Volume 10 | May 2024 | Number 1 | ISSN 2303-8616

HEALTH BULLETIN

Zdravstveni glasnik

Faculty of Health Studies
University of Mostar

Health Bulletin

Zdravstveni glasnik

Faculty of Health Studies
University of Mostar

Fakultet zdravstvenih studija
Sveučilište u Mostaru

Publisher: Faculty of Health Studies, University of Mostar

For the publisher: Professor Vajdana Tomić MD, PhD, University of Mostar, Bosnia and Herzegovina

Editor-in-Chief: Academician Professor Dragan Babić MD, PhD, University of Mostar, Bosnia and Herzegovina

Assistant Editors:
Assistant Professor Josip Šimić PhD, University of Mostar, Bosnia and Herzegovina
Assistant Professor Roberta Perković PhD, University of Mostar, Bosnia and Herzegovina
Assistant Professor Darjan Franjić PhD, University of Mostar, Bosnia and Herzegovina

Editorial Board:
Professor Vajdana Tomić MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Violeta Šoljić MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Ivan Ćavar MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Miro Miljko MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Joško Petričević MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Vesna Miljanović Damjanović MD, PhD, University of Mostar, Bosnia and Herzegovina
Assistant Professor Nada Prlić PhD, Josip Juraj Strossmayer University of Osijek, Croatia
Assistant Professor Ivona Ljevak PhD, University of Mostar, Bosnia and Herzegovina
Assistant Professor Martina Orlović Vlaho MD, PhD, University of Mostar, Bosnia and Herzegovina
Assistant Professor Olivera Perić RN, PhD, University Clinical Hospital Mostar, Bosnia and Herzegovina
Senior Assistant Romana Barbarić, MD, PhD, University Clinical Hospital Mostar, Bosnia and Herzegovina
Senior Assistant Dragana Rašić University of Mostar, Bosnia and Herzegovina

Scientific Advisory Board:
Professor Zoran Tomić PhD, University of Mostar, Bosnia and Herzegovina
Professor Ljerka Ostojić, MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Ivan Vasilj MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Josip Mašković MD, PhD, University Clinical Hospital Mostar, Bosnia and Herzegovina
Professor Ante Kvesić, MD, PhD, University Clinical Hospital Mostar, Bosnia and Herzegovina
Professor Ivo Čolak, PhD, University of Mostar, Bosnia and Herzegovina
Professor Milenko Bevanda MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Danijel Pravdić MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Mladen Mimica MD, PhD, University of Mostar, Bosnia and Herzegovina
Professor Dalibor Karlović PhD, University of Zagreb, Croatia
Professor Slobodan Mihaljević MD, PhD, University Hospital Centre Zagreb, Croatia
Professor Danica Železnik PhD, Faculty of Health and Social Sciences Slovenj Gradec, Slovenia
Professor Jürgen Deckert MD, PhD, University Hospital Würzburg, Germany
Professor Marco Sarchiapone MD, PhD, University of Molise, Italy
Professor Miroslava Jašović Gašić MD, PhD, University of Belgrade, Serbia

Technical Editors:
Senior Assistant Vladimir Ruf University of Mostar, Bosnia and Herzegovina
Sanja Brkić MPT, University of Mostar, Bosnia and Herzegovina

English Language Editor: Assistant Professor Kaja Mandić PhD, University of Mostar, Bosnia and Herzegovina

Fakultet zdravstvenih studija Sveučilišta u Mostaru / Faculty of Health Studies, University of Mostar
Zrinskog Frankopana 34, 88000 Mostar, Bosna i Hercegovina
Tel: +387 36 337 063; **Fax**: +387 36 337 051
E-mail: zdravstveni.glasnik@fzs.sum.ba

Health Bulletin is visible in HRČAK, Index Copernicus, Crossref, EBSCO (CEEAS), EBSCO (CINAHL Ultimate), SHERPA/RoMEO, ROAD, EuroPub, Google Scholar and COBISS databases.

All papers from Health Bulletin are licensed under a Creative Commons Attribution 4.0 International.

HEALTH BULLETIN

Zdravstveni glasnik

Faculty of Health Studies
University of Mostar

Fakultet zdravstvenih studija
Sveučilište u Mostaru

Volume 10 / May 2024 / Number 1 | ISSN 2303-8616

CONTENTS

Editorial
Dragan Babić
EDITORIAL 7

Editorial
Danijel Pravdić
THE BASIC BIOMEDICAL RESEARCH - FROM WHERE WE START 8

Original Scientific Article
Marijana Delić, Dragan Babić, Darjan Franjić
PREVALENCE OF PSYCHOACTIVE SUBSTANCE USE AMONG SECONDARY SCHOOL STUDENTS IN ŽUPANJA 11

Original Scientific Article
Anita Kajić-Selak
SOCIODEMOGRAPHIC DIFFERENCES IN PREVALENCE, INTENSITY AND PSYCHOSOCIAL CONSEQUENCES OF ADOLESCENT GAMBLING IN MOSTAR 24

Original Scientific Article
Anita Begić, Karolina Tadić-Lesko, Valentina Katić
THE RELATIONSHIP BETWEEN PARENTAL BEHAVIOR AND UPBRINGING OF UPPER ELEMENTARY SCHOOL CHILDREN 42

Original Scientific Article
Darko Bilić, Antonija Hrkać, Jozo Marković
THE EFFICACY OF MANUAL THERAPY AND ULTRASOUND IN TREATMENT OF CALCIFIC TENDINITIS OF THE SHOULDER 54

Original Scientific Article
Kristina Hanžek, Vesna Bratić, Anita Lukić, Slobodan Mihaljević
STRESS FACTORS OF NURSES IN COVID DEPARTMENTS 68

Original Scientific Article
Marina Ćurlin, Kata Barukčić, Vesna Pehar, Ivan Vasilj, Darjan Franjić
IMPACT OF THE COVID-19 PANDEMIC ON THE REGULAR IMMUNIZATION OF CHILDREN IN THE MOSTAR HEALTH CENTER 82

Original Scientific Article
Nafija Serdarević, Marina Ćurlin, Aldijana Dautbašić, Adina Elena Stanciu, Dabla Pradeep, Azra Durak-Nalbantić
CHANGES OF TSH, FT3 AND FT4 LEVELS IN PATIENTS WITH HYPERTHYROIDISM 94

Original Scientific Article
Katarina Martinović, Svjetlana Grgić, Monika Dalmatin Dragišić
KNOWLEDGE, ATTITUDE AND PRACTICE AMONG THE STUDENTS OF SCHOOL OF MEDICINE OF UNIVERSITY OF MOSTAR TOWARDS INFLUENZA VACCINATION 108

Review Article
Marija Brajković & Dragan Babić
THE CONNECTION BETWEEN QUALITY AND SELF-ESTEEM IN PATIENTS WITH BREAST CANCER 124

Review Article
Marija Čupić & Dragan Babić
PERSONALIZED HEALTHCARE AS AN INDICATOR OF PATIENT RESILIENCE 136

Professional Paper
Darko Bilić, Antonija Hrkać, Jure Mandić
ANALYSIS OF HEALTHCARE QUALITY: PUBLIC CLINICS AND PRIVATE REHABILITATION CENTERS FROM PATIENTS' PERSPECTIVE 153

Professional Paper
Lana Čabraja, Martina Zajec, Sanja Marušić, Marko Krpan
EPIDEMIOLOGICAL ANALYSIS OF MORTALITY FROM INFLUENZA IN THE REPUBLIC OF CROATIA 164

Professional Paper
Lucija Koturić Čabraja
MOTIVATION OF CROATIAN HEALTH WORKERS TO GO ABROAD 176

Professional Paper
Amina Šljivo, Amer Ovčina, Lejla Mešalić, Marijan Marjanović
SAFETY MANAGEMENT AT THE WORKPLACE IN PUBLIC AND PRIVATE HEALTHCARE FACILITIES IN THE CANTON OF SARAJEVO 188

Professional Paper
Darko Tomić, Vesna Majher Tomić, Ivana Stojak, Tanja Bavrka, Jasmina Marušić
COST ASSESSMENT OF COMPUTED RADIOGRAPHY TOWARDS CONVENTIONAL RADIOGRAPHY 205

Professional Paper
Marija Vidović & Boris Lukšić
BURNOUT SYNDROME OF NURSES/TECHNICIANS IN THE COVID-19 PANDEMIC AT UNIVERSITY CLINICAL HOSPITAL MOSTAR 214

Case Report
Svjetlana Grubeša Raguž & Marjana Jerković Raguž
NEWBORN WITH CONGENITAL SYPHILIS: CASE REPORT 226

Guidelines for Authors 234

EDITORIAL

Very respected and dear readers of our scientific journal, Health Bulletin,

In front of you is the nineteenth issue of the electronic journal Health Bulletin, in which we once again publish a variety of papers in the field of healthcare. We strive to maintain the achieved level and continuously work and fight to progress to an even higher level.

This issue contains seventeen quality papers (eight original scientific papers, two review papers, six professional papers and one case report) written by our current and former students and, of course, our doctoral students and teachers. The papers were written by authors from several health centers from Bosnia and Herzegovina, but there are also several authors from the Republic of Croatia, as well as from Romania and India. I am satisfied and proud that our journal is progressing professionally and scientifically and that we have an increasing number of papers for publishing. I hope that by reading the Health Bulletin, you will benefit by expanding and supplementing your knowledge, which will also help you in your practical work, and that you will have an additional motivation to have your paper published in our journal.

I would like to thank all the authors and co-authors of the published papers, especially my assistants and the editorial staff of this magazine who contributed to the publication of this issue, and at the same time I invite all those interested to submit their papers for our next editions exclusively in English language.

Mostar, May 2024 Dragan Babić

THE BASIC BIOMEDICAL RESEARCH - FROM WHERE WE START

Danijel Pravdić

School of Medicine, University of Mostar, 88 000 Mostar, Bosnia & Herzegovina

Received on 18.03.2024. Reviewed on 30.03.2024. Accepted on 10.04.2024.

By the definition the science is new, reproducible and useful knowledge. One of tha main ways to obtain that "new knowledge" is by doing research. On the other hand, the research can be defined as a searching for new, reproducible and applicable knowledge. It is an endeavour to discover new facts, procedures, methods, and techniques by the appropriate scientific study (The Concise Oxford Dictionary), and systemic investigation towards increasing the sum of knowledge (Chambers 20th Century Dictionary). Generally, in medicine research can be divided into basic, clinical, and epidemiological research. In all types of research, new knowledge is done by doing specific studies, which also can be basic, clinical and epidemiological. Basic medical research is also called fundamental or experimental research. It usually involves animal experiments, cell or cell culture studies, biochemical, genetic and physiological investigations, and studies on the properties of drugs and materials. In this type of experiments, at least one independent variable is changed and the effects on the dependent variable are investigated. The main advantage of this type of study is that experimental conditions and the experimental design can be precisely specified and controlled. It is also important that cofounding factors can be controlled or reduced. Also, many types of experiments are standardized and one should be able to repeat the research result in any other laboratory all around the world. The reproducibility of research is one of the main characteristics of a good experimental design. Basic biomedical research also includes the development and improvement of different analytical procedures (analytical determination of enzymes, genes, intracellular signaling pathways, gene sequencing), imaging procedures (computed tomography, magnetic resonance imaging, ultrasound imaging). Different mathematical procedures, such as statistical tests, experimental modeling and statistical evaluation, are also part of basic medical research.

Why the basic biomedical research is important?

The basic medical research is important

because it is necessary to generate new knowledge and tehnology to deal with major unsolved issues. It usually covers different areas: biology, biochemistry, biophysics, mathematics, statistics, together with physiology and organ function or disease mechanisms. Based on all above mentioned facts, it is important to develop and maintain the basic medical research, because it is the starting point for all other knowledge and the first place where young scientist enter into scientific community, and learn about basic technologies used in research, and where they are trained about study designs, statistical methods, handling with animals and research ethics, and to write researsh projects. It is also a source for new tools, models, and techniques (e.g., knockout mice, new drugs and compounds). First steps in scientific communication and teamwork are also taught during the first contact with science, and different research problems where we often need to seek help frm other colleagues. Here is one example of basic research: „In February 2021, Dr. Da-Neng Wang's research team (at the NYU School of Medicine) published the first report on the 3D structure of the human sodium-dependent citrate transporter (NaCT) protein - the instructions to make this protein are in the SLC13A5 gene. This research discovery carries important implications for patients with SLC13A5 Epilepsy". So, it is starting point to make a drug for epilepsy. Without the knowledge on the structure od this particular sodium channel, specific drugs for the tretamnet of epilepsy coud not be developed (Figure 1).

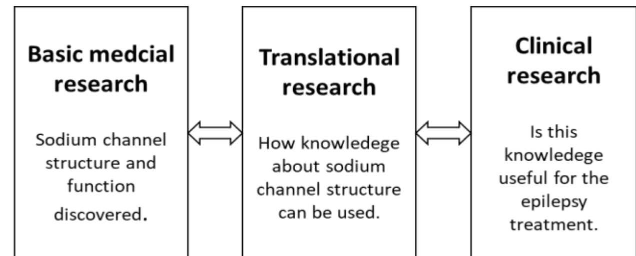

Figure 1. - *The connection between basic research with translational and clinical research*

CONCLUSION

Therefore, a good basic medical research is necessary to be established in every institution. At the end, we can cite prof. O. Sinanović: "In the desire for the greatest possible scope of knowledge and the possibility of providing the highest quality health care, educating students and teaching staff, science at the Faculty of Health Studies is an unquestionable need and obligation". Nine years of existence of *Health Bulletin* intended for publication of the best works of scientific work and establishment of the Doctoral Study at the *Faculty of Health Studies* is a good way of promoting science and medical research.

LITERATURE

1. Marušić M. Health profession and science. Health Bulletin 2015; 1(2): 9-14.
2. Mimica M, Babić D, Vasilj I. Importance and significance of science at the Faculty of Health Studies. Health Bulletin 2015; 1(1): 9-12
3. Marušić M i suradnici. Introduction into scientific work in medicine. 5th edition. Zagreb: Medicinska naklada, 2013.
4. Sinanović O, Babić D. The need and obligation of science at the Faculty of Health Studies. Health Bulletin. 2016;2:9-13.
5. Martinac M. Development of nursing as a basic science. Health Bulletin 2022. Vol. 8. No. 2.
6. TESS Research Foundation (visited on May 7th, 2024.).

PREVALENCE OF PSYCHOACTIVE SUBSTANCE USE AMONG SECONDARY SCHOOL STUDENTS IN ŽUPANJA

Marijana Delić[1], Dragan Babić[1,2], Darjan Franjić[2]

[1] Faculty of Humanities and Social Sciences, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

[2] Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 18.03.2024. Reviewed on 15.04.2024. Accepted on 26.04.2024.

ABSTRACT

Introduction: The use of psychoactive substances is a serious and difficult problem in many countries of the world, and is taking on epidemic proportions, especially in the youth population. Disorders caused by the psychoactive substance use include a wide range of disorders. Experts are finding it increasingly difficult to monitor the possible consequences that drugs can cause in the human body.

Aim: To examine the prevalence of the psychoactive substance use among high school students in Županja.

Respondents and methods: A cross-sectional survey was conducted during May 2023. The first group of respondents consisted of 115 students of the third and fourth grades of the Županja Grammar School, while the second group consisted of 100 students of the third and fourth grades of the Županja Vocational School. The research instrument was a standardised internationally agreed questionnaire "European Research in Schools on Smoking, Drinking and Drug Use among Pupils" (2011). European School Survey Project on Alcohol and Other Drugs (ESPAD).

Results: A statistically significant number of respondents has never used cigarettes, alcoholic beverages, adhesives and other solvents. Respondents from the Vocational School used cigarettes on a larger scale daily, while Grammar school students started smoking at an older age. In the last 12 months, when compared to the Vocational School students, a higher percentage of Grammar School students have used adhesives and other solvents. Grammar School students experimented with "drugs" in a higher proportion due to curiosity.

Conclusion: The prevalence of the psychoactive substance use among high school youth in Županja is at a satisfactory low level.

Keywords: psychoactive substances, students, secondary school

Corresponding author: Prof. Dragan Babić, PhD

E-mail: dragan.babic@fzs.sum.ba

INTRODUCTION

The use of psychoactive substances is a serious and difficult problem in many countries of the world, and it is taking on epidemic proportions, especially in the youth population (1). Experts define a psychoactive substance as a substance that acts on the central nervous system in such a way that it changes not only the psychological, but also the physical functioning of a person (2). People have used psychoactive substances in almost all cultures throughout all periods of human history. Concerns about the abuse of psychoactive substances arise when behaviour is presented as a potential cause of adverse consequences for the user or society (3). Disorders caused by the use of psychoactive substances include a wide range of disorders, ranging from acute intoxication of abuse or harmful use, addiction, abstinence syndrome to psychotic and other disorders caused by psychoactive substances (1). Diagnosis should be used when the use of more psychoactive substances is so improper or when improperly mixed multiple agents are being used. Treatment of psychoactive substance addicts is very demanding and complicated and requires a wide range of organic, psychological and social interventions as part of integral and multidimensional treatment (4).

Addiction is now considered a chronic, progressive recurrent disease and the health care system must define its role both in treatment and rehabilitation, but also in the prevention of addiction syndrome (5). It is estimated that almost a quarter of the adult population in the European Union has used illicit substances at some point in their lives. In most cases, they used cannabis (6). According to the mode of action on consciousness, we distinguish six basic groups of psychoactive substances: stimulants, central nervous system depressors, opioids, hallucinogens, nicotine and marijuana (3). The addictive scene has changed significantly in the last ten years, so that today it is characterized by an increasing number of non-opiate addicts, cannabis users and new "drugs", with the continuation of decreasing heroin use tendency (7). Experts are finding it increasingly difficult to monitor the possible consequences that drugs can cause in the human body (8). The increase in addiction among adolescents is usually attributed to the family environment and the school system characteristics. When considering our environment and conditions, we can add psychosocial consequences of war events,

unemployment and changes in the family structure (9) to these risk factors.

Some experts suggest that the use of psychoactive substances is the result of interactive action of demographic variables, socialization factors, psychological characteristics, attitudes and beliefs (10). Out of the demographic variables, the most important are age, gender, religious affiliation, socioeconomic status and family structure. Socialization factors that have a protective function are religious identification, school success and successful adaptation to the school environment. Unfavourable socialization factors include family conflicts and peer pressure. Psychological characteristics that increase the risk of using psychoactive substances are low self-esteem, feeling alienated, shyness, social isolation, etc. Genetic factors provide an explanation for about a quarter of addicts. Sons of alcoholics carry a higher risk of becoming alcoholics themselves, even when adopted by parents who do not consume alcohol (11). Early recognition of addictive substance abuse increases the likelihood of timely intervention or taking appropriate measures to prevent further abuse and the development of addiction (12).

The aim of this study was to examine the prevalence of the psychoactive substance use among high school students in Županja.

RESPONDENTS AND METHODS

During May 2023, a cross-sectional survey was conducted at the Županja Grammar school and at the Županja Vocational School. The tested sample consisted of 215 students from the above-mentioned schools. The first group consisted of 115 students of the third and fourth grade of the Županja Grammar School, while the second group consisted of 100 students of the third and fourth grades of the Županja Vocational School.

The research instrument was a standardised internationally agreed questionnaire "European Research in Schools on Smoking, Drinking and Drug Use among Pupils" (2011). European School Survey Project on Alcohol and Other Drugs – ESPAD) (13).

The study was conducted voluntarily and anonymously. The study excluded students who had a history of mental illness, mental disorders, as well as respondents who did not fill out the questionnaire correctly. After obtaining consent from the school, before conducting the survey, students were introduced with the basic research objective in order to give oral consent to participate, i.e. filling out the

questionnaire. They were told they could opt out of filling out the questionnaires at any point while conducting the survey. Also, they were informed that the collected data is confidential and that it would be used solely for the purpose of making a thesis.

STATISTICAL ANALYSIS

The collected data were statistically processed using descriptive statistics methods and presented in pictorial form. To test the differences between groups the $\chi 2$ test was used, as well as Fisher's exact test. The probability level of $p < 0.05$ in all tests was taken as statistically significant. The following software was used for statistical analysis of the obtained data: the SPSS system for Windows (version 13.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excell (version office 2007, Microsoft Corporation, Redmond, WA, USA).

RESULTS

There were no statistically significant differences in gender representation between the groups (p=0.013). The Grammar School students achieved significantly higher success in school than the respondents of the Vocational School (t=3.971; p<0.001), and they smoked cigarettes in a higher proportion, most of them aged 16 and over (p=0.003).

Respondents of the Vocational School used cigarettes on a larger proportion daily, while the Grammar school students started smoking at an older age. The largest number of respondents has never used cigarettes (Figure 1).

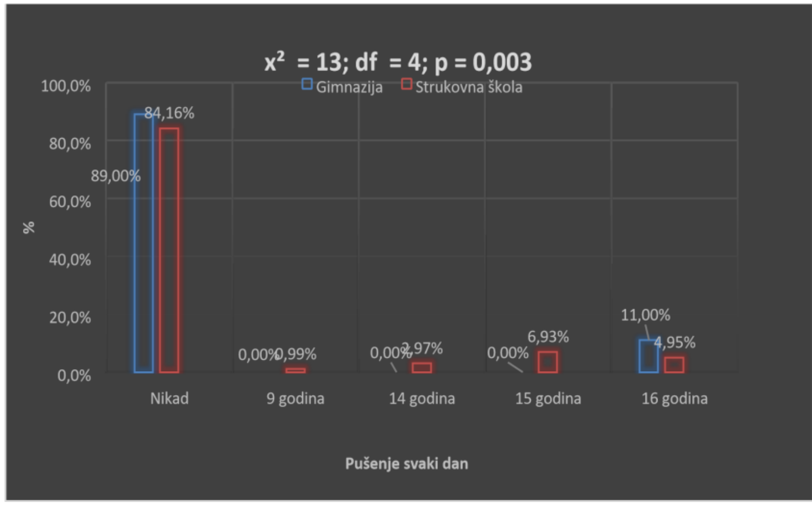

Figure 1. - *Age of smokers who smoke on daily basis*

Vocational School respondents were getting drunk in a higher percentage than the Grammar School respondents (p<0.001), while there were no statistically significant differences in the frequency of use of adhesives and other solvents in life among groups (p=0.111). In the last 12 months, the Grammar school students have used adhesives and other solvents in a higher percentage compared to the Vocational School students (Figure 2).

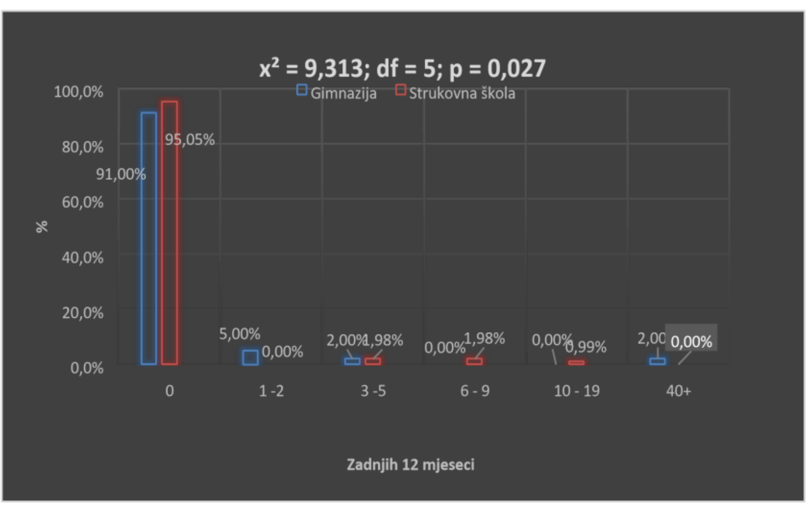

Figure 2. - *Frequency of use of adhesives and other solvents in the last 12 months*

There were no statistically significant differences in satisfaction with the child-mother relationship (p=0.444), as well as in satisfaction with the child-father relationship between the groups (p=0.480). The Grammar School students were significantly less satisfied with their personal health (p=0.035), as well as with themselves (p<0.001) than the Vocational School students. There were no statistically significant differences in satisfaction with friends (p=0.352), as well as in satisfaction with the families' financial situation among groups (p=0.728). The Grammar School students tried "drugs" in a significantly higher proportion due to curiosity, while the Vocational School students tried "drugs" in order to forget about their problems, the differences were statistically significant (Figure 3).

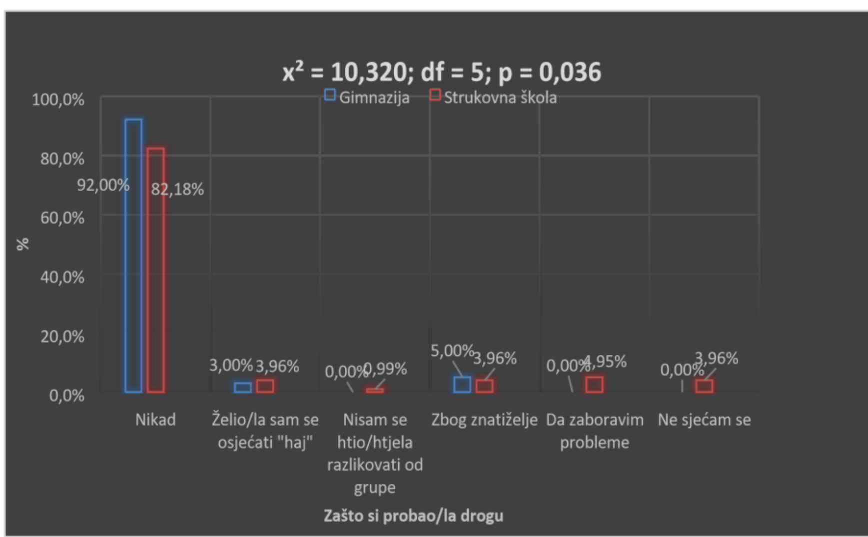

Figure 3. - *Reasons for trying "drugs"*

DISCUSSION

The results of this study indicated a low prevalence of cigarette smoking in high school students. These results are in some contrast to the results of the ESPAD study on smoking, drinking and taking psychoactive substances among students conducted in 2015. When it comes to smoking, 37.9% of students in Croatia have never smoked, while 62% have had this experience. With a percentage of 33% of current smokers, Croatia is, with Italy, Romania and Bulgaria, at the very top among the 48 participating countries (14).

The beginning of smoking is associated with the young people's desire to express "adult" behaviour, and to get closer to their role models who smoke, and they are also influenced by the characteristics of the young person, school, and the wider environment. The biggest role is played by peer groups, parents and older siblings. Early experimentation, peer pressure, insufficient social support and vague parental attitudes favour early adoption of smoking habits. The earlier a person starts smoking, the more likely they are to smoke more intensely and longer in adulthood. On drinking alcoholic beverages, students mostly stated that they drink occasionally. Most people encounter the use of alcoholic beverages at an early age, most often, which is also a paradox, in the presence of the elderly, neighbours, and often in the presence of parents. Some studies indicate that society as a whole, when socializing its youngest members in all areas of addiction, is acting incorrectly, which is ultimately reflected in the number of adult members of society suffering from alcoholism (15). In particular, it should be

noted that alcohol negatively affects the psychophysical health of young people, whose organism is more sensitive, so the harmful effects are more pronounced. Concentration, thinking, creativity and interest decrease. Alcoholism belongs to the group of socio-psychiatric disorders, because drinking alcoholic beverages causes numerous and severe consequences for the health of the individual, his family and society in a broader sense. Alcoholism is a disease that, due to excessive and prolonged use of alcoholic beverages, leads to damage to all organs, as well as the biopsychosocial characteristics of a person. Drinking alcohol once a week on weekends is a relatively common occurrence in high school students. The prevalence of alcohol use increases with age in both sexes. Lately, the increase in "risky drinking" that is, six or more times in a month has been worrying. Since early acquired bad habits can lead to the development of alcoholism, it is essential to know what action can be taken (16). Of the positive answers to the question about the use of addictive substances, the most mentioned psychoactive substances are marijuana and adhesives. Marijuana is almost the only addictive substance mentioned, from which it can be concluded that adolescents perceive it more acceptable than other substances. This speaks of a high perception of drug availability to the surveyed high school students, which is in line with ESPAD's previous research, according to which in 2015 there was an increase in the perception of the availability of addictive substances, especially marijuana (17).

While the Vocational School students are extremely satisfied with their health, the Grammar School students mostly consider their own health to be good, which may indicate the fact that Grammar School students have a higher level of stress than the Vocational School students. The same is evident in life satisfaction, where it turned out that the Vocational School students are more satisfied than the Grammar school students. The importance of adolescents' life satisfaction has been revealed in numerous studies, which show that individual differences in life satisfaction in adolescents can predict important life outcomes, such as the development of internalized and externalized behavioural problems, bullying, loneliness, self-confidence, leadership abilities and sociability, peer acceptance, popularity and popularity, and love and other social relationships (18).

In European countries, there has been an increase in the number of uses of psychoactive substances among adolescents, as confirmed by the results of a study conducted in Poland, which indicate that more than half of students (53.6%) can be diagnosed with a significant risk of addiction to psychoactive substances and that they should be immediately subjected to preventive actions (19). Although the use of new psychoactive substances is observed mainly in young, so-called recreational users, it also occurs in the population of problematic users of psychoactive substances. The Internet as a mechanism for the rapid spread of new trends presents an increasing challenge, but also as a large anonymous market with global reach. In this way, a new connection between the use of psychoactive substances and their supply is created. In parallel, the Internet provides opportunities to find new ways of treating, preventing and intervening (20). Cigarettes, alcohol, but also some types of psychoactive substances are easily available to young people at their most vulnerable age. In addition to adapting the necessary prevention measures, the public attitude towards numerous forms of addiction should be changed, and young people should be more pointed out to new types of addiction (21). Compared to other cultures, Zarrouq et al. report that in Morocco the overall prevalence of high school students' smoking was 16.1%, while the highest life prevalence was recorded in cannabis use (22). In Tunisia, a national survey was conducted among high school students, which showed that 3.8% of adolescents consumed alcohol and other drugs once or more in their lives, which is lower than the results of our study (23). In contrast to our results, a study was conducted in Nigeria indicating a high rate of about 22% of alcoholic beverage drinking among high school students, which is associated with male sex, low socioeconomic status, student status and public-school attendance (24).

Numerous studies have been conducted at our university regarding the incidence of the use of psychoactive substances in school youth. Several papers (25-27) cite results similar to those of this study. Bošnjak and colleagues in their research on the prevalence of the use of psychoactive substances among high school students state that the prevalence of the use of psychoactive substances among high school students of Mostar youth is at a satisfactory low level, while the most common risky behaviours among students

are cigarette smoking and drinking alcoholic beverages (28).

When considering the results of this study, one should take into account certain limitations of the research, which relate primarily to the honesty of high school students when completing the survey, the cross-sectional design of the study that prevents the monitoring of changes in research variables over a certain period of time, and the conditions for filling out questionnaires that could have contributed to distorted responses by respondents. The results of this study indicated a low prevalence of the use of addictive substances in the examined adolescent population. Most students spoke negatively about the use of addictive substances, and there is a large percentage of those who had a hard time agreeing to answer this question, from which it can be concluded that the actual number of users is probably higher.

CONCLUSION

The prevalence of psychoactive substances use among high school students in Županja is at a satisfactory low level. Grammar School students tried smoking cigarettes at a younger age, while the Vocational School students smoke cigarettes and drink alcoholic beverages on a daily basis in a significantly larger number. The Grammar School students significantly more often use adhesives and other solvents compared to the Vocational School students.

REFERENCES

1. Babić D. et al. Psihoaktivne tvari: Duševni poremećaji i poremećaji ponašanja uzrokovani uporabom psihoaktivnih tvari. [Psychoactive substances: Mental and behavioural disorders caused by the use of psychoactive substances]. Mostar (BiH): University of Mostar; 2016.
2. Brlas S. Rječnik ovisnosti. [Dictionary of Addiction]. Virovitica (HR): Institute of Public Health "Sveti Rok" Virovitica-Podravina County; 2011.
3. Kazdin EA. Encyclopedia of Psychology. Washington (USA): American Psychological Association and Oxford University Press; 2000.
4. Šimunović D, Škrbina D, Radić S. Basics of occupational therapy in people addicted to psychoactive substances. Pliva Croatia; 2008. [cited 23.06.2023]. Available at: https://www.bib.irb.hr/358640
5. Pozaić V. Droga od beznađa do nade. [From hopelessness to hope].

Zagreb (HR): Library of Bioethics Philosophical and Theological Institute; 1999.

6. Game Association. International Day against Drug Abuse and Illicit Drug Trafficking; 2021. [Cited 23.06.2023]. Available at: https://udrugaigra.hr/medunarodni-dan-borbe-protiv-zlouporabe-droga-i-nezakonitetrgovine-drogama/
7. Suimon D. Sloboda od ovisnosti. [Freedom from addiction]. Čakovec (HR): Biblioteka Jupiter; 2009.
8. Wills TA. Escalated Substances Use: A Longitudinal Grouping Analysis from Early to Middle Adolescence. Journal of Abnormal Psychology. 2014; 105:166-80
9. Windle M. Transitions Into Underage and Problem Drinking. Alcohol Research & Health. 2009;32:30-40.
10. Oetting ER. Peer cluster theory: Drugs and the adolescent. Journal of Counseling and Development. 2006;65:17-22.
11. Ljubotina D, Galić J. Obiteljski odnosi i konzumacija droga na populaciji adolescenata grada Zagreba. [Family relations and drug consumption among the adolescent population of Zagreb]. Ljetopis studijskog centra socijalnog rada [A yearbook of the study centre of social work]. 2002;9:207-32.
12. Cavicchi C, Babić D, Cavicchi G, Franjić D, Hasanefendić B. Značajke i tretman maloljetnih eksperimentatora u psihoaktivnim tvarima u terapijskoj zajednici. [Features and treatment of juvenile experimenters in psychoactive substances in the therapeutic community]. Zdravstveni glasnik [Health bulletin]. 2021 [accessed 27.04.2024.];7(1):83-92. Croatian. Available at: https://hrcak.srce.hr/file/378157
13. Kuzman M. ESPAD. Zagreb: Croatian Institute of Public Health; 2012. [cited 21.07.2023]. Available at: https://www.hzjz.hr/wpcontent/uploads/2013/11/espad_2011.pdf
14. Croatian Institute of Public Health. Presentation of Croatian national results. Zagreb; 2016. [Accessed 10.07.2023.]. Available at: https://www.hzjz.hr/wpcontent/uploads/2016/10/HR_ESPAD_2015_RGB_3.pdf

15. Uvodić-Đurić D. Mladi i alkohol. [Youth and alcohol]. Čakovec (HR): Autonomous Centre; 2007.
16. Bastašić Z. Pubertet i adolescencija. [Puberty and adolescence]. Zagreb (HR): Školska knjiga; 1995.
17. European Monitoring Centre for Drugs and Drug Addiction, ESPAD report 2015: results from the European school survey project on alcohol and other drugs. Publications Office; 2016. Available from: doi/10.2810/86718
18. McKnight CG. Relationships among stressful life events, temperament, problem behaviour, and global life satisfaction in adolescents. Psychology in the Schools. 2002;39:677-87.
19. Suwała M. Ocena ryzyka uzależnienia od alkoholu i innych substancji psychoaktywnych w wybranej grupie młodziezy szkół średnich. [Alcohol and other psychoactive substances addiction risk assessment among selected high school students test group]. Przeglad Lekarski [Medical Review]. 2014;71(11):620-3. Polish.
20. Greblo M, Šegregur J. Navika pušenja, konzumiranja alkohola i opojnih sredstava kod adolescenata. [The habit of smoking, drinking alcohol and intoxicants among adolescents]. Hrvatski Časopis za javno zdravstvo [Croatian Journal of Public Health] [Internet]. 2010 [accessed 26.04.2024.];6(23). Croatian. Available at: https://hrcak.srce.hr/310540
21. Babić R, Babić D, Martinac M, Pavlović M, Vasilj I, Miljko M, et al. Addictions without Drugs: Contemporary Addictions or Way of Life? Psychiatr Danub. 2018 Sep;30(Suppl 6):371-379.
22. Zarrouq B, Bendaou B, El Asri A, Achour S, Rammouz I, Aalouane R, et al. Psychoactive substances use and associated factors among middle and high school students in the North Centre of Morocco: a cross-sectional questionnaire survey. BMC Public Health. 2016 Jun 4;16:468.
23. World Health Organization. Global School-based Student Health Survey: Tunisia, Fact Sheet. 2008.
24. Mbachu CNP, Ebenebe JC, Mbachu II, Ndukwu CI, Elo-Ilo JC, Azubuike CM. Sociodemographic

profile of psychoactive substance use among selected secondary school students in rural Nigeria. Int J Adolesc Med Health. 2020 Sep 2;34(5):275-280.

25. Jakešević J, Martinac M. Prevalencija zlouporabe marihuane i hašiša među učenicima srednjih škola u Jajcu. [Prevalence of marijuana and hashish abuse among high school students in Jajce]. Zdravstveni glasnik [Health Bulletin] [Internet]. 2015 [accessed 27.04.2024.];1:44-50. Croatian. Available at: https://hrcak.srce.hr/257037
26. Soča M, Babić D. Pojavnost psihoaktivnih tvari u srednjoškolske mladeži. [Prevalence of psychoactive substances in high school youth]. Zdravstveni glasnik [Health Bulletin] [Internet]. 2015 [accessed 27.04.2024.];1:25-36. Croatian. Available at: https://hrcak.srce.hr/file/373660
27. Marić J, Babić D. Pojavnost uporabe psihoaktivnih tvari studenata fakulteta zdravstvenih studija Sveučilišta u Mostaru. [Prevalence of psychoactive substance use among students of the Faculty of Health Studies, University of Mostar]. Zdravstveni glasnik [Health Bulletin] [Internet]. 2020 [accessed 27.04.2024.];6:33-41. Croatian. Available at: https://hrcak.srce.hr/file/347128
28. Bošnjak M, Mandić M, Babić D. Prevalence of psychoactive substance use among students of Secondary Medical School "the Sisters of Mercy" in Mostar. Health Bulletin [Internet]. 2019 [accessed 27.04.2024.];5(1):24-31. Available at: https://hrcak.srce.hr/file/331417

POJAVNOST UPORABE PSIHOAKTIVNIH TVARI UČENIKA SREDNJIH ŠKOLA U ŽUPANJI

Marijana Delić[1], Dragan Babić[1,2], Darjan Franjić[2]

[1]Filozofski fakultet Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

[2]Fakultet zdravstvenih studija Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Uporaba psihoaktivnih tvari je ozbiljan i težak problem u mnogim zemljama svijeta, te poprima epidemijske razmjere, posebno u populaciji mladih. Poremećaji uzrokovani uporabom psihoaktivnih tvari obuhvaćaju širok spektar poremećaja. Stručnjaci sve teže prate moguće posljedice koje droge mogu izazvati u ljudskom organizmu.

Cilj: Ispitati pojavnost uporabe psihoaktivnih tvari učenika srednjih škola u Županji.

Ispitanici i metode: Provedeno je presječno istraživanje tijekom svibnja 2023. godine. Prvu skupinu ispitanika tvorilo je 115 učenika trećeg i četvrtog razreda Gimnazije Županja, dok je drugu skupinu tvorilo 100 učenika trećeg i četvrtog razreda Srednje strukovne škole Županja. Instrument istraživanja bio je standardizirani međunarodno usuglašeni upitnik „Europsko istraživanje u školama o pušenju, pijenju i uzimanju droga među učenicima“ (engl. European School Survey Project on Alcohol and Other Drugs – ESPAD).

Rezultati: Statistički značajno veći broj ispitanika nikada nije koristilo cigarete, alkoholna pića, ljepila i druga otapala. Ispitanici Srednje strukovne škole su u većem omjeru svakodnevno koristili cigarete, dok su gimnazijalci započinjali pušiti u starijoj dobi. Gimnazijalci su u zadnjih 12 mjeseci u većem postotku koristili ljepila i druga otapala od učenika Srednje strukovne škole. Gimnazijalci su u višem omjeru „drogu“ probali zbog znatiželje.

Zaključak: Pojavnost uporabe psihoaktivnih tvari u srednjoškolske mladeži Županje je na zadovoljavajuće niskoj razini.

Ključne riječi: psihoaktivne tvari, učenici, srednja škola

Autor za korespondenciju: prof. dr. sc. Dragan Babić

E-mail: dragan.babic@fzs.sum.ba

SOCIODEMOGRAPHIC DIFFERENCES IN PREVALENCE, INTENSITY AND PSYCHOSOCIAL CONSEQUENCES OF ADOLESCENT GAMBLING IN MOSTAR

Anita Kajić-Selak

Department of Psychology, Faculty of Humanities and Social Sciences,

University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 17.02.2024. *Reviewed on 15.03.2024.* *Accepted on 25.03.2024.*

ABSTRACT

Introduction: Adolescents are a risk group to develop problem gambling considering growing up in the era of widespread gambling activities, what is confirmed by the increasing prevalence of gambling among young people. Their gambling activities can develop into pathological gambling with numerous and harmful psychosocial consequences over time and with intensification.

Objective: The objective of this study is to determine the prevalence of different gambling activities (type and intensity), the rate of problematic gamblers and the psychosocial consequences of adolescent gambling in Mostar.

Subjects and methods: A total of 402 participants (198 males and 204 females) - students of final grades of high schools in Mostar participated in the study. Average age of participants was 17. Data was collected by filling out questionnaires in which the Gambling Activities Questionnaire and Canadian Adolescent Gambling Inventory were applied.

Results: Significant differences were found in the intensity of gambling, harmful psychosocial consequences and the risk of gambling in adolescents in regard to gender and school - young men from the Electrical Engineering School and Secondary Transportation School gamble more intensively and have more psychosocial consequences of gambling and show a higher risk for the development of problem gambling compared to girls and students who attend Gymnasium.

Conclusion: This study confirms a relatively high prevalence of problem gambling among adolescents in Mostar and the differences in intensity, risks of gambling and harmful psychosocial consequences with regard to gender, school and age, which confirms the importance of establishing and implementing preventive programs.

Keywords: gambling, adolescents, gambling intensity, gambling prevalence, psychosocial consequences.

Correspondence: Anita Kajić-Selak, mag. psych.

E-mail: anita.knezovic12@gmail.com

INTRODUCTION

The history of gambling goes back a long way - the first records date back to 5000 BC. (1) and appeared as a global phenomenon in the 19th century. In the 19th century, the important determinants of modern gambling were shaped - the industrialization and institutionalization (2). Gambling changed its forms with the appearance of automatic clubs, betting shops and Internet gambling, representing one of the of the fastest growing economies in the last two decades. It is becoming more and more widespread and accessible, and thus more frequent subject of scientific research. There are various classifications of games of chance, and according to the Law on Games of Chance of Bosnia and Herzegovina (Article 4), classic and special games are distinguished. Classic games of chance are games in which the amount of the prize fund is determined in advance, namely: (1) lottery ticket: commodity, money, commodity-money, express lottery, instant lottery, (2) lotto, keno and other variants of this game and additional games which are arranged in addition to the basic game and use the same ticket, (3) sports forecast - toto and additional games which are arranged in addition to the basic game and use the same ticket, (4) TV raffle - Bingo and additional games, (5) raffle - Bingo in Betting Shops. Special games of chance are games in which the prize fund is not determined in advance and these are: (1) casino games, (2) slot machine games in special clubs and (3) betting games on sports results and other uncertain events. Gambling is a common name for a set of various games, behaviors and activities, which involve investing money, with risk and hope in the expectation of a positive outcome, i.e. the player takes a risk and hopes to return the investment or get more than that (3). The legal definition of games of chance is similar to the aforementioned definition of gambling and states that a game of chance is considered a game in which, for the payment of a certain amount, the participants are offered the opportunity to gain money, goods, services or rights, whereby the gain or loss depends predominantly on the case or some other uncertain event (Law on Games of Chance, NN 143/14). Considering the frequency and consequences, gambling can best be described as a continuum of behavior from the complete absence of gambling, through social and risky, to problem and pathological gambling (4). Pathological gambling includes preoccupation with gambling, loss of control, tolerance, symptoms similar to drug withdrawal and

relapse and abstinence cycles associated with gambling, and is a clinical or psychiatric diagnosis. On the other hand, problem gambling is not a clinical diagnosis, and the term is associated with individuals who experience certain difficulties due to gambling, from mild to severe, but still do not meet the diagnostic criteria, emphasizing that there is a greater certainty that such individuals will develop pathological gambling. Pathological gambling in adulthood is strongly connected with gambling in early years, (5, 6) and in adolescents there is a faster transition from a social gambler to a problem gambler (1). When considering adolescent gambling, the term problem gambling is more often used to avoid stigmatization and labeling (6), but some clinicians believe that this phenomenon in adolescents is best viewed as a pre-clinical condition (6). Research continuously confirms that gambling leads to harmful psychosocial consequences, with young people being a particularly vulnerable group due to the developmental specificity of age: increased tendency to take risks and seek sensation (7), feelings of invincibility and invulnerability, egocentrism, underestimation of danger (1). Characteristic of adolescent gambling are, according to Stinchfield and Winters (1), the greater involvement of young males than females, more intense and frequent gambling by older adolescents, ethnic and racial differences, the early onset of gambling (in elementary school), and the involvement of the majority of young people in some of the gambling activities, connection between youth gambling and parents' gambling. According to the meta-analysis results by Shaffer, Hall and Vanderbilt, as stated by Dodig (8), the lifetime prevalence of adult problem gambling is 1.6% compared to the prevalence od gambling among adolescents and students, which is 3.9% and 4.7%. The prevalence of pathological gambling in the world remains at around 1%, despite variations in used methodology and location (9). There are consistent differences in the prevalence of gambling among adults and adolescents that suggest higher prevalence of adolescent gambling. Recent studies (10) confirm that, despite the fact that adolescent gambling is an illegal activity, it is part of the life experience of most minors. Adolescents not only engage in various types of gambling activities, but do so in a problematic manner that leads to a whole range of undesirable consequences. In countries with the longest tradition of youth gambling research (USA, Canada

and Australia), between 2 and 8% of young people manifest compulsive and/or problem gambling patterns (11, 12, 13, 14, 15). An analysis of 44 worldwide studies from 2017 (16) on the gambling of young people aged 10 to 24 shows that 0.2% to 12.3% of young people meet the criteria for problem gambling - 16.9% of them report low to moderate problems, while 70.8% gamble recreationally - problem-free gambling with a higher proportion of problematic consequences among young men. The gambling patterns of BiH high school students from 2015 are similar, where using the same instruments it was shown that 69.3% of students from Sarajevo and Tuzla (N=1036) gambled at least once in their life (17). Out of them, 72.9% have no problematic consequences of gambling (green light), 17.38% report low to moderate problems related to gambling behavior (yellow light), while 9.7% of students are problem gamblers who meet the criteria of problem gambling and report adverse psychosocial consequences. The objective of the research, taking into account adolescents as a vulnerable age group with an increasing prevalence of problem gambling, was to determine the representation of the type and intensity of various gambling activities, to determine the rate of problem gamblers and to investigate the differences between gambling with regard to significant sociodemographic characteristics.

METHODS

Participants and procedure

A total of 402 high school seniors (198 males and 204 females) from Mostar participated in the research in 2017. The sample was convenience and students attended Electrical Engineering School Ruđer Bošković (17.4 %), Secondary Transportation School (29.1 %), Jozo Martinović Secondary School of Economics (29.6 %) and Mostar Gymnasium (23.9 %). The age range was 16 to 19 years, and the average age of the participants was 17. The data was collected in school classrooms, during regularly scheduled classes. The researcher distributed the paper-pencil surveys and students completed them independently and anonymously.

Measuring instruments

The first part of the questionnaire included questions about sociodemographic data that were constructed for the purposes of this research. The gambling activities questionnaire (8) contained questions

about the types and frequency of gambling activities (11 types), on which the participants checked the playing of a certain game and the frequency on a scale from ``every day'' to ``once a year or less than that'' (11). The obtained results were used in this research as a measure of the frequency and intensity of adolescent gambling. The Canadian Adolescent Gambling Inventory (CAGI) is the first instrument designed specifically to assess the level of severity of adolescent gambling problems (18). A part of the instrument, which contains 24 items divided into four factors: psychological, financial and social consequences of gambling and lack of control (the total result is a linear combination of the answers to the questions) was used in this study. A factor analysis using the method of principal components with varimax rotation was verified, however, the existence of a two-factor solution was not confirmed as in the Croatian research (8). The obtained factor structure is unidimensional, and the reliability of the instrument (Cronbach alpha) is high .95.

Statistical analyses

The data collected in the study were analyzed using statistical software SPSS Statistics 25 (IBM Corp., Armonk, NY, USA). The Kolmogorov-Smirnov test determined a statistically significant deviation of the obtained distributions from normal, and non-parametric tests were used in the analysis. We calculated descriptive statistical parameters in order to analyze frequency of gambling and problem gambling. Mann-Whitney U, Chi-Square and Kruskal-Wallis tests were used to determine differences between data groups.

RESULTS

Descriptive analysis of the data show that only 29.1% of respondents did not gamble during their lifetime, while a high rate of them participated in one or more gambling activities during their lifetime (70.9%). According to the CAGI, 11.7% of respondents experience serious consequences because of their gambling (″red light″ or high severity of gambling-related problems). About 16% of adolescents are characterized by low to medium severity of gambling-related problems (″yellow light″). The majority of high school students (72.1%) are not experiencing any adverse gambling related consequences (″green light″). Sports betting, TV Bingo and Lotto tickets are the preferred adolescent gambling activities. Online gambling games without stakes are

also fairly common, with 25.9% adolescents playing this at least once a year. Additionaly, 21% of respondents bet regularly ("daily, several times a week and about once a week") in the last 3 months (Sports betting). The activities with low prevalence are playing roulette with a dealer, electronic roulette and card games in a casino (Table 1).

Table 1. - *Frequency of gambling (N = 402)*

	No	Yes	Daily	Several times a week	Once a week	Once a month	Once a year or less
Sports betting	238 (59.2%)	164 (40.8%)	25 (6.2%)	30 (7.5%)	30 (7.5%)	27 (6.7%)	52 (12.9%)
Lotto	294 (73.1%)	108 (26.9%)	6 (1.5%)	13 (3.2%)	8 (2%)	14 (3.5%)	67 (16.7%)
TV Bingo	276 (68.7%)	126 (31.3%)	6 (1.5%)	10 (2.5%)	10 (2.5%)	15 (3.7%)	85 (21.1%)
Lottery tickets	276 (68.7%)	126 (31.3%)	5 (1.2%)	8 (2%)	5 (1.2%)	10 (2.3%)	99 (24.6%)
Slot machines	336 (83.6%)	66 (16.4%)	10 (2.5%)	6 (1.5%)	4 (1%)	9 (2.2%)	37 (9.2%)
Electronic roulette	78 (94%)	24 (6%)	6 (1.5%)	4 (1%)	1 (0.2%)	3 (0.7%)	11 (2.6%)
Roulette	384 (95.5%)	18 (4.5%)	5 (1.2%)	1 (0.2%)	2 (0.5%)	5 (1.2%)	6 (1.5%)
Casino card games	364 (90.5%)	38 (9.5%)	13 (3.2%)	4 (1%)	5 (1.2%)	5 (1.2%)	12 (2.9%)
Virtual Horse Racing	332 (82.6%)	70 (17.4%)	5 (1.2%)	8 (2%)	5 (1.2%)	15 (3.7%)	37 (9.2%)
Internet Gambling	337 (83.8%)	64 (15.9%)	7 (1.7%)	15 (3.7%)	8 (2%)	14 (3.5%)	20 (5%)
Online Gambling without stake	298 (74.1%)	104 (25.9%)	17 (4.2%)	16 (4%)	11 (2.7%)	22 (5.5%)	37 (9.2%)

Male adolescents gamble significantly more and report more psychosocial consequences compared to females (Table 2).

Table 2. - *Gender differences in gambling intensity and pronounced psychosocial consequences (N = 402)*

	Male	Female	ManWhitney	*Z*	*p*
	Md	*Md*			
Intensity	5	1	10206.50	-8.71	< .001
Psychosocial consequences	6	0	8901	-10.76	< .001

There are significantly more females in the gropus without gambling problems (″green light″), while males are more common in the group characterized by a high degree of serious problems related to gambling ($X^2 = 63.55$, df = 1, p < .001). There is no difference in the risk of gambling with regard to age, education of father and mother (Table 3). A larger number of gymnasium high school students are found in the group without gambling-related problems (green light, $X^2 = 14.52$, df = 1, p < .001) and a significantly smaller number in the group of high severity of gambling-related problems (red light, $X^2 = 11.36$, df = 1, *p* < .001) compared to students of vocational schools who, in this research, represent a riskier group for the development of problematic gambling.

Table 3. - *Difference of adolescent gambling with regard to gender, school and parental education (N = 402)*

		"Green light"	"Yellow light"	"Red light"	X^2	*df*	*P*	*Phi coefficient*	*Cramer V*
		N	*N*	*N*					
Gender	Males	98	54	45	99.97	2	< .001	.50	.50
	Djevojke	192	10	2					
School	Transportation	73	22	22	27.12	6	< .001	.26	.18
	Economics	92	15	12					
	Electrical	41	17	11					
	Gymnasium	84	10	2					
Age	16	1	1	0	11.9	6	.06	.17	.17
	17	186	45	24					
	18	93	16	17					
	19	10	5	6					
Education (father)	Without	0	0	0	2.94	10	.98	.09	.06
	Elementary School	10	3	1					
	Highschool (2/3)	46	8	5					
	Highschool (4)	141	31	25					
	Bachelor´s degree	22	6	4					
	Ms	49	13	8					
	Doctorate	21	3	4					
Education (mother)	Without	1	0	0	18.02	12	.12	.21	.15
	Elementary School	14	1	0					
	Highschool (2/3)	24	5	4					
	Highschool (4)	162	29	25					
	Bachelor´s degree	18	9	6					
	MS	50	18	6					
	Doctorate	21	2	6					

p* <.05

Students that attend Engineering School Ruđer Bošković and Secondary Transportation School gamble more intensively, experience more adverse gambling related consequences and show a higher risk for the development of problem gambling than adolescents who attend Mostar Gymnasium ($Md = 0$, $p < .05$) and

Jozo Martinović Secondary School of Economics (*Md* = 0, *p* <. 05). No statistically significant difference in the intensity of gambling was found with regard to the age and parental education (*p* > .05). Additionally, older adolescents (19 years) experience more adverse psychosocial gambling consequences gambling than students aged 17 and 18, but not compared to those who are 16 years old (Table 4).

Table 4. - *Differences in intensity and psychosocial consequences of gambling with regard to school, age and parental education (N=402)*

		Intensity					*Psychosocial consequences*				
Variable	Group	*Md*	*Mean rank*	*H*	*Df*	*P*	*Md*	*Mean Rank*	*H*	*Df*	*p*
	Transportation	1	210.48	15.78	3	< .001	1	224.18	30.88	3	.000 **
School	Economics	0	188.87				0	184.78			
	Electrical	3	242.44				3	242.28			
	Gymnasium	0	176.37				0	164.85			
Age	16	15	325.25	6.99	3	.072	13	325.25	8.69	3	0.034*
	17	2	203.69				0	198.79			
	18	2	189.57				0	196.13			
	19	3	231.14				5	254.57			
	Without	0	0	1.05	5	.96	0	0	0.16	5	1.00
Education (father)	Elementary School	2	183.46				0	198.57			
	Highschool (2/3)	2	197.19				0	198.07			
	Highschool (4)	2	200.63				0	200.56			
	Bachelor´s degree	2	212.64				0	202.30			
	Ms	2	198.87				0	202.40			
	Doctorate	2	212.57				0	206.59			
	Without	2	197.00	11.45	6	.08	4	275.50	6.72	6	0.35
Education (mother)	Elementary School	1	159.13				0	165.27			
	Highschool (2/3)	1	173.89				0	201.55			
	Highschool (4)	2	197.68				0	197.35			
	Bachelor´s degree	4	244.95				3	234.18			
	Ms	2	201.23				0	198.52			
	Doctorate	5	234.81				0	219.07			

*p<0.05

DISCUSSION

The results of the research show that 70.6% of the adolescents in the study gambled at some point in their lives, while only 29.1% are those who never participated in any gambling activity**.** This represents alarming indicator, moreover, if we take into account the legal regulation of gambling activities in BiH, which prohibits persons under the age of 18 from receiving payments and participating in all games of chance in casinos, betting shops and slot machines clubs, as well as in games of chance organized via the Internet. Taking into account that the majority of high school students surveyed (63.4%) are minors, it can be concluded that the final availability of gambling games is poorly enforced provided by the legal norms. Most of the participants at some point were involved in sports betting, and half of those bet regulary (daily, several times a week, and approximately once a week). The second most common gambling game among adolescents is TV Bingo, followed by lottery-tickets. The gambling patterns in the current research and the previous one conducted in BiH and Croatia are similar (adolescent prefer sports betting, Internet gambling and TV Bingo (17), which could be because similar economic and political situation, cultural similarities and geographical proximity. The percentage of adolescents who played slot machines (16.4%) and card games in the casino (9.5%) is worrying, given the fact that slot machine games in clubs and casinos are associated with more serious forms of gambling and the risk of developing pathological gambling patterns because they include a high frequency of events, short intervals between stakes and payouts, the experience of an imminent win (which is a significant risk factor for continued gambling), a combination of the possibility of winning very high the builders of the lower profits and the absence of own judgment (19). The categorization of adolescents into gambling risk groups according to CAGI indicates a relatively high proportion of those with high level of severity of gambling-related problems (″red light″) - 11.7% and those with low to moderate harmful psychosocial consequences of gambling - 16% (″yellow light″) compared to the results of foreign research where 4 - 8% adolescents show compulsive or pathological gambling patterns, while 10 to 15% are at risk of developing more serious gambling problems (20). This can partly be explained by the variability of the instruments used in previous research:

CAGI is designed specifically for assessing the gambling risk of young people, and is according to the authors (21), more sensitive than clinical instruments for examining problematic gambling. Furthermore, gambling in our culture is considered as accepted activity, young people grow up in an environment where it is accessible and where games of chance are largely considered harmless entertainment. The research on general attitudes about gambling showed that gambling is perceived as an acceptable activity - a personal right (22), and an activity that does not represent such a serious social problem as alcohol and drug addictions, smoking and dangerous driving (23, 4). Furthermore, the research of Gori et al. in 2015 (24) showed that problematic gambling is related to geographical and social characteristics and that those that experience more harmful consequences related to gambling live in economically less favorable areas. An environmental variable that is also significantly associated with adolescent gambling is availability, and the parameters of the availability of these places in BiH (1 betting shop for every 2,500 inhabitants) do not contribute to the reduction of problematic gambling in the future. Of course, this relationship is not linear and cause-and-effect, but in future research this phenomenon should definitely be taken into account together with other environmental factors, which is also confirmed by international research (8). There are significant differences in the intensity of gambling and adverse psychosocial consequences with regard to gender - male adolescent gamble more, have more adverse consequences and are more often represented in groups with medium to highly serious problems related to gambling (″yellow light″ and ″red light″) compared to females, which is also found in previous research (25). Males are generally are more impulsive, disinhibited, extroverted, have a greater need for excitement and stimuli, are more competitive, money-oriented (26, 27), more prone to riskier games of chance (1). The influence of upbringing, socially defined gender roles and expectations regarding gender is also important. Some researchers (28) believe that parents encourage their sons' gambling, that it is a part of male culture (29) and that it enables young men to emphasize their masculinity in the social environment by showing boldness and courage (30, 31). Students of the Jozo Martinović School of Economics and the Mostar Gymnasium gamble less often, report a lower prevalence of psychosocial problems related to gambling

than the students of the Ruđer Bošković School of Electrical Engineering and the Secondary Transportation School. The educational context is important for understanding student behavior, which is supported by research results from Croatia (32), which show that vocational school students gamble more often than students that attend Gymnasium, and that those with a higher overall grade point average gamble less compared to their peers with lower grades. High school students that attend Gymnasium schools are generally overloaded with schoolwork: research suggests that 45% of them prepare for school for more than three hours a day, and 10% for five or more hours a day, while students of vocational schools report less learning hours (33), which leaves them more free and unstructured time (predictor of gambling activities). It is plausible that free time is a moderator variable between attending a certain school and gambling activities, because the results of some studies (34) showed that a statistically significant majority of adolescents (71.7%) play games of chance because they feel bored and do not spend own free time in a constructive manner. The obtained results are in accordance with previous research which indicates that students of vocational schools more often participate in games with high addictive potential, develop problems related to gambling (35), achieve higher results on the scale of gambling (31), bet somewhat more often than Gymnasium students and overall represent a group with high-risk behavior. Adolescents of different ages in this study are equally represented in different risk groups, and they do not differ in terms of gambling intensity, which is a worrisome data because it points to a conclusion that gambling is equally accessible to a part of respondents who did not reache the age of 18 and as such cannot legally participate in gambling games, which is in accordance with recent research in Mostar that suggests an increase in classic and contemporary addictions (36-40). Furthermore, adolescents who are 19 years old experience more adverse psychosocial consequences than those who are 17 and 18 years old, but not compared to those who are 16 years old. The level of parental education does not significantly influence the pattern of adolescent gambling, which may be a consequence of unequal representation of all educational groups in the sample.

CONCLUSION

The majority of adolescents in the Mostar area have gambled during their lifetime

and the most popular games of chance are sports betting, TV Bingo, lottery tickets and Lotto. The prevalence of adolescents with medium to highly serious psychosocial consequences of gambling is higher than foreign standards, but still in line with the prevalence of problem gamblers in the region. Older adolescents (19 years old) report more harmful psychosocial consequences of gambling than younger adolescents (17 and 18 years old), but not sixteen-year-olds. On average, young men gamble more intensively, report more psychosocial consequences of gambling and are statistically significantly more represented in high-risk groups for the development of problematic gambling compared to girls. Vocational high school students are more often represented in groups of risky gamblers than Gymnasium students. The results of this study speak of a relatively high prevalence of problem gambling among young people, as well as differences with regard to gender and school, which can be the basis for the establishment and implementation of preventive programs for young people that would act on this widespread problem in our country.

LITERATURE

1. Vukšić N. Kockanje srednjoškolaca u Slavonskom Brodu i štetne psihosocijalne posljedice. (Diplomski rad). Zagreb: edukacijsko-rehabilitacijski fakultet; 2013.
2. Kozjak B. Religija i kockanje. Socijalna ekologija: časopis za ekološku misao i sociologijska istraživanja okoline. 2008;17(3):263-84.
3. Koić E, Filaković P, Djordjević V, Nadj S. Alea Iacta Est (A Case Series Report of Problem and Pathological Gambling). Collegium antropologicum. 2009 Sep;33(3):961-71.
4. National Research Council. Pathological gambling: A critical review.
5. Volberg RA. Prevalence studies of problem gambling in the United States. Journal of gambling studies. 1996 Jun;12(2):111-28.
6. Volberg RA. The epidemiology of pathological gambling. Psychiatric Annals. 2002 Mar;32(3):171-8.
7. Cauffman E, Shulman EP, Steinberg L, Claus E, Banich MT, Graham S, Woolard J. Age differences in affective decision

making as indexed by performance on the Iowa Gambling Task. Developmental psychology. 2010 Jan;46(1):193.

8. Dodig D. Obilježja kockanja mladih i odrednice štetnih psihosocijalnih posljedica (Doctoral dissertation), Pravni fakultet u Zagrebu; 2013.
9. Wiebe J, Volberg RA. Problem gambling prevalence research: A critical overview. A report to the Canadian gaming association, 2007.
10. Molinaro S, Canale N, Vieno A, Lenzi M, Siciliano V, Gori M, Santinello M. Country-and individual-level determinants of probable problematic gambling in adolescence: A multi-level cross-national comparison. Addiction. 2014 Dec;109(12):2089-97.
11. Fisher S. Gambling and pathological gambling in adolescents. Journal of gambling studies. 1993 Sep;9(3):277-88.
12. Winters KC, Stinchfield RD, Fulkerson J. Toward the development of an adolescent gambling problem severity scale. Journal of gambling studies. 1993 Mar;9(1):63-84.
13. Shaffer HJ, LaBrie R, Scanlan KM, Cummings TN. Pathological gambling among adolescents: Massachusetts gambling screen (MAGS). Journal of Gambling Studies. 1994 Dec;10(4):339-62.
14. Jacobs DF. Juvenile gambling in North America: An analysis of long term trends and future prospects. Journal of Gambling Studies. 2000 Sep;16:119-52.
15. Welte JW, Barnes GM, Tidwell MC, Hoffman JH. The prevalence of problem gambling among US adolescents and young adults: Results from a national survey. Journal of gambling studies. 2008 Jun;24:119-33.
16. Calado F, Alexandre J, Griffiths MD. Prevalence of adolescent problem gambling: A systematic review of recent research. Journal of gambling studies. 2017 Jun;33:397-424.
17. Bijedić M, Kuralić-Čišić L, Kovačević R, Vardo E. Obilježja kockanja srednjoškolaca u Sarajevu i Tuzli - izvještaj o rezultatima istraživanja. Edukacijsko-

rehabilitacijski fakultet Sveučilišta u Tuzli, Tuzla; 2015.

18. Tremblay J, Stinchfield R, Wiebe J, Wynne H. Canadian adolescent gambling inventory (CAGI): Phase III final report. Ottawa: Canadian Centre on Substance Abuse; 2010.
19. Griffiths M, Wood RT. Risk factors in adolescence: The case of gambling, videogame playing, and the Internet. Journal of gambling studies. 2000 Sep;16:199-225.
20. Shaffer HJ, Hall MN. Estimating the prevalence of adolescent gambling disorders: A quantitative synthesis and guide toward standard gambling nomenclature. Journal of Gambling studies. 1996 Jun;12(2):193-214.
21. Rajić-Stojanović A. Razlike u individualnim i okolinskim obilježjima zagrebačkih studenata s obzirom na rizičnost kockanja (Diplomski rad). Zagreb: edukacijsko-rehabilitacijski fakultet Sveučilišta u Zagrebu; 2013.
22. Azmier JJ. Canadian gambling behaviour and attitudes: Summary report. Canada West Foundation; 2000.
23. Jacobs DF, Marston AR, Singer RD, Widaman K, Little T, Veizades J. Children of problem gamblers. Journal of Gambling Behavior. 1989 Dec;5:261-8.
24. Canale N, Vieno A, Lenzi M, Griffiths MD, Borraccino A, Lazzeri G, Scacchi L, Santinello M. Income inequality and adolescent gambling severity: Findings from a large-scale Italian representative survey. Frontiers in Psychology. 2017 Aug 3;8:263056.
25. Babić D. i sur. - Psihoaktivne tvari: duševni poremećaji i poremećaji ponašanja uzrokovani uporabom psihoaktivnih tvari. Mostar: Sveučilište u Mostaru, 2016.
26. Johansson A, Grant JE, Kim SW, Odlaug BL, Götestam KG. Risk factors for problematic gambling: A critical literature review. Journal of gambling studies. 2009 Mar;25:67-92.
27. Paula M, Oliveira MT, Araujo Silva MT. Pathological and nonpathological gamblers: a survey in gambling settings. Substance use &misuse. 2000 Jan;35(11):1573-83.
28. Ladouceur R, Boisvert JM, Pépin M, Loranger M, Sylvain C. Social cost of pathological gambling.

Journal of gambling studies. 1994 Dec;10:399-409.

29. Huxley J, Carroll D. A survey of fruit machine gambling in adolescents. Journal of gambling studies. 1992 Jun;8(2):167-79.
30. Griffiths MD. Gambling in children and adolescents. Journal of Gambling Behavior. 1989 Mar;5(1):66-83.
31. Kalčić A. Kockanje među adolescentima (Doctoral dissertation). Josip Juraj Strossmayer University of Osijek, Faculty of Humanities and Social Sciences. Department of Psychology; 2013-
32. Sabolić T. Kockanje, rizična ponašanja i slobodno vrijeme adolescenata. In2. konferencija PREVENCIJE OVISNOSTI i 1. ljetna škola MODERNIH TEHNOLOGIJA 2016 (pp. 61-70).
33. Bezinović P, Manestar K, Ristić Dedić Z. Obiteljska kohezivnost i zadovoljstvo životom djevojaka i mladića iz sela i iz grada. Sociologija i prostor: časopis za istraživanje prostornoga i sociokulturnog razvoja. 2004;42(1/2 (163/164)):157-72.
34. Itković Zuckerman Z, Prostran V. Kockanje u sportskim kladionicama–Pilot istraživanje među studentima Sveučilišta u Zadru. Kriminologija & socijalna integracija: časopis za kriminologiju, penologiju i poremećaje u ponašanju. 2009 Dec;17(2):105-14.
35. Ricijaš N, Dodig Hundrić D, Kranželić V. Sportsko klađenje i druga rizična ponašanja hrvatskih srednjoškolaca. Hrvatska revija za rehabilitacijska istraživanja. 2015 Dec 28;51(2):41-56.
36. Babić R. et al.. Addictions without drugs: Contemporary addictions or way of life? Psychiatria Danubina, 2018; Vol. 30 (suppl. 6), 371-379.
37. Marić J. and Babić D. Pojavnost uporabe psihoaktivnih tvari studenata Fakulteta zdravstvenih studija Sveučilišta u Mostaru. Zdravstveni glasnik, 2020; 6 (1), 33-41.
38. Bošnjak M. et al. Pojavnost uporabe psihoaktivnih tvari učenika učenika srednje škole sestara milosrdnica Mostar.Zdravstveni glasnik, 2019; 5 (1), 24-32.
39. Soča M. and Babić D. Pojavnost psihoaktivnih tvari u

srednjoškolske mladeži. Zdravstveni glasnik, 2015; 1 (1), 44-50.

40. Ajtlbez L. and Babić D. Shoppingholizam – ovisnost modernog doba. Zdravstveni glasnik. 2016;2: 72-82.

SOCIODEMOGRAFSKE RAZLIKE U PREVALENCIJI, INTENZITETU I PSIHOSOCIJALNIM POSLJEDICAMA KOCKANJA ADOLESCENTA U MOSTARU

Anita Kajić-Selak

Odsjek za psihologiju, Filozofski fakultet, Sveučilište u Mostaru, 88000, Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Adolescenti predstavljaju vulnerabilnu skupinu za razvoj problematičnog kockanja s obzirom na odrastanje u eri široko rasprostranjenih kockarskih aktivnosti što potvrđuje i sve veća prevalencija kockanja mladih ljudi. Njihove kockarske aktivnosti se mogu s vremenom i intenziviranjem razviti u patološko kockanje s brojnim i štetnim psihosocijalnim posljedicama.

Cilj: Cilj ovog istraživanja bio je utvrditi prevalenciju različitih aktivnosti kockanja (vrsta i intenzitet), stopu problematičnih kockara i psihosocijalne posljedice kockanja kod adolescenata u Mostaru.

Ispitanici i metode: U istraživanju su sudjelovala ukupno 402 ispitanika (198 mladića i 204 djevojke) - učenika završnih razreda srednjih škola u Mostaru. Prosječna dob sudionika bila je 17 godina. Podaci su prikupljeni ispunjavanjem upitnika u kojima su primijenjeni Upitnik o kockanju i Kanadski upitnik kockanja adolescenata.

Rezultati: Utvrđene su značajne razlike u intenzitetu kockanja, štetnim psihosocijalnim posljedicama i rizičnosti kockanja adolescenata s obzirom na spol i školu - mladići iz Elektrotehničke i Srednje prometne škole intenzivnije kockaju i imaju veće psihosocijalne posljedice kockanja te pokazuju veći rizik za razvoj problematičnog kockanja u usporedbi s djevojkama i učenicima gimnazije.

Zaključak: Ovo istraživanje potvrđuje relativno visoku prevalenciju problematičnog kockanja kod adolescenata u Mostaru te razlike u intenzitetu, rizicima kockanja i štetnim psihosocijalnim posljedicama s obzirom na spol, školu i dob, što potvrđuje važnost uspostavljanja i provođenja preventivnih programa.

Ključne riječi: kockanje, adolescenti, intenzitet kockanja, prevalencija kockanja, psihosocijalne posljedice.

Kontakt osoba za korespondenciju: Anita Kajić-Selak, mag. psych.

E-mail: anita.knezovic12@gmail.com

THE RELATIONSHIP BETWEEN PARENTAL BEHAVIOR AND UPBRINGING OF UPPER ELEMENTARY SCHOOL CHILDREN

Anita Begić[1], Karolina Tadić-Lesko[2], Valentina Katić[1]

[1] Faculty of Humanities and Social Sciences, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

[2] Institution "Center for Social Work of the City of Mostar", 88 000 Bosnia and Herzegovina

Received on 13.12.2023. Reviewed on 12.01.2024. Accepted on 25.01.2024.

ABSTRACT

Introduction: The roles of father and mother strive for equality in educational activities. However, they are different in terms of parental behaviors that are discussed in this study as well as in terms of circumstances of intrusive behavior and professional education, where differences in their inductive reasoning were determined.

Objective: Examine the relationship between parental behavior and the upbringing of children in upper grades of elementary school.

Method: The research was conducted in *Kamen-Šine* elementary School, Split, the Republic of Croatia. 102 respondents-parents participated in the research, 16.7% of whom were fathers and 82.4% were mothers, while one person did not declare the type of gender (male of female). The instrument used for the purposes of the research was the Parental Behavior Questionnaire URP29.

Results: The research showed that there was a statistically significant difference in intrusiveness between fathers and mothers. Mothers showed significantly more intrusive behavior compared to fathers, but on the other hand, no statistically significant difference in punishment was found due to parents' gender. No statistically significant difference was found in warmth, autonomy and parental knowledge with respect to the level of education, while a statistically significant difference was found in inductive reasoning with respect to the level of education. Parents with a secondary education level showed significantly more inductive reasoning compared to parents with a higher education level. No statistically significant difference was found between the other groups.

Conclusion: Mothers have more control over their behavior and the imposition of it, while fathers are more flexible in raising their children. Parents with secondary education level provide their children with greater support and the possibility of choice. Parental education that is full of care and love will enable the healthy development of children.

Keywords: connection, parental behavior, upbringing of children, elementary school

E-mail for correspondence: anita.begic@ff.sum.ba

INTRODUCTION

Education is defined in different ways because it takes place and is observed from different aspects. It is a process that begins at birth and continues throughout a person's life. Therefore, education is also defined as "an interpersonal relationship in which the conditions for development of human individual are created. Parents and children, children and other children, educators and those who are educated, teachers and students" (1). Education is seen as a permanent process, the same is the social phenomenon of giving and receiving where a person is formed, upgraded and changed. Within family, a child's first social attitudes, habits for order, work and social behavior are formed, because children initially start the process of socialization within family when they establish their first interactions with those closest to them, where they get to know the habits, behaviors and customs that they gradually adopt. The concept of parenting is a process that takes place within some characteristic time and space. As changes occur inside social community, so do the tasks of parenting (2). The family has a very strong effect on children's emotions and development of warm human relationships in the first period of a child's life (3). For many parents, setting boundaries for children is very demanding. Children need to understand the connection in what they do, in what way and what it leads to. In order to create meaningful purpose, the setting of boundaries, determination and clarity are needed in a way how persuasive parents are, while not using punishment but discipline. That is why it is the most important to achieve a balance that satisfies both parents and children (4). The influence of parents on children is indispensable, for example, through socialization processes, which in principle is related to influence between parents and the environment on a child and vice versa. In this way, both parents and children contribute to good family dynamics as well as healthier environment. However, mismatched relationships disorient every person and disrupt their concentration and organization, and lead to listless, destructive and conflict behavior (5). The roles of father and mother, no matter how much they strive for equality, are also different, just like their parenting behaviors, which are discussed in this paper. It is necessary to give a reasonable level of freedom in choice to a child, and it is a skill that requires a lot of parental involvement. However, the general rule is that children's independence of choice should be supported as long as the

consequences are not dangerous for their physical integrity or devastating for their psychological development (6). There are numerous factors in family environment and context that can influence parental behavior, so individual parenting experiences may depend on socioeconomic resources and child-specific factors. All factors are related to differences in parenting styles and child-discipline practices. Parents should have consistent parenting with as little as possible differences in their educational activities in oreder to avoid any kind of confusion as well as to avoid the posibility that the child abuses differences between parents' educational methods. As regards to what has been mentioned, the goal of the research was set, and research questions were used to examine the connection between parental behavior and upbringing of children in upper grades of elementary school, with special emphasis on parental intrusiveness and inductive reasoning. The goal is to determine the differences between fathers' and mothers' restrictive control towards the child and the differences between parental support towards the child in relation to their level of education.

SUBJECTS AND METHODS

SUBJECTS

The participants of this research were parents (N=102) of the fifth to the eighth grade of elementary school students *Kamen-Šine*, Split, the Republic of Croatia, 16.7% of whom were fathers and 82.4% were mothers, while one person did not declare the type of gender. 9.8% of the respondents have secondary education level, 32.4% have a higher education level, while 57.8% of the respondents have a university education level. When it comes to work status, 90.2% of the respondents are permanently employed, 7.8% of them are occasionally employed, while 2.0% are unemployed. 88.2% of respondents state living in a complete family (father, mother, child/children), whereas 10.8% of them state living in an incomplete family. They voluntarily agreed toparticipate in the research.

METHODS

To achieve the goal of the research, the parental behavior questionnaire URP29 (7) was used, for which the author's permission was obtained. The questionnaire consists of 26 items grouped into six theoretically assumed subscales: Warmth - T (4 items), Autonomy - A (4 items), Intrusiveness - I (4 items), Parental

knowledge - Z (4 items), Inductive reasoning - R (5 particles) and Punishment – K (5 particles). The research was conducted using a five-point Likert scale.

STATISTICAL ANALYSIS

Statistical analysis and data processing were performed using the IBM SPSS Statistics 25 program. Descriptive and inferential statistics measures were used to present the data and results, and the Shapiro-Wilk normality test was used to test the normality of the distribution. By looking at the values of the Shapiro-Wilks test for testing the normality of the distribution, it was determined that the distribution of all examined variables deviates from the normal distribution ($p<0.05$). Furthermore, by looking at the parameters of (a)symmetry and kurticity, it is visible that all values are in the range characteristic of a normal distribution, i.e. in the range -3 to +3 for the asymmetry index, while the values of the kurticity index are in the interval from -10 to + 10. An independent samples t-test, as well as an independent samples ANOVA were used to test differences. In order to determine between which groups there is a difference, the Scheffe post-hoc test was used. A significance level of 0.05 was used to evaluate the significance of the obtained results.

RESULTS

By looking at the basic descriptive parameters of the subscales of parental behavior, it can be noted that the theoretical maximum has been achieved on each subscale. The central values of intrusiveness and punishment were shifted towards lower values, while the central values of inductive reasoning, warmth, autonomy and parental knowledge were shifted towards higher values, which indicates a greater presence of the mentioned parental behaviors.

Table 1. - *Presentation of basic descriptive parameters for parenting behavior subscales*

	M	SD	Min	Max
Inductive reasoning	3.95	0.54	3.00	5.00
Warmth	4.73	0.33	3.25	5.00
Autonomy	4.64	0.29	4.00	5.00
Parental knowledge	4.23	0.58	1.75	5.00
Intrusiveness	2.41	0.72	1.00	5.00
Punishment	2.35	0.68	1.20	5.00

M-arithmetic mean; SD-standard deviation; Min-minimum value; Max-maximum value

In order to test the differences in the restrictive control of parents towards the child, i.e. intrusiveness and punishment depending on the parents' gender, a t-test for independent samples was used. Before the implementation of the t-test, Levene's test was used to test the equality of variances and it was determined that the variances of the two groups on the intrusiveness variable were statistically significantly different. A correction was used accordingly. No statistically significant difference in the variance of the two groups was found for the punishment variable.

Table 2. - Presentation of testing the significance of differences in intrusiveness and punishment with regard to the gender of the parents

	M		SD		T	df	p
	Fathers	Mothers	Fathers	Mothers			
Intrusiveness	2.03	2.50	0.42	0.75	-3.61	39.72	0.00
Punishment	2.25	2.38	0.51	0.71	-0.70	96	0.48

M-arithmetic mean; SD-standard deviation, t-t value; df-degrees of freedom; p-probability

A statistically significant difference in intrusiveness between fathers and mothers was found ($p<0.05$). Mothers report significantly more intrusive behavior than fathers. There was no statistically significant difference in punishment based on parents' gender. In order to determine whether there is a statistically significant difference in warmth, autonomy, parental knowledge and inductive reasoning with

regard to the level of education, a one-way ANOVA for independent samples was used.

Table 3. - *Presentation of testing the significance of differences in warmth, autonomy, parental knowledge, and inductive reasoning with respect to the level of education*

	M			SD			F	df	p
	SSS	VŠS	VSS	SSS	VŠS	VSS			
Warmth	4.78	4.64	4.77	0.28	0.41	0.29	0.38	2	0.18
Autonomy	4.80	4.58	4.64	0.26	0.29	0.29	0.36	2	0.12
Parental knowledge	4.28	4.20	4.23	0.45	0.55	0.62	0.04	2	0.94
Inductive reasoning	4.40	3.76	3.98	0.46	0.43	0.56	3.27	2	0.00

M-arithmetic mean; SD-standard deviation, SSS - secondary level of education, VŠS - higher level of education, VSS-university education, F-variance; df-degrees of freedom; p-probability

A statistically significant difference was found in inductive reasoning with regard to the level of education ($p<0.05$). No statistically significant difference was found in warmth, autonomy, and parental knowledge with regard to the level of education. In order to determine between which groups a significant difference in inductive reasoning was found, the Scheffe post-hoc test was used.

Table 4. - *Presentation of post-hoc testing of the significance of differences in inductive reasoning with regard to the level of education*

	Difference of arithmetic means	p
SSS-VŠS	0.64	0.00
SSS-VSS	0.42	0.06
VŠS-VSS	-0.22	0.16

SSS - secondary level of education; VŠS - higher level of education; VSS - university education

DISCUSSION

The obtained results are not in accordance with the previous ones (8). Also, the conducted research shows that mothers have a higher level of intrusive behavior, whereas regarding punishment there is no significant difference with respect to gender. Previous research has shown that women show more emotions than men. Through socialization, women are

encouraged to express love, happiness, but also sadness, while the same is unacceptable for men (9). If the above is observed in the context of upbringing, it can be expected that mothers will show more tenderness, warmth and affection towards their children. The above is confirmed by previous empirical evidence which suggests that mothers show more warmth, concern and care for children (10). The results of this research could have been influenced by the unequal ratio of the number of men and women, that is, fathers and mothers. According to Fagan et. al; Fuertes et al. and Roggmanet et al. cited in Vilaseca, Rivero (11) studies comparing the parenting of mothers and fathers have found both similarities and differences, so it seems that fathers are more often involved in play activities when interacting with their children, while mothers spend more time in care-giving activities. Furthermore, the analysis showed that fathers are more flexible in raising their children, which does not comply with the previous research. The results of the research (table 4) show that no statistically significant difference was found in warmth, autonomy, and parental knowledge regarding the level of education, while a statistically significant difference was found in inductive reasoning regarding the level of education ($p<0.05$). Also, "the motivation for practicing fatherhood is the children themselves: their unconditional love and unlimited trust enable fathers to develop fatherly skills through direct interaction. Nowadays the challenge for men is not to find and affirm their role as a father, but to find their place in a partnership, in which responsibility and power are shared equally between women and men" (12). Parents with a secondary education level report significantly more inductive reasoning than parents with a higher education level ($p<0.05$). No statistically significant difference was found between the other groups. The obtained results do not comply with the previous ones (13-15) because more educated parents do not provide more support, while parents with secondary education level provide more support. Also, the results of other research (16, 17) show that those parents who stayed longer in the education system, thereby achieving a higher educational level, can expect that their children will also achieve better results in the educational context. On the other hand, those who left education earlier can expect that their descendants will also have lower achievements in the educational context. Namely, the similarity between parents' and their childrens'

achievements, when it comes to the educational context, can be the result of common environmental influences and conditions, and not the result of direct genetic transmission or the direct influence of parents' characteristics on children's behavior, which has long been the dominant explanation, whatsoever. As a reason for deviation, it can be assumed that more educated parents have higher expectations from their children regarding their education, and therefore cause stress for children so that they do not to disappoint them, whereas parents with a secondary education level have realistic expectations and greater support for reasons which give children the option of choosing between further education or employment opportunities, i.e. they do not force further education and thus do not cause stress to their children s but support them in their choices. However, some researchers believe that parents' high educational expectations will cause them to spend a lot of time and energy on their children's academic work, which will result in giving priority to intelligence over morality, which will also give children too much interference and deny them space for self-exploration (18). Also, some scholars have pointed out that this kind of learning pressure imposed on children due to high educational expectations will harm children. For example, they believe that parents who have too high expectations from their children in terms of learning will affect their children's physical and mental health (19). Likewise, children whose parents try to reduce their emotional reactions as much as possible were assessed as less socially competent. Parents who are often angry and angry adversely affect the socio-emotional development of their children. Parents' negative emotional reactions are associated with poor understanding of emotions, and frequent exposure to parental anger hinders the process of learning to interpret emotions in children (20). Therefore, patience, warmth and love are an invaluable part of supportive parenting competencies.

CONCLUSION

Mothers have more control over their children's behavior and impose it, while fathers are more flexible in raising their children. More educated parents have high expectations from their children, while parents with a secondary education level have realistic expectations from their children and provide them greater support and the possibility of choice in further education or employment. Children need

unconditional parental support and love, and parents need help in thinking when making decisions about children. Parental upbringing that abounds in care and love will lay a solid foundation with which a child will grow into a satisfied and independent person who will act in society in accordance with social norms and values.

REFERENCES

1. Bognar L. Metodika odgoja [Upbringing methodology]. Osijek: Pedagoški fakultet Sveučilišta Josipa Jurja Štrosmajera u Osijeku (Faculty of Pedagogy *Josip Juraj Strossmayer* University in Osijek); 1999.
2. Klarin M. Razvoj djece u socijalnom kontekstu –roditelji, vršnjaci, učitelji, kontekst razvoja djeteta [Children's development within the social context - parents, peers, teachers, the context of a child's development]. Jastrebarsko: Naklada Slap; 2006.
3. Caktaš Biketa B, Ivanušec SM. Odgoj u obitelji [Family upbringing] [Internet]. 2014. [accessed 10.12.2023.]. Available at: http://www.djecjivrticivanic.hr/documents/zaroditelje/preporuke/Odgojuobitelji.pdf
4. Montgomery H. Roditeljska magija: Sedam jednostavnih koraka kako bismo uspjeli u odgoju djece [Parenting magic: Seven simple steps to succeed in children upbringing]. Zagreb: Naklada Ocean More; 2019.
5. Stevanović M. Obiteljska pedagogija [Family pedagogy]. Varaždinske Toplice: Tonimir; 2000.
6. Pernar M. Roditeljstvo [Parenthood]. KBC Rijeka: Zavod za kliničku, zdravstvenu i organizacijsku psihologiju: 2010.
7. Keresteš G, Brković I, Kuterovac Jagodić G, Greblo Z. Razvoj i validacija upitnika roditeljskog ponašanja [Development and validation of the parental behavior questionnaire]. Suvremena psihologija [Contemporary psychology] 2012;15(1):23-42.
8. Craig L. „Does father care mean fathers share? A comparison of how mothers and fathers in intact families spend time with children“. Gender and Society. 2006;20:259-281.

9. Balswick J, Proctor Avertt C. Differences in expressiveness: Gender, interpersonal orientation, and perceived parental expressiveness as contributing factors. Journal of Marriage and the Family 1977;39(1):121-27.
10. Sočo M, Keresteš G. Roditeljsko ponašanje zaposlenih roditelja: povezanost s objektivnim obilježjima posla i subjektivnim doživljajem odnosa roditeljske i radne uloge [Parental behavior of working parents: connection with objective job characteristics and subjective experience of the relationship between parental and work roles]. Društvena istraživanja [Social research]. 2011;20(3):647-69.
11. Vilaseca R, Rivero M. Parenting behaviors of mothers and fathers of young children with intellectual disability evaluated in a natural context. PLOS ONE 2020. [Internet]. [accessed 7.12.2023.]. Available at: https://journals.plos.org/plosone/article
12. Jull J. Biti otac, biti muškarac [Being a father, being a man]. Split: Harfa; 2020.
13. Keresteš G. Spol roditelja te dob i spol djeteta kao odrednice roditeljskog ponašanja [The parents' gender and the child's age and gender as determinants of parental behavior]. Suvremena psihologija [Contemporary psychology] 2002:1-2:7-24.
14. Perinčić D. Odnos percepcije roditeljskog ponašanja i eksternaliziranih problema kod adolescenata [The relationship between the perception of parental behavior and externalizing problems in adolescents] [Master thesis]. Zagreb: Odsjek za psihologiju Filozofskog fakulteta u Zagrebu; 2012.
15. Erceg M. Uloga obrazovnih aspiracija i očekivanja te ponašanje roditelja u objašnjenju perfekcionizma njihove djece [The role of educational aspirations and expectations and parents' behavior in explaining their children's perfectionism] [Graduate thesis on the internet]. 2014. [accessed 5.12.2023.]. Available at: https://www.unizd.hr/Portals/12/Diplomske%20pdf/2014%20-%20Diplomski%

16. Frisch R, Zussman N. The Causal Effect of Parents' Childhood Environment and Education on Their Children's Education. Research Department Bank of Israel Working Paper 2009. [Internet]. [accessed 8.12.2023.]. Available at: https://www.boi.org.
17. Burušić J, Babarović T. Koliko daleko padaju jabuke od stabla? Odnos obrazovnih postignuća djece i obrazovne razine njihovih roditelja [How far do apples fall from the tree? The relationship between the children's educational achievements and their parents' educational level]. Društvena istraživanja [Social research]. 2010;4-5;709-30.
18. Xiaohua G. Relationship between Parents' Educational Expectations and Children's Growth Based on NVivo 12.0 Qualitative Software 2022 [Internet]. [accessed 10.12.2023.]. Available at: https://www.hindawi.com
19. Chen H, Xiao W. Interpretation of the "educational Anxiety" Phenomenon of Chinese Parents [Internet]. National Institute of Education Administration Journal. 2014;2:18-23. [accessed 10.12.2023.]. Available at: https://qikan.cqvip.com
20. Brajša-Žganec A. Dijete i obitelj - Emocionalni i socijalni razvoj [A child and a family - Emotional and social development]. Jastrebarsko: Naklada Slap; 2003.

POVEZANOST RODITELJSKIH PONAŠANJA I ODGOJA DJECE VIŠIH RAZREDA OSNOVNE ŠKOLE

Anita Begić[1], Karolina Tadić-Lesko[2], Valentina Katić[1]

[1] Filozofski fakultet Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

[2] Ustanova „Centar za socijalni rad Grada Mostara“, 88 000 Bosna i Hercegovina

SAŽETAK

Uvod: Uloge oca i majke teže ravnopravnosti u odgojnom djelovanju. Međutim, iste su različite u pogledu roditeljskih ponašanja o kojima se raspravlja u ovom radu, na okolnosti intruzivnog ponašanja kao i u odnosu na stručnu spremu gdje su utvrđivane razlike u njihovom induktivnom rezoniranju.

Cilj: Ispitati povezanost roditeljskih ponašanja i odgoja djece viših razreda osnovne škole.

Metoda: Istraživanje je provedeno u Osnovnoj školi Kamen-Šine, Split, Republika Hrvatska. U istraživanju su sudjelovala 102 ispitanika-roditelja, od čega je 16,7% očeva i 82,4% majki, dok se jedna osoba nije izjasnila po pitanju spola. Instrument korišten za potrebe istraživanja bio je Upitnik roditeljskog ponašanja URP29 (Keresteš, 2012).

Rezultati: Istraživanje je pokazalo kako je utvrđena statistički značajna razlika u intruzivnosti između očeva i majki. Majke pokazuju značajno više intruzivnog ponašanja u odnosu na očeve ali s druge strane nije utvrđena statistički značajna razlika u kažnjavanju obzirom na spol roditelja. Nije utvrđena statistički značajna razlika u toplini, autonomiji te roditeljskom znanju obzirom na stupanj obrazovanja, dok je utvrđena statistički značajna razlika u induktivnom rezoniranju s obzirom na stupanj obrazovanja. Roditelji sa srednjom stručnom spremom pokazuju znatno više induktivnog rezoniranja u odnosu na roditelje s višom stručnom spremom. Između ostalih skupina nije pronađena statistički značajna razlika.

Zaključak Majke imaju veću kontrolu ponašanja, te nametanja istog, a očevi više popuštaju u odgoju svoje djece. Roditelji sa srednjom stručnom spremom pružaju djeci veću podršku i mogućnost izbora. Roditeljski odgoj koji obiluje brigom i ljubavlju omogućiti će zdrav razvoj djece

Ključne riječi: povezanost, roditeljsko ponašanje, odgoj djece, osnovna škola

Osoba za razmjenu informacija: doc. dr. sc. Anita Begić

anita.begic@ff.sum.ba

THE EFFICACY OF MANUAL THERAPY AND ULTRASOUND IN TREATMENT OF CALCIFIC TENDINITIS OF THE SHOULDER

Darko Bilić[1], Antonija Hrkać[2], Jozo Marković[1]

[1] Rehabilitation Centre „Život", 88 000 Mostar, Bosnia and Herzegovina

[2] Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 10.11.2023. Reviewed on 20.12.2023. Accepted on 25.01.2024.

ABSTRACT

Introduction: Shoulder calcification, also known as calcific tendinopathy, is a common cause of shoulder pain, typically occurring between the ages of 30 and 50. It is approximately twice as common in women compared to men. The pathogenesis of the disease is not well understood, and it exhibits a cyclic nature.

Objective: To investigate and assess the impact of ultrasound and manual therapy on reducing shoulder calcifications. Materials and Methods: This study, conducted at the Rehabilitation Center "Život" in Mostar from May to July 2023, involved 30 participants. Statistical analysis, using Microsoft Excel 2010 and IBM SPSS 23.0, included descriptive and inferential statistics, revealing significant insights into participants' perspectives and forming the basis for a comprehensive discussion.

Results: The research results demonstrated a statistically significant reduction in pain intensity after therapy, both in men and women. Additionally, calcification size significantly decreased, and shoulder range of motion improved. Analysis of demographic factors revealed differences between female and male participants, emphasizing the prompt seeking of therapy after the onset of pain.

Conclusion: The combination of ultrasound and manual therapy shows promising effectiveness in treating shoulder calcifications, laying the groundwork for further study and personalized clinical practice.

Keywords: calcification in the shoulder, manual therapy, ultrasound therapy.

Correspondence: Darko Bilić, Master of Physiotherapy

E-mail: darkobilic@gmail.com

INTRODUCTION

Calcification in the shoulder, also known as calcific tendinopathy, is a common cause of shoulder pain. This degenerative change in the shoulder joint is characterized by the accumulation of calcium salts within the tendons of the rotator cuff (1,2). The result of the above is the pain patients often experience, limited mobility, and reduced functionality of the shoulder. It most often occurs between the ages of 30 and 50 and is approximately twice as common in women than in men. It occurs more often in the right shoulder than in the left, and in 10% of patients, it involves both shoulders (1,3).

The disease has a cyclic nature and goes through several stages: initial, resting stage, resorptive, and post-calcifying stage (2,4). In the initial stage, the disease is mostly asymptomatic or with some mechanical symptoms, as a result of calcification deposits. In the resorptive stage, migration of calcifications to adjacent tissues can occur, which causes excruciating pain, more severe limited mobility, but also hyperesthesia, and redness of the surrounding skin, as well as increased body temperature. The causes of these migrations are not known, it is assumed that they are mechanical (5–8). Risk factors for the development of calcific tendinitis include endocrine disorders, such as thyroid disease and diabetes mellitus, alcohol consumption, and a history of traumatic injuries or surgical interventions on the shoulder (1).

The study in Taiwan included 42,915 patients diagnosed with diabetes between January 1, 2000, and December 31, 2015, and the data of 171,660 people were randomly selected as a control group. All subjects were monitored until the development of calcification tendinitis or the end of 2015. This study showed that patients with diabetes have a 27% increased risk of developing calcific tendinitis of the shoulder, 8 years after the initial diagnosis of diabetes (9).

Damage to the tendons in the shoulder and chronic inflammation, along with the formation of calcifications, can result in poorer blood supply to the tendons, muscle weakness in the shoulder joint, and junction of the tendons with other anatomical structures of the shoulder joint (area of the tendons of the supraspinatus muscle and the long head of the biceps). Shoulder pain (often at night), crepitations, reduced range of motion, and muscle weakness accompany calcifying tendinitis and "frozen shoulder."

Calcific tendinitis is classified based on the onset of symptoms into acute, subacute,

and chronic forms (3). The key instrument for the diagnosis and treatment of calcific tendinopathy is an ultrasound examination, with special emphasis on determining the location, size, and morphology of calcifications. It is important to note that ultrasound should not be exclusive, since there is a possibility of false positive and false negative findings. The diagnosis of calcifying tendinopathy can be easily made using conventional radiography (10). The use of magnetic resonance imaging is rarely recommended due to its high cost and minimal impact on the adjustment of therapy, but it is important in the assessment of potential tendon ruptures. It is important to note that the spontaneous reduction of symptoms in 9% of cases does not necessarily lead to the resorption of calcifications. The classical approach remains the basic method of treatment, achieving improvement in most patients using oral anti-inflammatory drugs, physical therapy interventions, corticosteroid injections, and endoscopic ultrasound (EUS) needles (11). Therefore, conservative treatment is recommended before surgery. Patients with acute pain should begin passive shoulder exercises to restore range of motion. In most patients with chronic pain, the range of movements (ROM) of the shoulder joint is close to the normal range. It is therefore necessary to start strengthening exercises within a range that is comfortable for the patient. Despite the variety of approaches, the combination of ultrasound and manual therapy is attracting increasing interest due to promising results (12,13).

Methods such as the Bowen and Emmett techniques, used as complementary therapies, have the potential to improve mobility and reduce symptoms. However, further studies are needed to determine the precise effects of calcification resorption in the shoulder. The Bowen technique is a manual therapeutic method that uses specific movements on soft tissue to solve biomechanical disorders. This technique has the potential to improve spinal and central nervous system function. Through gentle movements of the fingers and thumb, the physiotherapist stimulates the muscles, ligaments, tendons, and fascia, encouraging the body to return to its physiological balance. This procedure induces a piezoelectric effect, like a wave that travels through the fascia towards the brain (14). The Emmett technique, on the other hand, involves specific "moves" that the therapist applies with minimal strain. The goal of these techniques is to stimulate muscle balance, reduce tension and pain, and improve the general condition of the

body. It is used to alleviate problems such as back, neck, and shoulder pain, improve mobility, and treat sports injuries, muscle and joint problems and postural imbalances. It is important to emphasize that Bowen and Emmett's therapies are often used as complementary techniques to traditional medical care.

MATERIALS AND METHODS

This study included 30 participants, of both sexes, aged 20-60, who suffer from calcifying tendinopathy. The study was conducted in the Rehabilitation Center "Život" in Mostar in the period from May to July 2023. Ethical permission for this study was obtained from the mentioned rehabilitation institution. The criteria for the inclusion of participants were: ultrasound and radiological diagnosis of calcifying tendinopathy, age range between 20 and 60 years and willingness to participate in the study. The exclusion criteria were: the presence of other medical diagnoses in addition to calcification, mental disorders that interfere with the understanding of the study, and irregularity and non-compliance with agreed physiotherapy treatments. All participants were informed in detail about their rights and obligations, and before participating in the study they signed an informed consent. The diagnosis of calcification in the shoulder was confirmed by an orthopedist through a clinical examination and X-ray findings.

Outcome and outcome measures

The primary outcome measure was pain intensity, and secondary outcome measures included shoulder range of motion and radiological findings of shoulder calcification. All these variables were observed at two points in time - at the beginning of the study and after seven physiotherapy treatments.

The sociodemographic characteristics of the participants, including age, gender, and occupation, were collected at the beginning of the study using a self-designed questionnaire, consisting of 10 questions.

Pain intensity was assessed with a visual analog pain scale (VAS). The VAS consists of a straight line with equal intervals of 1 cm, from 0 "no pain" to 10 ("worst imaginable pain") (15). The assessment and evidence of pain were performed by the participants themselves. In the interpretation of pain intensity, the quantitative result is divided into categories: mild pain (VAS values of 1 - 3), moderate (VAS values of 4 - 7) and severe pain (VAS values of 8 - 10). The validity and reliability of this scale have

been well established and it has often been applied in scientific studies.

Shoulder range of motion was measured with a simple goniometer, assessing upper arm abduction and shoulder external rotation movements. Range of motion measurement criteria included flexion to 90°, extension to 50°, abduction to 90°, abduction to 90°, and lateral and medial rotation ranging from 0 to 90 degrees. Radiological diagnostics were used to assess the size of calcifications in the shoulder.

Intervention

The intervention consisted of paraffin wraps, ultrasound therapy (US), Emmet therapy, and Bowen therapy. Paraffin wraps were applied at the beginning of each treatment for 15 minutes. US therapy with a probe was applied to the shoulder area, with a power of 1.2 w per cm2, lasting 10 minutes during each treatment. Emmet therapy and Bowen therapy were conducted according to their principles. There were a total of 10 sessions, two sessions per week lasting 60 minutes.

Statistical analysis

Statistical data analysis included descriptive and inferential statistics. Categorized data are presented with absolute and relative frequencies, and significance was analyzed with the Chi-square test. The normality of the distribution of quantitative data (pain intensity) was tested with the Shapiro-Wilk test. Quantitative data are presented as mean value and standard deviation. The effect of the intervention on pain intensity was analyzed by Student's paired t-test. Results on ordinal scales (size of calcifications and shoulder range of motion) were evaluated by the Wilcoxon rank sum test for dependent variables. The level of significance in all tests was $p<0.05$. Statistical data processing was performed using the IBM SPSS 23 program (Armonk, NY: IBM Corp.), and Microsoft Excel 2010 was used in the interpretation of results.

RESULTS

The total sample in this study consisted of 30 participants. There were more females than males (56.7% vs 43.3%), without statistically significant difference ($p=0.465$). The highest number of participants was between the ages of 41 and 50 (46.7%), while the smallest number

of participants was between the ages of 20 and 30. In the age group from 20 to 40 years, there were more males, while females were more in the groups from 51 to 60 age and ≥61 age. In groups from 41 and 50 age, an equal number of participants was found, depending on sex (Table 1).

As for occupation, most of the participants were office workers (60%), 20% were health professionals, 16.7% were retired, and one was a hairdresser (3.3%). In the comparison of the representation of participants depending on their profession, a statistically significant difference was found (p>0.001).

Table 1. - *Sociodemographic characteristics in the total sample* (N=30)

Variable	N	%	χ2	df	p
Sex					
Male	13	43.3	0.533	1	0.465
Female	17	56.7			
Age group (Years)					
20-30	2	6.7	14.677	4	0.005
31-40	4	13.3			
41-50	14	46.7			
51-60	6	20			
61 i više	4	13.3			
Occupation					
Office worker	18	60	21.467	3	<0.001
Health professional	6	20			
Hairdresser	1	3.3			
Retired	5	16.7			

N – absolute frequency

% - relative frequency

χ2 – Chi-square test

df – degree of freedom

p – statistical significance (p<0.05)

The results of the analysis of pain intensity before and after the intervention are shown in Table 2. The presence of pain before the start of the study was in the range of one to three months. In a third of the participants (33%, n=10) the pain was present within

one month before the start of the study, in 43% (n=13) the pain in the shoulder was present from one to three months, and in 23% (n= 7) the participant's presence of pain lasted for six months. The presence of pain in the first month was reported only by male participants, while the presence of pain lasting three to six months was reported only by female participants.

The average rating of pain intensity at the beginning of the intervention was 8.20 (SD 1.45), while after the intervention it was 2.40 (SD 1.79). A statistically significant difference was found in the average values of pain intensity before and after the intervention ($p<0.001$). A significant reduction in pain was evident in both male and female participants ($p<0.001$).

Table 2. - *Average values and analysis of the significance of pain intensity (VAS) before and after the intervention in the total sample and depending on sex*

	Pain intensity (VAS)		Analysis of the significance*		
	Before intervention	After intervention	t	df	p
Total sample	8.20±1.45	2.40±1.79	26.15	29	<0.001
Sex					
Male	9.15±1.46	4.15±0.80	12.75	12	<0.001
Female	7.45±0.94	1.10±1	52.11	16	<0.001

** Student Paired t-test*

At the beginning of the intervention, 26.7% (n=8) of the participants had a calcification measuring five millimeters, 43.3% (n=13) had a calcification measuring six to ten millimeters, while 30% (N=9) had calcification of size ≥11 millimeters.

After the intervention, the size of the calcifications remained unchanged in 43.3% of the participants, while a decrease in the size of the calcifications to five millimeters was evident in 27% of the participants. Also, in 27% of the participants, a decrease in the size of the calcifications to less than 11 mm was evidenced (*Figure 1*). Analysis of the size categories of calcifications before and after the intervention revealed a statistically significant difference ($z=-4.00$; $p<0.001$).

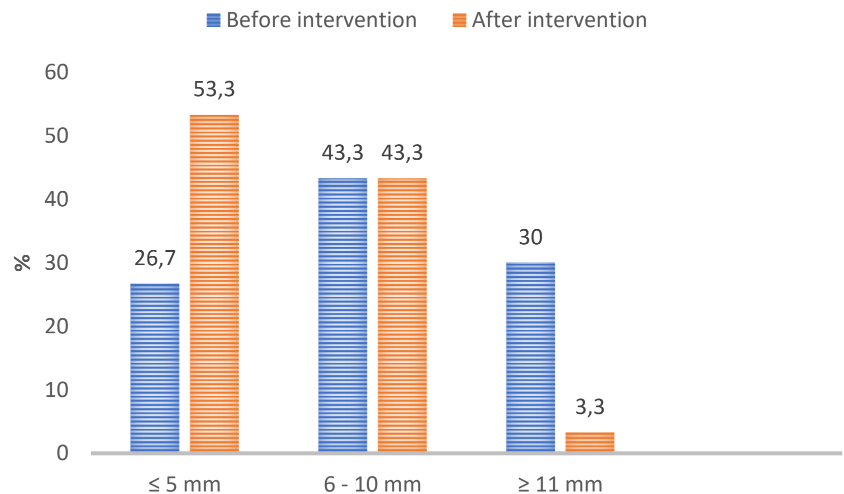

Figure 1. - *Calcification size (mm) before and after the intervention*

Before the start of the intervention, a limited range of shoulder abduction movement was evident in all participants, ranging from 30 to 60 degrees. After the intervention, a full range of motion (180 degrees) was achieved in 63.3% of participants, while in 36.7% of participants, the range of abduction ranged from 65 to 175 degrees (*Figure 2*).

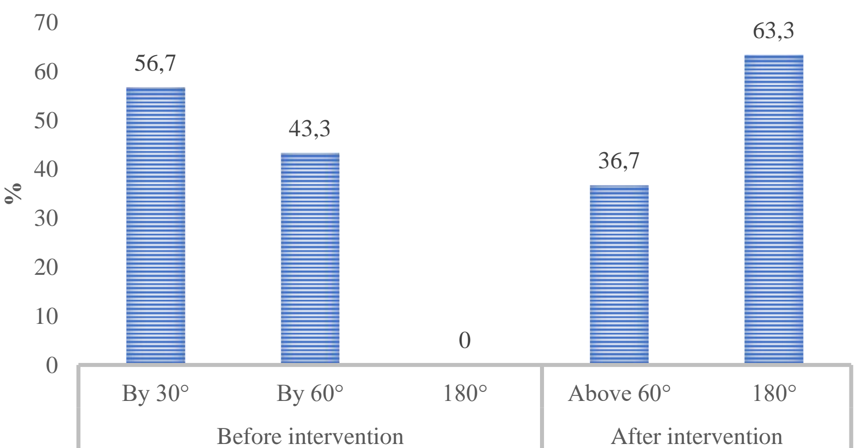

Figure 2. - *The range of abduction in the shoulder measured with a simple goniometer before and after the intervention*

The statistically significant difference in the range of motion before and after the intervention was confirmed ($z=-2.45$; $p<0.001$). Similar results were observed for the shoulder external rotation range of motion. Before the intervention, 36.7% of the subjects (n=11) could not perform the shoulder external rotation movement,

while the same number of subjects performed the movement up to 60 degrees. Also, 63.3% of the subjects (n=19) before the intervention had minimal external rotation movement up to 30 degrees, while the same number of subjects after the intervention achieved the full range of motion in the shoulder (90 degrees).

DISCUSSION

The results of this study indicate the beneficial effect of physiotherapy treatment, which consisted of the application of paraffin wraps, US and two manual therapies, Emmet and Bowen, in the treatment of calcifying tendinitis of the shoulder. The combination of these physiotherapy methods had an effect in reducing the size of the calcifications, the intensity of pain and increasing the range of abduction and extension movements in the shoulder.

Regardless of the unknown etiology of calcifications in the shoulder, it is well established that the absorption of calcifications occurs naturally (16). Moreover, a randomized controlled trial published in 2018 with a 10-year follow-up of the effect of physiotherapy interventions reports that symptomatic calcific tendinitis has a good likelihood of completely resolving naturally in the long term. However, the use of physiotherapy interventions, such as ultrasound, can accelerate the process of reducing calcific tendinitis. However, effective treatment of calcium deposits does not imply recovery from symptoms and improvement of function in calcified tendinitis (17).

The use of the US has been a well-established conservative treatment method for calcifying tendinitis of the shoulder for decades. Ultrasound has emerged as a non-invasive method that uses high-frequency sound waves to stimulate blood circulation, break down calcifications and reduce inflammation. Several authors have reported the beneficial short-term effect of the US for people with calcifin tendinitis (18, 19). On the other side, above mentioned the ten-year follow-up study reports on the short-term and long-term beneficial effects of using ultrasound in the treatment of calcifying tendinitis (17).

Systematic reviews published in 2010 and 2016, which report on the effect of the US in calcifying tendinitis of the shoulder, support these statements, with the note that all previous evidence was based on poor quality and heterogeneous studies (https://doi.org/10.2522/ptj.20080272). In conclusion, the authors state that future studies are needed with better methodology and more clearly described applied

parameters of the ultrasound (18, 20). In our study, a reduction of calcifications was found in more than half of the participants (57%), which confirms the above-mentioned records of the beneficial effect of the US in the treatment of calcifying tendinitis of the shoulder.

According to Chou et al (2007), the treatment of calcified tendinitis is possible with conservative methods, without striving for perfect decalcification, but with the necessary clinical confirmation of perfect absorption of calcareous materials during continuous treatment, regardless of the treatment method (21). Outcomes such as pain, function, and patient satisfaction provide evidence supporting conservative therapeutic interventions in the management of acute calcifying tendinopathies. For the treatment of calcified tendinopathy to be and/or be considered successful, attention should be paid to the outcomes and understanding of pathophysiology, prognostic factors, and physiotherapy interventions based on current calcium deposits and the patient's status in the healing continuum (17). Exercise therapy and manual therapy are two physiotherapy interventions that are commonly used in the treatment of calcifying tendinitis of the shoulder, not alone, but in combination with ultrasound or other non-invasive techniques (16).

In our study, two manual therapies were applied in addition to ultrasound, widely used in practice, but whose application has been poorly researched and thus confirmed in science. Recently published papers report the effectiveness of Bowen therapy in reducing pain and increasing mobility in myofascial syndromes and chronic pain (22-24). A pilot study published in 2001 also reported the beneficial effect of Bowen therapy in reducing pain, and increasing functionality and activities of daily living in individuals with frozen shoulders (25). The results of our study also established the possible benefit of Bowen therapy in the form of pain reduction and increased shoulder abduction and external rotation movements.

We have not found valid evidence about the effectiveness of Emmet therapy, so we cannot discuss it. Nevertheless, the fact that Emmet therapy was an integral part of our intervention, and its effectiveness was established, indicates that this method of manual therapy requires additional future scientific studies.

The limitation of this study is certainly that we did not have a control group, so we cannot compare the results more clearly or single out the superiority of some of the

applied interventions. So, future studies are necessary.

CONCLUSION

In the conclusion of this study, we highlight the extremely promising effectiveness of ultrasound and manual therapy in reducing calcifications in the shoulder. The application of these therapeutic methods has a positive effect on the resorption of calcifications, pain relief and functional improvement of the shoulder. Future studies will be crucial to confirm the sustainability and long-term effects of these therapeutic approaches in clinical practice.

REFERENCES

1. Kim MS, Kim IW, Lee S, Shin SJ. Diagnosis and treatment of calcific tendinitis of the shoulder. Clin Shoulder Elb. 2020;23(4):210–6.
2. Cesarec G, Martinec S, Čičak N. Kalcificirajuća tendinopatija rotatorne manšete - evolucija morfologije kalcifikata. Medica Jadertina. 2019;49(3–4):149–56.
3. Albishi W, Alaseem A, Aljasser S, Almohideb F, Almalki M, AlFaleh AF. Intraosseous extension of supraspinatus calcific tendonitis in a young patient with severe shoulder pain: a rare case report. J Surg Case Rep. 2023 Jun 27;2023(6):rjad354.
4. Kim MJ, Sung MS, Jeong CH, Park HI. Extratendinous migration of calcific tendinitis of the rotator cuff: imaging findings and clinical characteristics with temporal changes. Ultrason Seoul Korea. 2022;41(3):553–65.
5. Lawande MA, Daftary AR. MRI findings in calcific deposits in and around shoulder: atypical locations beyond supraspinatus. Clin Radiol. 2020;75(8):579–85.
6. Kalaycı CB, Kızılkaya E. Calcific tendinitis: intramuscular and intraosseous migration. Diagn Interv Radiol. 2019;25(6):480–4.
7. Bianchi S, Becciolini M. Ultrasound Appearance of the Migration of Tendon Calcifications. J Ultrasound Med Off J Am Inst Ultrasound Med. 2019;38(9):2493–506.
8. Hutchinson JL, Gusberti D, Saab G. Changing appearance of intraosseous calcific tendinitis in the shoulder with time: A case report. Radiol Case Rep. 2019;14(10):1267–71.
9. Su YC, Chung CH, Ke MJ, Chen LC, Chien WC, Wu YT. Increased risk of shoulder calcific tendinopathy in diabetes mellitus: A nationwide, population-based, matched cohort study. Int J Clin Pract. 2021;75(10):e14549.

10. Chianca V, Albano D, Messina C, Midiri F, Mauri G, Aliprandi A, et al. Rotator cuff calcific tendinopathy: from diagnosis to treatment. Acta Bio-Medica Atenei Parm. 2018;89(1-S):186–96.
11. Angileri HS, Gohal C, Comeau-Gauthier M, Owen MM, Shanmugaraj A, Terry MA, et al. Chronic calcific tendonitis of the rotator cuff: a systematic review and meta-analysis of randomized controlled trials comparing operative and nonoperative interventions. J Shoulder Elbow Surg. 2023;32(8):1746–60.
12. Čota S, Delimar V, Žagar I, Kovač Durmiš K, Kristić Cvitanović N, Žura N, et al. Efficacy of therapeutic ultrasound in the treatment of chronic calcific shoulder tendinitis: a randomized trial. Eur J Phys Rehabil Med. 2023;59(1):75–84.
13. Gasnick K. Verywell Health. 2022 [cited 2024 Jan 6]. Physical Therapy for Calcific Tendonitis: Benefits & Tips. Available from: https://www.verywellhealth.com/calcific-tendonitis-exercises-and-physical-therapy-5226004
14. Fizionova | Bowen Osijek Fizionova [Internet]. [cited 2024 Jan 6]. Available from: https://www.fizionova.hr/bowen-tehnika/
15. Hawker GA, Mian S, Kendzerska T, French M. Measures of adult pain: Visual Analog Scale for Pain (VAS Pain), Numeric Rating Scale for Pain (NRS Pain), McGill Pain Questionnaire (MPQ), Short-Form McGill Pain Questionnaire (SF-MPQ), Chronic Pain Grade Scale (CPGS), Short Form-36 Bodily Pain Scale (SF-36 BPS), and Measure of Intermittent and Constant Osteoarthritis Pain (ICOAP). Arthritis Care Res. 2011;63 Suppl 11:S240-252.
16. Oh DG, Yoo KT. The effects of therapeutic exercise using PNF on the size of calcium deposits, pain self-awareness, and shoulder joint function in a calcific tendinitis patient: a case study. J Phys Ther Sci. 2017;29(1):163-7. doi:10.1589/jpts.29.163
17. Pieber K, Grim-Stieger M, Kainberger F, Funovics M, Resch KL, Bochdansky T, et al. Long-Term Course of Shoulders After Ultrasound Therapy for Calcific Tendinitis: Results of the 10-Year Follow-Up of a Randomized Controlled Trial. Am J Phys Med Rehabil. 2018;97(9):651-8. doi:10.1097/PHM.0000000000000939
18. Page MJ, Green S, Mrocki MA, Surace SJ, Deitch J, McBain B, et al. Electrotherapy modalities for rotator cuff disease. Cochrane Database Syst Rev. 2016;2016(6):CD012225. doi:10.1002/14651858.CD012225
19. Cota S, Delimar V, Zagar I, Kovac Durmis K, Kristic Cvitanovic N, Zura N, et al.

Efficacy of therapeutic ultrasound in the treatment of chronic calcific shoulder tendinitis: a randomized trial. Eur J Phys Rehabil Med. 2023;59(1):75-84. doi:10.23736/S1973-9087.22.07715-2

20. Alexander LD, Gilman DRD, Brown DR, Brown JL, Houghton PE. Exposure to Low Amounts of Ultrasound Energy Does Not Improve Soft Tissue Shoulder Pathology: A Systematic Review. Physical Therapy. 2010;90(1):14-25. doi:10.2522/ptj.20080272
21. Choi CH, Kim SK, Lee HH: Conservative and arthroscopic treatment of calcific tendinitis. J Korean Should Elb Soc, 2007, 10: 167–74.)
22. Scibek JS, Carcia CR. Presentation and conservative management of acute calcific tendinopathy: a case study and literature review. J Sport Rehabil. 2012;21(4):334-42. doi:10.1123/jsr.21.4.334
23. Ying CLA, Lee TMA, Chen PY, Samy W, Au LYF, Siu CHD. The Effect of ISBT-Bowen Therapy in the Treatment of Myofascial Neck Pain-a Randomized, Single-Blinded Clinical Trial. Int J Ther Massage Bodywork. 2023;16(2):29-38. doi:10.3822/ijtmb.v16i2.801
23. Lee K, Lewis GN. Short term relief of multisite chronic pain with Bowen Therapy: A double. -blind, randomized controlled trial. J Bodyw Mov Ther. 2020;24(4):271-9. doi:10.1016/j.jbmt.2020.06.025
24. Amjad F, Khalid A. Comparative effects of Bowen therapy and tennis ball technique on pain and functional disability in patients with thoracic myofascial pain syndrome. Journal of Orthopaedic Surgery and Research. 2023;18(1):895. doi:10.1186/s13018-023-04379-z
25. Carter B. A pilot study to evaluate the effectiveness of Bowen Technique in the management of clients with frozen shoulder. Complementary Therapies in Medicine. 2001;9(4):208-15. doi:https://doi.org/10.1054/ctim.2001.0481

UČINKOVITOST MANUALNE TERAPIJE I ULTRAZVUKA KOD SMANJENJA KALCIFIKATA U RAMENU

Darko Bilić[1], Antonija Hrkać[2], Jozo Marković[1]

[1] Rehabilitacijski centar „Život", 88 000 Mostar, Bosna i Hercegovina

[2] Fakultet zdravstvenih studija Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Kalcifikat u ramenu, poznat i kao kalcificirajuća tendinopatija, česti je uzrok boli u ramenu i najčešće se javlja između 30. i 50. godine života te je približno dvostruko češća kod žena nego kod muškaraca. Patogeneza bolesti nije poznata i bolest ima cikličku prirodu.

Cilj: Istražiti i procijeniti utjecaj ultrazvuka i manualne terapije na smanjenje kalcifikata u ramenu.

Materijali i metode: U ovo istraživanje provedeno u Rehabilitacijskom centru "Život" u Mostaru tijekom svibnja do srpnja 2023. godine., sudjelovalo je 30 ispitanika. Statistička analiza, korištenjem Microsoft Excela 2010 i IBM SPSS-a 23.0, obuhvatila je deskriptivnu i inferencijalnu statistiku, otkrivajući značajne uvide u perspektive ispitanika i formirajući temelj za sveobuhvatnu raspravu.

Rezultati: Rezultati istraživanja su pokazali statistički značajno smanjenje intenziteta boli nakon terapije, kako kod muškaraca tako i kod žena. Također, veličina kalcifikata znatno se smanjila, a opseg pokreta u ramenu poboljšao. Analiza demografskih čimbenika otkrila je razlike između ženskih i muških sudionika te je istaknuto brzo traženje terapije nakon pojave boli.

Zaključak: Obećavajuća je učinkovitost kombinacije ultrazvuka i manualne terapije u liječenju kalcifikata u ramenu, postavljajući temelje za daljnja istraživanja i prilagođenu kliničku praksu.

Ključne riječi: kalcifikat u ramenu, manualna terapija, UZV terapija.

Osoba za razmjenu informacija: Darko Bilić, mag. physioth.

E-mail: darkobilic@gmail.com

STRESS FACTORS OF NURSES IN COVID DEPARTMENTS

Kristina Hanžek[1], Vesna Bratić[2], Anita Lukić[3], Slobodan Mihaljević[2]

[1] Clinic for Neurology, University Hospital Centre Zagreb, Kišpatićeva 12, 10 000 Zagreb, Croatia

[2] Clinic for Anesthesoiology, Reanimatology, Intensive Care Medicine and Pain Therapy, University Hospital Centre Zagreb, Kišpatićeva 12, 10 000 Zagreb, Croatia

[3] Department of Anesthesiology, Reanimatology and Intensive Care Medicine, General Hospital Varaždin, Ivana Meštrovića 1, 42 000 Varaždin, Croatia

Received on 26.01.2024. Reviewed on 09.02.2024. Accepted on 29.02.2024.

ABSTRACT

Objective**:** To define the stressors that cause the highest level of stress in nurses / technicians in COVID intensive care units (ICU) and regular COVID departments and to compare stressors between these two departments.

Methods**:** For the purposes of the research, a validated questionnaire on stressors at the workplace of hospital health workers was used. The questionnaires were distributed to 194 nurses/technicians, working in the COVID departments. The questionnaire consists of 3 parts; the first part contains demographic data of the respondents, the second part of the questionnaire consists of 34 questions that describe certain stress factors and are answers are offered on a Likert - type scale and the last part of the questionnaire consists of 3 open-ended questions to which respondents can add stressors to which they are exposed, which were not previously mentioned.

Results: Differences were found in the level of education regarding the length of work with COVID patients, nurses / technicians with a higher level of education worked longer in the COVID department (p=0.043). No differences were found in the level of stress between nurses/technicians working in the COVID department compared to the COVID ICU (p=0.181). Among the factors that caused the highest level of stress are: work overload, inadequate personal income, insufficient number of employees and everyday unpredictable and unplanned situations.

Conclusion**:** Our results indicate that there is no difference in the level of stress between nurses working in the COVID departments compared to nurses working in the COVID ICU. Due to the high prevalence of stress among nurses who work with COVID patients, it is necessary to monitor the symptoms of burnout and provide support in the workplace. According to the results of our research, there is a need to optimize working conditions and invest efforts in order to reduce the workload.

Keywords: stress, nurses, COVID, departments

Correspondence: Kristina Hanžek, univ. mag. med. techn.
E-mail: kristina.hanzek@kbc-zagreb.hr

INTRODUCTION

Many studies have shown that the profession of a nurse is one of the most stressful professions (1, 2). Chen et al. studied the intensity of work stress in six different occupations and found that the level of overall work stress for nurses is higher than average compared to other occupations (3). Stress among nurses is associated with negative impacts such as psychological distress, burnout, depression, anxiety, pain in the lower back, and worse patient care (4, 5, 6).

The emergence of the novel respiratory coronavirus 2 (SARS-CoV-2) in China at the end of 2019 led to a global pandemic, causing drastic changes in social, economic and health structures at the global level (7). Previous studies of health care workers during past epidemics have similarly shown increased mental burden among health care workers, with social isolation being a key stressor (8, 9, 10, 11). Nurses' responses to the stress of the current pandemic must be viewed from an occupational health and safety perspective. Stress and burnout were internationally recognized as occupational hazards for nurses even before the pandemic itself (12). Although research suggests that both professional and personality factors play a role in burnout (13, 14), in 2019 the World Health Organization declared burnout to be a professional phenomenon – not a health condition (15). Marked by a feeling of exhaustion, disengagement at work and a feeling of reduced professional fulfilment, burnout is considered the result of chronic stress at work that the individual is unable to resolve on his own (15). The onset of the COVID-19 pandemic increased work stress: studies from China (16, 17, 18) and Italy (19) have shown that working with patients with COVID is the main risk factor, but have also identified several other variables that explain reported symptoms of depression, anxiety, insomnia, psychological stress and post-traumatic stress among nurses (15, 19). Investigating nurses' perceptions of stress during the early phase of a pandemic provides important insight into the nurses' experiences and potential measures that health care facilities can take to alleviate nurse stress. Providing nurses with adequate personal protective equipment is one concrete measure that can help protect nurses and alleviate their fear of infection.

Healthcare facilities should provide opportunities for nurses to discuss the stress they are experiencing, support each other and make suggestions for adapting to the workplace during this pandemic. The management of a healthcare institution should recognize these sources of stress in order to implement and improve interventions to maintain the health, safety and well - being of nurses in a timely and effective manner (20).

Therefore, we investigated the possible stressors in nurses working in COVID departments. Also, we searched for the possible differences in the level of stress between nurses working in COVID intensive care unit (ICU) and regular COVID departments.

OBJECTIVE

The objective of this study is to define the stressors that cause the highest level of stress in nurses/technicians in COVID intensive care units and regular COVID departments and to compare stressors between these two departments at the University Hospital Centre Zagreb (UHC Zagreb).

SUBJECTS AND METHODS

The research was conducted at UHC Zagreb in the period from March 15 to May 20, 2022, and a total of 194 nurses /technicians participated. In that period were distributed a total of 194 questionnaires, one of which was returned incompletely filled for one question.

After obtaining permission from the Ethics Committee of the UHC Zagreb - tertiary health care centre, the questionnaires were distributed to all nurses/technicians, working in the COVID department and the COVID ICU at the UHC Zagreb at the time of this research.

For the purposes of the research, questionnaire on stressors at the workplace of hospital health workers was used. The questionnaire has been validated in the Croatian language (17) and consists of 3 parts; the first part contains demographic data of the respondents (gender, age, marital status, number of children, place of work, vocational training, length of total working experience and length of work in COVID), the second part of the questionnaire consists of 34 questions that describe certain stress factors and are answers are offered on a Likert-type scale (The lowest value is 1 - not stressful at all and the highest value is 5 - extremely stressful) and the last part of the questionnaire consists of 3 open-ended questions to which respondents can add stressors to which they are exposed, which were not previously mentioned.

STATISTICAL ANALYSIS

The demographic data of the respondents were presented with descriptive statistics, and the normality of the distribution of continuous numerical variables was tested with the D'Agostino-Pearson test. The existence of differences between categorical variables was tested with the χ2-test. The existence of differences between two continuous numerical variables was tested by Mann-Whitney test, while the existence of differences between more than two continuous numerical variables was tested by analysis of variance (ANOVA).

The sum of all answers for each respondent was compared by a t-test for one sample with the neutral value of all answers per individual respondent 102 (if the respondent answered all questions with a neutral answer of 3, the sum of all answers of an individual respondent would be 102 : 34 questions with a Likert scale x 3). Also, the sum of the responses of all respondents for each individual question was compared with the neutral value of all responses by a t-test for one sample.

The association between two continuous numerical variables was tested with a non-parametric rank correlation test (Spearman's rho).

All statistical analyses were performed using MedCalc 20.110 (MedCalc Software Ltd, Ostend, Belgium). P values less than 0.05 were considered statistically significant.

SAMPLE

A total of 194 nurses/technicians between the ages of 26 and 57, with different levels of education (82 general nurses/technicians, 99 bachelor's degrees in nursing and 13 graduates/master's degrees in nursing) who voluntarily agreed to the research participated in the research. From the total number of respondents; 57 respondents were male and 137 female.

RESULTS

The results of the research indicate that there was no difference in the marital status of the respondents regarding gender (p=0.248) and place of work (p=0.836) (Table 1).

***Table 1.** - Marital status of respondents*

	Marriage status. N (%)					Total
	Single	Married	Cohabiting	Divorced	Widowed	
total	132 (68)	41 (21)	16 (8)	3 (2)	1 (1)	193 (99)*
Gender						
Male	41 (72)	9 (16)	6 (10)	0	1 (2)	57 (100)
Female	91 (67)	32 (24)	10 (7)	3 (2)	0	136 (99)*
COVID						
Department	14 (67)	6 (28)	1 (5)	0	0	21 (100)
ICU	118 (68)	41 (20)	16 (9)	3 (2)	1 (1)	172 (99)*

* one respondent did not declare her marital status

No differences were found in the possession of children with regard to the gender of the respondents (p=0.527) and considering the respondent's place of work (p=0.624)(Table 2).

***Table 2.** - Number of respondents' children*

	Children N (%)		Total
	Yes	No	
Total	47	147	194 (100)
Gender			
Male	12 (21)	45 (79)	57 (100)
Female	35 (25)	102 (75)	137 (100)
COVID			
Department	6 (29)	15 (71)	21 (100)
ICU	41 (24)	132 (76)	173 (100)

Differences in the level of education have been established with regard to gender, that is, women have a higher level of education (p= 0.009), no differences were found in the level of education regarding work in the COVID department and the COVID ICU (p=0.093). The results indicate that there are differences in the level of education with regard to the length of service in COVID, graduates/masters in nursing work longer in COVID (p=0.043),(ANOVA). Different levels of education differ according to age. (p=0.022) (ANOVA). There is no difference in the level of education with respect to the total length of service (p=0.474) (ANOVA) (Table 3).

Table 3. *- Level of education*

	Level of education. N (%)			Total
	Nurse/Technician	Bachelor's Degree	Master's Degree in Nursing	
Total	82 (42)	99 (51)	13 (7)	194 (100)
Gender				
Male	33 (58)	23 (40)	1 (2)	57 (100)
Female	49 (36)	76 (55)	12 (9)	137 (100)
COVID				
Department	13 (62)	6 (29)	2 (9)	21 (100)
ICU	69 (40)	93 (54)	11 (6)	173 (100)
	Median, range (IQR), years			
Age	24, 20-57 (6)	27, 23-49 (8)	29, 24-43 (8)	-
Length of service				
Total	5, 1-36 (5)	5, 1-29 (7)	5, 2-25 (8)	-
On COVID	0.17, 0.08-2.08 (0.17)	0.17, 0.08-1.00(0.08)	0.25, 0.17-1.00 (0.17)	-

The results indicate that the most significant stress factor for nurses working in the COVID department and the COVID ICU is work overload, the following stress factors were further ranked: inadequate personal income, insufficient number of employees, everyday unpredictable or unplanned situations, administrative tasks, inadequate workspace, misinforming patients by the media and other sources (Table 4).

Differences between individual stress factors for nurses between the COVID department and the COVID ICU were determined: inadequate workspace, poor organization of work, little possibility of advancement and promotion, poor communication with superiors, conflicts with superiors and conflicts with colleagues are stress factors that higher in nurses working in the COVID ICU (Table 4).

***Table 4.** - Sum of all answers for each question*

Question	All respondents		COVID DEPARTMENT		COVID ICU		P* (COVID DEPARTMENT vs. COVID ICU)
	average Sum (neutral total 582)	average	average Sum (neutral total 63)	average	average Sum (neutral total 519)	average	
1	785	4.05	84	4.00	701	4.05	0.806
2	645	3.32	51	2.43	594	3.43	<0.001
3	528	2.72	56	2.67	472	2.73	0.814
4	621	3.20	71	3.38	550	3.18	0.515
5	659	3.40	68	3.24	591	3.42	0.542
6	651	3.36	65	3.10	586	3.39	0.301
7	665	3.43	71	3.38	594	3.43	0.847
8	540	2.78	64	3.05	476	2.75	0.230
9	603	3.11	66	3.14	537	3.10	0.877
10	654	3.37	70	3.33	584	3.38	0.860
11	611	3.15	72	3.43	539	3.12	0.180
12	642	3.31	62	2.95	580	3.35	0.143
13	680	3.54	58	2.76	622	3.64	0.002
14	774	3.99	112	3.78	662	3.83	0.340
15	582	3.00	47	2.24	535	3.09	0.003
16	547	2.82	45	2.14	502	2.90	0.059
17	598	3.08	54	2.57	544	3.14	0.048
18	689	3.55	78	3.71	611	3.53	0.478
19	768	3.96	82	3.90	686	3.97	0.808
20	717	3.70	72	3.43	645	3.73	0.237
21	497	2.56	40	1.90	457	2.64	0.009
22	476	2.45	41	1.95	435	2.51	0.042
23	481	2.48	43	2.05	438	2.53	0.084
24	443	2.30	48	2.29	395	2.30	0.970
25	566	2.92	60	2.86	506	2.92	0.824
26	652	3.36	63	3.00	589	3.40	0.176
27	600	3.09	64	3.05	536	3.10	0.857
28	667	3.44	58	2.76	609	3.52	0.164
29	637	3.28	67	3.19	570	3.29	0.700
30	598	3.08	57	2.71	541	3.13	0.136
31	546	2.81	57	2.71	489	2.83	0.705
32	556	2.87	52	2.48	504	2.91	0.145
33	616	3.18	69	3.29	547	3.16	0.662
34	554	2.86	58	2.76	496	2.87	0.712

DISCUSSION

The results of this research indicate that the most significant stress factor for nurses working in the COVID departments and the COVID ICU is work overload, which indicates an increased workload at the workplace of nurses who care for COVID patients.

A study conducted in Iran in which the authors compared the level of burnout in nurses working in COVID departments to those working in other wards indicated that there was a significantly higher level of stress in nurses working in COVID departments. Among the most significant risk factors for burnout, they consider: experience in caring for patients with COVID infection, hospital resources and stress at work (21).

On the other hand, there is no research investigating the differences in the level of stress between nurses in the COVID departments and the COVID ICU, as we did in our research.

Our results indicate that there is no difference in the level of stress between nurses working in the COVID departments compared to nurses working in the COVID ICU. The difference in the treatment of COVID patients who are hospitalized in COVID departments compared to patients in the COVID ICU is the need for a larger number of nurses on shift in the ICU, most of the patients are on mechanical ventilation and are vitally endangered, unlike the wards where they are patients who receive a high flow of oxygen using NIV or different oxygen masks are not vitally endangered, and accordingly, our hypothesis that work in the COVID ICU is more stressful than work in the COVID department is rejected.

The insufficient number of employees is one of the most significant factors contributing to the high level of stress among nurses in the COVID department. Namely, the frequent absence of nurses due to isolation or self-isolation and, consequently, frequent changes in work schedules further emphasized the general shortage of nurses at the labour market.

Other studies also indicate a connection between the high level of stress of nurses who work with COVID patients with a high workload and an insufficient number of nurses (22, 23, 24).

The stress factor of nurses, which is ranked according to the results of our research, is in the fourth place, everyday unpredictable and unplanned situations. Considering great pressure to admit patients with COVID infection at the time of the conduction of this research, every available bed was waiting for the admission of new patients, and accordingly the dynamics of admission and discharge were increased.

With each admission of a new patient, the nurses were daily faced with different cases and comorbidities that existed in patients that they had not encountered in their work until then.

One of more significant factors of nurses' stress according to our results are administrative tasks. According to the Act on Nursing in the Republic of Croatia, nursing documentation is mandatory and the nurse is obliged to keep nursing documentation that records all procedures performed during 24 hours. Considering the raising administrative workload the nurses are burdened with, we believe there is a need to adjust the hospital information system in order to simplify the application of nursing documentation and reduce the time for documentation patient care and progress and suggest methods of reducing the workload by changing the existing functionalities in the information system (25, 26).

According to the results of this research, the lowest level of stress for nurses is caused by conflicts with the patient and family members, which was expected given the great demands of patient care and their great gratitude to the staff.

CONCLUSION

Our results indicate that there is no difference in the level of stress between nurses working in the COVID departments compared to nurses working in the COVID ICU. According to the results of this research, the lowest level of stress for nurses is caused by conflicts with the patient and family members, which was expected given the great demands of patient care and their great gratitude to the staff.

Due to the high prevalence of stress among nurses who work with COVID patients, it is necessary to monitor the symptoms of burnout and provide support in the workplace. According to the results of our research, there is a need to optimize working conditions and invest efforts in order to reduce the workload.

LITERATURE

1. Batra K, Singh TP, Sharma M, Batra R, Schvaneveldt N. Investigating the Psychological Impact of COVID-19 among Healthcare Workers: A Meta-Analysis. International Journal of Environmental Research and Public Health. 2020;17(23).

2. Chen Q, Liang M, Li Y, Guo J, Fei, D, Wang L, He L. I., Sheng C, Cai Y, Li X, Wang J, Zhang. Mental health care for medical staff in China during the COVID-19 outbreak. The Lancet Psychiatry. 2020; 7(4), e15– e16.

3. Çınar D, Kılıç Akça N, Zorba Bahçeli P, Bağ Y. Perceived stress and affecting factors related to COVID-19 pandemic of emergency nurses in Turkey. Journal of nursing management. 2021; 29(7), 1916–1923.

4. Collins S, Couture B, Kang MJ, Dykes P, Schnock K, Knaplund C, Chang F, Cato K. Quantifying and Visualizing Nursing Flowsheet Documentation Burden in Acute and Critical Care. Annual Symposium proceedings, AMIA Symposium. 2018; 348–357.

5. Farquharson B, Bell C, Johnston D, Jones M, Schofield P, Allan J, Ricketts I, Morrison K, Johnston M. Nursing stress and patient care: Real-time investigation of the effect of nursing tasks and demands on psychological stress, physiological stress and job performance: Study protocol. Journal of Advanced Nursing. 2013; 69, 2327– 2335.

6. Gonge H, Jensen LD, Bonde JP. Are psychosocial factors associated with low back pain among nursing personnel? Work & Stress. 2002;16, 79– 87.

7. Hall RCW, Hall RCW, Chapman MJ. The 1995 Kikwit Ebola outbreak: lessons hospitals and physicians can apply to future viral epidemics. Gen Hosp Psychiatry. 2008;30(5):446–52.

8. Heesakkers H, Zegers M, Van Mol M, Van den Boogaard M. The impact of the first COVID-19 surge on the mental well-being of ICU nurses: A nationwide survey study. Intensive & critical care nursing. 2021; 65, 103034.

9. Kang L, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: A cross-sectional study. Brain Behav. Immun. 2020; 87:11–17.

10. Lai CC, Shih TP, Ko WC, Tang HJ, Hsueh PR. Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and coronavirus disease (COVID-19): The epidemic and the challenges. International Journal of Antimicrobial Agents. 2020 Mar 1;55(3):105924.

11. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, Wu J, Du H, Chen T, Li R et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. JAMA Netw. Open. 2020; 3(3).

12. Lee SH, Juang YY, Su YJ, Lee HL, Lin YH, Chao CC. Facing SARS: psychological impacts on SARS team nurses and psychiatric services in a Taiwan general hospital. Gen Hosp Psychiatry. 2005;27(5):352–8.

13. Lehmann M, Bruenahl CA, Löwe B, Addo MM, Schmiedel S, Lohse AW et al.

Ebola and psychological stress of health care professionals. Emerg Infect Dis. 2015 May;21(5):913–4.

14. Leveck ML, Jones, CB. The nursing practice environment, staff retention and quality of care. Research in Nursing and Health,. 1996; 19, 331– 343.

15. Liu Z, Han B, Jiang R, Huang Y, Ma C, Wen J, Zhang T, Wang Y, Chen H, Yongchun M. Mental health status of doctors and nurses during COVID-19 epidemic in China. SSRN J. 2020.

16. McGrath A, Reid N, Boore J. Occupational stress in nursing. International Journal of Nursing Studies. 2003; 40(5), 555– 565.

17. Milošević M et al. 'Validacija upitnika o stresorima na random mjestu bolničkih zdravstvenih djelatnika', Sigurnost. 2009;51(2), str. 75-84.

18. Nikeghbal K, Kouhnavard B, Shabani A, Zamanian Z. COVID-19 Effects on the Mental Workload and Quality of Work Life in Iranian Nurses. Annals of global health. 2021; 79-87.

19. Oyeleye O, Hanson P, O'Connor N, Dunn D. Relationship of workplace incivility, stress and burnout on nurses' turnover intentions and psychological empowerment. Journal of Nursing Administration. 2019; 43(10), 536– 542.

20. Arnetz JE, Goetz CM, Arnetz BB, Arble E. Nurse Reports of stressful Situations during the COVID-19 Pandemic: Qulaitative Analysis of Survey Responses. Int J Environ Res Public Health. 2020.

21. Pérez-Fuentes M, Molero - Jurado MM, Gázquez-Linares JJ, Simón-Márquez MM. Analysis of burnout predictors in nursing: Risk and protective psychological factors. Eur. J. Psychol. Appl. Leg. 2018; 11:33–40.

22. Rossi R, Socci V, Pacitti F, Di Lorenzo G, Di Marci A, Siracusano A, Rossi A. Mental health outcomes among frontline and second-line health care workers during the coronavirus disease 2019 (COVID-19) pandemic in Italy. JAMA Netw. Open. 2020 May 1;3(5).

23. Sarboozi Hoseinabadi T, Kakhki S, Teimori G, Nayyeri S. Burnout and its influencing factors between frontline nurses and nurses from other wards during the outbreak of Coronavirus Disease - COVID-19- in Iran. Investigacion y educacion en enfermeria. 2020; 38(2).

24. Worringer B, Genrich M, Müller A, Gündel H, Contributors of the SEEGEN Consortium. Angerer P. Hospital medical and nursing managers' perspective on the mental stressors of employees. Int. J. Environ. Res. Public Health. 2020;17:5041.

25. World Health Organization Burn-Out an "Occupational Phenomenon":

International Classification of Diseases. (accessed on 22 October 2020); Available online: https://www.who.int/mental_health/evidence/burn-out/en/

26. Yin Z, Liu Y, McCoy AB, Malin BA, Sengstack PR. Contribution of Free-Text Comments to the Burden of Documentation: Assessment and Analysis of Vital Sign Comments in Flowsheets. Journal of medical Internet research. 2021; 23(3).

ČIMBENICI STRESA MEDICINSKIH SESTARA U COVID ODJELIMA

Kristina Hanžek[1], Vesna Bratić[2], Anita Lukić[3], Slobodan Mihaljević[2]

[1] Klinika za neurologiju, Klinički bolnički centar Zagreb, Kišpatićeva 12, 10 000 Zagreb, Croatia

[2] Klinika za anesteziologiju, reanimatologiju i intenzivnu medicinu i terapiju bolu, Klinički bolnički centar Zagreb, Kišpatićeva 12, 10 000 Zagreb, Croatia

[3] Odjel za anesteziologiju, reanimatologiju i intenzivno liječenje, Opća bolnica Varaždin, Ivana Meštrovića 1, 42 000 Varaždin, Croatia

SAŽETAK

Cilj: Definirati stresore koji na radnom mjestu u COVID jedinicama intenzivne skrbi i COVID odjelima uzrokuju najvišu razinu stresa kod medicinskih sestara/tehničara i usporediti stresore između navedenih odjela.

Metode: Za potrebe istraživanja korišten je validiran upitnik o stresorima na radnom mjestu bolničkih zdravstvenih djelatnika. Upitnici su podijeljeni na 194 medicinske sestre / tehničare koji rade na COVID odjelima. Upitnik se sastoji od 3 dijela; u prvom dijelu su demografski podaci ispitanika, drugi dio upitnika sastoji se od 34 pitanja koja opisuju pojedine čimbenike stresa te su ponuđeni odgovori na skali Likertovog tipa i zadnji dio upitnika sastoji se od 3 pitanja otvorenog tipa na koje ispitanici mogu nadopisati stresore kojima su izloženi, a koji nisu prethodno spomenuti.

Rezultati: Utvrđene su razlike u razini obrazovanja obzirom na duljinu rada s COVID bolesnicima, u COVID odjelu su duže radile medicinske sestre/tehničari više razine obrazovanja, P=0.043. Nisu utvrđene razlike u jačini stresa između medicinskih sestara/tehničara koje rade u COVID odjelu u odnosu u COVID JIL, P=0.181. Među čimbenicima koji uzrokuju najvišu razinu stresa su: preopterećenost poslom, neadekvatna osobna primanja, nedostatan broj djelatnika i svakodnevne nepredvidive i neplanirane situacije.

Zaključak: Naši rezultati pokazuju da nema razlike u razini stresa između sestara koje rade u COVID odjelima u usporedbi s medicinskim sestrama koje rade u COVID JIL-u. Zbog visoke prevalencije stresa među medicinskim sestrama koje rade s COVID bolesnicima potrebno je pratiti simptome sagorijevanja i pružiti podršku na radnom mjestu. Prema rezultatima našeg istraživanja, postoji potreba za optimizacijom radnih uvjeta i ulaganjem napora u cilju smanjenja radnog opterećenja.

Ključne riječi: stres, medicinske sestre, COVID, odjeli

Autor za korespondenciju: Kristina Hanžek, univ. mag. med. techn.

kristina.hanzek@kbc-zagreb.hr

IMPACT OF THE COVID-19 PANDEMIC ON THE REGULAR IMMUNIZATION OF CHILDREN IN THE MOSTAR HEALTH CENTER

Marina Ćurlin, Kata Barukčić, Vesna Pehar, Ivan Vasilj, Darjan Franjić
Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 13.02.2024. *Reviewed on 04.03.2024.* *Accepted on 03.04.2024.*

ABSTRACT

Introduction: Vaccines for protection against 10 infectious diseases are available in the Program of Regular Immunization in the Federation of Bosnia and Herzegovina. These vaccines save the lives of up to 3 million people worldwide every year. The latest report of the Institute of Public Health of the Federation of Bosnia and Herzegovina on regular immunization carried out during 2020 shows that the rate of vaccination of children during the 2019 coronavirus disease (COVID-19) pandemic with regular vaccines has decreased compared to previous years. Such a situation in the health system leads to a potential risk of outbreaks of infectious diseases that are prevented by vaccination.

Objective: To examine the impact of the COVID-19 pandemic on the regular immunization of children in the Mostar Health Center.

Materials and methods: A retrospective cross-sectional epidemiological study was conducted. Data on regular immunization of children from the Mostar Health Center, Herzegovina-Neretva County in the Federation of Bosnia and Herzegovina from 2017, 2018, 2021 and 2022 were used.

Results: A statistically significant difference was obtained in vaccination against measles, mumps and rubella during a period of four years. Vaccination with the mentioned vaccines was significantly higher in 2017 and 2018 than in 2021 and 2022.

Conclusion: It was shown that the COVID-19 pandemic affected the regular immunization of children in the Mostar Health Center.

Keywords: regular immunization of children, COVID 19 pandemic, MMR vaccine, Mostar

Corresponding author: Professor Ivan Vasilj, Ph.D.

Email: ivan.vasilj@fzs.sum.ba

INTRODUCTION

The novel coronavirus disease 2019 (COVID-19) was discovered in Wuhan, China, in December 2019, triggering a worldwide public health emergency. The disease was declared a pandemic by the World Health Organization (WHO) on March 11, 2020 worldwide. The pandemic has affected more than 200 countries globally, and has seriously affected the economy and global health (1). Most people who have been infected with the COVID-19 virus have experienced mild to moderate respiratory illness without the need for special treatment. People from the elderly population as well as those with more serious diseases such as cancer, diabetes, chronic respiratory diseases developed serious symptoms (2, 3).

As the pandemic progressed, the number of newly infected, hospitalized with critical conditions and people who succumbed to the coronavirus infection grew, so that the measures gained momentum and were increasingly strict all over the world. A state of complete lockdown prevailed in the world with a decline in the quality of life (4-6) as well as psychological consequences (7-9), while some authors also mentioned the media construction of an infection similar to the seasonal flu (10, 11). At that time, a large number of works on the contagiousness of this virus had already been published in the world (12). The health system was facing serious challenges such as lack of medical equipment, hospital capacity and staff. The lack of cooperation and dialogue between the entities made it even more difficult to allocate resources efficiently. The damage caused by the coronavirus pandemic has forced the health care system to make prevention a top priority (13,14), especially for those with limited resources, because in 2019, over 250 thousand people died from corona in the world (15, 16), and the mortality rate in Herzegovina was 5.1% (17).

The benefits of vaccination are clearly visible in the eradication or huge decrease in the frequency of numerous vaccine-preventable diseases. In recent decades, there has been a significant reduction in diseases that can be prevented through routine vaccination programs (18). Vaccination of children is very effective in reducing the incidence of a number of infectious diseases, as well as reducing the associated morbidity and mortality (19). However, despite the large body of evidence showing that childhood vaccination is safe and effective, vaccination coverage rates do not always

meet the rates required for collective immunity suggested by the WHO (20). The World Health Organization defines vaccination as creating immunity by introducing substances that stimulate the immune system to produce antibodies against a specific pathogen (21). In the mandatory vaccination program in Bosnia and Herzegovina, children are vaccinated against tuberculosis, hepatitis B, diphtheria, tetanus, whooping cough, polio, hemophilus influenza type b, measles, rubella and mumps (22).

Measles, mumps and rubella are highly contagious diseases associated with a significant medical and social burden. Effective vaccines against these diseases are available, and the implementation of vaccination programs has drastically reduced the incidence of the disease on a global scale. However, reports of outbreaks of measles and mumps in recent years highlight the remaining challenges in eliminating these diseases. Measles, mumps and rubella are highly contagious viral infections that cause a significant burden on affected individuals and healthcare systems. Children are vaccinated from 12 months of age and in the first grade of primary school. The vaccine is administered subcutaneously or intramuscularly in the upper arm in a dose of 0.5 ml (23).

Due to the risk of infection and the need to maintain physical distance during the early stages of the COVID-19 pandemic, many countries have temporarily and justifiably suspended preventive mass vaccination campaigns against infectious diseases such as measles, polio, diphtheria, whooping cough, polio, tetanus and meningitis. The causes of delayed or interrupted vaccinations are parents' fears, restrictions on movement, more precisely, quarantine policies, changing priorities for COVID-19 among health personnel, as well as logistical problems with delivery (i.e., delays in the transport of vaccines). The World Health Organization, UNICEF and GAVI, The Vaccine Alliance reported that routine immunization programs have been significantly disrupted in at least 68 countries, affecting approximately 80 million children (24).

The aim of this study was to examine the impact of the COVID-19 pandemic on the regular immunization of children in the Mostar Health Center.

MATERIALS AND METHODS

A retrospective cross-sectional epidemiological study was conducted in the period between March and May 2023.

The research includes processing of statistical data and belongs to the field of descriptive epidemiology. Data on regular immunization of children from the Mostar Health Center, Herzegovina-Neretva County in the Federation of Bosnia and Herzegovina were used. For data on immunization before the pandemic, databases from 2017 and 2018 were used, while for data on immunization during and after the pandemic, data from 2021 and 2022 were taken into account. The data was collected in such a way that the Mostar Health Center provided insight into the data on children's immunization, i.e. the number and percentage of children vaccinated with the measles, mumps and rubella (MMR) vaccine. Information on the gender of the children was also collected in order to describe the demographic characteristics of the sample.

A number of 1734 children participated in the research from the records of regular immunization of children in the Health Center in Mostar, from 2017 to 2018 and from 2021 to 2022.

STATISTICAL ANALYSIS

Data were analyzed in the Statistical Program for the Social Sciences (SPSS) for Windows, version 26.0. The results were analyzed using descriptive and inferential statistics methods. Categorical variables are presented as frequencies and percentages, and the difference between them was tested with the Chi-square test. Statistical procedures were two-way. The level of statistical significance for all tests was $p < 0.05$.

RESULTS

Male gender is predominant in the sample, 887 of them or 51.2%, while 847 of them or 48.8% are female. Table 1 shows that the highest vaccination rate was with the bacillus Calmette-Guérin (BCG) vaccine, and the lowest with the MMR vaccine.

Table 1. - *Basic sample data*

		N	%
Sex	Male	887	51,2
	Female	847	48,8
Year of data collection	2017.	457	26,4
	2018.	513	29,6
	2021.	395	22,8
	2022.	369	21,3
Vaccine	BCG	1517	87,5
	Type B	1499	86,4
	Dtap-IPV-Hib	1503	86,7
	MMR	812	46,8
Complete order		233	13,4
Not vaccinated		211	12,2
Revaccination	No revaccination	1049	60,5
	One revaccination	222	12,8
	Has revaccinations	463	26,7

Table 2 shows that there was a decline in MMR vaccination from 2017-2022, and especially in the pandemic years of 2021 and 2022.

Table 2. - *Presentation of differences with immunization with the MMR vaccine before and after the COVID 19 pandemic*

	MMRvaccine					
	no	yes	total	χ^2	*df*	*p*
2017	92	365	457	631,770	3	<0,05*
2018	169	344	513			
2021	325	70	395			
2022	336	33	369			

χ^2 = chi-square test, df = degrees of freedom, p< 0,05*

The last chi-square test confirmed the expected difference. A significant difference was obtained in the regular immunization of children with the MMR vaccine between 2017, 2018, 2021 and 2022 ($p < 0.05$). Significantly more children were vaccinated with the aforementioned vaccine in the period before the COVID 19 pandemic, more precisely from 2017 to 2018, than during the aforementioned pandemic, that is, from 2021 to 2022. It is interesting to note that

before the pandemic, more children were vaccinated with the MMR vaccine, while during and after the pandemic, it was recorded that most children were not vaccinated with the mentioned vaccine.

DISCUSSION

The aim of the research was to examine the impact of the COVID 19 pandemic on the regular immunization of children in the Health Center in Mostar. With regard to the results of the latest research (23-31), it was expected that vaccination coverage with regular vaccines for children would be lower in the period during and after the pandemic, that is, in 2021 and 2022, than in the period before the pandemic, specifically in 2017 and in 2018. The results of the research conducted by Bramer et al. in 2020 (25) showed that the vaccination rate of children with regular vaccines decreased for all children's age cohorts, except for hepatitis B immunization. A similar study was conducted in the same year by Chandir et al. (26) in Pakistan. Factors contributing to low vaccination coverage included fear of exposure to the virus in health care facilities, restrictions on movement across the city, worker shortages, and the diversion of resources from child health to addressing the pandemic (27). Other researchers obtained similar results in their research (28-30). Nuzhath and colleagues in 2021 (31) also obtained results in their research that show a reduced rate of regular immunization of children during the pandemic. The drop in the vaccination rate was the largest for regular immunizations in the age groups of 5 and 16 months, and the smallest for vaccines administered at birth.

Based on the data obtained from the mentioned literature, it can be assumed that the COVID-19 pandemic had a negative impact on the regular immunization of children in the Federation of Bosnia and Herzegovina, specifically in the area of the city of Mostar. The data analysis determined that the frequency of immunization with regular vaccines (MMR) is statistically significantly lower in the period during and after the pandemic than before the COVID 19 pandemic.

A number of factors may have contributed to a decrease in the rate of vaccination with regular vaccines for children during the COVID-19 pandemic. In many areas, including Bosnia and Herzegovina, during the pandemic, access to health facilities was closed or restricted, resulting in reduced availability of regular health services, including vaccinations. In addition, during the pandemic, the fear of infection was also significantly present,

especially when visiting health institutions. It is possible that parents were concerned about separating their child from home and taking them to health care facilities for fear of exposure to the COVID-19 virus, which may have resulted in delaying or avoiding routine health care visits, including vaccinations. Healthcare systems have been under enormous pressure during the pandemic, focused on diagnosing, treating and monitoring COVID-19 patients. This may have resulted in reduced capacity to implement regular health programs, including vaccination (25). During the pandemic, the focus of the public and health authorities was on the fight against COVID-19. Messages about the importance of regular vaccination may have been neglected or lost in the mass of information about the pandemic (27, 29). The financial difficulties of many families during the pandemic may have resulted in priorities, where some parents may have decided to cut costs, including those related to health care.

An interesting finding from this research is certainly the fact that most children, during and after the pandemic, were not vaccinated with the MMR vaccine. It is shown that in the rest of the world, vaccination with this vaccine is lower than usual (23). One of the reasons may be the fear of vaccine side effects or even the age of vaccination. Namely, the first dose of the MMR vaccine is received at 12 months, and the second at 6 years. Of all regular vaccines for children, this vaccine is received last. So, it can be assumed that one of the reasons is the later age of receiving the first dose (only at one year), therefore the unintentional carelessness of the parents, which can occur with the passage of time since the first vaccines, can play a significant role.

Only 26.7 % of the sample has gone through revaccination, which can be attributed to the fear of side effects or even accidental negligence on the part of the parents, but also to the belief that the dose itself is sufficient prevention and that revaccination is not necessary, which again results from parents' ignorance and insufficient information about vaccination.

The research carried out provides an insight into the real health status of children's immunization in the previous two years in the area of the city of Mostar. The results can direct health system workers and researchers to the consequences of the COVID-19 pandemic and how this pandemic affected the prevention and treatment of other infectious diseases, which decades before the current pandemic were eradicated

thanks to vaccination. Research findings can contribute to raising awareness of the importance of regular immunization of children, as well as increasing the quality of health services. This kind of research can motivate to conduct similar research in other parts of the Federation of Bosnia and Herzegovina and beyond.

CONCLUSION

It was shown that the COVID-19 pandemic affected the regular immunization of children in the Mostar Health Center. The potential reduced immunization of children during the COVID-19 pandemic is insufficient to create collective immunity and also represents an additional risk of outbreaks of other, highly contagious diseases, especially highly virulent diseases such as measles, rubella and parotitis. There is a risk of additional burden on the health system, families and children. It is necessary to raise awareness in the population and point out the importance of mandatory vaccination as the most effective primary prevention measure against infectious diseases.

LITERATURE

1. Brečić P, Jendričko T, Vidović D, Markić P, Ćurković M, Ćelić I. Utjecaj pandemije COVID-19 na pacijente s anksioznim i depresivnim poremećajima. Medicus. 2020;29(2):237-42.
2. Wang C, Horby PW, Hayden FG, Gao GF. A novel coronavirus outbreak of global health concern. Lancet. 2021;3(9):470-3.
3. Bubaš M, Capak K. Povratak zdravlja i snage nakon Covid-19. Donja Stubica:Salvus d.o.o.; 2022.
4. Cucinotta D, Vanelli M. WHO declares COVID-19 a pandemic. Acta Biomed. 2020;9(1):157-60.
5. Ren LL, Wang YM, Wu ZQ, Xiang ZC, Guo L. Identification of a novel coronavirus causing severe pneumonia in human: A descriptive study. Chin Med J. 2019;133:1015-24.
6. Ware J, Kosinski M, Keller SD. A 12-Item Short-Form Health Survey: construction of scales and preliminary tests of reliability and validity. Med Care. 2018;3(4):220-33.
7. Zhang SX, Wang Y, Rauch A, Wei F. Unprecedented disruption of lives and work: Health, distress and life satisfaction of working adults in China one month into the COVID-19 outbreak. Psychiatry Res. 2020;288:112958.

8. Gates B. Responding to Covid-19. A once in a century pandemic? New Engl J Med. 2021;382:1677-79.
9. Sher L. Post – COVID syndrome and suicide risk. QJM an Int J Med. 2021;114(2):95-8.
10. Xu Z, Li S, Tian S, Li H, Kong LQ. Full spectrum of COVID-19 severity still being depicted. Lancet. 2021;4(16):947-8.
11. Sudre CH, Murray B, Varsavsky T, Graham MS, Penfold RS, Bowyer RC, et al. Attributes and predictors of long COVID. Nat Med. 2021 Apr;27(4):626-631.
12. Wu JT, Leung K, Leung GM. Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: A modelling study. Lancet. 2021;4(8):689-97.
13. Ponjavić M, Karabegović A, Ferhatbegović E, Tahirović E, Uzunović S, Travar M, et al. Spatio - temporal data visualization for monitoring of control measures in the prevention of the spread of COVID-19 in Bosnia and Herzegovina. Med Glas. 2020;17(2):265-74.
14. Vojinović M, Torlak N. Zdravstvo, mediji, kultura i obrazovanje u doba pandemije. Aktuelnosti. 2021;7-13.
15. Dušanić - Gačić S, Agić Z. Finansiranje obrazovanja tokom pandemije Covid-19. Aktuelnosti. 2021:81-90.
16. Vasilj I, Ljevak I. Epidemiološke karakteristike Covida-19. Zdravstveni glasnik. 2020;6(1):9-18.
17. Vasilj I, Herceg K, Čović I, Šantić M, Ćurlin M, Ljevak I, et al. Determinants of the Covid-19 pandemic in the West Herzegovina canton. PsychiatrDanub. 2020;32(suppl. 2):221-5.
18. Agrinier N, Le Maréchal M, Fressard L, Verger P, Pulcini C. Discrepancies between general practitioners' vaccination recommendations for their patients and practices for their children. ClinMicrobiol Infect. 2017 May;23(5):311-317.
19. Caron-Poulin L, Rotondo J, Cutler J, Desai S, Squires S. Burden and deaths associated with vaccine preventable diseases in Canada, 2010-2014. Online J Public Health Inform. 2017;9(1):e094.

20. Adams J, Bateman B, Becker F, Cresswell T, Flynn D, McNaughton R, et al. Effectiveness and acceptability of parental financial incentives and quasi-mandatory schemes for increasing uptake of vaccinations in preschool children: systematic review, qualitative study and discrete choice experiment. Health Technol Assess. 2015 Nov;19(94):1-176.
21. Richter D. Cijepljenje i cjepiva. Paediatria Croatica. 2005;49(1):60-70.
22. Zavod za javno zdravstvo Federacije Bosne i Hercegovine [Internet]. Kalendar imunizacije za djecu/mladež od 0 do 18 godina u 2022. godini [citirano 26.4.2024.]. Dostupno na: https://www.zzjzfbih.ba/kalendar-imunizacije-za-djecu-mladez-od-0-do-18-godina-u-2022-godini/
23. Kauffmann F, Heffernan C, Meurice F, Ota MOC, Vetter V, Casabona G. Measles, mumps, rubella prevention: how can we do better? Expert Rev Vaccines. 2021 Jul;20(7):811-26.
24. Dinleyici EC, Borrow R, Safadi MAP, van Damme P, Munoz FM. Vaccines and routine immunization strategies during the COVID-19 pandemic. Hum VaccinImmunother. 2021:17(2):400-7.
25. Bramer CA, Kimmins LM, Swanson R, Kuo J, Vranesich P, Jacques-Carroll LA, et al. Decline in child vaccination coverage during the COVID-19 pandemic - Michigan Care Improvement Registry, May 2016-May 2020. MMWR Morb Mortal Wkly Rep. 2020 May 22;69(20):630-31.
26. Chandir S, Siddiqi DA, Mehmood M, Setayesh H, Siddique M, Mirza A. Impact of COVID-19 pandemic response on uptake of routine immunizations in Sindh, Pakistan: an analysis of provincial electronic immunization registry data. Vaccine. 2020:38(45):7146-55.
27. Lassi ZS, Naseem R, Salam RA, Siddiqui F, Das JK. The Impact of the COVID-19 Pandemic on immunization campaigns and programs: A Systematic Review. IJERPH. 2021:18(3):988.
28. Hoffman J. Vaccine rates drop dangerously as parents avoid doctor's visits. The New York Times. 2020 Apr 23:5.

29. Abbas K, Mogasale V. Disruptions to childhood immunisation due to the COVID-19 pandemic. The Lancet. 2021;398(10299);469-71.
30. Shapiro E. Child vaccinations plummet 63 percent, a new hurdle for NYC schools. The New York Times. 2020 May 1:16.
31. Nuzhath T, Ajayi KV, Fan Q, Hotez P, Colwell B, Callaghan T, et al. Childhood immunization during the COVID-19 pandemic in Texas. Vaccine. 2021;39(25):3333-7.

UTJECAJ PANDEMIJE COVID-19 NA REDOVNU IMUNIZACIJU DJECE U DOMU ZDRAVLJA MOSTAR

Marina Ćurlin, Kata Barukčić, Vesna Pehar, Ivan Vasilj, Darjan Franjić
Fakultet zdravstvenih studija Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: U Programu redovne imunizacije u Federaciji Bosni i Hercegovini dostupna su cjepiva za zaštitu od 10 zaraznih bolesti. Navedena cjepiva svake godine spašavaju živote do 3 milijuna ljudi diljem svijeta. Najnovije izvješće Zavoda za javno zdravstvo Federacije Bosne i Hercegovine o redovnoj imunizaciji provedenoj tokom 2020.godine pokazuje kako je stopa procijepljenosti djece za vrijeme pandemije koronavirusne bolesti 2019 (COVID-19) redovnim cjepivima smanjena u odnosu na ranije godine. Takva situacija u zdravstvenom sustavu dovodi do potencijalnog rizika od izbijanja epidemija zaraznim bolestima koje se preveniraju cijepljenjem.

Cilj: Ispitati utjecaj pandemije COVID-19 na redovnu imunizaciju djece u Domu zdravlja Mostar.

Materijali i metode: Provedeno je retrospektivno presječno epidemiološko istraživanje. Korišteni su podaci o redovnoj imunizaciji djece iz Doma zdravlja Mostar, Hercegovačko-neretvanske županije u Federaciji Bosne i Hercegovine iz 2017., 2018., 2021. i 2022. godine.

Rezultati: Dobivena je statistički značajna razlika u procijepljenost cjepivom protiv ospica, zaušnjaka i rubeole tijekom razdoblja od četiri godine. Značajno je veća procijepljenost navedenim cjepivima bila u 2017. i 2018. nego u 2021. i 2022. godini.

Zaključak: Pokazalo se da je pandemija COVID-19 utjecala na redovnu imunizaciju djece u Domu zdravlja Mostar.

Ključne riječi: redovna imunizacija djece, pandemija COVID 19, MMR cjepivo, Mostar

Autor za korespondenciju: prof. dr. sc. Ivan Vasilj
E-mail: ivan.vasilj@fzs.sum.ba

CHANGES OF TSH, FT3 AND FT4 LEVELS IN PATIENTS WITH HYPERTHYROIDISM

Nafija Serdarević[1,2], Marina Ćurlin[3], Aldijana Dautbašić[2,4], Adina Elena Stanciu[5], Dabla Pradeep[6], Azra Durak-Nalbantić[7]

[1] Institute for Clinical Biochemistry with Immunology, Clinical Center of the University of Sarajevo, 71 000 Sarajevo, Bosnia and Herzegovina

[2] Faculty of Health Studies, University of Sarajevo; 71 000 Sarajevo, Bosnia and Herzegovina

[3] Faculty of Health Studies, University of Mostar; 88 000 Mostar, Bosnia and Herzegovina

[4] Blue Polyclinic, 75 000 Tuzla, Bosnia and Herzegovina

[5] Department of Carcinogenesis and Molecular Biology, Institute of Oncology Bucharest, 252 Fundeni, 022338 Bucharest, Romania

[6] Department of Biochemistry, G. B. Pant Institute of Postgraduate Medical Education and Research (GIPMER), GNCTD, Delhi, India

[7] Clinic for Heart, Blood Vessels and Rheumatic Diseases, Clinical Center University of Sarajevo, 71 000 Sarajevo, Bosnia and Herzegovina

Received on 20.03.2024. *Reviewed on 27.03.2024.* *Accepted on 25.04.2024.*

ABSTRACT

Introduction**:** The thyroid hormone secretion disorders may be hyperthyroidism (reduced TSH levels and increased levels of FT3 and FT4) and subclinical hyperthyroidism (decreased concentration of TSH with normal FT3 and FT4).

Aim: To investigate levels of thyroid hormones (TSH, FT3, and FT4) in patients with hyperthyroidism or subclinical hyperthyroidism treated at Tuzla Blue Clinic.

Materials and methods**:** The study included 120 patients divided into three groups: a control group, groups with respondents who have hyperthyroidism, and a group of patients with subclinical hyperthyroidism. The concentrations of the hormones TSH, FT3, and FT4 were analyzed. The determination was carried out on the device IMMULITE 1 Siemens using the immunochemistry method.

Results**:** TSH between our group investigated the existence of significant statistical differences between the control group and the group with hyperthyroidism ($p<0.0001$) and between the control group and the group with subclinical hyperthyroidism ($p=0.0001$), and the parameter FT3 showed that a statistically significant difference exists between the control group and the group with hyperthyroidism ($p<0.0001$), and between patients with hyperthyroidism and subclinical hyperthyroidism ($p<0.0001$). For FT4, we found a statistically significant difference between the control group and the group with

hyperthyroidism (p<0.0001) and between groups with hyperthyroidism and subclinical hyperthyroidism (p <0.0001).

Conclusions**:** The concentration of TSH is reduced in both hyperthyroidism and subclinical hyperthyroidism. The serum concentrations of FT3 and FT4 are elevated in hyperthyroidism, while in subclinical hyperthyroidism, the serum concentrations of FT3 and FT4 stand in the reference area.

Keywords: Thyrotropin, thyroxine, TSH, FT3, FT4, hyperthyroidism

Corresponding author: Nafija Serdarević, PhD, Full Professor

E-mail: serdarevicnafija@yahoo.com

INTRODUCTION

In routine clinical practice, thyroid dysfunction is very common. During life, the prevalence of thyroid dysfunction is approximately 5–10% (1). One of the roles of thyroid-stimulating hormone (TSH) is regulation of the synthesis and secretion of the thyroid hormone (2) and is considered the primary indicator to assess thyroid function (3). According to the to the American Thyroid Association (ATA), for laboratory testing of thyroid function, it is recommended to use thyrotropin (TSH), free thyroxine (FT4), or FT4 combined with total triiodothyronine (TT3). The importance of determining TSH activity includes: primary hypothyroidism and hyperthyroidism; secondary hypothyroidism (with determination of free T4); control of the treatment; pregnant women's euthyroidism; and states of latent hyperthyroidism (e.g., toxic thyroid adenoma) (4). In the blood, T4 concentration depends on synthesis and secretion from the thyroid and utilization in peripheral tissues. The FT4 concentration reflects the synthesis and secretion of T4, the conversion of T4 into T3, and the and the elimination of hormones. One of the main roles of T4 is its conversion to T3 by deiodination via the enzyme deiodinase I (1, 5). Pearce et al. makes a definition of subclinical thyrotoxicosis (SCT), or subclinical hyperthyroidism, as a biochemical state in which the serum thyroid stimulating hormone (TSH) is below the reference range but with normal concentrations of circulating free thyroid hormones (FT4, FT3). The mean differences are in etiology and outcome depending upon whether the serum TSH is in the low but detectable range (0.1–0.4 mIU/l) or fully suppressed (<0.1 mIU/l). According to the investigation of Pearce et al. and Garber, patients with SCT and a fully suppressed

TSH do have mild thyroid autonomy or early thyrotoxicosis, although the rate of progression to overt hyperthyroidism is low, at only 3-5% annually. Common causes of subclinical hyperthyroidism include excessive levothyroxine replacement, autonomously functioning multi-nodular goiter, and subclinical Graves' disease. One of the potentially risky factors for these patients is developing atrial fibrillation and possibly osteoporosis (6, 7).

The aim of our study was to investigate levels of thyroid hormones (TSH, FT3, and FT4) in patients with hyperthyroidism or subclinical hyperthyroidism treated at Tuzla Blue Clinic.

MATERIAL AND METHODS

The retrospective study was conducted in the Blue Polyclinic, Tuzla, and included data from medical records collected from the beginning of 2018 to the end of 2019. The study included 120 patients aged over 50 who were divided into three groups: patients with hyperthyroidism, patients with subclinical hyperthyroidism, and a control group. The inclusion criteria were patients with hyperthyroidism or subclinical hyperthyroidism before the introduction of therapy. The exclusion criteria were patients with diabetes mellitus, patients with other hormonal imbalances, and patients undergoing therapy for the treatment of hyperthyroidism or subclinical hyperthyroidism.

The determination of TSH, FT3, and FT4 hormones was performed on the IMMULITE 1 immunochemical analyzer, which is based on the immunochemical method. The principle of the immunochemical method in this case is the chemiluminescence reaction. The method is based on the binding of antigens from serum and antibodies from reagents labeled with alkaline phosphatase. The method is based on two binding sites, i.e., "sandwich" immunoassay, where chemiluminescence is used for detection. First, a conjugate of alkaline phosphatase (reagent) is formed with paramagnetic particles (which serve as a solid substrate to which monoclonal antibodies are attached) during the immune reaction. In this way, monoclonal antibodies are labeled with alkaline phosphatase. The alkaline phophatase that binds to the granules (solid plates) dephosphorylates the substrate (adamantyl dioxyethane phosphate) into an unstable anion intermediate. The unstable intermediate emits light after decay. The amount of light

emitted is directly proportional to the amount of alkaline phosphatase bound (8).

STATISTICAL ANALYSIS

The software packages used for data processing were Statistical Package for Social Sciences (SPSS) version 21.0 and MedCalc. The data obtained are presented in tables and figures. In order to establish the existence of a statistically significant difference in the examined parameters (TSH, FT3, FT4), between the groups of subjects, we used the Mann Whitney U test, in which we performed a statistical examination of two groups against each other, that is, their cross-examination "each with each." Based on this test, statistically significant differences between individual groups of respondents and the individual examined parameters are analyzed in detail.

Microsoft Excel for Windows was used to prepare and store the data for statistical analysis. The Qi Macros 2019 program was used for the graphical layout. The tested results were statistically processed for $p < 0.001$.

RESULTS

In order to establish the existence of a statistically significant difference in the examined parameters (TSH, FT3, FT4), between the groups of subjects, we used the Mann Whitney U test $p < 0.001$, in which we performed a statistical examination of two groups against each other, that is, their cross-examination "each with each." Based on this test, statistically significant differences between individual groups of respondents and the individual examined parameters are analyzed in detail.

In a group of patients with hyperthyroidism, the TSH value was 0.016 mIU/L, for FT3 11,96 pg/mL, and for FT4 51,32 pmol/L. The standard deviation for TSH is 0.028 mIU/L, for FT3 it is 4.94 pg/mL,, while for FT4 it is 15.43 pg/mL,, which indicates that FT4 also has the highest dispersion of results in this case, in the case of hyperthyroidism. The minimum value for TSH was 0.004 mIU/L, for FT3 6.80 pg/mL, and for FT4 24.50 pmol/L, while the maximum value for TSH was about 13 mIU/L, for FT3 26.90 pg/mL, and for FT4 77.20 pmol/L.

The second group has subclinical hyperthyroidism. The mean value for TSH was 0.088 mIU/L, for FT3 3.77 pg/mL, and for FT4 17.27 pmol/L. The standard deviation for TSH is 0.081 mIU/L, for FT3 it is 0.78 pmol/L, while for FT4 it is 3.38 pmol/L, where FT4 again has the highest dispersion of results. The minimum value

for TSH was 0.004 mIU/L, for FT3 2.4 pg/mL, and for FT4 11.6 pmol/L, while the maximum value for TSH was 0.26 mIU/L, for FT3 5.6 pg/mL, and for FT4 22.9 pmol/L. In the control group, the mean value for TSH was 1.5 mIU/L, for FT3 3.41 pg/mL, and for FT4 14.83 pmol/L. The standard deviation for TSH is 0.587 mIU/L, for FT3 it is 0.612 pmol/L, and for FT4 it is 1.52 pmol/L, which indicates that FT4 has the highest dispersion of results. The minimum value for TSH was 0.63 mIU/L, for FT3 2.3 pg/mL, and for FT4 12.3 pmol/L, while the maximum value for TSH was 2.7 mIU/L, for FT3 4.6 pg/mL, and for FT4 18.2 pmol/L.

Based on the mean values of the tested parameters TSH, FT3, and FT4 between the three groups of subjects, we can observe the significance and connection of the parameters, as well as the differences between individual groups of subjects. In Figures 1, 2, and 3, the average concentrations of TSH, FT3, and FT4 in the investigation groups are shown: TSH (Figure 1), FT3 (Figure 2), and FT4 (Figure 3).

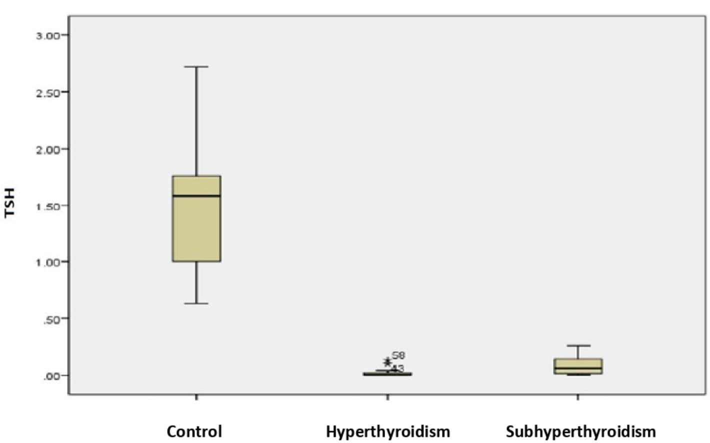

Figure 1. - *The average TSH values in three groups of subjects*

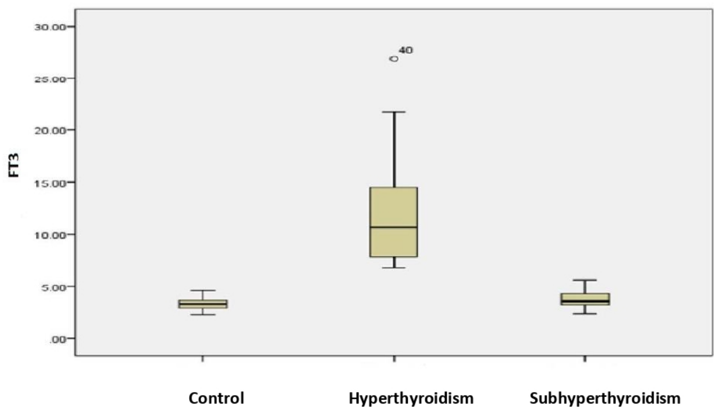

Figure 2. - *The average FT3 values in three groups of subjects*

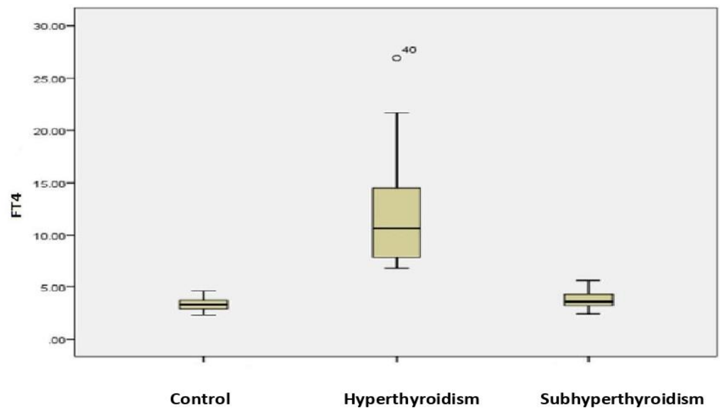

Figure 3. - *The average FT4 values in three groups of subjects*

If we look at our reference values for all three parameters measured on the IMMULITE 1 device, TSH (0.4–4.0 mIU/L); FT3 (2.3–6.4 pg/mL), and FT4 (10.3–24.3 pmol/L), we see that the values for TSH in the control group are around 1.5 mIU/L, while the values in the group of subjects with hyperthyroidism and subclinical hyperthyroidism are significantly below the lower reference limits, in contrast to the already mentioned TSH value for the control group, which is within the reference values. In the values for FT3, we see a return of the same value within normal limits in the control group of subjects and the group with subclinical hyperthyroidism, and a deviation in the value in the group with hyperthyroidism. The same case can be applied to the FT4 value, which is within the reference range in the control group and in subjects with subclinical hyperthyroidism, while we observe a deviation in the group with hyperthyroidism.

The Man Whitney's U test showed that the value of parameter TSH between our group

investigated the existence of significant statistical differences between the control group and the group with hyperthyroidism (Z = 6.743; p <0.0001) and between the control group and the group with subclinical hyperthyroidism (Z = 6.654; p = 0.0001). Using the same test in groups with hyperthyroidism and subclinical hyperthyroidism, we got significant statistical differences (Z = 4.314; p <0.0001), as shown in Table 1.

Table 1. - *Comparison of serum TSH concentrations between the studied groups*

Comparison groups	Mann-Whitney U	Z	P
TSH Hyperthyroidism /Control group	<0.001	6.743	<0.0001*
TSH Subclinical hyperthyroidism/ control group	<0.001	6.654	0.0001*
TSH Hyperthyroidism / Subclinical hyperthyroidism	165	4.314	<0.0001*

For FT4, we found a statistically significant difference between the control group and the group with hyperthyroidism (Z = 6.621; p <0.0001) and between groups with hyperthyroidism and subclinical hyperthyroidism (Z = 6.653; p <0.0001). Using the same test in the group with subclinical hyperthyroidism and the control group, we got significant statistical differences (Z = 2.484; p = 0.013), as shown in Table 2.

Table 2. - *Comparison of serum FT4 concentrations between the studied groups*

Comparison groups	Mann-Whitney U	Z	P
FT4 Hyperthyroidism /Control group	30	6.621	<0.0001*
FT4 Subclinical hyperthyroidism/ control group	282	2.484	0.013
FT4 Hyperthyroidism / Subclinical hyperthyroidism	<0.001	6.653	<0.0001*

In our study, there was a significant difference between concentrations of FT3 between the control group and the group with hyperthyroidism (Z = 6.654; p

<0.0001) and between groups with hyperthyroidism and subclinical hyperthyroidism (Z = 6.655; p <0.0001). We got **a difference** between concentrations of FT3 subclinical hyperthyroidism and the control group (Z = 1.746 ; p = 0.080), as shown in Table 3.

Table 3. - *Comparison of serum FT3 concentrations between the studied groups*

Comparison groups	Mann-Whitney U	Z	P
FT3 Hyperthyroidism /Control group	<0.001	6.654	<0.0001*
FT3 Subclinical hyperthyroidism/ control group	332	1.746	0.080
FT3 Hyperthyroidism / Subclinical hyperthyroidism	<0.001	6.655	<0.0001*

DISSCUSION

Our research was aimed at determining a decrease in the concentration of TSH hormone with a simultaneous increase in the concentration of FT3 and FT4 hormones in hyperthyroidism, and a decrease in the concentration of TSH hormone with normal concentrations of FT3 and FT4 in subclinical hyperthyroidism. Also, one of the goals was to compare the obtained concentrations of TSH, FT3, and FT4 between the groups of subjects in order to determine the difference between hyperthyroidism and subclinical hyperthyroidism.

The determination of the TSH mean value, which is used to measure thyroid dysfunction, has been associated with the development of hyperthyroidism. The lowest value of TSH serum concentration was found in the group with hyperthyroidism; the mean value was 0.016 mIU/L, compared to the group with subclinical hyperthyroidism. The mean value for TSH was 0.088 mIU/L, while the subjects in the control group had a mean value of 1.5 mIU/L. The maximum value for the TSH parameter was measured in the control group of patients and is 2.72 mIU/L. The minimum value measured for TSH in the group with hyperthyroidism was 0.004 mIU/L (Figure 1).

For the parameter FT3, the highest mean concentration of 11.96 pg/mL was found in the group with hyperthyroidism and subclinical hyperthyroidism (3.77 pg/mL), and the control group's FT3 concentration

was 33.41 pg/mL. The maximum value for FT3 (26.90 pg/mL) was measured in the group of subjects with hyperthyroidism, while the minimum value for the FT3 parameter was measured in the control group of subjects (2.30 pg/mL) (Figure 2.).

The highest mean values of the FT4 parameter were found in the hyperthyroid group at 51.32 pmol/L, in the subclinical hyperthyroidism group at 17.27 pmol/L, and in the control group at 14.83 pmol/L. The minimum value for FT4 was measured in the group of subjects with subclinical hyperthyroidism and was 11.6 pmol/mL (Figure 3.).

The study from Hoogendoorn EH found that 3.9% of patients in the study 3.9% were diagnosed with subclinical hyperthyroidism, with a TSH concentration < 0.1 mIU/l, while 0.2 were diagnosed with hyperthyroidism, the rest of the subjects were a group of euthyroid patients (9). In another study from the USA in which 968 subjects participated, 2.5% of US residents had a TSH concentration < 0.1 mIU/l, that is, they belonged to the group of subclinical hyperthyroid patients (10, 11). In the investigation in the Germany area with iodine deficiency, respondents without previously known thyroid disease, had a concentration of TSH < 0.1 mIU/l and normal concentrations of FT3 and FT4, which concluded that it was a subclinical hyperthyroidism (12). The study by Favresse J. found that subjects with overt hyperthyroidism will have low or suppressed TSH levels with elevated free T4 and total T3 levels. Patients with mild/subclinical hyperthyroidism will have low or suppressed TSH with normal free T4 and total T3 levels. 'T3 toxicosis' is defined as low/suppressed TSH with normal T4 and elevated T3 levels (13). Generally, serum FT3 is predominantly elevated in endogenous subclinical hyperthyroidism, such as Graves' disease, resulting in a high FT3/FT4 ratio (14).

By measuring the value of TSH between our examined groups, we found that there is a significant statistical difference both between the control group and the group with hyperthyroidism ($p < 0.0001$) and between the control group and the group with subclinical hyperthyroidism ($p = 0.0001$), and for the parameter FT3, a statistically significant difference exists between the control group and the group with hyperthyroidism ($p<0.0001$), and between subjects with hyperthyroidism and those with subclinical hyperthyroidism ($p<0.0001$). For FT4, we got a statistically significant difference between the control group and the group with hyperthyroidism

(p<0.0001) and between the group with hyperthyroidism and subclinical hyperthyroidism (p < 0.0001). The results for FT3 and FT4 in the group with subclinical hyperthyroidism and the control group showed no statistically significant difference (p < 0.001), as shown in Tables 1–3.

Overt hyperthyroidism affects 1.9% of women and 0.16% of men and is characterized by a TSH level lower than the reference range and FT4 and/or FT3 levels above the normal reference range. Complications include Graves' opthalmopathy, thyrotoxic crisis, atrial fibrillation, loss of bone mass, and congestive heart failure (15). The study of Gan et al. shows that there is evidence to support an association between cognitive impairment and subclinical hyperthyroidism or low TSH within the reference range (16). The female patients in study conducted by Tan who had TSH levels in the lowest tertile (less than 1 mIU per L) had a higher risk of Alzheimer disease (HR = 2.39; 95% CI, 1.47 to 3.87) over a mean 12.7-year follow-up period compared with those whose TSH levels were in the middle tertile (17). Results of Canaris et al. have found that subclinical hyperthyroidism is most common in patients receiving thyroid hormone replacement therapy; the prevalence in these patients may be as high as 20% (18), particularly in those taking desiccated thyroid hormone. Subclinical hyperthyroidism affects approximately 2% of adults and increases with advancing age, with 3% of adults over 80 years of age being affected. It is characterized by TSH levels lower than the reference range but FT4 and FT3 levels within the normal reference range (19).

In our study, we have some possible limitations, such as limited number of study patients, unequal group distributions, and a single study time point that reduced the internal validity of the study.

CONCLUSION

In our investigation, we have confirmed that the serum concentration of the hormone TSH is lowered while the concentrations of FT3 and FT4 are elevated in patients with latent and pronounced hyperthyroidism compared to the control group of patients of the same age. TSH concentration is decreased in hyperthyroidism and subclinical hyperthyroidism. The serum concentration of FT3 and FT4 is elevated in hyperthyroidism, while in subclinical hyperthyroidism, the serum concentration of FT3 and FT4 is in the reference range.

REFERENCES

1. Mansoor R, Rizvi SR, Huda SH. Spectrum of thyroid diseases: an experience in the tertiary care and teaching hospital. Annals of Pakistan Institute of Medical Sciences. 2010(6);101-6.
2. Menjo M, Yamaguchi S, Murata Y, Hayashi Y, Nagaya T, Ohmori S, et al. Responsiveness to thyroid hormone is enhanced in rat hepatocytes cultured as spheroids compared with that in monolayers: altered responsiveness to thyroid hormone possibly involves complex formed on thyroid hormone response elements. Thyroid. 1999 Sep;9(9):959-67.
3. Castellano CA, Laurin D, Langlois MF, Fortier M, Tessier D, Gaudreau P, et al. Thyroid function and cognition in the euthyroid elderly: a case-control study embedded in Quebec longitudinal study - NuAge. Psychoneuroendocrinology. 2013 Sep;38(9):1772-6.
4. Topić E, Primorac D, Janković S: Medicinskobiohemijska dijagnostika u kliničkoj praksi: Štitnjača [Medical biochemical diagnostics in clinical practice: Thyroid]. Zagreb [HR): Medicinska naklada; 2004.
5. Čvorišćec D, Čepelak I. Štrausova medicinska biokemija: Hormoni štitnjače [Internet]. Medicinska naklada; 2009. Available at: https://www.scribd.com/doc/125006648/Medicinska-Biohemija-Strausova-Sa-Prilozima [Accessed 15.05.2021]
6. Pearce EN, Hennessey JV, McDermott MT. New American thyroid association and American association of clinical endocrinologists guidelines for thyrotoxicosis and other forms of hyperthyroidism: significant progress for the clinician and a guide to future research. Thyroid. 2011;21(6):573-6.
7. Garber JR, Cobin RH, Gharib H, Hennessey JV, Klein I, Mechanick JI, et al. Clinical practice guidelines for hypothyroidism in adults: cosponsored by the American Association of Clinical Endocrinologists and the American Thyroid Association. Endocr Pract. 2012 Nov-Dec;18(6):988-1028.
8. Siemens Medical Solutions Diagnostics. Immulite Operators Manual. 600882-0001. New Jersey (US): Diagnostic Products Corporation; 2007.
9. Hoogendoorn EH, Den Hejier M, van Dijk APJ, Hermus AR. Subclinical Hyperthyroidism: to treat or not to treat? Postgrad Med J. 2004;80:394-8.
10. Bagchi N, Brown TR, Parish RF. Thyroid dysfunction in adults over age 55 years. A

study in an urban US community. Arch Intern Med. 1990;150:785-7.
11. Biondi B, Bartalena L, Cooper DS, Hegedüs L, Laurberg P, Kahaly GJ. The 2015 European Thyroid Association Guidelines on Diagnosis and Treatment of Endogenous Subclinical Hyperthyroidism. Eur Thyroid J. 2015;4(3):149-63.
12. Völzke H, Lüdemann J, Robinson DM, Spieker KW, Schwahn C, Kramer A, et al. The prevalence of undiagnosed thyroid disorders in a previously iodine-deficient area. Thyroid. 2003 Aug;13(8):803-10.
13. Favresse J, Burlacu MC, Maiter D, Gruson D. Interferences With Thyroid Function Immunoassays: Clinical Implications and Detection Algorithm. Endocr Rev. 2018;39(5):830-50.
14. Laurberg P, Vestergaard H, Nielsen S, Christensen SE, Seefeldt T, Helleberg K, et al. Sources of circulating 3,5,3'-triiodothyronine in hyperthyroidism estimated after blocking of type 1 and type 2 iodothyronine deiodinases. J Clin Endocrinol Metab. 2007 Jun;92(6):2149-56.
15. Clinical Knowledge Summaries. Hyperthyroidism. 2008. Available from: www.cks.nhs.uk [Accessed Nov, 2023]
16. Gan EH, Pearce SH. Clinical review: The thyroid in mind: cognitive function and low thyrotropin in older people. J Clin Endocrinol Metab. 2012;97(10):3438-49.
17. Tan ZS, Beiser A, Vasan RS, Au R, Auerbach S, Kiel DP, et al. Thyroid function and the risk of Alzheimer disease: the Framingham Study. Arch Intern Med. 2008 Jul 28;168(14):1514-20.
18. Canaris GJ, Manowitz NR, Mayor G, Ridgway EC. The Colorado thyroid disease prevalence study. Arch Intern Med. 2000;160(4):526-34.
19. Gibbons V, Conaglen JV, Lillis S et al. Epidemiology of thyroid disease in Hamilton (New Zealand) general practice. Aust NZ J Pub Health. 2008;32(5);421-3.

PROMJENE KONCENTRACIJA TSH, FT3 I FT4 KOD PACIJENATA SA HIPERTIREOZOM

Nafija Serdarević[1,2], Marina Ćurlin[3], Aldijana Dautbašić[2,4],
Adina Elena Stanciu[5], Dabla Pradeep[6], Azra Durak-Nalbantić[7]

[1] OJ Klinička biohemija s imunologijom, Klinički Centar Univerziteta u Sarajevu,
71 000 Sarajevo, Bosna i Hercegovina

[2] Fakultet zdravstvenih studija, Univerzitet u Sarajevu; 71 000 Sarajevo, Bosna i Hercegovina

[3] Fakultet zdravstvenih studija, Sveučilište u Mostaru; 88 000 Mostar, Bosna i Hercegovina

[4] Plava Poliklinika, 75 000 Tuzla, Bosna i Hercegovina

[5] Odjel karcinogeneze i molekularne biologije, Onkološki institut Bukurešt,
252 Fundeni, 022338 Bukurešt, Rumunjska

[6] Odjel za biokemiju, G. B. Pant Institut za poslijediplomsko medicinsko obrazovanje i istraživanje (GIPMER),
GNCTD, Delhi, Indija

[7] Klinika za srce, krvne žile i reumatske bolesti, Klinički centar Univerziteta u Sarajevu,
71 000 Sarajevo, Bosna i Hercegovina

SAŽETAK

Uvod: Poremećaji lučenja hormona štitnjače mogu biti hipertireoza (snižene razine TSH i povišene razine FT3 i FT4) i subklinička hipertireoza (snižena koncentracija TSH uz normalan FT3 i FT4).

Cilj: istražiti koncentracije hormona štitnjače (TSH, FT3 i FT4) kod pacijenata sa hipertireozom ili subkliničkom hipertireozom liječenih u Plavoj Klinici u Tuzli.

Materijali i metode: Istraživanjem je obuhvaćeno 120 bolesnika podijeljenih u tri skupine kontrolnu skupinu, skupinu s ispitanicima koji imaju hipertireozu i skupinu bolesnika sa subkliničkom hipertireozom. Analizirana je koncentracija hormona TSH, FT3 i FT4. Određivanje je izvršeno na analizatoru IMMULITE 1 Siemens, a određivanje parametara je urađeno sa imunokemijskom metodom.

Rezultati: Rezultati su pokazali za TSH je postojanje značajnih statističkih razlika između kontrolne skupine i skupine s hipertireozom ($p<0,0001$) te između kontrolne skupine i skupine sa subkliničkom hipertireozom ($p=0,0001$), a parametar FT3 pokazao je da postoji statistički značajna razlika između kontrolne skupine i skupine s hipertireozom ($p<0,0001$), te između bolesnika s hipertireozom i subkliničkom hipertireozom ($p<0,0001$). Za FT4 smo utvrdili statistički značajnu razliku između kontrolne skupine i skupine s hipertireozom ($p<0,0001$) te između skupina s hipertireozom i subkliničkom hipertireozom ($p<0,0001$).

Zaključak: Koncentracija TSH je smanjena kod hipertireoze, kao i kod subkliničke hipertireoze. Serumske koncentracije FT3 i FT4 su povišene u hipertireozi, dok je u subkliničkoj hipertireozi serumska koncentracija FT3 i FT4 u referentnom području.

Ključne riječi: tirotropin, tiroksin, TSH, FT3, FT4, hipertireoza

Osoba za razmjenu informacija: dr. sc. Nafija Serdarević, red. prof.
E-mail: serdarevicnafija@yahoo.com

KNOWLEDGE, ATTITUDE AND PRACTICE AMONG THE STUDENTS OF SCHOOL OF MEDICINE OF UNIVERSITY OF MOSTAR TOWARDS INFLUENZA VACCINATION

Katarina Martinović[1,2], Svjetlana Grgić[1,2], Monika Dalmatin Dragišić[1]

[1] Clinic for Infectious Diseases, Clinical Hospital Center Mostar, 88 000 Mostar, Bosnia and Herzegovina

[2] School of Medicine, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 04.12.2022. *Reviewed on 10.01.2023.* *Accepted on 15.12.2023.*

ABSTRACT

Introduction: Influenza is an acute, infectious disease of the human respiratory system, caused by influenza viruses. Since it is a vaccine - preventable disease, medical students as future health professionals should be involved in programs promoting the importance of flu vaccination.

Aim: Compare knowledge, attitude and practice of vaccination against influenza among students of the first and sixth year of School of Medicine of University of Mostar.

Subjects and methods: The study included a total of 81 students of the School of Medicine of the University of Mostar. The data were collected using a questionnaire that consists from demographic data of the respondents andtwenty questions with the offered answers about the knowledge, attitude and practice of vaccination against influenza.

Results: Sixth - year students showed greater knowledge about contraindications for vaccination. Both groups of students showed mainly positive attitudes about influenza vaccination. No surveyed student was vaccinated against influenza and many of them reasoned that influenza is not a serious illness.

Conclusions: Despite good knowledge and mostly positive attitudes about influenza vaccination, no student who participated in the study was vaccinated against influenza. Therefore, it would be useful for medical students to provide additional information about the importance of illness prevention, because they represent an important part of the future workforce in the health system, that will affect the global attitudes of vaccination.

Keywords: influenza, vaccination, knowledge, practice, students

Corresponding author: Katarina Martinović, MD

E-mail: katarina.martinovic@mef.sum.ba

INTRODUCTION

Flu (influenza) is an acute, infectious and contagious disease of the human respiratory system, caused by influenza viruses A, B and C. It is easily transmitted and spreads rapidly. It occurs in smaller and larger epidemics, and occasionally pandemic (1). There are three types of influenza virus: A, B, and C. Influenza A virus usually causes the most severe clinical picture. Influenza is spreading very fast and today, of all the classic infectious diseases, only it appears pandemic (2).

Influenza occurs epidemically almost every year. Since influenza is a serious disease, and for older people and chronic patients also fatal, and appears epidemiological and occasionally pandemic, public health and epidemiological measures for disease prevention and control are very important. Vaccination is the most effective way to prevent infection and serious complications caused by influenza viruses. It is recommended to be vaccinated every year, and it is especially useful for vulnerable groups of the population.The optimal time for vaccination is during October and November, but at-risk individuals can be vaccinated even after the onset of an influenza epidemic (3, 4).

Continuous change in the nature of influenza virus requires continuous global monitoring and frequent vaccine reformulation (5). Influenza vaccination reduces the incidence of serious forms of the disease, the number of hospitalizations, deaths, doctor visits, and absenteeism (3).

Healthcare workers are at high risk of contracting the influenza virus due to increased exposure to patients, and the risk further extends especially to vulnerable individuals (6). It is estimated that a quarter of healthcare workers have influenza infection in any given year, with a subsequent risk of transmission to colleagues and patients. During clinical practice, medical students are also at risk for influenza. Influenza vaccine intake by health professionals and medical students globally is low (7).

Physicians, health educators, and other health care workers are an integral part of raising community awareness, improving vaccination education, and developing campaigns to increase vaccine reception among the general population and other health care workers.

Many interventions, such as education, mobile immunization carts, vaccination champions, incentives, and required declination signature forms, have been demonstrated to improve vaccine

coverage; however, none alone or in combination have succeeded in achieving target coverage rates. Mandatory immunization policies in America, such as mandatory vaccination (all individuals must be vaccinated) and mandatory masking or vaccination (individuals must be vaccinated or wear a mask in patient-care areas), have achieved target vaccine rates and are supported by the Centers for Disease Control and Prevention (CDC) and multiple professional organizations such as the American Academy of Pediatrics and the Society for Healthcare Epidemiology of America. However, mandatory policies have been met with individual and organized resistance by healthcare providers and their unions (8).

Medical students as future health care professionals should be involved in programs to promote the importance of vaccination against influenza in the target groups and influence the current bad attitudes about vaccination, both among students who will in future carry the health care system and the impact on global attitudes about vaccination and in the wider community.

Therefore, it is crucial that students are well informed about the benefits and importance of vaccination, as this could be useful in creating more effective educational materials and plans to increase vaccination against influenza, to break myths about the harmfulness of vaccination and point to its benefits.

AIM

The aim of this paper is to:

• Examine knowledge and attitudes on influenza vaccination among the students of School of Medicine of University of Mostar;

• Determine the level of influenza prevention in medical students;

• Compare knowledge and attitudes on influenza vaccination among first and sixth - year medical students and thus assess the level of awareness of the importance of vaccination at the beginning and end of studies;

• Encourage students to receive regular vaccination and to participate in programs to promote influenza vaccination.

SUBJECTS AND METHODS

Study design

This cross - sectional study was conducted at the School of Medicine of the University of Mostar, on 30st April, 2019. The respondents are first - and sixth - year students of the Medical Faculty of the

University of Mostar. The study included all students, eighty one of them, who were present at the faculty on the day of the examination and who had previously agreed to the survey. All students who did not want to participate in the survey and those who were not present at the faculty on the day of the examination were excluded from the survey.

Data collection

After the lecture, the survey questionnaire was distributed to the students by a neutral person (an employee of the faculty), who had nothing to do with the research. The research was conducted at the same time among the above groups of students.Survey data were obtained using a survey questionnaire. Our own questionnaire was compiled with a supplement from the questionnaire by Yu Ma, Tiegang Li, Wanqi Chen, Jiandong Chen, Meixia Li, Zhicong Yang, from the article "Knowledge, Attitudes and Practices (KAP) towards seasonal influenza vaccine among young workers in South China" (9). The survey questionnaire consists of two parts. The first part includes general demographic data (age, gender, place of residence and year of study). The second part of the questionnaire assesses the knowledge and attitude about influenza vaccination and explores the practice of vaccination among students in these groups, and consists of twenty questions with offered answers.For each of the above questions, only one of the offered answers had to be circled. The survey questionnaire is completely anonymous and the information obtained was used only for the purpose of the research.

Statistical analyses

Frequency and percentage were used to display nominal variables. A chi-square test was used to analyze the nominal variables, and Fisher's exact test was used in the absence of the expected frequency. The possibility of error was accepted at $\alpha < 0.05$ and the differences between the groups were accepted as statistically significant for $p<0.05$.

RESULTS

A total of 81 respondents participated in the research, 45 first-year students and 36 sixth-year students of the School of Medicine of the University of Mostar. In the first year, 13 men were interviewed, and in the sixth year, 11 men. The study involved 32 women in the first year and 25 women in the sixth year of study. There were no significant gender differences

between years of study. All respondents belonged to the age group in the range of 18-28 years.

Differences between knowledge, attitude and practice between student groups

Sixth - year students showed a significantly higher percentage (80.6 %) of knowledge about contraindications for vaccination ($\chi2 = 18.243$, $p <0.001$), compared to first-year students, of whom 33.3 % knew the correct answer (Table 1). First-year students mostly stated that the new influenza vaccine was quadrivalent (60.8 %) and thus gave the correct answer, which proved to be statistically significant compared to the answers of sixth-year students ($\chi2 = 13,803$, $p = 0.002$). Only 30.6 % of sixth-year students opted for the same answer. There were no significant differences in the other variables shown in Table 1.

Table 1. - *Differences in knowledge and attitudes about influenza vaccine between first- and sixth-year students of the School of Medicine of the University of Mostar 1.*

	Year of study				χ^2	p
	1		6			
	N	%	N	%		
Influenza vaccine by composition is:					0,227	0,634
live attenuated	21	46,7	14	38,9		
inactivated	24	53,3	22	61,1		
The influenza vaccine can cause the following side effects					3,359	0,352*
redness, swelling and pain at the application site	2	4,4	3	8,3		
elevated body temperature (fever)	8	17,8	4	11,1		
headache and muscle pain	3	6,7	0	0,0		
all previous answers are correct	32	71,1	29	80,6		
Should pregnant women be vaccinated against influenza?					0,006	0,941
Yes	24	53,3	18	50,0		
No	21	46,7	18	50,0		
What are the contraindications for influenza vaccination?					18,243	**<0,001***
egg allergy	2	4,4	0	0,0		
acute febrile conditions	16	35,6	3	8,3		
severe side effect after previous administration of the vaccine	12	26,7	4	11,1		
all previous answers are correct	15	33,3	29	80,6		
The latest influenza vaccine is:					13,803	**0,002***
bivalent	2	4,4	2	5,6		
trivalent	9	20,0	12	33,3		
quadrivalent	31	68,9	11	30,6		
pentavalent	3	6,7	11	30,6		
What population group needs an influenza vaccine?					1,931	0,886*
persons over 65 years of age	1	2,2	0	0,0		
children (from 6 months to 5 years)	1	2,2	1	2,8		
chronic patients	2	4,4	1	2,8		
medical staff	3	6,7	1	2,8		
all previous answers are correct	38	84,4	33	91,7		
*Fisher's exact text						

Sixth - year students knew, in a significantly higher proportion, that influenza vaccination was recommended from October to December (66.7 %). This question was answered correctly by 46.7 % of first - year students (Table 2). A significant part of first-year students answered “I don't know” to this question (33.3 %).Thus, there is a statistically significant difference between these groups of students in the knowledge of the time of year at which influenza vaccination is recommended ($\chi2$ = 11.773, p= 0.009). In the other variables shown in Table 2, such as the attitude about the need for vaccination each year, the efficacy and safety of the vaccine, etc., there were no significant differences.

***Table 2.** - Differences in knowledge and attitudes about the influenza vaccine between first- and sixth-year students of the School of Medicine of the University of Mostar 2.*

	Year of study				χ^2	p
	1		6			
	N	%	N	%		
In which period of the year is vaccination against influenza recommended?					11,773	**0,009***
from January to March	4	8,9	8	22,2		
from April to June	3	6,7	0	0,0		
from July to September	2	4,4	1	2,8		
from October to December	21	46,7	24	66,7		
I do not know	15	33,3	3	8,3		
Do you think that vaccination against influenza is required every year?					0	1
Yes	31	68,9	25	69,4		
No	14	31,1	11	30,6		
Are you worried you might get the flu?					3,561	0,213*
Very worried	0	0,0	3	8,3		
worried	6	13,3	5	13,9		
I'm not worried	39	86,7	28	77,8		
Have you ever heard of an influenza vaccine before?					0,450	0,375*
Yes	41	91,1	35	97,2		
No	4	8,9	1	2,8		
Do you think that the flu vaccine can protect you from getting the disease?					0,237	0,454*
Yes	40	88,9	34	94,4		
No	5	11,1	2	5,6		
To what extent do you think the influenza vaccine is safe?					3,297	0,115*
it is safe and has no side effects	3	6,7	6	16,7		
it is basically safe, but side effects are possible	42	93,3	29	80,6		
it is not safe and has obvious side effects	0	0,0	1	2,8		
Would you advise your family and friends to get vaccinated against influenza?					0,088	0,767
Yes	30	66,7	26	72,2		
No	15	33,3	10	27,8		
*Fisher's exact text						

Table 3 shows the practice of influenza vaccination among first- and sixth-year students of the School of Medicine of the University of Mostar. The results show that no first- or sixth-year students received the influenza vaccine (n=0). As a reason for

not being vaccinated, 22.2 % of first-year students and 19.4 % of sixth-year students chose the answer "I think that influenza is not a serious disease." The largest number of students from both groups decided to answer "other reasons". There were no statistically significant differences in the other variables in this table.

***Table 3. -** Differences in the practice of influenza vaccination between first- and sixth-year students of the School of Medicine of the University of Mostar.*

	Year of study				χ^2	p
	1		6			
	N	%	N	%		
Have you been vaccinated against influenza in the past?					-	-
No	45	100,0	36	100,0		
If the answer to question 14 is "no", what are your reasons?					2,185	0,756*
I don't think the flu is a serious illness	10	22,2	7	19,4		
the vaccine is unsafe	0	0,0	1	2,8		
limited effect of the vaccine	5	11,1	2	5,6		
I don't know where I can get vaccinated	3	6,7	2	5,6		
other reasons	27	60,0	24	66,7		
Do you have any intention of vaccinating against influenza in the future?					1,161	0,598*
Yes	21	46,7	19	52,8		
No	2	4,4	3	8,3		
Maybe	22	48,9	14	38,9		
If your answer to the previous question is "no", what are your reasons?					1,234	1*
high costs	0	0,0	1	33,3		
side effects and poor safety	1	50,0	1	33,3		
other reasons	1	50,0	1	33,3		
Do you think you belong to the population group that is recommended to be vaccinated against influenza?					0,533	0,465
Yes	24	53,3	23	63,9		
No	21	46,7	13	36,1		
Do you think it is necessary to introduce an obligation to vaccinate against influenza in BiH?					0,016	0,898
Yes	27	60,0	23	63,9		
No	18	40,0	13	36,1		
*Fisher's exact text						

DISCUSSION

This study compared the knowledge and attitude of first- and sixth-year students of the School of Medicine of the University of Mostar on influenza vaccination. Also, the rate of influenza vaccination was investigated in the same groups of students. The results of this study, which included a total of 81 students, showed that, in most questions, there was no significant difference in knowledge and attitudes about influenza vaccination between first- and final-year medical students. There is a significant difference in knowledge about contraindications to receiving the vaccine: one third of first-year students knew all the contraindications to vaccination, while most of sixth-year students answered this question correctly. Better knowledge on the time of year at which vaccination is recommended was also demonstrated by sixth-year students. Two thirds of them knew that vaccination was recommended in the period from October to December. The same question was answered correctly by half of first-year students. The results obtained coincide with the results of a survey among medical students in Spain, where it was found that clinical students have better knowledge of influenza vaccination than preclinical students (10). When asked about the awareness of students that they belong to the population group for which influenza vaccination is recommended, almost half of first-year students and one third of sixth-year students answered positively. This coincides in part with a survey at the School of Medicine in Warsaw, where almost a half of students are aware of belonging to the group recommended for vaccination, and with a survey in Tehran, where the percentage is 39.8 %. A higher percentage of awareness of the need for influenza vaccination (77.9 %) was found among medical students in Strasbourg (11).

The results of this study showed that none of the surveyed students received the influenza vaccine, which differs significantly from many previous studies based on medical students (12-17). Most students cite the opinion that influenza is not a serious disease and other reasons as the reason why they have not been vaccinated in the past, while a smaller part of them do not know where they can be vaccinated. These results partially coincide with the results of a study in Frankfurt, where a quarter of unvaccinated students believe that influenza is not a serious disease (18). A small number of respondents believe that the vaccine is

unsafe or has a limited effect. This is in direct contrast to the information provided to students during their studies and the information provided by public health campaigns. They make it clear that an individual is not at risk of getting the disease from receiving an inactivated influenza vaccine and that the risk of serious side effects is very low in most individuals. Even with the abundance of information available in and out of the lecture halls, some respondents had misconceptions about the safety of vaccination. Vaccination is associated with a significant reduction in doctor visits, better school performance, and fewer days of absence from school or work. Thus, immunization provides the best preventive strategy against the influenza virus. Despite this, even the most effective vaccine is ineffective if people do not want to be vaccinated. Unfortunately, the public is distrustful of influenza vaccines. Multiple studies have shown that the motivation for refusing a new influenza vaccine is the fear of side effects. Many people also believe that vaccination will not be effective or that new vaccines have not been adequately tested and can be harmful and weaken the immune system. Others are not worried about influenza and simply do not want the vaccine (14, 19).

A study at the School of Medicine in Bari (Italy) showed that 20.9 % of medical students have ever received a vaccine (20). A study conducted in China on knowledge, attitudes and practice of influenza vaccination showed that the incidence among medical students is very low (less than 10%) and the main reasons for this were insufficient knowledge about the vaccine, fear of side effects and the belief that the vaccine is unnecessary (21). A similar survey among healthcare professionals in India found that only 4.4 % of them had ever received the flu vaccine, although most felt that influenza posed a potential danger to them or their environment. Some of the reasons were ignorance of vaccine availability, skepticism about efficacy, fear of side effects, belief that vaccination programs are profit-motivated, etc. (22). The results of my research have shown that more than 90 % of medical students in Mostar have a positive attitude about the effectiveness of vaccines in terms of disease protection and mostly consider the vaccine safe, which largely coincides with other studies (9, 13). However, students do not decide to receive the vaccine. A possible reason for a significantly lower rate of influenza vaccination among medical students in Mostar than for medical students in other

countries lies in the fact that regular influenza vaccination campaigns are routine in developed countries, while in Bosnia and Herzegovina such campaigns are mainly initiatives of certain doctors and some hospitals, not national policies and recommendations of most public health institutions. Although medical students should be informed about vaccination during their education, it cannot be presumed that they will have positive views and beliefs about the vaccine against seasonal flu. In addition, the study has shown that good knowledge of influenza and vaccination does not necessarily mean an increase in the vaccination practice itself. Views on the benefits and risks of vaccination, as well as misperceptions, can play an important role in the decision to receive the vaccinee. The results of this study indicate that it would be useful to provide additional information intended for medical students, with the aim of informing about the safety of vaccines, the importance of disease prevention and possible complications. Strengthening students'educational efforts seems crucial, as influencing attitudes at an earlier age can be simpler. Medical students represent an important part of the future workforce in the health care system, which can be an important factor in providing accurate and clear health information, including training on the importance and benefits of vaccination, both for the individual and for the general community. Therefore, increasing the use of influenza vaccines in this population, informing and correcting false attitudes may be useful in creating more effective educational material and plans to increase the incidence against influenza, in order to break the vaccination myths.

It is important to take into account that the effectiveness of vaccines can play a role in the decision-making process of those who do not want to be vaccinated, which may be particularly pronounced among populations informed about the effectiveness of the vaccine, such as healthcare professionals. Further research is needed to determine whether the knowledge of the effectiveness of the vaccine influences the vaccination decision itself, in order to establish a more comprehensive understanding of why some do not want to be vaccinated.

CONCLUSIONS

Based on the results, it can be concluded that there is a statistically significant difference in knowledge about contraindications for receiving the vaccine and about the time of year at which

influenza vaccination is recommended, with sixth-year students showing greater knowledge compared to the first - year. First-year students are more likely to know that the latest influenza vaccine is quadrivalent, which has proven to be statistically significant. Both groups of students have positive attitudes about influenza vaccination. Despite good knowledge and mostly positive attitudes about vaccination, none of the surveyed students was vaccinated against influenza. Students should be provided with additional information on the importance of vaccination and included in programs to promote influenza vaccination in target groups.

REFERENCES

1. Ibrahimpašić N. Respiratorne virusne bolesti. U: Krkić-Dautović S. Infektologija. Sarajevo/Tuzla: Medicinski fakultet/Asocijacija infektologa u Bosni i Hercegovini, 2011; 321-4.
2. Kuzman I. Infektologija za visoke zdravstvene škole. Zagreb: Medicinska naklada; 2012. 65-7.
3. Graham Worrall, MBBS MSc MRCGP FCFP. Influenca. CanFamPhysician. 2008; 54:415–16.
4. Fleming DM. Influenza diagnosis and treatment: a view from clinical practice. Philos Trans R SocLond B Biol Sci. 2001; 356:1933–43.
5. World Health Organization [WHO]. Influenza. Vaccines. 2019. Available at: https://www.who.int/influenza/vaccines/en/
6. World Health Organization [WHO]. Influenza (Seasonal). 2018. Available at: https://www.who.int/en/news-room/fact-sheets/detail/influenza-(seasonal)
7. Walker L, Newall A, Heywood AE. Knowledge, attitudes and practices of Australian medical students towards influenza vaccination. Vaccine. 2016; 34:6193-9.
8. Ghandora H, Halperin DM, Isenor JE, Taylor BA, Fullsack P, DiCastri AM, i sur. Knowledge, attitudes, behaviours, and beliefs of healthcare provider students regarding mandatory influenza vaccination. Hum VaccinImmunother. 2019; 15:700–709.
9. Ma Y, Li T, Chen W, Chen J, Li M, Yang Z. Knowledge, Attitudes and Practices (KAP) toward seasonal

influenza vaccine among young workers in South China. Hum VaccinImmunother. 2018;14:1283–93.

10. Hernández-García I, Domínguez B, González R. Influenza vaccination rates and determinants among Spanish medical students. Vaccine. 2012;17:1-2.
11. Machowicz R, Wyszomirski T, Ciechanska J, Mahboobi N, Wnekowicz R, Obrowski M, i sur. Knowledge, attitudes, and influenza vaccination of medical students in Warsaw, Strasbourg, and Teheran. Eur J Med Res. 2010;15:235–40.
12. Milunic SL, Quilty JF, Super DM, Noritz GH. Patterns of influenza vaccination among medical students. InfectControlHospEpidemiol. 2010 ;31:85-8.
13. Ali S, Khakoo R, Fisher M, Hobbs GR. An assessment of influenza vaccination among health profession students. Scand J InfectDis. 2007;39:822-5.
14. Toy WC, Janosky JE, Laird SB. Influenza immunization of medical residents: knowledge, attitudes, and behaviors. Am J InfectControl. 2005;33:473-5.
15. Banaszkiewicz A, Talarek E, Śliwka J, Kazubski F, Małecka I, Stryczyńska-Kazubska J, i sur. Awareness of Influenza and Attitude Toward Influenza Vaccination Among Medical Students. AdvExp Med Biol. 2016;934:83-8.
16. Wodi AP, Samy S, Ezeanolue E, Lamour R, Patel R, Budnick LD, i sur. Influenza vaccine: immunization rates, knowledge, and attitudes of resident physicians in an urban teaching hospital. InfectControlHospEpidemiol. 2005 ;26:867-73.
17. Lee SI, Aung EM, Chin IS, Hing JW, Mummadi S, Palaniandy GD, i sur.Factors Affecting Medical Students' Uptake of the 2009 Pandemic Influenza A (H1N1) Vaccine. InfluenzaResTreat. 2012;2012:753164.
18. Wicker S, Rabenau HF, von Gierke L, François G, Hambach R, De Schryver A. Hepatitis B and influenza vaccines: important occupational vaccines differently perceived among medical students. Vaccine. 2013;31:5111-7.
19. Ramsey MA, Marczinski CA. College Students’ Perceptions of

H1N1 Flu Risk and Attitudes toward Vaccination. Vaccine. 2011;29:7599–601.

20. Gallone MS, Gallone MF, Cappelli MG, Fortunato F, Martinelli D, Quarto M, i sur. Medical students' attitude toward influenza vaccination: Results of a survey in the University of Bari (Italy). Hum VaccinImmunother. 2017;13:1937–41.
21. Tuohetamu S, Pang M, Nuer X, Mohemaiti M, Qin Y, i sur. The knowledge, attitudes and practices on influenza among medical college students in Northwest China. Hum VaccinImmunother. 2017;13:1688–92.
22. Bali NK, Ashraf M, Ahmad F, Khan UH, Widdowson MA, Lal RB, Koul PA. Knowledge, attitude, and practices about the seasonal influenza vaccination among healthcare workers in Srinagar, India. InfluenzaOtherRespirViruses. 2013 ;7:540-5.

ZNANJE, STAV I PRAKSA CIJEPLJENJA PROTIV INFLUENCE MEĐU STUDENTIMA MEDICINSKOG FAKULTETA SVEUČILIŠTA U MOSTARU

Katarina Martinović[1,2], Svjetlana Grgić[1,2], Monika Dalmatin Dragišić[1]

[1]Klinika za infektivne bolesti, Sveučilišna klinička bolnica Mostar, 88 000 Mostar, Bosna i Hercegovina

[2]Medicinski fakultet, Sveučilište u Mostaru, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Influenca je akutna, infektivna bolest dišnog sustava čovjeka uzrokovana virusima influence. Budući da se radi o cijepno-preventabilnoj bolesti, studenti medicine kao budući zdravstveni radnici trebali bi se uključiti u programe promicanja važnosti cijepljenja protiv influence.

Cilj: Usporediti znanje, stavove i praksu cijepljenja protiv influence među studentima prve I šeste godine Medicinskog fakulteta Sveučilišta u Mostaru.

Ispitanici i metode: Istraživanje je obuhvatilo ukupno 81 studenta Medicinskog fakulteta Sveučilišta u Mostaru. Podaci su prikupljeni pomoću upitnika. Prvi dio upitnika sadrži opće demografske podatke ispitanika, a drugi dio sadrži dvadeset pitanja s ponuđenim odgovorima o poznavanju, stavu i praksi cijepljenja protiv influence.

Rezultati: Studenti šeste godine pokazali su veće znanje o kontraindikacijama za cijepljenje. Obje skupine studenata pokazale su uglavnom pozitivne stavove o cijepljenju, Nijedan ispitani učenik nije cijepljen protiv influence, a mnogi od njih obrazlažu da influence nije ozbiljna bolest.

Zaključak: Unatoč dobrom poznavanju i uglavnom pozitivnim stavovima o cijepljenju protiv influence, niti jedan student koji je sudjelovao u istraživanju nije bio cijepljen protiv iste. Stoga bi bilo korisno da se studenti medicine dodatno informiraju o važnosti prevencije bolesti jer oni predstavljaju važan dio buduće radne snage u zdravstvenom sustavu koja će utjecati na globalne stavove o cijepljenju.

Ključne riječi: influenca, cijepljenje, znanje, praksa, studenti

Autor za korespondenciju: Katarina Martinović, dr. med.

E-mail: katarina.martinovic@mef.sum.ba

THE CONNECTION BETWEEN QUALITY AND SELF-ESTEEM IN PATIENTS WITH BREAST CANCER

Marija Brajković & Dragan Babić

Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 06.09.2023. Reviewed on 23.11.2023. Accepted on 20.12.2023.

ABSTRACT

Greater insight into patient's quality of life can help researchers and clinicians to use quality of life as a measure for treatment outcomes.

Breast cancer is a stressful and causes extremely difficult physical, emotional and social challenges. In addition to concerns about whether breast cancer will metastaize and the impact of treatment side effects on daily life, breast cancer patients are more likely to experience depression than patients with other types of cancer. Surgery, chemotherapy, radiation therapy, and other forms of treatment can cause changes in a patient's physical apperance, leading to anxiety, pain, depression, and low self-esteem.

Self-esteem is determined by positive or negative feelings as well assatisfaction and confidence in oneself. It also refers to the belief that one is capable of coping with life's challenges and is worthy of happiness. One study found that self-esteem is a key factor in the growth and return to normal life in breast cancer patients. Low self-esteem has been found to be strongly associated with depression and other psychological problems.

The diagnosis and treatment of breast cancer encompasses a critical period in a woman's life during which she suffers from anxiety of the cancer spreading to other parts of the body, uncertainty about the future, anxiety and depression, anger, frustration, pain, changes in self-image, fear of losing femininity and changed confidence. Advances in the diagnosis and treatment of breast cancer, pathological differences between this disease and other chronic diseases, changes in self-esteem, the development of negative emotions, the experience of everyday problems at work and in interpersonal relationships, and the development of anxiety can lead to changes in the quality of life of patients with breast cancer.

The objective of this study is to explain the connection between the quality of life and self-esteem of breast cancer patients.

Keywords: connection, quality of life, self-esteem, cancer, breast

Correspondence: Marija Brajković, Master of Radiological Technology, Ph. D. student

E-mail: marija.brajkovic@fzs3.sum.ba

INTRODUCTION

Breast cancer is the most commom neoplasm in women worldwide, and is a considered a global public health problem. Among women with breast cancer, some of the most common psychological symptoms in adjusting to the disease are decreased self – esteem and distored body image. Althought there are numerous studies aimed at promoting different psychological variables, quality of life, body image and self-esteem are often considered separately despite their connection and importance for the disease process. The choice of treatment method for breast cancer depends on the stage of the disease (extent of the disase), characteristics of the tumor (pathohistological findings) and the general condition of the patient. The spread of breast cancer, or the stage of the disease, is determined by the size of the primary tumor, involvement of regional lymph nodes and the presence of distant metastases. Breast cancer is most often treated with different combinations of several types of treatment. Certain treatments are carried out simultaneously, and some are carried out sequentially, one after the other. It is also important to emphasize that the treatment plan may change depending on how successful it is. The decision on the best method of treatment will be made by the oncologist in agreement with the patients.

The objective is to explain the connection between the quality of life and self- esteem of breast cancer patients.

QUALITY OF LIFE

Quality of life has become a major topic in mental health care. This is related to a number of fundamental changes in mental health care in the 1990s. The focus in mental health has shifed from institutionalizing the patient to community care (1).

The patient's own perspective and patient-centered care have become much more important, and improving general well-being is now considered as importantas the absence of disease symptoms. Finally, improvement in quality of life is considered an important outcome of treatment (2). Overall, these changes have led to more attention being paid to the impact of psychiatric disorders on daily functioning, well- being, and environmental resources. Althought there is no universal definition of quality of life, it is generally accepted that it contains objective as well as subjective dimensions (3).

Objective dimensions of quality of life refer circumstances such as living situation or finances. The subjective dimensions of

quality of life refer to the feeling of well-being and satisfaction. Previous research has focused on discovering the relationship between objective and subjective quality of life, which appears to be weak to moderate (4).

Narvez et al. (5) found that the correlation between objective and subjective quality of life is low. Pribea et al. (6) showed higher subjective quality of life scores in older patients, those with paid work and patients with lower symptom scores. However, the of factors other than age differed between diagnostic groups. They also found a consistent association between psychiatric symptoms and lower subjective quality of life. Numerous objective and subjective factors play a role in the quality of life of patients. Counterintuive findings about subjective and objective quality of life make it difficult to understand the relationship between these dimensions. There are two reasons why a better understanding of this relationship is important. First, insight into this relationship and other factors that might affect quality of life is useful for directing treatment toward improving subjective quality of life. Second, greater insight may help researchers and clinicians use quality of life as a mesure of treatment outcome.

BREAST CANCER

Breast cancer is one of the most common neoplasms in women, accounting for 16 % of all cancers in women and with more than 1.2 million case diagnosed every year in the world, it is considered a global public health problem. Due to improvements in diagnosis and treatment of the disease, breast cancer has a survival rate of 90 % at 5 years, and about 80 % at 10 years, although survivors face multiple mental and physical health challenges (7).

Therefore, health professionals are concerned about the quality of life of female survivors, including the physical, emotional, psychological, and social aspects associated with trauma and adjustement to breast cancer (8).

It is common that systematic treatment of women with breast cancer, such as chemotherapy, hormonal treatment and radiotherapy, harms the quality of life of patients. These harmful effects are physical (eg pain, vomiting and sleep disturbances) and psychological (bad perception of self-image, depression, anxiety, etc.). These problems may persist for a long time after treatment is completed. For example, when women with breast cancer start chemotherapy, they face aspects such as hair loss, eyelash loss, weight loss, etc. These physical losses and changes produce cognitive, behaviral and emotional

changes, which affect women's well-being, and self-esteem. The reason for this is that for many women, self-confidence is based solely on the perception of their own body, so a bad perception of it can lead to a drop in self-esteem and at the same time negatively affect a person's daily life (9).

Maligant disease is usually associated with concepts such as pain, fear, hopelessness, and death. The patient feels fear of death, fear of dependence of family, spouse and doctor, fear of changes in physical apperance, which is often associated with sexual dysfunction, fear of not being able to perform tasks at work, school or in free time, fear of breaking interpersonal relationships, and ulimately, the fear of pain in later stages of the disease. In this vortex of fears and emotions, different reactions devolp in the patient. Psychological reactions to the knowledge of the disease are most often expressed in the form of depression and anxiety (10).

Among women with breast cancer, the most common psychological problems in adjusting to the disease include mood disorders, increased levels of distress, distored body image, and reduced self-esteem. In this sense, body image (BI) relates to the perception, evaluation and derived feelings about body appearance and physical functioning, considering it a part of selfconcept (11).

SELF - ESTEEM

Self-esteem is related to self-concept, and refers to attitudes or feelings of self-satisfaction, based on an assessment of one's own characteristics (12).

Self-esteem is determined by positive or negative feelongs as well as satisfaction and confidence in oneself. It also refers to the belief that one is capable of coping with life's challenges and is worthy of happiness (13).

Self-esteem reflects what people feel about themselves and is a multifaceted construct related to other psychological constructs such as self-image, self- concept, self-perception, self-confidence, self-acceptance, self-esteem and self-worth. Research suggests that self-esteem is related to physical well-being and psychological problems (14).

Healthy self-esteem is described as holdnig a balanced view of oneself in which one recognizes and accepts weaknesses and appreciates own strengths and good qualities. Small but significant gender differences were found, with lower levels of self-esteem in women (15).

Findings from prospective studies suggest that self-esteem is relatively stable throughout life. It is widely believed that there are many benefits to embracing a self-view. High self-esteem appears to predict success and well- being in various

areas of life such as relationships, work, and health (16).

Low self-esteem in adolescence, on the other hand, is associated with a higher risk of mental health problems, substance dependence, and lower levels of life and relationship satisfaction in adulthood. However, the relationship between self-esteem and relative outcomes (eg. performance, interpesonal functioning, lifestyle, and happiness) is not always straight-forward (17).

The association between low self-esteem and psychiatric disorders indicates that low self-esteem is in important transdiagnostic construct. The association between low self-esteem and symptoms of mental disorders may be bitercional. A meta-analysis by Sowislo and Orth (16) found that lack of self-confidence predicted depression, while the direction was unclear for anxiety disorders. Self-esteem can represent a vulnerability to problems or disorders such as depression, social anxiety, eating disorders and substance use, but it can also be a product of psychiatric disorders. Symptoms of depression, for example, can reduce self-esteem in people with mental disorders (18).

THE RELATIONSHIP OF QUALITY OF LIFE AND SELF-ESTEEM IN BREAST CARCINOMA

In psychological research, the quality of life is investigated as a complex subjective experience of a person that depends on the objective circumstances in which they lives (social, material, work, environmental, etc.), their personality, interpretation and experience of the real situation, and the system of values and expectations. The quality of life in medicine is most often determined according to the degree of preserved functions of the patient (19).

Quality of life is multidimensional, depending on general health, psychological status, degree of independence in performing daily activities, social relationships, environment and the possibility of realizing personal goals. Health status is only a fraction of what is included in the category of quality of life, describing only the physical and psychological (emotional) aspect. One study showed that self-esteem is a key factor in the growth and return to normal life in breast cancer patients (20). Low self-esteem has been found to be strongly associated with depression and other psychological problems (21).

Mental adaptation to cancer is a psychological response to coping with cancer that involves adopting strategies to cope with life-threatening situations. This

adjustment can be maladaptive or adaptive and is influenced by the patient's age, personality traits, religious attitudes, family support, social contexts, and the attitudes of their family and health care providers (22).

Studies show that maladaptive mental adjustment such as helplessness-hopelessness is negatively related to physical, emotional, and functional well-being, increases with anxiety and depression, and affects quality of life (23).

The scientific literature highlights the relationship between ST and KD: its chronic nature, its epidemiological importance and the significant psychological and social connotations it has for women due to the importance of the breast to them. Part of this importance lies in the association between female breasts and the idea of femininity dictated by social and cultural systems, which emphasize the ideal of beauty for women (i.e. health, youth and symmetry). For most women, breasts are one of the elements that define them, and losing them would mean losing their femininity. Moreover, female breasts are associated with the sphere of sexuality, physical attractiveness, motherhood and breastfeeding. Therefore, for many women suffering from this disease, may mean that they give up their desire to be mothers (24).

It has also been scientifically proven that the type of surgical intervention used is a relevant factor for ST in women suffering from this disease. When the treatment involves a masectomy, the situation becomes more difficult, because the woman has to face a significant loss of body. In this regard, women with KD who have had a mastectomy may show emotional instability, a reduced perception of physical attractiveness, a decrease in self-esteem, and disturbances in partner relationships (25).

It was also found that women preparing for late reconstruction were more dissatisfied with their physical appearance than those with immediate reconstruction. Both mastectomy and breast reconstruction or implant patients reported lower satisfaction with their breasts, ST, and sexual functioning than those who underwent breast conservation therapy or autologous breast reconstruction (26).

In addition to these influences and their consequences, these women also have to start a completely different life by adjusting to other routines and activities. Therefore, it is necessary to promote the intended actions in order to achieve adequate adaptation to the changes that will be experienced. In this sense, it is important to work on the self-esteem and physical appearance of female patients due to the negative impact of KD on ST and

female self-esteem, as well as its importance in the disease process (27).

Group interventions are a powerful therapeutic tool that promotes personal interactions, an important element of psychological development. They are effective in providing emotional support and motivation and in reducing anxiety and depression by offering the opportunity to learn how other people have successfully managed the problems caused by cancer. However, there are numerous interventions aimed at promoting ST and self-esteem independently, but not together (28).

The most recent studies focused on improving self-esteem with other outcome variables are: (I) Group therapies: self-esteem/social skills therapy and cognitive-behavioral therapy and a randomized educational trial (29,30);

(II) Physical activity therapies: Physical activity intervention, exercise program interventions and self-controlled moderate-intensity walking intervention at home (31),

(III) Spiritual interventions: mindfulness-based program (32),mind-body Qigong exercises and RIME intervention (relaxation, mental imagery, spirituality) (33).

At our university, other studies have been organized that connect the quality of life and cancer patients.

Šimić et al. thus investigated the resolution and quality of life in oncology patients, and stated that various factors such as diagnosis, process and side effects of treatment, psychological and social difficulties can significantly impair the quality of life. Due to reduced quality and satisfaction of life, affected persons have difficulties in objective and subjective well-being, making decisions important for treatment, maintaining social roles, coping with malignant disease and daily functioning (34).

Subjects treated with radiotherapy achieved statistically significantly higher results on the subscales of quality of life: mental health, social relations and environment. No statistically significant correlations were found between the level of resistance and results in the domains of quality of life (35).

Korda-Vidić et al. have investigated the influence of the relationship between breast cancer in women and stresscaused by traumatic experiences during the war in BiH. They found that women with breast cancer had statistically significantly more traumatic war experiences and thus more stress than women in the control group. The following conclusions are also noteworthy: 39% of the women in the study group were younger than 50 years old when they were diagnosed with breast cancer. Only one woman received

psychosocial care as part of breast cancer treatment. High mean age of physiological menstrual loss (≥50), longer fertile period, as well as smoking habit are statistically more present risk factors for breast cancer (36).

CONCLUSION

Self-esteem is positively correlated with mental adjustment in breast cancer patients. Older people with religious beliefs, were employed, had a lower stage of cancer and fewer symptoms of distress showed more effective mental adjustment. Patients' self-confidence, cancer stage, performance status, and pain symptoms were found to directly influence mental adjustment.

A disturbed body image, the presence of depressive and anxiety symptoms, a lower level of self-esteem and inadequate social support from a partner are associated with a lower quality of life. Interventions are crucial for self-esteem of women with cancer and can significantly contribute to their recovery.

REFERENCES

1. Thornicroft G, Deb T, Henderson C. Community mental health care worldwide: Current status and further developments. World Psychiatry. 2016;15:11.
2. Prigent A, Simon S, Durand-Zaleski I, Leboyer M, Chevreul K. Quality of life instruments used in mental health research: Properties and utilization. Psychiatry Res. 2014;215:8.
3. Van Hecke N, Claes C, Vanderplasschen W, De Maeyer J, De Witte N, Vandevelde S. Conceptualisation and measurement of quality of life based on Schalock and Verdugo’s model: A cross-disciplinary review of the literature. Soc. Indic. Res. 2017;137:17.
4. Fakhoury WKH, Priebe S. Subjective quality of life: It’s association with other constructs. Int. Rev. Psychiatry. 2002;14:6.
5. Narvaez J.M, Twamley E.W, McKibbin C.L, Heaton R.K, Patterson T.L. Subjective and objective quality of life in schizophrenia. Schizophr. Res. 2008;98:8.
6. Priebe S, Reininghaus U, McCabe R, Burns T, Eklund M, Hansson L, Junghan U, Kallert T, Van Nieuwenhuizen C, Ruggeri M. et al. Factors influencing subjective quality of life in patients with schizophrenia and other mental disorders: A pooled analysis. Schizophr. Res. 2010;121:8.

7. Bray F, Ferlay J, Soerjomataram I. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA Cancer J. Clin. 2018;68:394–424.
8. Martino ML, Lemmo D, Gargiulo A, Barberio D, Abate V, Avino F, Tortoriello R. Underfifty women and breast cancer: Narrative markers of meaning-making in traumatic experience. Front. Psychol. 2019;10:618.
9. Bratovcic V, Mikic B, Kostovski Z, Teskeredzic A, Tanovic I. Relations between Different Dimensions of Self-Perception, Self-Esteem and Body Mass Index of Female Students. Int. J. Morphol. 2015;33:1338–1342.
10. Babić D et al. Psychology in medicine and healthcare. Mostar: University of Mostar: 2020.
11. Taylor SE. editor. Psicología de la Salud. 6th ed. McGraw Hill Interamericana; México, México: 2007. Manejo de enfermedades crónicas; pp. 286–312.
12. Davis C, Tami P, Ramsay D, Melanson L, MacLean L, Nersesian S, Ramjeesingh R. Body image in older breast cancer survivors: A systematic review. Psychooncology. 2020;29:823–832.
13. Kaplan JB. Aesthetic self-esteem. Plast. Surg. Nurs. 2015;35:33–39.
14. Sowislo JF, Orth U. Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychol. Bull.* 2013;139: 213–240.
15. Kling KC, Hyde JS, Showers CJ, Buswell BN. Gender differences in self-esteem: a meta-analysis. *Psychol. Bull.* 1999;125: 470–500.
16. Orth U, Robins RW. The development of self-esteem. *Curr. Dir. Psychol. Sci.* 2014;23: 381–387.
17. Baumeister RF, Campbell JD, Krueger JI, Vohs KD. Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychol. Sci. Public Interest.* 2003;4: 1–44.
18. Burwell RA, Shirk SR. Self processes in adolescent depression: the role of self-worth contingencies. *J. Res. Adolesc.* 2006;16: 479–490.
19. Šimičić M, Franjić D, Babić D. Depression and quality of life in women with breast cancer. Health Gazette. 2022;8(1):59-67.
20. Mustian KM, Katula JA, Gill DL, Roscoe JA, Lang D, Murphy K. Tai Chi Chuan, health-related quality of

life and self-esteem: A randomized trial with breast cancer survivors. Support. Care Cancer. 2004;12:871–876.

21. Yu J, Dong H, Wu Q, Yang Y, Pi H. Factors associated with low self-esteem among patients with hematologic malignancies: A cross-sectional study. Front. Psychiatry. 2021;12:683894.
22. Hernández R, Calderon C, Carmona-Bayonas A, Rodríguez Capote A, Jara C, Padilla Álvarez A. et al. Differences in coping strategies among young adults and the elderly with cancer. Psychogeriatrics. 2019;19:426–434.
23. Kugbey N, Meyer-Weitz A, Oppong Asante K. Mental adjustment to cancer and quality of life among women living with breast cancer in Ghana. Int. J. Psychiatry Med. 2019;54:217–230.
24. Villarreal-Garza C, Martinez-Cannon BA, Platas A, Mohar A, Partridge AH, Gil-Moran A, Lopez-Aguirre YE. Fertility concerns among breast cancer patients in Mexico. Breast. 2017;33:71–75.
25. Bardot J, Magalon G, Mazzola RF. History of breast cancer reconstruction treatment. Ann. Chir. Plast. Esthet. 2018;63:363–369.
26. Lagendijk M, van Egdom LSE, van Veen FEE, Vos EL, Mureau MAM, van Leeuwen N. et al. Patient-reported outcome measures may add value in breast cancer surgery. Ann. Surg. Oncol. 2018;25:3563–3571.
27. Vicente Pardo JM, López-Guillén García A. Problemas y factores psicológicos en el retorno al trabajo tras incapacidad temporal prolongada por cáncer de mama. Med. Segur. Trab. 2017;63:245–259
28. Gottlieb BH. Marshalling Social Support: Format, Processes and Effects. Sage; Newbury Park, CA, USA: 1988.
29. Bellver-Pérez A, Peris-Juan C, Santaballa-Beltrán A. Effectiveness of therapy group in women with localized breast cancer. Int. J. Clin. Health Psychol. 2019;19:107–114.
30. Daneshvar M, Vakilian K, Zadeh-Emran AH, Zadeh RH. The Effect of ACT on Self-Esteem and Self-efficacy of Women with Breast Cancer in Iran. Curr. Wom. Health Rev. 2020;16:74–80.
31. Gokal K, Munir F, Wallis D, Ahmed S, Boiangiu I, Kancherla K. Can physical activity help to maintain cognitive functioning and psychosocial well-being among breast cancer patients treated with chemotherapy? A randomised controlled trial: Study

protocol. BMC Public Health. 2015;15:414.

32. Franco C, Amutio A, Mañas I, Sánchez-Sánchez LC, Mateos-Pérez E. Improving psychosocial functioning in mastectomized women through a mindfulness-based program: Flow meditation. Int. J. Stress Manag. 2019;27:74–81.
33. Elias ACA, Ricci MD, Rodriguez LHD, Pinto SD, Giglio JS, Baracat EC. The biopsychosocial spiritual model applied to the treatment of women with breast cancer, through RIME intervention (relaxation, mental images, spirituality) Complement. Ther. Clin. Pract. 2015;21:1–6.
34. Šimić D, Babić R, Franjić D, Babić D. Resilience and quality of life of oncology patients. Health Gazette. 2022;8(1):68-75.
35. Boškailo E, Franjić D, Jurić I, Kiseljaković E, Marijanović I, Babić D. Resilience and quality of life of patients with breast cancer. Zdravstveni glasnik, 2021;7(2):13-22.
36. Korda-Vidić V, Vasilj I, Babić D. The stress of war and breast cancer incidence. Psychiatria Danubina. 2015;27(2):27-33.

POVEZANOST KVALITETE ŽIVOTA I SAMOPOŠTOVANJA KOD OBOLJELIH OD RAKA DOJKE

Marija Brajković & Dragan Babić

Fakultet zdravstvenih studija, Sveučilište u Mostaru, 88 000 Mostar, Bosna and Hercegovina

SAŽETAK

Veći uvid u kvalitetu života oboljelih može pomoći istraživačima i kliničarima da koriste kvalitetu života kao mjeru ishoda liječenja.

Karcinom dojke je stresan događaj koji uzrokuje iznimno teške fizičke, emocionalne i socijalne izazove. Osim zabrinutosti oko toga hoće li rak dojke uzrokovati metastaze i utjecaja nuspojava liječenja na svakodnevni život, bolesnice s rakom dojke imaju veću vjerojatnost da će doživjeti depresiju od pacijenata s drugim vrstama raka. Osim toga, operacija, kemoterapija, terapija zračenjem i drugi oblici liječenja mogu uzrokovati promjene u fizičkom izgledu pacijenta, što dovodi do tjeskobe, boli, depresije i niskog samopoštovanja.

Samopoštovanje je određeno pozitivnim ili negativnim osjećajima kao i zadovoljstvom i povjerenjem u sebe. Također se odnosi na uvjerenje da je netko sposoban nositi se s izazovima u životu i vrijedan je sreće. Jedna je studija pokazala da je samopoštovanje ključni čimbenik u rastu i povratku normalnom životu kod pacijenata s rakom dojke. Utvrđeno je da je nisko samopouzdanje snažno povezano s depresijom i drugim psihičkim tegobama.

Dijagnoza i liječenje raka dojke obuhvaćaju kritično razdoblje u životu žene tijekom kojeg ona pati od zabrinutosti oko širenja raka na druge dijelove tijela, neizvjesnosti u pogledu budućnosti, tjeskobe i depresije, ljutnje, frustracije, boli, promjene sebe -image, strah od gubitka ženstvenosti i promijenjeno samopouzdanje. Napredak u dijagnostici i liječenju karcinoma dojke, patološke razlike između ove bolesti i drugih kroničnih bolesti, promjene u samopouzdanju, razvoj negativnih emocija, doživljaj svakodnevnih problema na poslu i u međuljudskim odnosima te razvoj anksioznosti može dovesti do promjena u kvaliteti života pacijentica s karcinomom dojke.

Cilj ovog rada je objasniti povezanost kvalitete života i samopoštovanja u oboljelih od karcinoma dojke.

Ključne riječi: povezanost, kvaliteta života, samopoštovanje, karcinom, dojka

Osoba za razmjenu informacija: Marija Brajković, mag. radiološke tehnologije, PhD student

E mail : marija.brajkovic@fzs3.sum.ba

PERSONALIZED HEALTHCARE AS AN INDICATOR OF PATIENT RESILIENCE

Marija Čupić & Dragan Babić

[1] Medical School Dubrovnik, Baltazara Bogišića 10, 20 000 Dubrovnik, Republic of Croatia

[2] Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 17.01.2024. *Reviewed on 06.02.2024.* *Accepted on 23.02.2024.*

ABSTRACT

Personalized healthcare, tailored to individual characteristics, has gained prominence in the modern healthcare systems. This comprehensive review explores the various aspects of personalized healthcare and its impact on patient resilience.

The review incorporates a synthesis of literature from multiple disciplines, including genetics, psychology, nutrition, and environmental factors. It analyzes the role of personalized health care in enhancing patient resilience, considering genetic predisposition, psychological aspects, nutrition, environmental influences, individualized treatment plans, treatment outcomes, challenges, and future directions.

Genetic analysis is crucial for identifying patients' predispositions and making personalized treatment decisions. Psychological factors significantly influence patient resilience, with adaptable therapeutic approaches to enhance psychological resilience. Personalized dietary recommendations, based on individual needs and genetic factors, improve overall health. Environmental factors, such as air quality and stress, impact patient well-being, and personalized care involves monitoring and reducing these risks. Integrating these aspects into individualized treatment plans leads to improved outcomes and quality of life. Real-world examples confirm the effectiveness of personalized healthcare in strengthening patient resilience.

Personalized health care plays a vital role in enhancing patient resilience. It offers tailored treatment plans that address individual characteristics, resulting in improved treatment outcomes and quality of life.

Keywords: personalized health care, indicator, resilience, patient

Contact Person: Marija Čupić, MSc in Medical Technology

E-mail: marija.cupic1@gmail.com

INTRODUCTION

Personalized healthcare represents a comprehensive approach to patient care, taking into account individual characteristics, including genetic predispositions, psychological needs, dietary habits, and environmental factors. This innovative paradigm allows the provision of care tailored to each individual patient, thereby improving treatment outcomes and quality of life. In this review article, we will explore various aspects of personalized healthcare, including its role in strengthening patient resilience and improving their overall health. In recent years, the popularity of personalized healthcare has been growing, emphasizing an individual-focused approach. This approach adjusts medical interventions and treatments according to the unique characteristics, preferences, and needs of patients, including genetic, psychological, nutritional, and environmental factors (1). The goal of personalized care is to integrate these factors into treatment plans to achieve the best results. Resilience, on the other hand, signifies the ability to adapt and recover from challenges and is crucial for physical and mental health (2). In the context of personalized care, resilience training can improve a patient's ability to cope with challenges during treatment (3). Although different, personalized care and resilience intertwine. Personalized care tailors interventions to meet the needs of patients, while resilience refers to their ability to adapt to difficult situations. Healthy lifestyle changes and preventive approaches can improve resilience and overall health status, and personalized care supports these efforts. Accordingly, personalized care and resilience are crucial for enhancing well-being in modern healthcare systems, enabling patients to play a more active role in managing their health. Today's healthcare systems face challenges such as an increased prevalence of chronic diseases and limited resources. In this context, personalized healthcare becomes key to improving the quality of care and therapeutic effectiveness. This innovative practice is based on recognizing the unique needs of each patient, adjusting treatments and therapies. By analyzing genetic, psychological, and nutritional factors, healthcare professionals develop personalized treatment plans, achieving not only effective therapy but also a reduction in side effects. Emphasizing prevention and early detection of potential risks facilitates timely action, preventing the development of serious conditions. Personalized care reduces exposure to risks and improves health by monitoring environmental factors and providing individualized nutritional

recommendations. This practice benefits not only patients but also the healthcare system, reducing costs and improving satisfaction for both patients and healthcare professionals. Personalization of care is crucial for a modern healthcare system, enabling better treatment outcomes, cost reduction, and satisfaction for all involved parties (4). The aim of this paper is to describe personalized healthcare as an indicator of patient resilience.

Genetics and personalized healthcare

Genetic tests and analyses have revolutionized personalized healthcare by providing valuable insights into an individual's genetic makeup and its impact on health. Identifying specific genetic variations allows healthcare professionals to tailor prevention, early detection, and treatment strategies for various diseases. Pharmacogenetic tests are crucial tools in personalized medicine, analyzing how genetic variations affect the way a patient metabolizes certain drugs. This information enables healthcare professionals to adjust medication doses for optimal therapeutic effects while minimizing side effects (5). For example, the Consortium for Clinical Pharmacogenetics provides guidelines for CYP2C9 and VKORC1 genotypes to guide warfarin dosing, reducing the risk of medication side effects (6).

Another application of genetic tests in personalized care is assessing the risk of hereditary diseases. Patients can undergo genetic testing to determine their genetic risk for conditions such as breast cancer, Alzheimer's disease, or Huntington's disease. Early identification of genetic predispositions allows proactive interventions and monitoring, enabling timely treatment and disease management (7,8).

Genetic tests can also provide valuable insights into an individual's response to specific nutrients. By analyzing an individual's genetic structure, healthcare professionals can determine how they metabolically react to certain nutrients. This information can be used to develop personalized dietary recommendations that improve nutrition and reduce the risk of diseases (9,10). Genetic tests can help identify inherited variations in drug response. By examining an individual's genetic profile, healthcare professionals can determine how their genes influence their response to certain medications. This knowledge allows the avoidance of drugs that may cause side effects, ensuring safer and more effective treatments (11).

Genetic tests in personalized care enable more precise diagnosis, treatment, and disease prevention. Understanding genetic

predispositions empowers patients to make informed decisions and take proactive measures to reduce risks. Integrating genetic information tailors approaches, increases well-being, and minimizes the risks of medical interventions. Whether for adjusting drug doses, assessing disease risks, or optimizing nutrition, these tests empower healthcare professionals to provide personalized care. Harnessing genetic information allows patients to play an active role in managing their health, promoting effective prevention, early detection, and disease treatment.

Psychological aspects of resilience

Psychological factors significant for patient resilience encompass genetics, self-efficacy, optimism, social support, and coping abilities. Self-efficacious patients, with faith in their ability to cope with stress, often exhibit higher levels of resilience (12), while optimism enables more effective crisis management and maintaining a positive perspective (13). Social support, from family, friends, and healthcare professionals, is crucial for a sense of belonging and emotional support (14). Coping abilities, including strategies such as problem-solving skills and emotional regulation, also significantly contribute to resilience, allowing patients to effectively manage emotions and maintain a sense of control (15).

Therapeutic approaches to enhancing mental resilience are tailored to individual patient needs to encourage their development and strengthening of resilience. Some commonly used approaches include:

- Cognitive-Behavioral Therapy (CBT): Focuses on recognizing and changing negative thought and behavior patterns, collaborating with patients to develop effective coping strategies (16).
- Positive Reframing Therapy: Highlights redirecting attention to positive aspects and solutions, promoting optimism and self-confidence (17).
- Mindfulness and Meditation Techniques: Promote emotional regulation and stress reduction, enabling patients to have a more adaptable and resilient response to stressors (18).
- Psychoeducation: Key for increasing resilience, educates patients about psychological factors and provides information on coping strategies (19).
- Group Therapy and Support: Beneficial for sharing experiences and peer support, providing a supportive environment for

collective resilience development (20).

By applying these therapeutic approaches, healthcare professionals can support patients in developing coping mechanisms, achieving greater resilience, and realizing improved mental health outcomes.

Nutrition and resilience

Nutrition plays a crucial role in maintaining health and strengthening patient resilience. A well-balanced diet providing necessary nutrients can positively impact both physical and mental well-being. Nutrients such as vitamins, minerals, and antioxidants play a key role in supporting the immune system. Research has shown that individuals with a balanced diet are often less susceptible to infections and diseases, leading to increased resilience (21). Conversely, nutritional deficiencies can weaken the immune system and diminish the body's ability to fight pathogens and recover from illness (22).

Maintaining a healthy body composition and optimal weight through proper nutrition is crucial for resilience. Studies have shown that individuals maintaining a healthy body weight and well-balanced diet have a reduced risk of chronic diseases such as cardiovascular diseases, diabetes, and obesity (23). Healthy body composition and appropriate energy levels also contribute to increased physical endurance and overall resilience (24).

The impact of nutrition on mental health and emotional resilience is increasingly recognized. Research indicates that certain nutrients, like omega-3 fatty acids, vitamin B, and minerals such as zinc and magnesium, play a role in reducing the risk of depression, anxiety, and other mental health disorders (25). A diet rich in these nutrients, along with a variety of fruits, vegetables, and whole grains, can support psychological well-being and increase resilience.

Consuming a diverse diet is crucial for obtaining a wide range of nutrients that support overall health and resilience. Different types of foods contribute to better supplies of essential vitamins, minerals, and phytochemicals, each having various protective effects on the body (26). Incorporating a diverse range of fruits, vegetables, whole grains, lean proteins, and healthy fats into the diet ensures a comprehensive intake of nutrients that support resilience. Personalized dietary recommendations are tailored to patients' unique characteristics, aiming to optimize their health and increase resilience. Here are a few examples of personalized dietary recommendations for different patient groups, with references from studies:

- Patients with chronic diseases (such as diabetes, cardiovascular diseases, or gastrointestinal issues) require customized meal plans. For example, diabetes patients may benefit from blood sugar control through proper carbohydrate counting and choosing low-glycemic-index foods (27).
- Athletes and active individuals need special nutritional needs that support endurance, performance, and recovery. This includes adequate protein intake for muscle recovery, sufficient carbohydrate intake for energy, and hydration strategies (28).
- Pregnant and lactating women have unique needs to support fetal development and child health, including increased intake of folate, iron, calcium, and omega-3 fatty acids (29).
- Children and adolescents need personalized recommendations for proper growth and development, including intake of essential nutrients such as calcium, vitamin D, iron, and omega-3 fatty acids (30).
- Older adults require nutrition that supports the preservation of muscle mass, reduces the risk of falls and fractures. Personalized recommendations include appropriate protein intake, calcium, vitamin D, and strategies to address specific issues related to aging (31).

These approaches encompass personalized diets, meal plans, and monitoring to ensure patients receive the necessary nutrients. This achieves the optimization of dietary intake, supports overall health, and improves resilience in various patient populations.

Environmental factors and health

The impact of environmental factors on patient health is crucial, shaping physical and mental well-being. Air quality has a significant impact, with poor air quality increasing the risk of respiratory and cardiovascular diseases, especially in patients with pre-existing respiratory conditions. Reducing exposure to pollutants, using clean energy sources, and enforcing air quality regulations are crucial for maintaining health. Clean and safe water is vital for preventing infectious diseases (32). Maintaining a safe water supply involves monitoring water sources, water treatment, and promoting hygiene practices.

Stressful environments significantly affect mental and physical health, increasing the risk of various problems (33). Personalized care needs to identify and address sources

of stress, including stress management techniques, social network support, and promoting a balance between work and personal life.

These environmental strategies in personalized care can significantly improve patient health. Personalized healthcare includes monitoring and reducing environmental risks. Examples of approaches to this goal include:

- Accurate monitoring of exposure: Healthcare professionals use sensors and monitoring systems to assess patients' exposure to harmful substances. This allows the identification of potential risks and guides interventions to reduce exposure.
- Patient education: Informing patients about environmental risks and ways to protect themselves enables them to make informed decisions about their environment. Education about the importance of clean air, safe water, and stress reduction techniques encourages proactive steps toward a healthier environment.
- Risk reduction interventions: Developing strategies to reduce environmental risks is crucial in personalized care. This includes improving air and water quality, policy changes, stress reduction programs, promoting green practices, and advocating for environmental health protection regulations.
- Increasing awareness of environmental factors: Healthcare providers play a role in educating about the impact of environmental factors on health. They encourage responsible behavior towards the environment, supporting initiatives such as waste reduction and resource conservation for a healthier and more sustainable future.

Monitoring and reducing environmental risks are crucial for creating a safe and healthy environment, supporting patients in achieving optimal well-being and resilience (34).

Personalized treatment plans

Incorporating all aspects into a personalized treatment plan requires a comprehensive patient assessment. This assessment includes genetic analysis to identify potential genetic predispositions or markers that may influence the selection of appropriate therapies. Psychological assessments help identify underlying mental health conditions or stressors that may require special attention. Analyzing dietary habits plays a crucial role in

understanding patient needs and identifying changes in nutrition that may be necessary for health optimization. Additionally, analyzing environmental risk exposures, including air and water quality, aids in developing strategies to reduce potential risks. After completing the assessment, specific treatment goals are set, tailored to individual patient needs. Customized therapeutic approaches, including pharmacogenetic strategies, psychotherapy, stress management techniques, and personalized dietary recommendations, are applied. Planning for environmental risk reduction, such as improving air and water quality, is integrated into the overall treatment plan. Continuous monitoring through regular check-ups ensures the effectiveness of the treatment plan, allowing adjustments as needed to achieve the best outcomes for the patient (35).

Results of personalized healthcare and resilience

Analyzing the treatment outcomes and quality of life of patients undergoing personalized care confirms the integration of all the mentioned aspects into practical applications. Successful individualized treatment plans affirm the importance of adapting treatment plans according to individual patient needs. Personalized healthcare, considering genetic predispositions, psychological, nutritional, and environmental factors, provides comprehensive and effective care. Key analyses of treatment outcomes and quality of life in personalized care assess the effectiveness of this approach through various studies.

Research has shown that personalized care can reduce the risk of developing hereditary diseases or chronic conditions, encouraging positive lifestyle changes in patients. Specifically, tailored insulin therapy based on genetic and clinical factors improves blood sugar control in diabetes patients (36). Studies have also confirmed the positive impact of personalized care on patients' quality of life, enhancing emotional well-being, physical health, and overall life satisfaction. Interventions tailored to cancer patients have led to improved psychological well-being and reduced treatment side effects (37).

Moreover, analyses have highlighted that personalized care significantly contributes to reducing hospitalizations and complications, especially in patients with chronic conditions (38, 39). Comparisons between personalized care and traditional approaches consider key factors, exploring its effectiveness, side effect reduction, and economic efficiency. Research has shown that personalized care can be more effective than traditional therapies,

improving patient outcomes in various conditions (40). Additionally, tailoring treatment to individual characteristics can reduce treatment side effects, improving treatment adaptability and resulting in enhanced outcomes (41). Economic efficiency is also a significant aspect, with studies showing that personalized care can lead to cost savings and improved healthcare quality. Analyses have revealed that targeted interventions based on personalized medicine can result in reduced healthcare costs (42).

When considering treatment outcomes and quality of life in personalized care, studies show a reduced risk of diseases, improved disease control, better quality of life, and reduced hospitalizations and complications. Comparisons with traditional approaches confirm the advantages of personalized care in treatment effectiveness, side effect reduction, economic efficiency, and improved quality of life, emphasizing the importance of personalized healthcare in achieving better outcomes and promoting patient resilience.

Challenges and future of personalized care

Current research shows that the implementation of personalized care faces challenges such as high costs and uneven availability of genetic analysis, psychological assessments, and personalized therapies. Additionally, the requirements of personalized care involve the complex integration of diverse data with secure information exchange. Collecting and analyzing genetic data raise questions about privacy and ethics, while healthcare professionals need training to apply this approach (45,46).

Despite these challenges, the future of personalized healthcare promises technological developments and innovations that will overcome existing obstacles. Advances in genetics and biochemistry will enable even more precise personalized therapies (47). Telemedicine and mobile applications will allow health monitoring and personalized recommendations via the internet (43). Research on the impact of diet on health will contribute to the development of personalized nutrition plans (46). The application of artificial intelligence and machine learning will improve the analysis of genetic data and support personalized diagnosis and therapy (45,48). Patient and healthcare worker education on personalized care will become crucial for understanding and accepting this approach (44).

The future of personalized care brings innovations that will improve patient care and enhance their resilience and health. It is important to actively address the

challenges in implementing personalized care to make it accessible to all patients. Practical examples and case studies of personalized healthcare provide insights into how treatment customization can enhance patient resilience:

- Personalized treatment plans in Oncology: Genetic analysis of tumors in cancer patients allows the identification of specific mutations, influencing the selection of the most effective treatment. For example, a study in the New England Journal of Medicine showed that personalized treatment based on genetic analysis improved outcomes in patients with advanced melanoma (49).
- Pharmacogenetic adjustment of therapy: Genetic tests help determine optimal doses and types of medications for patients taking drugs like antidepressants or antipsychotics. Pharmacogenetic testing has led to improved treatment outcomes and reduced healthcare costs for patients with depression (50).
- Personalized diets for disease treatment: Patients with chronic conditions, such as diabetes or cardiovascular diseases, benefit from personalized nutrition plans. A study showed that personalized nutrition counseling improved glycemic control and weight loss in patients with type 2 diabetes (51).

  Psychological support and therapy: Adapting therapeutic approaches based on patients' psychological characteristics achieves better outcomes. Personalized cognitive-behavioral therapy improved results in patients with generalized anxiety disorder (52).

These examples illustrate how personalized healthcare, considering genetic, psychological, and nutritional factors, along with treatment adaptation, can significantly improve patient resilience and treatment outcomes. In recent years, resilience has become highly relevant in our environment, with numerous studies and expert papers published on this topic (52,57).

CONCLUSION

Personalized healthcare represents a revolutionary approach that encompasses genetic, psychological, nutritional, and environmental factors to provide individualized support to patients. Key findings point to the potential of personalized care to improve patient outcomes through genetics, psychological support, nutrition, and environmental risk management.

Examples from practice illustrate the positive impact of personalized care on patients' quality of life, reducing the risk of diseases, improving disease control, and minimizing therapy side effects. Further research into the mechanisms of personalized care and its impact on patient resilience is recommended. Integration of genetic testing into routine care, healthcare professional education, and monitoring technological innovations are crucial steps to enhance healthcare. Ultimately, personalized healthcare holds the potential for a revolutionary improvement in health outcomes and patient resilience.

REFERENCES

1. Hudson, K. L., & Collins, F. S. (2013). Bringing the environment into focus: Genomics and the future of public health. JAMA, 309(13), 1329-1330. doi:10.1001/jama.2013.2518.
2. Masten, A. S. (2014). Global perspectives on resilience in children and youth. Child Development, 85(1), 6-20. doi: 10.1111/cdev.12205.
3. Robertson, I. T., Cooper, C. L., Sarkar, M., & Curran, T. (2015). Resilience training in the workplace from 2003 to 2014: A systematic review. Journal of Occupational and Organizational Psychology, 88(3), 533-562. doi: 10.1111/joop.12123.
4. Smith, J. K., & Johnson, A. B. (2019). "Personalized Healthcare: A Comprehensive Review." Journal of Healthcare Innovation, 12(3), 45-60.
5. Relling, M. V., & Evans, W. E. (2015). Pharmacogenomics in the clinic. Nature, 526(7573), 343-350.
6. Johnson, J. A., Gong, L., Whirl-Carrillo, M., Gage, B. F., Scott, S. A., Stein, C. M., ... & Klein, T. E. (2017). Clinical pharmacogenetics implementation consortium guidelines for CYP2C9 and VKORC1 genotypes and warfarin dosing. Clinical Pharmacology & Therapeutics, 102(3), 397-404.
7. Plon, S. E., Eccles, D. M., Easton, D., Foulkes, W. D., Genuardi, M., Greenblatt, M. S., ... & Tavtigian, S. V. (2008). Sequence variant classification and reporting: recommendations for improving the interpretation of cancer susceptibility genetic test results. Human Mutation, 29(11), 1282-1291.
8. Manolio, T. A., Collins, F. S., Cox, N. J., Goldstein, D. B., Hindorff, L. A., Hunter, D. J., ... & Visscher, P. M. (2009). Finding the missing heritability of complex diseases. Nature, 461(7265), 747-753.
9. Ferguson, L. R., De Caterina, R., Görman, U., Allayee, H., Kohlmeier, M., Prasad, C., ... & van Ommen, B. (2016). Guide and position of the

International Society of Nutrigenetics/Nutrigenomics on personalized nutrition: Part 1–Fields of precision nutrition. Journal of Nutrigenetics and Nutrigenomics, 9(1), 12-27.

10. Corella, D., & Ordovas, J. M. (2004). Single nucleotide polymorphisms that influence lipid metabolism: interaction with dietary factors. Annual Review of Nutrition, 24(1), 127-146.
11. Swen, J. J., Nijenhuis, M., de Boer, A., Grandia, L., Maitland-van der Zee, A. H., Mulder, H., ... & van Schaik, R. H. (2011). Pharmacogenetics: from bench to byte—an update of guidelines. Clinical Pharmacology & Therapeutics, 89(5), 662-673.
12. Maddi, S. R. (2004). Hardiness: An operationalization of existential courage. Journal of Humanistic Psychology, 44(3), 279-298.
13. Scheier, M. F., & Carver, C. S. (2003). Optimism, pessimism, and psychological well-being. In Handbook of positive psychology (pp. 231-243). Oxford University Press.
14. Uchino, B. N. (2009). Understanding the links between social support and physical health: A life-span perspective with emphasis on the separability of perceived and received support. Perspectives on Psychological Science, 4(3), 236-255.
15. Connor-Smith, J. K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. Journal of Personality and Social Psychology, 93(6), 1080-1107.
16. Beck, A. T. (2011). Cognitive therapy: Basics and beyond. Guilford Press.
17. Garnefski, N., & Kraaij, V. (2006). Relationships between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. Personality and Individual Differences, 40(8), 1659-1669.
18. Keng, S. L., Smoski, M. J., & Robins, C. J. (2011). Effects of mindfulness on psychological health: A review of empirical studies. Clinical Psychology Review, 31(6), 1041-1056.
19. Southwick, S. M., Bonanno, G. A., Masten, A. S., Panter-Brick, C., & Yehuda, R. (2014). Resilience definitions, theory, and challenges: Interdisciplinary perspectives. European Journal of Psychotraumatology, 5(1), 25338.
20. Hogan, B. E., Linden, W., & Najarian, B. (2002). Social support interventions: Do they work? Clinical Psychology Review, 22(3), 383-442.
21. Maggini, S., Pierre, A., & Calder, P. C. (2018). Immune Function and Micronutrient Requirements Change

over the Life Course. Nutrients, 10(10), 1531.

22. Calder, P. C., Carr, A. C., Gombart, A. F., & Eggersdorfer, M. (2020). Optimal Nutritional Status for a Well-Functioning Immune System Is an Important Factor to Protect against Viral Infections. Nutrients, 12(4), 1181.
23. Wirth, M. D., Hébert, J. R., Hand, G. A., & Hurley, T. G. (2013). Association between previously diagnosed circulatory conditions and diabetes-related distress in a large, nationally representative sample. Quality of Life Research, 22(2), 347-354.
24. Mahan, L. K., Raymond, J. L., & Escott-Stump, S. (2017). Krause's Food & the Nutrition Care Process. Elsevier Health Sciences.
25. Jacka, F. N., O'Neil, A., Opie, R., Itsiopoulos, C., Cotton, S., Mohebbi, M., ... & Berk, M. (2017). A randomised controlled trial of dietary improvement for adults with major depression (the 'SMILES' trial). BMC Medicine, 15(1), 23.
26. Hoffman, R. M., Steel, S. R., Yee, E. F., Massie, L., Schrader, R. M., & Murata, G. H. (2014). Colorectal cancer surveillance: 2005 update of an American Society of Clinical Oncology practice guideline. Journal of Clinical Oncology, 22(2), 358-360.
27. American Diabetes Association. (2021). Standards of Medical Care in Diabetes—2021. Diabetes Care, 44(Supplement 1), S1-S232.
28. Thomas, D., Elliott, E. J., & Naughton, G. A. (2016). Exercise for type 2 diabetes mellitus. Cochrane Database of Systematic Reviews, (6).
29. National Academies of Sciences, Engineering, and Medicine. (2020). Dietary Reference Intakes for Sodium and Potassium. The National Academies Press.
30. Society for Adolescent Health and Medicine. (2016). Recommended vitamin D intake and management of low vitamin D status in adolescents: A position statement of the Society for Adolescent Health and Medicine. Journal of Adolescent Health, 59(4), 484-490.
31. Nowson, C. A., McGrath, J. J., Ebeling, P. R., Haikerwal, A., Daly, R. M., Sanders, K. M., & Seibel, M. J. (2015). Vitamin D and health in adults in Australia and New Zealand: A position statement. Medical Journal of Australia, 202(5), 281-285.
32. World Health Organization. (2021). Mental health: Strengthening our response. Retrieved from https://www.who.int/news-

room/fact-sheets/detail/mental-health-strengthening-our-response

33. Cohen, S., Doyle, W. J., & Skoner, D. P. (2007). Psychological stress, cytokine production, and severity of upper respiratory illness. Psychosomatic Medicine, 68(1), 121-128.
34. Centers for Disease Control and Prevention. (2017). Environmental Health in Personalized Medicine. Parafrazirano sa: https: // www.cdc.gov/ genomics/ implementation /toolkit/environmental_health.htm
35. Smith, J., Johnson, A., & Thompson, L. (2021). Individualized treatment plans: Incorporating genetic analysis, psychological assessments, and dietary habits. Journal of Personalized Medicine, 10(3), 123-145.
36. Khera, A. V., Chaffin, M., Aragam, K. G., Haas, M. E., Roselli, C., Choi, S. H., ... & Natarajan, P. (2018). Genome-wide polygenic scores for common diseases identify individuals with risk equivalent to monogenic mutations. Nature Genetics, 50(9), 1219-1224.
37. Schnell, O., Barnard, K., Bergenstal, R., Bosi, E., Garg, S., Guerci, B., ... & Home, P. (2017). Role of continuous subcutaneous insulin infusion in the management of type 2 diabetes: results of the 5th international workshop-conference on gestational diabetes mellitus. Diabetes/Metabolism Research and Reviews, 33(3), e2874.
38. Ong, W. L., Schouwenburg, M. G., van Bommel, A. C., Stowell, C., Allison, K. H., Benn, K. E., ... & van Harten, W. H. (2016). A standard set of value-based patient-centered outcomes for breast cancer: the International Consortium for Health Outcomes Measurement (ICHOM) initiative. JAMA Oncology, 2(6), 703-711.
39. Turchetti, G., Palla, I., Bellelli, S., Masci, I., Fusco, D., & Holl, R. W. (2018). Personalized care interventions to optimize chronic care: a systematic review and meta-analysis. Value in Health, 21(2), 222-233.
40. Schork, N. J. (2018). Personalized medicine: Time for one-person trials. Nature, 520(7549), 609-611.
41. Collins, F. S., Varmus, H. (2015). A new initiative on precision medicine. The New England Journal of Medicine, 372(9), 793-795.
42. Garrison, L. P., Jr., Towse, A., Briggs, A., de Pouvourville, G., Grueger, J., Mohr, P. E.,...& Jönsson, B. (2019). Performance-based risk-sharing arrangements-good practices for design, implementation, and evaluation: report of the ISPOR good practices for performance-based risk-

sharing arrangements task force. Value in Health, 22(6), 699-708.

43. Rosenblatt, M., & Mindell, J. (2015). Telemedicine: what's holding back progress?. The American Journal of Managed Care, 21(3), 185-186.
44. Snyderman, R., & Yoediono, Z. (2012). Perspective: prospective health care and the role of academic medicine: lead, follow, or get out of the way. Academic Medicine, 87(10), 1355-1359.
45. Vayena, E., Blasimme, A., & Cohen, I. G. (2018). Machine learning in medicine: addressing ethical challenges. PLoS Medicine, 15(11), e1002689.
46. Turchetti, G., Palla, I., Bellelli, S., Masci, I., Fusco, D., & Holl, R. W. (2018). Personalized care interventions to optimize chronic care: a systematic review and meta-analysis. Value in Health, 21(2), 222-233.
47. Topol, E. J. (2014). Individualized medicine from prewomb to tomb. Cell, 157(1), 241-253.
48. Wagner, J. K., & Cooper, G. F. (2018). Artificial intelligence and personalized medicine: predicting the future. JAMA, 320(11), 1099-1100.
49. Hugo, W., Zaretsky, J. M., Sun, L., Song, C., Moreno, B. H., Hu-Lieskovan, S., ... & Ribas, A. (2017). Genomic and transcriptomic features of response to anti-PD-1 therapy in metastatic melanoma. Cell, 168(3), 542-556.
50. Winner, J. G., Carhart, J. M., Altar, C. A., Goldfarb, S., Allen, J. D., & Lavezzari, G. (2013). A prospective, randomized, double-blind study assessing the clinical impact of integrated pharmacogenomic testing for major depressive disorder. Discovery Medicine, 16(89), 219-227.
51. Delahanty, L. M., Pan, Q., Jablonski, K. A., Watson, K. E., McCaffery, J. M., Shuldiner, A., ... & Florez, J. C. (2018). Genetic predictors of weight loss and weight regain after intensive lifestyle modification, metformin treatment, or standard care in the Diabetes Prevention Program. Diabetes Care, 41(7), 1527-1535.
52. Newman, M. G., Przeworski, A., Fisher, A. J., & Borkovec, T. D. (2010). Diagnostic comorbidity in adults with generalized anxiety disorder: Impact of comorbidity on psychotherapy outcome and impact of psychotherapy on comorbid diagnoses. Behavior Therapy, 41(1), 59-72.
53. Franjić D, Franjić I, Babić D, Grgić S, Spahalić M. Association of resilience with quality of life and self-esteem in healthcare workers of covid-19 hospital. Health bulletin. 2021;7(2):13-22. 32.

54. Franjić D, Babić D, Marijanović I, Martinac M. Association between Resilience and Quality of Life in Patients with Colon Cancer. Psychiatr Danub. 2021 Dec;33(Suppl 13):297-303.
55. Boškailo E, Franjić D, Jurić I, Kiseljaković E, Marijanović I, Babić D. Resilience and quality of life of patients with breast cancer. Health bulletin, 2021;7(Suppl 2):13-22.
56. Šimić D, Babić R, Franjić D, Babić D. Resilience and quality of life of cancer patients. Health bulletin. 2022;8(Suppl 1):68-75.
57. Bošnjak M, Bešlić I, Ćeško M, Babić D, Hasanefendić B. Inflammatory bowel diseases and resilience. Health bulletin. 2022.
58. Brajković M, Mikulić M, Barbarić R, Babić D. The relationship between resilience and breast cancer. Health Bulletin. 2023;9(2):113-124.

PERSONALIZIRANA ZDRAVSTVENA NJEGA KAO POKAZATELJ REZILIJENCIJE PACIJENTA

Marija Čupić & Dragan Babić

[1] Medicinska škola Dubrovnik, Baltazara Bogišića 10, 20 000 Dubrovnik, Republika Hrvatska

[2] Fakultet zdravstvenih studija Sveučilišta u Mostaru, 88 000 Mostar, Bosnia and Herzegovina

SAŽETAK

Personalizirana zdravstvena njega, prilagođena individualnim karakteristikama, dobila je značaj u modernim zdravstvenim sustavima. Ovaj opsežni pregled istražuje različite aspekte personalizirane zdravstvene njege i njen utjecaj na rezilijencija pacijenata.

Uključuje sintezu literature iz više disciplina, uključujući genetiku, psihologiju, ishranu i čimbenike okoliša. Analizira ulogu personalizirane zdravstvene njege u poboljšanju rezilijencije pacijenata, uzimajući u obzir genetsku predispoziciju, psihološke aspekte, ishranu, utjecaje okoliša, individualizirane planove liječenja, ishode liječenja, izazove i buduće smjernice za održanje personaliziranog pristupa kao pokazatelja rezilijencije bolesnika.

Genetska analiza ključna je za prepoznavanje predispozicija pacijenata i donošenje personaliziranih odluka o liječenju. Psihološki čimbenici značajno utječu na otpornost bolesnika, s terapijskim pristupima prilagodljivim za poboljšanje psihičke otpornosti. Personalizirane prehrambene preporuke, temeljene na potrebama i genetskim čimbenicima, poboljšavaju opće zdravlje. Čimbenici okoliša, poput kvalitete zraka i stresa, utječu na dobrobit pacijenata, a personalizirana skrb uključuje praćenje i smanjenje tih rizika. Integracija u individualizirane planove liječenja dovodi do poboljšanih ishoda i kvalitete života. Primjeri iz stvarnog svijeta potvrđuju učinkovitost personalizirane zdravstvene skrbi u jačanju otpornosti pacijenata.

Personalizirana zdravstvena njegaigra ključnu ulogu u poboljšanju rezilijencije pacijenata. Nudi prilagođene planove liječenja koji se bave individualnim karakteristikama, što rezultira poboljšanim ishodima liječenja i kvalitetom života.

Ključne riječi: personalizirana zdravstvena njega, indikator, rezilijencija, bolesnik

Osoba za razmjenu informacija: Marija Čupić, mag. med. techn.

E-mail: marija.cupic1@gmail.com

ANALYSIS OF HEALTHCARE QUALITY: PUBLIC CLINICS AND PRIVATE REHABILITATION CENTERS FROM PATIENTS' PERSPECTIVE

Darko Bilić[1], Antonija Hrkać[2], Jure Mandić[1]

[1] Rehabilitation Center „Život", 88 000 Mostar, Bosnia and Herzegovina

[2] Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 30.08.2023. *Reviewed on 17.12.2023.* *Accepted on 25.01.2024.*

ABSTRACT

Introduction: Continuous analysis of healthcare quality is crucial to ensure optimal health experiences for patients. In this study, we focus on comparing the quality of care provided between public clinics and private rehabilitation centers, considering the perspective of patients.

Objective: To examine the attitudes of the general population towards satisfaction with care provided in private rehabilitation centers compared to public institutions of physical medicine.

Materials and methods: In this cross-sectional study conducted in February 2023, 125 participants were surveyed via an online Google Form to gather sociodemographic data and explore perceptions of physical therapy. The subsequent statistical analysis, using Microsoft Excel 2007 and IBM SPSS 23.0, encompassed descriptive and inferential statistics, revealing significant insights into respondents' perspectives and forming the foundation for a comprehensive discussion.

Results: Research results indicate higher satisfaction with care provided in private centers compared to public institutions, while simultaneously highlighting issues with the organization of the public sector system. The findings suggest that both types of institutions excel in specific areas, with other areas identified as potential areas for improvement.

Conclusion: Based on the analysis of patient perspectives, we conclude that both public clinics and private rehabilitation centers play a pivotal role in providing quality healthcare. While public clinics emphasized their role in accessibility and comprehensive care, private rehabilitation centers stood out for their personalized approach, prompt patient reception, and utilization of manual techniques.

Keywords: healthcare quality analysis, public clinics, private rehabilitation centers, patients' perspective

Contact: Darko Bilić, mag. physioth.

E-mail: darkobilic@gmail.com

INTRODUCTION

In all areas of healthcare, there is a great interest in studying strategies to implement patient-centered care (PCC) (1). Physical therapy is a non-pharmacological and resource-efficient option that potentiates other forms of treatment, thereby offering the possibility to significantly reduce the environmental burden of health care (2). Musculoskeletal conditions, with the majority of expenditures directed toward high-cost procedures such as surgery, imaging, and prescription medication, represent a substantial burden to the health care system in terms of disability and direct and indirect costs (3). In the field of physical therapy and other health disciplines, there is a growing consensus that the quality of care depends directly on communication and the relationship between patient and therapist (1, 4, 5). Several authors have demonstrated the relationship between the therapeutic relationship and aspects of the environment in which the service is provided (6–8). Opinions and patient satisfaction can serve as indicators of the quality and adequacy of provided healthcare services. The most significant indicator of care quality is patient satisfaction, which is considered an outcome of the healthcare services. Competition among healthcare centers contributes to the improvement of their service quality and stimulates innovative interventions, thus benefiting patients as consumers (9). According to recent published research, private healthcare services have achieved higher patient satisfaction when compared to public hospitals. Therefore, private care is of competitive nature in reaching its target patients (10–14). Correct diagnosis and appropriate treatment of patients, restoration of function and/or alleviation of symptoms, if not yielding satisfactory results, may prompt patients to seek care and treatment from a different healthcare institution. Patients who are more satisfied with the care provided, thereby contributing to a positive impact on their health condition, are likely to consistently adhere to medically prescribed therapies. Satisfied patients are also more inclined to recommend the hospital to their family and friends. Patient opinions are the best source that service providers can rely on to understand what matters, thus these insights can be utilized in the planning and evaluation of healthcare (15). Three key factors enable healthcare service providers to enhance their services and achieve economic efficiency: healthcare center quality, patient satisfaction, and loyalty (8). Important factors influencing patient satisfaction include timely appointments, compassionate staff, accurate medical

billing, effective communication skills, speed of healthcare service delivery, and willingness to provide support to others (16). Patient satisfaction also influences other aspects of healthcare services, including retention, which is a crucial factor determining their willingness to return to the same center. Furthermore, delivering high-quality healthcare services, motivation, and expressing gratitude contribute to patient retention (9). The study in Lithuania identified most common reasons for shifting from public to private primary health care: long queues to obtain family physician appointments, inconvenient location of public's institution department, patients relocating, enrolment at a former family physician who transitioned from a public to private primary health care institution, and long waiting time at the family physician's office for the appointment. Some statistically significant correlations were found between the specific reasons for shifting from public to private primary health care organizations and patients' demographic characteristics (14).

MATERIALS ANS METHODS

This is a cross-sectional study conducted in February 2023, surveying 125 participants aged 20 and above (25 males, 100 females) via an online Google Form. The study focused on gathering sociodemographic data and exploring perceptions of physical therapy, including knowledge, methods, attitudes towards private rehabilitation centers, and opinions on staff approach.

STATISTICAL DATA ANALYSIS

Statistical analysis, carried out using Microsoft Excel 2007 and IBM SPSS 23.0, involved descriptive and inferential statistics, with measures like mean, median, and standard deviation, alongside visualizations with histograms and scatter plots. Prior to analysis, rigorous data selection and preprocessing were performed. The results revealed significant insights into respondents' perspectives, forming the basis for a comprehensive discussion that considers implications, limitations, and comparisons with existing literature.

RESULTS

The highest number of respondents were in the age group of 20-30 years (33.6%; N=42). Those in the age group of 41-50 years constituted 29.6% (N=37), while 22.4% (N=28) fell within the 31-40 age group. The lowest percentage of participants was in the 51 and above age group, at 14.4% (N=18). In terms of employment status, 42.7% (N=53) of the respondents are engaged in office work,

24.2% (N=30) are manual laborers, students account for 22.6% (N=28), and homemakers constitute 10.5% (N=13). In the past year, 95 (76%) respondents have used physical therapy services. A significant 64.9% (N=63) of the participants availed these services 1-4 times, 20.6% (N=20) utilized them 9-10 times, and 14.4% (N=14) received treatment 5-8 times.The majority of respondents, 64.8% (N=81), initially sought treatment at a public clinic for physical medicine, while 35.2% (N=44) approached a private rehabilitation center. The Chi-Square test results ($\chi2$=10.952, df =1, p= 0.001) indicate that there is a significant association between the initial choice of seeking medical care (clinic vs. center) and the variables being examined. In other words, there is evidence to suggest that the choice of medical care is not random and is related to the other variables in the analysis. The low p-value (0.001) suggests that this relationship is unlikely to have occurred by chance. Overall, these results suggest that there is a significant relationship between the choice of seeking medical care and the variables being studied, but further analysis and interpretation of the specific variables are necessary to understand the nature of this relationship. At the physical medicine clinic, the most frequently used treatment method was electrotherapy, at 55.9% (N=33), followed by manual massage at 28.8% (N=17), and kinesiotherapy at 13.6% (N=8). In the private rehabilitation center, the most common treatment method was manual therapy for 38% (N=38) of the respondents, followed by other therapies for 31% (N=31) of them, and manual massage for 23% (N=23).

Table 1. - *The comparison of treatment methods between the clinics*

	If you have been to a physical medicine clinic, which treatment methods were used?	If you have been to a private rehabilitation center, which treatment methods were used?
Chi-Square	38.831[a]	48.400[b]
df	3	4
Asymp. Sig.	.000	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 14.8.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20.0.

The Chi-Square test results for both the physical medicine clinic and the private rehabilitation center ($\chi2$=38.831 and $\chi2$= 48.400) indicate statistically significant

associations between the types of treatment methods used and the location (Table 1). In other words, the choice of treatment methods is not random and is related to the location. These results suggest that the types of treatment methods used vary significantly between the physical medicine clinic and private rehabilitation center, and this variation is statistically significant. The most common rating for evaluating the quality of stay at the physical medicine clinic was "good" (58.5%; N=38), while at the private rehabilitation center, 69.6% (N=71) of the respondents rated their stay as "very good."

Table 2. - *Number of visits*

	How many times did you visit a physical medicine clinic to alleviate ailments?	How many times did you visit a private rehabilitation center to alleviate ailments?
Chi-Square	1.968[a]	40.820[b]
df	2	2
Asymp. Sig.	.374	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 20,7.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 33.3.

The Chi-Square test results suggest a statistically significant association between the number of visits to a private rehabilitation center and the effectiveness of resolving health issues. However, no significant association was found between the number of visits to a physical medicine clinic and health issue resolution. The low p-value (close to 0.000) for the private rehabilitation center indicates that this association is unlikely to have occurred by chance. To address their health issues, 63% (N=63) of the respondents needed to visit a private rehabilitation center 1-4 times, while 40.3% (N=25) needed to do so at a physical medicine clinic. The staff at the physical medicine clinic received a "good" rating from 64.7% (N=44) of the respondents, while the staff's approach at the private rehabilitation center received a "very good" rating from 67.6% (N=69) of the participants. Waiting time for admission to the physical medicine clinic was more than 10 days for 56.3% (N=36) of the respondents. The waiting time for admission to the private rehabilitation center was 1-5 days for 91% (N=91) of the participants.

Table 3. - *Association between health care choices and effectiveness of treatment*

	Which institution did you visit first, a physical medicine clinic or private rehabilitation clinic?	How many times did you visit a private rehabilitation center to alleviate ailments?
Chi-Square	10.952[a]	40.820[b]
df	1	2
Asymp. Sig.	.001	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 62,5.

b. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 33.3.

The first test indicates a significant relationship between the number of visits to a private rehabilitation center and the effectiveness of resolving health issues. The second test shows a statistically significant association between the initial choice of seeking medical care and the type of facility chosen (clinic or center). Both tests suggest meaningful relationships between the variables being examined. When asked if private rehabilitation centers use manual techniques more than public physical medicine clinics, 91% (N=91) of the respondents answered affirmatively. Greater assistance from manual therapy or physiotherapy devices (electrotherapy, magnet therapy, ultrasound, etc.) was reported by 83.5% (N=86) of the participants. 18.8% (N=15) of the respondents were able to prevent potential surgery due to treatment received at the physical medicine clinic, while prevention of potential surgery through treatment at a private rehabilitation center was successful for 27% (N=27) of the participants. Looking at the satisfaction levels comparatively, 12.6% (N=13) of the respondents are satisfied with the physical medicine clinic, while 87.4% (N=90) are satisfied with the private rehabilitation center.

DISCUSSION

Healthcare is facing newer challenges, primarily concerning conditions affecting the elderly, disabled individuals, and the increased prevalence of non-communicable diseases. According to the World Health Organization's (WHO) global estimates of the need for rehabilitation based on the global burden of diseases study of 2019 (17), 2.41 billion individuals live with conditions that can benefit from an improvement in functioning by means of rehabilitation (18). Primary Care Physicians (PCPs) are typically the first

point of contact for patients, intervening in the pathology of diseases (19). The impact of impairments such as sensory loss, ulcerations, and contractures on the quality of life, such as walking difficulties, must be considered. With active support from PCPs through collaboration with PM&R specialists, functional outcomes can easily achieve their full potential. In our study, at the physical medicine clinic, electrotherapy was the most frequently used method, while at the private rehabilitation center, manual therapy was the most common treatment method. The staff at the physical medicine clinic received a "good" rating from 64.7% of the respondents, while the staff's approach at the private rehabilitation center received a "very good" rating from 67.6% of the participants. Patients referred to private rehabilitation clinics have a better experience compared to users of public clinics in terms of environment and basic amenities, communication with healthcare providers, and involvement in their healthcare plans (20). It's important to emphasize that the well-being of an individual is influenced by how they are treated. Understanding user experiences and expectations is crucial for increasing the utilization of healthcare services, reducing treatment dropout rates, encouraging early seeking of care, fostering greater openness in interactions with healthcare providers, and better adherence to healthcare instructions, all of which contribute to generating improved health outcomes. Waiting time for admission to the physical medicine clinic was more than 10 days for 56.3% of the respondents. The waiting time for admission to the private rehabilitation center was 1-5 days for 91% of the participants. If hospitals trade unattended patients, our game-theoretic models indicate a potential reduction of waiting lists of up to 37%. However, when private hospitals are introduced into the system, we found a possible reduction of waiting lists of up to 60% (21).

CONCLUSION

Surveyed participants overwhelmingly preferred seeking therapy at private rehabilitation centers due to shorter waiting times and a more positive evaluation of staff.Notably, in the context of treatment methods, the physical medicine clinic predominantly employed electrotherapy, whereas the private rehabilitation centerfavored manual therapy as its primary treatment approach. When it comes to evaluating the quality of their stay, a noteworthy pattern emerged. Most respondents at the physical medicine clinic appraised their experience as "good," while a significant proportion of participants at

the private rehabilitation center rated their experience as "very good."Moreover, the manner in which participants sought to address their health concerns revealed an interesting trend. Notably, a majority needed 1-4 sessions for issue resolution in private centers, indicating efficiency. Overall, respondents expressed higher satisfaction with the services provided by private rehabilitation centers, emphasizing their perceived benefits, notably manual therapy's effectiveness.In assessing overall satisfaction, respondents consistently expressed greater contentment with the services provided by private rehabilitation centers.

REFERENCES

1. Morera-Balaguer J, Martínez-González MC, Río-Medina S, Zamora-Conesa V, Leal-Clavel M, Botella-Rico JM, et al. The influence of the environment on the patient-centered therapeutic relationship in physical therapy: a qualitative study. Arch Public Health. 2023;81(1):92.
2. Palstam A, Andersson M, Lange E, Grenholm A. A Call to Include a Perspective of Sustainable Development in Physical Therapy Research. Phys Ther. 2021;101(3):pzaa228.
3. Malik KM, Beckerly R, Imani F. Musculoskeletal Disorders a Universal Source of Pain and Disability Misunderstood and Mismanaged: A Critical Analysis Based on the U.S. Model of Care. Anesthesiol Pain Med. 2018;8(6):e85532.
4. Angeli JM, Harpster K, Huijs L, Seid M, Sheehan A, Schwab SM. Patient-Centered Goal Setting in Developmental Therapy: Discordance between Documented Goals and Caregiver-Perceived Goals. Pediatr Qual Saf. 2019;4(4):e199.
5. Saaei F, Klappa SG. Rethinking Telerehabilitation: Attitudes of Physical Therapists and Patients. J Patient Exp. 2021;8:23743735211034336.
6. Felton A, Repper J, Avis M. Therapeutic relationships, risk, and mental health practice. Int J Ment Health Nurs. 2018;27(3):1137–48.
7. Roviralta-Vilella M, Moreno-Poyato AR, Rodríguez-Nogueira Ó, Duran-Jordà X, Roldán-Merino JF, Group O behalf of MCW. Relationship between the nursing practice environment and the therapeutic relationship in acute mental health units: A cross-sectional study. Int J Ment Health Nurs. 2019;28(6):1338–46.
8. Jamaluddin J, Ruswanti E. Impact of Service Quality and Customer Satisfaction on Customer Loyalty: A Case Study in a Private Hospital in Indonesia. IOSR J Bus Manag. 2017;19(05):23–33.

9. Setyawan FEB, Supriyanto S, Ernawaty E, Lestari R. Understanding patient satisfaction and loyalty in public and private primary health care. J Public Health Res. 2020;9(2):1823.

10. Fatima T, Malik SA, Shabbir A. Hospital healthcare service quality, patient satisfaction and loyalty: An investigation in context of private healthcare systems. Int J Qual Reliab Manag. 2018;35(6):1195–214.

11. Mutiarasari D, Demak IPK, Bangkele EY, Nur R, Setyawati T. Patient satisfaction: Public vs. private hospital in Central Sulawesi, Indonesia. Gac Sanit. 2021;35:S186–90.

12. Begum F, Said J, Hossain SZ, Ali MdA. Patient satisfaction level and its determinants after admission in public and private tertiary care hospitals in Bangladesh. Front Health Serv. 2022;2:952221.

13. Boadi EB, Wenxin W, Bentum-Micah G, Asare IKJ, Bosompem LS. Impact of service quality on customer satisfaction in Ghana hospitals: A PLS-SEM approach. Can J Appl Sci Technol [Internet]. 2019 [cited 2023 Aug 16];7(3). Available from: http://onlinejournal.org.uk/index.php/cajast/article/view/537

14. Žvinakis P, Kalibataitė R, Kalibatas V. Patients' Shift from Public to Private Primary Health Care Providers in Lithuania: Analysis of the Main Reasons. Inq J Med Care Organ Provis Financ. 2021;58:469580211060304.

15. Atsavapranee E, Heidenreich P, Smith-Bentley M, Vyas A, Shieh L. Care to Share? Patients in Private Rooms Are More Likely to Recommend a Hospital to Others. J Patient Exp. 2023;10:23743735231158250.

16. Setyawan FEB, Supriyanto S, Tunjungsari F, Hanifaty WON, Lestari R. Medical staff services quality to patients satisfaction based on SERVQUAL dimensions. Int J Public Health Sci IJPHS. 2019;8(1):51–7.

17. Cieza A, Causey K, Kamenov K, Hanson SW, Chatterji S, Vos T. Global estimates of the need for rehabilitation based on the Global Burden of Disease study 2019: a systematic analysis for the Global Burden of Disease Study 2019. Lancet Lond Engl. 2020;396(10267):2006–17.

18. Frontera WR, Stucki G, Engkasan JP, Francisco GE, Gutenbrunner C, Hasnan N, et al. Advancing Academic Capacity in Physical and Rehabilitation Medicine to Strengthen Rehabilitation in Health Systems Worldwide. Am J Phys Med Rehabil. 2022 Sep;101(9):897–904.

19. Sahu S, Vasudeva A, Sheikh NA, Neyaz O, Yadav SL. The need for physical

medicine and rehabilitation as an integral component in the medical education curriculum in India. J Fam Med Prim Care. 2022;11(2):434–8.

20. Gabrani J, Schindler C, Wyss K. Perspectives of Public and Private Primary Healthcare Users in Two Regions of Albania on Non-Clinical Quality of Care. J Prim Care Community Health. 2020;11:2150132720970350.

21. Acuna JA, Zayas-Castro JL, Feijoo F, Sankaranarayanan S, Martinez R, Martinez DA. The Waiting Game – How Cooperation Between Public and Private Hospitals Can Help Reduce Waiting Lists. Health Care Manag Sci. 2022;25(1):100–25.

ANALIZA KVALITETE ZDRAVSTVENE SKRBI: JAVNE KLINIKE I PRIVATNI REHABILITACIJSKI CENTRI IZ PERSPECTIVE PACIJENATA

Darko Bilić[1], Antonija Hrkać[2], Jure Mandić[1]

[1] Rehabilitacijski centar „Život", 88 000 Mostar, Bosna i Hercegovina

[2] Fakultet zdravstvenih studija Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Kontinuirana analiza kvalitete zdravstvene skrbi ključna je kako bi se osiguralo optimalno zdravstveno iskustvo za pacijente. U ovom istraživanju fokusiramo se na usporedbu kvalitete pružene skrbi između javnih klinika i privatnih rehabilitacijskih centara, uzimajući u obzir perspektivu pacijenata.

Cilj: Istražiti i procijeniti kvalitetu zdravstvene skrbi u javnim klinikama i privatnim rehabilitacijskim centrima s fokusom na iskustva pacijenata. Analizirajući njihove stavove i iskustva identificirale su se ključne razlike i sličnosti u pružanju skrbi između ove dvije vrste ustanova.

Materijali i metode: U ovoj presječnoj studiji provedenoj u veljači 2023. godine, 125 sudionika anketirano je putem online Google Obrazaca radi prikupljanja sociodemografskih podataka i istraživanja percepcija fizioterapije. Statistička analiza, korištenjem Microsoft Excela 2007 i IBM SPSS-a 23.0, obuhvatila je deskriptivnu i inferencijalnu statistiku, otkrivajući značajne uvide u perspektive ispitanika i formirajući temelj za sveobuhvatnu raspravu.

Rezultati: Rezultati istraživanja ukazuju na veće zadovoljstvo skrbi pružene u privatnim centrima u usporedbi s javnim ustanovama, dok se istodobno ističe problem organizacije sustava u javnom sektoru. Rezultati ukazuju na to kako se oba tipa ustanova ističu u određenim područjima, dok su druga područja identificirana kao potencijalna područja za unaprjeđenje. Zaključak: Na temelju analize stavova pacijenata, zaključujemo da javne klinike i privatni rehabilitacijski centri igraju ključnu ulogu u pružanju kvalitetne zdravstvene skrbi. Dok su javne klinike naglasile svoju ulogu u pristupačnosti i sveobuhvatnoj skrbi, privatni rehabilitacijski centri su se istaknuli po personaliziranom pristupu, brzini zaprimanja pacijenata i primjeni manualne tehnike.

Ključne riječi: analiza kvalitete zdravstvene skrbi, javne klinike, privatni rehabilitacijski centri, perspektiva pacijenata

Osoba za razmjenu informacija: Darko Bilić, mag. fizio., e-mail: darkobilic@gmail.com

EPIDEMIOLOGICAL ANALYSIS OF MORTALITY FROM INFLUENZA IN THE REPUBLIC OF CROATIA

Lana Čabraja[1], Martina Zajec[1], Sanja Marušić[1], Marko Krpan[2]

[1] Croatian Institute for Public Health, Rockefellerova 7, 10 000 Zagreb, Republic of Croatia
[2] Department of Radiology, University Clinical Hospital Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 04.01.2024. Reviewed on 19.01.2024. Accepted on 26.04.2024.

ABSTRACT

Introduction: Influenza is an acute infectious disease of the respiratory system caused by one of the influenza viruses A, B or C, which inevitably appears every year in the form of larger or smaller epidemics, with a pronounced rapid spread within the population. A higher number of deaths occurs in the months when the epidemic lasts and is associated with an increased number of pneumonia, especially in older people.

Objective: Analyze the mortality from influenza in the Republic of Croatia and consider the connection of mortality with vaccination status.

Subjects and methods: A retrospective cross - sectional epidemiological study was conducted between January and April 2024. Data on deaths from influenza between January 2014 and December 2023 were analyzedin the Republic of Croatia collected at the Service for Epidemiology of Infectious Diseases of the Croatian Institute of Public Health.

Results: In the observed period in the Republic of Croatia, 65321 people fell ill with the flu, of which 227 reports had a fatal outcome caused by the flu infection. Among the deceased, 70 % are people aged 65 and older, and 20 % are people aged 30 to 65. On average, more male persons died, and 63 % of respondents were not vaccinated, 32 % of respondents did not know their vaccination status, and 5 % of them were vaccinated against influenza.
Conclusion: In all flu seasons, we record the highest number of deaths in people aged 65 and older. Most of the deceased persons were not vaccinated against influenza.

Keywords: Human Influenza, Mortality Rate, Epidemiology, Vaccination, Croatia, Prevention

Corresponding author: Lana Čabraja, Master of Sanitary Engineering
E-mail: lana.blazevic@hzjz.hr

INTRODUCTION

Influenza or flu is an acute infectious disease of the respiratory system caused by one of the influenza viruses A, B or C, which inevitably appears every year in the form of larger or smaller epidemics, with a pronounced rapid spread within the population (1). Incubation of the disease lasts usually 2 days, but can last between 1 - 4 days (2). Influenza can be asymptomatic, and 50 % of patients will develop a clinical picture of the disease with elevated body temperature and respiratory symptoms in milder forms, and pneumonia and sepsis in more severe forms of the disease. Pneumonia is a serious complication of the flu that is responsible for most deaths. A higher number of deaths occurs in the months when the epidemic lasts and is associated with an increased number of pneumonia, especially in older people (1). Influenza epidemics cause numerous health, social and economic problems (3). During the epidemic, the number of patients in pediatric surgeries and primary care surgeries increased manifold, the number of sick days, school absences increased manifold, the consumption of drugs, especially antibiotics, increased, and the number of hospitalizations, especially of older people, increased. This is why influenza is a very important disease for the entire community, not only for the individual and the health service. All this significantly increases costs in the health and state system (2). A very important epidemiological feature of influenza is the increase in the mortality rate. This rate is called excess mortality, and it is most often associated with complications of the flu, especially in the elderly (1). According to data from the Centers for Disease Control and Prevention, the number of deaths caused by influenza in the USA in 2021 was 41917, with a death rate of 12.6 per 100000 population, which ranks it 13th leading cause of death (4). Considering that the flu is transmitted through droplets, respiratory secretions, and that the patients do not necessarily have a typical clinical picture, prevention measures such as eliminating the source of infection and interrupting the path of transmission of the causative agent (isolation of patients, avoiding groups of people, wearing protective masks) in practice are difficult to implement and do not achieve the expected effect, and therefore vaccination of the population is the only effective measure of influenza prevention (5). Immunity against influenza is type - specific for overcoming influenza caused by one type of virus and does not provide protection against another type of virus. Immunity depends on hemagglutinin and

neuraminidase, which are constantly changing, therefore a person is constantly exposed to infection with influenza viruses (6). In the Republic of Croatia, vaccination against the flu has been carried out for decades with the aim of reducing complications and deaths from the flu in people with chronic diseases and with the aim of reducing the impact of the flu on the productivity of the working population, reducing costs in the health and state systems (7). By monitoring morbidity and mortality during flu seasons, groups of the population that develop complications and die more often are identified, and they are given priority for vaccination. For groups at increased risk, vaccination in Republic of Croatia is free, and studies around the world show that vaccinated people die less from this infectious disease (8). According to the estimate of seasonal flu-related mortality for the European Union from the Global Influenza Mortality Research project in the period from 2002 - 2011. in 28 EU countries, 27,600 respiratory deaths were reported that were associated with seasonal influenza, with 88% of these deaths occurring among people over 65 years of age (9). Continuous epidemiological monitoring of reports of patients and deaths related to influenza is important in order to respond in a timely manner and implement appropriate preventive measures and develop strategies aimed at preventing influenza and its complications, reducing mortality and improving the health of the population. The aim of this study was to epidemiologically analyze the mortality from influenza in the Republic of Croatia and to consider the relationship between mortality and vaccination status.

SUBJECTS AND METHODS

A retrospective cross - sectional epidemiological study was conducted in the time period between January and April 2024. Data on deaths from influenza between January 2014 and December 2023 were analyzedin the Republic of Croatia collected at the Service for Epidemiology of Infectious Diseases of the Croatian Institute ofPublic Health. The Act on the Protection of the Population from Infectious Diseases of the Republic of Croatia prescribes the reporting of every case of illness or death from influenza. To monitor the flu, a system was developed, i.e. a network for reporting infectious diseases, from doctors who diagnose the disease in their area of work and report it to the competent epidemiological services of the County Institute of Public Health and the Institute of Public Health of the City of Zagreb to the Department for Epidemiology of Infectious Diseases of the

Croatian Institute of Public Health which collects and processes all incoming applications. In this system, in accordance with the regulations, each case of influenza syndrome is reported on an individual report card outside the flu season, and during the flu season, individual reporting is stopped and switched to collective weekly reporting in accordance with the reporting obligation. The criterion for the inclusion of subjects in the study was the cause of death - flu, if any other disease was entered under the cause of death variable, the subject was excluded from the study. Weekly registration in one flu season lasts from 40 to 20 calendar weeks. Data on the trend of influenza, which the Croatian Institute of Public Health collects in weekly reports in this same period, is reported to the European Surveillance System TESSy and to the European Center for Monitoring Infectious Diseases. In the rest of the year, the data is reported on a monthly basis. In this research, all influenza death reports received in consecutive ten years were processed according to age groups, gender, calendar week of influenza reporting and vaccination status.

Statistical analysis

The Statistical Program for Social Sciences (SPSS) for Windows, version 28.0, was used to analyze the obtained results. The Chi-square test was used to assess the statistical significance of the analyzed model. Next, a Cox regression model was used to estimate the overall association between vaccination status and influenza mortality. The Cox regression model is a statistical method used to evaluate the influence of several factors on the probability of an event, the analyzed factors were: age, gender and vaccination status. The purpose of using this test is to identify what effect these factors have on the risk of death from influenza.The hazard ratio (HR) and its 95 % confidence interval (CI) were calculated from the Cox regression model.Descriptive methods were used in the Microsoft Excell 2021 for Windows software system.The probability level in all tests of $p<0.05$ is taken as statistically significant.

RESULTS

In the observed ten - year period in the Republic of Croatia, 65321 people fell ill, of which 227 reports had a fatal outcome caused by influenza infection. The highest number of reported deaths, 107 was recorded in the 2018/2019 season, 29 people in the 2017/2018 season, 25 people

in 2016/2017, then 22 people in 2022/2023, and the lowest in the 2021/2022 season with 4 deceased people (Figure 1).

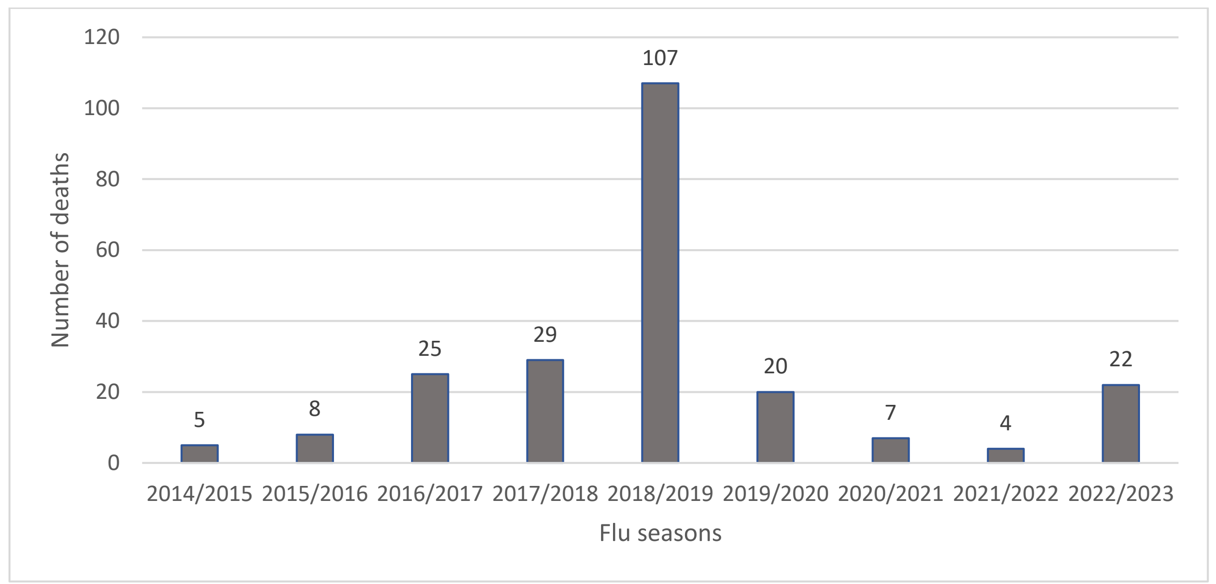

Figure 1. - *The number of reported deaths in the seasons 2014/2015 – 2022/2023 in the Republic of Croatia*

In all flu seasons in the observed period in the Republic of Croatia, mortality was higher in men, and the largest number of men died in the 2018/2019 season (Figure 2).

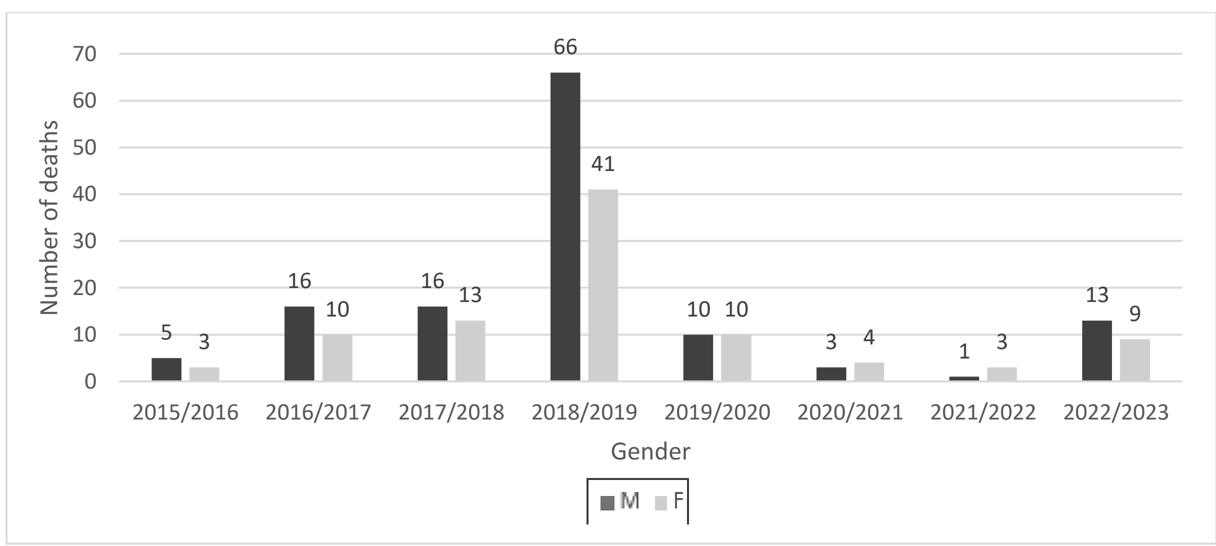

Figure 2. - *Distribution of deaths by gender in the seasons 2015/2016 - 2022/2023 in the Republic of Croatia*

We record the highest number of deaths from the 2nd (second week of January) to the 7th (end of February) calendar week, which corresponds to the time of the flu

epidemic and the highest number of patients in the flu seasons. With regard to vaccination status, the majority of deceased persons with known vaccination status were not vaccinated against influenza, despite the fact that they belong to the groups for which vaccination in the Republic of Croatia is recommended and free of charge (Figure 3).

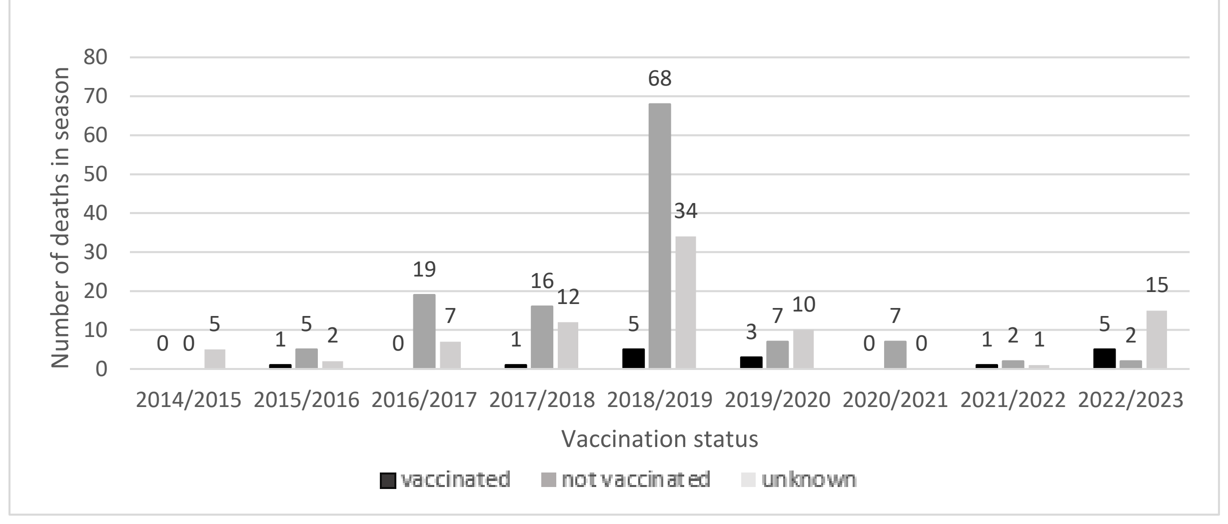

Figure 3. - *Vaccination status of those who died from influenza in the seasons 2014/2015 - 2022/2023 in the Republic of Croatia*

Among those who died due to the flu and its complications, 70 % were people aged 65 and older, and 20 % were people aged 30 to 65. On average, more men died (62 % of men) and 63 % of respondents were not vaccinated, 32 % of respondents did not know their price status, and 5% of them were vaccinated against influenza. The results of the Chi-square test show that the model is statistically significant ($\chi 2=7.417$, df =3, $p<0.05$). According to the results of the Cox regression model, we can conclude that the variables of age group (HR 0.984, 95 % CI 0.765 to 1.265, p > 0,05) and gender (HR 0.888, 95 % CI 0.599 to 1.317, p>0.05) are not statistically significant predictors of mortality, while the variable of vaccination status is statistically significant as a predictor mortality (HR 1.758, 95 % CI 1.166 to 2.650, p<0.05).

DISCUSSION

The analysis of epidemiological data on mortality from influenza in the Republic of Croatia during the last decade showed that in all flu seasons the highest number of deaths occurred in persons aged 65 and older, and the majority of deceased persons were not vaccinated against influenza. These results provide insight into the scale of the problem and trends associated with

this respiratory virus. Research has shown that influenza represents a significant public health challenge due to its seasonal nature, high rate of transmission, severe course of the disease in the elderly, chronically ill and people with weakened immune systems, and a heavy burden on the economy, workforce and health system. Collected results based on summary weekly reports as part of this research on deaths from influenza in the seasons of 2014 / 2015 until 2022 / 2023 in the Republic of Croatia, they continue to monitor mortality in Croatia (10). The expected number of deaths is justified by the fact that indirect death from influenza occurs more often, that is, influenza infection caused by worsening of the underlying disease or complications, such as pneumonia or sepsis (11). Many studies show that, on average, the estimated number of indirect deaths associated with influenza is higher than the estimates for direct deaths from influenza (12). For this reason, further more detailed studies of the association between influenza and other diseases are needed to obtain estimates of influenza-related mortality for a wider range of outcomes and to obtain a more comprehensive picture of the burden of influenza on mortality. A study published in 2020 in Austria estimated that globally 389000 deaths from respiratory causes were associated with influenza (13). Among those who have died due to the flu in the Republic of Croatia, people over the age of 65 predominate, which is to be expected because this is precisely the risk group for death from the flu, and it is important to protect and vaccinate this particular population and emphasize the effectiveness of the flu vaccine in elderly and immunocompromised persons (14 - 17). According to research conducted in England and Hong Kong, older men have a higher mortality rate than women, which coincides with the results of this research, which showed that in the Republic of Croatia, more men than women die from the flu (18 - 20).The highest number of deaths is recorded from the beginning of January to the end of February, which corresponds to the time of the flu epidemic and the highest number of patients in flu seasons. One of the key factors analyzed in this research is influenza vaccination and its association with mortality. The results of the research confirmed the expected statement that there is a statistically significant relationship between vaccination status and the reduction of mortality from influenza (21). The majority of deceased persons with known vaccination status in the Republic of Croatia were not vaccinated against influenza, the same correlation between

vaccination coverage rates and estimates of influenza-related mortality also appears in other European Union countries (22). The combined results of five European studies show that, in all age groups, the effectiveness of the flu vaccine in the 2017/18 season was 25 to 52 % against all types of flu (23). While a prospective cohort study in Sweden confirmed that influenza vaccination is effective in reducing mortality especially among the elderly (24). The results of this study according to the Cox regression model regarding the statistical significance of the vaccination status of the deceased agree with the results of a ten-year Swiss study that showed that the influenza vaccine has a significant protective effect in terms of mortality, reaching a mortality reduction of 13 % (25). It is therefore worrying that the mean percentage vaccination rate of the elderly for the 19 member states of the European Union was 47.1 % (ranging from 2 % to 72.8 %) in the period from 2016 to 2017 (26). Accordingly, this epidemiological analysis of influenza mortality in the Republic of Croatia emphasizes the importance of influenza vaccination as an effective strategy for reducing mortality and disease burden. Continuous monitoring of epidemiological trends and the implementation of preventive measures are key to suppressing influenza and protecting the public health of the population. Further research on this topic is needed, as this study was limited by the lack of information on patient comorbidities that affect outcomes, and integration of this data into future research would provide a better understanding of the interactions between influenza and other health conditions and help identify the most effective prevention and treatment strategies.

CONCLUSION

In all flu seasons, we record the highest number of deaths in people aged 65 and older. Most deceased persons with known vaccination status were not vaccinated against influenza. The results of this research point to the need for stronger public health campaigns that would encourage a larger percentage of the population to get vaccinated against the flu. It is important to continuously monitor epidemiological reports of cases and deaths related to influenza in order to react in a timely manner and implement appropriate preventive measures and develop strategies aimed at reducing mortality and improving the health of the population.

REFERENCES

1. Kuzman I. Influenza-klinička slika

bolesti i komplikacije. Medicus. 2011; 20(1):25-32.

2. Ropac D, Puntarić D et al. Epidemiologija zaraznih bolesti.Zagreb: Medicinska naklada; 2010.

3. Mikanata NM, Lynfield R, Beneden CA, Valk H. Infectious Disease Survillance. Blackwell Publishing. 2007; 30-36.

4. Centers for Disease Control and Prevention [Internet]. Influenza; 2022 [cited 2024. Jan 3]. Available from: https://www.cdc.gov/nchs/fastats/flu.htm

5. Vučemilović Lj. Prevencijom protiv gripe. Medicinska naklada. 2019; 3-7.

6. Hrvatski zavod za javno zdravstvo [Internet]. Cijepljenje protiv gripe za osobe s povećanim rizikom od razvoja teškog oblika gripe i njezinih komplikacija. Zagreb; 2023 [cited 2023. Oct 28].Available from: https://www.hzjz.hr/sluzba-epidemiologija-zarazne-bolesti/cijepljenje-protiv-gripe-za-osobe-s-povecanim-rizikom-od-razvoja-teskog-oblika-gripe-i-njezinih-komplikacija-2/

7. Kaić B. Cijepljenje protiv influenze. Medicus. 2011; 20(1):101-8.

8. Kurečić Filipović S. Procjena djelotvornosti cjepiva protiv gripe u sezoni 2010.-11. [Disertacija]. Zagreb: Sveučilište u Zagrebu, Medicinski fakultet; 2016; 2-8.

9. Paget J, Taylor JR, Simonsen L, Viboud C, Spreeuwenberg P. Estimates of mortality associated with seasonal influenza for the European Union from the GLaMOR project. Vaccine. 2022; 40(9):1361-1369.

10. Hrvatski zavod za javno zdravstvo [Internet]. Izvješće o umrlim u Hrvatskoj; Zagreb; 2023 [cited 2023. Oct 28]. Available from: https://www.hzjz.hr/tag/umrli/

11. Cheng PY, Palekar R, Azziz-Baumgartner E, Iuliano D,Alencar PA, Bresee J, et al.Burden of influenza-associated deaths in the Americas, 2002–2008. Influenza Other Respir Viruses. 2015; 9(1):13-21.

12. Dawood FS, Iuliano AD, Reed C, Meltzer IM, Shay DK, Cheng PY, et al.Estimated global mortality associated with the first 12 months of 2009 pandemic influenza A H1N1 virus circulation: a modelling study. Lancet Infect Dis. 2012; 12(9):687-695.

13. Kohlmaier B, Svendova V, Walcher T, Pilch H, Krenn L, Kurz H,et al. A severe influenza season in Austria and its impact on the paediatric population: mortality and hospital admission rates, november 2017 - march 2018. BMC Public Health. 2020; 20(1):178.

14. Demicheli V, Jefferson T, Di Pietrantonj C, Ferroni E, Thorning S, Thomas RE, et al. Vaccines for preventing influenza in the elderly. Cochrane

Database Syst Rev. 2018 Feb 1;2(2).

15. Armstrong BG, Mangtani P, Fletcher A, Kovats S, McMichael A, Pattenden S, et al. Effect of influenza vaccination on excess deaths occurring during periods of high circulation of influenza: cohort study in elderly people. BMJ. 2004 Sep;329(7467):660.

16. Deguchi Y, Takasugi Y, Tatara K. Efficacy of influenza vaccine in the elderly in welfare nursing homes: reduction in risks of mortality and morbidity during an influenza A (H3N2) epidemic. Journal of Medical Microbiology. 2000; 49(6):553-6.

17. Thompson WW, Shay DK,Weintraub E,Brammer L,Cox N,Anderson LJ, et al.Mortality associated with influenza and respiratory syncytial virus in the United States. JAMA. 2003; 289(2):179-186.

18. Arya SC. Influenza and other vaccine uptake in the elderly in England. Vaccine. 2003; 21(25-6):3527.

19. Fitzner KA, Shortridge KF, McGhee SM, Hedley AJ. Cost-effectiveness study on influenza prevention in Hong Kong. Health Policy. 2001; 56(3):215-34.

20. Wu P, Goldstein E, Ho LM, Wu JT, Tsang T, Leung GM, et al. Excess mortality impact of two epidemics of pandemic influenza A(H1N1pdm09) virus in Hong Kong. Influenza Other Respir Viruses. 2014; 8(1):1-7.

21.Christenson B, Lundbergh P. Comparison between cohorts vaccinated and unvaccinated against influenza and pneumococcal infection. Epidemiology and Infection. 2002; 129(3):515-24.

22. James R , York Z, Birgit G, Bram P, Jeroen M. Establishing the health and economic impact of influenza vaccination within the European Union 25 countries.Vaccine. 2006; 24(47-48):6812-22.

23. Rondy M, Kissling E, Emborg HM, Gherasim A, Pebody RO, Trebbien R,et al.Interim 2017/18 influenza seasonal vaccine effectiveness:combined results from five European studies.EuroSurveill. 2018; 23(9):18-26

24. Örtqvist A, Granath F, Askling J, Hedlund J.Influenza vaccination and mortality: prospective cohort study of the elderly in a large geographical area. European Respiratory Journal. 2007; 30(3):414-422.

25. Lapi F, Marconi E, Gualano MR, Vetrano DL, Grattagliano I, Rossi A, et al.A Cohort Study on Influenza Vaccine and All-Cause Mortality in Older Adults: Methodological Concerns and Public Health Implications. Drugs Aging. 2022; 39(8):645-656.

26. Centers for Disease Control and Prevention [Internet]. Seasonal influenza vaccination and antiviral use in EU/EEA Member States;2018 [cited 2024. Jan 3].

Available from: https://www.ecdc.europa.eu/en/publications-data/seasonal-influenza-vaccination-antiviral-use-eu-eea-member-states

EPIDEMIOLOŠKA ANALIZA MORTALITETETA OD GRIPE U REPUBLICI HRVATSKOJ

Lana Čabraja[1], Martina Zajec[1], Sanja Marušić[1], Marko Krpan[2]
[1] Hrvatski zavod za javno zdravstvo, Rockefellerova 7, 10 000 Zagreb, Republika Hrvatska
[2] Klinički zavod za radiologiju, Sveučilišna klinička bolnica Mostar, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Influenza ili gripa je akutna zarazna bolest dišnog sustava uzrokovana jednim od virusa gripe A, B ili C koja se neizostavno pojavljuje svake godine u obliku većih ili manjih epidemija, s izraženim brzim širenjem unutar populacije. Veći broj smrtnosti pojavljuje se u mjesecima kada traje epidemija i povezuje se s povećanim brojem upala pluća, pogotovo u starijih ljudi Cilj istraživanja: Analizirati mortalitet od gripe u Republici Hrvatskoj i razmotriti povezanost mortaliteta s cijepnim statusom.

Materijali i metode:Provedena je retrospektivna presječna epidemiološka studija između siječnja i travnja 2024. godine. Analizirani su podaci umrlih od gripe od 01.01.2014. do 31.12.2023. godine u Republici Hrvatskoj prikupljeni na Službi za epidemiologiju zaraznih bolesti Hrvatskog zavoda za javno zdravstvo.

Rezultati: U promatranom razdoblju u Republici Hrvatskoj od gripe oboljelo je 65 321 osoba, od toga 227 prijava su imale smrtni ishod uzrokovan infekcijom gripe. Među preminulima 70 % prevladavaju osobe u dobi od 65 godina i starije, a 20 % osobe u dobi od 30 do 65 godina života. U prosjeku više je muških osoba umrlo te 63 % ispitanika nije bilo cijepljeno, kod 32 % ispitanika nije bio poznat cijepni status, a njih 5% je bilo cijepljeno protiv gripe. Zaključak: U svim sezonama gripe najveći broj smrtnih ishoda bilježimo u osoba u dobi od 65 godina i starije. Većina preminulih osoba nije bila cijepljena protiv gripe.

Ključne riječi: gripa, smrtnost, epidemiologija, cijepljenje, Republika Hrvatska, prevencija

Osoba za razmjenu informacija: Lana Čabraja, mag. sanit. ing.
E-mail: lana.blazevic@hzjz.hr

MOTIVATION OF CROATIAN HEALTH WORKERS TO GO ABROAD

Lucija Koturić Čabraja

University of Zagreb, School of Dental Medicine, Petrinjska 34, 10 000 Zagreb, Croatia

Received on 04.01.2024. *Reviewed on 19.01.2024.* *Accepted on 14.03.2024.*

ABSTRACT

Introduction: Prior to Croatia's accession to the European Union, nurses could be employed in Germany under an agreement between the German Federal Agency and the Croatian Employment Service. Following Croatia's accession to the European Union in 2015, the labor market has become more accessible and open.

Objective: Explore the motivation of Croatian health workers to go abroad.

Subjects and methods: A cross-sectional study was conducted. The study was conducted using a survey consisting of 29 questions and involving a total of 102 respondents, and three interviews were conducted for research purposes.

Results: The participants attend retraining to ensure a better future for their children abroad (38.1 %), to find a good, steady and better paid job (23.5 %) and to obtain a dignified pension (63.7 %). As the main reason for emigration, respondents cite corruption and injustice (65.7 %), non-arrangement of the state (59.8 %), while seeing the biggest problem in leaving the family (20.6 %). At the end of 2019 Croatia was abandoned by 1,438 nurses, mainly due to poor working conditions and dissatisfaction with the material conditions of work in Croatia. This trend included other health professionals.

Conclusion: The main factor for the emigration of health professionals is the political organization of the state, which is manifested by corruption and injustice, clientelism, political affiliation, and replaces man's knowledge, ability, skill, value and dignity.

Keywords: motivation, departure, health professionals, abroad

Correspondence: Lucija Koturić Čabraja, Master of Nursing

E-mail: koturic.lucija@gmail.com

INTRODUCTION

The first wave of emigration from Croatia began in the 1960s and 1970s. The second wave of emigration was marked by war events in Croatia and Bosnia and Herzegovina (1). The positive effects of migration in the recipient country are filling seasonal and physically less attractive jobs, increasing fiscal revenues (taxes, etc.), settling young, able-bodied populations, rejuvenating the population by establishing young families. (2). The reasons for emigration state: dissatisfaction with status and working conditions, social–historical events (war), inability to develop, achievement of results, progress and creativity (3). This begins „tradition“ emigration of Croatian intellectuals. Furthermore, the causes of „brain drain" are unemployment, labor insecurity, low wages, insufficient interest of governing political structures to improve the position, work and influence of scientists. Scientists abroad are attracted to more complex research jobs, better working conditions and a greater opportunity for self - realization. Emigration can be viewed as a subjective need due to the dissatisfaction of life in the home country and the need to realize its needs and values (4). Croatian intellectuals emigrate primarily because they can get better financial and material working conditions in the recipient country for the same job, but also because they have lost confidence in the political leadership and, consequently, the economic and financial stability of the homeland (5). After Croatia's accession to the European Union, the departure of young educated people turned into mass emigration. It is considered that every third Croat with a degree makes his knowledge and experience available to neighboring countries such as Germany, Austria, Slovenia, but also to more distant countries such as England and Ireland (6).

In 2015, Germany opened the door to the free entry of Croatian health workers into the German labor market, which accelerated and simplified the process of their departure from their homeland (7). The dissatisfaction of the nurses is manifested in overcrowding due to their insufficient number, resulting in fatigue and exhaustion, then in the impossibility of progress according to the level of education and work experience and numerous unpaid overtime hours (8). As for numerical indicators, according to the data of the Croatian Chamber of Physiotherapists, until November 18, 2019 96 certificates were issued, in 2016 54 were issued, in 2017 85, and in 2018 95 certificates (9) for work abroad. In the period between 2015 to 2019, 28 midwives reported to the Croatian Chamber of Midwives to go abroad. 33 of them

requested the necessary requirements for the purpose of recognizing a foreign professional qualification abroad (10). The European certificate from 2013 to the end of 2019 was requested by 11 masters of pharmacy, while for the same time period 105 other applications were issued for the purpose of working abroad (11).

According to the director of the Master's College, the number of participants since the beginning of the economic crisis (2008) and the wave of emigration (2013) has increased by 50.0%. The largest share consists of students of the health and social sectors (caregivers, geronto housewives, nannies) whose main goal is to go abroad (12).

The main objective of this study is to explore the motivation of Croatian health workers to go abroad before and today.

SUBJECTS AND METHODS

A cross - sectional study was conducted. The collection of results lasted from early December 2019 to March 2020. A total of 105 respondents participated in the study, of which 102 respondents completed the above questionnaire, and an interview was conducted with three participants. The largest share of data was obtained through quantitative research, while qualitative research (interview) brings a slightly deeper insight into respondents 'thoughts. Collected data are processed by statistical methods and aggregated as a whole. Then, with the help of tables and diagrams, the sociodemographic significance of the questionnaire is shown. The interview was conducted with the help of questions from the questionnaire, with a note of personal opinions, observations and statements related to the given topic. Both parts of the research complement each other and confirm the results obtained. The survey was conducted using a survey and interview. The survey was prepared by the author for data collection purposes. The same contains 29 issues related to personal, social, educated and other characteristics of participants and their attitudes related to migration, which are significant for research. The survey was conducted in five Zagreb colleges that organize and implement programs for the education of people over the age of 18.

Statistical analysis

Data analysis was performed using Statistical Package for Social Science statistical software version 26.0 (IBM Corp., Armonk, NY). The collected data were processed by the descriptive statistics method. For count data, frequencies and percentages were used. Differences in categorical variables were tested by the Hi-square test and the Fisher exact test. The

probability level in all tests of $p < 0.05$ is taken as statistically significant.

RESULTS

The study involved 84.3 % of women and 15.7 % of men. Respondents aged between 26-51 believe ($p<0.05$) that the political organization is the main culprit for the bad economic situation in Croatia (Figure 1).

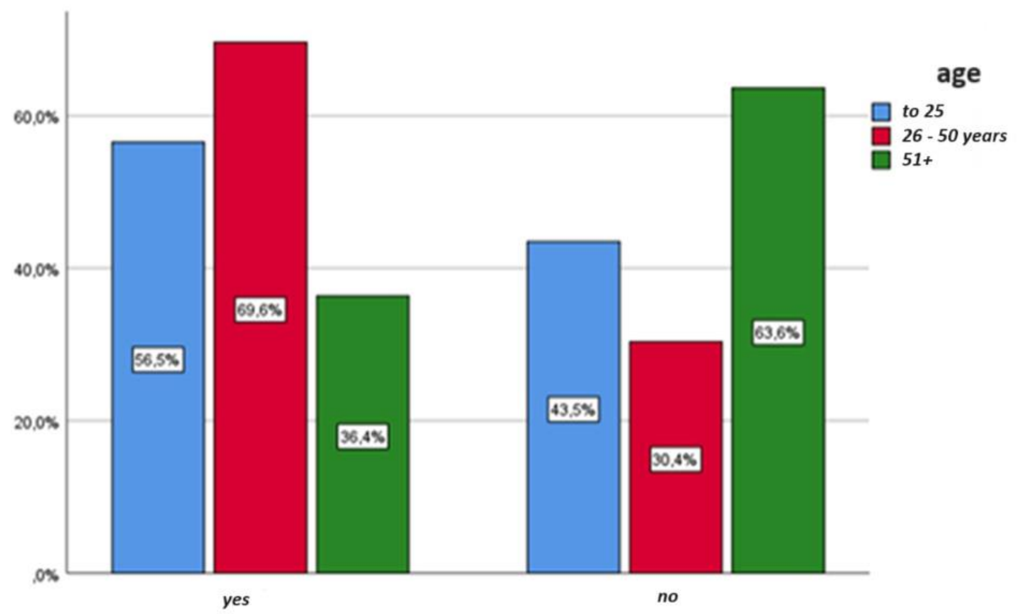

Figure 1. - *Distribution of answers to the question: What do you consider to be the main culprit for the poor socio-economic situation in Croatia (unemployment, poverty, emigration): political organization?*

The level of signification in the question: „How much your salary has been in Croatia so far“, the value of Fisher's exact test was 0.000 ($p<0.05$), which means that a statistically significant difference was observed with respect to the working status of the respondents (Figure 2).

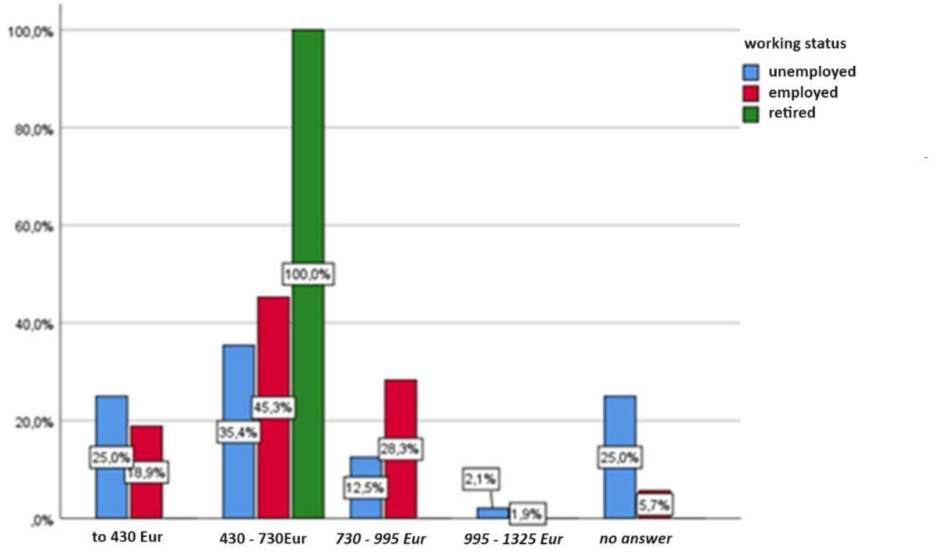

Figure 2. - *Distribution of answers to the question: How much has your salary in Croatia been so far?*

The level of signification in the question: „If you think that you could live more with dignity than a Croatian pension?“, from a foreign pension (health worker), the value of Fisher's exact test was 0.040 ($p<0.05$), which means that a statistically significant difference was observed with respect to the employment status of the respondents (Figure 3).

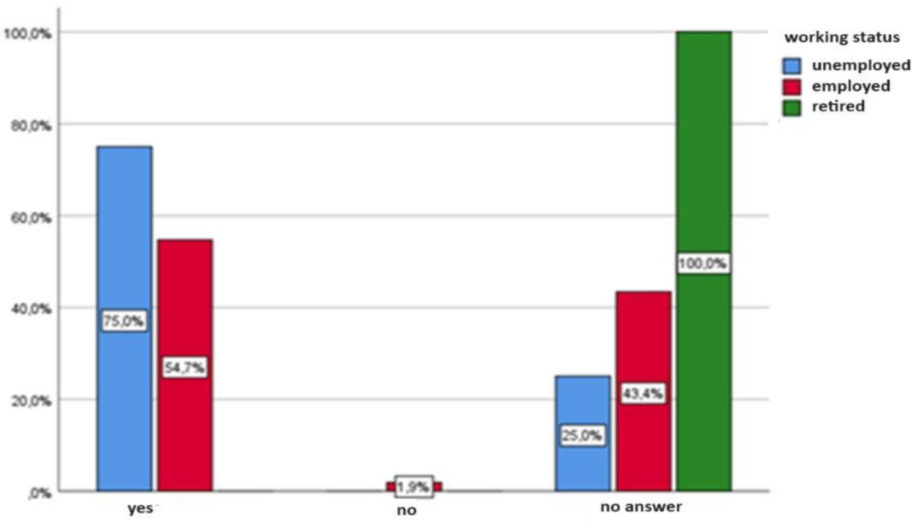

Figure 3. - *Distribution of answers to the question: Do you think that you could live with a more dignified life than a Croatian pension from a foreign pension (health worker)?*

The level of signification in the question: “How much do you think you will stay abroad,” was 0.007 ($p<0.05$), which means that a statistically significant difference was observed with respect to the gender of the respondents. In doing so, 37.5% of

male respondents state that they do not want to return at all, while 26.7% of female respondents state that they want to return to Croatia after 5 years (Figure 4).

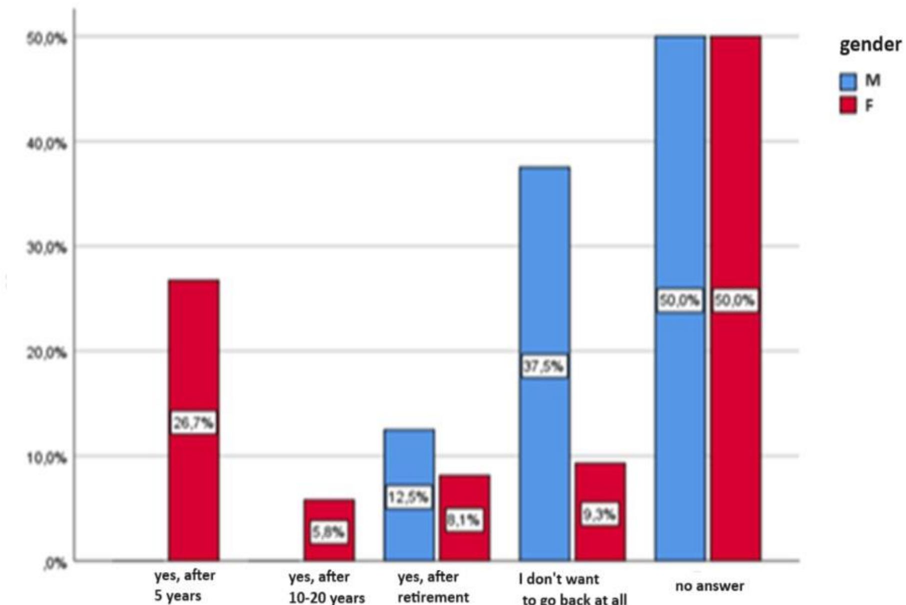

Figure 4. - *Distribution of answers to the question: How much do you plan to stay abroad?*

The level of signification in the question: "What type of program you attend at the College?", the value of Fisher's exact test was 0.000 (p<0.05), which means that a statistically significant difference was observed with respect to age of respondents. In doing so, 65.2% of respondents up to 25 years of age are unanswered, while respondents aged 26 to 50 and 51 and over list training to a significantly greater extent (Figure 5).

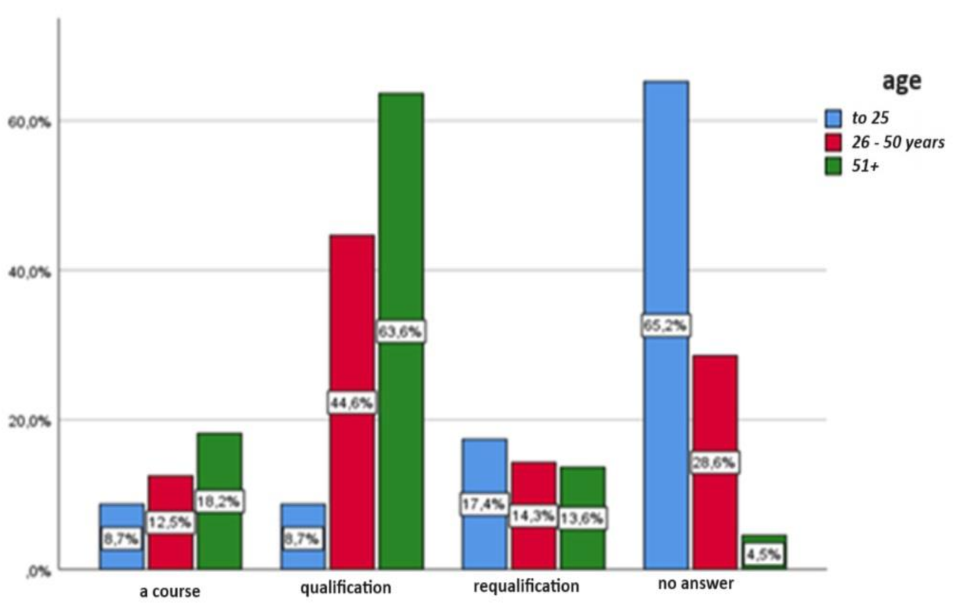

Figure 5. - *Distribution of answers to the question: What kind of program do you attend at the College?*

DISCUSSION

A number of surveys of the main factors of emigration of health professionals abroad have been conducted in Croatia so far. The results of these studies confirm the quantitative results of this research. Unlike the previous analyzes of the main emigration factors conducted on health workers, this sample survey has participants of vocational occupations who become health professionals after completing their education (training, retraining), and with the aim of emigration, thus increasing the number of young people from Croatia to European countries. As there is no research conducted on the same topic, there is no relevant data to compare the data obtained. Therefore, the author will list the main features of quantitative and qualitative research in the discussion. The results of the research showed that the main hypothesis, which as the main reasons why participants enroll in retraining / training states their intention to move abroad and find a job there, is partially confirmed. The secondary hypothesis that gender does not affect attitudes about going abroad has not been confirmed. Another secondary hypothesis, that gender affects attitudes about return from abroad, has been confirmed. Most respondents, as noted, implement a retraining program to find a better job and not necessarily abroad. But it should be mentioned here that some of the respondents who rounded up in the questionnaire so as not to move abroad, in

addition to the rounded answer, were masterfully corresponded to move out if given the opportunity for a good job. So, even some attendees who would prefer to stay in Croatia would not refuse a good business offer from abroad. Taking into account the above facts and the data obtained from the interview, we are certainly getting unfavorable indicators for our homeland. Ljubić conducted a study of the analysis of the factors influencing the emigration of nurses and proved that nurses are 74.7% more prone to emigration than medical technicians. This role is played by old age - those aged 25 to 35they are more prone to emigration 28.6% and the level of education - those with completed secondary education are more likely to emigrate 64%, which is in line with this research. Also, the first selection of the recipient country is Germany for 63.3% of respondents. As many as 86.7 % of respondents do not think about returning to their homeland at all, and the same was confirmed by this study. The difference exists in the main cause of emigration - in Ljubić it is dissatisfaction with working conditions 67.1 %, while the results of this research indicate that the main reason for emigration is social injustice and corruption 65.7% (13). The Troskot and Prskalo also cite clientelism and corruption, political and kinship ties as the main reasons for the departure of highly educated young people. In addition to these factors, young people are demotivated by the realization that their advancement and training depends on subjective and biased criteria. Therefore, the state should necessarily invest in the most endangered areas from which there is the largest brain drain: health, technical and scientific, in order to reduce the emigration of experts (14). In a conducted study, Potočnik and Adamovac confirmed once again that young people from Croatia are emigrating due to the dominant influence of political roles and disorder of the country, with the biggest challenge being separation from their families.

Other reasons for leaving the homeland are: dissatisfaction with life, unemployment, the influence of friends and the pessimism of young people. Respondents described emigration as a positive experience that brought them a sense of happiness, highlighted the increase in social responsibility and the need for their own action, a better quality of life, and at least higher earnings (15). Škalec conducted a study considering the thoughts of female nursing students of the Croatian Catholic University on migration after graduation and obtained the results of how students aged 36 thought about migration, 32.3 %, those who have work experience 29.5 %, and mostly are single 30.6 % with knowledge of a certain level

of German 19.0 % (16). According to Vlačić, the motivation for moving abroad is found by participants in a greater opportunity to improve and advance 48 %, while the positive attitude about professional careers is held by thirty-year-olds, those with high and higher education and 15 years of work experience (17).

The advantage of the research is the correlation of quantitative and qualitative research results that confirm the validity of the data obtained, while the lack is a large proportion, as many as 24.5 % of participants, who did not give any answer to the question of the main reasons for enrollment. In addition, it should be noted that only 15.7 % of male people participated in the survey and that the survey was conducted only in the area of the city of Zagreb, so the results cannot be generalized.

A comparison of the results of the research conducted over the last three years shows that there are non-negligible similarities in the results and that the state has not taken concrete investment measures to prevent the emigration of young highly educated and able-bodied populations. Immigrants give preference to members of the European Union who thus fill their jobs with highly educated, often experienced people who often become cheap labor, while the negative consequences of emigrant countries are seen in the first place in an increasing share of the elderly population.

CONCLUSION

Croatia's accession to the European Union has enabled more free movement of Croatian citizens in the European Union labor market. A large proportion of expatriates are also nurses and other health professionals, as confirmed by data available to official associations, societies and chambers of health professionals. The motivation for the emigration of respondents is: good pay for work, desire for further education in the profession, the need to ensure a better future for your family and higher pensions, and the main reason for emigration is the organization of the state, in which corruption and injustice predominate.

REFERENCES

1. Jurić T. Iseljavanje Hrvata u Njemačku - Gubimo li Hrvatsku? [Are we losing Croatia?]. Zagreb (HR): Školska knjiga; 2018. p. 31
2. Vukorepa I. Migracije i pravo na rad u Europskoj uniji. [Migration and the right to work in the European Union]. Zbornik Pravnog fakulteta u Zagrebu. 2018; 68(1):85–120.

3. Golub B. Hrvatski znanstvenici u svijetu: Socijalni korijeni u prostoru i vremenu. [Croatian scientists in the world: Social roots in space and time]. Zagreb, Hrvatska: Institut za društvena istraživanja; 2004.
4. Šverko I. Studentske namjere odlaska u inozemstvo: Veličina potencijalnog "odljeva mozgova" i njegove odrednice u 1995., 1997. i 2004. godini. [Students' intentions to go abroad: The size of the potential "brain drain" and its determinants in 1995, 1997 and 2004]. Društvena istraživanja: časopis za opća društvena pitanja. 2005; 14(6):1149–74.
5. Perić-Kaselj M, Škiljan F, editors. Dijasporski i manjinski identiteti: migracije, kultura, granice, države. [Diaspora and minority identities: migration, culture, borders, states]. Zagreb, Hrvatska: Institut za migracije i narodnosti; 2018.
6. M. Peruško Uzroci emigriranja mladih [thesis]. [Causes of emigration of young people]. Pula: Sveučilište Jurja Dobrile u Puli, Fakultet ekonomije i turizma "Dr. Mijo Mirković"; 2016. p. 1–44.
7. Lončar Z, editor. Iskustva sestrinske profesije prije i poslije ulaska u EU: [Experiences of the nursing profession before and after joining the EU]. Zbornik 4. Simpozij medicinskih sestara i tehničara s međunarodnim sudjelovanjem. Mostar, BiH: Fakultet zdravstvenih studija Sveučilišta u Mostaru, Sveučilišna klinička bolnica Mostar; 2016. p. 14-15
8. Ravlić D. Sklonost radnoj migraciji učenika Srednje zdravstvene škole u Splitu [thesis]. [Propensity for labor migration of students of the Secondary Health School in Split]. Split: Sveučilište u Splitu, Ekonomski fakultet Split; 2017. p. 1–46.
9. Cerjan M. Odgovor na upit za Luciju Koturić. [Answer to the inquiry for Lucija Koturić]. [Zagreb, Hrvatska: Hrvatska komora fizioterapeuta; 2019. (napomena: direktan izvor)
10. Paklec S. Odgovor na upit za Luciju Koturić.[Answer to the inquiry for Lucija Koturić]. Zagreb, Hrvatska: Hrvatska komora primalja; 2019. (napomena: direktan izvor)
11. Laginja P. Odgovor na upit za Luciju Koturić. [Answer to the inquiry for Lucija Koturić]. Zagreb, Hrvatska: Hrvatska

ljekarnička komora; 2020. (napomena: direktan izvor)

12. Zubović I. Odgovor na upit za Luciju Koturić. [Answer to the inquiry for Lucija Koturić]. Zagreb, Hrvatska: Hrvatska komora dentalne medicine; 2020. (napomena: direktan izvor)
13. Ljubić L. Analiza različitih čimbenika na emigracije medicinskih sestara i tehničara iz Republike Hrvatske [thesis]. [Analysis of various factors on emigration of nurses and technicians from the Republic of Croatia]. Varaždin: Sveučilište Sjever; 2019. p. 1–58.
14. Troskot Z, Prskalo ME, Banović RŠ. Ključne odrednice iseljavanja visokokvalificiranog stanovništva. [Key determinants of emigration of the highly qualified population]. Zbornik radova Pravnog fakulteta u Splitu. 2019; 56(4):877–904.
15. Potočnik D, Adamović M. Iskustvo migracije i planirani odlasci mladih iz Hrvatske. [Migration experience and planned departures of young people from Croatia]. Zagreb, Hrvatska: Zaklada Friedrich Ebert, Zagreb; 2018.
16. Škalec K. Namjera za emigraciju među studentima sestrinstva na Hrvatskom katoličkom sveučilištu [thesis]. [Intention to emigrate among nursing students at the Croatian Catholic University]. Zagreb: Hrvatsko katoličko sveučilište, Odjel za sestrinstvo, Zagreb; 2018.
17. Vlačić A. Stavovi medicinskih sestara i tehničara prema profesionalnoj karijeri i migraciji iz Republike Hrvatske [thesis]. [Attitudes of nurses and technicians towards professional career and migration from the Republic of Croatia]. Osijek: Sveučilište Josipa Jurja Strossmayera u Osijeku, Medicinski fakultet Osijek; 2018. p. 1–37.

MOTIVACIJA HRVATSKIH ZDRASTVENIH DJELATNIKA ZA ODLAZAK U INOZEMSTVO

Lucija Koturić Čabraja

Stomatološki fakultet Sveučilišta u Zagrebu, Petrinjska 34, 10 000 Zagreb, Hrvatska

SAŽETAK

Uvod: Prije ulaska Republike Hrvatske u Europsku uniju, medicinske sestre mogle su se u Njemačkoj zaposliti na temelju sporazuma između Njemačke savezne agencije i Hrvatskog zavoda za zapošljavanje. Nakon pristupa Republike Hrvatske Europskoj uniji 2015. godine, tržište rada postalo je pristupačnije i otvorenije.

Cilj: Istražiti motivaciju hrvatskih zdravstvenih djelatnika za odlazak u inozemstvo.

Ispitanici i metode: Studija je provedena pomoću ankete koja se sastoji od 29 pitanja i u kojoj je sudjelovalo ukupno 102 ispitanika, a u svrhu istraživanja provedena su i tri intervjua.

Rezultati: Rezultati istraživanja pokazali su da polaznici pohađaju prekvalifikaciju kako bi u inozemstvu osigurali bolju budućnost svojoj djeci (38,1 %), kako bi pronašli dobar, stalan i bolje plaćen posao (23,5 %) i priskrbili dostojanstvenu mirovinu (63,7 %). Kao glavni razlog iseljavanja, ispitanici navode korupciju i nepravdu (65,7 %), neuređenost države (59,8 %), dok najveći problem vide u napuštanju obitelji (20,6 %). Krajem 2019. godine Republiku Hrvatsku je napustilo 1438 medicinskih sestara, uglavnom zbog loših radnih uvjeta i nezadovoljstva materijalnim uvjetima rada u Republici Hrvatskoj. Taj trend obuhvatio je i druge zdravstvene djelatnike.

Zaključak: Glavni čimbenik iseljavanja zdravstvenih djelatnika jest političko ustrojstvo države koje se očituje korupcijom i nepravdom, klijentelizmom, političkom pripadnosti te se zamjenjuje čovjekovo znanje, sposobnost, vještina, vrijednost i dostojanstvo.

Ključne riječi: motivacija, odlazak, zdravstveni djelatnici, inozemstvo

Autor za korespondenciju: Lucija Koturić Čabraja, mag. med. techn.

E-mail: koturic.lucija@gmail.com

SAFETY MANAGEMENT AT THE WORKPLACE IN PUBLIC AND PRIVATE HEALTHCARE FACILITIES IN THE CANTON OF SARAJEVO

Amina Šljivo[1], Amer Ovčina[2,3], Lejla Mešalić[4], Marijan Marjanović[5]

[1] Polyclinic “Europharm” Sarajevo, 71 000 Sarajevo, Bosnia and Herzegovina

[2] Faculty of Health Studies, University of Sarajevo, 71 000 Sarajevo, Bosnia and Herzegovina

[3] Clinical Center of the University of Sarajevo, 71 000 Sarajevo, Bosnia and Herzegovina

[4] Faculty of Medicine, University of Tuzla. 75 000 Tuzla, Bosnia and Herzegovina

[5] Faculty of Health Studies, University "Vitez", 72 250 Vitez, Bosnia and Herzegovina

Received on 02.04.2024. Reviewed on 03.04.2024. Accepted on 12.04.2024.

ABSTRACT

Introduction: Workplace safety means implementing a modern risk assessment method automatically included in the risk management activity. When a risk is discovered, it is necessary to reduce it or eliminate it completely through preventive measures or interventions.

Aim: To examine to what extent healthcare organizations care about their workers, to what extent workers are aware of the risks, whether they have adequate working conditions and whether they respect them.

Participants and methods: The study was included 144 healthcare professionals employed in public and private healthcare institutions in the Sarajevo Canton. The sample was selected by the method of random selection. The study is descriptive and comparative.

Results: The total sample (N=144) included 140 or 97.2% respondents working in public healthcare institutions, and 4 or 2.8% respondents working in private healthcare institutions. Almost ¾ of respondents are familiar with the implementation of risk assessment in the workplace, and in 25.0% of cases they are familiar with some strategic document on risk management and assessment of risky workplaces. The largest number of respondents, 63.9%, state that they respect the protection measures provided by the employer. None of the respondents gave reasons for non-compliance.

Conclusion: Respondents confirmed the existence of workplace risks in public and private healthcare institutions and awareness about them, they are fully or partially aware of the risks and partially practice protection against them. A significant number of employees mention illnesses that are potentially caused by a risky workplace.

Keywords: workplace safety, management, healthcare institutions.

Corresponding author: Amina Šljivo, dms, Master of Health Management

e-mail: amina.sljivo@eurofarm.ba

INTRODUCTION

Improving health and safety at work has been an important issue in the European Union (EU) since the 1980s. According to the principles of the United Nations (UN), the World Health Organization (WHO) and the International Labor Organization (ILO), every citizen of the world has the right to healthy and safe work in a working environment that enables him to live a healthy and long productive life. “Numerous key documents speak of this: the Constitution, Alma Ata Declaration, Health for All Strategy, General Work Programs and several resolutions of the World Health Assembly. The need to protect and improve health and safety at work by eliminating and/or controlling hazards and risks in the working environment was emphasized. In this way, the improvement of the health and working ability of working people is achieved" (1).

Workplace safety means the implementation of a modern risk assessment method that is automatically included in the risk management activity. When a risk is discovered, it is necessary to reduce it or eliminate it completely through preventive measures or interventions. Risk assessment at the workplace is crucial and the first step in the prevention of accidents at work, occupational diseases and work-related diseases.

“Within every organization, in order to perform work tasks in an appropriate manner, it is necessary to ensure that the workforce can adequately take care of their health needs, that is, to ensure that their working environment is safe for their health. Health, safety and security are considered to be one of the most important aspects in any company (2).

“Working conditions and the working environment can have a positive (salutogenic) or harmful effect on health and well-being. Employment and work give an individual the possibility of economic security, development of knowledge, work skills and competences, and the ability to socialize. On the other hand, daily exposure to hazards, risk factors (chemical, physical, biological, psychosocial) and various loads can cause occupational illness or accidents at work. Numerous studies have offered convincing evidence of the positive connection between health at work and: good organization of work, clearly defined work tasks, regular supervision and rewards, good management-leadership, a healthy and creative workplace, the safety of which provides conditions suitable for advancement at work and social development. The health and safety

strategy at work not only ensures the health of workers, but also significantly contributes to productivity, product quality, work motivation and job satisfaction." The modern concept of safety and health protection at work is implemented in companies and corporations of the developed world with the message that good safety means good work (3).

In modern companies, the organization of people management with its tasks and activities has positioned itself as an important and significant driver of change, and as a basic prerequisite for efficient and effective operations, that is, as an important determinant of business success (4).

There are several tools and techniques that can be used to assess risk. The decision tree and risk matrix are among the most commonly used tools, but there are other techniques such as hazard analysis and critical control points (HACCP) and job safety analysis (JSA). Depending on the industry and specific workplace, some of these tools may be more appropriate than others.

It is important that risk assessment is carried out and updated regularly to ensure that protection and risk management measures are relevant and effective. In addition, it is important to educate employees about the risks in the workplace and the safety procedures they should follow to reduce the risk of accidents and injuries (5).

By reviewing the available literature as well as the relevant internet databases, we were unable to find similar research in our area an workplace safety that would be specifically focused on work in healthcare institutions. For this reason, we believe that this study will certainly contribute to a better understanding of the issue of safety at workplaces in healthcare institutions, and contribute to their improvement.

The main objective of this study is to examine the extent to which healthcare organizations take care of their workers, especially workers in places of increased risk. Also the objective is to examine the extent to which workers are aware of the risks, whether they are provided with working conditions and whether they respect them.

PARTICIPANTS AND METHODS

The study was conducted among healthcare workers employed in public and private healthcare institutions in the Sarajevo Canton. The survey included 144 healthcare workers. The sample was selected by the method of random selection.

The study is descriptive and comparative. An author's questionnaire created on the

basis of a review of professional and scientific literature and on the basis of experiences from everyday clinical practice was used as a research instrument. The questionnaire was created in the electronic form “Google Forms” and was available to respondents via e-mail. The research was conducted in the period from January 15 to January 30, 2023. The questionnaire is anonymous and it is not possible to find out the identity of the respondents from the answers provided. The scientific methods used are the method of induction, deduction, compilation, etc.

In this research, all ethical principles related to the protection of the identity of the respondents and the data obtained through the questionnaire were respected.

Statistical analysis

The software system SPSS for Windows (version 13.0, SPSS Inc, Chicago, Illinois, USA) and Microsoft Excel (version 11, Microsoft Corporation, Redmond, WA, USA) were used for statistical analysis of the obtained data. Nominal and ordinal variables in the research were analyzed with the χ^2 test, and in case of missing the expected frequency, Fisher's exact test was used. For continuous variables in the study, the symmetry of their distribution was first analyzed using the Shapiro-Wilk test. If the distribution of continuous variables was not symmetrical, the arithmetic mean and standard deviation were used to display the mean value and measures of dispersion, and parametric tests (Student's t-test) were used to compare these variables. If the distribution of continuous variables was asymmetrical, the median and interquartile range were used to display the mean value and dispersion measures, and non-parametric tests (Mann-Whitney U test, Kruskal-Wallis test) were used to compare them.

RESULTS

Sample description

The total sample consisted of 144 healthcare professionals from the area of Sarajevo Canton. The total sample included 140 or 97.2 % of respondents working in public healthcare institutions, and 4 or 2.8 % of respondents working in private healthcare institutions.

In relation to gender distribution, women were more represented in the sample in 125 or 86.8% of cases compared to 19 or 13.2% of men.

In the total sample, respondents in the age group of 37-45 years were most often represented in 52 or 36.1%, followed by respondents in the age group of 46-55 years in 39 or 27.1%, and respondents in the age group of 26-36 years old in 31 or 21.5% of cases.

Only one respondent was over 65 years old.

The largest number of respondents in the sample has completed high school education in 97 or 67.4%, followed by respondents with faculty education in 29 or 20.1%, master's degrees, PhDs or professors in 16 or 11.1% of cases, and only 2 respondents or 1.4% with higher education (Table 1).

Table 1. - *Overview of the sociodemographic characteristics of the respondents*

		N	%
Sector	Public health institution	140	97.2
	Private healthcare institution	4	2.8
Gender	Male	19	13.2
	Female	125	86.8
Age	18-25 years	7	4.9
	26-36 years	31	21.5
	37-45 years	52	36.1
	46-55 years	39	27.1
	56-65 years	14	9.7
	over 65 years	1	.7
Qualifications	Highschool	97	67.4
	Higher education	2	1.4
	Faculty	29	20.1
	Master's degree, doctor of science, professor	16	11.1

Presentation of study results

Respondents rated their health with an average rating of 3.54±0.98 on a scale from 1 to 5. Most often, respondents rated their health with a rating of 4 or 3.

The majority of respondents, 95 or 66.0% state that they do not have any occupational disease, 30 or 20.8% that they do, and 19 or 13.2% that they do not perform health examinations.

Of the total number of respondents, 17 or 11.9% stated that they were offered to change their workplace due to an occupational illness, which 9 or 6.3% accepted immediately, while 8 or 5.6% of the respondents refused it on personal responsibility (Table 2).

Table 2. - *Overview of the average health score and prevalence of occupational diseases*

Health rating (scale 1-5)	**X**	**3.54**	
	SEM	0.08	
	Median	4.00	
	SD	0.98	
	Minimum	1.00	
	Maksimum	5.00	
		N	**%**
Representations of occupational diseases	Yes	30	20.8
	No	95	66.0
	I do not carry out health examinations	19	13.2
Representations of change of workplace due to occupational illness	Yes, but I don't want to change my workplace, I accept on my own responsibility	8	5.6
	Yes, I accepted it immediately	9	6.3
	No	127	88.2

The analysis of the degree of satisfaction with aspects of the working environment on a scale from 1 to 5, where 1 represents the answer “Completely dissatisfied” and 5 “Completely satisfied” shows that the respondents generally evaluated all aspects with an average score of around 3, which corresponds to the answer “Neither satisfied nor dissatisfied” “.

Satisfaction with the technical equipment of the OJ in which they work was assessed with an average score of 2.85±1.23, with the most common answer being “Partially dissatisfied” in 43 or 29.9%. Satisfaction with the relationship between subordinates and superiors was evaluated with an average score of 2.91±1.29, with the most common answer being “Partially satisfied” in 38 or 26.4%. Satisfaction with teamwork was assessed with an average score of 3.08±1.21, with the most common answer being “Partially satisfied” in 43 or 29.9%. Satisfaction with the quality of the working environment was evaluated with an average score of 2.81±1.23, with the most common answer being “Partially satisfied” in 46 or 31.9%. Satisfaction with the amount of monthly income was assessed with an average score of 2.59±1.23, with the most common answer being “Partially dissatisfied” in 46 or 31.9%. Satisfaction with workplace safety was evaluated with an average score of 2.83±1.29, with the most common answer being “Partially dissatisfied” in 46 or 31.9% (Figure 1).

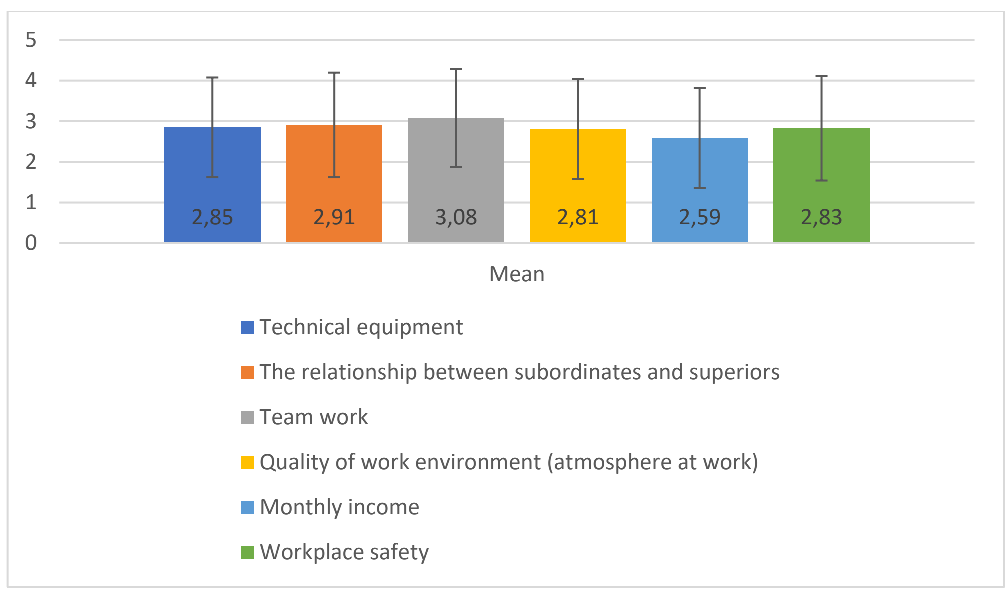

Figure 1. - *Analysis of respondents' degree of satisfaction with aspects of the workplace*

Almost half of the respondents, 69 or 47.9%, state that they do not know or are not sure whether there is an occupational safety service or an authorized worker for occupational safety in their institution. Of the total number, 51 or 35.4% gave an affirmative answer, while 24 or 16.7% gave a negative answer.

To the question "Are you familiar with conducting a risk assessment at the workplace in your institution?", almost ¾ of respondents answered yes in 103 or 71.5% of cases (Table 3).

Table 3. - *Analysis of the presence of occupational health and safety services and the familiarity of respondents*

		N	%
There is an occupational safety service or an authorized worker for occupational safety	Yes	51	35.4
I am familiar with conducting a risk assessment in the workplace	Yes	103	71.5
I am familiar with the risks in the workplace	Yes	81	56.3
	Partially	56	38.9
Acquainted with some strategic document on risk management and assessment of risky workplaces	Yes	36	25.0
	Partially	68	47.2

The analysis of familiarity with some strategic document on risk management and assessment of risky workplaces shows that 36 or 25.0% of respondents are fully aware, 68 or 47.2% partially, and 40 or 27.8% that they are not aware. As the most

common means of personal protection provided to them by the institution where they work, respondents state personal protective equipment according to standards in 68 or 47.2%, followed by regular systematic examinations in 40 or 27.8%, followed by ergonomic working conditions in 23 or 16 .0%, educational seminars for workplace protection in 15 or 10.4%, psychological and social support as needed in 11 or 7.6%, and benefits due to the established estimated risk in 4 or 2.8%. Likewise, 30 or 20.8% of respondents state none of the above (Figure 1).

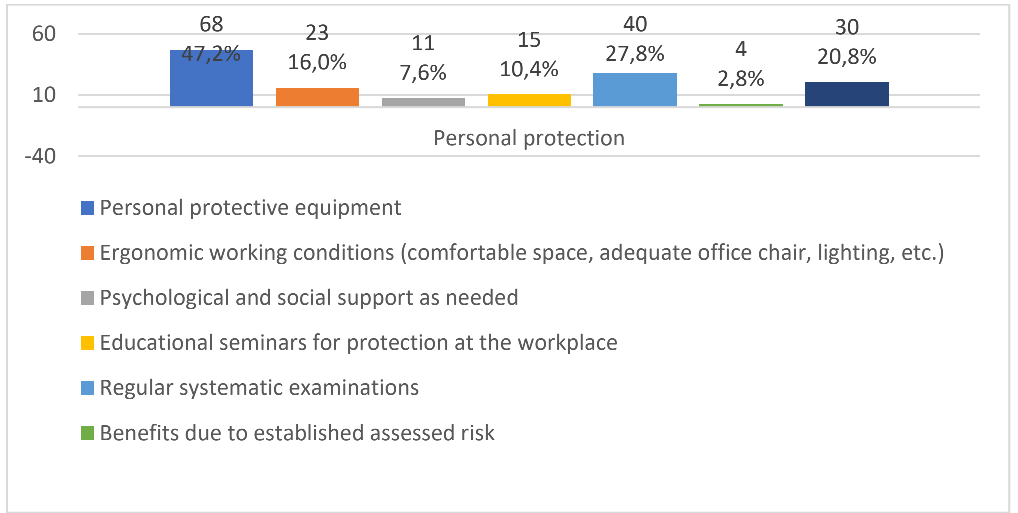

Figure 2. - *Analysis of personal protection conditions provided by the institution*

The largest number of respondents, 92 or 63.9%, state that they respect the protection measures provided by the employer, 32 or 22.2% that they do so because it is mandatory, and 20 or 13.9% that they partially respect the protection measures. None of the respondents gave reasons for non-compliance.

Of the total number of respondents, 17 or 11.8% state that they are familiar with some protection measures that the employer is obliged to provide, but did not do so, 61 or 42.4% partially, and 66 or 45.8% that they are not.

As measures that the employer did not provide, the respondents mentioned: “Personal protection in the zone of ionizing radiation” in 2 cases and in one case: “Security”, “Staff rotation from a more difficult workplace to an easier one”, “Already mentioned above, differences by departments, inequality” and “Protection from noise in the workplace”.

Almost half of the respondents state that there were incidents that occurred due to inadequate risk assessment in the workplace, fully in 26 or 18.1%, and partially in 43 or 29.9%. Out of the total

number, 75 or 52.1% of respondents stated that there were no such incidents.

The analysis of familiarity with the rights and obligations related to protection at work shows that 52 or 36.1% of respondents are fully familiar with the same, 77 or 53.5% partially, and 15 or 10.4% that they are not at all familiar with the aforementioned (Table 4).

Table 4. - *Overview of compliance with measures and familiarity with risks*

		N	%
I respect the protection measures provided by the employer	Yes	92	63.9
	Yes, because it is mandatory	32	22.2
	Partially	20	13.9
I am familiar with some protection measures that the employer is obliged to provide, but he did not do so	Yes	17	11.8
	Partially	61	42.4
I am familiar with incidents that occurred due to inadequate risk assessment at the workplace	Yes	26	18.1
	Partially	43	29.9
I am familiar with the rights and obligations related to protection at work	Yes	52	36.1
	Partially	77	53.5

Correlation analysis shows that familiarity with risks in the workplace has a positive impact in the sense that workers rate their health better, rate interpersonal relations in the workplace better, team work and the quality of the working environment, have higher monthly incomes and rate workplace safety better, as well as the availability of psychosocial assistance if necessary (Table 5).

Table 5. - *Correlation analysis of the impact of familiarity with risks in the workplace*

		Familiarity with workplace risks
Health rating (scale 1-5)	ro	-.276**
	p	.001
The relationship between subordinates and superiors	ro	-.236**
	p	.004
Team work	ro	-.247**
	p	.003
Quality of work environment (atmosphere at work)	ro	-.258**
	p	.002
Amount of monthly income	ro	-.206*
	p	.013
Safety in the workplace	ro	-.263**
	p	.001
Psychological and social support as needed	ro	.193*
	p	.021
****. Correlation significant at p<0.01 level**		
***. Correlation significant at p<0.05 level**		

DISCUSSION

In this research, the majority of respondents stated that they do not have any occupational disease, and about one quarter that they do not perform health examinations. But, of the total number of respondents, almost 12 % stated that they were offered to change their workplace due to an occupational illness.

Almost half of the respondents state that there were incidents that occurred due to inadequate risk assessment in the workplace

According to the other authors, the annual prevalence of HCW incidents and injuries was about 3 %. The highest rate of injuries was found among nurses and nurse assistants and the most commonly reported injuries were from sharp instruments or needle sticks. These injuries are frequent and costly (6, 7). Factors associated with injuries from needles and sharp objects are age, level of education, number of shifts per month, and history of related training (7). Other frequent incidents reported by HCWs were threats and violence. This is a problem, especially in psychiatric care and emergency wards and has been reported by various health professionals (8). Other frequent injury situations were patient manual handling, including positioning, transferring, and lifting. The most

commonly reported pain locations were the trunk, shoulder, arm, hand and lower back. Andersen et al. found an association with daily patient transfer and increased risk for back injury among HCWs and the use of assistive devices reduced the risk (9).

In one review, Vieira et al. summarises that up to 50 – 90 % have WMSD during their careers where low back pain is the body part most commonly affected (10). Another study by Darragh et al. analysed injury incidents among PTs and occupational therapists. They found that among 248 injury incidents, manual therapy and transfers/lifts were associated with 54 % of all injuries (11).

The analysis of the degree of satisfaction with aspects of the working environment on a scale from 1 to 5 shows that the respondents generally evaluated all aspects with an average score of around 3, which corresponds to the answer "Neither satisfied nor dissatisfied".

Almost half of the respondents state that they do not know or are not sure whether there is an occupational safety service or an authorized worker for occupational safety in their institution. Also, the analysis of familiarity with some strategic document on risk management and assessment of risky workplaces shows that one quarter of the respondents are fully familiarized. The largest number of respondents, almost 65 % state that they respect the protection measures provided by the employer.

As measures that the employer did not provide, the respondents mentioned: "Personal protection in the zone of ionizing radiation", "Security", "Staff rotation from a more difficult workplace to an easier one", "Already mentioned above, differences by departments, inequality" and "Protection from noise in the workplace".

Correlation analysis shows that familiarity with risks in the workplace has a positive impact in the sense that workers rate their health better, rate interpersonal relations in the workplace better, teamwork and the quality of the working environment, have higher monthly incomes and rate workplace safety better, as well as the availability of psychosocial assistance if necessary.

Other authors have found that factors associated with injuries from needles and sharp objects are age, level of education, number of shifts per month, and history of related training (7). Other frequent incidents reported by HCWs were threats and violence. This is a problem, especially in psychiatric care and emergency wards and has been reported by various health professionals (8). Other frequent injury situations were patient manual handling,

including positioning, transferring, and lifting. The most commonly reported pain locations were the trunk, shoulder, arm, hand and lower back. Andersen et al. found an association with daily patient transfer and increased risk for back injury among HCWs and the use of assistive devices reduced the risk (9).

Safety at work is an item that has been a priority throughout history, and we especially emphasize it today because there are many drivers and motives, and safety is something that is necessary for every worker, especially those who are exposed to greater risks (12-15).

In Bosnia and Herzegovina, safety at work is an important topic that is considered by numerous experts and authors in their works. In the last few years, the need to ensure safety at work has been particularly emphasized, given that this area is still subject to numerous risks and dangers (2).

In the literature, we find different approaches to this topic, depending on the field of research and the interest of the author. Some authors focus on the legal framework for occupational safety, while others consider practical measures that can be taken to ensure a safe working environment (12-15).

The authors in Bosnia and Herzegovina emphasize that responsibility for safety at work is shared between employers and employees. Employers are responsible for providing safety conditions, equipment and tools, and training employees on safety protocols and procedures in the event of accidents or injuries. Employees, on the other hand, are responsible for complying with safety regulations and acting in accordance with them. This research confirms that a large number of workers adhere to protective measures, but that employers have not in all cases provided everything necessary for workplace safety (16-19).

The Agency for Quality and Accreditation in Health Care in Federation of Bosnia and Herzegovina (AKAZ) has developed Safety and Quality Standards for hospitals that help create a safer environment for both patients and health professionals working in health care facilities, which all accredited health care facilities are required to adhere to (20). In some books on this topic, the importance of education and training of employees is emphasized in order to increase the awareness of safety at work. The authors also recommend regular equipment maintenance, strict safety protocols and risk assessment, which can help prevent accidents and injuries. Workers in public and private healthcare institutions confirm that protocols of this type are followed, but that there is much room for improvement (21).

Finally, the importance of constant evaluation of security measures and protocols, as well as regular training of employees, is emphasized. All these measures can contribute to risk reduction and ensure the safety of employees in the workplace (22).

Many authors emphasize the need for employers to take responsibility for the safety of their employees and provide adequate training and protective equipment to prevent accidents and injuries at work.

Also, the legal framework for occupational safety is discussed and the rights and obligations of employers and employees are discussed. The authors recognize the importance of workplace safety and provide valuable insights and recommendations on how to ensure a safe work environment for all employees. Their works provide practical advice and guidance for employers and employees on how to prevent accidents and injuries and how to comply with safety regulations.

The analysis carried out by Ovčina and Karić showed that respondents who are currently in the process of professional development or have a better social background are less exposed to mobbing in the form of “passive-aggressive communication”. People with high incomes are less exposed to “pathological lying as a means to an end”, in contrast to respondents who live in urban areas. People with a higher level of education are more exposed to “stress due to communication with colleagues and patients, conflicts” (2018), which also speaks to the safety factors at the workplace that were also examined by this research (23).

Begović (2020) also concludes in his research on the role of safety managers in the development of safety culture that an expert responsible for ensuring safety at work is necessary primarily for the purpose of ensuring humane working conditions and prevention of injuries and illnesses at work, and secondarily for the general well being of workers and more efficient work of employees engaged in risky or relatively risky occupations. The analysis of workers' attitudes towards safety showed that workers have a developed attitude about safety, but the values have large deviations, which indicates the existence of exceptions that can have negative consequences, which was also confirmed in this research (24).

Therefore, we can say that it is of crucial importance that workers are provided with conditions for safe work and that work is done on the awareness of workers on issues of safety at work, that is, that they know what they can legally demand from the employer.

Methods such as trainings and workshops related to safety at work can be helpful, but it is important that in the future it is possible for institutions to employ safety experts in the workplace, whether they are individuals or organizations. This would relieve the administration of the institution and open up space for improving workplace safety, which in the future would motivate workers to be more productive at work, but also happier with the work they do, which would ultimately lead to better efficiency.

CONCLUSIONS

Health workers confirmed the existence of workplace risks in public and private healthcare institutions and their awareness of them. Respondents are fully or partially aware of the risks and partially practice protection against them. Less than half of the respondents confirmed that risk protection measures are provided at the workplace by the employer. A significant number of employees mention illnesses that are potentially caused by a risky workplace.

In Bosnia and Herzegovina, there are regulations related to this area, such as the Law on Safety and Health Protection at Work and the Rulebook on the Organization and Way of Implementing Occupational Safety Measures in Health Care Institutions. Safety management in healthcare institutions is a long-term process, but its adoption achieves better protection of the health and safety of employees and patients, and ultimately improves the quality of healthcare.

REFERENCES

1. Alexander M, et al. Zdravlje i sigurnost na poslu [Health and safety at work]. In: Stručni tekstovi iz sestrinstva LEMON [Professional texts from nursing LEMON]. Sarajevo (BIH): Fondacija Fami; 1999.
2. Pranjić N. Sigurnost i zaštita zdravlja na radu [Safety and health protection at work]. Sarajevo (BIH): Forum lijeve Inicijative; 2016.
3. Pranjić N. Acute and chronic work – related stress: adrenalin fantigue, and time as decisive factor with regard to the harmful effects. Proceedings of Conference of Global safety (Globalna varnost). 2009.
4. Arsenović B. Organizaciona socijalizacija kao integrativni faktor organizacione kulture. Sinteza – impact of the Internet on Business Activities in Serbia and Worldwide. 2014.
5. Stipić D. Zdravlje i sigurnost na radu [Health and safety at work] [master thesis]. Karlovac (HR): Sveučilište u Karlovcu; 2021.

6. Health and Safety Executive (HSE), Workplace Fatalities in Great Britain 2018 [Internet]. HSE Annual Statistics; July 4, 2018 [accessed 29.04.2024.]. Available from: http://www.hse.gov.uk/statistics/pdf/fatalinjuries.pdf
7. Elseviers MM, Arias-Guillén M, Gorke A, Arens HJ. Sharps injuries amongst healthcare workers: review of incidence, transmissions and costs. J Ren Care. 2014 Sep;40(3):150-6. doi: 10.1111/jorc.12050. Epub 2014 Mar 20. PMID: 24650088.
8. Motaarefi H, Mahmoudi H, Mohammadi E, Hasanpour-Dehkordi A. Factors Associated with Needlestick Injuries in Health Care Occupations: A Systematic Review. J Clin Diagn Res. 2016 Aug;10(8):IE01-IE04. doi: 10.7860/JCDR/2016/17973.8221. Epub 2016 Aug 1. PMID: 27656466; PMCID: PMC5028444.
9. Groenewold MR, Sarmiento RFR, Vanoli K, Raudabaugh W, Nowlin S, Gomaa A. Workplace violence injury in 106 US hospitals participating in the Occupational Health Safety Network (OHSN), 2012-2015. Am J Ind Med. 2018 Feb;61(2):157-166. doi: 10.1002/ajim.22798. Epub 2017 Nov 20. PMID: 29152784.
10. Andersen LL, Burdorf A, Fallentin N, Persson R, Jakobsen MD, Mortensen OS, et al. Patient transfers and assistive devices: prospective cohort study on the risk for occupational back injury among healthcare workers. Scand J Work Environ Health. 2014 Jan;40(1):74-81. doi: 10.5271/sjweh.3382. Epub 2013 Sep 12. PMID: 24030699.
11. Vieira ER, Schneider P, Guidera C, Gadotti IC, Brunt D. Work-related musculoskeletal disorders among physical therapists: A systematic review. J Back Musculoskelet Rehabil. 2016 Aug 10;29(3):417-28.
12. Darragh AR, Campo M, King P. Work-related activities associated with injury in occupational and physical therapists. Work. 2012;42(3):373-84. doi: 10.3233/WOR-2012-1430. PMID: 22523031; PMCID: PMC3839086.
13. Šijaković A. Doprinos društveno odgovornog poslovanja sigurnosti i zaštiti zdravlja na radu [The contribution of socially responsible business to safety and health protection at work] [dissertation]. Zagreb (HR): Sveučilište u Zagrebu; 2016.
14. Šimunović T. Rizici u radu medicinske sestre [Risks in the work of a nurse] [dissertation]. Bjelovar(HR): Sveučilište u Bjelovaru; 2016.

15. Horvat K. Zaštita i sigurnost na radu u nastavnom programu medicinskih sestara/tehničara opće njege u Republici Hrvatskoj i susjednim zemljama [Protection and safety at work in the teaching program of nurses/general care technicians in the Republic of Croatia and neighboring countries]. Sigurnost [Internet]. 2019.
16. Pravilnik o zaštiti zdravlja na radu u zdravstvenim ustanovama. Službeni glasnik Federacije BiH, br. 76/13.
17. Pravilnik o zaštiti zdravlja na radu u zdravstvenim ustanovama. Službene novine Federacije BiH, br. 26/04.
18. Zakon o zaštiti na radu u Federaciji BiH. Službeni glasnik Federacije BiH, br. 26/16.
19. Zakon o zdravstvenoj zaštiti u Federaciji BiH. Službeni glasnik Federacije BiH, br. 32/12.
20. Agencija za kvalitet i akreditaciju u u zdravstvu Federacije Bosne i Hercegovine, Standardi sigurnosti i kvaliteta za bolnice, Standardi za bolnice 2020 (akaz.ba)
21. Hrenović J. Risk management in healthcare. Croatian Journal of Public Health. 2019.
22. Habek I. Organizacijska kultura i strategija [Organizational culture and strategy] [dissertation]. Pula (HR):Sveučilište u Puli; 2021.
23. Ovčina A, Eminović E, Izetbegović S, Marušić J, Dedović D, Spasojević N. Menadžment rizika u procesu kliničke zdravstvene njege [Risk management in the process of clinical health care]. Acta medica Croatica [Internet]. 2020 [accessed 29.04.2024.];74(3):291-91. Available at: https://hrcak.srce.hr/245745
24. Begović V. Sigurnost na izdvojenom mjestu rada [Safety at a separate workplace]. Sigurnost [Internet]. 2020. [accessed 29.04.2024.];62(4):391-401. Available at: https://doi.org/10.31306/s.62.4.6

UPRAVLJANJE SIGURNOŠĆU NA RADU U JAVNIM I PRIVATNIM ZDRAVSTVENIM USTANOVAMA U KANTONU SARAJEVO

Amina Šljivo[1], Amer Ovčina[2,3], Lejla Mešalić[4], Marijan Marjanović[5]

[1]Poliklinika "Europharm" Sarajevo, 71 000 Sarajevo, Bosna i Hercegovina

[2]Fakultet zdravstvenih studija, Sveučilište u Sarajevu, 71 000 Sarajevo, Bosna i Hercegovina

[3]Klinički centar Sveučilišta u Sarajevu, 71 000 Sarajevo, Bosna i Hercegovina

[4]Medicinski fakultet Univerziteta u Tuzli. 75 000 Tuzla, Bosna i Hercegovina

[5]Fakultet zdravstvenih studija, Sveučilište "Vitez", 72 250 Vitez, Bosna i Hercegovina

SAŽETAK

Uvod: Sigurnost na radnom mjestu podrazumijeva primjenu moderno koncipirane metode procjene rizika koja se automatski uključuje u aktivnost upravljanja rizikom. Kada se otkrije rizik, potrebno ga je preventivnim mjerama ili intervencijama smanjiti ili potpuno otkloniti. Cilj: Ispitati u kojoj mjeri zdravstvene organizacije brinu o svojim radnicima, u kojoj su mjeri radnici svjesni rizika, da li imaju adekvatne uslove rada i da li ih poštuju.

Ispitanici i metode: Istraživanjem je obuhvaćeno 144 zdravstvenih radnika zaposlenih u javnim i privatnim zdravstvenim ustanovama na području Kantona Sarajevo. Uzorak je odabran metodom slučajnog izbora. Studija je deskriptivna i komparativna.

Rezultati: Ukupan uzorak (N=144) obuhvata 140 ili 97,2 % ispitanika koji rade u javnim zdravstvenim ustanovama i 4 ili 2,8 % ispitanika koji rade u privatnim zdravstvenim ustanovama. Gotovo ¾ ispitanika upoznato je sa primjenom procjene rizika na radnom mjestu, u 25,0 % slučajeva je upoznato sa nekim strateškim dokumentom o upravljanju rizicima i procjeni rizičnih radnih mjesta. Najveći broj ispitanika, njih 63,9 %, navodi da poštuje mjere zaštite koje im poslodavac pruža. Niko od ispitanika nije naveo razloge za nepoštovanje.

Zaključak: Ispitanici su potvrdili postojanje rizika na radnom mjestu u javnim i privatnim zdravstvenim ustanovama i svijest o njima, te su potpuno ili djelimično svjesni rizika i djelimično praktikuju zaštitu od njih. Značajan broj zaposlenih navodi oboljenja koja su potencijalno uzrokovana rizičnim radnim mjestom.

Ključne riječi: sigurnost na radnom mjestu, menadžment, zdravstvene ustanove**.**

Autor za korespondenciju: Amina Šljivo, dms, magistar zdravstvenog menadžmenta

E-mail: amina.sljivo@eurofarm.ba

COST ASSESSMENT OF COMPUTED RADIOGRAPHY TOWARDS CONVENTIONAL RADIOGRAPHY

Darko Tomić[1,2,3], Vesna Majher Tomić[1], Ivana Stojak[2], Tanja Bavrka[3], Jasmina Marušić[4]

[1] Croatian Hospital "Dr. Fr. Mato Nikolić",72 276 Nova Bila, Bosnia and Herzegovina

[2] Faculty of Health Studies, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

[3] Faculty of Health Studies, University "Vitez", 72 270 Travnik, Bosnia and Herzegovina

[4] Faculty of Medicine, University of Zenica, 72 000 Zenica, Bosnia and Herzegovina

Received on 03.11.2023. *Reviewed on 11.01.2024.* *Accepted on 22.04.2024.*

ABSTRACT

Introduction: With the expansion of the development of computer equipment and the improvement of software interfaces, there is also a sudden development of radiology without film, through computerized radiography (CR) systems. The CR system made it possible to improve the quality of the radiological image, and thus to make a more accurate and faster diagnosis.

Objective: To estimate the costs of computed radiography compared to conventional radiography.

Materials and methods: The analysis used data on the costs of radiological materials and existing radiological information systems from the plans and signed contracts for 2019 and 2022 in the Croatian Hospital "Dr. Fr. Mato Nikolić" Nova Bila.

Results: The costs of conventional radiology are exceptionally high, including the procurement of X-ray films, processing chemicals, and equipment maintenance. The analysis compares the number of procedures and the displayed costs for the hospital.

Conclusion: Computerized radiography is more cost-effective than conventional radiography due to reusable phosphor imaging plates and reduced chemical and film expenses.

Keywords: Diagnostic Imaging, Radiography, Cost-Effectiveness Analysis, Radiology Information Systems

Corresponding author: Darko Tomić, MSc

e-mail: darkotomic@hotmail.com

INTRODUCTION

In the last thirty years, digital radiology began to strongly develop thanks to the development and improvement of computer techniques. The advantages of computerization of radiological activities have been recognized worldwide for decades. The originator of the idea of a hospital without films was the American doctor Eliot Siegel. It took four years for him to realize his idea, and already in 1993 he was at the head of the first hospital without films in the World (1). The main goal of introducing filmless radiology was to avoid the loss of films. At that time, there were comments that the hospital had been without films before, because otherwise it was impossible to find them. The first hospital in the United Kingdom to introduce radiology without films in 1997 (2). The first radiology without films in the region was introduced in 2006 at the Banja Luka Clinical Center (3). The advantages of the computerization of radiology are the reduction of costs, the increase of productivity and the level of quality of the X-ray image. Instead of using conventional X-ray film to capture the image, computed radiography (CR) uses a recording plate (digital panel). This plate contains photosensitive storage phosphors, which retain the latent image. When the image plate is scanned by the laser beam in the digitizer, the latent image information is released as visible light. This light is captured and converted into a digital stream to compute a digital image. An additional image processing process called postprocessing is a procedure that enables the enlargement of certain anatomical details up to several times, as well as precise measurements, length and volume of different organs or pathological processes, which is important for planning further therapy (4). This compatibility with existing sources and imaging plate makes the transition from traditional film radiography to CR a fairly uncomplicated and inexpensive proposition. In a digital image, it is possible to distinguish 4000 shades of gray, while the human eye can distinguish about 50 shades. The basic features of every radiological digital image are spatial resolution and contrast (5).

Digital radiological images are archived in the picture archiving and communication system (PACS) and radiology information system (RIS). All communication is done in Digital Imaging and Communications in Medicine (DICOM) format (6). The PACS system is a system in which imaging devices, computers (workstations), servers and digital archives are connected. It serves for storing, searching, transferring, managing, distributing and displaying medical images (7). Electronic images and

messages are transmitted digitally through the PACS system, replacing the need for manual work. Via the Internet and Virtual Private Network channels, it is connected to other information systems in the health institution, institutions in the region and teleradiology (8). The RIS system serves for the reception and registration of patients, the storage of finished findings and the administrative management of the radiology department.

The objective of the study was to estimate the costs of computed radiography compared to conventional radiography.

MATERIALS AND METHODS

The analysis used data on the costs of radiological materials and existing radiological information systems from the plans and signed contracts for 2019 and 2022 in the Croatian Hospital "Dr. Fr. Mato Nikolić" Nova Bila. In our study, only descriptive cost analysis data is presented.

The cost analysis included consumables, which could be completely replaced by the computerization of the radiological activity. The analysis compared the number of procedures and the displayed costs for the hospital.

The source of information on the costs of consumables was obtained from the Hospital's Economic Affairs Service. Due to the limited availability of data on all costs for all hospital consumables, as well as the donations received, the analysis was done only for the most commonly used radiological consumables. Radiological consumables included in the analysis were the advantages of computed radiography. The collected data were entered into the Microsoft Excel program 2016, Microsoft corp., where appropriate functions and tools for data tabulation were used.

RESULTS

The conducted researchinto the impact of computerization in radiology on costs and efficiency, utilizing real data from our healthcare institution.

Below we present an estimate of the costs of conventional and computerized radiography (Table 1).

Table 1. - *The costs of conventional and computerized radiography*

Radiological consumables	Conventional radiography	Computed radiography
X-ray films (various sizes)	4500.84 EUR	0
Chemicals - fixer (X- Omat)	544.00 EUR	0
Chemicals - developer (X- Omat)	1001.09 EUR	0
Paper cartridges for X-ray films	15.56 EUR	0
DVB films for CT imaging	3644.65 EUR	0
DVD-R media (4.7GB)	0	8.31 EUR
CD-R media (700 MB)	0	32.74 EUR
Paper cover for CD/DVD	0	37.85 EUR
One-year rental of radiology image storage and communication system (PACS) extension	-	0
One-year RIS maintenance and user support service	-	0
Connecting radiology software applications	-	0
Total estimated costs / EUR	9697.08 EUR	78.90 EUR
Total estimated costs / EUR	9775.99 EUR	

DVB – Digital Versatile Broadcasting; DVD-R – Digital Versatile Disc Recordable; CD-R – Compact Disc Recordable; GB – Gigabytes; MB – Megabytes; RIS – Radiology Information System

DISCUSSION

Based on the results of our research, it is evident that the costs of conventional radiology are exceptionally high, including the procurement of X-ray films, processing chemicals, and equipment maintenance. These costs are significantly reduced through the use of digital technology. For instance, the costs of acquiring films, chemicals, and paper cartridges for X-ray films in digital radiology are zero, whereas in conventional radiology, these costs are substantial.

Many documents point out that relying on information systems can lead to a loss of attention and concentration of employees in relation to the flow of data, control of procedures and the very implementation of procedures (10). Typical errors in the use of information systems include lack of complete documentation in the database, inconsistencies in multiple databases, lack of manual verification of computer operations and calculations, and lack of appropriate procedures for verification and quality control (11).

Although the advantage of "paperless" operation of information systems due to

space saving is highlighted, some researchers point to the weaknesses of the system. For example, in some countries, the keeping of paper documentation and its preservation is still regulated by law. Trust in data storage in electronic form has not been fully achieved (12).

As far as radiology is concerned, the modernization and implementation of information technologies depends on the devices. It is recommended to replace devices older than ten years, while devices older than five years can be upgraded with software (13). Economic problems in Europe make it difficult to implement IT technologies in radiology, and a percentage of equipment of different ages is recommended in order to maintain the quality of work (14). Close cooperation of all involved entities in development and management for proactive, long-term, systematically based strategies and infrastructure will enable a sustainable future of quality radiology (15).

The benefits of computed radiography are: storing the amount of X-ray action on the phosphor of the digital plate has an extremely wide dynamic range. This gives a high tolerance to different exposure conditions and greater freedom in choosing the exposure dose. As a result, the need for repeated exposures is drastically reduced,drastic reduction of the radiation dose for the patient and professionally exposed staff,reduced time required for the procedure - TAT (Turn Around Time),speeding up radiological interpretations in emergency cases (teleradiology),the possibility of networking institutions and all devices,flexible phosphor plates that can be reused up to 10,000 times (9).

One study has reported that CR increased mean number of examinations by 12% compared to conventional radiography. The same study has found that the time for the radiogram to get ready for interpretation shortened by 77% in CR compared to conventional (16).

We expected to find a higher radiographic quality score in CR group owing to the ability of the manipulation of the digital data, acquisition of a wide dynamic range, and a higher spatial resolution compared to conventional radiography (17,18).

Two studies reported that CR (phosphorus cassette) radiograms assess mediastinal structures and peripheral lung fields with a higher score compared with conventional radiograms (19). Van Soldt et al. reported a better image quality with CR compared to conventional radiography (20).

Despite the obvious advantages of digital X-ray imaging, there is a lack of clarity around the associated ethical and legal issues. Whether the current law applies to

telemedicine in the same way as it applies to other medical specialties remains controversial (9).

We can say that the prices of conventional and digital technology services were approximate, but due to the lack of complete data on the service, there will be no research method.

It is important to note that the services of installation, rental and expansion of the system for storage and communication of radiological images (PACS), maintenance services of user support (RIS) and connection of radiology software applications are borne by the Government of the Canton of Central Bosnia, so the hospital has no additional costs from that side.

CONCLUSION

Computerized radiography is more cost-effective than conventional radiography due to reusable phosphor imaging plates and reduced chemical and film expenses.The decision to switch from conventional to computed radiography should be made on the basis of cost savings and improved productivity, looking at the long term. From the results of the cost analysis, we can conclude that the existing information systems and digitization they replace conventional radiology, and are economically justified - they bring significant savings.

REFERENCES

1. Siegel E, Reiner B. Filmless radiology at the Baltimore VA Medical Center: a 9 year retrospective. Comput Med Imaging Graph. 2003; 27:101-9.
2. Park C, You SC, Jeon H, Jeong CW, Choi JW, Park RW. Development and Validation of the Radiology Common Data Model (R-CDM) for the International Standardization of Medical Imaging Data. Yonsei Med J. 2022; 63(Suppl):S74-S83. doi: 10.3349/ymj.2022.63.S74. PMID: 35040608; PMCID: PMC8790584.
3. Praskalo J, Vulin N. Information technologies in radiology. Infotech. Jahorina. 2010; 9:909-12.
4. Atkinson S, Michael D. Reject rate analysis in digital radiography: an Australian emergency imaging department case study. Journal of Medical Radiation Sciences. 2019. 67. 10.1002/jmrs.343.
5. Biber D. Digital radiological methods [Final thesis]. University of Split, University Department of Health Studies; 2014. [Accessed: 25.03.2023]. Available at: https://urn.nsk.hr/urn:nbn:hr:176:385877

6. Mildenberger P, Eichelberg M, Martin E. Introduction to the DICOM standard. EurRadiol. 2002; 12(4):920-7. doi: 10.1007/s003300101100. Epub 2001 Sep 15. PMID: 11960249.
7. Bidgood WD Jr, Horii SC, Prior FW, Van Syckle DE. Understanding and using DICOM, the data interchange standard for biomedical imaging. J Am Med Inform Assoc. 1997; 4(3):199-212. doi: 10.1136/jamia.1997.0040199. PMID: 9147339; PMCID: PMC61235.
8. Turk A. Possibilities of computerization of radiology: assessment of current costs [Final specialist]. Zagreb: University of Zagreb, Faculty of Medicine; 2015; [accessed 26 August 2023]. Available at: https://urn.nsk.hr/urn:nbn:hr:105:032171
9. White P. Legal issues inteleradiology - distant thoughts! No. J Radiol. 2002; 75(891):201-6. doi: 10.1259/bjr.75.891.750201. PMID: 11932211. 201-6.
10. Boochever S. HIS/RIS/PACS integration: getting to the gold standard. Radiology Management. 2004; 26(3):16-24.
11. Hackländer T, Kleber K, Martin J, Mertens H. DICOM router: an open source toolbox for communication and correction of DICOM objects, Academic radiology. 2005; 12(3):385-92.
12. Fornell D. New Trends and Technology in Radiology. Radiol Soc North Am. 2013. Available at: http://www.itnonline.com/article/newtrends-and-technology-radiology-
13. Napoli M, Nanni M, Cimarra S, Crisafulli L, Campioni P, Marano P. Picture archiving and communication in radiology, Rays, 2003; 28(1):73-81
14. Kumar S, Krupinski E. Teleradiology, Berlin Hiedelberg: Springer Verlag, Berlin, 2008.
15. Vukman D. An example from healthcare: Quality as a means of saving money in radiology. In: Proceedings of the 13th Croatian Conference on Quality; 2013. Brijuni: Croatian Society for Quality; p. 88-58.
16. Andriole KP. Productivity and cost assessment of computed radiography, digital radiography, and screen-film for outpatient chest examinations. Journal of Digital Imaging 2002; 15:161-9
17. Commission of the European Communities a – Radiation Protection Programme. CEC Quality Criteria for Diagnostic Radiographic Images and Patient Exposure Trial. Caats- inserm eur 12952. (1989).

18. Busch HP. Digital radiography for clinical applications. EurRadiol 1997; 7 Suppl3:66-72.
19. Ramli K, Abdullah BJ, Ng KH, Mahmud R, Hussain AF. Computed and conventional chest radiography: a comparison of image quality and radiation dose. AustralasRadiol 2005;49:460-6
20. Van Soldt RT, Zweers D, van den Berg L, Geleijns J, Jansen JT, Zoetelief J. Survey of posteroanterior chest radiography in The Netherlands: patient dose and image quality. Br J Radiol. 2003;76:398-405

PROCJENA TROŠKOVA KOMPJUTERIZIRANE RADIOGRAFIJE PREMA KONVENCIONALNOJ RADIOGRAFIJI

Darko Tomić[1,2,3], Vesna Majher Tomić[1], Ivana Stojak[2], Tanja Bavrka[3], Jasmina Marušić[4]

[1] Hrvatska bolnica "Dr. fra Mato Nikolić", 72 276 Nova Bila, Bosna i Hercegovina

[2] Fakultet zdravstvenih studija Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

[3] Fakultet zdravstvenih studija Sveučilišta "Vitez", 72 270 Travnik, Bosna i Hercegovina

[4] Medicinski fakultet Univerziteta u Zenici, 72 000 Zenica, Bosna i Hercegovina

SAŽETAK

Uvod: Ekspanzijom razvoja računalne opreme i usavršavanjem softverskih sučelja dolazi i do naglog razvoja radiologije bez filma, kroz sustave računalne radiografije. Sustav računalne radiografije omogućio je poboljšanje kvalitete radiološke slike, a time i točniju i bržu dijagnozu.

Cilj: Procijeniti troškove računalne radiografije u usporedbi s konvencionalnom radiografijom.

Materijali i metode: U analizi su korišteni podaci o troškovima radioloških materijala i postojećih radioloških informacijskih sustava iz planova i potpisanih ugovora za 2019. i 2022. godinu u Hrvatskoj bolnici "Dr. fra Mato Nikolić" Nova Bila.

Rezultati: Troškovi konvencionalne radiologije iznimno su visoki, uključujući nabavu rendgenskih filmova, kemikalija za obradu i održavanje opreme. Analiza uspoređuje broj postupaka i prikazanih troškova za bolnicu.

Zaključak: Računalna radiografija isplativija je od konvencionalne radiografije zbog fosfornih ploča za višekratnu upotrebu i smanjenih troškova kemikalija i filma.

Ključne riječi: slikovna dijagnostika, radiografija, analiza isplativosti, radiološki informacijski sustavi

Autor za korespondenciju: mr. sc. Darko Tomić

e-mail: darkotomic@hotmail.com

BURNOUT SYNDROME OF NURSES/TECHNICIANS IN THE COVID-19 PANDEMIC AT UNIVERSITY CLINICAL HOSPITAL MOSTAR

Marija Vidović[1] & Boris Lukšić[2,3]

[1] Clinical Institute for Nuclear Medicine, Clinical Hospital Centre Split, 21 000 Split, Croatia

[2] Clinical Department of Infectious Diseases, Clinical Hospital Centre Split, 21 000 Split, Croatia

[3] School of Medicine, University of Split, 21 000 Split, Croatia

Received on 13.03.2024. Reviewed on 27.03.2024. Accepted on 04.04.2024.

ABSTRACT

Introduction: Burnout syndrome results from chronic stress at work combined with ineffective coping with stress. Medical workers belong to the occupations with the highest percentages of burnout syndrome, which has been further increased by the crisis caused by the COVID-19 pandemic.

Objective: To identify the symptoms and risk factors for the development of burnout syndrome in nurses/technicians during the COVID-19 pandemic.

Subjects and methods: A prospective study was conducted with a survey for symptoms and risk factors for the development of burnout syndrome among nurses/technicians of the University Clinical Hospital (UCH) Mostar in the COVID wards, during the COVID-19 pandemic, in July and August of 2021. A survey questionnaire specially created for this research was used, and data analysis was performed in the program SPSS.

Results: All nurses and technicians felt exhaustion while working in the COVID wards, they were worried about infecting their family members, and the vast majority had severe headaches and were irritable. Most of the respondents had demanding working hours, were overloaded with work and insufficiently informed about this new disease. However, most nurses/technicians did not show serious symptoms such as anxiety, concentration problems, high blood pressure, emotional exhaustion, depression, or suicidal thoughts. Almost everyone experienced a sense of belonging to the team and good mutual communication.

Conclusion: The research indicates a significant risk of burnout syndrome among nurses and technicians while working with COVID-19 patients. Therefore, it is very important to recognize the development of this syndrome in time, and to develop a strategy for prevention, treatment, and rehabilitation of these persons.

Keywords: nurses/technicians, burnout syndrome, COVID-19, healthcare system.

Contact person: Marija Vidović, mag. med. techn.

E-mail: mrsicmare@gmail.com

INTRODUCTION

Coronavirus-2 (SARS-CoV-2) is a new virus that appeared at the end of 2019 in Wuhan, China, and is recognized as the cause of an epidemic of severe pneumonia. Today, this coronavirus disease is called COVID-19 and has spread in the form of a pandemic on a global level (1, 2). The disease is transmitted mainly by droplets, but also by touching contaminated surfaces and by the feco-oral route (2,3). The spectrum of symptomatic infection with SARS-CoV-2 ranges from mild to critical clinical conditions, including acute respiratory distress syndrome (ARDS), acute renal failure, heart failure, or fatal outcome (4,5). Most patients experience mild symptoms and have a good prognosis (6).

Burnout syndrome results from chronic stress at work combined with ineffective coping with stress (7). Chronic workload-related stress is often treated as depression or left untreated (8). Symptoms include difficulty concentrating, irritability, insomnia, muscle pain, dizziness and palpitations (9). For a diagnosis, symptoms must be present for at least two weeks, with significant suffering and reduced ability to work, excluding other diagnoses or abuse of psychoactive substances (9).

Stages of burnout syndrome:

- Work enthusiasm: strong energy, unrealistic expectations, job satisfaction.
- Stagnation: awareness of inability to cope with workload, feeling of frustration, communication problems.
- Emotional withdrawal: isolation from colleagues, physical symptoms such as headaches and insomnia.
- Apathy: loss of motivation, minimal engagement, loss of self-confidence and communication problems (9, 10).

Research shows that medical workers are exposed to a much higher level of stress at the workplace compared to the general population under normal circumstances, and are exposed to a higher risk of psychosomatic diseases (10, 11). Nevertheless, a person exposed to stress still uses various strategies to cope with stress, has the will and motivation to fight, but when the burnout syndrome occurs, the person feels a great loss of motivation, no longer wants to go to work, psychological and somatic complaints intensify and has feeling as if there is no more strength to fight (12). Health care workers, nurses and doctors belong to the professions with the highest percentages of burnout syndrome, which was further increased by the crisis caused by the pandemic of the disease COVID-19 (13, 14). Front-line medical staff are under increased psychological

burden during the pandemic, with higher levels of stress, anxiety and depression than second-line medical staff.

In 2020, in the United States, 54% of nurses and technicians had burnout syndrome (15). Nurses are exposed to psychosocial risks that can impair both psychological and somatic health due to stressful conditions, and prolonged stress can lead to burnout syndrome. An important protective factor against psychosocial risks is emotional intelligence, which is associated with physical and psychological health, job satisfaction, increased commitment to work and reduced burnout (16).

Since the review of previous research systematically indicates an increase in the symptoms of burnout syndrome during the COVID-19 pandemic, the main goal of this research is to identify the symptoms and risk factors for the occurrence of burnout syndrome in nurses/technicians of the UCH in Mostar who worked in the COVID wards, during this pandemic.

SUBJECTS AND METHODS

A prospective study was conducted with a survey for symptoms and risk factors for the occurrence of burnout syndrome, which was completed by 60 nurses/technicians of UCH Mostar who worked on the COVID wards, during the COVID-19 pandemic, in July and August of 2021. A survey questionnaire specially created for this research was used with a set of questions that included basic information about healthcare workers, such as demographic characteristics (age, gender, profession, workplace, work experience in the profession, work in the COVID department, having recovered from SARS-CoV-2 infection), then questions about the symptoms that appeared among the respondents and are related to burnout syndromes (insomnia, anxiety, problems with concentration, fatigue, irritability, headache, increased blood pressure, emotional exhaustion). At the end of the questionnaire, there were questions about risk factors for the occurrence of burnout syndrome (was there enough equipment for personal protection, were they sufficiently informed about this new disease, were they overloaded with work, did they have a sense of belonging to the team, was there good communication between employees, were the working conditions difficult and demanding working hours, and enough time for rest).

The survey was conducted by a person outside the research team to ensure anonymity, and the researcher did not participate in the survey process.

Statistical analysis

Statistical software SPSS (Statistical Package for Social Sciences) for Windows (version 17.0, SPSS Inc. Chicago, Illinois, USA) was used for statistical data processing. Category variables were presented by descriptive statistics in the form of frequency and percentage, while continuous variables were presented as arithmetic mean and standard deviation.

RESULTS

Table 1 shows the basic descriptive parameters for the age and length of service of the respondents. Out of a total of 60 respondents, the youngest was 21 and the oldest 45. The average age was 28.70 (SD ± 6.515) years. The length of service of the respondents ranged from one year to 23 years. The average length of service was 6.02 (SD±5.770) years.

Table 1. - *Descriptive parameters for the age and work experience of the respondents*

	N	Minimum value	Maximum value	Average deviation	Standard. deviation
Age	60	21	45	28.70	6.515
Length of service	59	1	23	6.02	5.770

Figure 1 shows the distribution of respondents by gender. In this research, there were more women (76.67%) than men (23.33%).

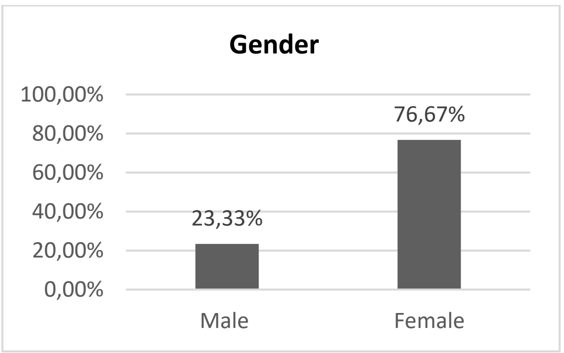

Figure 1. - *Respondents gender*

Figure 2 shows that the largest percentage of respondents had a secondary education (81.67%) followed by a higher education (16.67%), while the least number of respondents had a university education (1.67%).

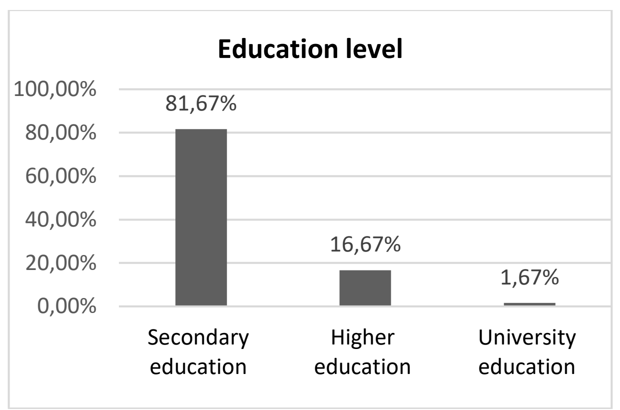

Figure 2. - *Education level of respondents*

The respondents were employees of different hospital departments. Graph 3. clearly shows that the highest percentage of respondents was from the infectious department (44.07%), followed by respondents from the surgery department (16.95%), while the representation of respondents from the internal medicine department (1.69%) and sterilization (1.69%) was very small. Representation of other respondents was 8.47% from the otorhinolaryngology department, 6.78% from the psychiatry department, and equally (5.08%) from the urology and neurosurgery departments, and equally (3.39%) from the gynecology department (3.39%), ophthalmology (3.39%) and pulmonology (3.39%) (Figure 3).

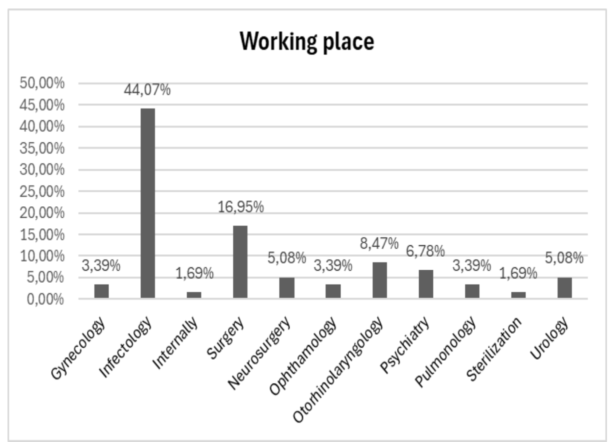

Figure 3. - *Respondents' workplaces*

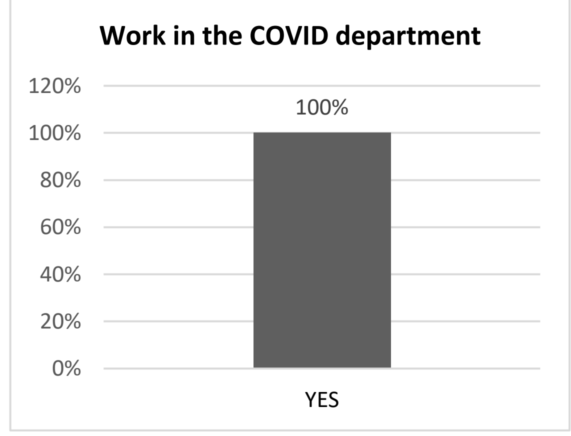

Figure 4. - *Representation of work in the COVID department*

Despite their primary departments, all respondents in this research worked in the COVID department (Figure 4).

Most respondents (65%) had already recovered from a SARS-CoV-2 infection, while the remaining 35% had not yet been infected (Figure 5).

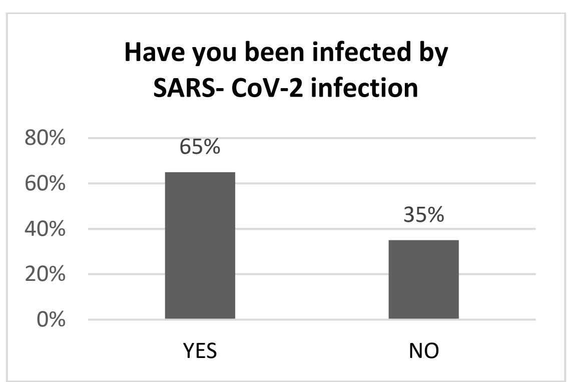

Figure 5. - *Representation of recovery from SARS-Cov-2 infection*

Burn-out syndrome symptoms

Table 2 shows the results of the frequency analysis of respondents' responses to questions related to the symptoms of burnout syndrome while working in the COVID ward. Namely, all respondents felt tired while working with COVID-19 patients and all were worried about infecting their family members. The vast majority (91.7%) had a headache, and 60% of them were irritable. Slightly less than half of the respondents (48.3%) had insomnia or were emotionally exhausted (41.7%). Furthermore, about 1/3 of nurses and technicians were anxious (36.7%) or had problems with concentration (33.3%) or had elevated blood pressure (28.3%). Only a small number (16.7%) of respondents were depressed, and almost no one thought about suicide.

Table 2. - *Frequencies of responses to questions related to symptoms of burnout syndrome while working in the COVID department*

The presence of symptoms of burnout syndrome while working in the COVID ward	Yes		No		I don't know	
	f	%	f	%	f	%
insomnia	29	48.3	31	51.7	0	0
anxiety	22	36.7	36	60.0	2	3.3
Concentration problems	20	33.3	37	61.7	3	5.0
tiredness	60	100.0	0	0	0	0
irritability	36	60.0	17	28.3	7	11.7
headache	55	91.7	3	5.0	2	3.3
Elevated blood pressure	17	28.3	20	33.3	23	38.3
emotional exhaustion	25	41.7	35	58.3	0	0
concern about the transmission of infection to members of their family	60	100.0	0	0	0	0
depression	10	16.7	49	81.7	1	1.7
Suicide thoughts	1	1.7	59	98.3	0	0

Risk factors associated with burnout syndrome

Table 3 shows the results of the frequency analysis of respondents' responses to questions related to risk factors for burnout syndrome while working in the COVID department. Most respondents (81.7%) had demanding working hours, were overloaded with work (63.3%), had difficult working conditions (60%), and they were not sufficiently informed about this new disease (57.6%). In contrast, a very high percentage of respondents while working in the COVID department had a sense of belonging to a team (95%), good communication among employees (91.7%) and sufficient equipment for personal protection (93.3%).

Table 3. - *Frequencies of responses to questions related to risk factors for burnout syndrome while working in the COVID ward*

The presence of risk factors for burnout syndrome while working in the COVID ward	Yes		No		I don't know	
	f	%	f	%	f	%
there was not enough equipment for personal protection	20	33.3	36	60.0	4	6.7
I was not informed enough about this new disease	34	56.7	23	38.3	3	5.0
I was not sufficiently informed about the procedures related to the patient	23	38.3	36	60.0	1	1.7
I was overwhelmed with work	38	63.3	21	35.0	1	1.7
There was no fairness	19	31.7	35	58.3	6	10.0
I had a feeling of belonging to a team	57	95.0	1	1.7	2	3.3
there was good communication between the employees	55	91.7	3	5.0	2	3.3
we had difficult working conditions	36	60.0	19	31.7	5	8.3
I had demanding working hours	49	81.7	11	18.3	0	0
there was not enough time to rest	25	41.7	35	58.3	0	0

DISCUSSION

Burnout syndrome, gradually developing as a result of long-term professional stress, represents a challenge for medical personnel. Caring for patients with different needs often requires a lot of effort and patience. Working with serious diseases further increases the burden, as medical staff not only take care of the physical health of patients, but also provide important psychological support (15, 16). Overtime, common in medical professions, often leads to neglect of personal life and needs. Night work can have a negative effect on psychophysical health, which is aggravated by constant stress and the high demands of the job. The cumulative process of burnout syndrome develops slowly, with initial warning symptoms, and years of work can pass before serious psychological and emotional problems manifest, often resulting in a loss of motivation to work (17, 18). Previous research indicates that nurses and technicians who have worked with COVID-19 patients experience burnout syndrome more often than those who have no contact with these patients (19). Our study, focused only on nurses and technicians in the COVID department of UCH Mostar, suggests similar results, but we cannot compare them with certainty to those working in other departments, since in this study we did not survey nurses and technicians who worked in other departments. Analysis of risk factors shows that working hours, work overload, difficult working conditions and lack of information about the disease are associated with burnout syndrome (19). Our respondents emphasized the feeling of belonging to the team, good mutual

communication and sufficient equipment for personal protection as protective factors. The review of other studies (19-22) shows variations in the association of burnout syndrome with age, gender and length of service. Our study with the majority participation of women (76.67%) does not reveal significant differences in the burnout syndrome between the sexes. However, the average age of 28.70 years and working experience of 6.02 years are possible limitations that affect the results. Our results do not confirm a statistically significant correlation between burnout syndrome and length of work with COVID-19 patients, but this may be a consequence of the limited number of subjects and the specific conditions of the pandemic (19).

CONCLUSION

Research indicates a significant risk of burnout syndrome among nurses and technicians while working with COVID-19 patients. Therefore, it is very important to recognize the development of this syndrome in time, and to develop a strategy for prevention, treatment, and rehabilitation of these persons.

LITERATURE

1. Dhama K, Khan S, Tiwari R, Sircar S, Bhat S, Malik YS, et al. Coronavirus Disease 2019-COVID-19. Clin Microbiol Rev. 2020;33(4):e00028-20. doi:10.1128/CMR.00028-20
2. Konjevoda S, Canovic S, Pastar Z,Tabain I, Savic V, BarbicLj, et al. Ophthalmic Manifestations of Novel Coronaviruses: Precautionary Measures and Diagnostic Possibilities. J Glob Health. 2020;10(1):010430. doi: 10.7189/jogh.10.010340
3. Huang X, Wei F, Hu L, Wen L, Chen K. Epidemiology and Clinical Characteristics of COVID-19. Arch Iran Med. 2020;23(4):268-271. doi: 10.34172/aim.2020.09.
4. Lu H. Drug Treatment Options for the 2019-new Coronavirus (2019-nCoV). Biosci Trends. 2020;14(1):69-71 doi:10.5582/bst.2020.01020.
5. Internet: World Health Organization (WHO) [Internet]. Who Coronavirus (Covid – 19). [updated 2022 May 30; Available from: https://covid19.who.int/
6. Li X, Geng M, Peng Y, Meng L, Lu S. Molecular Immunopathogenesis and Diagnosis of COVID-19. J Pharm Anal.2020;10(2):102-108. doi:10.1016/j.jpha.2020.03.001

7. Freudenberger HJ. Staff Burn-Out. J Soc Issues. 1974;30(1).
8. Kakiashvili T, Leszek J, Rutkowski K. The Medical Perspective on Burnout. Int J Occup Med Environ Health. 2013;26(3):401-412.
9. Schaufeli WB, Leiter MP, Maslach C. Burnout: 35 Years of Research and Practice. Career Development International. 2009;14:204-220.
10. Huang L, Zhang Y, Yao YC, Cui FF, Shi T, Wang YW, et al. Effects of Personality and Psychological Acceptance on Medical Workers' Occupational Stress. Chinese Journal of Industrial Hygiene and Occupational Diseases. 2018;36(7):519-522.
11. Polyakova OB, Bonkalo TI. Features of Psychosomatization of Medical Professionals with Occupational Deformations. Health Care of the Russian Federation. 2020;64(5):278-286.
12. Waddill-Goad SM. Stress, Fatigue, and Burnout in Nursing. J Radiol Nurs. 2019;38(1):44-46.
13. Rotenstein LS, Torre M, Ramos MA, Rosales RC, Guille C, Sen S, et al. Prevalence of Burnout Among Physicians: A Systematic Review. JAMA. 2018;320(11): 1131-50.
14. Antonijevic J, Binic I, Zikic O, Manojlovic S, Tosic-Golubovic S, Popovic N. Mental Health of Medical Personnel During the COVID-19 Pandemic. Brain Behav. 2020;10(12):e01881. doi:10.1002/brb3.1881.
15. Kelly LA, Gee PM, Butler RJ. Impact of Nurse Burnout on Organizational and Position Turnover. Nurs Outlook. 2021;69(1):96-102.
16. Soto-Rubio A, Giménez-Espert MDC, Prado-Gascó V. Effect of Emotional Intelligence and Psychosocial Risks on Burnout, Job Satisfaction, and Nurses' Health During the COVID-19 Pandemic. Int J Environ Res Public Health. 2020;17(21):7998, doi:10.3390/ijerph17217998.
17. Dhama K, Khan S, Tiwari R, Sircar S, Bhat S, Malik YS et al. Coronavirus Disease 2019-COVID-19. Clin Microbiol Rev. 2020;33(4):e00028-20.
18. Raudenská J, Steinerová V, Javůrková A, Urits I, Kaye AD, Viswanath O, et al. Occupational Burnout Syndrome and Posttraumatic Stress Among Healthcare Professionals During the Novel Coronavirus Disease

2019 (COVID-19) Pandemic. Best Pract Res Clin Anaesthesiol. 2020;34(3):553-560.

19. Aydin Sayilan A, Kulakaç N, Uzun S. Burnout Levels and Sleep Quality of COVID-19 Heroes. Perspect Psychiatr Care. 2021;57(3):1231-6.
20. Stanetić K, Tesanović G.Influence of Age and Length of Service on the Level of Stress and Burnout Syndrome. Med Pregl. 2013;66(3-4):153-62.
21. Ljevak I, Romić M, Vasilj I, Šimić J, Perić O. Izvor stresa u medicinskih sestara – primalja Sveučilišne kliničke bolnice Mostar [Source of stress in nurses - midwives of the University Clinical Hospital Mostar]. Zdravstveni glasnik [Health bulletin] [Internet]. 2016 [accessed 29.04.2024.];2(2):65-71. Available at: https://hrcak.srce.hr/file/373800
22. Babić D, Babić M, Ćurlin M. Kako se sačuvati od stresa za vrijeme pandemije koronom [How to save yourself from stress during the corona pandemic]. Zdravstveni glasnik [Health bulletin] [Internet]. 2020 [accessed 29.04.2024.];6(1):25-32. Available at: https://hrcak.srce.hr/file/347127

SINDROM SAGORIJEVANJA MEDICINSKIH SESTARA/TEHNIČARA U PANDEMIJI COVID-19 U SVEUČILIŠNOJ KLINIČKOJ BOLNICI MOSTAR

Marija Vidović[1] & Boris Lukšić[2,3]

[1] Klinički zavod za nuklearnu medicinu, Klinički bolnički centar Split, 21 000 Split, Republika Hrvatska

[2] Klinika za infektologiju, Klinički bolnički centar Split, 21 000 Split, Republika Hrvatska

[3] Medicinski fakultet, Sveučilište u Splitu, 21 000 Split, Republika Hrvatska

SAŽETAK

Uvod: Sindrom sagorijevanja proizlazi iz kroničnog stresa na poslu uz neučinkovito suočavanje sa stresom. Medicinski radnici pripadaju zanimanjima koja imaju najveće postotke sindroma sagorijevanja, što je dodatno povećano krizom koju je izazvala pandemija COVID-19.

Cilj**:** Prepoznati simptome i čimbenike rizika za razvoj sindroma sagorijevanja kod medicinskih sestara/tehničara tijekom pandemije COVID-19.

Ispitanici i metode**:** Provedeno je prospektivno istraživanje s anketom za simptome i čimbenike rizika za razvoj sindroma sagorijevanja među medicinskim sestrama/tehničarima Sveučilišne kliničke bolnice (SKB) Mostar na COVID odjelima, tijekom pandemije COVID-19, u srpnju i kolovozu 2021. godine. Korišten je anketni upitnik namjenski sačinjen za ovo istraživanje, a analiza podataka izvršena je u SPSS programu.

Rezultati: Sve medicinski sestre i tehničari su tijekom rada na COVID odjelima osjećali umor, bili su zabrinuti da ne zaraze članove svoje obitelji, a velika većina je imala izraženu glavobolju te su bili razdražljivi. Većina ispitanika imala je zahtjevno radno vrijeme, bili su pretrpani poslom i nedovoljno informirani o ovoj novoj bolesti. Ipak, većina medicinskih sestara/tehničara nije pokazivala ozbiljne simptome poput anksioznosti, koncentracijskih problema, visokog krvnog tlaka, emocionalne iscrpljenosti, depresije ili suicidalnih misli. Gotovo svi su doživljavali osjećaj pripadnosti timu i dobru međusobnu komunikaciju.
Zaključak: Istraživanje ukazuje na značajan rizik od sindroma sagorijevanja među medicinskim sestrama i tehničarima u SKB Mostar tijekom rada s COVID-19 pacijentima. Stoga je vrlo važno na vrijeme prepoznati razvoj ovog sindroma, te razviti strategiju prevencije, liječenja i rehabilitacije tih osoba.

Ključne riječi: medicinske sestre/tehničari, sindrom sagorijevanja, COVID-19, zdravstveni sustav.

Osoba za razmjenu informacija: Marija Vidović, mag. med. techn.

E-mail: mrsicmare@gmail.com

NEWBORN WITH CONGENITAL SYPHILIS: CASE REPORT

Svjetlana Grubeša Raguž[1] & Marjana Jerković Raguž[1,2]

[1] Department of Neonatology and Intensive Care Unit, Clinic for Children's Diseases, University Clinical Hospital of Mostar, 88 000 Mostar, Bosnia and Herzegovina

[2] School of Medicine, University of Mostar, 88 000 Mostar, Bosnia and Herzegovina

Received on 09.11.2023. Reviewed on 21.02.2024. Accepted on 26.03.2024.

ABSTRACT

Introduction: Congenital syphilis is caused by the spirochete, *Treponema pallidum*, which can be transmitted from the infected mother to the fetus by pregnancy. The incidence of congenital syphilis is growing rapidly across the world, with 700 000 to 1.5 million cases reported between 2016 and 2023. Despite the penicillin treatment beeing available, there were 2152 cases reported in 2020 in USA. Differential diagnosis should always consider congenital syphilis as a possible diagnosis in case of clinically unclear conditions and penicillin is still the first-line treatment, irrespective of the stage of the disease.

Objective**:** To show the importance of screening and prevention for congential symphilis in pregnancy.

Case presentation: We report a male newborn GD 37+5/7 born naturally to a mother who was syphilis positive in the second trimester and was treated with penicillin. After delivery, the newborn is admitted to the Clinical Department of Neonatology for lumbar puncture and extensive laboratory workup. Because of the possibility of other organ systems being affected, an extensive ultrasound scan is performed.

Conclusion: Although syphilis is not a major public health problem today, the most serious outcomes of this infection are associated with highly vulnerable groups, such as pregnant women and children. The screening of women for syphilis should become not only a health priority, but also a political priority for every country, and if there is a debate on the spread of this infection, the cure should be available to everyone.

Keywords: pregnancy, congenital syphilis, newborn, penicillin

Corespondent author:

Svjetlana Grubeša Raguž, MD, pediatric specialist

E-mail: gsvjetlana@gmail.com

INTRODUCTION

Syphilis is an infectious disease caused by the spirochaete bacterium Treponema pallidum subspecies pallidum. Congenital syphilis occurs after the penetration of Treponema pallidum from an infected mother to the fetus, most often after the first trimester of pregnancy (1, 2). The disease can rarely be transmitted during childbirth and by contact with a lesion in the area of the genital tract (3), while it can be transmitted through breastfeeding only if the primary lesion is around the area of breast nipple (4). Thought to be eradicated, this organism has re-emerged as a global pathogen (5). Perinatal syphilis is the second leading cause of stillbirth, and is associated with significant morbidity and mortality among infants with congenital syphilis (6). While some countries such as Cuba and Thailand have successfully eliminated congenital syphilis, rates are increasing in many other countries (7, 8). Syphilis being left untreated in pregnancy can lead to miscarriage, stillbirth, intrauterine growth restriction, premature birth, and perinatal death (3). Congenital syphilis is divided into a early syphilis that is diagnosed during the first two years of life and late congenital syphilis that is diagnosed after the second year of life (9). Early congenital syphilis is characterized, among other things, by premature birth, low birth weight, hepatosplenomegaly, anemia, jaundice, thrombocytopenia (1, 2, 10, 11). One of the earliest symptoms is a nasal discharge as a huge source of treponema. Vesiculobullous changes on the palms and soles, which are highly characteristic of congenital syphilis, may also occur (10). Late congenital syphilis corresponds to the symptoms of tertiary syphilis, and its manifestations can be divided into malformations or stigma and active pathological processes. Stigma are scars formed as a result of lesions in early congenital syphilis. It is believed that the central nervous system is affected in 60% of patients with congenital syphilis. It is diagnosed by a positive VDRL (Venereal Disease Research Laboratory) test, pleocytosis and elevated protein content in the cerebrospinal fluid (12, 13). The diagnosis is based on the clinical aspect of congenital syphilis in the child with positive treponemal and non-treponemal tests in the mother. In order to prevent congenital syphilis, it is recommended to test for syphilis in the first trimester of pregnancy and at birth (14). Prenatal testing and a single dose of benzathine penicillin G (BPG) successfully treat infection in both mother and fetus, and prevent unwanted pregnancy outcomes (15, 16). If the child's congenital infection is proven positive or there where there is a high probability, the drug of choice and the

method of administration is the solution of crystalline penicillin G, in a dose of 100,000 to 150,000 IU/kg/day, IV, for 10 days.

CASE REPORT

This case describes a newborn tha has been admitted in the Clinical Department of Neonatology in the first hour of life, GD 37+5/7 weeks, born naturally. Newborn was G1P2, and mother previously had one abortion. In this pregnancy, during the second trimester, the mother tested positive for syphilis, and was treated with penicillin. Cervical smears in the mother was isolated with Ureaplasma urealyticum and she was treated with Azithromycin. Apart the above, the pregnancy went well. After birth, the newborn had normal vital signs, birth weight 4000 g, birth length 55 cm, and is transferred to our clinic for monitoring, treatment and treatment. Laboratory work-up performed on admission (blood count, glucose, bilirubin and minerals in serum) was within the reference interval. A lumbar puncture is beeing performed, and the results came back with increased number of proteins in the cerebrospinal fluid. A serological test for TPHA (Treponema pallidum haemagglutinationassay) is performed, and the result was positive. A wider ultrasound examination was performed (brain, heart, kidneys, abdomen). Specialists in dermatovenerology, infectology and ophthalmology were consulted. A neuropediatric USG of the brain showed a small resorption hematoma on the left caudothalamic sulcus. We consulted an infectious disease specialist from the The University Hospital for Infectious Diseases in Zagreb, and it is recommended to monitor the antibody levels. After the all workup, the antibiotic therapy of a crystalline penicillin G for 10 days intravenously was applied. After the treatment, the newborn is discharged with recommendations. This is the first recorded case of congenital syphilis in the last 20 years in the region of Western Herzegovina. Trough telephone conversation with the parents, we found out that they have moved to the Republic of Croatia, and that further checks and treatment will continue in Croatia, after that we have lost the patients trace.

DISCUSSION

Congenital syphilis rates in the United States have been steadily increasing since 2012 (17, 18). In 2020, there were a total of 2152 reported cases of congenital syphilis in the United States, including 122 stillbirths caused by syphilis and 29 infant deaths (18, 19). The case rate in 2020 (57 cases per 100,000 live births) is the highest

reported rate since 1991 (20). The World Health Organization (WHO) advocates antenatal screening programs aimed at the global elimination of mother-to-child transmission of syphilis and the occurrence of congenital syphilis. Recently, an increase in the incidence and prevalence of early congenital syphilis has been observed in Korea, as well as in other Western countries, despite prenatal serological screening. Kim et al. from Korea reported a clinical case of congenital syphilis in a 3-month-old child who had a skin lesions over the entire body and no other specific symptoms, leading to a delay in diagnosis (21). If the diagnosis is missed, death can occur, despite the fact that syphilis is a very easy disease to treat (22). The skin findings of early congenital syphilis are classically a vesiculobullous or maculopapular rash on the palms and soles and may be associated with desquamation (23). Slutsker and colleagues conducted a study on the factors that contribute to the occurrence of congenital syphilis. The findings have shown that in 88% of the fetuses of pregnant women infected with syphilis in the period from 2010 to 2016 in New York, transplacental transmission of the infection was avoided, due to the screening of the mothers in the early period pregnancy and effectively implemented therapy (24). The Center for Disease Control (CDC) recommends the identification of syphilis in the mother, so all pregnant women should be screened for syphilis at their first visit at the gynecologist, and be additionally tested between the 28th and 32nd weeks of gestation. In recent years, especially since 2004, the incidence of maternal syphilis during pregnancy has been increasing in Shanghai. A study by Zhu et al. (25) shows, that the migrant population is a socioeconomically disadvantaged group, especially in terms of maternal and perinatal health. However, another study by Temmerman M et al showed that congenital syphilis still occurs in 14% of cases of maternal syphilis after appropriate treatment, which coincides with our data (26). Maternal serum screening is the essance of diagnosis. Treating the mother will prevent most, but not all, cases of congenital syphilis. Since our patient was diagnosed in the first days of life, the manifestation of other clinical variatioins of congenital syphilis remained to be monitored during further controls and follow-ups by the multidisciplinary team involved in the care of such patients, because syphilis is a disease with a hundred faces.

CONCLUSION

Congenital syphilis is a preventable infection, although global data indicate an

increase in the number of cases. It is the result of a multitude of factors including substance abuse, low socioeconomic status, and inadequate public health infrastructure to reduce community transmission of perinatal syphilis. Screening pregnant women for syphilis should become not only a health, but also a political priority of every country, and since it is a curable infection, the medicine should be available to everyone. Therefore, it is necessary to improve the detection system, not only for T. pallidum infection, but also for other sexually transmitted infections that can be treated. With this case report, we want to draw attention to the importance of early recognition and diagnosis of congenital syphilis, and open the question of whose role it is to monitor the child after the newborn period (infectologist, pediatrician, dermatovenerologist).

REFERENCES

1. Braun-Falco O, Plewig G, Wolff HH, Burgdorf WH. Sexually transmitted bacterial diseases. In: Braun-Falco O, Plewig G, Wolff HH, Burgdorf WH, editors. Dermatology. 2nd ed. Berlin (DE): Springer; 2000. p. 245-98.
2. Murat-Sušić S. Konatalni sifilis [Conatal syphilis]. In: Lipozenčić J et al., editors. Dermatovenerologija [Dermatovenereology]. Zagreb (HR): Naklada Zadro; 1999. p. 357-8.
3. Sanchez PJ, Wendel GD. Syphilis in pregnancy. Clin Perinatol. 1997;24:71-90.
4. Genc M, Lediger WJ. Syphilis in pregnancy. Sex Transm Inf. 2000;76:73-9.
5. Force, U.P.S.T. Screening for Syphilis Infection in Nonpregnant Adolescents and Adults: US Preventive Services Task Force Reaffimati on Recommendation Statement. JAMA. 2022;328,1243–1249.
6. Salom S, Cambriglia MD, Scarano SM, Capone E, Betts I, Pacella D, et al. Congenital syphilis in the twenty-first century: An area-based study. Eur J Pediatr. 2023;182:41–51.
7. Gilmour LS, Walls T. Congenital Syphilis: A Review of Global Epidemiology. Clin Microbiol Rev. 2023;36,e0012622.
8. Paixao ES, Ferreira AJ, Dos Santos IO, Rodrigues LC, Fiaccone R, Salvi L, et al. Mortality in children under 5 years of age with

congenital syphilis in Brazil: A nation wide cohort study. PLoS Med. 2023;20,e1004209.
9. Morton RS. The treponematoses. In: Champion RH, Burton JL, Burnes DA, Breathnach SM, editors. Rook/Wilkinson/Ebling Text book of dermatology. 6th ed. Oxford (GB): Blackwell; 2002. p. 1237-75.
10. Parrish JL. Treponemal infections in pediatric population. Clin Dermatol. 2000;18:687-700.
11. Michelow IC, Wendel GD, Norgard MV, Zeray F, Leos K, Alsaadi R, et al. Central nervous system infection in congenital syphilis. N Engl J Med 2002;346:1792-8.
12. MMWR. Evaluation of congenital syphilis surveillance system – New Jersey, 1993. Arch Dermatol. 1995;131:987-8.
13. Stoll BJ, Lee FK, Larsen S, Hale E, Schwartz D, Rice RJ, et al. Clinical and serologic evaluation of neonates for congenital syphilis: acontinuing diagnostic dilemma. J Infect Dis. 1993;167:1093-9.
14. World Health Organization. September 2007. The global elimination of congenital syphilis: rationale and strategy for action. Available at: https://www.who.int/reproductivehealth/publications/rtis/9789241595858/en// [Accessed 29.04.2024.]
15. Blencowe H, Cousens S, Kamb M, Berman S, Lawn JE. Lives saved tool supplement detection and treatment of syphilis in pregnancy to reduce syphilis related still births and neonatal mortality. BMC Public Health. 2011;11(Suppl 3):S9.
16. Bowen V, Su J, Torrone E, Kidd S, Weinstock H. Increase in incidence of congenital syphilis-United States, 2012-2014. MMWR Morb Mortal Wkly Rep. 2015 Nov 13;64(44):1241-5.
17. Centers for Disease Control and Prevention (CDC). Congenital syphilis - United States, 2000. MMWR Morb Mortal Wkly Rep. 2001 Jul 13;50(27):573-7.
18. Kimball A, Torrone E, Miele K, Bachmann L, Thorpe P, Weinstock H, et al. Missed Opportunities for Prevention of Congenital Syphilis - United States, 2018. MMWR Morb Mortal Wkly Rep. 2020 Jun 5;69(22):661-65.
19. Center for Disease Control and Prevention. National review - Surveillance of sexually transmitted diseases: 2019. Available at:

https://www.cdc.gov/std/statistics/2019/overvie

20. Center for Disease Control and Prevention. National review - Surveillance of sexually transmitted diseases: 2020. Available at: https://www.cdc.gov/std/statistics/2020/tables-htm
21. Kim HY, Kim BJ, Kim JH, Yoo BH. Early congenital syphilis presenting with skin eruption alone: a case report. Korean J Pediatr. 2011 Dec;54(12):512-4.
22. Chakraborty R, Luck S. Syphilis is on the increase: the implications for child health. Arch Dis Child. 2008 Feb;93(2):105-9.
23. Woods CR. Syphilis in children: congenital and acquired. Semin Pediatr Infect Dis. 2005 Oct;16(4):245-57.
24. Slutsker JS, Hennessy RR, Schillinger JA. Factors contributing to congenital syphilis cases - New York City, 2010-2016. MMWR Morb Mortal Wkly Rep. 2018;67(39):1088– 093.
25. Zhu L, Qin M, Du L, Xie RH, Wong T, Wen SW. Maternal and congenital syphilis in Shanghai, China, 2002 to 2006. Int J Infect Dis. 2010 Sep;14 Suppl 3:e45-8.
26. Temmerman M, Gichangi P, Fonck K, Apers L, Claeys P, Van Renterghem L, et al. Effect of a syphilis control programme on pregnancy out come in Nairobi, Kenya. Sex Transm Infect. 2000 Apr;76(2):117-21.

NOVOROĐENČE S KONGENITALNIM SIFILISOM: PRIKAZ SLUČAJA

Svjetlana Grubeša Raguž[1] & Marjana Jerković Raguž[1,2]

[1] Klinički odsjek za neonatologiju i intenzivno liječenje, Klinika za dječje bolesti, Sveučilišna klinička bolnica Mostar, 88 000 Mostar, Bosna i Hercegovina

[2] Medicinski fakultet Sveučilišta u Mostaru, 88 000 Mostar, Bosna i Hercegovina

SAŽETAK

Uvod: Kongenitalni sifilis uzrokuje spiroheta, *Treponema pallidum*, koja se može prenijeti sa zaražene majke na fetus tijekom trudnoće. Na globalnoj razini, učestalost kongenitalnog sifilisa je u porastu, i to sa 700 000 prijavljenih slučajeva u 2016. godini na 1,5 milijuna u 2023. godini. Unatoč širokoj dostupnosti penicilina, 2020. godine u SAD-u je prijavljeno 2152 slučajeva. Sifilis je bolest koja se prezentira veoma različitim kliničkim slikama. Diferencijalno dijagnostički uvijek treba razmišljati o sifilisu kao o mogućoj dijagnozi kod klinički nejasnih stanja dok je lijek prvoga izbora i dalje penicilin, neovisno o stadiju bolesti.

Cilj: Ukazati na važnost ranog probira trudnica na sifilis radi prevencije kongenitalnog sifilisa.

Prikaz slučaja: Riječ je o muškom novorođenčetu GD 37+5/7 tjedana rođenim prirodnim putem od majke koja je sifilis pozitivna bila u drugom trimestru trudnoće, te je liječena Penicilinom. Po porođaju novorođenče je smješteno na Klinički odsjek za neonatologiju, te je urađena lumbalan punkcija i proširena laboratorijska obrada. Zbog mogućnosti poremećaja drugih organskih sustava urađena je šira ultrazvučna obrada.

Zaključak: Iako sifilis danas nije jedan od vodećih javnozdravstvenih problema, najveći izazovi ove infekcije vezani su za vrlo ranjive skupine kao što su trudnice i nerođena djeca. Probir trudnica na sifilis trebao bi postati ne samo zdravstveni, nego i politički prioritet svake države, a budući da se radi o izlječivoj infekciji, lijek bi trebao biti dostupan svima.

Ključne riječi: trudnoća, kongenitalni sifilis, novorođenče, penicilin

Autor za korespodenciju: Svjetlana Grubeša Raguž, dr. med., specijalist pedijatrije E-mail: gsvjetlana@gmail.com

AUTHOR GUIDELINES

Health Bulletin is a multidisciplinary scientific journal dedicated to publishing unpublished original scientific, professional and review articles, as well as case reports, reviews, professional notices and a broad range of topics from areas of health care disciplines.

Organization of the Manuscript

Articles and all attachments/appendices are submitted in English, with a mandatory summary in Croatian language. The article should contain up to 15 pages, including pictures, tables and bibliography. It must be written in Microsoft Word and you should use 12pt Times New Roman font throughout the text, 1.5 spacing, and both sides alignment. An original scientific article should contain the following components: introduction, objectives, materials and methods, results, discussion and conclusions. The introduction should briefly indicate the objective of the study and its purpose. The materials and methods should be brief and sufficient and therefore allow the reader to repeat the research. Already know methods are not described but mentioned in the references. The results should be clear and logical, and their relevance should be supported with corresponding statistical methods. The discussion section should include a brief statement of the principal findings, a discussion of the findings in light of other published work dealing with the same or closely related subjects. Conclusions must correspond with the present objectives of the research.

Along with the title, the title page should contain author's full name, institution, address, city and the country of the article.

The abstract, in Croatian and English, should not exceed 250 words. Up to 5 keywords representing the main content of the article should be written underneath the abstract. Tables and pictures should be provided on a separate page. They must have an ordinal number that corresponds with the text, and a heading.

With their consent to publication in the Health Bulletin, the authors inform that they will not publish the same work elsewhere without the permission of the Editorial Board. Authors will not receive monetary compensation for the published article. Along with their work, the authors must submit a cover letter to the relevant Editorial Office, which contains a handwritten statement of all the authors:

1. that the said paper has not been published or accepted for publication in another journal,

2. that the research was approved by the Ethics Commission,

3. that the accepted work becomes the property of the Health Bulletin.

The journal is not paid any fee for submitting the work, translating and publishing the work.

Citation style

Indicate sources in the text and bibliography section in accordance with the Vancouver Citation Style. The citation must be in accordance with the uniform provisions for paper submissions to Biomedical Journals of the International Committee of Medical Journals

Editors. References within the text of the article are numbered in Arabic numerals in round brackets in the order they are first used in the text.

The authors are responsible for the accuracy of the references. The headings of the journals must be abbreviated according to the style used in the list of journals indexed for MEDLINE, see: http://www.nlm.nih.gov/tsd/serials/lji.html.

Examples

Standard Format for Journal Articles: Indicate the names of all authors unless there are seven or more, in this case indicate the first six followed by et al.

Babić D, Jakovljević M, Martinac M, Šarić M, Topić R, Maslov B. Metabolic syndrome and combat post-traumatic stress disorder intensity: Preliminary findings. Psychiatr Danub. 2007;19:68-75.

Marčinko D, Begić D, Malnar Z, Dordević V, Popović-Knapić V, Brataljenović T, et al. Suicidality among veterans suffering from chronic PTSD treated at center for crisis intervention, zagreb university hospital center. Acta Med Croat. 2006;60:335-9.

Book or manual: Sadock B, Sadock V. Kaplan & Sadock's Synopsis of Psychiatry 9. ed. Baltimore, Philadelphia: Lippincott Williams and Wilkins; 2003.

Chapter in book: Meltzer PS, Kallioniemi A, Trent JM. Chromosome alterations in human solid tumors. In: Vogelstein B, Kinzler KW, editors. The genetic basis of human cancer. New York: McGraw-Hill; 2002. p. 93-113.

Internet: Cancer-Pain.org [Internet]. New York: Association of Cancer Online Resources, Inc.; c2000-01 [updated 2002 May 16; cited 2002 Jul 9]. Available from: http://www.cancer-pain.org/.

Foley KM, Gelband H, editors. Improving palliative care for cancer [Internet]. Washington: National Academy Press; 2001 [cited 2002 Jul 9]. Available from: http://www.nap.edu/books/0309074029/html/.

For detailed instructions see: http://www.nlm.nih.gov/bsd/uniform_requirements.html

At the end of the article specify the contact information of the lead author or one of the co-authors.

The paper is submitted to the Editorial Board via the electronic form of the HRČAK OJS (Open Journal Systems) system at the link https://hrcak.srce.hr/ojs/index.php/zdravstveniglasnik/about/submissions or another magnetic media to the address: Faculty of Health Studies, University of Mostar (for the magazine), Zrinski Frankopana 34, 88 000 Mostar, BiH.