



No. 4, Vol. 14, 2023

Editor-in-chief: Prof. DDr. med. Dr. habil Claus Muss Ph.D.

Including: Social Work, Humanitary Health Intervention, Nursing, Missionary Work

# CLINICAL SOCIAL WORK AND HEALTH INTERVENTION

international  
scientific  
group  
of applied  
preventive  
medicine I - GAP  
vienna,  
austria



Author: Michal Olah

## *An interdisciplinary perspective on prevention I* Original Articles

- ✓ AN INTERDISCIPLINARY PERSPECTIVE ON PREVENTION I
- ✓ COLORECTAL CANCER AND PREVENTION PROGRAMS FOCUSED ON COLONOSCOPY
  - ✓ PREVENTION OF VIRAL HEPATITIS C IN SOCIAL REINTEGRATION FACILITIES IN SLOVAKIA
- ✓ A MODERN PATHWAY TO THE PREVENTION OF CARDIOVASCULAR DISEASES
  - ✓ OSTEOPOROSIS AS A PROBLEM OF POSTMENOPAUSE WOMEN
- ✓ PERIPHERAL ARTERY DISEASE -IN SLOVAKIA WE HAVE A CHANCE TO FIND OUT MORE
  - ✓ MAIN CAUSES OF AVOIDABLE MORTALITY IN SLOVAKIA
  - ✓ ANALYSIS OF SAFETY ASPECTS IN NUCLEAR MEDICINE IN THE COMPARISON OF RADIO CAMERAS
  - ✓ TRENDS IN THE RECRUITMENT AND HIRING OF EMPLOYEES IN THE HEALTHCARE SECTOR IN
  - ✓ PREVENTION OF INFERTILITY IN SURGICAL TREATMENT OF ENDOMETRIOSIS WITH MONITORING OF AMH VALUES
  - ✓ RISK MANAGEMENT IN THE AREA OF URINARY TRACT INFECTIONS RELATED TO HEALTHCARE

# Editors

## Editor-in-Chief:

Prof. DDr. med. Dr. habil Claus Muss Ph.D.

## Deputy Chief Editors:

Dr. Daniel J. **West**, Jr. Ph.D, FACHE  
(University of Scranton, Department of Health Administration and Human Resources, USA)

## Editorial board and reviewers:

Dr. Andrea **Shahum**, MD (University of North Carolina at Chapel Hill School of Medicine, USA)

Dr. Vlastimil **Kozon**, Ph.D.  
(Allgemeines Krankenhaus – Medizinischer Universitätscampus, Vienna, AT)

Dr. Stephen J. **Szydlowski**, MBA, MHA, DHA  
(University of Scranton School of Education, USA)

Dr. zw. dr hab. Pawel S. **Czarnecki**, Ph.D.  
(Rector of the Warsaw Management University, PL)

Dr. Michael **Costello**, MA, MBA, J.D.  
(University of Scranton School of Education, USA)

Dr. Roberto **Cauda**, Ph.D.  
(Institute of Infectious Diseases,  
Catholic University of the Sacred Heart, Rome, IT)

Dr. Tadeusz **Bak**, Ph.D.  
(Instytut Ekonomii i Zarządzania PWSTE  
Jarostaw, PL)

Dr. Daria **Kimuli**, Ph.D.  
(Catholic University of Eastern Africa, Nairobi, KE)

Dr. Gabriela **Lezczano**, Ph.D.  
(University of California, San Francisco, USA)

Dr. Jirina **Kafkova**, Ph.D. (MSF, Freetown, SL)

Prof. Dr. Arab **Naz**, Ph.D.  
(University of Malakand Chakdara Khyber  
Pakhtunkhwa PK)

Dr. Vitalis Okoth **Odero**, Ph.D.  
(St. Philippe Neri Schools Joshka, KE)

Dr. Johnson **Nzau Mavole**, Ph.D.  
(Catholic University of Eastern Africa, Nairobi, KE)

Prof. Dr. Selvaraj **Subramanian**, Ph.D.  
(SAAaRMM, Kuala Lumpur, MY)

Dr. hab. Zofia **Szarota**, Ph.D.  
(Pedagogical University of Cracow, PL)

## Commissioning and language editor:

Prof. Dr. John **Turner** (Amsterdam, NL)  
Whole-Self@quicknet.nl

## Submit manuscript:

cswjournal@gmail.com

## Photo:

Client of a social services facility – homeless person

### Contact

**International Gesellschaft für angewandte  
Präventionsmedizin i-gap e.V.  
(International Society of Applied Preventive  
Medicine i-gap)**

Währinger Str. 63 A-1090

Vienna, Austria

Tel. : +49 - 176 - 24215020

Fax : +43 / 1 4083 13 129

Mail : office@i-gap.org

Web : www.i-gap.org

### Visiting Editors

Stefania Moricova, Jaroslaw Drobnik

### Impact factor

1. november 2019

**1,21**

(ISIIndexing)

**Subscription rates 2023, Vol. 14, No.4**

**Open Access Journal**

**Additional Information on Internet:**

www.clinicalsocialwork.eu

This journal works on the non-profit basis. For each published article 300 EUR/USD was charged, and there is a standard range which cannot be exceeded.

# Table of Contents

## Original Articles

Stefania Moricova, Jaroslav Drobnik <b>An Interdisciplinary Perspective on Prevention I</b> .....	5
Jozef Babečka, Mária Popovičová, Petr Snopek, Nadežda Petrková Justhová <b>Colorectal Cancer and Prevention Program Focused on Colonoscopy</b> .....	6
Mária Belovicova, Nada Jankelova, Matej Mucska, Nadezda Jankelova, Stefania Moricova <b>Prevention of Viral Hepatitis C in Social Reintegration Facilities in Slovakia</b> .....	15
Maria Popovicova, Jozef Babecka, Petr Snopek, Maria Belovicova <b>A Modern Pathway to the Prevention of Cardiovascular Diseases</b> .....	24
Maria Supínova, Jana Laukova, Pavel Bartosik <b>Osteoporosis as a Problem of Postmenopause Women</b> .....	32
Katarina Dostalova, Eva Wimmerova, Peter Makara, Mária Belovicova, Matej Mucska, Stefania Moricova <b>Peripheral artery Disease -in Slovakia we have a Chance to find out more</b> .....	39
Andrej Kovac, Nadezda Jankelova, Matej Mucska, Nada Jankelova <b>Main Causes of avoidable Mortality in Slovakia</b> .....	48
Lukáš Lacko, Jozef Babecka <b>Analysis of Safety Aspects in Nuclear Medicine in the Comparison of Cardio Cameras</b> .....	53

Vladimir Vozar, Nadezda Jankelova, Nada Jankelova,  
Stefania Moricova

**Trends in the Recruitment and Hiring of  
Employees in the Healthcare Sector in .....61**

Silvia Zambova, Lucia Borucka, Stefan Zamba,  
Igor Rusnak

**Prevention of Infertility in Surgical Treatment  
of Endometriosis with Monitoring of AMH Values.....68**

Lukas Lacko, Jozef Babecka, Maria Popovicova,  
Nadezda Peterkova Justhova

**Risk Management in the Area of Urinary  
Tract Infections Related to Healthcare .....73**

## Editorial

# An Interdisciplinary Perspective on Prevention I

Source: *Clinical Social Work and Health Intervention*

Volume: 14

Issue: 4

Pages: 5

---

CSWHI 2023; 14(4): 5; DOI: 10.22359/cswhi\_14\_4\_01 © Clinical Social Work and Health Intervention

This volume of the Clinical and Social Intervention Journal is devoted to very serious and diverse problems in the field of public health.

The authors of the contributions are university teachers as well as experts from hospital facilities: the Slovak Medical University in Bratislava – the Faculty of Public Health, the Faculty of Business Economics, the University of Economics in Bratislava, St. Elizabeth University of Health and Social Sciences, Bratislava, the Catholic University in Ruzomberok Faculty of Health, the Educational, Scientific and Research Institute Agel, Tomas Bata University in Zlin - the Faculty of Humanities and Faculty of Management and Economics, University Hospital Bratislava, Central Military Hospital Ružomberok, and Railway Hospital Bratislava.

The contributions in this volume are devoted to serious diseases such as hepatitis C and peripheral artery disease. Prevalence, risk detection, and early diagnosis, play an irreplaceable role here.

In public health, cardiovascular and oncological diseases are an epidemiological problem, where nutrition, which is one of the basic lifestyle factors, plays a very important role. In addition to nutrition, the prevention of these serious diseases is equally important.

By improving the healthcare delivery and with primary prevention, deaths could be avoided or prevented. These deaths are often associated with factors such as insufficient access to quality health care, insufficient prevention and health awareness, and insufficient vaccinations.

Serious public health problems in the female population include infertility as well as osteoporosis, the prevalence of which is associated with menopause in women. Prevention and an appropriate approach to treatment could lead to their reduced incidence.

The constantly increasing number of ex-

aminations in nuclear medicine brings serious problems from the point of view of the radiation protection of health care workers. Ways to minimize personnel radiation are related to the development of new diagnostic devices, the reduction of repeated doses, as well as the shortening of examination times.

A key factor in the success of modern society is the efficient use of available resources in the healthcare sector, in addition to the added value of human work and cooperation.

**Stefania Moricova**

Faculty of Public Health

Institute of Occupational Health Service

Slovak Medical University, Bratislava,

Slovakia

**Jaroslav Drobnik**

Medical University of Wrocław,

Poland

# Colorectal Cancer and Prevention Program focused on Colonoscopy

J. Babečka (Jozef Babečka)<sup>1,2</sup>, M. Popovičová (Mária Popovičová)<sup>3</sup>, P. Snopek (Petr Snopek)<sup>4,5</sup>, Peterková Justhová (Nadežda Petrková Justhová)<sup>6</sup>

Original Article

<sup>1</sup> Catholic University in Ružomberok, Faculty of Health, Slovakia.

<sup>2</sup> Central Military Hospital Ružomberok SNP – FN, Nuclear Medicine Clinic, Slovakia.

<sup>3</sup> St. Elizabeth University of Health and Social Sciences, Bratislava, Slovakia.

<sup>4</sup> Tomas Bata University in Zlin, Faculty of Humanities, Department of Health Care, Sciences – Professional assistant, Czech Republic.

<sup>5</sup> Tomas Bata Regional Hospital, Zlin, Czech Republic.

<sup>6</sup> St. Elizabeth University of Health and Social Sciences, Bratislava, Slovakia.

## E-mail address:

jozef.babecka@ku.sk

## Reprint address:

Jozef Babecka  
Nam. A. Hlinku 48  
034 01 Ruzomberok  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 6 – 14

Volume: 14  
Cited references: 12

Issue: 4

## Reviewers:

Michael Costello  
University of Scranton School of Education, USA  
Gabriela Lezcano  
University of California, San Francisco, USA

## Keywords:

Colorectal Cancer. Colonoscopy. Prevention. Diagnosis. Patient.

## Publisher:

International Society of Applied Preventive Medicine i-gap

---

CSWHI 2023; 14(4): 6 – 14; DOI: 10.22359/cswhi\_14\_4\_02 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** The article deals with the importance of prevention in the case of colorectal cancer and subsequent radiotherapy

**Objective:** The objective is to highlight the importance of colorectal cancer prevention focused on colonoscopy

**Research sample group and methodology:** The research sample group consisted of 3,051 respondents who underwent a colonoscopy examination in the period of 2017-2022 for preventive or diagnostic purposes. The obtained data were processed in the STATISTICA program.

**Results:** Within the studied set, during colonoscopy, diagnostic examinations were performed more often than preventive examinations - in 2,301 respondents, which represents 74.50%. Furthermore, we found that age is related to the diseases the respondents suffer from. According to the age at the time of the examination, more patients were over 50 (82%), mainly due to a screening that is indicated for people of this age group. During preventive Colonoscopies, 290 cases of polyps were diagnosed, which is 39.2% of all findings. The next most frequent finding during prevention were haemorrhoids, representing 32.6.

**Conclusion:** Participation in colonoscopy examinations for the year 2020-2021 decreased by up to 13.00% compared to the previous period due to the impact of the Covid pandemic. The impact of neglecting preventive examinations, according to experts, may be manifested in the next few years by a higher growth in the number of patients with colorectal cancer in an advanced stage of the disease, and it is important to point out the significance of colorectal cancer prevention focused on colonoscopy.

## Introduction

Tumours are one of the most common and severe diseases today. 11 million new cases of cancer occur and 7 million sufferers of this insidious disease die every year. According to statistics, cancer affects more than a third of the population in developed countries and is the cause of more than 20% of all deaths. The number of deaths related to cancer will probably be higher than deaths due to cardiovascular diseases, which so far have prevailed (1). One of the reasons for the increase in the incidence of cancer is the increase in the average length of life. Currently, approximately half of all cancers occur in people aged 65 and over (2).

Colorectal cancer (CRC) currently represents a serious epidemiological problem in terms of morbidity and mortality of this oncological disease in the Slovak population. To this fact also responds an implemented National Oncology Program of the Slovak Republic, which since 2019 includes population screening for CRC in people between 50 and 70 years of age, with the aim of improving control, secondary prevention and follow-up treatment of this cancer (3). Colorectal cancer is a multifactorial disease affecting the colon and rectum. It is a malignant tumour disease that arises from the malignant transformation of the cylindrical epithelium of the colon and rectum. Nine out of

ten malignant colorectal tumours are preceded by a benign adenoma, which is considered a precancerous condition. According to estimates by the International Agency for Research on Cancer (IARC), in 2015, colorectal cancer was the third most common malignancy in men and the second most common in women worldwide (4). From the latest data on the incidence of malignant tumours in Slovakia, malignant tumours of the colorectum in men represent a significant and currently dominant location. In women, the occurrence of colorectal cancer is in second place (after malignant breast tumours), but its incidence shows an upward trend. The exact cause of colorectal cancer is unknown, but several risk factors are known. Based on what is known so far, it is assumed that colon and rectal cancer arises from a complex interaction between endogenous factors and environmental factors (5). Internal (endogenous) factors include genetic factors and predisposing factors (6). In terms of hereditary factors, people with hereditary non-polyposis colon cancer, people with familial adenomatous polyposis, and people with hamartomatous polyps in the small and large intestine have an increased risk of developing colorectal cancer. Predisposing factors include age (the disease is significantly more common in people over 50), gender (incidence of colorectal cancer is higher in men, while rectal cancer predomi-

nates in them, colon cancer is more common in women), positive family or personal history, non-specific inflammation of the large intestine (especially ulcerative colitis, Crohn's disease), implantation of ureters into the large intestine and rectum, radiotherapy applied in neoplastic processes in the small pelvis, the presence of Barrett's esophagus. A relationship between diabetes mellitus and an increased risk of colorectal cancer in men and women was also found. The external etiological factors of colorectal cancer include lifestyle factors, which include: food (its qualitative and quantitative composition), smoking, alcohol consumption, physical activity, obesity. Environmental factors can have not only an aggressive, tumorigenic effect, but also a protective one. In recent years, epidemiological and experimental studies have convincingly demonstrated a significant relationship between nutrition (improper diet) and colorectal cancer. A high intake of fats (mainly animal fats), increased consumption of meat (mainly red and processed with unsuitable technologies), higher caloric intake (often associated with obesity, hyperglycaemia and hyperinsulinism), reduced intake of fibre and low intake of micronutrients (vitamins and minerals) are considered the decisive factors in increasing the incidence of colorectal cancer. There is also an increased risk of colorectal cancer in smokers and alcohol consumers. Lack of physical activity is also included among the risk factors of colorectal cancer. Adherence to a healthy lifestyle - which we refer to as a set of voluntary human activities, reactions to external stimuli, behaviour in various life situations, a way of solving problems, but also satisfying personal needs, which are based on individual choices from various options - also play a role. The main principles of a healthy lifestyle include varied and balanced diet, an appropriate choice of exercise, avoiding smoking, using harmful substances or drinking alcohol. One should have good quality sleep, optimism and good mood, avoid stress and have regular rest. It cannot be said that there is a single correct guide for following a healthy lifestyle; the needs and possibilities of each individual are different. Therefore, it is necessary to assess a healthy lifestyle especially with regard to the physical and mental condition, age, gender and health status of the person (7).

Interest in a healthy lifestyle (healthy eating, stress prevention, active participation in screening programs, common physical activities) is a good starting point for creating a community. Community activities represent a flexible and at the same time effective way of implementing primary prevention in its everyday form (8).

Protective factors include sufficient amount of fibre in one's diet, calcium, vitamin D, acetylsalicylic acid, non-steroidal anti-inflammatory drugs and the composition of the bacterial intestinal microflora. The age factor is very prominent in the epidemiology of colorectal cancer as a basic (endogenous) risk factor. Colonoscopy is one of the options for the prevention and diagnosis of colorectal cancer. 1. Preventive colonoscopy. It is a broader term to denote a colonoscopy performed for preventive reasons to detect CRC or its precursors. 2. Screening colonoscopy. It is a narrower term to denote a preventive colonoscopy performed for preventive reasons in insured persons who have been found to have a positive test for occult bleeding in the stool. 3. Primary screening colonoscopy. It is a narrower term to denote a preventive colonoscopy, which is performed in patients over 50 years of age on the basis of law. 4. Diagnostic colonoscopy. It is a colonoscopy indicated by a physician to clarify the signs and symptoms that could indicate colon disease in patient. Distinguishing these concepts is important from the point of view of statistical processing, because they represent different groups which, after processing, provide statistically significant differences.

### **Research sample group and methodology**

In this retrospective cohort study, a database containing records of patients who underwent colonoscopy in the period 2017-2022 for preventive or diagnostic purposes was used. We used descriptive and analytical statistics to process and analyse the obtained data. The statistical processing itself was carried out by algorithms found in the STATISTICA and MS Excel applications. To verify the hypothesis, we used the chi<sup>2</sup>-test (chi-square test of independence). When testing hypotheses, we also present p-values. We tested the hypotheses at the significance level of  $p = 0.05$ . The basic set for the questionnaire consisted of residents of towns and villages in the Slovak Republic.



## Results

The research sample group consisted of 3,051 respondents who met the following inclusion criteria: age 18 and over, gender: male, female, completed colonoscopy examination. Out of the total number, there were 1,545 women (51%) and 1,506 (49%) men. The highest completed education was: 9.97% of respondents finished elementary school, 32.01% had secondary school without school leaving examination, 43.32% of respondents finished a secondary school with school leaving examination and 14.69% of respondents had university education. The group consisted of 50.67% respondents living in towns and cities and 49.33% respondents living in villages. Respondents were from all Slovak regions, while the largest number of respondents, 39.17%, was from the Žilina region. The patients were classified into individual intervals according to the year of birth (picture no. 9) and also the age at the time of the examination. The most represented interval is the year of birth 1940-1950, the number of examined patients was 985 (32% of the total number). The least represented group is the year of birth 2000-2010, from which only 2 patients were examined. In this case, the median is 1955. The average year of birth of the patients is 1955. According to the age at the time of examination, more patients were over 50 (82%), mainly due to the screening, which is indicated for people of this age group. The youngest patient in the studied group was 18 years old, the oldest was 95 years old. The performed examinations were

divided into two basic groups, preventive and diagnostic (table 1). Preventive examinations are those when the patient is asymptomatic, i.e. does not come with any problems or symptoms of colorectal disease. These patients came for examination most often at a request of the health insurance company, general practitioner or gynaecologist. Diagnostic tests are performed in patients who are symptomatic.

More diagnostic examinations were performed within the examined group, total of 2,311, which represents 76%. 740 preventive colonoscopies were performed (24% of the total number of performed colonoscopy examinations). From the resulting data, it is clear that diagnostic colonoscopy prevails over preventive colonoscopy. The results of the performed colonoscopies were classified into groups according to the most frequent findings.

In Table 1, two distinct groups of diseases were represented, namely polyps and haemorrhoids. With a slight predominance, there are more findings of haemorrhoids ( $n = 1013$ ; 33.2%) than polyps ( $n = 985$ ; 32.3%). 57 CRCs were found in the examined file, which represent 1.9% of all findings. The least represented group are lipomas ( $n = 5$ ; 0.2%). Other findings include e.g. oxyuriasis, proctitis, granuloma and post-radiation changes.

The main results of this research are findings in preventive and diagnostic colonoscopies. Since the numbers of polyps are high in both types of colonoscopies, it is clear that prevention is very important. Even if the polyps are benign formations, if they are not removed, they will transform into malignant ones, and thus the initial stage of colorectal cancer will occur. Polyps should therefore be removed as soon as possible. The patient remains monitored, there are regular check-ups. During preventive colonoscopies, 290 cases of polyps were found, which is 39.2% of all findings. The polyp is also the

**Table 1** Type of colonoscopy examination

	colonoscopy examination		
	preventive	diagnostic	total
Total	750	2301	3051

**Table 2** Individual types of diseases among respondents

Type of disease	Individual types of diseases							total
	Polyps	Haemorrhoids	Diverticula	Tumours	Ulcerative colitis	normal finding	other diseases	
Total	985	1013	351	57	69	540	36	3051

most common finding in preventive colonoscopies. For this reason, prevention is very important to partially prevent the development of colon cancer. The next most frequent findings during prevention were haemorrhoids (n = 241). Haemorrhoids account for 32.6%, i.e., their incidence does not differ by that much compared to polyps. There were also diverticula in a significantly smaller number (n = 76; 10.3%). As part of the preventive examination, 8 tumours were diagnosed (which represents only 1.1%), 9 cases of ulcerative colitis (1.2%), and 3 lipomas (0.4%). Only 15.3% of patients (n = 113 patients out of 740) had a normal finding, which is clear evidence of the importance of prevention.

During diagnostic colonoscopies, haemorrhoids (n = 772; 33.4%) slightly predominated over polyps (n = 695; 30.1%). Diverticula (n = 275; 11.9%) were also abundantly represented. During diagnostic colonoscopies, 49 tumours (2.1%), 60 cases of ulcerative colitis (2.6%), 5 cases of Crohn's disease (0.2%), 2 lipomas (0.1%) were found. 18.5% of patients (n= 427) from a total of 2,311 respondents had normal findings.

## Hypothesis 1

*The age of the respondents is related to the disease they suffer from.*

In hypothesis 1, based on the demographic item, we evaluated the age of the respondents with the respondents' disease. We investigated whether there is a statistically significant difference in the diseases the respondents suffer from depending on their gender.

Hypothesis 1 was tested on the basis of the identification item - the ages of the respondents and the questionnaire item in which the addressed respondents expressed which disease they suffer from. The number of degrees of freedom  $df = 24$ , and the marginal Chi-square at the chosen significance is 9.49. Since the calculated Chi-square value is higher ( $\chi^2 = 615.809102$ ) and the calculated probability  $p = 1.164E-114$  is lower than the chosen significance of 0.05, we claim that we have enough evidence to reject the null hypothesis. We therefore claim that the age of the respondents is related to the disease they suffer from.

**Table 3** Observed values of the respondents' diseases in relation to their age

observed frequency	Diseases of the respondents							
	Polyps	Haemorrhoids	Diverticula	Tumours	Ulcerative colitis	normal finding	other diseases	Total
Age of the respondents								
18 – 33 years	7	8	8	1	7	23	10	64
34 - 53 years	124	67	53	6	13	119	6	388
54 - 73 years	214	628	143	22	26	234	6	1273
74 - 83 years	486	213	113	21	22	123	7	985
84 and over	154	97	34	7	1	41	7	341
total	985	1013	351	57	69	540	36	3051

**Hypothesis 2**

*The gender of the respondents is related to the disease they suffer from.*

According to the tables, the Chi-square limit at the chosen significance and the calculated degrees of freedom is 36.42. In our case, the calculated Chi-square ( $\chi^2 = 446.0400725$ ) is greater

than the table value of df. The calculated p value of 3.49286E-93 is well below the chosen significance of 0.05. Based on the testing results we can reject the null hypothesis and accept the alternative hypothesis. This means that the disease of the respondents is different depending on the gender.

**Table 4** Expected values of the respondents' diseases in relation to their age

expected frequency	Diseases of the respondents							
Age of the respondents	Polyps	Haemorrhoids	Diverticula	Tumours	Ulcerative colitis	normal finding	other diseases	Total
18 - 33 years	20,6621	21,2494	7,36283	1,19567	1,44739	11,327433	0,75516	64
34 - 53 years	125,264	128,825	44,6372	7,24877	8,77483	68,672566	4,57817	388
54 - 73 years	410,982	422,664	146,451	23,7826	28,7896	225,30973	15,0206	1273
74 - 83 years	318,002	327,042	113,319	18,4021	22,2763	174,33628	11,6224	985
84 and over	110,09	113,2196	39,23009	6,37069	7,71189	60,353982	4,02359	341
total	985	1013	351	57	69	540	36	3051

**Table 5** Observed values of the respondents' diseases in relation to gender

observed frequency	Diseases of the respondents							
gender of respondents	Polyps	Haemorrhoids	Diverticula	Tumours	Ulcerative colitis	normal finding	other diseases	total
female	344	746	223	18	18	170	26	1545
male	641	267	128	39	51	370	10	1506
total	985	1013	351	57	69	540	36	3051

**Table 6** Expected values of the respondents' diseases in relation to gender

expected frequency	Diseases of the respondents							
gender of respondents	Polyps	Haemorrhoids	Diverticula	Tumours	Ulcerative colitis	normal finding	other diseases	Total
female	498,795	512,974	177,743	28,8643	34,941	273,451327	18,23009	1545
male	486,205	500,026	173,257	28,1357	34,059	266,548673	17,76991	1506
total	985	1013	351	57	69	540	36	3051

### Hypothesis 3

*Completion of preventive examinations has an impact on early diagnosis of the disease among respondents.*

The performed examinations were divided into two basic groups, preventive and diagnostic. Preventive examinations are those when the patient is asymptomatic, i.e. does not come with any problems or symptoms of colorectal disease. These patients came for examination most often at a request of the health insurance company, general practitioner or gynaecologist. We also consider it a preventive colonoscopy when the patient has a positive TOKS, but is asymptomatic. Diagnostic tests are performed in patients who are symptomatic.

More diagnostic examinations were performed within the examined group, in total of 2,301 respondents, which represents 74,50 %. Preventive colonoscopies were performed in 760 (25,50 %) of respondents. From the resulting data, it is clear that diagnostic colonoscopy prevails over preventive colonoscopy. In the last hypothesis, we investigated whether the completion of preventive examinations has an impact on the early diagnosis of the respondents' disease.

**Table 7** Observed values of colonoscopy examinations and respondents' disease

Observed frequency	colonoscopy examination		
	preventive	diagnostic	Total
disease	691	1820	2511
Normal finding	59	481	540
total	750	2301	3051

**Table 8** Expected values of colonoscopy examinations and respondents' disease

Expected frequency	colonoscopy examination		
	diagnostic	diagnostic	Spolu
disease	609,0265487	1901,973451	2511
Normal finding	130,9734513	409,0265487	540
total	750	2301	3051

Due to the calculated chi-square value, we found that there is a connection between the completion of preventive examinations and the early diagnosis of the disease among the respondents. The chi-square value is higher ( $\chi^2 = 82.30021$ ) than the table value for 1 df degree of freedom, which expresses the dependence between the variables. Also, the p value of 1.1691E-19, which is well below the significance level of 0.05, indicates a connection between the individual items.

### Discussion

From the available data of the Institute of Health Information and Statistics, the total participation in colonoscopy examinations for 2020 decreased by up to 12%, due to the Covid pandemic. The management of healthcare facilities was not prepared for such pandemic, which implies the need to improve the crisis skills of healthcare managers (9). The impact of neglecting preventive examinations, according to experts, can be manifested in the next few years by a large increase in the number of patients with cancer in an advanced stage.

In their article, Sveen et al. stated that the proportion of carcinomas found in preventive colonoscopies is 3% of all findings. Adenomas were diagnosed in more than a third of the performed preventive examinations. According to data from the journal Gastroenterology, colorectal cancer mortality has decreased by 27% thanks to screening colonoscopies. Our study found that in preventive colonoscopies, cancer was detected in 1.1% of cases. Adenomas accounted for 39.2% of findings (10)

Many people believe that haemorrhoids are mainly related to the older age, around 50 years. According to Sveen, haemorrhoids most often

occur in people aged 45-65, mainly because the connective tissue by the anus weakens. The main cause is also pressure on the anus caused by constipation, diarrhoea, or, e.g. a sedentary profession. In younger women, this is primarily due to pressure on the abdomen during pregnancy, which causes swelling of the veins (10).

The obtained data show that haemorrhoids were the dominant finding in patients under 50 years of age and occurred to a greater extent than in people over 50 years of age. The opposite is the case with diverticula, which clearly dominated in the age group over 50. According to the journal *Digestive Diseases*, the incidence of diverticula varies greatly worldwide and its prevalence is largely dependent on age. The formation of diverticula in the elderly is primarily due to changes in the resistance of the colon wall, impaired colonic motility, and a lack of fibre (11).

Many articles have debated whether CRC affects one or the other gender more. In our study it was found that men are the more burdened group with CRC. Limam et al. report in their article that there were more men than women with CRC in their study group. CRC was diagnosed in 586 men and 490 women. If this problem is looked at globally, the results of the International Agency for Research on Cancer show a higher incidence of CRC in men (12).

## Conclusion

Participation in colonoscopy examinations for the year 2020-2021 decreased by up to 13.00% compared to the previous period due to the impact of the Covid pandemic. The impact of neglecting preventive examinations, according to experts, might manifest in the next few years by a large increase in the number of patients with colorectal cancer in an advanced stage, and it is essential to note the importance of colorectal cancer prevention with a focus on colonoscopy.

## References

1. BELOVICOVA M (2019) The importance of social workers education in the issue of diseases of civilization. p. 205-214. In: . Schavel M., Gallova A. Collection of scientific international contributions: Trends and innovations in university education in the field of social work. Rimavská Sobota 2019, 517 p. ISBN: 978-80-8132-202-0.
2. VANSAC P (2017) Spirituality as a substantial element for supporting oncological sufferers in the community. p. 92-103. In: Edds: Vansáč, P., Barkasi, D., Popovičová, M.: Community social work and community nursing. Society of Slovaks in Poland, 2017, Krakow. ISBN: 978-83-7490-995-2.
3. VAVRECKA A (2010) Epidemiology, etiology, clinical picture and prevention of colorectal cancer. *Via pract.* 2010;7(1):10–13.
4. ARAN V, VICTORINO AP, THULER LC, FERREIRA CG (2016) Colorectal cancer: epidemiology, disease mechanisms and interventions to reduce onset and mortality. *Clin Colorectal Cancer* 2016;15(3):195–203.
5. TORRE LA, BRAY F, SIEGEL RL, FERLAY J, LORTET-TIEULENT J (2015) Global cancer statistics, 2012. *CA Cancer J Clin.* 2015;65(2):87–108.
6. LESNAKOVA A, LITVA V, SOLOVIC I, HLINKOVA S (2018) Biological Treatment of Ulcerative Colitis Complicated by Military Tuberculosis. In: *Studia pneumologica et Phiseologica: Czech Pneumological and Physiological Society and Slovak Pneumological and Physiological Society.* – Prague (Czech republic): Trios. – ISSN 1213-810X. – – vol. 78, no. 1 (2018), p. 4-9.
7. BARKASI D (2018) Lifestyle of Social work university students. In: BELOVICOVA, M., VANSAC, P. Days of practical obesity and metabolic syndrome. Collection of scientific papers. Warsaw: Publishing house: Department of Philosophy, Faculty of Psychology, University of Finance and Management in Warsaw, 2018. ISBN 83-89884-07-0, s. 20 – 34.
8. DOSTALOVA K et al (2022) Prevention of vascular diseases and obesity in the light of community medicine. In *Obesity and metabolic syndrome. Collection of scientific papers.* Collegium Humanum: Warsaw Management University, Warsaw 2022, ISBN 978-83-964214-3-2, p.123-129.
9. JANKELOVA N et al. (2021) Leading Employees through the Crises: Key Competences of Crises Management in Healthcare Facilities in Coronavirus Pandemic. In: *Risk Management and Healthcare Policy* [electronic resource]. - Auckland: Dove Medical

Press. ISSN 1179-1594. - Vol. 14, no. 1, p. 561-573 online.

10. SVEENA, BRUUN J, EIDE P W et al (2018) Colorectal Cancer Consensus Molecular Subtypes Translated to Preclinical Models Uncover Potentially Targetable Cancer Cell Dependencies. *Clinical Cancer Research*. 24 (4), 794–806. DOI: 10.1158/1078-0432.CCR-17-1234.
11. COMPARATO G, PILOTTO A, FRANZE A (2007) Diverticular Disease in the Elderly. *Digestive Diseases*. 25, 151–159. DOI: 10.1159/000099480.
12. LIMAM M, MATTHES K L, PESTONI G et al. (2021) Are there sex differences among colorectal cancer patients in treatment and survival? A Swiss cohort study. *Journal of Cancer Research and Clinical Oncology*. 147, 1407–1419. DOI: 10.1007/s00432-021-03557-y.

# Prevention of Viral Hepatitis C in Social Reintegration Facilities in Slovakia

M. Belovicova (Mária Belovicova)<sup>1</sup>, N. Jankelova (Nada Jankelova)<sup>1,2</sup>, M. Mucska (Matej Mucska)<sup>1</sup>, N. Jankelova (Nadezda Jankelova)<sup>3</sup>, S. Moricova (Stefania Moricova)<sup>1</sup>

Original Article

<sup>1</sup> Faculty of Public Health, Slovak Medical University, Bratislava – teacher, Slovakia.

<sup>1</sup> Faculty of Public Health, Slovak Medical University, Bratislava – doctoral student, Slovakia.

<sup>2</sup> Bratislava Bory Hospital – doctor, Slovakia.

<sup>1</sup> Faculty of Public Health, Slovak Medical University, Bratislava – teacher, Slovakia.

<sup>3</sup> Faculty of Business Management Economic University Bratislava - teacher, Slovakia.

<sup>1</sup> Faculty of Public Health, Slovak Medical University, Bratislava – teacher, Slovakia.

## E-mail address:

mriab9@gmail.com

## Reprint address:

Maria Belovicova  
Becherov 145  
086 35 Becherov  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 15 – 23

Volume: 14  
Cited references: 42

Issue: 4

## Reviewers:

Roberto Cauda

Institute of Infectious Diseases, Catholic University of the Sacred Heart, Rome, IT

Daria Kimuli

Catholic University of Eastern Africa, Nairobi, KE

## Keywords:

Hepatitis C. Prevention. Social reintegration Facilities. Public Health.

## Publisher:

International Society of Applied Preventive Medicine i-gap

CSWHI 2023; 14(4): 15 – 23; DOI: 10.22359/cswhi\_14\_4\_03 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** The WHO has adopted a global strategy to eliminate viral hepatitis as a major public health threat by 2030.

**Aim of the research:** a) to determine the prevalence and risks of hepatitis C in selected social reintegration facilities; b) to initiate the necessary measures to prevent and reduce the incidence of the disease.

**Characteristics of the sample group:** We have tested a total of 3803 clients and employees from social reintegration facil-

ities in Eastern Slovakia for the presence of antibodies against hepatitis C. The screening was on a voluntary basis.

**Methodology:** To identify hepatitis C antibodies (antiHCV) we used a test for rapid diagnostics. At the same time, we gave the clients a questionnaire of our own design.

**Results:** Anti HCV positivity was found in a total of 97 clients, which represents a prevalence of 2.5%. In case of positive HCV antibodies, we ordered the client for an examination in hepatology / infectiology clinic.

**Conclusions:** CHC is currently the only chronic viral infection that can be definitively cured. Our screening project is prospective.

## Introduction

In addition to metabolic diseases (NAFLD - non-alcoholic fatty liver disease, NASH - non-alcoholic steatohepatitis), **viral liver diseases are considered to be the most common liver diseases** (1, 2).

In 2010 and 2014, **World Health Assembly's resolutions WHA63.18 and WHA67 recognized viral hepatitis as a global public health problem**. This has guided the WHO to develop and implement a comprehensive strategy for viral hepatitis, including the development of guidelines on the diagnosis and treatment of HBV and HCV for Member States (3).

**According to the WHO, hepatitis B (HBV) and hepatitis C (HCV) infections are major causes of both acute and chronic liver damage.** They cause about 1.4 million deaths a year. It is estimated that there are 2 billion people in the world who have overcome or currently have HBV infection, and 248 million of them are chronic carriers of HBsAg (HBV surface antigen).

Despite a decreasing global incidence of HCV (according to WHO data from 2019, there are 58 million people infected with HCV infection in the world), a large number of people were infected with CHC 30-60 years ago and are currently dying from complications of CHC such as liver cirrhosis (4,5) with its complications that heavily cripple patients in various aspects of their lives, including their mental (6,7) and legal capabilities (8,9), and finally hepatocellular carcinoma, leading to many premature deaths (10). Based on WHO data, approximately 400,000 people died from complications of CHC in 2019. 1.5 million new cases of hepatitis C will be added annually. Globally, 3.2 million children and adolescents are infected with chronic hepatitis C (4,5).

HCV infection is still widespread in developing areas due to the existing vast reservoir of infection by asymptomatic infected individuals without diagnosis and treatment (11).

At the same time, developing countries have an imperfect system for testing blood donors, a low level of use of disposable devices, which contributes to the spread of hepatitis C. Migration of infected people from developing countries carries the risk associated with transmission (12).

The World Health Organization has therefore adopted a global strategy to eliminate viral hepatitis as a major public health threat by 2030. This strategy covers both hepatitis B (HBV) and hepatitis C (HCV). Its goals include a 90% reduction in consequences and a 65% reduction in mortality related to HBV / HCV by 2030 (13, 14).

Testing and diagnosis of hepatitis B and hepatitis C is a key prerequisite for their prevention and treatment and at the same time a crucial part of an effective response to the hepatitis epidemic (15).

According to expert estimates, up to 90% of infected individuals are undiagnosed (1). The symptoms are often non-existent or nonspecific and the patients often go through lengthy tests included in differential diagnosis of various abdominal organic (16,17), functional (18,19) and psychosomatic ailments (20). Therefore, despite the existence of an effective antiviral therapy that slows disease progression and prevents the development of cirrhosis and liver cancer, many patients who could benefit from the treatment remain undetected (21).

Therefore, an early identification of people with chronic HBV or HCV infection will allow them to receive the necessary care and treatment to prevent or slow the progression of liver disease (22). Testing also provides an opportunity



to connect people with interventions focusing on the reduction of hepatitis transmission through the provision of risk behaviour counselling, commodities for prevention (e.g., sterile syringes and needles), and hepatitis B vaccination (3). In contrast to hepatitis C, for which an effective vaccine still does not exist, the epidemiological status of hepatitis B in many countries is continuously improving. This is primarily because of the introduction of obligatory vaccination for children (23), even though there is a rise in the number of cases where vaccinations are postponed or cancelled because of contraindications (24), and the young generation of parents increasingly ignores the vaccination recommendations in general (25). This is happening despite various strategies aiming at enforcing them (26) that are accepted by medical and public health professionals (27) and state institutions (28) that take into consideration the latest lessons learned on vaccine efficacy from the COVID-19 (29) or influenza pandemics (30,31). Also the radical improvements in sanitary and hygienic standards in hospitals and outpatient clinics play crucial role when it comes to hepatitis B, because it is still acquired by patients with a higher frequency during medical procedures and, consequently, in developed countries the highest incidence of acute hepatitis is reported among

the adult unvaccinated population (23) among which the treatment results are still unsatisfactory in significant number of patients (32) and vaccination efforts tend to focus mainly on the high risk groups (33).

**Aim of the research:** a) to determine the prevalence and risks of hepatitis C in selected social reintegration facilities; b) to initiate the necessary measures to prevent and reduce the incidence of the diseases.

### Characteristics of the sample group

Hepatitis C screening took place during the years 2019 - 2021 under the title *“Hepatitis C screening in social reintegration facilities in Eastern Slovakia”*.

*So far, we have tested a total of 3803 clients and employees from social reintegration facilities, charity facilities, community centres, and slums in Eastern Slovakia for the presence of antibodies against hepatitis C.* The screening was on a voluntary basis. A total of 251 employees (6.6%) and 3552 clients (93.4%) were examined - of which 2312 were men (60.7%) and 1494 were women (39.2%). The average age of clients in social reintegration facilities was 43.7 years - i.e. people of working age (see Graph 1). The average length of a client’s stay in the facility was 4.3 years.

**Graph 1** Characteristics of the social reintegration facilities clients sample group

<b>Parameter</b>	<b>Year 2019 N / (%)</b>	<b>Year 2020 N / ( %)</b>	<b>Year2021 N ( %)</b>
<b>Respondents</b>	<b>1387</b>	<b>861</b>	<b>1555</b>
- clients	1255 / (90)	804 / (93)	1493(96)
- employees	132 / (10)	57 / ( 7)	62(4)
<b>Gender</b>			
- men	786 / (57)	516 / (60)	1010(65)
- women	602 / (43)	345 / (40)	544(35)
<b>Age (+ - SD)</b>	<b>41y (+-17y)</b>	<b>45y (+- 16y)</b>	<b>45y (+-17y)</b>
<b>Length of stay Average (+-SD)</b>	<b>5y (+- 4,8y)</b>	<b>4,9y 7,9y)</b>	<b>2,9y (+-3,9y)</b>

***In 2019, we visited a total of 28 social reintegration facilities.*** Here are the numbers of clients we examined at each facility: Charity Vranov nad Toplou (3 clients), Michalovce Mlynska Street (58), Michalovce shelter – asylum house (13), Community Centre Pavlovce (31), Community Centre Slavkovce (23), Institute of Christ the King Sovereign Priest in Zakovce (207), Kosice - Lunik IX settlement (181), Resocia no Petrovce (20), Resocia no Rozhanovce (13), Greek Catholic Charity Presov Pod Taborom (70), Sarisske Jastrabie (69) Presov Charity (23), Resocia no Repejov (14), Jakubany (60), Presov Dorka (20), Greek Catholic Charity Kosice shelter dormitory (9), Kosice Dorka (10), Presov Community Centre K Starej Tehelni (98), Oaza Nadej pre novy zivot (Oasis Hope for a new life) Bernatovce (134), Kosice surrounding (29), Community Centre Stropkov (29), Charity Vranov nad Toplou 2 (13 clients), Spisska Nova Ves (18), Shelter of St. Frantisek Levoca (15), Low-threshold center for children and family Kendice (25), Charity house of St. Elisabeth (38), Greek Catholic Charity Svidnik – House of St. Faustina (17), and Youth Center Vranov (13).

***In 2020, we also visited a total of 28 social reintegration facilities.*** Here are the numbers of clients we examined at each facility: Charity Vranov nad Toplou (10 clients), Humenne shelter (12), Institute of Christ the King Sovereign Priest in Zakovce (13), Institute of Christ the King Sovereign Priest in Lubica (22), Kosice - Lunik IX settlement (80), Resocia no Petrovce (42), Resocia no Rozhanovce (14), Greek Catholic Charity Presov Pod Taborom (77), Sarisske Jastrabie (24) Presov Charity (13), Resocia no Repejov (13), Presov Dumbierska – halfway house (10), Presov Community Centre K Starej Tehelni (89), Kosice – Oaza (Oasis) (217), Kosice - Community centre on Adlerova street (26), Kosice - Samaritan (8), Kosice – Svatopluk’s Street (6), Kosice - Charity (37), Kosice Greek Catholic Charity shelter dormitory on Fialkova Street (27), Kosice Polna Street (49), Kosice Resocia no Tahanovce (7), Charity Vranov nad Toplou 2 (17 clients), Shelter of St. Frantisek Levoca (7), Poprad Outpatient psychiatric clinic (3), Greek Catholic Charity Svidnik - House of St. Faustina (20), Charity Svidnik (20).

***In 2021, we visited a total of 26 social re-***

***integration facilities.*** Here are the numbers of clients we examined at each facility: DSS (social services house) Trstena (40), DSS Namestovo and shelter dormitory (44), Detva - Community centre (267), Detva City office (38), Detva PZ (Police force) (8), Kosice - Lunik IX settlement (106), OZ (civic association) Dobry Pastier Klastor pod Znievom (363), Presov Charity Pod Taborom (39), Presov Charity (11), Lucenec shelter dormitory (10), Resocia no Petrovce (40), Resocia no Repejov (23), Kosice Charity (31), Kosice Resocia (7), Lucenec (10), Lucenec Community Centre (80), Michalovce asylum house (17), Svidnik charity – House of St. Faustina (12), Sutovo Centre for drug addicts (25), Martin - charity (42), Martin – OZ (civic association) Manus (16), Martin DSS Medik (68), Martin Asylum house (51), Liptovsky Mikulas – Charity (14), Kosice – Oaza (Oasis) (126), Presov Community Centre K Starej Tehelni (54), House of St. Anna – assistance service for homeless (32).

## Methodology

To identify hepatitis C antibodies (anti-HCV), we used a test for rapid diagnostics of hepatitis C (Liver HCV rapid test – Voyage and Turklab).

At the same time, we gave the clients a questionnaire of our own design with questions that focused on the risk factors of viral hepatitis as well as on the reasons for their arrival to the social reintegration facility. From the grant funds, we purchased disposable needles and single use rapid tests to detect antiHCV antibodies. To determine the antibodies to hepatitis C, we used a drop of capillary blood that we placed on the diagnostic set. A positive or negative result of antiHCV antibody was recorded after 15 minutes.

In the case of positivity with antiHCV antibodies, we educated clients about chronic hepatitis C, its possible complications, and possibilities of antiviral treatment. We supplemented the examination of blood count, blood coagulation and biochemical parameters (glucose, creatinine, bilirubin, liver function tests, lipid profile, albumin, superstructure methodology for determining a possible presence of chronic hepatitis C virus - HCV RNA, CHC genotype).

In case of positive HCV RNA, we ordered the client for an examination in hepatology / in-

fectiology clinic in order to start chronic hepatitis C treatment.

Clients underwent ultrasonographic examination of the abdominal cavity and examination by transient elastography in specialized hepatology / infectiology outpatient clinics (according to the region in which the facility was located).

**Results**

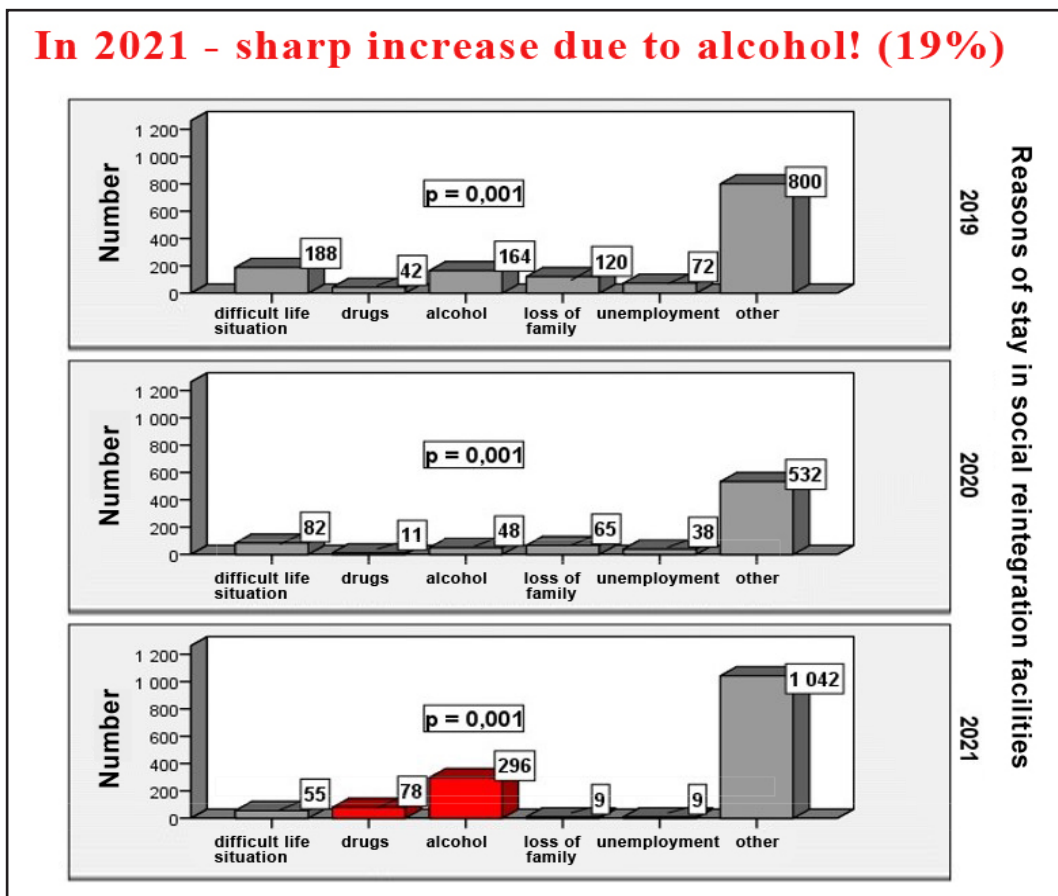
Clients gave various reasons for coming to social reintegration facility: difficult life situation, drugs, alcohol, loss of family, unemployment, other reasons. As the questionnaire was anonymous, we cannot verify the veracity of clients' answers. When comparing the individual years of the project, we noticed that **in 2021, the number of clients who reported alcohol as the main reason for coming to the social reintegration facility increased by 19%**. As usually, the

answer „other“ dominated in the questionnaire. Behind that reason, alcohol can also be hidden. A more detailed analysis and comparison of the reasons for placement in the social reintegration facility is shown in graph no. 2.

**Out of the total number of 1387 examined in 2019, 1335 clients were antiHCV negative, 52 (3.7%) were antiHCV positive.** In our research sample group, 174/1255 clients (13.9% of the group) used drugs, while 124/1255 clients used drugs intravenously, which represents 9.9% of the group (see Graph 3).

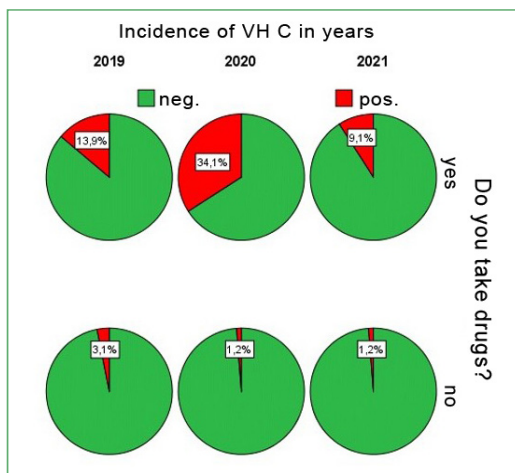
**Out of the total number of 861 examined in 2020, 839 clients were antiHCV negative, 22 (2.7%) were antiHCV positive.** In our research sample group, 274/804 clients used drugs (34.1% of the group), while 46/804 clients used drugs intravenously, which represents 5.5% of the group (see Graph 3).

**Graph 2** Reasons for placing clients in social reintegration facilities in 2019-2021



**Out of the total number of 1555 examined in 2021, 1532 clients were antiHCV negative, 23 (1.5%) were antiHCV positive.** In our research sample group, 136/1493 clients used drugs (9.1% of the group), while 74/1493 clients used drugs intravenously, which represents 4.9% of the group (see Graph 3).

**Graph 3** Incidence of hepatitis C in drug use (p=0,001)



**Anti HCV positivity was found in a total of 97 clients, which represents a prevalence of 2.5%! (compared to 0.1% prevalence in the general adult population of the Slovak Republic).**

Clients who reported intravenous drug use (IDU) in the questionnaire also had more frequent experience with other drugs. They most often reported marijuana, benzodiazepines, methamphetamine, heroin, cocaine, other hallucinogens, hypnotics, amphetamines.

In the questionnaires, there was no question on clients' nationality. However, according to the locations in which clients live, we know that e.g. the Lunik IX settlement in Kosice is inhabited exclusively by Roma community. We plan to continue testing risky clients from this location in the future and to evaluate this file independently. There is a need for repeated education of these clients and for involvement of field workers in solving this problem.

Field workers provide counselling for Roma families in the field of social matters, upbringing and education. They focus mainly on working with an individual and their family. They solve individual client problems and use methods of

social work, which they apply in the client's natural environment (34).

## Discussion

**Chronic viral hepatitis B and C (CHB / CHC)** are a serious medical, public health, social and economic problem on a global scale, in Europe as a whole, and in Central and Eastern Europe in particular (35).

**Injecting drug use remains the main route of transmission of hepatitis C infection (HCV) in Europe.** In 2017-2018, the prevalence of HCV antibodies in national samples of injecting drug users ranged from 16% to 86%, with 10 out of the 16 countries with national data reporting rates above 50% (36).

According to an analysis of epidemiological data, approximately 10 million intravenous drug users worldwide were anti-HCV positive. Studies show that each person who injects drugs with an infected needle is likely to infect about 20 other drug users, and this rapid transmission of the disease occurs within the first three years of the initial infection (37).

The approach of educating injecting drug users about the prevention, testing and treatment of hepatitis C is therefore an important requirement for the elimination of this disease. Although effective oral antiviral medications with direct effects are currently available, expanding the supply of these medications, along with opioid substitution treatment and needle exchange programs, is still challenging for many countries. An introduction of better diagnostic and surveillance techniques to identify people chronically infected with the virus is important for targeting the treatment to all infected people (36).

Successful detection and treatment of viral hepatitis in substance users requires effective cooperation and functional interconnection not only of health professionals and specialists, but of the wide range of professionals and institutions involved in the care of such patient - social workers, volunteers working within governmental and non-governmental organizations, in self-help groups and foundations, family members and friends of the drug addicts (12,38).

To successfully solve the hepatitis B and C problem, emphasis needs to be placed on prevention, proactive screening and early diagnosis of people at risk, such as injecting drug users,

prisoners, HIV-infected people, immigrants from endemic countries, health workers, children, and pregnant women, etc. (38).

It is essential to initiate and support the development and funding of comprehensive and well-managed national information campaigns to raise awareness about these diseases, especially with a focus on at-risk groups.

## Conclusions

Chronic hepatitis C is currently the only chronic viral infection that can be definitively cured.

The most important factor in preventing the occurrence of viral hepatitis in IDUs is the adoption of basic measures to end risky behaviour - a discontinuation of drug use. Social reintegration facilities help to achieve this goal and enable clients to find a new meaning in life - a drug-free life (39). The ultimate goal of the re-socialization process is the reintegration of drug addicts into a natural (or alternative) social environment and for them to gain independence from institutional social support (40, 41).

Our screening project is prospective (2019-2021-2022-2023). We see the benefit of the project in: a) the continuous education of clients of social reintegration facilities; b) the detection of specific people with CHC infection c) the implementation of secondary prevention.

Successful detection and treatment of viral hepatitis in substance users not only requires effective cooperation and functional interconnection of health professionals and specialists, but of the wide range of professionals and institutions involved in the care of such patients - social workers, volunteers working within governmental and non-governmental organizations, in self-help groups and foundations, family members, and friends of the drug addicts (12, 42).

A screening for chronic hepatitis C and subsequent treatment should be part of a comprehensive client care in social reintegration facilities.

## References

1. BLACHIER M, LELEU H, PECK-RA-DOSAVLJEVIC M, VALLA D-CH, ROUDOT-THORAVALL F (2013) The Burden of liver disease in Europe 2013. A review of available epidemiological data. In *J Hepatol*. ISSN 0168-8278, 2013, vol. 58: 593-608.
2. BELOVICOVA M, BALAZOVA I (2018) Chronic hepatitis C - a serious public health problem. Experience from Eastern Slovakia. In *J Health Inequal*. ISSN 2450-5722, 2018, vol. 4(1): 36-38.
3. WHO GUIDELINES ON HEPATITIS B AND C TESTING (2017) February 2017. ISBN 978-92-4-154998-1.
4. WHO: UPDATED RECOMMENDATIONS ON TREATMENT OF ADOLESCENTS AND CHILDREN WITH CHRONIC HCV INFECTION, AND HCV SIMPLIFIED SERVICE DELIVERY AND DIAGNOSTICS. 2022 <https://www.who.int/publications/i/item/9789240052734> 12.6.2023.
5. EASL RECOMMENDATIONS ON TREATMENT OF HEPATITIS C: Final update of the series. 2020. In *Journal of Hepatology* 2020. <https://easl.eu/publication/easl-recommendations-on-treatment-of-hepatitis-c-2020/> 20.06.2023.
6. TRNKA J, DROBNIK J, SUSŁO R (2010) The specificity of the doctor-patient relationship in the case of the family doctor. *Family Medicine & Primary Care Review*. 2010;12:488-490.
7. DROBNIK J, TRNKA J, SUSŁO R (2017) Ambushes related to collecting patients' consent for medical procedures by family doctors. *Family Medicine & Primary Care Review*. 2017;19:298-302. doi:10.5114/fmp-cr.2017.69294.
8. SUSŁO R, TRNKA J, SIEWIERA J, DROBNIK J (2015) Hypoxia-Related Brain Dysfunction in Forensic Medicine. *Advances in Experimental Medicine and Biology*. 2015;837:49-56. Springer, Cham. doi:10.1007/5584\_2014\_84.
9. TRNKA J, DROBNIK J, SUSŁO R (2017) The role of primary care physicians in enabling validation of a patient's ability to make legal statements and express a last will. *Family Medicine & Primary Care Review*. 2017;19:319-322. doi:10.5114/fmp-cr.2017.69298.
10. TRNKA J, ĆESICKI M, SUSŁO R, SIUTA J, DROBNIK J, PIROGOWICZ I (2013) Death as a result of violent asphyxia in autopsy reports, *Advances in Experimental Medicine and Biology*. 2013;788:413-416. doi:10.1007/978-94-007-6627-3\_56.

11. HALOTA W, FLISIAK R, JUSZYK J, MALKOWSKI P, PAWLOWSKA M, SIMON, TOMASIEWICZ K (2018) Recommendations of the Polish Group of HCV Experts on the treatment of C-type viral hepatitis in 2018. In *Hepatology*, 2018; 18: 1- 9. doi:10.5114/hepatologia.2018.75974.
12. BELOVICOVA M (2018) *Selected liver diseases and their impact on public health*. 1<sup>st</sup> ed. Bardejov: SSPO, p. 159. ISBN 978-80-971460-6-1.
13. JAROSZEWICZ J (2018) HCV elimination by 2030 as part of the WHO strategy. HCV prescription. In *Information magazine on hepatitis C*. Gilead Sciences Poland 2018; 7.
14. KLAPACZYNSKI J (2018) From aspiration to success in HCV eradication. HCV prescription. In *Information magazine on hepatitis C*. Gilead Sciences Poland 2018;12.
15. LEDESMAF, BUTIM, DOMINGUEY-HERNANDEZ R et al. (2020) Is the universal population Hepatitis C virus screening a cost-effective strategy? A systematic review or the economic evidence. In *Revista Espanola de Quimioterapia*, ISSN 02143429, 2020. doi: 10.37201/req/030.2020.
16. LEWANDOWSKA A, SUSLO A, PARADOWSKI L, DROBNIK J (2009) Problems in establishing pancreas tumors diagnosis - family doctor role. *Family Medicine & Primary Care Review*. 2009;11(3):385-388.
17. SUSLO A, LEWANDOWSKA A, DROBNIK J, MASTALERZ-MIGAS A (2008) Diagnostic problems in disseminated or rare abdominal cancers. *Family Medicine & Primary Care Review*. 2008;10(3):1234-1236.
18. LEWANDOWSKA A, SUSLO A, DROBNIK J, MASTALERZ-MIGAS A (2008) Critical assessment of repeated hospitalization indications in patients diagnosed with irritable bowel syndrome. *Family Medicine & Primary Care Review*. 2008;10(3):488-490.
19. WASZCZUK E, SUSŁO A, LESZEK PARADOWSKI L (2007) Intestinal pseudoobstruction. *Advances in Clinical and Experimental Medicine* 2007;16(1):149-154.
20. WASZCZUK E, MICHALSKI Ł, SUSŁO A, KOSZEWICZ M, ADAMOWSKI T, PARADOWSKI L (2008) The Connection between Celiac Disease and Nervous System and Mental Disorders. *Advances in Clinical and Experimental Medicine* 2008;17(5):495-502.
21. HOPE VD et al. (2014) Prevalence and estimation of hepatitis B and C infections in the WHO European Region: a review of data focusing on the countries outside the European Union and the European Free Trade Association. In *Epidemiol & Infect*. ISSN 1469-4409, 2014, 142: 270-286. doi: 10.1017/S0950268813000940.
22. BABECKA J, POPOVICOVA M (2022) *Nursing process for education and practice*. Bratislava: Publishing House St. Elizabeth University of Health and Social Sciences, 2022. ISBN: 978-80-8132-251-8.
23. DAWGIAŁŁO M, TOPCZEWSKA-CABANEK A, FAŁEK M, ŻYCIŃSKA K, NITSCH-OSUCH A (2015) Hepatitis B vaccination coverage rate among adult patients of a chosen primary care clinic in Warsaw in 2009-2013. *Family Medicine & Primary Care Review*. 2015;17(1):7-10.
24. KRASNICKA J, KRAJEWSKA-KUŁAK E, KLIMASZEWSKA K et al. (2018) Child vaccination at the Outpatient Clinic of the Pro Medica Center in Białystok, Poland in the years 2013-2016. *Family Medicine & Primary Care Review*. 2018;20(4):341-345. doi:10.5114/fmpcr.2018.79345.
25. KAŁUCKA S, ŁOPATA E (2016) Age-conditioned differences in parents' attitudes towards compulsory vaccination. *Family Medicine & Primary Care Review*. 2016;18(4):425-428. doi:10.5114/fmpcr.2016.63695.
26. SUSŁO R, POBROTYN P, MIERZECKI A, DROBNIK J (2022) Fear of Illness and Convenient Access to Vaccines Appear to Be the Missing Keys to Successful Vaccination Campaigns: Analysis of the Factors Influencing the Decisions of Hospital Staff in Poland concerning Vaccination against Influenza and COVID-19. *Vaccines*. 2022; 10(7):1026. doi:10.3390/vaccines10071026.
27. PAPLICKI M, SUSŁO R, BENEDIKT A, DROBNIK J (2020) Effectively enforcing mandatory vaccination in Poland and worldwide. *Family Medicine & Primary Care Review*. 2020;22(3):252-256. doi:10.5114/fmpcr.2020.98255.

28. PAPLICKI , SUSŁO R, NAJJAR N, CIESIELSKI P, AUGUSTYN J, DROBNIK J (2018) Conflict of individual freedom and community health safety: legal conditions on mandatory vaccinations and changes in the judicial approach in the case of avoidance. *Family Medicine & Primary Care Review*. 2018;204:389-395. doi:10.5114/fmp-cr.2018.80081.
29. DROBNIK J, SUSŁO R, POBROTYN P, FABICH E, MAGIERA V, DIAKOWSKA D, UCHMANOWICZ I (2021) COVID-19 among Healthcare Workers in the University Clinical Hospital in Wrocław, Poland. *International Journal of Environmental Research and Public Health*. 2021; 18(11):5600. doi:10.3390/ijerph18115600.
30. SUSŁO R, POBROTYN P, BRYDAK L, RYPICZ Ł, GRATA-BORKOWSKA U, DROBNIK J (2021) Seasonal Influenza and Low Flu Vaccination Coverage as Important Factors Modifying the Costs and Availability of Hospital Services in Poland: A Retrospective Comparative Study. *International Journal of Environmental Research and Public Health*. 2021;18(10):5173. doi:10.3390/ijerph18105173.
31. DROBNIK J, POBROTYN P, WITCZAK IT, ANTCZAK A, SUSŁO R (2023) Influenza as an important factor causing increased risk of patients' deaths, excessive morbidity and prolonged hospital stays. *Archives of Medical Science*. 2023;19:941-951. doi:10.5114/aoms/138145.
32. DE LIYIS BG, TJANDRA D, MARESKA V, SUTEDJA J, PURNAMASIDHI C, KRISNAWADANI K C (2023) Poly(Ethylene Glycol)-Poly(Lactic Acid) TLR7 Agonist as a Novel HBsAg Immune Response Stimulant. *Family Medicine & Primary Care Review*. 2023;25(1):87-92. doi:10.5114/fmpcr.2023.125499.
33. MIROWSKA-GUZEL D, NITSCH-OSUCHA (2023) Practical tips on vaccination in multiple sclerosis patients. *Family Medicine & Primary Care Review*. 2023;25(2):217-223. doi:10.5114/fmpcr.2023.127683.
34. HANOBIK F (2020) *Social work with marginalized groups*. 1st ed. Warsaw: Publishing house of the Philosophy Department of the University of Economics and Humanities, p. 81. ISBN 978-83-61087-57-1.
35. BELOVICOVA M, BALAZOVA I, PILKO J, VANSAC P, MIRONYUK I, ERMOLOVA T (2019) Chronic hepatitis C - a global public health problem. In *Clinical Social Work and Health Intervention* 2019; 10(4): 33-41.
36. EUROPEAN DRUG REPORT (2020) Key Issues. EMCDDA, Lisbon, September 2020 [https://www.emcdda.europa.eu/publications/edr/key-issues/2020\\_en](https://www.emcdda.europa.eu/publications/edr/key-issues/2020_en) Eiropske 30.09.2020.
37. POPOVICOVA M (2020) Vulnerable groups of chronic hepatitis C. In: Belovičcva, M – Vansac, P. *Collection of scientific works from an institutional project of VSZaSP, BA, DP Michalovce 1/2019*, 2020. Issued by: St. Elizabeth University of Health and Social Sciences Bratislava, Detached workplace of bl. Metod Dominik Trčka Michalovce, Slovak Society of Practical Obesity SSPO. ISBN 978-80-8132-223-5, p. 54 – 68.
38. BELOVICOVA M, URBANOVA A (2022) *Social reintegration facilities and chronic hepatitis C*. 1st ed. Krakow: Society of Slovaks in Poland. P. 136. ISBN 978-83-8111-275-8.
39. BABECKA J, LACKO A (2020) Proper adherence to pharmacotherapy in the elderly. In: *Ukraine. Zdorovja naciji: nauko-vo-praktyčnyj žurnal*. Kyiv (Ukraine): Ukrainian Institute of Strategic Research of the Ministry of Health of Ukraine. ISSN 2077-6594. Vol. 61, no. 3/1 (2021), p. 89-91, DOI 10.24144/2077-6594.3.2.2020.213712.
40. GAZDIKOVA K, GAZDIK F, HUCKOVA D et al. (2010) Prevalence of viral hepatitis C and B in clients of social reintegration facilities in Slovakia. In *Psychiatric Practice*, ISSN 1335-9584, 2010, vol.11, no 4, p. 136-138.
41. BALAZOVA I (2020) *Chronic viral liver disease - a challenge for public health*. 1st ed. Bardejov: SSPO, p. 147. ISBN 978-80-971460-7-8.
42. GLASOVA H, CYMBALOVA D, HOLOMAN (2012) Active screening of viral hepatitis, education and multidisciplinary cooperation in the care of drug addicts. In *Trends in Hepatology*, ISSN 1337-9836, 2012, vol. 4, no. 2, p.11 - 17.

# A Modern Pathway to the Prevention of Cardiovascular Diseases

M. Popovicova (Maria Popovicova)<sup>1</sup>, J. Babecka (Jozef Babecka)<sup>1,2</sup>, P. Snopek (Petr Snopek)<sup>3,4</sup>, M. Belovicova (Maria Belovicova)<sup>5</sup>

Original Article

<sup>1</sup> St. Elizabeth University of Health and Social Sciences in Bratislava – teacher, Slovakia.

<sup>2</sup> Catholic University in Ruzomberok, Faculty of Health, Ruzomberok – teacher, Slovakia.

<sup>3</sup> Tomas Bata University in Zlin, Faculty of Humanities, Department of Health Care Sciences – Professional assistant, Czech Republic.

<sup>4</sup> Tomas Bata Regional Hospital, Zlin, Czech Republic.

<sup>5</sup> Slovak Medical University in Bratislava – teacher, Slovakia.

## E-mail address:

maria.popovic911@gmail.com

## Reprint address:

Maria Popovicova  
Pupavova 4  
071 01 Michalovce  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 24 – 31

Volume: 14  
Cited references: 9

Issue: 4

## Reviewers:

Johnson Nzau Mavole  
Catholic university of Eastern Africa, Nairobi, KE  
Jirina Kafkova  
MSF, Freetown, SL

## Keywords:

Prevention. Cardiovascular Diseases. Nutrition. Patient.

## Publisher:

International Society of Applied Preventive Medicine i-gap

---

CSWHI 2023; 14(4): 24 – 31; DOI: 10.22359/cswhi\_14\_4\_04 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** Nutrition is an essential lifestyle factor for maintaining good health. The correct composition of food is an essential part of the prevention of cardiovascular diseases. Proper nutrition is a basic prerequisite for healthy human development and the main condition for the prevention of cardiovascular diseases. Therefore, in our research, we focused on the modern prevention of cardiovascular diseases.

**Research sample group and research objective:** We approached 240 cardiology clinic patients who came for a check-up cardiology examination with various cardiology diagnoses. The goal of the research was to map the level of awareness of



the adult population in the context of modern prevention of cardiovascular diseases.

**Methods:** To verify the hypotheses, we used the tools of inductive statistics, Chi-square test. We made the decision about the significance of the differences based on the calculated value and a significance level of 0.05.

**Results:** Through a deeper analysis, we found that the awareness about modern prevention of cardiovascular diseases, i.e., the consumption of black coffee, red wine 0.2 dl per day, 70% dark chocolate, and Omega 3 fatty acids is unsatisfactory among our selected sample of respondents. We also found a statistically significant relationship between cardiology diagnoses and BMI in a selected sample of respondents. The frequency of cardiology examinations has an effect on respondents' awareness of modern prevention of cardiovascular diseases.

**Conclusion:** The role of the prevention and reduction of risk factors in society is not only a small part necessary to prevent the occurrence and spread of cardiovascular diseases, it is an important element needed to improve the overall health of the population. Such prevention can be achieved mainly by providing sufficient information and supporting and motivating individuals to have a better lifestyle, as well as by creating greater interest and responsibility for their own health.

## Introduction

The unfavourable state of the environment in combination with the way of life leads to the emergence of cardiovascular diseases, which, due to their importance, constitute one of the biggest problems of our population. Diet largely contributes to an unhealthy lifestyle. Nutrition contributes 20-60 percent to the development of cardiovascular diseases. A healthy diet reduces the risk through several mechanisms - through a decrease in body weight, a decrease in blood pressure, an improvement in the levels of fatty substances and glucose in the blood, and others. Biologically valuable food should contain all the substances that the body needs in the necessary quantity and in the optimal ratio and should not contain substances that can harm the body. In order for a person to be able to regulate their own nutrition and change their eating habits, they must have basic information about nutrition and the composition of food.

Interest in a healthy lifestyle (healthy eating, stress prevention, active participation in screening programs, common physical activities) is a good starting point for creating a community. Community activities represent

a flexible and at the same time effective way of implementing primary prevention in its everyday form (1).

## Healthy foods - prevention of cardiovascular diseases

Nutrition is an essential lifestyle factor for maintaining good health. The correct composition of food is an essential part of the prevention of cardiovascular diseases, and above all, atherosclerosis. Proper nutrition is a basic prerequisite for healthy human development and the main condition for the prevention of cardiovascular diseases (2).

**Flavonoids** (vitamin P) – These phenolic substances occur naturally in plants and help protect against harmful influences. Together with vitamins C and E and enzymes with antioxidant effects, they help create and strengthen the body's overall defence system. Several studies have demonstrated a direct effect of flavonoids on reducing the incidence of coronary heart disease and myocardial infarction. From apples to onions, almost all fruits and vegetables are rich in bioactive plant substances, including flavonoids. Flavonoids are abundant in red cabbage,

broccoli, red grapes, green tea, and dark chocolate with 70% cocoa content.

**Black chokeberry – (proanthocyanidins)** - They represent a group of condensed flavonoids. Aronia reduces high blood pressure and eye pressure, has a beneficial effect on the flexibility and strength of blood vessels, helps with varicose veins, has an anti-sclerotic and anti-inflammatory effect.

**Sea buckthorn fruits and oils** – It contains omega-7 fatty acid, which is rarely found in nature, and has a high antioxidant effect. It stimulates the work of the heart muscle, supports the elasticity of veins and arteries, reduces blood clotting and the formation of blood clots. They reduce total cholesterol, LDL cholesterol and increase HDL cholesterol.

**Garlic** – Its essential oils reduce elevated cholesterol levels, it has antioxidant properties, it is a natural aspirin. It helps regulate high blood pressure.

**Almonds** - Monounsaturated fatty acids, which make up 90% of almond fat, reduce LDL cholesterol and lower blood pressure.

**Salmon** – Salmon and other fatty fish like sardines, tuna, cod and mackerel are among the superstars of heart-healthy foods. They contain a huge amount of omega-3 fatty acids (DHA and EPA).

**Soy** – Soy products, including tofu, soy butter and soy milk, are a good way to add protein to our diet without unhealthy fats and cholesterol. They contain a high amount of polyunsaturated fats, fibre, vitamins and minerals. It lowers blood pressure and LDL cholesterol.

**Avocado** – Rich in unsaturated omega-3 fatty acids, it reduces the level of dangerous fats in the blood. It supplies vitamin B, protecting the heart.

Other healthy foods for the heart and blood circulation: flax seeds, potatoes, broccoli, pineapple, eggplant, berries, tomato, buckwheat, Brussels sprouts, spinach and others (3).

**Black coffee and tea** - Caffeinated coffee is an important source of natural antioxidants, of which there are even more in coffee than in tea when carefully prepared. Xanthines themselves, including caffeine, also have antioxidant effects. It should be remembered that roasting creates not only the wonderful aroma of coffee, but also some antioxidants. In medical records, drinking

black coffee is still registered as abuse, among harmful habits. Compared to black tea, green tea has a higher concentration of antioxidants by only 0.9 mmol/l. Black tea has a wider range of antioxidants compared to green tea. The concentration of caffeine in both types of tea is the same, approximately 2x higher than in coffee. Caffeine has a beneficial effect on blood vessels, improves blood circulation in the brain, kidneys and heart, and also has proven antioxidant effects. If we want to achieve a beneficial protective effect on health, e.g. on the vascular wall, you need to drink 5-6 cups of tea during a day.

**Cocoa and chocolate** - The overall effects of chocolate on human health are currently evaluated mostly negatively. 70% real chocolate, which is rich in antioxidants, minerals, vitamin D, causes vasodilation modified by flow, reduces the adhesion of blood platelets, which prevents the formation of blood clots that causes a heart attack or stroke. Real chocolate even reduces insulin resistance, thus improving the utilization of glucose (4).

**Alcohol – red wine** - Red wine is produced by maceration of grape skins, which leaches into the wine substances belonging to effective antioxidants, these are various polyphenols such as flavonoids, procyanidins and proanthocyanidins. Resveratrol is produced by some plants when they are attacked by pathogenic microorganisms such as bacteria or fungi. It is found in the skin of red grapes, in some types of berries (black currants, blueberries, pomegranate, etc.). Eating foods with a high content of resveratrol has a significant beneficial effect on our health, especially on the function of the heart and blood vessels. Resveratrol is one of the most important antioxidants, it prevents chronic inflammation, prevents the formation of blood clots, reduces fibrillation and improves blood vessel function (3).

### **Medicinal plants that regulate blood pressure values:**

**White mistletoe** (*Viscum album*) - regulates blood pressure. It lowers high blood pressure, adjusts low blood pressure. It slows down the accelerated heart rate.

**One-seeded hawthorn** (*Crataegus monogyna*) - expands the blood vessels supplying the heart and increases the performance of the heart muscle, expands the peripheral blood vessels.

**Rosemary** (*Rosmarinus officinalis*) - strengthens the heart, improves blood circulation.

**Ginkgo biloba** - improves blood flow to the brain, adjusts irregular activity of the heart. It dilates blood vessels and improves cerebral blood flow and coronary flow.

**Garlic** (*Alium sativum*) - is used in the treatment of cardiovascular diseases, after strokes, atherosclerosis and other vascular diseases.

**Black chokeberry** (*Aronia melanocarpa*) - increases the speed of blood flow, which is suitable for the treatment of hypertension, and has a positive effect on the flexibility and strength of blood vessels (2).

### Research objective:

The main goal of the research was to map the level of awareness of the adult population in the context of modern prevention of cardiovascular diseases. Another goal was to find out whether the duration of cardiovascular diseases has an impact on the awareness of modern prevention of cardiovascular diseases. A third aim was to assess whether the annual interval of cardiology examinations has an impact on awareness in connection with modern prevention of cardiovascular diseases. We were also interested in whether BMI is related to the type of cardiovascular diseases of the respondents.

### Research sample group and methodology

Our research was carried out on a selected set of patients of a cardiology outpatient clinic who came for a follow-up cardiology examination with various cardiology diagnoses. 240 re-

spondents were included in the research. Their age range was from 21 to 82, there were both females and males, and they had different levels of education. We verified the hypotheses with inductive statistics, statistical tests, and the Chi-square test. We used a significance level of 0.05.

### Results

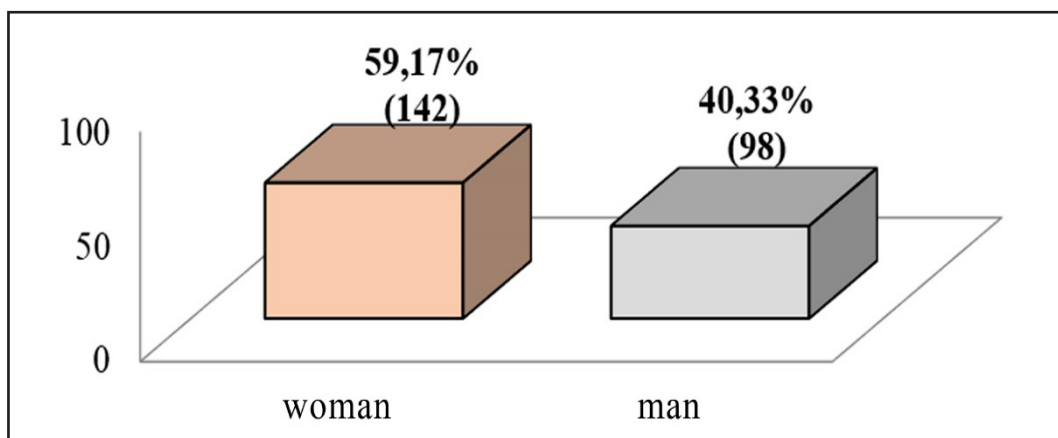
In the first categorization question, we found out the gender of the respondents.

A total of 240 (100%) respondents took part in the research. Of the total 240 respondents, there were 142 women (59.16%) and 98 men (40.83%).

The second categorization question was aimed at calculating their body mass index (BMI).

By asking a question about height and weight, we wanted to find out the body mass index (BMI). Of the total number, 48 (20%) respondents had a normal weight. 92 respondents, i.e., 38.33% were overweight. 54 (22.50%) respondents were suffering from class 1 obesity. According to the body mass indexes, 34 (14.16%) respondents had class 2 obesity and 12 respondents, or 5%, had the most severe type of obesity. The individual body weight index was given according to the gender of the respondents, and 8 (16.32%) men and 16 (22.56%) women had a normal weight. 22 respondents, i.e., 44.89% of men and 24 women (33.80%) were overweight. Both men and women suffer from class 1 obesity. 4 (8.16%) men and 17 (14.16%) women were class 2 obese. 4 men, i.e., 8.16%, and 2 women, i.e., 2.81%, were suffering from the most severe, class 3 obesity.

**Graph 1** Gender of respondents



**Graph 2** BMI of respondents



**Hypothesis testing**

**H1** BMI is related to the type of cardiovascular disease of the respondents

The chi-square value is 19.64208545 and the degree of freedom (df) is 8. The Pearson chi-square critical value for 8 degrees of freedom and 5% significance level is 15.51. The chi-square value is greater than the critical value, and the p value of 0.011778388 is less than the significance level of 0.05, so we can say that there is a statistically significant relationship (significance) between cardiology diagnoses and BMI in the selected sample of respondents. Respondents who survived a heart attack (52.38%) are overweight. Respondents with high blood

pressure are the most obese (41.14%). Respondents with heart rhythm disorders are overweight (86.36%). Respondents with heart failure are obese (60%). Valve defects are not affected by weight according to data analysis.

**H2** The annual interval of cardiology examinations has an impact on respondents' awareness of modern prevention of cardiovascular diseases

The chi-square value is 17.42431 and the degree of freedom (df) is 3. The Pearson chi-square critical value for a degree of freedom of 3 and a significance level of 5% is equal to 7.82. The chi-square value is greater than the critical value. We confirmed the statistical significance between

**Table 1** Contingency table for processing hypothesis H1

observed frequencies	I overcame a heart attack	I am being treated for high BP	I am being treated for heart rhythm disorders	heart failure	I am being monitored for valve defects	Total
Normal weight	4	16	12	4	12	48
overweight	22	24	18	16	12	92
obesity	16	28	14	30	12	100
Total	42	68	44	50	36	240
Df	8			15,51		
p value	0,011778388					
chi test	19,64208545					

**Table 2** Contingency table for processing hypothesis H2

observed frequencies	informed	uninformed	total
every 3-4 months	76	46	122
semiannually	24	42	66
once in a year	12	20	32
only as needed	6	14	20
Total	118	122	240
Df	3	7,82	
chi test	17,42431		
p value	0,000578019		

**Table 3** Contingency table for processing hypothesis H3

observed frequencies	informed	uninformed	total
less than 1 year	18	12	30
1 to 5 years	36	24	60
6 to 10 years	32	46	78
11 to 15 years	8	12	20
more than 15 years	24	28	52
Total	118	122	240
Df	4	9,49	
chi test	7,155834		
p value	0,127879		

visits to the cardiology outpatient clinic and patient awareness based on the chi-square and p value of 0.000578019, which is lower than the significance level of 0.05. It follows that there is a statistically significant dependence (significance) between respondents' awareness and the annual interval of cardiology examinations.

**H3** The duration of cardiovascular diseases has an effect on the respondents awareness of modern prevention of cardiovascular diseases.

The chi-square value is 7.155834 and the degree of freedom (df) is 4. The Pearson chi-square critical value for a degree of freedom of 4 and a significance level of 5% is 9.49. The chi-square value is lower than the critical value. Statistical dependence between the items was not confirmed. We can therefore claim that there is no statistically significant dependence (significance) between the length of the cardiology disease and the respondents' awareness.

Respondents who have been treated for less than 1 year or up to 5 years are better informed about modern prevention of cardiovascular diseases than respondents who have been treated for more than 5 years.

## Discussion

Cardiovascular diseases are the main cause of death for more than 4 million people in Europe every year. Therefore, the prevention of cardiovascular diseases, whether in the general population or at the individual level in patients with high cardiovascular risk or documented ischemic heart disease, represents one of the most important tasks in reducing mortality from cardiovascular diseases (5).

Due to this fact, our research focused on the awareness of the adult population in the context of modern prevention of cardiovascular diseases. We investigated whether the length of treat-

ment for cardiovascular disease has an impact on the awareness of modern prevention of cardiovascular diseases. We were also interested in whether the annual interval of cardiology examinations has an impact on awareness in connection with modern prevention of cardiovascular diseases and whether BMI is related to the type of cardiovascular disease of the respondents. We ascertained awareness of modern prevention of cardiovascular diseases using respondents' opinion on the consumption of black coffee, red wine (0.2 dl per day), 70% dark chocolate, and omega-3 fatty acids.

Our research was carried out on a set of patients of a cardiology outpatient clinic who came for a check-up cardiology examination with various cardiology diagnoses. 240 respondents were included in the research. The age range of the respondents was from 21 to 82 years and 142 (59.16%) were female and 98 (40.83%) were male. When measuring the body mass index (BMI), we found that 48 (20%) of the respondents had a normal weight. 92 respondents, or 38.33%, were overweight. 54 (22.50%) respondents were suffering from class 1 obesity. According to the body mass index, 34 (14.16%) respondents had class 2 obesity, and 12 respondents, or 5%, have the most severe obesity. We verified the hypotheses with inductive statistics, statistical tests, and a chi-square test. We used a significance level of 0.05. With the first hypothesis, we determined a statistically significant dependence between cardiology diagnoses and BMI in a selected sample of respondents. The relationship between cardiology diagnoses and BMI was confirmed. According to WHO global data, more than 1.4 billion people (aged  $\geq 20$  years) are found to be overweight. Of these people, more than 200 million were men and almost 300 million were women. Due to this fact, experts rightly consider obesity an epidemic of the 3rd millennium (6). With another hypothesis, we found that the annual interval of cardiology examinations has an impact on the awareness of modern prevention of cardiovascular diseases. In the last hypothesis, we found that the duration of cardiovascular diseases has no influence on the awareness of modern prevention of cardiovascular diseases. We were also interested in the respondents' opinion on the consumption of black coffee. We found that only 76 (31.66%) respondents indicated that

black coffee has a positive effect on the heart and blood vessels. Despite past concerns that coffee could damage the heart, studies have shown no link to heart diseases. On the contrary, one study of 41,836 healthy women aged 55 to 69 found that one to six cups of coffee a day (both caffeinated and decaffeinated) reduced the risk of death from heart diseases. The most powerful protective effect has 4 to 6 cups per day (7). We were interested in the respondents' opinion on the consumption of red wine (0.2 dl per day). 112 respondents (46.66%) think that it has a good effect on the heart and blood vessels. Only 10 (4.16%) respondents think that it damages the heart muscle. The largest group, 118 (49.16%) respondents, could not answer and chose the option "don't know". The author Horáková (3) deals with the question: Why do men live longer in some areas of Europe? Doctor Roger Corder found the answer to this question. Together with his team, he studied several groups of people who lived to be a hundred years old. Research has provided insight into the types of wines that are best for long-lasting healthy living. He identified a substance in red wine that is responsible for reducing the risk of coronary heart disease and reducing overall mortality with moderate regular consumption of red wine. He proved that it is not resveratrol and quercetin as previously thought, but the procyanidines found in wine that are the most effective. The results of the Cordera team's research showed that even after two weeks of 125 ml of procyanidin-rich wine daily, they set positive health effects on the cardiovascular system. The respondents' opinions of dark chocolate were predominantly positive. 132 (55%) think that 70% dark chocolate has a good effect on the cardiovascular system. 26 (10.83%) respondents reacted very positively. On the other hand 48 (20%) respondents think that dark chocolate does not have a positive effect on the cardiovascular system. The author Horáková (3) states that many studies have confirmed that dark chocolate can be useful for our heart. In fact, one publication published in the Heart Journal in 2012 reported that consuming a small amount of dark chocolate daily reduced the risk of heart attacks and strokes in people at high risk of developing these problems. This finding only applies to dark chocolate, meaning chocolate that contains at least 60 to 70 percent cocoa (2). Next,

we investigated the opinion on omega-3 fatty acids. 146 (60.83%) respondents think that omega 3 fatty acids reduce blood cholesterol. Only 6 (2.50%) respondents answered that it increases blood pressure. Other respondents in the number of 88 (36.66%) answered with the option "I don't know". Authors Dudová-Skripová, Pella (8) state that the positive effects of omega 3 polyunsaturated acids (n-3 PUFA) are probably mediated through their antiarrhythmic, lipid-lowering, antithrombotic and anti-inflammatory properties. More and more, treatment with n-3 PUFA holds great promise for primary, but especially for secondary prevention of cardiovascular diseases. Many studies have shown that adequate consumption of fish oil reduces the incidence of cardiovascular events, especially acute myocardial infarction, sudden cardiac death, etc. In the Italian GISSI study, patients after myocardial infarction were given 1 g of omega-3 fatty acids daily in addition to standard treatment. After 3 months, mortality compared to the control group was reduced by 41% and after 4 months by up to 50%. The beneficial effects were also confirmed by studies focusing on cardiac arrhythmias. However, omega-3 fatty acids have many other beneficial effects. They have an anti-inflammatory effect, prevent hypertension (high blood pressure), reduce the risk of blood clots, and suppress autoimmune reactions (8).

## Conclusion

Cardiovascular diseases are an increasingly common problem nowadays, they occur more and more frequently in society, even among younger people. Cardiovascular diseases can be largely prevented. Population-wide measures and improved access to health care can significantly reduce the health and socio-economic burden caused by cardiovascular diseases and reduce the risk factors of the disease. Likewise, in the work environment, management can pay close attention to activities that reduce the stressful environment of employees (Jankelová, Czarneczki, 2021). Addressing cardiovascular disease requires sustained and concrete action in areas that are key components of any global or national strategy: surveillance and monitoring, prevention and reduction of risk factors. The role of prevention and reduction of risk factors in society is not only a small part necessary to

prevent the occurrence and spread of cardiovascular diseases, but it is an important element necessary to improve the overall health of the population, to increase life expectancy and also to increase the productive age. Such prevention can be achieved mainly by providing sufficient information, supporting and motivating individuals to a better lifestyle, but also to greater interest and responsibility for their own health and subsequent regular preventive check-ups with general practitioners and specialists.

## References

1. DOSTALOVA K et al. (2022) *Prevention of vascular diseases and obesity in the light of community medicine. Obesity and metabolic syndrome, collection of scientific papers*, Collegium Humanum - Warsaw Management University, Warsaw 2022, ISBN 978-83-964214-3-2, p.123-129
2. BULAVA A (2017) *Cardiology for non-medical health fields*. Prague: Grada Publishing, 2017. 224 p. ISBN 978-80-271-0468-0.
3. HORAKOVA K (2016) *How to have a healthy heart and blood vessels at any age*. Bratislava: Plat4M Books, s.r.o. 2016. p. 285. ISBN 978-80-89642-23-6.
4. BADA V (2017) *How to prevent diseases of the heart and blood vessels*. 2. ed. Bratislava: A-medi management, s.r.o. 2017. p. 161. ISBN 978-80-89797-26-4.
5. UHLIAR R (2018) *Secondary prevention of cardiovascular disease: research report*. Bratislava: Cardiology clinic, 2018. p. 6.
6. POPOVICOVA M, BELOVICOVA M, SNOPEK P, BABECKA J (2021) Key Predictors of Overweight and Obesity in Adult Population. In *Clinical Social Work*, 2021, ISSN 2076-9741. No. 5, Vol. 12, p 79-86.
7. SLOVAK HEART FOUNDATION. [cit. 2023-06-25]. Available online: <https://nadciasrdca.sk/>
8. PELLA D, DUDOVA D (2010) Cardioprotective properties of Omega-3 polyunsaturated fatty acids. In *Cardiology for practice*. ISSN 1336-3433, vol. 8, no. 3, p. 142-146.
9. JANKELOVA N, CZARNECZKI P (2021) *Managerial Knowledge and Skills in the Practice of Healthcare Managers 1st Edition*. - Warsaw: Collegium Humanum - Warsaw Management University, 2021. 171 p.

# Osteoporosis as a Problem of Postmenopausal Women

M. Supinova (Maria Supínova)<sup>1</sup>, J. Laukova (Jana Laukova)<sup>1</sup>,  
P. Bartosik (Pavel Bartosik)<sup>2</sup>

Original Article

<sup>1</sup> The Faculty of Public Health SZU in Bratislava with its headquarters in Banska Bystrica, Slovakia.

<sup>2</sup> St. Elizabeth University of Health and Social Work in Bratislava, Slovakia.

## E-mail address:

maria.supinova@szu.sk

## Reprint address:

Maria Supinova  
Faculty of Public Health SZU in Bratislava  
Headquarters in Banská Bystrica  
974 01  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 32 – 38

Volume: 14  
Cited references: 15

Issue: 4

## Reviewers:

Michael Costello  
University of Scranton School of Education, USA  
Selvaraj Subramanian  
SAAaRMM, Kuala Lumpur, MY

## Keywords:

Menopause, Osteoporosis, Age, BMI, Bone density, Climacterium.

## Publisher:

International Society of Applied Preventive Medicine i-gap

---

CSWHI 2023; 14(4): 32 – 38; DOI: 10.22359/cswhi\_14\_4\_05 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** Osteoporosis is one of the major public health problems, and its prevalence is most often associated with menopause.

**Aim:** To analyze bone mass status in menopausal women with regard to age, BMI and duration of menopause.

**Method:** A retrospective analysis of the densitometric examination results of 650 postmenopausal women was used. We performed simple and multiple regression, while we considered the densitometry examination conclusion as the dependent variable. We calculated correlation coefficients ( $r$ ), determination coefficients and their level of significance.

**Results:** The occurrence of osteoporosis is associated with age. In the age category under 50 years, bone tissue remodeling was detected in 46.92% of women, while in the over 50 category it was 32.92%. The dependence of the duration of



menopause in years and the onset of bone remodeling was also confirmed,  $t_{Stat}=2.26$  ( $t_{crit} = 1.647$ ). The negative correlation of the conditionality of the onset of menopause and weight ( $r = -0.067$ , very weak dependence) confirms the assumption that women with higher weight enter menopause at an older age. The negative value of the correlation ( $r = -0.2218$  weak dependence) confirms that the degree of osteopenia or osteoporosis decreases with an increasing BMI value. The onset of osteopenia or osteoporosis is not conditioned by intolerance to dairy food  $p = 0.6652 > \alpha = 0.05$  or smoking  $p = 0.448 > 0.05$ .

**Conclusion:** The obtained results show that the occurrence of osteopenia and osteoporosis is related to the age of women and the duration of postmenopause. The degree of osteopenia or osteoporosis decreases with increasing BMI. Bone tissue remodeling is not related to dairy food intolerance or smoking in the observed group. In connection with the occurrence of osteoporosis in postmenopausal women, it is necessary to raise public awareness of the importance of regular bone densitometry monitoring.

## Introduction

Osteoporosis is one of the serious public health problems associated with considerable sickness and socio-economic burden (1). Its prevalence is most often associated with menopause (2). Menopause as a biological process typically occurs between the ages of 40 and 60, (average value 51 years). Natural menopause is defined as the cessation of the menstrual cycle for 12 consecutive months resulting from a lack of ovarian follicular activity (3). Early menopausal age is associated with an increased risk of cardiovascular disease and osteoporosis. Environmental factors explain only a small part of the variance in menopausal age. (4). Menopause is a critical time for bone health, with rapid bone loss occurring in the three-year period following the last menstrual cycle. Bone density measurements may be clinically useful in predicting the onset of a phase of rapid bone loss and in identifying women who are most at risk for osteoporosis during menopause. Monitoring bone density is also important in assessing the effectiveness of osteoporosis treatment (5).

According to Brown et al., (2009), osteoporosis is the most common cause of fractures. It is estimated that approximately 30% of postmenopausal women in the United States and the European Union suffer from osteoporosis. In Asia, the overall prevalence of postmenopausal osteoporosis is higher than in Western countries (2).

Payer et al., (2007), identified genetic predisposition, age and gender as non-influential factors in the development of osteoporosis. Factors that can be influenced include physical inactivity, calcium intake in food, smoking and excessive alcohol intake (6).

Opinions on the protective effect of excess weight against osteoporosis are not unequivocal (7). A higher body mass index (BMI) is a key problem that greatly affects people's health (8). A higher body mass index (BMI) as a protective factor reducing bone loss is reported by several authors (1,7,9). Guiming et al. (2019) reports higher BMI values as a risk factor for the development of postmenopausal bone remodeling (10).

The described starting points were the incitement for conducting research aimed at a detailed analysis, which provides a systematic overview of the factors supporting the development of osteoporosis in menopausal women. We mapped the area of key factors: duration of menopause, climacterium, woman's age, obesity, BMI, smoking.

## Methodology

In the conducted research, a retrospective content analysis of health documentation in the form of an "evaluation study" was used. The results of the examination of women who underwent a densitometric examination at a specialized densitometric workplace in Banská

Bystrica (SK) were reviewed, more specifically from January to October 2020. The data on each examined woman were processed in the MS Excel program. A descriptive analysis of all variables was performed. Statistical analysis was performed using Pearson's chi-square test and t-test. We calculated BMI using the formula weight (kg) / height (m<sup>2</sup>).

We investigated clinically significant factors that can lead to osteoporosis in a group of 650 women. In our observation, we included the age of the respondents, the age at the onset of menopause, ovariectomy, hysterectomy, diseases of the thyroid gland and kidneys, GIT, weight (BMI), dairy food intolerance and smoking.

Only women in postmenopause, natural or artificially induced climacteric after bilateral ovariectomy were included in the group. The age of the respondents, their education and social status did not determine their inclusion in the group. A 20-year-old female respondent was not included in our study because of the high age deviation.

According to the WHO, densitometry results are classified into four categories: A. Norm: T-score > - 1; B. Osteopenia: T-score >-1.r > T-score > - 2.5; C. Osteoporosis: T-score < - 2.5; D. Manifest osteoporosis: T-score < - 2.5 + at least one fracture.

**Table 1** Distribution of the group according to age and onset of menopause

	min	max	average	s
Age	39	90	63,4769	8,3915
Onset of menopause	32	61	49,3384	4,6039

**Table 2** Incidence of the disease by age categories, absolute and relative values

Category diseases	Age				Σ	
	< 51		>50			
	n	%	N	%	N	%
0	44	6,7692	87	13,3846	131	20,1538
1	140	21,5384	205	31,5384	345	53,0769
2	74	11,3846	100	15,3846	174	26,7692
Σ	258	39,6923	392	60,3076	650	100

Legenda: 0 norm; 1 osteopenia; 2 osteoporosis;

The number of fractures to determine manifest osteoporosis was not recorded in the medical records examined by us. For the analysis of the densitometry results, we therefore divided the respondents into three categories: 0=norm; 1=osteopenia; 2=osteoporosis.

The main aim of the study was to analyze the impact of hormonal remodeling due to menopause and the ongoing climacteric effect on the occurrence of osteoporosis in the context of the duration of postmenopause, age and BMI of the woman.

The sub-objectives of the study were to assess the influence of the respondents' ages at the time of measurement, the ages at the onset of menopause, the number of years lived in menopause and body weight expressed in BMI values on the occurrence of osteopenia or osteoporosis in postmenopausal women.

## Results

We monitored the onset of menopause and associated problems with hormonal changes in a sample of 650 women aged 39 to 90; the average age of the respondents was 63.5.

We excluded one female respondent 20-year-old from the study due to high age deviation. The basic numerical characteristics of the collection are listed in Table 1.

In the age category over 50 years old, postmenopausal bone tissue remodeling was recorded in a total of 46.92% of women, while in the age category under 50 years old, some form of bone tissue remodeling appeared in 32.92% of women. The most frequent diagnosis in both age categories was osteopenia. Only 20% of women in the monitored group did not suffer from any form of bone remodeling. We present the results in Table 2.

**Table 3** Numerical characteristics of the weight sign, onset of menopause

	Weight in kg	Onset of menopause in years	Osteopenia, osteoporosis
r	73,8553	49,3384	1,0661
s	14,2243	4,6039	0,6818

**The relationship between weight and the onset of menopause**

We investigated the relationships between the occurrence of osteopenia/osteoporosis, the weight of the respondents and the age at the onset of menopause.

More than 90% of female respondents experienced menopause between the ages of 40 and 58.

The mutual conditionality of the onset of menopause and weight, expressed by the correlation coefficient  $r$ , has a value of  $r = -0.0671$ . This is a very weak dependence. However, the negative correlation confirms the assumption that women with higher weight enter menopause at an older age.

**The relationship between the BMI value and the degree of bone deterioration (osteoporosis or osteopenia)**

The correlation coefficient  $r = -0.2218$  expresses only a weak dependence. The negative value confirms that as the BMI value increases, the degree of bone damage decreases.

**Table 4** Occurrence interval by value  $\sigma$

	$\sigma$		$2\sigma$	
Weight	59,6	88,1	45,4	102,3
Onset of menopause	44,7	53,9	40,1	58,5
r	-0,0671			

r- correlation coefficient

**The relationship between BMI value and the onset of osteoporosis or osteopenia**

We verified the dependence between the observed characteristics using the  $\chi^2$  test at a significance level of 0.05. We present the measured and expected values in the following tables (5,6). CHITEST in the EXCEL program was used for verification.

The result value of CHITEST is the probability value  $p = 1.3890E-07 < 0.05$ . When monitoring the relationship between BMI values and the onset of both osteopenia and osteoporosis, dependence was confirmed (Table 6).

**Dependence between the onset of osteoporosis or osteopenia and dairy food intolerance**

From the total set of 650 female respondents, only 21 reported intolerance to dairy food (3.23%). There is no dependency between the observed characters. The onset of osteopenia or osteoporosis is not conditioned by intolerance to dairy food. The resulting probability value is  $p = 0.6652 > \alpha = 0.05$ . Intolerance to dairy food has not been proven to be a possible factor influencing the onset of Weight 59,6 88,1 45,4 102,3 observed bone structure damage (Table 6).

The influence of individual factors tested separately in relation to the monitored diagnoses is in the zone of weak dependence. Within the given collection, the age of menopause onset was the only parameter that entered the zone of addiction acceptance.

**Table 5** Measured values, frequency distribution according to BMI

Measured	Damage			Trend
BMI	0	1	2	n age
<23,9	12	81	53	146 48,8576
24-28,9	36	136	61	233 49,7518
29-38,9	71	121	57	249 49,2289
>39	11	7	4	22 48,0476
$\Sigma$	130	345	175	650

**Table 6** Values of coefficients – EXCEL program output - data analysis - regression

	Coefficient	Standard deviation	t Stat	P-value	Lower 95%	Higher 95%
Interception	4,9	3,863	1,286	0,199	-2,62	12,55
Age	0,0001	0,007	0,019	0,984	-0,01	0,013
Height	-0,0099	0,023	-0,44	0,662	-0,05	0,034
Weight	-0,0071	0,024	-0,29	0,775	-0,05	0,041
Menopause in years	0,013	0,006	2,26	0,024	0,002	0,026
Dairy food tolerance	-0,079	0,143	-0,56	0,579	-0,36	0,202
Smoking	-0,0620	0,082	-0,76	0,448	-0,22	0,099
Hormonal therapy	0,0630	0,079	0,796	0,427	-0,09	0,219
BMI	-0,0172	0,064	-0,27	0,785	-0,14	0,108

## Discussion

In the conducted study, we verified the effect of selected factors on bone tissue remodeling in postmenopausal women.

The results of the conducted study show that the incidence of postmenopausal bone tissue remodeling increases with the increasing age of women. The basic numerical characteristics of the group are presented in Tables 1 and 2. Some authors mention the young age of women at the onset of menopause as a risk factor for the development of osteoporosis (3). The increasing menopausal age in connection with the increasing incidence of osteopenia and osteoporosis is also reported by Agrawal et al. (1) and Veiga Silva et al. (11). According to Karlamangla et al. (5), there is a rapid loss of bone mass in the first three years from the date of the last menstrual period.

In respondents with an artificially induced onset of menopause after ovariectomy or hysterectomy, we noted a more frequent occurrence of osteoporosis. However, this increase is not statistically significant. We present the results of the t-test in Table 6. The age related to the occurrence of ovariectomy and hysterectomy is only marginally statistically related to the occurrence of osteopenia and osteoporosis in the set of respondents.

From the research results, it follows that

women with higher weight enter menopause at an older age. Weak dependence was confirmed (Tables 3 and 4).

When monitoring the relationship between BMI values and the onset of osteopenia or osteoporosis in our group, a negative dependence was confirmed. An important factor is the fact that estrogens are soluble in fats (2), so it is assumed that the rate of bone damage decreases with increasing BMI values in our group (Table 5). Opinions differ on higher BMI values as a protective or moderating factor in the development of postmenopausal osteoporosis (12). According to the authors Tian et al. (2017), there are significant age, gender and race differences in the risk of osteoporosis and the composition of fat mass (13). Higher weight, BMI and body type have a protective effect on bone remodeling according to Török-Oance et al. (2) and Veiga Silva et al. (11). According to Aghaei et al., a low BMI value is also a risk factor associated with bone mass loss (8). Guiming et al. (10) reports higher age, a higher number of pregnancies and also higher BMI, as the risks of developing postmenopausal osteoporosis in Chinese women.

In our research, intolerance to dairy food did not prove to be a significant factor affecting the onset of observed damage to bone structure.

According to Payer et al. (2007), female smokers have an accelerated catabolism of en-

ogenous estrogens, and therefore menopause occurs earlier in female smokers (6). In the set of respondents examined by us, this factor was not confirmed as statistically significant (Table 5). According to Agrawal et al. (1), a healthy lifestyle (diet, exercise and exposure to sunlight) can have a fundamental positive effect on bone health. These public health measures are recommended for the general population because they are effective, safe and cost-efficient. The management of organizations can provide various prevention options in this area within the framework of benefits (14).

## Conclusion

The conducted study demonstrated a higher prevalence of osteopenia than osteoporosis and confirmed that older age and menopause are risk factors for both outcomes, i.e., for both osteopenia and osteoporosis. A BMI above 25 is a slightly protective factor from the point of view of the development of osteopenia or osteoporosis. Osteoporosis is a major public health problem associated with evident sickness and socio-economic burden. According to the Slovak Arthroplasty Register, the number of patients suffering from this disease is constantly increasing in today's fast-paced times. Patients with this disease suffer from pain and limited mobility of the hip joint. These symptoms greatly affect their lives and their level of self-sufficiency (15). Early detection can help reduce fracture occurrence rates and the overall socio-economic burden. The presented study was carried out on the basis of screening results of bone density measurements in women in the postmenopausal period of life. It was aimed at revealing the determining factors responsible for the pathological remodeling of bone tissue in the studied sample of respondents. In this context, a wider public awareness of the possibilities of preventive densitometry measurement in postmenopausal women is needed.

## References

1. AGRAWAL M T, VERMA B A K (2013) Cross sectional study of osteoporosis among women. In: *Med J Armed Forces India*. 2013 Apr; 69(2): 168–171. Published online 2012 Nov 3.
2. TOROK-OANCEA R, BALA M (2015) Body weight, BMI, and stature have a protective effect on bone mineral density in women with postmenopausal vertebral osteoporosis, whereas greater age at menarche and years after menopause have a negative effect. In: *Asian Biomedicine* Vol. 9 No. 1 February 2015; 81 – 86.
3. MORON F J, RUIZ A, GALAN J J (2009) Genetic and genomic insights into age at natural menopause. In: *Genome Medicine* 2009, Available at: <http://genomemedicine.com/content/1/8/76>.
4. KOK H S, VAN ASSELT K M, VAN DER SCHOUW Y T, PEETERS P H M, WIJMENGA C (2005) Genetic studies to identify genes underlying menopausal age. In: *Hum Reprod Update*. Sep-Oct 2005;11(5):483-93.
5. KARLAMANGLA A S, BURNETT-BOWIE S A M, CRANDALL C J (2018) Bone Health During the Menopause Transition and Beyond. In: *Obstet Gynecol Clin North Am*. 2018 Dec;45(4):695-708.
6. PAYER J, BAQI L, KILLINGER Z (2007) Climacterium and bone. Hormone substitute therapy in the prevention and treatment of osteoporosis. In: *Ambulatory therapy*, 2007, vol. 5 (1): 6–9.
7. SALAMAT M R, SALAMAT A H, I ABEDI I, JANGHORANI M (2013) Relationship between weight, body mass index, and bone mineral density in men referred for dual-energy X-ray absorptiometry scan in Isfahan, Iran. In: *J Osteoporos*. 2013;2013:205963.
8. POPOVICOVA M, BELOVICOVA M, SNOPEK P, BABECKA J (2021) Key Predictors of Overweight and Obesity in Adult Population. In *Clinical Social Work*, 2021, ISSN 2076-9741. No. 5, Vol. 12, p 79-86.
9. AGHAEI M, AFSHAN H R, QORBANI M, DASHTI H S, SAFARI R (2013) Bone mineral density in Iranian patients: effects of age, sex, and body mass index. In: *J Prev Med*. 2013; 3: 128-31.
10. GUIMING YAN, YAQI HUANG, HONG CAO, JIE WU, NAN JIANG, XIAONA CAO (2019) Association of breastfeeding and postmenopausal osteoporosis in Chinese women: a community-based retrospective study. Yan et al. In: *BMC Women's Health* (2019).
11. VEIGA SILVA A C, DA ROSA M I, FER-

- NANDES B et al. (2015) Fatores associados à osteopenia e osteoporose em mulheres submetidas à densitometria óssea [Factors associated with osteopenia and osteoporosis in women undergoing bone mineral density test]. In: *Rev Bras Reumatol*. 2015 May-Jun;55(3):223-8. Portuguese. doi: 10.1016/j.rbr.2014.08.012. Epub 2014 Oct 24. PMID: 25440700.
12. LLOYD J T, ALLEY D E, HAWKES W G, ORWIG D L (2014) Body mass index is positively associated with bone mineral density in US older adults. In: *Archives of Osteoporosis*; December 2014. 9(1):175.
  13. TIAN L M, YANG R F, WEI L H, LIU J, YANG Y, SHAO F F, MA W J, LI T T, WANG Y, GUO T K Prevalence of osteoporosis and related lifestyle and metabolic factors of postmenopausal women and elderly men: A cross-sectional study in Gansu province, Northwestern of China. In: *MEDICINE*. Volume: 96; Issue: 43, Article Number: e8294.
  14. JANKELOVA N, CZARNECZKI P (2021) Managerial Knowledge and Skills in the Practice of Healthcare Managers 1st Edition. - Warsaw: Collegium Humanum - Warsaw Management University, 2021. 171 p.
  15. POPOVICOVA M, SNOPEK P, HANCAKOVA J (2018) Specifics of nursing care of patients with total hip arthroplasty. In: *A multidisciplinary approach to the provision of health care". Scientific monograph from the international scientific conference Banská Bystrica*, April 19, 2018. Slovak Medical University, The Faculty of Public Health, Banská Bystrica, 2018. p. 217 – 235. ISBN: 978-80-89702-51-0.

# Peripheral Artery Disease -In Slovakia We Have a Chance To Find Out More

K. Dostalova (Katarina Dostalova)<sup>1</sup>, S. Wimmerova (Eva Wimmerova)<sup>1</sup>, P. Makara (Peter Makara)<sup>2</sup>, M. Belovicova (Mária Belovicova)<sup>1</sup>, M. Mucska<sup>1</sup>, S. Moricova (Stefania Moricova)<sup>1</sup>

<sup>1</sup> Slovak Medical University, Bratislava, Slovakia.

<sup>2</sup> Slovak Society of General Practice, Bratislava, Slovakia.

Original Article

## E-mail address:

katarina.dostalova@szu.sk

## Reprint address:

Katarina Dostalova  
Matejkova 13  
841 05 Bratislava  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 39 – 47

Volume: 14  
Cited references: 18

Issue: 4

## Reviewers:

Zofia Szarota  
WSB Academy / WSB University in Dąbrowa Górnicza, PL  
Andrea Shahum  
University of North Carolina at Chapel Hill School of Medicine, USA

## Keywords:

Peripheral arterial Disease. Risk Factors. Screening.

## Publisher:

International Society of Applied Preventive Medicine i-gap

CSWHI 2023; 14(4): 39 – 47; DOI: 10.22359/cswhi\_14\_4\_06 © Clinical Social Work and Health Intervention

## Abstract:

**Aim:** The aim of our study was to compare the referral of patients with suspected peripheral arterial disease (PAD) to the angiological department before and after the inclusion of the ankle-brachial index (ABI) measurement in the preventive examination performed by a general practitioner.

**Design:** Retrospective study.

**Participants:** 151 patients referred by general practitioners or other specialists (surgeon, diabetologist, internist, cardiologist, neurologist).

**Methods:** We determined the presence of atherosclerosis risk factors and measured the ABI using a Doppler ultrasound probe.

**Results:** We found that in the first half of 2019, 2.8 times more patients with suspected PAD were referred to the outpatient clin-

ic than in the first half of 2015. In 2015, general practitioners sent 32.5% of patients, and in 2019 it was 40.1% of patients.

**Conclusion:** A retrospective study shows that the inclusion of ABI measurement into the preventive examinations accelerated the detection of PAD.

*The retrospective study was supported by an internal grant from the Slovak Medical University.*

### **Biography of the first author:**

MUDr. Katarina Dostálová, PhD, MPH comes from Slovakia. She is an internist, an angiologist and a general practitioner, assistant professor at Faculty of Public Health, Slovak Medical University. She completed her PhD in Public Health. As a member of the Slovak Angiological Society Committee she is responsible for cooperation with Slovak Society of General Practice. She is a member of the editorial board of several medical journals. Her professional interest focuses on prevention and community medicine, which she considers to be a promising modality of medicine in the future with the support of new technologies.

## **Introduction**

Peripheral arterial disease (PAD) is a syndrome characterized by an imbalance between the need and the supply of oxygen and nutrients (blood perfusion) in the tissues of the lower limbs (1). Peripheral arterial disease (PAD) includes obliterative diseases of limb arteries and other arterial beds with the exception of coronary arteries (2). The most important risk factors for PAD remain smoking, diabetes mellitus (DM), arterial hypertension (AH) and dyslipoproteinemia (DLP). Less significant ones are gender, age and chronic renal failure. Their management is mainly the responsibility of angiologists and diabetologists. Smoking and diabetes mellitus show the strongest association with the occurrence and progression of PAD. PAD reduces the quality of life; it can even lead to the amputation of the affected limb (3). A characteristic symptom is claudication pain, which occurs during exertion and stops after a short rest. However, only a certain part of patients has typical symptoms (4).

Claudication pain may be absent in patients with polyneuropathy, and it is often absent in di-

abetics. Claudication does not occur in patients who cannot walk due to immobility caused by musculoskeletal diseases, exertional dyspnoea or other difficulties due to polymorbidity. Interestingly, up to 10-50% of patients with intermittent claudication have never consulted a medical doctor about their problems (4).

PAD of the lower limbs is characterized by narrowing and/or thickening of the arteries supplying the lower limbs, which leads to a deterioration of blood supply to the tissues and nerves, and thus to their damage.

PAD of the limb arteries occurs in about 5-10% of the population older than 60 years, while its incidence varies in individual epidemiological studies depending on the diagnostic methods used to diagnose PAD (based on anamnestic data or also using instrumental examination methods). The choice of the investigated file is also decisive.

In a German prospective study that followed the fate of 109 patients with intermittent claudication for 10 years, 62.3% of patients developed "polyvascular" disease, with 20% of patients having 3 vascular beds affected (3). Similarly, in a Slovak study of 2,207 patients who were examined by general practitioners, it was found that patients with an ankle-brachial index of less than 0.9 had a significantly higher incidence of myocardial infarction, angina pectoris and stroke (2).

In an inpatient study of 990 patients who were treated for various causes in a department of internal medicine, it was found that 6% of the patients had a history of PAD, but measurement of ankle-brachial pressure index revealed that up to 43.7% of patients had an index of less than 0.9 (4). In a German epidemiological study of 6,880 patients (average age 72.5 years) where GPs measured the ankle-brachial index (ABI) in all patients over 65 years of age, a prevalence of PAD (ABI less than 0.9) in 19.8% of men and 16.8% of women was found (5).

The measurement of ankle pressures and subsequently the calculation of the ankle-bra-



chial index (the abbreviation ABI from the English Ankle-Brachial Index is commonly used) is a basic auxiliary examination in the diagnosis of PAD. The ABI index is defined as the ratio of the blood pressure measured on the lower limb (ankle) and the blood pressure measured on the upper limb. Reduced pressure in the lower limbs occurs in ischemic disease of the lower limbs. The ABI index is thus an important risk marker of ischemic disease of the lower limbs and predicts the probability of a heart attack or stroke (6). It has been shown that ABI is an indirect indicator of atherosclerotic damage in other vascular beds (coronary, cerebral, renal) (7). It is a very simple and at the same time informative examination for the identification of patients that are at risk. The ABI value reliably confirms or excludes vascular limb disability.

Under physiological circumstances, arterial blood pressure (BP) values increase slightly towards the periphery. Any pathology in terms of narrowing or closing of the artery will be manifested by a drop in blood pressure in the periphery. We measure systolic BP on the peripheral arteries at the place of the applied cuff. It responds most sensitively to hemodynamic changes and is easily detected using a Doppler ultrasound meter.

Ankle BP is measured at a. dorsalis pedis in a supine patient. We record the BP at which the Doppler signal appears when the cuff is inflated. The value of the measured BP is from the place where the cuff is applied. If we measure on 2 or 3 arteries of the lower limb, the highest measured ankle BP is decisive. However, at some workplaces, ABI is calculated for each examined artery separately. We also measure BP on both aa. brachialis. Decisive is the higher measured

systolic blood pressure (sBP). ABI for the right lower limb (RABI - right ankle-brachial index) and ABI for the left lower limb (LABI - left ankle-brachial index) are then calculated according to the formula:

RABI =	$\frac{\text{systolic pressure on the peripheral artery of the right lower limb}}{\text{higher systolic pressure in the upper limb}}$
LABI =	$\frac{\text{systolic pressure on the peripheral artery of the left lower limb}}{\text{higher systolic pressure in the upper limb}}$

Physiological ABI values range between 1 and 1.4 (8). Values below 0.9 are pathological. Borderline values (0.9-1) may occur after exercise, but should normalize within 30 seconds. ABI is measured at rest and 1 minute after exercise. With narrowed arteries, the pathological result becomes more pronounced after the load. If BP remains reduced by 20%, it is a diagnostic criterion for PAD (9). An absolute value of ankle BP below 50 mmHg indicates impending critical limb ischemia. The overall survival of patients with ABI<0.3 is significantly shorter than that of patients with a higher value (4). Increased ABI values  $\geq 1.4$  indicate mediocalcinosis.

An ABI value of <0.9 confirms the diagnosis of PAD and at the same time detects PAD in asymptomatic patients. A pathologically reduced ABI value confirms the vascular etiology of pain in the lower limbs, and we also use it to assess the severity of the disease. It thus gives us key information about the patient's long-term prognosis (Table no. 1).

**Table 1** Diagnostic significance of ABI<0.9 (modified according to Norgren, 2007)

Confirms the diagnosis of PAD
Detects PAD in asymptomatic patients
Confirms a vascular etiology of pain in the lower limbs
Helps in assessing the severity of the disease
Helps to assess the development of the disease (progression, improvement, stabilization)
Has a high correlation with coronary and cerebrovascular disease
Key information about long-term prognosis (increased risk of cardiovascular mortality)

Ankle BP should be measured in all patients over 65 years of age, in smokers and ex-smokers, in patients with diabetes from the age of 50 (8), in patients with atherosclerosis, in those with dyslipoproteinemia, in hypertensive patients, in patients with pain in the lower limbs, and in patients with claudication or rest pain (7).

In the context of the anamnesis and clinical examination of the patient (inspection, palpation - especially of peripheral pulsations, auscultation over large arteries, and in questionable situations also the use of stress tests - e.g., according to Ratschow), the general practitioner evaluates the results of the ABI measurement (Table 2):

In 2016, ABI measurement was included in the preventive check-up performed by a general practitioner for all patients over 60 years of age and for patients over 50 years of age if they have at least one risk factor (10).

## Methods

The aim of our work was an analysis focusing primarily on the risk factors of atherosclerosis in a set of patients suspected of having PAD who were referred for the first time to the Angiological Outpatient Clinic at the Academician Ladislav Dérer Hospital of the Bratislava University Hospital.

As in 2016 in the Slovak Republic the ABI measurement was included in the preventive check-up in the general practitioner's clinic for adults, we compared the characteristics of patients referred in the first half of 2015 and in the first half of 2019.

Another aim was to compare the characteristics of patients referred by general practitioners and other specialists.

Into our research sample group, we included 151 patients who were examined for the first time in the Angiological Outpatient Clinic at the Academician L. Dérer Hospital of the Bratislava University Hospital in the first half of 2015 (40 patients) and the first half of 2019 (111 patients) with a suspected diagnosis of peripheral arterial disease. Of the 151 patients, 75 were men (49.7%) and 76 were women (50.3%). Patients were referred by general practitioners or other specialists (surgeon, diabetologist, internist, cardiologist, neurologist).

We took patient's medical history, including the identification of atherosclerosis risk factors. We also drew information from medical records or we added laboratory tests. Patients underwent clinical examination. Subsequently, we measured the systolic blood pressure on the upper limbs above the brachialis artery and the systolic blood pressure on the lower limbs in the area of the ankle above the tibialis posterior artery and the dorsalis pedis artery with a BIDOP 100V3 portable doppler device. We calculated the ABI according to the standard formula (the ratio between the systolic pressure at the arm and at the ankle).

Statistical analyses were carried out using SPSS (Statistical package for social sciences) software (11). For the basic statistical analysis, we used frequency tables, and as numeric characters also mean, standard deviation, minimum, maximum and range (12). To compare the results for the investigated subsets, we used contingency tables and Fisher's exact test for nominal characters (13). For numerical characters, for comparison, we used non-parametric exact Mann-Whitney U test and Kruskal Wallis Test

**Table 2** ABI interpretation and following procedure

ABI	Interpretation	Following procedure
> 1,3	Mediocalcinosis	Angiological examination Prevention according to the patient's risk profile
1,0 – 1,29	Normal values	Prevention according to the patient's risk profile
0,9 – 1,0	Borderline values	Repeat ABI, ABI after load Prevention according to the patient's risk profile
0,5 – 0,8	PAD	Angiological examination Prevention according to the patient's risk profile
< 0,5	A severe form of PAO	Early angiological examination Prevention according to the patient's risk profile

(14). The relationships between the investigated variables are significant when the corresponding p-value is:  $p < 0.05$  (15). Tables and graphic presentation of the comparisons were made using the MS Excel program.

## Results

The research sample group consisted of 151 patients, who were examined for the first time in the Angiological Outpatient Clinic at the Academician L. Dérer Hospital of the Bratislava

University Hospital in the first half of 2015 and the first half of 2019 with a suspected diagnosis of peripheral arterial disease (Table 3). Of the 151 patients, 75 were men (49.7%) and 76 were women (50.3%). Patients were referred by general practitioners or other specialists (surgeon, diabetologist, internist, cardiologist, neurologist).

In the first half of 2015, 12 men and 28 women were referred to the Angiology Outpatient Clinic. In the first half of 2019, it was 63 men and 48 women. Using Fisher's exact test, we found that the proportion of women in 2015 was statistically significantly higher (Fisher's exact test,  $p = 0.004$ ).

We were also interested in the risk profile of the referred patients. By comparing the risk factors of patients referred in the first half of 2015 and of 2019, we found that the proportion of smokers increased statistically significantly (Fisher's exact test,  $p=0.005$ ). The proportion of patients with hyperlipoproteinemia also increased by 15.8 percentage points, but it was not statistically significant (Fisher's exact test,  $p=0.089$ ) (Table. 4).

We determined the body mass index (BMI) of the patients. We found that not even 27.8% of referred patients had a BMI>30 kg/m<sup>2</sup>; 18.7% of men and 36.8% of women, which is a statistically significant difference using Fisher's exact test ( $p=0.018$ ). Given the higher proportion of obese women, the higher proportion of female diabet-

**Table 3** Characteristics of the research sample group

Year of examination		2015	2019
Sex	M	12	63
		30,0%	56,8%
	F	28	48
		70,0%	43,2%
Age	mean	70,80	72,78
	median	72,00	72,00
BMI	mean	28,79	27,41
	median	28,47	26,99
RABI	mean	0,95	0,94
	median	0,95	0,93
LABI	mean	0,91	0,96
	median	0,95	0,93

**Table 4** Risk factors present in patients referred in the first half of 2015 and 2019

Risk factors	2015 (40 patients)	2019 (111 patients)	p (Fisher's exact test)
Smoking	15 (37,5%)	70 (63,1%)	0,005
Hyperlipoproteinemia	20 (50 %)	73 (65,8%)	0,089
Diabetes mellitus	23 (57,5%)	64 (57,7%)	0,966
Arterial hypertension	38 (95,0%)	94 (84,7%)	0,104

**Table 5** Risk factors in men and women

Risk factor	Men 75 (49,7%)	Women 76 (50,3%)	p (Fisher's exact test)
Smoking	51 (68,0%)	34 (44,7%)	0,005
Hyperlipoproteinemia	38 (50,7%)	50 (65,8%)	0,090
Diabetes mellitus	42 (56,0%)	45 (59,2%)	0,743
Obesity (BMI>30 kg.m <sup>-2</sup> )	14 (18,7%)	28 (36,8%)	0,018
Arterial hypertension	71 (95,0%)	64 (84,7%)	0,104

ics (59.2%) compared to male diabetics (56.0%) is not surprising, but using Fisher's exact test ( $p=0.743$ ) this is not statistically significant.

We were also interested in the proportion of smokers between men and women. Of the referred men, 68% were smokers and 44.7% of the referred women were smokers. Using Fisher's exact test, this difference was found to be significant,  $p=0.005$  (Table 5).

From the point of view of anamnestic data, specifically the leading clinical symptom of peripheral arterial disease - intermittent claudication, we observed only a slight increase of 2.3 percentage points over 4 years (40.0% in 2015, 42.3% in 2019), which was not statistically significant (Fisher's exact test,  $p=0.474$ ) (Table 6).

From the point of view of a serious clinical finding regarding the occurrence of ulceration (which is a sign of the most serious involvement of PAD - critical limb ischemia), there was an increase of 25.6 percentage points after 4 years, which is statistically significant (in the first half of 2015 it was 5% of patients, and in the first half of 2019, it was 30.6% of patients ( $p=0.001$ , Fisher's exact test) (Table 6).

We found that in the first half of 2019, 3.5 times more patients with suspected peripheral arterial disease were referred than in the 2015. The share of general practitioners increased from 32.5 to 41.4%, (an increase of 8.9 percentage points, which is not statistically significant (Fisher's exact test,  $p=0.211$ ) (table no. 7).

We were interested in the difference in the occurrence of individual risk factors between patients referred by specialists and general practitioners in individual years. Between the first half of 2015 and 2019, we did not detect statistically significant changes in smoking, hyperlipoproteinemia or arterial hypertension. However, the number of patients with diabetes mellitus increased statistically significantly (Fischer's exact test,  $p=0.11$ ) (Table 8).

We were interested whether the patients who were referred used thromboprophylaxis in the form of antiplatelet or anticoagulant treatment. In the first half of 2015, 62.5% of patients had thromboprophylaxis, in the first half of 2019 it was 8.7 percentage points higher (71.2%). However, Fisher's exact test did not show that it was statistically significant ( $p=0.325$ ).

**Table 6** Clinical picture of the referred patients

Clinical picture	2015 40 patients	2019 111 patients	p Fisher's exact test
Claudication	16 (40,0%)	47 (42,3%)	0,797
Ulceration	2 (5,0%)	34 (30,6%)	0,001

**Table 7** Patients referred by general practitioners (GPs) and by other specialists

Referring specialist	2015 40 patients	2019 111 patients
GPs	13 (32,5%)	46 (41,4%)
other specialists	27 (67,5%)	65 (58,6%)

**Table 8** Risk factors of patients referred by general practitioners and specialists

Risk factor	General practitioner 59 patients	Other specialist 92 patients	Fisher's exact test p
Smoking	35 (59,3%)	50 (54,3%)	0,615
Hyperlipoproteinemia	38 (64,4%)	55 (59,8%)	0,610
Arterial hypertension	50 (84,7%)	82 (89,1%)	0,458
Diabetes mellitus	26 (44,1%)	61 (66,3%)	0,011

We found that 59.5% of patients who were referred with ulcerations (critical limb ischemia) died within three years of referral and 37.7% of referred patients without ulcerations died within 3 years of referral. The difference is statistically significant ( $p=0.020$ , Chi-square according to Pearson) (Table 9).

The odds ratio of death within 3 years of referral to an angiological outpatient clinic was 2.422 (95% confidence interval = 1.135-5.167). We can say that patients referred with ulceration have a 2.422 times higher chance of death within 3 years of being referred to an angiological outpatient clinic than patients without ulceration.

## Discussion

The results of the PAOS study, which was devoted to PAD screening in the Slovak Republic, showed that of the 2,207 examined patients, 9.4% had a pathologically reduced  $ABI < 0.9$ . Patients with pathologically reduced ABI had a significantly higher risk of myocardial infarction, angina pectoris and stroke. The affected were mostly men, smokers, diabetics, patients with hypertension, patients with dyslipoproteinemia and patients with lower education (7). In our retrospective study, we also confirmed the following fact: in 2015, there were 37.5% of smokers and in 2019 it was up to 63.1%. In 2015, there were 50% of patients with hyperlipoproteinemia and in 2019 it was 65.8%. In 2015, 57.8% of patients had diabetes mellitus and 57.7% in 2019. The proportion of hypertensive patients was high - in 2015, 95%, and in 2019 it was 84.7%.

Peripheral arterial disease of the limb arteries occurs in about 5-10% of the population older than 60 years, while its incidence is different in individual epidemiological studies depending on the diagnostic methods used to diagnose PAD (on the basis of anamnestic data or using instrumental examination methods). The choice of the investigated file is also decisive.

We state that in 2019, 3.5 times more patients were referred with suspected peripheral arterial disease than in 2015. The share of referring general practitioners increased from 32.5% to 41.4%, but this is not statistically significant. We assume that the higher proportion of general practitioners to referring specialists indicates a higher level of awareness among general practitioners. We assume that general practitioners also participate indirectly in the overall increase in patient referrals. Apparently, patients with ulcerations are primarily referred to surgeons, vascular surgeons, who after the initial examination of the patient consult an angiologist for the purpose of diagnostic clarification and further follow-up. This fact is also confirmed by the increased number of referred patients with ulcerations in 2019. The proportion of patients with ulcerations (which is a sign of the most serious involvement of PAD - critical limb ischemia) increased after 4 years by 25.6 percentage points, which is statistically significant ( $p=0.001$ , Fisher's exact test). In our research sample group, patients with ulcerations were sent for angiological examination by specialists other than general practitioners statistically significantly more often ( $p < 0.001$ , Fisher's exact test).

We expected the mortality of patients with critical limb ischemia to be high, but we were surprised that the findings were statistically significant in a not so large cohort. We found that 59.5% of patients who were referred with ulcerations (critical limb ischemia) died, which is statistically significantly more in contrast to patients referred without ulcerations (37.7%) ( $p=0.020$  Chi-square according to Pearson).

## Conclusion

In the 21st century, peripheral artery disease has become a global problem. Governments, NGOs as well as the private sector must address the social and economic implications and evaluate the best strategies for optimal

**Table 9** Survival of patients referred with and without ulcerations

Patient condition within 3 years of referral	ulceration 37 patients	without ulceration 114 patients
alive	15 (40,5%)	71 (62,3%)
exitus	22 (59,5%)	43 (37,7%)

prevention and treatment of peripheral artery disease (16).

From a public health point of view, we can say that general practice medicine in the Slovak Republic has seen significant professional development over the last decade. One of the important milestones is also the inclusion of ABI measurement by an automatic device using the oscillometric method in the preventive examination of patients over 50 years of age with risk factors and in all patients over 60 years of age. The measurement of ABI as well as the expansion of competences by the possibility of carrying out pre-operative examinations, the expansion of competences and prescription options all broaden the experience of general practitioners, who can thus, with greater knowledge, make decisions even in the differential diagnosis of pain in the lower limbs. Based on our work, we believe that in smokers and diabetics, it is worth considering performing the ABI measurement in younger age groups.

After treatment at a specialized vascular clinic, such a patient returns to ambulatory care. The general practitioner has a great responsibility in the subsequent management of atherosclerosis risk factors (careful monitoring and treatment of arterial hypertension, hyperlipoproteinemia, diabetes mellitus, influencing the patient's weight and motivating the patient in their physical activities) (17). Whether the result of the revascularization procedure will have long-term clinical success and will result in prolongation of life and improvement of its quality depends on this. Interest in a healthy lifestyle (healthy eating, stress prevention, active participation in screening programs, common physical activities) is a good starting point for the creation of communities of patients, which have great motivational potential (18).

## References

1. BABECKA J, POPOVICOVA M (2016) Limits in lifestyle in persons with chronic disease. In: *The position of nursing and public health in health promotion*. Trenčín: Slovakia; Alexander Dubček University in Trenčín, Faculty of medicine, 2016: 4-13. ISBN 978-80-8075-744-1.
2. STVRTINOVA V et al. (2009) *Peripheral arterial disease in Slovakia*, CEVJ, vol. 8, No 1, 2009.
3. BABECKA J (2020) The influence of the Mediterranean diet on health of an individual. In: *Days of practical obesitology and metabolic syndrome: Collection of scientific papers*. 1. ed., Warsaw (Poland): Collegium Humanum - Management University, 2020. ISBN 978-83-958245-0-0, s. 11-16.
4. NORGEN L, HIATT W R, DORMANDY J A et al. (2007) TASC II Working Group. Inter-Society Consensus for the Management of Peripheral Arterial Disease (TASC II). In *Eur J Vasc Endovasc Surg* 2007; 33: S1-75.
5. BALLOTTA E, GRUPPO M, MAZZALAI F, MARTELLA B et al. (2010) Infrapopliteal arterial reconstructions for limb salvage in patients aged  $\geq 80$  years according to preoperative ambulatory function and residual status. In *J Vasc Surgery* 2010; 148(1): 119-28.
6. BABECKA J (2022) The impact of obesity on urinary incontinence. In: *Multidisciplinary practical experience in providing health care for patients/clients with COVID-19*. Proceedings from VIII. International Scientific Conference in Michalovce, November 12 2021- online, 1. ed. Warsaw (Poland): Collegium Humanum - Management University, 2022. ISBN: 978-83-964214-0-1, s. 36-50.
7. STVRTINOVA V et al. (2008) *Vascular diseases*, SAP, Bratislava, 2008, 896s.
8. ROOKE T W et al. (2011) ACCF/AHA 2011 ACCF/AHA Focused Update of the Guideline for the Management of Patients With Peripheral Artery Disease (Updating the 2005 Guideline). In *Circulation*. 2011 Nov 1;124(18):2020-45.
9. ORCHARD T J, STRADNESS D E (1992) Assessment peripheral vascular disease in diabetes: report and recommendations of an international workshop sponsored by the American Diabetes Association and the American Heart Association September 18-20, 1992, New Orleans Louisiana. In *Circulation* 1993, 88:819-828.
10. Professional guidelines of the Ministry of Health of the Slovak Republic. Journal. Number: S03396-OZS-2015. 2015;63, 71-125
11. LUHA J (2009) Mathematical and statistical aspects of the processing of questionnaire re-

- search. Forum statisticum slovacum. 3/2009. SŠDS Bratislava 2009.
12. LUHA J (2006) Statistical methods of analysis of qualitative features. Forum statisticum slovacum. 2/2006. SŠDS Bratislava 2006.
  13. LUHA J (2010) Methodological principles of data recording from various areas of medicine and principles of their control. Forum statisticum slovacum. 1/2010. SŠDS Bratislava 2010.
  14. KANJI G K (2006) 100 Statistical Tests. 3rd Edition. SAGE 2006.
  15. LUHA J (1985) Testing of statistical hypotheses in the analysis of sets characterized by qualitative features. STV Bratislava, 1985.
  16. FOWKES F G et al. (2013) Comparison of global estimates of prevalence and risk factors for peripheral artery disease in 2000 and 2010: a systematic review and analysis. *Lancet*. 2013 Oct 19;382(9901):1329-40.
  17. DOSTALOVA K, MORICOVA S (2013) Conservative treatment of peripheral arterial disease of the lower limbs, In: *Cardiology for practice*. - ISSN 1336-3433. - vol.11, no. 2 (2013), p. 77-80.
  18. DOSTALOVA K et al. (2022) Prevention of vascular diseases and obesity in the light of community medicine, p. 123-129 in: BELOVIČOVÁ, M., POPOVIČOVÁ, M., VANSÁČ, P.: *Obesity and metabolic syndrome. Collection of scientific papers*, Collegium Humanum - Warsaw Management University, Warsaw, p. 487, 2022, ISBN 978-83-964214-3-2.

# Main Causes of Avoidable Mortality in Slovakia

A. Kovac (Andrej Kovac)<sup>1,2</sup>, N. Jankelova (Nadezda Jankelova)<sup>3</sup>, M. Mucska (Matej Mucska)<sup>1</sup>, N. Jankelova (Nada)<sup>1</sup>

Original Article

<sup>1</sup> Slovak Medical University in Bratislava, Faculty of Public Health, Slovakia.

<sup>2</sup> Educational, Scientific and Research Institute AGEL, NPO, Slovakia.

<sup>3</sup> University of Economics in Bratislava, Faculty of Business Management, Slovakia.

## E-mail address:

andrej.kovac@szu.sk

## Reprint address:

Andrej Kovac  
Slovak Medical University in Bratislava  
Faculty of Public Health  
Limbova 12  
833 03 Bratislava  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 48 – 52

Volume: 14  
Cited references: 9

Issue: 4

## Reviewers:

Arab Naz  
University of Malakand Chakdara Khyber Pakhtunkhwa PK  
Vitalis Okoth Otero  
Catholic University of Eastern Africa, Nairobi, KE

## Keywords:

Preventable Mortality, Risk Factors, Prevention.

## Publisher:

International Society of Applied Preventive Medicine i-gap

---

CSWHI 2023; 14(4): 48 – 52; DOI: 10.22359/cswhi\_14\_4\_07 © Clinical Social Work and Health Intervention

## Abstract:

Avoidable mortality refers to deaths that could be prevented or averted through adequate prevention, healthcare and interventions. These deaths are often linked to factors such as a lack of access to quality healthcare, insufficient prevention and health awareness, a lack of vaccinations, misdiagnosed or untreated diseases, and inadequate healthcare systems. The work maps the incidence of preventable diseases in Slovakia in comparison with OECD countries. According to a published statistical report by the Eurostat agency, up to 11,000 inhabitants of Slovakia under the age of 75 die annually from so-called preventable diseases. Up to 32% are caused by diseases of the heart and blood vessels, and 16% are caused by stroke. However, diseases of the heart and blood vessels account for up to 52% of all deaths in Slovakia (1). Slovakia ranks 21st



in treatable diseases. This does not indicate a good state of healthcare. The work also examines the occurrence of causes of preventable and curable diseases. The most common are cardiovascular diseases, tumors, and diseases of the respiratory and digestive organs. In the case of preventable diseases, these are the same groups. Examples of preventable mortality may include deaths from infectious diseases such as malaria, tuberculosis or HIV/AIDS that could be prevented with adequate preventive measures, vaccination or available treatment. For non-HIV patients who are at high risk of HIV infection and willing to adhere to prescribed medications, PrEP is very effective. Among adherents, PrEP can reduce the risk of HIV transmission by more than 90% (2). Another example would be deaths linked to unhealthy lifestyles, such as cardiovascular disease caused by smoking, an unhealthy diet and a lack of physical activity, which could be averted through prevention and lifestyle changes. Preventable mortality is an important area for health systems and health policies because it shows the possibilities of improving healthcare and reducing mortality through appropriate measures. Identifying the causes of preventable deaths can help create health programs and policies that aim to improve population health and prevent unnecessary loss of life.

## Introduction

Mortality analysis is often used to examine the course of diseases, especially in connection with their characteristics, such as time of death or causes of death. The most important characteristic of adult mortality is avoidable mortality. Avoidable mortality is death that could be prevented by improving healthcare and prevention. Barkasi (2017) adds that civilization diseases and their gradual prevalence in our population represent, from an economic point of view, in addition to constantly increasing healthcare expenses, also include costs associated with the loss of work productivity and the failure of economic growth due to lost working days, mortality and permanent disability. From a social point of view, the spread of civilizational diseases represents a loss of social status for the affected part of the population, a drop in their income and thus a decrease in consumption for this part of the population. Compared to the economic and social losses associated with the prevalence of civilization diseases, the costs of prevention and effective treatment of these diseases are significantly lower (3).

Worldwide, the threshold before which we talk about preventable mortality, has been deter-

mined as the age of 75. Avoidable mortality is divided into:

- Preventable mortality, which can be prevented primarily by preventive measures, i.e., mainly effective public health and primary preventive interventions (i.e., before the outbreak of diseases/injuries, in order to reduce the occurrence).
- Curable mortality, which can mainly be avoided even after the onset of the disease with timely and effective interventions in the field of healthcare, including secondary prevention and treatment.

### **A comparison of the causes of preventable deaths in the Slovak Republic and in the EU**

The OECD (4) defines preventable and treatable causes of mortality as follows:

- Preventable mortality (preventable): Causes of death that are preventable mainly through effective public healthcare and primary prevention interventions (i.e., before disease/injury outbreaks, to reduce occurrence).
- Treatable (or accessible) mortality: Causes of death that are largely avoidable through early and effective healthcare interventions, including secondary prevention and treatment (i.e., after disease onset to reduce mortality).

As stated in OECD documents (5), in 2019 more than 1 million premature deaths could have been prevented in EU countries through better prevention and healthcare interventions. This represents about two-thirds of deaths in the under-75 age group. Most of these deaths (644,000 or 64% of the total) were preventable through effective primary prevention and other public health interventions, while just over one-third (371,000 or 36%) were considered treatable through more effective and timely interventions within healthcare (Fig. 1).

According to Eurostat data for 2019 (4), Slovakia ranked 21st out of 27 European countries in the assessment of preventable mortality. In 2019, there were 395 avoidable deaths per 100,000 inhabitants a year in Slovakia. Of the total number of preventable deaths in 2019, avoidable deaths accounted for 231 and treatable deaths for 164 per 100,000 inhabitants per year (Fig. 2).

The Slovak Republic was placed at the bottom end of this ranking and this indicates serious deficiencies in the prevention and treatment of chronic non-infectious diseases in particular.

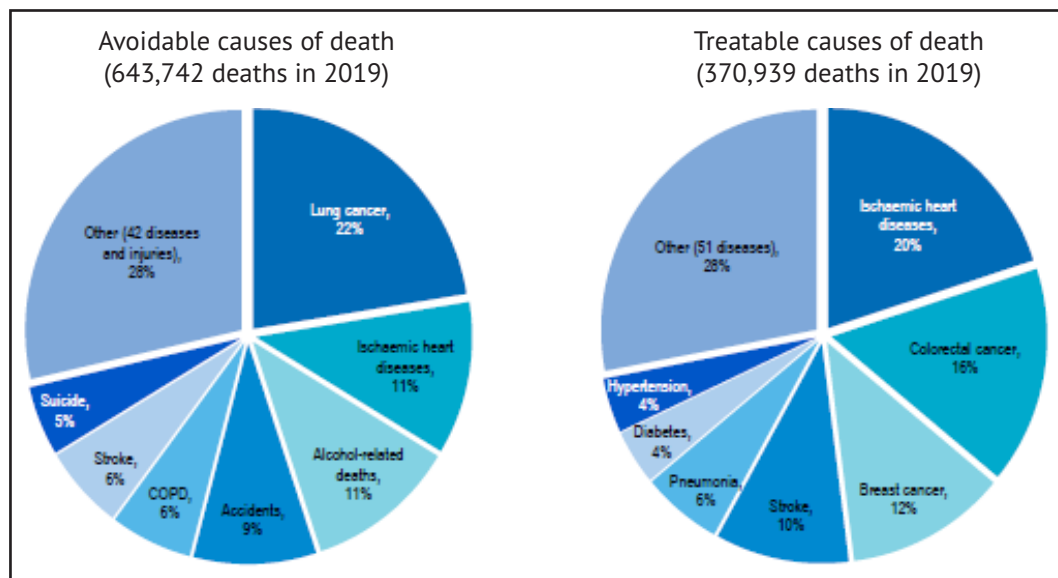
The most important groups of preventable deaths according to the OECD (2022) are:

- *Cardiovascular diseases* - the most common are myocardial infarction, heart failure, stroke and hypertension. These diseases are often

associated with an unhealthy lifestyle and are related to risk factors such as smoking, an unhealthy diet, a lack of exercise, obesity, high blood pressure and diabetes.

- *Tumor diseases* - these are malignant tumors that occur in various organs. Risk factors include smoking, excessive alcohol consumption, a lack of exercise and an unhealthy diet. Tumor diseases are gradually becoming the biggest problem for the health system around the world, and we can expect that malignant tumors to threaten the human population even more in the third millennium of its existence. It is estimated that in 2030 the total number of cancer patients may triple (6).
- *Alcohol and drug addiction* - Alcohol is the most common preventable risk factor for health damage and death. Controlling the availability and supply of alcohol has been shown to be among the most efficient and cost-effective approaches to reducing alcohol-related health harm (7). Alcoholism and drug addiction are serious health problems that can cause a range of complications, including heart disease, liver disease and mental disorders.
- *Disorders of the respiratory system* - for example, chronic obstructive pulmonary disease (COPD) and bronchial asthma, etc. The main risk factors include smoking and air pollution.

**Figure 1** Leading causes of preventable deaths in the EU, 2019



Source: OECD/European Union (2022), *Health at a Glance: Europe 2022*

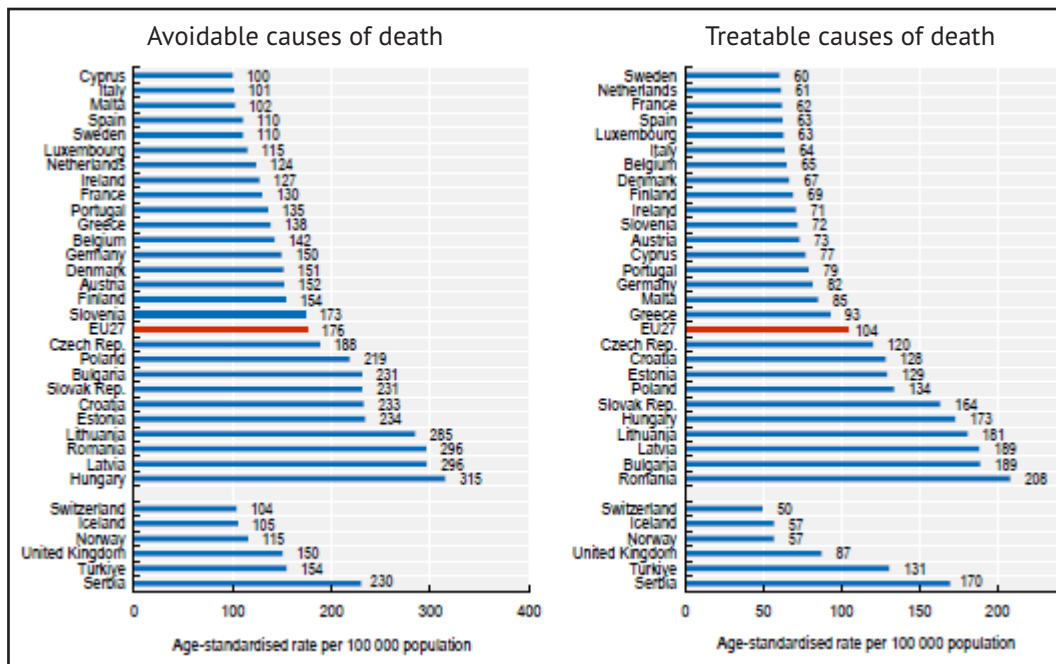
- *Injuries* - including traffic accidents, accidents at work and domestic accidents. Accident prevention includes following safety rules and using protective equipment.

According to NCZI (2022-8), the majority of diseases that cause total death in the Slovak Republic are diseases of the circulatory system, tumors of the respiratory and digestive systems, and external causes. These mentioned diseases caused 93.23% of all deaths in 2010. In 2012, the mentioned diseases caused death in 93.25% of the population. In 2013, mortality from these diseases dropped to 92.97%. In the following years, the given diseases caused death in the range of 92.24% to 90.65%, while each year the percentage decreased slightly. In 2020, the above-mentioned diseases caused 85.15% of all deaths. Between 2012 and 2020, the number of deaths per 100,000 inhabitants is 0.46 to 0.47 and is more or less stable, the higher occurrence was in 2021 as a result of deaths from diseases caused by the coronavirus. In 2021, a total of 73,461 people died in Slovakia. The increase compared to the previous year, when 59,089 people died, is explained by deaths associated with the COVID-19 pandemic.

As reported by NCZI (2019 - 9), in cases of preventable deaths in 2017 in Slovakia, the most common causes of death were myocardial infarction and coronary heart disease (20.3%), lung cancer (13.3%), diseases caused by alcohol and other poisonings (12%), and cerebrovascular accidents (CVA) and cerebrovascular diseases in total (9.1%). The risk factors that connect most of these diseases are smoking, overeating, a lack of exercise, alcohol and not having preventive examinations. But the common basis is an incorrect lifestyle and a lack of health awareness. Our population has not been guided by the family towards a healthy lifestyle since childhood. The school, which complements the family in education, does not deal with the special subject “health education”. At the same time, it is known that the knowledge and habits that an individual develops in his/her youth usually have a permanent character and persist throughout the rest of their life.

In the cases of treatable deaths, the most common causes were myocardial infarction and coronary artery disease, overall 27%, colorectal cancer (14.2%), central brain stroke and cerebrovascular diseases in general (10.8%), breast cancer in women (7,1%). (9).

**Figure 2** Avoidable deaths in EU countries, 2019



Source: OECD/European Union (2022), *Health at a Glance: Europe 2022*

74,461 inhabitants died in Slovakia in 2021, out of which 35,820 were under the age of 75. The most common causes of death were diseases of the circulatory system. A total of 28,332 people died of these diseases, of which 9,964 people under the age of 75 were at the age of preventable diseases. A total of 13,039 individuals died of malignant tumors, of which 8,061 were under the age of 75. Respiratory system diseases accounted for 6,306 or 2,944 deaths and, in the case of diseases of the digestive tract, 3,135 or 2,280 deaths. In general, almost 50% of deaths were in people younger than 75 (8).

## Conclusion

It is important to emphasize that a crucial number of preventable deaths are associated with unhealthy lifestyles and preventable risk factors. It is enough not to smoke, eat a healthy and balanced diet, exercise enough and participate in preventive and screening programs in time. Most cases of preventable mortality in Slovakia could be averted by adequate preventive measures and the improvement of public health, including education about healthy lifestyles, the availability of healthcare and support for the creation of a healthy environment. If the Slovak healthcare system manages to mitigate the impact of risk factors, provide high quality diagnostic and therapeutic procedures, and provide sufficient medical personnel and financial resources, we believe that the indicators of the health status of the Slovak population can improve in a relatively short period of time.

## References

1. BABECKA J, VISNOVCOVA E (2021) Factors affecting nursing care for seniors in the terminal stage of the disease. In: *Medical studies* [text document (print)]: scientific-professional journal of the Faculty of Health of the Catholic University in Ružomberok. – Ružomberok (Slovakia): Catholic University in Ružomberok. Faculty of Health.– ISSN 1337-723X. – Year 13, no. 1 (2021), p. 3-6.
2. BABECKA J, GULASOVA I (2020) Prevention and prophylaxis of HIV infection. In: *Proceedings VI. International scientific conference HEALTH, SOCIAL AND NURSING ASPECTS OF CIVILIZATION DISEASES 2020*, Michalovce, St. Elizabeth University of Health and Social Sciences, p. 9-15., ISBN: 978-83-952951-3-3.
3. BARKASID (2017) Social worker as part of a multidisciplinary team in managing diabetes mellitus. In: BELOVICOV M, VANSAC . *Days of practical obesitology and metabolic syndrome*. Collection of scientific papers. Warsaw: Humannum Publishing Institute, 2017. ISBN: 978-83-7520-221-2, p. 9 – 21.
4. Avoidable mortality: OECD/Eurostat lists of preventable and treatable causes of death (January 2022 version) (2022) Paris: OECD/Eurostat, 2022. Available on: <https://www.oecd.org/health/health-systems/Avoidable-mortality-2019-Joint-OECD-Eurostat-List-preventable-treatable-causes-of-death.pdf>.
5. OECD/European Union (2022) Health at a Glance: Europe 2022: State of Health in the EU Cycle. Paris: OECD Publishing, 2022. 217 p. ISBN 978-92-64-67515-5. Available on: <https://doi.org/10.1787/507433b0-en>.
6. POPOVICOVA M (2019) Use of statistical data in oncology nursing. Bratislava: VŠZaSP St. Elizabeth, 2019, p. 66. ISBN 978-80-8132-208-2.
7. POPOVICOVA M, SULCOVA J, BARTA R (2022) Alcoholism – Epidemic of the Current Times after COVID-19 Pandemic (Letter to the Editor), *Clinical Social Work and Health Intervention*, No.6, Vol 13, 2022. p. 8-18.
8. National Center for Health Information (2022) Health Yearbook of the Slovak Republic 2021. Bratislava: NCZI, 2022. 256 p. ISBN 978-80-89292-83-7. Available on: [https://www.nczisk.sk/Documents/rocniky/2021/Zdravotnicka\\_rocenka\\_Slovenskej\\_republiky\\_2021.pdf](https://www.nczisk.sk/Documents/rocniky/2021/Zdravotnicka_rocenka_Slovenskej_republiky_2021.pdf)
9. NCZI (National Center for Health Information) (2019) *Health Yearbook of the Slovak Republic 2017*. Bratislava: NCZI, 2019. 277 p. ISBN 978–80–89292–69–1. Available on: [https://www.nczisk.sk/Documents/rocniky/2017/Zdravotnicka\\_rocenka\\_Slovenskej\\_republiky\\_2017.pdf](https://www.nczisk.sk/Documents/rocniky/2017/Zdravotnicka_rocenka_Slovenskej_republiky_2017.pdf).

# Analysis of Safety Aspects in Nuclear Medicine in the Comparison of Cardio Cameras

L. Lacko (Lukáš Lacko)<sup>1</sup>, J. Babecka (Jozef Babecka)<sup>2,3</sup>

Original Article

<sup>1</sup> University of Security Management, Kosice, Slovakia.

<sup>2</sup> Catholic University in Ruzomberok, Faculty of Health, Slovakia.

<sup>3</sup> Central Military Hospital Ruzomberok SNP – FN, Nuclear Medicine Clinic, Slovakia.

## E-mail address:

lukas.lacko@vsbm.sk

## Reprint address:

Lukas Lacko  
University of Security Management, Košice  
Kostova 1  
040 01 Kosice  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 53 – 60

Volume: 14  
Cited references: 8

Issue: 4

## Reviewers:

Vlastimil Kozon  
Allgemeines Krankenhaus – Medizinischer Universitätscampus, Vienna, AT  
Steve Szydowski  
University of Scranton School of Education, USA

## Keywords:

Nuclear Medicine. Radiation Protection. Cardio Camera. Security. Patient.

## Publisher:

International Society of Applied Preventive Medicine i-gap

---

CSWHI 2023; 14(4): 53 – 60; DOI: 10.22359/cswhi\_14\_4\_08 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** Examinations in nuclear medicine brings several problems for the patient and the staff from the point of view of radiation protection. The solution should be to reduce the radiation load. Therefore, ways are being sought to minimize the radiation of both the patient and the staff. This is related to the development of new diagnostic devices in nuclear medicine that enable a reduced radiation load by reducing the applied dose of the radiopharmaceutical, shortening the examination time and using a radionuclide with a favourable effective half-life and energy. The essence of diagnostics and treatment in nuclear medicine is the introduction of an open emitter into the body and, using the tracer principle, the detection of ionizing radiation emitted from the patient's body. This enables the monitoring of regional physiology and biochemistry in the organism using special devices - gamma cameras.

**Objective:** At our workplace, we started working with a new cardio camera, CZT 530c, which reduces the patient's radiation load, brings more valid results, etc. The goal was to compare the radiation load per patient when comparing two cameras.

**Research sample group and methodology:** In this retrospective cohort study, records of patients who underwent myocardial scintigraphy were used and evaluated. In the first monitored group of patients, during the years 2003-2016 at the Central Military Hospital in Ružomberok, these examinations were performed with 18,000 patients using the Millennium gamma camera, VG Hawkey f. GE. We analysed a set of 4,270 individuals that were examined in the years 2014-2016 by myocardial perfusion scintigraphy. In the second set of respondents, for a period of two years (2019-2021), we performed perfusion scintigraphy of the myocardium in 2,900 individuals on a cardiology gamma camera CZT 530c f. GE. We compared these two files. The data were processed in the STATISTICA program using a z-test of relative values.

**Results:** In the first monitored group, there were 61% negative findings and 39% positive findings. Of the number of positive findings, conservative treatment was recommended in 19%, MSCT coronary angiography in 7% and SCA in 13%. The sensitivity was around 95% and the specificity around 92%. In the second group, we found a negative finding in 49% of individuals and a positive finding in 51% of individuals. Of the positive findings indicative of coronary heart disease, we recommended coronary angiography in 24% of those examined, namely MSCT in 13% and SCA in 11% of individuals. For the remaining 27% of the examined patients, medical treatment was recommended.

**Conclusion:** The new type of cardio gamma camera "Discovery NM CZT 530c f. GE" enables the speeding up of the examination, increasing the sensitivity and specificity of the examination, at the same time reducing the dose of the radiopharmaceutical, thus reducing the radiation burden of patients by 50%. During the assessment, it allows for a better evaluation of the hemodynamic parameters. The result is more valid when compared with coronary angiography.

## Introduction

Nuclear medicine is a relatively young field, as it has been around for about 70-80 years. The era of nuclear medicine began in the late 1940s, and with its gradual development, especially regarding of computer technology, a separate medical field was created that deals with diagnostics and treatment with open emitters. The essence of the examination is the administration of an open emitter into the organism, which is characterized by two principles: the tracking principle using

the detection of ionizing radiation emitted from the patient's body and the principle of targeted administration of a radioactive substance with sufficient energy to irradiate a defined volume of tissue for the purposes of treatment. The tracer principle was discovered by George de Hevesy (1). It is used to monitor regional physiology and biochemistry inside the body, using devices that detect the radiation of a radiopharmaceutical labelled with a radionuclide from the organism under investigation. On the same basis, but with

a different purpose, it is also used in radionuclide treatment, when the radiopharmaceutical is deliberately introduced into the target volume of the tissue (organ), which must be irradiated with a high dose. Nuclear medicine is unique in that it provides information about a patient's condition that may not be easily detected or obtained at all by other investigative methods. Examinations with open emitters mainly determine the function and the course of metabolic processes. It does not focus on the anatomical structure of the examined parts of the body. In many diseases, functional pathological changes precede the appearance of structural morphological changes. The results of examinations in nuclear medicine are complementary to structural imaging methods, which also led to the emergence of hybrid imaging.

### **Radiation protection in nuclear medicine**

Examination in nuclear medicine brings several problems from the point of view of radiation protection. The effective detection efficiency of diagnostic devices is low, because the emitted radiation spreads in all directions and we scan only a small part falling on the detector. This causes some limitations that make it difficult to reduce the applied activity. This problem also affects the radiation load of the patient, to whom we have to apply a sufficient amount of radiopharmaceutical to ensure a high-quality recording. Another problem is the effect of radiation on personnel. The above shows the importance of radiation protection for all nuclear medicine workers (starting with radiopharmacists, through physicists, doctors, nurses, radiological technicians, reception and cleaning service workers). A patient is always exposed to radiation. Therefore, ways are being sought that should lead to the minimization of radiation to the lowest possible level so that the necessary diagnostic and treatment effect is achieved. This is related to the development of new diagnostic devices in nuclear medicine, which enable a reduced radiation load (reduction in the dose of the radiopharmaceutical, shortening of the examination time, etc.). It is very important to know the physical properties of radionuclides that are used in nuclear medicine. Here belong:

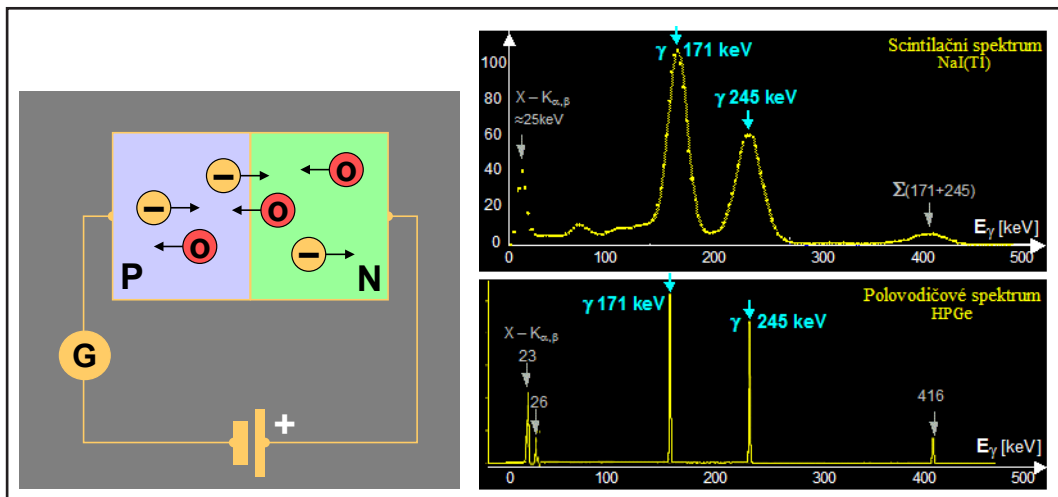
- type of radiation emitted
- energy of radiation emitted

- the physical half-life of the transformation (1).

The basic imaging device in nuclear medicine is a gamma camera (called Anger's scintillation camera, according to the inventor). The gamma camera is used to perform scintigraphy or single-photon emission computed tomography (SPECT). Currently, only digital gamma cameras and so-called hybrid tomographs (integrating functional imaging of nuclear medicine with a morphological imaging modality into one device) are being produced (2). There is a new type of gamma camera, which instead of a large surface scintillation detector is based on a principle of semiconductor detectors, and it belongs to the group of semiconductor gamma cameras. Work had already begun in 1991 on the construction of small cameras with semiconductor CdTe (Cadmium Telluride) detectors. The first commercially available cameras with semiconductor detectors were special single-purpose cameras for nuclear cardiology. A breakthrough after 2016 was brought by a new commercially available dual-head gamma camera for general SPECT/CT use (Discovery CZT by GE). The abbreviation CZT means semiconductor composition (Cadmium-Zinc-Tellur) (3).

Semiconductors are solid substances that have higher electrical conductivity than insulators, but lower than metals. Electric current is transferred using electron-hole pairs. The properties of semiconductors significantly depend on their composition. Radiation particles are capable of directly or indirectly ionizing semiconductor atoms and thus creating free charge carriers. The resulting electron (-)-hole (0) pairs increase the current flow, the value of which provides information on the energy spectrum of the incident particles. When comparing semiconductor detectors with gas-filled ionization detectors, their advantage is ten times less energy (2.96eV-Ge) required to create one ion pair, resulting in their higher resolution. Compared to scintillation detectors, they have significantly more accurate energy resolution and significantly (20x) higher sensitivity (Picture 1).

**Picture 1** The principle of the semiconductor detector (SD) - a comparison of the energy spectrum from a semiconductor detector shows a significantly higher resolution compared to the spectrum from a scintillation detector (1).

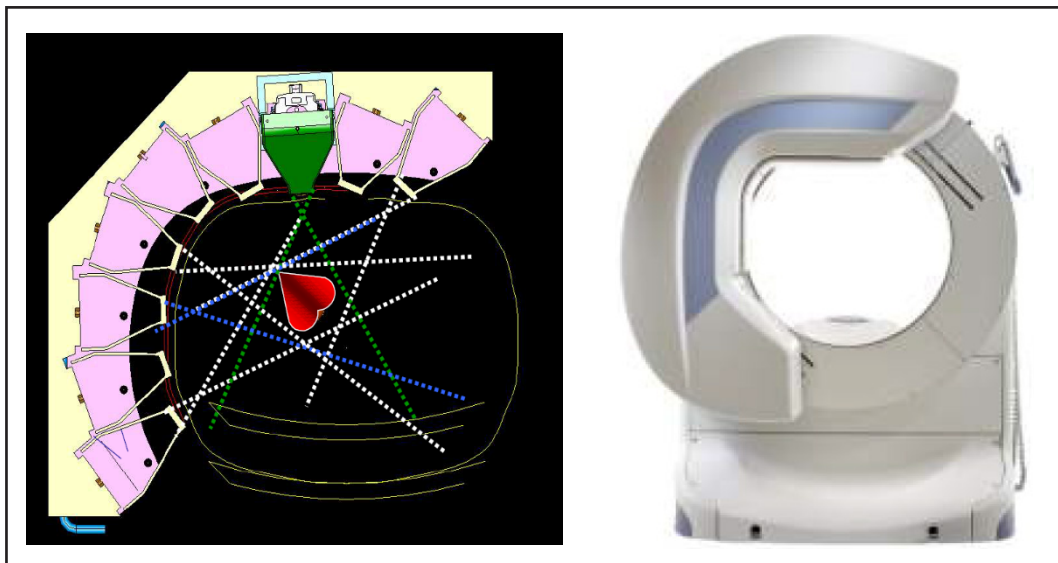


### Cadmium-Zinc-Telluride semiconductor detector:

- electric current is transmitted by a pair: electron-hole,
- one semiconductor detection unit corresponds to one hole on the collimator (**pinhole**), one image point (pixel),
- the detector is arranged in a semicircle, without rotation,
- sensitivity increases (4x) and resolution improves (4).

Cardio camera “Discovery CZT 530c” has a semiconductor detector of ionizing radiation. In digital semiconductor gamma cameras with direct conversion of gamma radiation, one hole on the collimator (pinhole) corresponds to one detection unit of the semiconductor and also to one resulting image point (pixel). This design principle practically corresponds to the old multi-detector gamma cameras, which had high sensitivity and low dead time. The difference is that the spatial resolution of the new semicon-

**Picture 2** Cadmium-Zinc-Telluride semiconductor detector (5)





ductor cameras (given by one pixel) is 2.5 mm, which is 5-10 times better than that of multi-detector cameras and almost 2 times better than that of scintillation cameras of a classic design, see Picture 2 (6).

### Cardiology tomographic gamma camera „Discovery CZT 530c“

Special gamma cameras for cardiology use (SPECT) take advantage of the fact that the heart is a relatively small organ that does not require a large detector. Initially, they were just a downsizing of standard instruments (which achieved a reduction in price) (5). However, new semiconductor systems with new type detectors have significant design deviations (Picture 3):

- A larger number of (new type) solid semiconductor cadmium-zinc-telluride (CZT) detectors, arranged in a semicircle, without rotation around the patient during scanning, simultaneously scanning from multiple angles.
- The entire detection process takes place simultaneously and not sequentially, as with classic SPECT, dynamic recording can also be performed.
- Semiconductor detectors CZT (Cadmium-Zinc-Tellur) significantly increase the sensitivity of detection, the result is a reduction of the detection time, a reduction of the applied activity and thus of the effective dose.
- The duration of the examination was reduced from 15 minutes to 5 minutes.
- Speeding up the examination, thereby increasing work efficiency.
- Higher sensitivity (4x) for standing detectors, ensures better resolution.
- Reduction of the radiopharmaceutical dose (radiation load for the patient by 50%).
- More accurate evaluation of hemodynamic parameters.
- Possibility of dynamic scanning in 3D projection.
- A more valid result when compared with coronary angiography (7).

### A set of examined patients

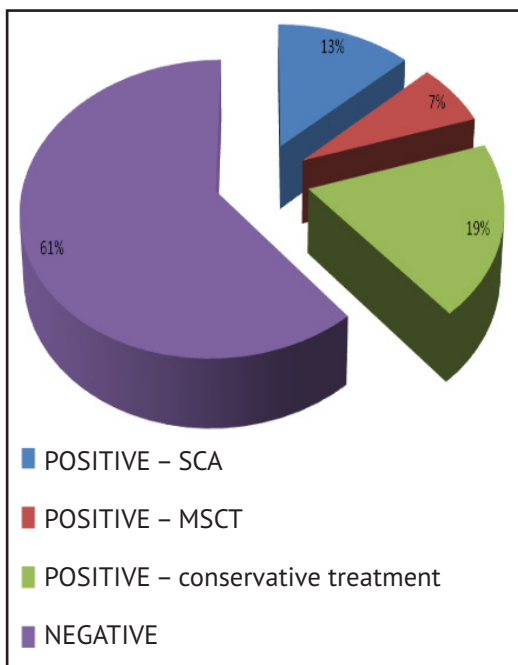
During the years 2003-2016, we performed myocardial perfusion scintigraphy on a gamma camera Millennium, VG Hawkay f. GE in 18,000 patients. We analysed a set of 4,270 individuals examined in the years 2014-2016, who were examined by myocardial perfusion scintigraphy. In this group, there were 61% negative findings and 39% positive findings. Of the number of positive findings, conservative treatment was recommended in 19%, MSCT coronary angiography in 7% and SCA in 13%. The sensitivity was around 95% and the specificity around 92%. (Graph 1).

Over a period of two years, in the period 2019-21, we performed myocardial perfusion

**Picture 3** Discovery NM CZT 530c f. GE (Nuclear Medicine Clinic at Central Military Hospital Ružomberok SNP – FN)



**Graph 1** Analysis of a set of 4,270 patients with negative and positive findings

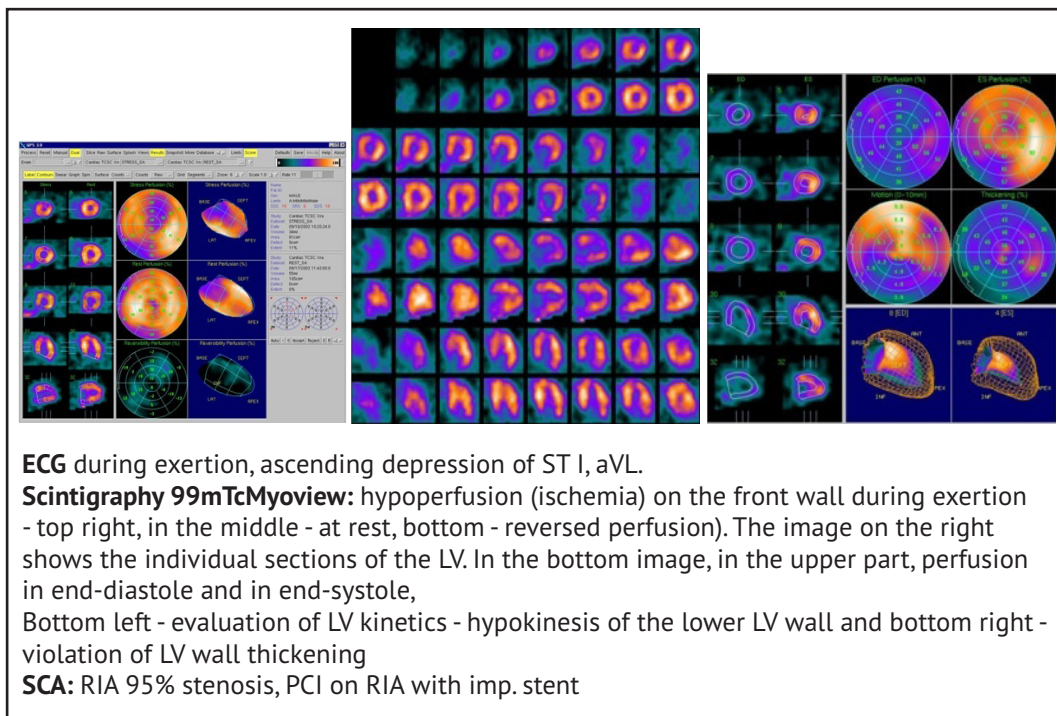


scintigraphy in 2,900 individuals on a cardiology gamma camera CZT 530c f. GE.

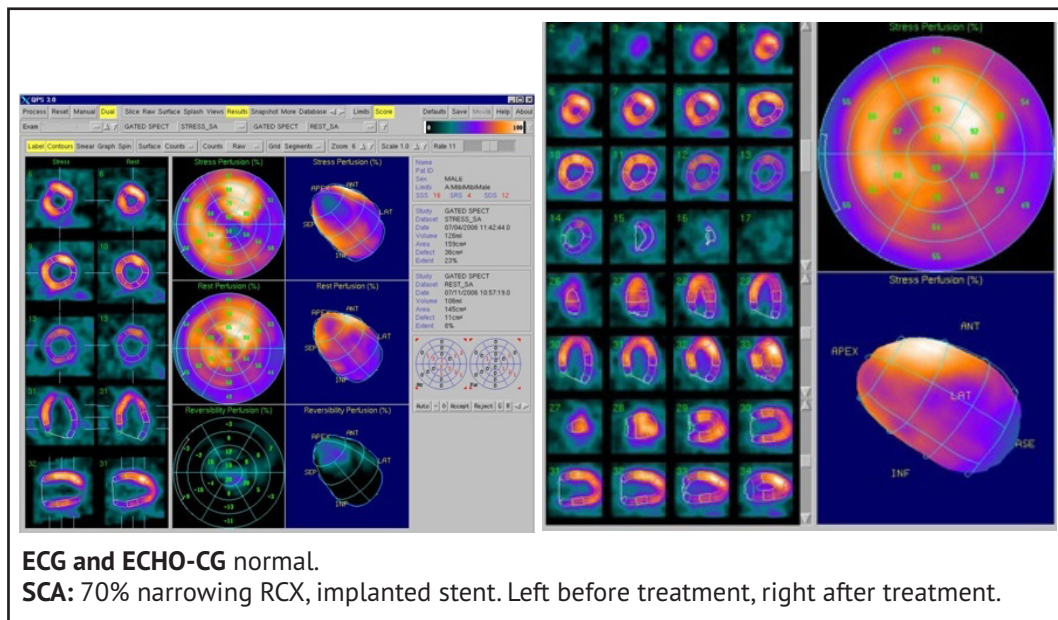
Here we found negative findings in 49% of individuals and positive findings in 51% of individuals. Of the positive findings indicative of coronary heart disease, we recommended coronary angiography for 24% of the examined patients, namely MSCT for 13% and SCA for 11% of individuals. For the remaining 27% of the examined patients, medical treatment was recommended (Graph 2). In the group of patients examined by coronary angiography, normal coronary angiographic findings were found in 2% of individuals.

We statistically evaluated the significance of the capture of positive findings between the Hawkae gamma camera and the CZT 530c cardio camera using a test of relative values, a so-called z-test. The test showed a statistically significant difference in the capture of positive findings between the Hawkeye gamma camera (39%) and the CZT 530c cardio camera (51%) at the level of significance  $p > 0.00001$ .

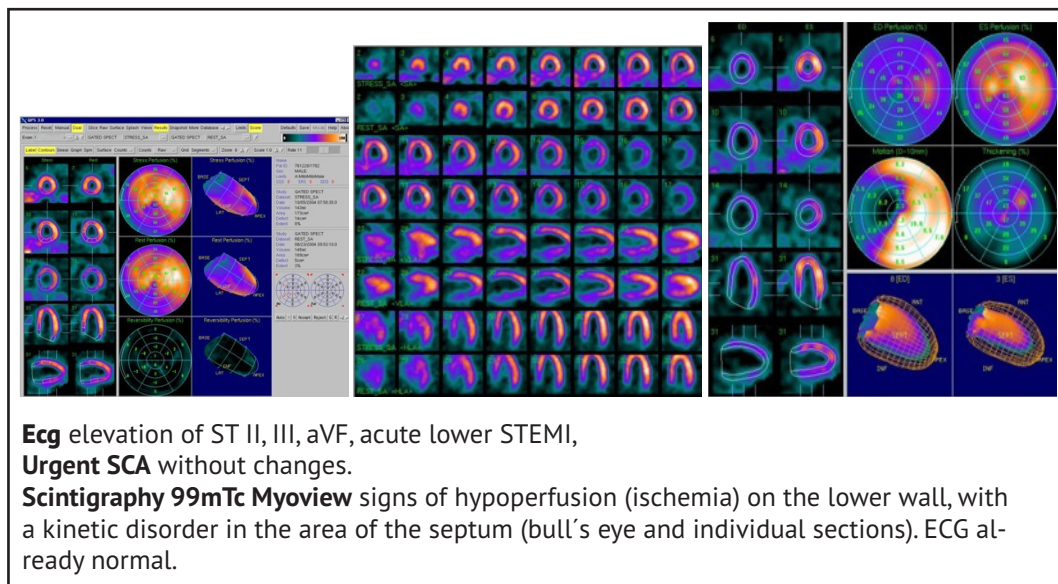
**Figure 1** SPECT-SCA (1947): overcome nonSTEMI, exertional stenocardia, poor tolerance to physical exertion.



**Figure 2** Positive scintigraphic finding in a diabetic- left above after exertion, below at rest, with signs of silent ischemia on the side wall.



**Figure 3** A healthy athlete (1976) sudden resting stenocardia



**Conclusion**

A scintigraphic examination records changes at the molecular level, allowing timely recording of changes in coronary flow in the area of microcirculation. It is very important in screening at-risk individuals. From a holistic point of view, however, it also includes the need to focus

on the ability of the management of healthcare organizations to work with the obtained information and make the right decisions (8). With a negative coronary angiographic finding, with a positive clinical picture, a scintigraphic finding may record changes at the level of small vessels, “small vessels disease”. In some cases, on the

contrary, we can save the patient from invasive coronary angiography. A New type of cardio gamma camera “Discovery NM CZT 530c f. GE”, enables speeding up of examinations and increases the sensitivity and specificity of the examination. At the same time, it reduces the dose of the radiopharmaceutical, thus reducing the radiation burden of patients by 50%. During the assessment, it allows for a better evaluation of the hemodynamic parameters. The result is more valid when compared with coronary angiography.

## References

1. LEPEJ J, LACKO A (2018) *Nuclear medicine 1,2,3*. Košice: Equilibria, 2018.
2. LEE B, FICARO E (2016) *Methods for the Estimation of Myocardial Blood Flow and Coronary Flow Reserve with 99mTc SPECT in Corridor 4DM*. Invia Medical Imaging Solutions, 2016.
3. CREA F, LANZA A G, CAMICI P G (2014) *Coronary microvascular dysfunction*. Springer-Verlag Rome 2014. p256.
4. WELLS R G, TIMMINS R, KLEIN R et al. (2014) Dynamic SPECT measurement of absolute myocardial blood flow in a porcine model. In *J.Nucl.Med.* 2014,Oct; 55(10): 1685-91.
5. MIGNERONE A (2014) Low dose and Fast exams are a win discovery NM 530c.for patients and clinicians alike. In *GE*, 2014.
6. UDELSON E J, DILSIZIAN V, BONOW O R (2015) *Nuclear cardiology*.p.293-339. In: Braunwalds heart disease. A textbook of Cardiovascular Medicine.2015.p.2021.
7. WILLEY CH (2009) *Improving productivity, patient comfort, and dose management were the big driving factors for purchase of the Discovery NM 530c*.GE, 2009.
8. JANKELOVA N, CZARNECZKI P (2021) *Managerial Knowledge and Skills in the Practice of Healthcare Managers 1st Edition*. - Warsaw: Collegium Humanum - Warsaw Management University, 2021. 171 p.

# Trends in the Recruitment and Hiring of Employees in the Healthcare Sector in

V. Vozar (Vladimir Vozar)<sup>1,2</sup>, N. Jankelova (Nadezda Jankelova)<sup>3</sup>, N. Jankelova (Nada Jankelova)<sup>4,5</sup>, S. Moricova (Stefania Moricova)<sup>6,7</sup>

Original Article

<sup>1</sup> Faculty of Public Health, Slovak Medical University, Bratislava – doctoral student

<sup>2</sup> Railway Hospital and Polyclinic. Šancová 3150/110 831 04 Bratislava - Doctor in the Orthopedic Department, Slovakia.

<sup>3</sup> Faculty of Business Management Economic University Bratislava – teacher, Slovakia.

<sup>4</sup> Faculty of Public Health, Slovak Medical University, Bratislava – doctoral student

<sup>5</sup> Bratislava Bory Hospital - doctor, Slovakia.

<sup>6</sup> Faculty of Public Health, Slovak Medical University, Bratislava – teacher, Slovakia.

<sup>7</sup> Bratislava University Hospital – doctor, Slovakia.

## E-mail address:

vozar.v@gmail.com

## Reprint address:

Vladimir Vozar  
Stromova 54  
Bratislava  
831 01  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 61 – 67

Volume: 14  
Cited references: 7

Issue: 4

## Reviewers:

Jirina Kafkova  
MSF, Freetown, SL  
Selvaraj Subramanian  
SAAaRMM, Kuala Lumpur, MY

## Keywords:

Human Resource Management. Human Resources in Healthcare. The Recruitment and selection Process.

## Publisher:

International Society of Applied Preventive Medicine i-gap

CSWHI 2023; 14(4): 61 – 67; DOI: 10.22359/cswhi\_14\_4\_09 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** A key factor in the success of a modern company in a competitive environment is the effective use of the resources available to it. The resource that still provides the highest added value relative to its cost is undoubtedly human labor: human effort leading to a goal, involvement, invention, and cooperation.

**Research sample and research objective:** The main research objective was to find out the perceptions of the respondents on the importance of the goals of human resources management in the health sector and compliance with the established steps in the process of recruiting and selecting employees. The partial goals were to assess the opinions of the respondents regarding the importance of various human resources management goals in the health sector and to evaluate the extent to which the established steps in the process of recruiting and selecting employees are being applied in healthcare organizations. The research sample was selected by deliberate selection and consisted of 109 respondents: health care managers (n=16), experts from the field of health management (n=15), experts from the field of human resources (n=19), directors of health facilities (n=10), and medical (n=28) and paramedical staff (n=21). **Methods:** A Likert scale as used to quantify subjective responses and gather data on participants' attitudes or opinions toward a particular topic. The range of interpretation of the average score of the Likert scale was given as follows: 1,0-2,4 (negative attitude), 2,5-3,4 (neutral attitude) and 3,5-5,0 (positive attitude).

**Results:** According to the results, the most important human resources management goal is "Support the achievement of the organization's strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management)" received the most positive responses.

**Conclusion:** The majority of respondents (52.29%) mentioned that their organization either applies all of the defined steps or has its own customized procedure for recruitment and selection. However, a significant proportion (approximately 58.72%) indicated that only some or none of the defined steps are being followed, raising concerns about the effectiveness and consistency of the recruitment and selection process in these organizations. The findings highlight the need for further investigation and potential improvements in HR practices to ensure a more standardized and rigorous approach to hiring and selecting employees.

**Biography of the first author:** In 2004, I finished my studies at the Faculty of Medicine, Comenius University, Bratislava. In 2013 at the Slovak Medical University in Bratislava in the Department of Trauma Surgery, I conducted the Specialization Exam on 21.10. 2013. In the period 2012-2014, I was in post-graduate study in Surgical Science at The University of Edinburgh, UK. In 2020, I obtained the title of Public Health Administration/ MHA at St. Elisabeth University of Health Care and Social Work and at the University Institute of Economic and Legal Sciences the title of Master of Business Administration.

In the period 2006-2009, I worked at The Faculty Hospital in Nitra. From 2009-2011 I worked at the University Hospital of

Wales as a doctor in the Department of Orthopedics and Traumatology (Clinical Fellow Trauma and Orthopedic Department, SpR) and as a doctor in the Department of Emergency Medicine (Clinical Fellow Accident and Emergency Department, Locum SpR). Between 2011-2012 I was employed at Norfolk and Norwich University Hospital as a doctor in the Department of Orthopedics and Traumatology (Clinical Fellow Trauma and Orthopedic Department, SpR). Next, until 2014, I worked at the Hospital and Polyclinic of Saint Luke, Galanta as a doctor in the Department of Trauma Surgery and Orthopedics and as a chief physician in the Central Patient Intake Department (from 01.01.2014). Until 2015, I worked at Uherské Hradiště Hospital, JSC as Deputy Head of the Trauma Department. In the period 2015-2016, I worked as a doctor in the Department of Trauma Surgery SZU UNB. Since 2016, I have been working at the Hospital with Polyclinic Trnavské mýto as a doctor in the Orthopedic Department. In 2023, I finished my rigorous work at the Faculty of Public Health, Slovak Medical, Bratislava.

## Introduction

A key factor in the success of a modern company in a competitive environment is the effective use of the resources available to it. The resource that still provides the highest added value relative to its cost is undoubtedly human labor: human effort leading to a goal, involvement, invention, and cooperation. Therefore, human resources management is an important part of the strategic management of any organization (1).

The goal of human resources management should mainly be to ensure a sufficient number of employees with the necessary skills and qualities with a long-term perspective of their involvement. Thus, the goals of human resource management include:

- strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management),
- contribute to the development of a culture aimed at achieving high performance,
- to ensure the organization of talented, qualified, and dedicated people,
- strive to create positive working relationships and instill mutual trust between management and employees,
- to support the application of an ethical approach to people management (2).

People management is a broad complex of definition, planning, management, organization,

and procedures depending on the life cycle of the employee and the company. Human resources management consists of passive personnel administration, operational personnel management, and conceptual human resources management (3).

One of the stated goals is to secure talented, qualified, and dedicated people. Ensuring human resource management is associated with the application of various procedures in the field of human resource planning, recruitment, and selection, talent management, performance management, compensation, training, and development (2).

Fulfilling this goal is largely the task of the organization's personnel department or individual staff members. However, the content of their work is not only administrative tasks and personnel management methodologies (3). They also help in creating an environment for achieving higher performance of employees, more effective use of their skills and knowledge, and personal satisfaction in the workplace and in private life (work-life balance). Both employees and organizations will benefit from the results achieved.

An important process that affects the successful fulfillment of goals is the acquisition of new employees and their selection (4). That is, deciding which job applicants should be hired. It is a multi-stage process, which should also in-

clude continuous evaluation of input parameters and possibly adjustments to the process to meet the desired goals. Organizations usually invest considerable resources and energy in recruiting and selecting employees. This is because the high-quality recruitment and selection of employees is a condition for their job stabilization and thus a comprehensive solution to all factors affecting turnover. Fluctuation can be a consequence of low levels of job satisfaction (5).

Armstrong and Taylor (2) include the following steps in the recruitment and selection process:

- Defining requirements
- Addressing applicants
- Handling applicants' requests
- Conducting interviews with applicants
- Testing of applicants
- Assessing applicants, obtaining references, and checking them
- Confirmation of the job offer
- Monitoring of a new employee

## Research objective

The main research objective was to find out the perceptions of the respondents on the importance of the goals of human resources manage-

ment in the health sector and compliance with the established steps in the process of recruiting and selecting employees. The partial goals were to assess the opinions of the respondents regarding the importance of various human resources management goals in the health sector and to evaluate the extent to which the established steps in the process of recruiting and selecting employees are being applied in healthcare organizations.

To find out respondents' perceptions of the respondents on the importance of the goals of human resources management in the health sector and compliance with the established steps in the process of recruiting and selecting employees we set the following research questions:

RQ1: What are the perceptions of respondents regarding the importance of different human resources management goals in the health sector?

RQ2: What are the perceptions of respondents on the extent healthcare organizations implement the previously defined steps in the process of recruiting and selecting employees?

**Table 1** Average Likert scale score - respondents' answers to the question „How important do you think the following human resources management goals are“

	1 (least important)	2	3	4	5 (most important)	Average score
Support the achievement of the organization's strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management)	0	0	21	212	245	4,39
Contribute to the development of a culture aimed at achieving high performance,	0	30	105	112	155	3,69
To ensure the organization of talented, qualified, and dedicated people,	0	0	78	176	195	4,12
Strive to create positive working relationships and instill mutual trust between management and employees	0	36	123	96	130	3,53
To support the application of an ethical approach to people management	0	16	75	128	220	4,03



**Table 2** Respondents answers to the question „Are the following steps applied in your organization (defining requirements, addressing applicants, processing applicant requests, interviewing applicants, testing applicants, evaluating applicants, obtaining references and checking them, confirming job offers, tracking new employees) to the process of recruitment and selection of employees?“

	Absolute frequency (n)	Relative frequency (%)
Yes, we apply all of the defined steps	18	16,51
Yes, we only apply some of the defined steps	39	35,78
No, we do not apply the defined steps	25	22,94
We have our own procedure for recruiting and selecting employees	27	24,77

## Research sample and methodology

In order to obtain answers to the research questions, we carried out anonymous questionnaire research. The research sample was selected by deliberate selection and consisted of 109 respondents: health care managers (n=16), experts from the field of health management (n=15), experts from the field of human resources (n=19), directors of health facilities (n=10), and medical (n=28) and paramedical staff (n=21). As a tool, we used a questionnaire of our own construction that contained socio-demographic questions and questions related to the researched area. We used the Likert scale to quantify subjective responses and gather data on participants' attitudes or opinions toward a particular topic. The range of interpretation of the average score of the Likert scale was given as follows: 1,0-2,4 (negative attitude), 2,5-3,4 (neutral attitude) and 3,5-5,0 (positive attitude) (6).

## Results

According to the results, the option "Support the achievement of the organization's strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management)" received the most positive responses. Based on the average score of the Likert scale, the respondents expressed a positive perception (score between 3,5-5,0) of the importance of all the stated objectives of human resources management

Based on the provided responses and their absolute and relative frequencies, we can inter-

pret the application of the specified steps in the recruitment and selection process in the organization as follows:

"Yes, we apply all of the defined steps". This response indicates that 18 out of the 109 respondents (approximately 16.51%) stated that all of the defined steps, including defining requirements, addressing applicants, processing applicant requests, interviewing applicants, testing applicants, evaluating applicants, obtaining references and checking them, confirming job offers, and tracking a new employees, are applied in their organization's recruitment and selection process. This is a positive indication that the organization follows a comprehensive and systematic approach to hiring new employees.

"Yes, we only apply some of the defined steps". 39 respondents (approximately 35.78%) reported that their organization applies only some of the defined steps in the recruitment and selection process. This response suggests that while some aspects of the process are being followed, there may be gaps or inconsistencies in implementing all the necessary steps.

"No, we do not apply the defined steps". 25 respondents (approximately 22.94%) indicated that the defined steps in the recruitment and selection process are not applied in their organization. This response is concerning as it indicates a lack of adherence to established HR practices, which could potentially lead to suboptimal hiring decisions and employee selection.

"We have our own procedure for recruiting and selecting employees". 27 respondents (approximately 24.77%) mentioned that their orga-

nization follows its own procedure for recruiting and selecting employees. While this response does not provide specific details about the steps followed, it suggests that the organization has a customized approach to the recruitment and selection process.

## Discussion

Regarding the importance of human resources management, it can be concluded from the results of the survey that, according to the respondents, the most important is: supporting the achievement of the organization's strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management), ensuring the organization has talented, qualified and dedicated people, and supporting the application of an ethical approach to people management. The obtained results can be supported by the theory of people management according to Armstrong and Taylor (2), who confirm, among other things, that supporting the achievement of the organization's strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management); ensuring an organization has talented, qualified and dedicated people; and promoting the application of an ethical approach to people management are some of the main objectives of people management. These results also (partly) correspond with some of the key discussions and concepts covered by Dessler and Varkey (7).

Overall, the majority of respondents (52.29%) mentioned that their organization either applies all of the defined steps or has its own customized procedure for recruitment and selection. However, a significant proportion (approximately 58.72%) indicated that only some or none of the defined steps are being followed, raising concerns about the effectiveness and consistency of the recruitment and selection process in these organizations. The findings highlight the need for further investigation and potential improvements in HR practices to ensure a more standardized and rigorous approach to hiring and selecting employees.

## Conclusion

Regarding the importance of human resources management, it can be concluded from the

results of the survey that, according to the respondents, the most important are: supporting the achievement of the organization's strategic goals by creating and applying human resources strategies in accordance with the organization's strategy (strategic human resources management), ensuring the organization has talented, qualified and dedicated people, and supporting the application of an ethical approach to people management.

Interesting results were yielded by the answers to the question: "Are the following steps applied in your organization (defining requirements, addressing applicants, processing applicant requests, conducting interviews with applicants, testing applicants, assessing applicants, obtaining references and checking them, confirming job offers, tracking new employees) to the process of recruitment and selection of employees?". 39 respondents (36%) only apply some of the recommended steps for the recruitment and selection of employees. 27 respondents (25%) have their own procedure for recruiting and selecting employees. 25 respondents (23%) do not apply of the above steps, and only 18 respondents apply all the above steps (23%).

## References:

1. VISNOVCOVA E, BABECKA J (2021) Crisis management in healthcare. In: *Ružomberok Healthcare days 2021*. Proceedings of the international conference. 1st ed. Vol. 15. Ružomberok (Slovakia): Catholic University in Ruzomberok. VERBUM - KU publishing, 2021. – ISBN 978-80-561-0903-8, p. 303-308.
2. ARMSTRONG M, TAYLOR S (2020) *Armstrong's Handbook of Human Resource Management Practice*. London: Kogan Page Publishers.
3. GLADKIJ I et al. (2003) *Management healthcare*. Brno: Computer Press, 2003. 380 p. ISBN 80-7226-996-8.
4. BABECKA J, POPOVICOVA M (2022) *Nursing process for education and practice*. Bratislava: Publishing House St. Elizabeth University of Health and Social Sciences, 2022. ISBN: 978-80-8132-251-8
5. POPOVICOVA M (2022) Significant predictors of nurses' turnover intentions. In:

- 43rd annual SSVPL conference 2021*. ISBN 978-80-974283-3-4. p. 49.
6. WANJOHI M A, SYOKAU P (2021) *How to conduct Likert scale analysis* [online] [cit. 2023-07-27] Available at: <https://www.kenpro.org/how-to-conduct-likert-scale-analysis/>.
  7. DESSLER G, VARKEY B (2018) *Human Resource Management*. Pearson India, 2018. ISBN: 978-9352862658.

# Prevention of Infertility in Surgical Treatment of Endometriosis with Monitoring of AMH Values

S. Zambova (Silvia Zambova)<sup>1,2</sup>, L. Borucka (Lucia Borucka)<sup>3,4</sup>, S. Zamba (Stefan Zamba)<sup>5</sup>, I. Rusnak (Igor Rusnak)<sup>6,7</sup>

Original Article

<sup>1</sup> Private gynecological clinic, Michalovce – doctor, Slovakia.

<sup>2</sup> Štefan Kukura Hospital, Michalovce – doctor, Slovakia.

<sup>3</sup> Slovak Medical University, Bratislava – teacher, Slovakia.

<sup>4</sup> Bratislava University Hospital, Bratislava – doctor, Slovakia.

<sup>5</sup> Štefan Kukura Hospital, Michalovce – doctor, Slovakia.

<sup>6</sup> Slovak Medical University, Bratislava – teacher, Slovakia.

<sup>7</sup> Bratislava University Hospital, Bratislava – doctor, Slovakia

## E-mail address:

silviazambova@seznam.cz

## Reprint address:

Silvia Zambova  
Remeselnicka 16  
Michalovce  
071 01  
Slovakia

Source: *Clinical Social Work and Health Intervention*  
Pages: 68 – 72

Volume: 14  
Cited references: 5

Issue: 4

## Reviewers:

Michael Costello  
University of Scranton School of Education, USA  
Gabriela Lezcano  
University of California, San Francisco, USA

## Keywords:

Endometriosis. Prevention. Laparoscopy. Surgical Treatment. Infertility.

## Publisher:

International Society of Applied Preventive Medicine i-gap

CSWHI 2023; 14(4): 68 – 72; DOI: 10.22359/cswhi\_14\_4\_10 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** Endometriosis is a disease defined as the presence of endometrium outside the uterine cavity. The cause of endometriosis is multifactorial. An appropriate approach to the treatment of the disease affects a woman's chance of conceiving, either spontaneously or with the help of assisted reproduction techniques. Adherence to the principles of appropriate treatment is how to prevent a negative impact on a woman's fertility.

**Research sample group and aim of the research:** 109 female

respondents with fertility disorders from the private gynaecological outpatient clinic Zagyn s.r.o. from the Michalovce district were included in the research. The respondents' ages were between 18 and 50 years with an average age of 30.89 years (SD = 5.21); marital status was not decisive.

The data were obtained through a clinical study and from the medical documentation of the observed women. The aim of the research was to find optimal criteria and procedures that lead to the prevention of infertility in the treatment of endometriosis.

**Methods:** For evaluation, we used descriptive statistics and the Chi-square test. The values of continuous variables between two groups were analysed by a t-test for 2 independent sets, or between several groups by ANOVA analysis.

**Results:** Using logistic regression models we examined the associations of the type of treatment and the type of medical treatment with 5 dichotomized variables of success of conception and delivery. However, we confirmed only one statistically significant association. Women who received medical treatment alone were 2.6 times more likely to conceive naturally and deliver than women who received combined treatment (logistic regression, OR=2.60, confidence interval: 1.11-6.07,  $p < 0.05$ ).

**Conclusion:** Endometriosis can even occur in young patients with the development of menarche. Early diagnosis and proper treatment are the way to prevent the infertility caused by this disease. Excision of endometriotic cysts does not improve the pregnancy rate or embryo quality. For women with recurrent endometriomas who have already undergone a previous surgery, IVF is a more successful option than another surgery.

## Introduction

Prevention refers to the prevention of diseases or preventive care, a set of measures to prevent diseases, errors, injuries and their consequences. Our work focuses on secondary prevention, which is a set of measures aimed at preventing the outbreak of a disease that the individual has already overcome, to prevent the development of the disease or its complications when the disease is in a latent stage or it is a person at risk. Research is devoted to the possibility of preventing infertility in the treatment of endometriosis, which is a disease defined as the appearance of the endometrium outside the uterine cavity. The cause of endometriosis is multifactorial. The disease is typically manifested by chronic pelvic pain, irregular, painful bleeding, pain during sexual intercourse or fertility disorders. The treatment of endometriosis consists of a comprehensive approach to the disease, focusing on the

type and stage of the disease, the age and parity of the patient, and clinical symptoms (1).

A surgical approach to the treatment of endometriosis can affect the function of the ovaries and reduce their ovarian reserve, which is already at risk. It is necessary that the surgical removal of endometriosis be strictly individually considered and the degree of risk of the operation to reduce the ovarian reserve be evaluated. It is known from practice that if pregnancy did not occur after the first surgical procedure, the next surgical procedure only very rarely increases the probability of pregnancy (2). Currently, with the development of laparoscopic surgery, the number of surgeries is increasing, but if the principles are not followed, their impact on a woman's fertility can be negative (3). AMH (Anti-Müllerian hormone) begins to be produced in women at puberty, by the granulosa cells of the follicles in the ovaries. Its main

role is to control the formation of primary follicles by inhibiting the excessive action of FSH. Its level does not change during the individual phases of the menstrual cycle, so it can be taken at any time. It is secreted only in follicles up to a maximum size of 4 mm and is an indicator of the so-called follicular reserve. It is a relatively new marker of ovarian function. AMH level does not say anything about egg quality.

## Research objective

The main goal of the research was to determine the optimal therapeutic procedure in the treatment of endometriosis that maximally reduces the negative impact on a woman's fertility. We investigated the relationship between the age of patients with endometriosis in connection with the success of conception and childbirth, as well as the effect of treatment on the success of conception and childbirth.

## Research sample group and methodology

The research study included 109 female respondents who visited the gynaecological clinic with a fertility disorder during the research period and in whom, through further examinations, endometriosis was confirmed as the main cause of infertility. They ranged in age from 18 to 50 years with a mean age of 30.89 years (SD = 5.21), and their marital status was not decisive. After twelve months from the end of the treatment, we retrospectively evaluated the percentage of pregnancy success in the groups with medical and surgical treatment and in the group without treatment.

All patients underwent a preoperative examination, abdominal and transvaginal ultrasound of the organs of the small pelvis, and an evaluation of Ca 125 and AMH parameters from their blood. We used descriptive statistics (mean values, standard deviations, frequencies) to describe the investigated variables. We verified

**Table 1** Age distribution of the research sample group

	Age in years
minimum-maximum	20,0-42,0
mean/ standard deviation	30,89/5,21
percentiles 25	27,0
50	31,0
75	34,5
	N (v %)
30 years and under	52 (47,7)
over 30 years	57 (52,3)

**Table 2** The connection between the type of treatment and the success of conception and delivery (multinomial regression analysis, n=106)

		Parameter Estimates					95% Confidence Interval for Exp (B)		
CONCEIVED <sup>a</sup>		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
IVF conceived, delivered	Intercept	-.486	,449	1,167	1	,280			
	Medical	-1,440	,605	5,670	1	,017	,237	,072	,775
	Combined	0 <sup>b</sup>	.	.	0	.	.	.	.
IVF conceived, did not deliver	Intercept	-.773	,494	2,454	1	,117			
	Medical	-1,152	,638	3,259	1	,071	,316	,090	1,104
	Combined	0 <sup>b</sup>	.	.	0	.	.	.	.
did not conceive did not deliver	Intercept	-.956	,526	3,297	1	,069			
	Medical	-.431	,617	,487	1	,485	,650	,194	2,180
	Combined	0 <sup>b</sup>	.	.	0	.	.	.	.

a. The reference category is: conceived, delivered

b. This parameter is set to zero because it is redundant.

the differences in the occurrence of selected parameters of categorical variables using the Chi-square test. The values of continuous variables between two groups were analysed by t-test for 2 independent sets, or between several groups by ANOVA analysis. We analysed the association of selected variables with the categorical variable conception/delivery using multinomial regression analysis. The reference category was the category conceived naturally, delivered. The category conceived naturally and did not deliver was excluded from the analyses due to the low representation of female patients (n=1). We analysed the association of selected variables with dichotomous variations of the conception/ delivery variable using logistic regression analysis.

**Results**

We calculated age by subtracting the year of birth from 2019. For the purposes of some analyses, we dichotomized this variable, dividing the patients into groups „aged 30 and under and older“. The research sample group consisted of 109 women between the ages of 23 and 49.

For the purposes of analyses, we used pre-treatment AMH to categorize, but we also used the change in AMH after treatment compared to pre-treatment (AMH ante – AMH Table 3 Distribution of AMH in the research sample group

**Discussion**

Compared to patients who underwent only medical treatment, patients who underwent surgical treatment had a 4.22-fold higher chance of undergoing IVF and giving birth than of conceiving naturally and giving birth (multinomial regression analysis, OR=0.237, confidence interval: 0.072-0.775 / p<0.05). The chance of failure of conception and delivery was not related to the type of treatment. It is likely that surgical intervention and IVF will be offered at the same stage of treatment. Due to the small representation of female patients in the groups, it is not possible to verify the statistical significance of the investigated connections by multinomial regression analysis. Using logistic regression models, we examined the associations of the type of treatment and the type of medical treatment with 5 dichotomized variables of success of conception and delivery, but we confirmed only one statistically significant association. Women who received medical treatment alone were 2.6 times more likely to conceive naturally and deliver than women who received combined treatment (logistic regression, OR=2.60, confidence interval: 1.11-6.07, p <0.05). For women with recurrent endometriomas who have already undergone a previous surgery, IVF is a more successful option than another surgery. Women who

**Table 3** Distribution of AMH in the research sample group

	N	v %
AMH1ante 1-9	52	81,3
AMH1ante under 1	8	12,5
AMH1ante over 9	4	6,5
Missing data	45	

**Table 4** Association of AMH before treatment with the success of conception, delivery - multinomial regression analysis (n=63)

		Parameter Estimates						95% Confidence Interval for Exp (B)	
CONCEIVED <sup>a</sup>		B	Std. Error	Wald	df	Sig.	Exp(B)	Lower Bound	Upper Bound
IVF, delivered	Intercept	-1,053	,695	2,295	1	,130			
	AMH1 a	-,134	,166	,656	1	,418	,874	,632	1,210
IVF, did not deliver	Intercept	-,206	,643	,102	1	,749			
	AMH1 a	-,356	,205	3,002	1	,083	,700	,468	1,048
Did not conceive, Did not deliver	Intercept	-,989	,533	3,441	1	,064			
	AMH1 a	,030	,095	,097	1	,755	1,030	,855	1,240

a. The reference category is: conceived, delivered

achieved a postoperative pregnancy had a lower risk of disease recurrence. Women who get the disease at a younger age are more likely to be infertile. We found that the greater the involvement of the ovaries and the lower the AMH, the lower the probability of spontaneous pregnancy. Other results show that the younger the affected person's age, the smaller the chance of spontaneous pregnancy. It is important to define the consequences of surgical interventions from the point of view of the probability of post-operative pregnancy and to evaluate the possibility of a reduced ability to conceive after reoperation compared to the first operation. The young age of a patient must be a key factor influencing the decision on the advantages and disadvantages of the treatment being considered. Even before surgical treatment, affected women have lower AMH levels than healthy women, and this decrease is more pronounced in cases of bilateral ovarian involvement. It is not clear whether the tissue is more damaged by surgical intervention or by the oxidative stress of the present endometrioma. The decrease in AMH compared to a control set of the same age women without endometriosis appears to be progressive and increasing with the size of the endometrioma. Asymptomatic patients with reduced ovarian reserve benefit more from a direct IVF procedure. The effect of treatment is very difficult to reliably measure due to the presence of a large number of factors affecting fertility. Therefore, the use of a suitable therapeutic procedure requires an assessment of all possible infertility factors, subjective difficulties, possible side effects and, above all, the wishes of the patient.

## Conclusion

Surgical excision of endometriotic cysts does not improve pregnancy rates, fertilization rates, or embryo quality. The fact is that for women with recurrent endometriomas who have already undergone a previous surgery, IVF is a more successful option than another surgery. Women who achieved a postoperative pregnancy had a lower risk of disease recurrence. Globally, there is a prevailing trend away from radical surgical methods. And despite this, clinical studies do not report an increase in the recurrence of the disease, which is around 1-4% in the short post-operative period (4). Before surgical treatment,

especially if a radical procedure is expected, it is appropriate to consider egg banking and a consultation at an assisted reproduction centre (5). After performing the surgical intervention, it is necessary to consider the subsequent medical treatment to suppress the residual endometriotic deposits. It is important even for young patients who do not yet have reproductive plans to think about this disease and start appropriate treatment in time as a way of preventing infertility caused by endometriosis.

## References

1. ZAMBOVA S, BORUCKA L, RUSNAK I (2022) Medical versus surgical treatment of endometriosis and its impact on fertility. In *Slovak gynaecology and obstetrics*. ISSN 1335-0862, vol. 29, no. 3, p. 156 -160.
2. HARBULAK P, BEHUNOVA Z (2015) Treatment of endometriosis in patients with sterility. *Slovak gynaecology and obstetrics*. 2015, p. 64 -65.
3. VERCELLINI P et al. (2009) Surgery for endometriosis – associated infertility: a pragmatic approach. *Human Reproduction Update*. 2009, vol.24, pp. 254 - 269.
4. HANACEK J, REDECHA M, DRAHONOVSKY J (2021) Surgical treatment of endometriosis. In *Modern gynaecology and obstetrics*. ISSN 1211-1058, 2021, vol. 28, no. 3, p. 396.
5. IVANKOVA K, MATVANNOVA Z, HANACEK J et al. (2021) Conservative treatment of endometriosis. In *Modern gynaecology and obstetrics*. ISSN 1211-1058, 2021, vol. 28, no. 3, p. 390-394.



# Risk Management in the Area of Urinary Tract Infections Related to Healthcare

L. Lacko (Lukas Lacko) <sup>1</sup>, J. Babecka (Jozef Babecka) <sup>2,3</sup>, M. Popovicova (Maria Popovicova) <sup>4</sup>, N. Peterkova Justhova (Nadezda Peterkova Justhova) <sup>5</sup>

Original Article

<sup>1</sup> University of Security Management, Kosice, Slovakia.

<sup>2</sup> Catholic University in Ruzomberok, Faculty of Health, Slovakia.

<sup>3</sup> Central Military Hospital Ruzomberok SNP – FN, Nuclear Medicine Clinic, Slovakia.

<sup>4</sup> St. Elizabeth University of Health and Social Work in Bratislava

<sup>5</sup> St. Elizabeth University of Health and Social Work in Bratislava, Slovakia

## E-mail address:

lukas.lacko@vsbm.sk

## Reprint address:

Lukas Lacko  
University of Security Management, Košice  
Kostova 1  
040 01 Kosice  
Slovakia

Source: *Clinical Social Work and Health Intervention*

Pages: 73 – 84

Volume: 14

Cited references: 28

Issue: 4

## Reviewers:

Gabriela Lezcano

University of California, San Francisco, USA

Roberto Cauda

Institute of Infectious Diseases, Catholic University of the Sacred Heart, Rome, IT

## Keywords:

Risk Management. Urinary tract. Infections. Healthcare.

## Publisher:

International Society of Applied Preventive Medicine i-gap

---

CSWHI 2023; 14(4): 73 – 84; DOI: 10.22359/cswhi\_14\_4\_11 © Clinical Social Work and Health Intervention

## Abstract:

**Introduction:** Urinary tract infections associated with bladder catheterization (Catheter-Associated Urinary Tract Infection - CAUTI) are the most common type of infection related to providing healthcare, accounting for more than a third of these infections.

**Research aim and objectives:** The objective was to map risk management in the provision of nursing care in the context of prevention of urinary tract infections associated with healthcare, which at the same time, is related to the improvement of nursing care in this area.

**Methods:** The quantitative research had the design of an ob-

servational descriptive cross-sectional study, the method of this research phase utilized a non-standardized questionnaire. The respondents of the quantitative part of the research were non-medical health workers in managerial positions (station, executive, head nurses and deputy assistants in nursing care). Data analysis was performed using SASD 1.5.8 (Statistical data analysis) and SPSS (Statistical Package for the Social Sciences) programmes.

**Results:** In the context of the prevention of urinary tract infections associated with catheterization of the bladder, the following dimensions that corresponded were assessed in the quantitative research areas of prevention: “Risk management”, “Education”. Results of the conducted research showed that in clinical practice, the recommendation to monitor quality indicator results is not widely accepted, the number of CAUTIs is monitored according to 33.3% of respondents, the number of cases of secondary infections of the bloodstream with a source in the urinary tract is monitored according to 31.7% of respondents, and the number of catheter days (in %) is recorded according to a quarter (24.7%) of the interviewed. This was confirmed during interviews with quality managers. Research included assessment of further education of nurses in the areas of CAUTI prevention. 49.5% of respondents confirmed the implementation of further education in the field of correct catheterization procedures, urinary catheter care, and CAUTI prevention, and 86.2% of respondents attend at least one educational event per year.

**Conclusion:** Based on the results of the research, the monitoring of result indicators of the quality of care, and possibly also the introduction of an electronic form of medical documentation, both for the needs of record keeping and for the possibility of ongoing monitoring of quality indicators, can be mentioned as recommendations. It would also be recommended to hold periodic training events for the education of general nurses for the transfer of theoretical information. For knowledge testing there is a possibility of using IT technologies - educational programmes in the form of e-learning.

## Introduction

Šupšáková (1) defines a risk management model, namely risk determination, risk analysis/assessment, investigation, risk resolution and risk integration into related activities. In contrast, Višňovcová (2021) mentions the ten procedures for the implementation and management of risks: “systematic identification of processes and assessment of the risk rates, identification of resources for risk management processes, detection of process changes associated with risks, early detection of risks and risk factors, determination of the direction of the management process risks,

creation of teams ready to enforce and implement risk management, creation of variants of possible management steps and communication about them, selection of risk management steps with a focus on gradual results, management of results and their use for further risk management and the display of the display of results within the terms of risk management (2).”

## Risk management in healthcare

Healthcare is a very specific environment. It differs significantly from non-healthcare organizations - especially in terms of organizational

structure, complexity of operations, high specialization of the profession and the number of workers providing the health and safety care of patients (3). Currently, an important task of the management of medical facilities is risk management, an area strongly supported by the Ministry of Health of the Slovak Republic. Based on the Luxembourg Declaration on Patient Safety, it defines risk management as one of the priority tasks of the medical facility management. Škrļa and Škrlová (4) denote that risk management in healthcare is a process where the person in charge of risk management tries to prevent damage to the patient's health, property and the reputation of the organization. The risk areas are known to the care provider, and the moral obligation of health professionals is to ensure high-quality and safe care.

Furthermore, the authors Škrļa and Škrlová (4) state that risk management must be introduced as a standard procedure in the entire healthcare sector and that it is a very fundamental part of the management of the quality of care provided and one of the important management skills of a healthcare manager (5). The identification, elimination and prevention of risk factors in the provision of healthcare is a global trend, and the aforementioned steps lead to a reduction in the costs of healthcare and an increase in trust in the healthcare facility and with patient satisfaction with the care provided (6,7). Barkasi and Leczová (2019) add to this that medical personnel belong in the category of helping professions, which are characterized by close and regular contact with people and also helping other people. This work is called a mission because their primary goal is to help others (8).

Smejkal and Rais (9) define risk as the probability or possibility of loss or failure or as the uncertainty of achieved results. Risk is also often understood as the danger of loss and damage. In the context of healthcare, the term "risk" can be defined as an event that can negatively affect the healthcare facility (6) and the health and safety of patients. Healthcare facilities are putting risk management into practice, which, together with the implementation of process management focused on the effectiveness of individual processes, Process management appears to be ment optimal is closely in the risk linked manage-with ment process.

Process management is closely linked with

quality management, especially in the area of introducing standards, subsequently also within control activities and when conducting audits. Process management includes the identification, visualization, measurement, evaluation and continuous improvement of processes using methods and procedures based on the process procedure (6). Keclíková (10) adds that in the analysis and assessment of risks, their representation on a risk map is of great importance. This document is then a source of information in the field of risk management and helps the management of the facility to focus on priorities depending on the seriousness of the risk. It is also a tool for introducing risk management in the organization, and, it is also a part of prevention (11). Fundamental risks in healthcare are mainly physical, chemical and biological, but there are also combined risks (6).

Facilities using process management have established information systems that are not only a repository of controlled medical documentation, but also support process management, risk management itself, and quality management, as reported by Prokešová et al. (6) and Prokešová (6). The emergence of risks is explained by many models and theories. For the health sector, the most commonly accepted is the so-called "Swiss Cheese Model", the essence of which is the assumption that the created risk can cross "layers" or even "barriers".

### **Risk management and monitoring of quality indicators as part of the prevention of healthcare-associated urinary tract infections**

To monitor the risk of CAUTI, outcome and process indicators are monitored (12). This fact is already mentioned in section 1.2.3. The Guideline for the Prevention of Catheter-Associated Urinary Tract Infections in the context of quality management and care safety recommends monitoring the number of CAUTIs per 1,000 catheter days, the number of secondary bloodstream infections originating in the urinary tract per 1,000 catheter days and the number of catheter days of care as quality indicators (expressed as a percentage) (13). Jindrák et al. (12) state that surveillance is recommended to be carried out in the departments of the healthcare provider and in patients where bladder catheterization is often indicated. Here there is a high risk of complications. Process indicators are then according to Jindrák

et al. (12), especially the results of audits of nursing care and documentation (especially records of catheterization and indication for catheterization) and the proportion of competent persons for bladder catheterization (12). Carter et al. (14) performed a comparison of quality indicators issued by AHRQ (Agency for Healthcare Research and Quality), the NQF (the National Quality Forum) and the ANA (the American Nurses Association). Recommendations regarding CAUTI are given by the NQF, namely monitoring the prevalence of CAUTI and the number of CAUTIs in relation to bladder catheterization. A review processed by Burston et al. (14) presented an overview of quality indicators monitored in nursing care, data were processed from 40 studies and 43 verified quality indicators of nursing care were determined. According to the review, the most frequently used indicators are patient falls, pressure ulcers, medication errors and mortality. Thirteen studies reported the number of urinary tract infections as a quality indicator. At the end of the review, Burston et al. (15) mention that in the case of indicators of the quality of care, it is necessary to choose sensitive indicators, continuously monitor them and evaluate the results. The steps to eliminate and minimize the risks of urinary tract infections must be comprehensive. Based on the above, it is therefore possible to define specific areas of CAUTI prevention.

## Research goal

The aim of the work was to map the risk management in the provision of nursing care in the context of the prevention of urinary tract infections associated with healthcare, which are simultaneously related to the improvement of the quality of nursing care in this area.

Specified hypotheses

H1: The process of implementing risk management in the area of healthcare-related urinary tract infections depends on the type of hospital.

H2: Education in the issue of catheterization, care of a patient with a urinary catheter, and prevention of urinary tract infections related to healthcare depends on the type of workplace.

## Collection and methodology

The research focused on a specific area of nursing care, the selection of respondents was chosen so that the reason for the research was

fulfilled. The respondents were nurses in a management position, or deputy for nursing care (nursing care manager, head nurse, deputy for non-medical health workers), senior, station and executive nurses working in hospitals providing inpatient care in Slovakia the selection of acute healthcare providers was total. When distributing the questionnaires, a criterion-referenced selection of the research group was chosen - respondents had to be employed by a provider of acute inpatient care in Slovakia and had to meet the criterion of practicing the profession of a nurse and having already performed the previously mentioned functional position. Due to the fact that the range of respondents was defined, the selection of respondents was deliberate. 34 hospitals agreed with the research. All three questionnaires were completely filled out and submitted by 186 respondents (n = 186). There were 26.9% of respondents from faculty hospitals, 19.4% from district hospitals and 18.8% from private type hospitals. Furthermore, 14.5% of respondents were from regional hospitals, 15.0% from city hospitals. Ten respondents, i.e. 5.4%, were from the type of hospitals "other". In the research, ten nursing assistants (5.4%) provided their answers, together with 32.8% that were senior nurses, 106 (57%) that were station nurses, and nine nurses (4.8%) that held the position of executive nurse. The quantitative research had the design of an observational descriptive cross-sectional study, the method of this phase of the research was questioning using questionnaires, or two non-standardized and one standardized questionnaire used in the implementation of the DUQuE (Deepening our Understanding of Quality Improvement in Europe) project. The respondents of the quantitative part of the research were non-medical health workers in the position of manager (station, executive, and senior nurses and nursing assistants). Data analysis was performed using SASD 1.5.8 (Statistical Data Analysis) and SPSS (Statistical Package for the Social Sciences) programmes.

## Results

The results of the research are presented in tables, for the sake of clarity, the codes assigned to the statisticians are preserved within the individual table items. All results of statistical data processing are available from the authors of the

work, the explanation of the abbreviations used in the tables is as follows:  $\chi^2$  – chi square;  $p$  – independence test;  $df$  – degrees of freedom.

### Evaluation of hypotheses

Hypothesis H1 was established to assess the “Risk Management” dimension. To evaluate this hypothesis, associated characteristics were monitored (Table 1) and the association between characteristics and type of hospital was assessed.

In this area, the conducted research showed a statistically significant connection between the type of hospital and the sign of the appointment of one or more managers/coordinators for quality and safety ( $\chi^2 = 15.013$ ;  $p < 0.05$ ). It has been shown that quality managers/coordinators are appointed to a significantly lesser extent in city-type hospitals. The association between the type of hospital and the presence of awards/incentives for quality improvement also proved to be statistically significant. Awards/incentives are introduced to a significantly greater extent in private and other type hospitals, to a significantly lesser extent in city-type hospitals ( $\chi^2 = 21.295$ ;  $p < 0.001$ ). The power of the tests was limited by the insufficient number of observations in one field of the contingency table, again the Yates correction was applied. Hypothesis 1 assumed an association between hospital type and implementation of healthcare-related urinary tract infection risk management. The connection was confirmed in the items of the provisions of one or more managers/coordinators for quality and safety and also the existence of awards/incentives for quality improvement. **The connection with other features of risk man-**

**agement has not been confirmed by the conducted research.**

H2: Education in the issue of catheterization, care of a patient with a urinary catheter, and prevention of urinary tract infections related to healthcare depends on the type of workplace. To verify Hypothesis 2, the features of education in the issue of catheterization, care of a patient with a urinary catheter, and prevention of CAUTI and their connection with the type of workplace were monitored. First, the relationships between the observed characteristics and workplaces of the internal (non-surgical) type were determined. During the data analysis, the category other non-surgical workplaces was combined into one item so that the scale contained 2 types of workplaces – internal department and other non-surgical departments – due to the insufficient number of observations. At the same time, the items “disagree” and “disagree at all” and the items “fully agree” and “agree” for questions 37.1 to 42.1 and for question 53.1 were merged, and the scale item “partially agree” was preserved so that the scale contained the three options mentioned above. The analysis of the data of the conducted research did not show a statistically significant connection between the workplace of the non-surgical type and the characteristics listed in Table 2.

Research has shown that the approach of individual non-surgical workplaces is homogeneous in these areas of care and does not differ statistically significantly.

Furthermore, the relationships between the observed characteristics determined to verify Hypothesis 3 (“Education in the issue of cath-

**Table 1** Hospital type and safety quality

Hospital type and ...			
– a special internal budget is designated for quality improvement	4,045	5	0,543
<b>one or more steering groups or quality committees have been established</b>	10,098	5	0,073
– one or more quality and safety managers have been appointed	15,013	5	< 0,05
<b>– there are awards/incentives for improving quality</b>	21,295	5	< 0,001
– at least one educational event per year	2,767	1	0,100
– ... receive feedback on their patient care	4,738	5	0,449
– ... are encouraged to report accidents and adverse events	4,348	5	0,500

eterization, the care of a patient with a urinary catheter, and prevention of urinary tract infections related to healthcare depends on the type of workplace”) and the type of surgical workplace were investigated. Due to the insufficient number of observations, the other surgical-type workplaces were again combined into one item so that the scale contained two types of workplaces – surgical departments and other surgical-type departments. Furthermore, the items “disagree” and “fully disagree” and the items “strongly agree” and “agree” for questions 37.1 to 42.1 and for question 53.1 were merged and the scale item “partially agree” was kept. The scale contained the above mentioned response options. Even in the case of surgical-type workplaces, the conducted research did not demonstrate a connection between the surgical-type workplace and the characteristics intended to verify the hypothesis (Table 3).

The analysis of the data of the presented research did not show a statistically significant connection between the surgical workplace and

the characteristics established in the field of education in the field of catheterization, the care of a patient with a urinary catheter, and prevention.

Based on the results of the presented research, it can therefore be concluded that the approach of individual surgical-type workplaces is homogeneous in these areas of care and does not differ significantly in terms of statistics.

After the transformation of the data, as described previously, for the purpose of data analysis to verify the connections between the type of workplaces and characteristics related to the field of education in the field of catheterization, the care of a patient with a urinary catheter, and prevention of CAUTI, the non-surgical workplace was combined into one unit and the surgical workplace to the second one. Table 4 demonstrates the results of the mentioned comparison.

The presented research did not demonstrate a statistically significant connection between non-surgical and surgical types of workplaces and the characteristics listed in Table 4. Based

**Table 2** Association of the non-surgical workplace with indicators of education in the issue of catheterization, care of a patient with a urinary catheter, and prevention

Non-surgical workplace and ...	value $\chi^2$	df	P
– utilizing the employer’s offer of courses...	3,794	3,794	3,794
– utilizing the employer’s offer - workshop	0,177	2	0,915
– utilizing the e-learning offer	0,941	2	0,625
– education is supported by the executive	0,175	2	0,916
– education ... can be attended during working hours	1,061	2	0,588
– education ... can be attended repeatedly	0,374	2	0,829

**Table 3** Correlation of the surgical workplace with indicators of education in the issue of catheterization, care of a patient with a urinary catheter, and prevention

Surgical workplace and ...	value $\chi^2$	df	P
–utilizing the employer’s offer of courses...	0,468	2	0,792
– utilizing the employer’s offer - workshop	0,998	2	0,607
– utilizing the e-learning offer	0,421	2	0,810
– education is supported by the executive	2,449	2	0,294
– education ... can be attended during working hours	1,129	2	0,569
– education ... can be attended repeatedly	0,800	2	0,670

on the results of the conducted research, it can therefore be concluded that the approach of individual types of workplaces (non-surgical and surgical type) are homogeneous in these areas of care and do not differ significantly in terms of statistics.

The answers to the question “Is further training of non-physicians in the field of correct catheterization procedures, the care of a patient with a urinary catheter and prevention of healthcare-related infections carried out?” are shown in Table 4. The possibility of education in the mentioned areas was confirmed by 49.5% (n = 92 ) of the respondents, and on the contrary, was not confirmed by 50.5% (n = 94) of the respondents.

If respondents answered yes to question 19.1, “Is further training of non-physicians in the area of proper catheterization procedures, the care of patients with a urinary catheter and prevention of healthcare-related infections carried out?”, they were asked to answer the following questions: What categories of non-physicians in the abovementioned areas are educated?, What type of educational actions are implemented, in

which area of care mentioned in question 19.1 are they educated (Table 5).

When asked what categories of non-medical health workers are trained by the inpatient medical care provider, it was possible to mark multiple answers. The table presents the absolute number of responses for individual professions of non-physicians. The profession of nurses was chosen the most, followed by practical nurse and paramedics.

Furthermore, respondents who answered yes to question 19.1 responded to the question of what type of education they receive in this area. Respondents could choose more than one answer. Out of the total number of 121 (n = 121) responses, 21.5% (n = 26) were initial training, periodic training was chosen as an answer 43 times (35.5%), emergency training made up 17.4% of responses ( n = 21), and in 25.6% (n = 31) of the answers the answer “other” was marked - here the answer was a certified course or a clinical seminar.

Overall, based on the results of the conducted research, it can be concluded that Hypothe-

**Table 4** Correlation of workplace type with indicators of education in the issue of catheterization, care of a patient with a urinary catheter, and prevention of CAUTI

Non-surgical and surgical workplace type and ...	value x <sup>2</sup>	df	P
– further education in the field of catheterization	0,069	1	0,797
– the field of education	0,707	2	0,702
– method of education	2,631	3	0,452
– education is supported by the executive	2,400	2	0,301
– education ... can be attended during working hours	0,280	2	0,869
– education ... can be attended repeatedly	3,020	2	0,221
– the indication for catheterization is the patient’s choice	0,788	2	67423

**Table 5** Responses to the question: „If your answer to question 19.1 was YES, indicate which categories of non-physicians.“

Hospital type	nurse	practical nurse	para-med	sanitation worker	Care-giver	physio-therapist	Occupational therapist	radiological technician
total/ absolute frequency of responses	89	62	30	25	34	2	15	1

sis 2 (“Education in the issue of catheterization, care of a patient with a urinary catheter, and prevention of urinary tract infections related to healthcare depends on the type of workplace”) was not confirmed. According to the results of the research, the possibilities of education in the issue of catheterization, care of a patient with a urinary catheter, and prevention of urinary tract infections related to healthcare do not depend on the type of workplace.

## Discussion

In connection with the dimensions “Increasing the quality of care”, “Monitoring the quality of care” and “Risk management”, the conducted research attempted to establish the situation related to the introduction of standards associated with the performance of bladder catheterization, care of a patient with a urinary catheter, and prevention of CAUTI infections and control of their fulfillment, i.e. verification audits. The conducted research showed that the standard bladder catheterization procedure is implemented according to 86.8% of the respondents, the procedure for caring for a patient with a urinary catheter was confirmed by 89.2% of the respondents, and the introduction of the CAUTI prevention standard was confirmed by almost sixty-seven percent of respondents. The results of the analysis of research data from this area were again supplemented by interviews with quality managers and the statements of interview participants; the introduction of standard procedures at providers of acute inpatient care in the SR was confirmed, only in one case it was stated that there were no standard procedures implemented at the provider of acute inpatient care because graduates should be equipped with knowledge and skills from their studies. Furthermore, the verification of the fulfillment of standards by audits was also confirmed by the analysis of interviews. The presented research further demonstrated the connection between regular audits of CAUTI prevention procedures and the existence of a standard CAUTI prevention procedure – where a standard is in place, audits are performed significantly more often ( $x^2 = 23.171$ ;  $p < 0.001$ ). Carter et al. (16); Purvis et al. (17); Freeman-Jobson et al. (18); Johnson et al. (19) evaluate the introduction of standards of care for patients with a urinary catheter and regular ver-

ification of established standard care procedures by audits as effective CAUTI prevention measures. In a review study published by McNeill (20), it is stated that care of the urinary catheter and collection system begins at the moment of catheter insertion, patient care and acceptance of CAUTI preventive procedures, however, must be continuously monitored.

84.4% of respondents confirmed regular revisions of nursing care standards at acute inpatient care providers (according to the results of the presented research), statements about updating the established standards according to NOP were recorded in interviews with quality managers. However, after analyzing the results of the research, it was possible to conclude that the implementation of standards of nursing care, namely the performance of bladder catheterization, care of the patient with a urinary catheter and prevention of CAUTI, does not depend on the type of hospital. The results of the conducted research confirmed the homogenous approach of managers of individual types of hospitals to the implementation of standard procedures in practice.

The analysis of research data related to education in the issue of improving the quality of care belonging to the CAUTI prevention dimension “Education” also determined the connection between the character “education in the field of quality” and the type of workplace. The conducted research showed that more training is carried out within the quality of care in the field of bladder catheterization at surgical-type workplaces ( $x^2 = 5.834$ ;  $p < 0.05$ ) and at least one educational event per year is also more often implemented at surgical-type workplaces to enhance improvement of professional qualifications of nurses ( $x^2 = 6.076$ ;  $p < 0.05$ ).

Furthermore, the results of the presented research showed a more frequent implementation of education of health professionals in procedures ensuring patient safety in surgical workplaces ( $x^2 = 5.672$ ;  $p < 0.05$ ). In connection with these results, it is possible to state the opinion of Aufseeser-Weisse and Ondocka (19), namely that every general nurse, as well as every health professional, should have comprehensive knowledge in the field of quality of care, an overview of the current legislation is also important. The general nurse is obliged to monitor the quality of



nursing care, receives information from regular audits, nurses are members of teams whose activities focus on the issue of risk management in the department and in the hospital (21). Ravindra et al. (22) add that nurses are responsible for the quality of care provided, and continuous, lifelong education is one of the aspects guaranteeing safe and relevant nursing care performed according to valid standards of care.

In the presented research, 49.5% of respondents confirmed the implementation of further education for non-physicians to increase their qualifications in the field of proper catheterization procedures, the care of patients with urinary catheters and CAUTI prevention, 86.2% of respondents attend at least one educational event per year to improve their professional qualifications and, at acute inpatient care providers, 88.4% of research respondents confirmed that medical professionals are trained in patient safety procedures.

In the "Education" dimension, the conducted research then investigated the connections between the type of workplace and education in specific areas: bladder catheterization, care of a patient with a urinary catheter, and prevention of CAUTI. The analysis of the research data related to this dimension showed that 70.4% of respondents could use the employer's offer of courses/seminars, 41.6% of respondents said that they could use the employer's offer of a workshop, training or verification of bladder catheterization skills, 31.3% of respondents can take an e-learning course on urinary catheter care and CAUTI prevention at their employer. The support of education in the areas of care for patients with a urinary catheter, and prevention of CAUTI and bladder catheterization was confirmed by 57.2% of respondents in the presented research. In his study, Quinn (23) gave an example of an educational programme where lectures were organized continuously so that health workers could attend them according to their work shifts. The author also mentions that the diagnosis and therapy of CAUTI increase the financial costs of care, after the implementation of the educational programme, the number of CAUTI cases significantly decreased, the effectiveness of the educational programme, which was ongoing for two months, was thus verified. Quinn (24) described the continuous implementation of education so

that health professionals have the opportunity to participate in education according to the schedule of their shifts. According to the results of the presented research, 56.6% of respondents can take part in educational activities in the mentioned issue related to bladder catheterization and CAUTI prevention during working hours.

The data analysis of the research presented by the dissertation also showed a statistically significant relationship between the support of education by executives and the opportunity to participate in education within working hours ( $\chi^2 = 105.237$ ;  $p < 0.001$ ) - the results showed that where education is supported by executives, workers can participate in education during working hours. Jain et al. (25) emphasize that the education of healthcare professionals in the field of CAUTI prevention is a high priority and essential for reducing the number of CAUTI cases. Oman et al. (26) in connection with education as a step to prevent CAUTI, recommend the education of all health professionals who participate in a care for a patient with a urinary catheter - i.e. for nurses and other non-medical health workers, e.g. physiotherapists, caregivers, transport workers, radiological assistants. Viner (27) clarifies that as long as nurses are properly retrained, they can educate other health professionals who participate in care, e.g. physiotherapists, occupational therapists or speech therapists. The aforementioned author (27) also conducted a study aimed at evaluating the education of health professionals in long-term care departments, which is essential for verifying the quality of the educational programme.

The recommendation of the CDC (28) regarding education is clear, it is advisable to undertake periodic training of competent health professionals, which is comprehensive and contains information on the correct procedures for catheterization of the bladder, including the possibility of practicing performance, and the issue of prevention of CAUTI and other complications of catheterization should also be included in the education. In the context of this recommendation, the data analysis of the presented research showed that "participation in periodic training" was the most frequent answer to the question of what type of training the interviewees can receive. The conducted research also brought interesting results in the case of

a comparison of access to education by non-physicians according to the type of department. The analysis of the research data showed that in the field of correct procedures for bladder catheterization, care of a patient with a urinary catheter and prevention of CAUTI, 20.0% of nurses are trained in non-surgical workplaces as part of their initial training, and in surgical workplaces it was 23.1% of nurses. According to the results of the research, approximately 35.5% of nurses in both surgical and non-surgical workplaces regularly undergo periodic training. The results of the quantitative phase of the conducted research belonging to the "Education" dimension were verified by the qualitative part of the research. On the basis of the above, it can be concluded that, according to the presented research, education among providers of acute inpatient care is implemented in various forms - seminars, courses, certified courses and occasionally also e-learning. In just a single case, it was stated in the interviews that education is not implemented because graduates should be equipped with knowledge and skills from their studies.

## Conclusion

Based on the results of the research, monitoring the result indicators of the quality of care, and if possible, the introduction of an electronic form of medical documentation, both for the needs of record keeping and for the possibility of ongoing monitoring of quality indicators, can be recommended. It is possible to recommend periodic training events for the education of general nurses and for the transfer of theoretical information. For possible knowledge testing, there is a possibility of using IT technologies - educational programmes in the form of e-learning.

## References

1. SUPSAKOVA P (2017) Risk management in the provision of health services. Prague: Grada. 288 p. ISBN 978-80-271-0062-0.
2. VISNOVCOVA E, BABECKA J (2021) Crisis management in healthcare. In: Ružomberok Health Days 2021 [electronic document]: Proceedings of the international conference. 1st ed. Year 15. Ružomberok (Slovakia): Catholic University in Ružomberok. VERBUM - KU publishing, 2021. – ISBN 978-80-561-0903-8, p. 303-308.
3. KOZON V, ZACHAROVA E (2016) Stress factors in the work of nurses / In: Clinical Social Work and Health Intervention Vienna (Austria): Gesellschaft für angewandte Präventionsmedizin. – ISSN 2222-386X. – ISSN (online) 2076-9741. – Year 7 (2016), p. 105-115.
4. SKRLA P, SKRLOVA M (2008) Risk management in medical facilities. Prague: Grada. 199 p. ISBN 978-80-247-2616-8.
5. JANKELOVA N, CZARNECZKI P (2021) Managerial Knowledge and Skills in the Practice of Healthcare Managers. 1st Edition. - Warsaw : Collegium Humanum - Warsaw Management University, 2021. 171 p.
6. PROKESOVA R, BRABCOVA I, BARTLOVA S, TOTHOVA V (2014) Specifics of Risk Management in Select Medical Facility. In: *Kontakt: Journal of nursing and social sciences related to health and illness* [online]. 16(4), e256– e262 [cit. 2022-04-09]. Available on: [https://kont.zsf.jcu.cz/artkey/knt-201404-0009\\_specifika-rize-ni-rizik-ve-vybranych-zdravotnickych-zarizenich.php](https://kont.zsf.jcu.cz/artkey/knt-201404-0009_specifika-rize-ni-rizik-ve-vybranych-zdravotnickych-zarizenich.php).
7. JANKELOVA N, CZARNECZKI P (2022) *Diversity Management and Organizational Culture in Healthcare Facilities in Slovakia*. 1st Edition. - Warsaw : Collegium Humanum - Warsaw Management University, 2022. 139 p.
8. BARKASID, LECZOVA D (2019) Motivation to choose a field of study for students of helping professions. 1st ed. Michalovce: St. Elizabeth University of Health and Social Work, NPO. in Bratislava, Institute of the Blessed Metod Dominik Trčka in Michalovce, 2019. 90 p. ISBN: 978-80-8132-210-5.
9. SMEJKAL V, RAIS K (2013) Risk management in companies and other organizations. Prague: Grada. 466 p. 4., update and diff. ed. ISBN 978-80-247-4644-9.
10. KECLIKOVA K (2012) Risk management system as part of an integrated quality management system in healthcare. Zlín. Dissertation thesis. Tomas Bata University in Zlín. ISBN 978-80-7454-194-0.
11. JANKELOVA N, MORICOVA S, MASAR D (2016) The Current State of Knowledge Management Activities in Health Facilities

- in Slovakia. In: *Kontakt : Journal of Nursing and Social Sciences Related to Health and Illness*. - České Budějovice : Faculty of health and social studies of University of South Bohemia. - ISSN 1212-4117. - Vol. 18, no. 4. pp. 296-306.
12. JINDRAK V, PRATTINGEROVA J, HEDLOVA D (2013) Current concept of prevention and control of healthcare-associated infections. Part III: Program for prevention and control of infections in medical facilities [online]. Czech Society of Hospital Epidemiology and Hygiene [cit. 2022-01-29]. Available on: [https://www.sneh.cz/\\_soubory/\\_clanky/54.pdf](https://www.sneh.cz/_soubory/_clanky/54.pdf).
  13. GOULD D, GAZE S, DREY N, COOPER T (2017) Implementing Clinical Guidelines to Prevent Catheter-Associated Urinary Tract Infections and Improve Catheter Care in Nursing Homes: Systematic Review. In: *American Journal of Infection Control* [online]. 45(5), 471–476 [cit. 2022-03-09]. ISSN 0196-6553. 179 Available on: <https://www.sciencedirect.com/science/article/pii/S0196655316309075>.
  14. CARTER N M, REITMEIER L, GODLOE L R (2014) An Evidence-Based Approach to the Prevention of Catheter-Associated Urinary Tract Infections. In *Urologic Nursing* [online]. 34(5), 238–245 [cit. 2022-02-08]. ISSN 2247-4863. doi:10.7257/1053-816X.2014.34.5.238.
  15. BURSTON S, CHABOYER W, GILLESPIE B (2014) Nurse-Sensitive Indicators Suitable to Reflect Nursing Care Quality: a Review and Discussion of Issues. In *Journal of Clinical Nursing* [online]. 23(13–14), 1785–1795 [cit. 2022-02-03]. ISSN 1365-2702. doi:10.1111/jocn.12337.
  16. CARTER E J, PALLI D J, MANDEL L, SINNETTE C, SCHUUR J D (2016) A Qualitative Study of Factors Facilitating Clinical Nurse Engagement in Emergency Department Catheter-Associated Urinary Tract Infection Prevention. In *Journal of Nursing Administration* [online]. 46(10), 495–500 [cit. 2022-02-08]. ISSN 0002-0443. doi:10.1097/mna.0000000000000392.
  17. PURVIS S, GION T, KENNEDY G et al. (2014) Catheter-Associated Urinary Tract Infection. In *Journal of Nursing Care Quality* [online]. 29(2), 141–148 [cit. 2022-04-12]. ISSN 1057-3631. Available on: <http://content.wkhealth.com/linkback/openurl?sid=WKPTLP:landingpage&an=00001786-201404000-00007>.
  18. FREEMAN-JOBSON J H, ROGERS J L, WARD-SMITH P (2016) Effect of an Education Presentation on the Knowledge and Awareness of Urinary Tract Infection among Non-Licensed and Licensed Health Care Workers in Long-Term Care Facilities. In *Urologic Nursing* [online]. 36(2), 67–71 [cit. 2022-03-11]. ISSN 2247-4863. Available on: <https://pubmed.ncbi.nlm.nih.gov/27281862>.
  19. JOHNSON P, GILMAN A, LINTNER A, BUCKNER E (2016) Nurse-Driven Catheter-Associated Urinary Tract Infection Reduction Process and Protocol: Development Through an Academic-Practice Partnership. In *Critical Care Nursing Quarterly* [online]. 39(4), 352–362 [cit. 2022-02-10]. ISSN 1550-5111. doi:10.1097/CNQ.0000000000000129.
  20. MCNEILL L (2017) Back to basics: How Evidence-Based Nursing Practice Can Prevent Catheter-Associated Urinary Tract Infections. In *Urologic Nursing* [online]. 37(4), 204–206 [cit. 2022-05-11]. ISSN 2247-4863. Available on: [https://search.proquest.com/docview/1929673641/fulltext-pdf/1FC4BCC90B6A\\_4B26PQ/1?accountid=9646](https://search.proquest.com/docview/1929673641/fulltext-pdf/1FC4BCC90B6A_4B26PQ/1?accountid=9646).
  21. AUFSEESER-WEISS M R, ONDECK D A (200) Medication Use Risk Management: Hospital Meets Home Care. In *Journal of Nursing Care Quality*. 15(2), 50–57. ISSN 1057-3631.
  22. RAVINDRA H N, PATEL S M, PATEL S A (2019) Study to assess the Effectiveness of SOP on Knowledge and Practice Regarding Urinary Catheterization Procedure among Staff Nurses of Dhiraj Hospital, Vadodara. In *International Journal of Nursing Education* [online]. 11 (4) [cit. 2022-03-19]. ISSN 0974-9357. Available on: <http://172.20.40.131:80/jspui/handle/123456789/3466>.
  23. QUINN M, AMELING J M, FORMAN J, KREIN S L, MANOJLOVICH M, FOWLER K E, KING E A, MEDDINGS J (2019)

- Persistent Barriers to Timely Catheter Removal Identified from Clinical Observations and Interviews. In *The Joint Commission Journal on Quality and Patient Safety* [online]. [cit. 2022- 03-03]. ISSN 1553-7250. Available on: <https://doi.org/10.1016/j.jejq.2019.10.004> 121.
24. QUINN P (2015) Chasing Zero: A Nurse-Driven Process For Catheter-Associated Urinary Tract Infection Reduction in a Community Hospital. In *Nursing Economics* [online]. 33(6), 320–325 [cit. 2022-03-08]. ISSN 0746-1739. Available on: <https://pubmed.ncbi.nlm.nih.gov/26845820/>.
  25. JAIN M, DOGRA V, MISHRA B, THAKUR A, LOOMBA P S (2015) Knowledge and Attitude of Doctors and Nurses Regarding Indication for Catheterization and Prevention of Catheter-Associated Urinary Tract Infection in a Tertiary Care Hospital. In *Indian Journal of Critical Care Medicine* [online]. 19(2), 76 [cit. 2022-05-02]. ISSN 0972-5229. Available on: <http://www.ijccm.org/text.asp?2015/19/2/76/151014>.
  26. OMAN K S, MAKIC M B F, FINK R et al. (2012) Nurse-Directed Interventions to Reduce Catheter-Associated Urinary Tract Infections. In *American Journal of Infection Control* [online]. 40(6), 548–553 [cit. 2022-05-12]. ISSN 0196-6553. Available on: <https://pubmed.ncbi.nlm.nih.gov/22047997/>.
  27. VINER S (2020) Urinary Tract Infection Knowledge of Long-Term Care Nursing Staff: The Effect of an Educational Intervention. In *Urologic Nursing* [online]. 40(1), 7–11 [cit. 2022-05-01]. ISSN 2247-4863. Available on: <https://www.thefreelibrary.com/Urinary+Tract+Infection+Knowledge+of+LongTerm+Care+Nursing+Staff%3A...-a061715012>.
  28. GOULD CAROLYN V (2019) Guideline for Prevention of Catheter-Associated Urinary Tract Infections (2009) [online]. The Centers for Disease Control and Prevention – CDC [cit. 2022-05-12]. Available on: <https://www.cdc.gov/infectioncontrol/pdf/guidelines/cauti-guidelines-H.pdf> 43.

No. 4, Vol. 14, 2023

Editor-in-chief: Prof. DDr. med. Dr. habil Claus Muss Ph.D.

# CLINICAL SOCIAL WORK *AND HEALTH INTERVENTION*

**Indexed by:**

Web of Science/ESCI

ERIH

Alexander Street

ProQuest

ScienceOpen

Ulrich's

CrossRef Similarity Check Powered by iThenticate

Journal DOI 10.22359/cswhi

Issue DOI 10.22359/cswhi\_14\_4

