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Clinical Center University of Sarajevo





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Foreword

Dear readers, nurses and health technicians of all profiles and educational levels, It is my great honor and pleasure to write the foreword for the first issue of the Bosnian Journal of Health Sciences and Technologies, created as a result of the need and responsibility to advance the medical profession through science and research.

The role and significance of nurses and technicians can be likened to that of a mother raising a child. Caring for human life begins at birth, from minor colds and injuries to far more serious conditions, including terminal illnesses. Over time, this care and knowledge became systematized and evolved into a profession. It began with midwives, then wound dressers, and eventually developed into graduate nurses and technicians. Throughout history, depending on cultural circumstances, these roles were sometimes held by women, and other times by men. Knowledge was traditionally passed orally, through codes and recommendations. In the last two hundred years, the nursing profession has been taught through well-structured textbooks. The nursing profession - at all educational levels - has developed from a role focused on helping the sick to one that also encompasses preventive measures to combat disease.

The earliest documented nursing schools date back to 200 B.C. in India. For the past 2,000 years, European medicine has largely owed its development to institutions linked to religion, as various missionaries were among the best caregivers for the ill. We can draw comparisons between the role of a nurse or caregiver in the 19th, 20th, and 21st centuries. In the 19th century, the nurse's role combined caregiving and assisting the physician. In the 20th century, the title of "nurse" expanded to include "technician," as the development of modern techniques demanded greater knowledge in patient care, therapy, and diagnostics. By the end of the 20th century, the evolution of medical knowledge led to the specialization of nurses. Today, we have nurses and technicians working in hospital wards, intensive care units, specialized emergency departments, and diagnostic institutions. Technological advancements have also led to a division of the profession into patient-oriented nurses/technicians, laboratory technicians, sanitary technicians, and pharmaceutical technicians. Modern diagnostic technologies require deep knowledge of radiological procedures, resulting in the development of radiology technicians and, later,

engineers. In Bosnia and Herzegovina, the pinnacle of recognizing this specialization was the establishment of the Faculty of Health Studies, which evolved from the Higher Medical School and now offers various specializations for laboratory, sanitary, physiotherapy, and radiology technicians.

The 21st century is a digital era in which the profession must be redefined and reorganized, which requires serious research. Advancements in medicine and technology constantly demand our dedication to new knowledge and innovations, which will be presented through journals. All articles in this journal, including scientific, professional, and review papers, will be of great help in your professional development. The editorial team and authors come from various fields, ensuring a high level of quality and relevance of the content. The works are based on the latest research and clinical experiences. The first issue of the Bosnian Journal of Health Sciences and Technology represents an important step toward the advancement of healthcare in Bosnia and Herzegovina, and I hope it will soon become a key resource for all healthcare professionals adapting their work to the modern age.

I would like to thank everyone who contributed to this project, and I invite you to continue learning, researching, and advancing the profession and science. Together, let us build a better and healthier society.

Director of Discipline for Research and Development
Prim. dr. sci. med. Sanko Pandur

Predgovor

Dragi čitatelji, medicinske sestre-tehničari i zdravstveni tehničari svih profila i nivoa obrazovanja, imam veliku čast i zadovoljstvo napisati predgovor za prvi broj Časopisa *Bosnian Journal of Health Sciences and Technologies* nastalog kao rezultat potrebe i odgovornosti za unapređenjem medicinske struke kroz nauku i istraživanje.

Uloga i značaj medicinske sestre i tehničara poistovjećuje se sa ulogom majke u odgoju djeteta. Briga o ljudskom životu počinje rođenjem, od bezazlenih prehlada i povrjeđivanja do mnogo ozbiljnijih stanja uključujući i smrtne bolesti. Vremenom briga i znanje se sistematiziraju i prerastaju u profesiju. Prvo su to bile babice, potom ranarke i na kraju diplomirane medicinske sestre i tehničari. Kroz historiju, zavisno od kulturoloških okolnosti, negdje su bile žene, a negdje muškarci nosioci ovih aktivnosti. Prenos znanja bio je usmenim predajama od zakonika i preporuka. Zadnjih dvjesto godina profesija medicinske sestre i tehničara uči se kroz dobro koncipirane udžbenike. Profesija medicinske sestre-tehničara svih nivoa obrazovanja razvila se od struke koja je imala za cilj pomoći bolesniku do preventivnih mjera za suzbijanje bolesti.

Prve škole za medicinske sestre iz pisanih izvora datiraju iz 200 g.p.n.e. u Indiji. Europska medicina posljednjih 2000 godina svoj razvoj ima zahvaliti uglavnom institucijama koje su vezane uz religije, jer su različiti misionari bili najbolji skrbnici oboljelih ljudi. Možemo napraviti uporedbu uloge medicinske sestre ili njegovateljice u 19., 20. i 21. vijeku. U 19. vijeku uloga medicinske sestre sastojala se iz ličnosti njegovateljice i asistenta ljekaru. U 20. vijeku nazivu medicinska sestra pridodaje se i tehničar jer razvoj savremenih tehnika zahtjeva od sestrinske profesije veća znanja koja su potrebna u njezi, terapiji i dijagnostici. Krajem 20. vijeka razvoj znanja diktira i profiliranje medicinskih sestara u specijalističkom smislu pa tako imamo medicinske sestre-tehničare u bolničkim odjelima, jedinicama intenzivne njege, specijaliziranim urgentnim odjeljenjima i dijagnostičkim institucijama. Razvoj tehnika diktira i podjelu profesije prema medicinskoj sestri-tehničaru orijentiranoj prema pacijentu, laboratorijskom tehničaru, sanitarnom tehničaru, farmaceutskom tehničaru. Moderne dijagnostičke tehnologije zahtjevaju veliko znanje radioloških procedura pa se profiliraju radiološki tehničari, a kasnije inženjeri.

U Bosni i Hercegovini je kruna spoznaje o specijaliziranosti profesije Fakultet zdravstvenih studija proistekao iz Više medicinske škole te različitih specijalizacija za laboratorijske, sanitarne, fizioterapeutske i radiološke tehničare.

21. vijek je digitalno doba u kome profesija mora biti redefinisana i reorganizirana, no, zato je potrebno ozbiljno istraživanje. Napredovanje u oblasti medicine i tehnologije neprestano zahtjeva našu posvećenost novim saznanjima i inovacijama koji će biti prezentirani u časopisima. Svi radovi u ovom časopisu, uključujući naučne, stručne i revijalne članke, biće od velike pomoći u Vašem profesionalnom razvoju.

Urednički tim i autori časopisa dolaze iz raličitih oblasti što garantuje visoki nivo kvaliteta i relevantnosti sadržaja. Radovi su zasnovani na najnovijim istraživanjima i kliničkim iskustvima.

Prvi broj časopisa zdravstvenih nauka i tehnologija predstavlja važan korak u unapređenju zdravstva u BiH i nadam se da će uskoro postati ključni resurs za sve zdravstvene radnike koji svoju profesiju prilagođavaju modernom dobu.

Zahvaljujem se svima koji su dali doprinos ovom projektu i pozivam Vas, da nastavite učiti, istraživati i unapređivati struku i nauku. Želimo zajedno graditi bolje i zdravije društvo.

Direktor Discipline za nauku i nastavu
Prim. dr. sci. med. Sanko Pandur

Editorial

Development of Nursing through 130 Years of the Clinical Center University of Sarajevo

Razvoj sestriinstva kroz 130 godina Kliničkog centra Univerziteta u Sarajevu

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ABSTRACT

The history of medicine goes back to the prehistoric period, when instinctive, empirical and magical-religious medicine was dominant. The medicine of ancient civilizations was developed during the slavery period, whereas in Europe, women only began to be formally educated in medicine towards the end of the 9th century through the Salerno School. During the Ottoman Empire in Bosnia and Herzegovina, health care was informal and mostly provided by women without formal education. Modernization of the healthcare system began in 1878 with the arrival of the Austro-Hungarian Empire. Already in 1879, the Regulation on the Practice of Medicine, Surgery and Midwifery was passed, which laid the foundations for the professionalization of nurses and the suppression of quackery. One of the key steps in the development

of nursing was the opening of the National Hospital in Sarajevo in 1894, which played an important role in providing health care and introducing organized nursing care. The National Hospital, today's Clinical Center University of Sarajevo (CCUS), became the basis for the development of health institutions and training of medical staff in Bosnia and Herzegovina. During the Austro-Hungarian period, nursing began to develop as a profession, with the organized education of nurses. Initially, nurses were mostly nuns and volunteers, but gradually trained nurses began to work, which improved the quality of hospital care and hygiene standards. The development of the nursing profession at the Clinical Center University of Sarajevo during 130 years was crucial for the health care improvement. As the leading health institution the CCUS played a significant role in

the education and professionalization of nurses. Their contribution over the decades has been reflected in the improvement of hospital care, implementation of modern medical standards and continuous education of personnel, which resulted in higher quality health care in Bosnia and Herzegovina. For the first time, the Nursing School diplomas issued in Sarajevo, originating from private archive, are presented in this paper. These diplomas provide a unique insight into the educational system and healthcare practice in Sarajevo in a certain period of time, and the role that the Nursing School played in the development of professional staff for the needs of healthcare. By analyzing the content of the diplomas, date of issue, names of the graduates, and the issuing institutions, it is possible to reconstruct certain aspects of the educational system of that time and its connection with the social and cultural circumstances of that particular period.

Keywords: medicine, nursing, health care, nursing school, health system, professionalization

SAŽETAK

Historija medicine seže unazad do prahistorijskog perioda, kada je dominirala nagoniska, empirijska i magično-religijska medicina. Tokom robovlasničkog perioda razvijale su se medicine drevnih civilizacija, dok su se u Europi žene tek krajem 9. stoljeća počele formalno obrazovati u medicini kroz Salernsku školu. U Bosni i Hercegovini, za vrijeme osmanske vladavine, zdravstvena njega bila je neformalna i uglavnom su je pružale žene bez formalnog obrazovanja. Dolaskom Austro-Ugarske 1878. godine započela je modernizacija zdravstvenog sistema. Već 1879. godine donesena je Uredba o vršenju liječničke, ranarske i primaljske prakse, kojom su postavljeni temelji za profesionalizaciju medicinskih sestara i suzbijanje nadriliječništva. Jedan od ključnih koraka u razvoju sestrinstva bio je otvaranje Zemaljske bolnice u Sarajevu 1894. godine, koja je imala važnu ulogu u pružanju zdravstvene zaštite i uvođenju organizirane bolničarske njege. Zemaljska bolnica, današnji Klinički centar Univerziteta u Sarajevu (KCUS), postala je temelj za razvoj zdravstvenih ustanova i školovanje

medicinskog kadra u Bosni i Hercegovini. Tokom austrougarskog perioda, sestrinstvo se počelo razvijati kao profesija, uz organizovanu edukaciju bolničarki i medicinskih sestara. U početku, njegovateljice su uglavnom bile redovnice i volonterke, ali su postepeno počele raditi školovane medicinske sestre, čime se poboljšala kvaliteta bolničke njege i higijenskih standarda. Razvoj sestrinske profesije u Kliničkom Centru Univerziteta u Sarajevu tokom 130 godina bio je ključan za unapređenje zdravstvene zaštite. KCUS, kao vodeća zdravstvena ustanova, imao je značajnu ulogu u obrazovanju i profesionalizaciji medicinskih sestara. Njihov doprinos kroz desetljeća ogleda se u unapređenju bolničke njege, implementaciji savremenih medicinskih standarda i kontinuiranoj edukaciji kadrova, što je rezultiralo kvalitetnijom zdravstvenom zaštitom u Bosni i Hercegovini. U ovom radu prvi put su predstavljene diplome Bolničarske škole izdate u Sarajevu, koje potiču iz privatne arhive. Ove diplome pružaju jedinstven uvid u obrazovni sistem i zdravstvenu praksu u Sarajevu u određenom vremenskom periodu, kao i ulogu koju je Bolničarska škola imala u formiranju stručnih kadrova za potrebe zdravstvene zaštite. Analizom sadržaja diploma, datuma izdanja, imena diplomiranih, te samih institucija koje su ih izdale, moguće je rekonstruisati određene aspekte obrazovnog sistema tog vremena i njegove povezanosti sa socijalnim i kulturnim prilikama u tom periodu.

Ključne riječi: medicina, sestrinstvo, zdravstvena njega, bolničarska škola, zdravstveni sistem, profesionalizacija

„1.jula 1894. godine otvorena su vrata nove Zemaljske bolnice u Koševi, otvorena čovječanstvu koje boluje i trpi, da međ tim zidinama traži svojim bolima lijeka, svome tijelu zdravlja“.

Časopis Bošnjak, nepoznati autor 14.06.1894.

„On 1 July 1894, the doors of the new National Hospital in Koševi were opened, to the sick and the suffering, to seek cure for their pain within these walls, and health for their bodies“.

Bošnjak magazine, unknown author 14.06.1894

The need for nurses has developed simultaneously with the progress of the medical profession and the need for care and treatment of the sick and wounded. At the beginning, the nursing profession was closely linked to charity, and the first nurses performed their work in monasteries, caring for the sick and poor. The nursing profession developed from religious myths and traditions that included caring for the sick and helping abandoned people. During the wars, there was an increasing need for caring after the injured and wounded, which contributed to the expansion of the nursing profession (1).

Florence Nightingale will be remembered as the first of the nursing pioneers and hospitals' reformer, all at a time when Victorian England did not even think that women could attend colleges and have professional careers. In 1854, together with 38 other women recruited by The Secretary of War she performed nursing duties in Skutara during the Crimean War. She had a rich philosophical, literary and mathematical education, but also a developed interest in social issues and the ability of helping sick people. She worked in London, stayed in Egypt, Germany and France, and was part of the British expedition in Turkey. Within St. Thomas Hospital in London, Florence Nightingale founded a school for nurses in 1860, which marked the beginning of the nursing professionalization (2,3).

In 1886, Lavinia Lloyd Dock graduated from Bellevue Training School for Nurses. In 1890, as an already educated sister, Lavinia became a member of the Board of Sisters in New York.

The first university-type institution for nurses was established in 1890 at the Johns Hopkins Clinic, and it was completed by Mary Adelaide Nutting, who herself was a great supporter of university education and training of nurses (2).

In Bosnia and Herzegovina, and throughout the Balkans, nurses were initially engaged on an informal basis, performing basic care related to the war wounded, sick and injured. The first recorded traces of organized nursing care dated from the time of the Austro-Hungarian rule, which began in 1878. It was at that time that the first organization of health care in Bosnia and Herzegovina took place, including the establishment of hospitals, and thus the first initiative for the education of nurses. Difficult social

and economic conditions and the presence of number of aggressors on our soil hindered the progress of our people, but events in the world had a huge impact on the education of health workers in Bosnia and Herzegovina (4).

In 1894, the "Bošnjak" magazine published an article related to the opening of the National Hospital: On 1 July 1894, the doors of the new National Hospital in Koševi were opened, to the sick and the suffering, to seek cure for their pain within these walls, and health for their bodies. It would only be desirable that our people think carefully about all this and understand what has been done for their benefit, and that they meet doctors with the greatest trust and seek their help with firm confidence. Let the patient, in every major illness, freely and with hope, seek a cure in the new hospital. For whoever tries to help himself, will receive God's help. We hope that our esteemed readers will read these few words with the same good intentions with which we wrote them. The construction of the National Hospital was approved in 1892. It was about time to build a new hospital, as the old one was not even remotely fit for the purpose, and since that's the case, it's perfectly fine to build a hospital not from one day to the next, but for many years to come (5).

The ceremonial opening of the National Hospital, with 238 beds, took place on 1 July 1894. The following departments were put into operation: Internal Department for Throat and Nose Deceases (but not the ear) with 45-50 beds; Surgical Department with Ophthalmology (and ear surgery) with 45-50 beds; Dermatology and Syphilis Department with 70-80 beds and Gynecology-Obstetrics Department with 70-80 beds. Interestingly, all wards were divided into male and female, with the confessional division being insisted on, especially in the kitchen area. Thus the Muslim patients had a specially modern designed kitchen. Inside the hospital, apartments were designed and built for doctors, medical and other staff employed at the National Hospital (6).

The first heads of the National Hospital departments were appointed in Vienna in 1893, His Excellency Benjamin Kalaj and the project leaders for the hospital construction, professors Braun, Chrobak and Neumann. The first Prosector of the hospital was Roman Wodynski, former Assistant at the Institute of

Pathological Anatomy in Krakow. In addition to the heads of individual departments, each department had 1 assistant and a physician associate. During this period, not all departments had assistants, and associate physicians had to change every 6 months (7).

There was no special department for infectious diseases, but for this purpose a barrack was built in 1895 based on the Dr. Koha (Koch) system, with 22 beds, enclosed area with a separate entrance and construction area of 410.84 m². This department served for the necessary isolation of patients suffering from acute infectious diseases such as: scarlet fever, diphtheria, cholera, typhoid and other intestinal infectious diseases. Already in the first year of its operation the National Hospital was burdened with an influx of patients beyond its capacity (8).

Due to the increasing workload of the departments, within the limits of humanity, the hospital administration insisted on reducing the length of hospital treatment. Special treatment was provided for patients from more remote places and regions with whom communication was rather difficult. Given that there were few trained medical staff in the field who could provide quality post-hospital treatment, efforts were made to accommodate those patients and keep them in inpatient treatment until optimal recovery (6).

The establishment of the National Hospital in Sarajevo in 1894 marked the rapid development of the health service and the growing need for nursing assistants. During that period, a number of short courses were organized for the training of assisting hospital staff, and the education was carried out by doctors. In 1910, the National Hospital in Sarajevo organized courses for training of the assisting hospital staff (9).

Already in the first year of the operations, the National Hospital was faced with a problem of quality medical staff, as the existing staff was significantly burdened by the increased demands for hospital treatment. Specifically, there was a need to hire professional medical staff, so the chief physicians, thanks to their acquaintances and connections, invited nurses from other countries who owing to their merits would train local staff to do the work (6).

During the period of Austro-Hungarian domination in our country, the first midwives who worked in the

Gynecology Department of the National Hospital in Sarajevo were Alojzija Vensko and Ana Kokić, nuns, educated in confessional medical schools, and there were no secondary medical staff (5).

In that regard, in 1898, the National Government issued the so-called Instruction for Midwives (Hebammeninstruction), with 21 paragraphs, containing decisive regulations on the obligations of midwives in the field of maternity practice (10,11).

Over the time, there was an increasing need for midwifery schools, given that practical education alone (according to the Provisional Status for Training of Midwives) was not sufficient to meet the demands and needs, even for home births. Women in labor gained more confidence in giving birth in the hospital, even though the hospital's midwives were overburdened due to their shortage. This trend indicated a significant need for the establishment of an independent school for midwives (12, 13).

Until 1900, there was a pronounced shortage of professional medical staff - doctors, assistants and secondary doctors, as well as professional intermediate medical staff. In 1900, there was a total of 122 employees in the National Hospital, of which 62 were professional medical staff and 60 were administrative and other non-medical staff (6).

In late 1900, the National Hospital employed: one midwife, one assistant surgeon, one pharmacy laboratory technician, 6 male nurses and 38 female nurses. The administrative and housekeeping staff of the National Hospital in 1900 included: August Kaminski - hospital administrator; Jovan Žokić - his assistant; Arnold Beck - head of accounting; Karl Bohm and Ostoja Pavković - office clerks; Danica Kamber - head cook; 2 day workers; 1 porter; 1 office servant; 1 bathroom manager; 1 machinist; 1 stoker; 2 coachmen; 2 day servants; 4 laundresses; 3 cooks; 1 bricklayer; 3 members of the kitchen staff; 2 apprentices; 1 Islamic religious cook; 2 seamstresses; 10 house servants; 1 waiter; 13 maids; 3 cooks and a cyclist (6).

The work of nurses was mainly performed by so-called head nurses (Oberschwester), mostly nuns or head nurses of the department, who supervised and instructed nurses and other assisting staff (11).

On 26 February 1914, Primarius Dr. Hamdija Karamehmedović, as a Member of Parliament,

submitted an exposition of the Parliament Health Committee proposing a draft Law on the Improvement of Health Institutions in Bosnia and Herzegovina. He requested the establishment of schools for midwives with boarding schools for female students (14).

The draft law submitted by Primarius Dr. Karamehmedović was unanimously adopted by the National Government Parliament, and a supplementary decision was drafted to build a new National Hospital with 800 beds by 1925. All these requests, although discussed in detail and adopted at the session of the National Government Health Council, were not materialized as their implementation was interrupted four months later by the First World War, which had just begun in Sarajevo, the headquarter of the National Government and the National Hospital (6).

By the beginning of the World War I, the health status of the population, thanks to the network of health institutions and employed personnel, had significantly improved compared to the situation at the end of Ottoman rule. On average, there were 0.6 beds per inhabitant, 12,912 inhabitants per doctor, 16,222 inhabitants per midwife, and 40,384 inhabitants per pharmacy. There were almost no middle-level medical staff.

After the end of the First World War in 1918, there was even greater poverty in Bosnia and Herzegovina, given that doctors, who were mostly foreigners, left the country, and epidemics of infectious diseases ravaged the country leaving severe consequences. Unfortunately, the only educational institution left was the Lower Midwifery School in Sarajevo. Medical doctrine was extremely conservative and underdeveloped. At the end of the World War there was a difficult post-war economic situation in Sarajevo and BiH. With the departure of the Austro-Hungarian Monarchy in 1918, the **National Hospital** changed its name to the **State Hospital** of the newly formed Kingdom of Serbs, Croats and Slovenes (15).

In the period from 1918 to 1941, the General State Hospital in Sarajevo experienced organizational, personnel, and partially spatial changes. After the end of the First World War, the Director of the hospital was Dr. Risto Jeremić, succeeded by Dr. Uroš Krulj, who at certain point was the head of the health service in Bosnia and Herzegovina. After his departure to

Belgrade, the position of Director was taken over by Dr. Hamdija Karamehmedović, followed by Dr. Špiro Šeat, until his retirement, and just before the World War II Dr. Asaf Šarac was appointed a new Director (6).

The work of the Sisters of Mercy at the "National Hospital" in Sarajevo began on the initiative and with the efforts of the Hospital Director and the Head of the Surgical Department, Dr. Milivoj Kostić. On 13 January 1919, he sent a letter to the superior of the Dužba, Msgr. Matija Seigerschmied, asking him for eight to ten nurses to care for the Hospital patients. The letter emphasized the belief that nurses were excellent caregivers and particularly conscientious in using patient's inventory.

Based on the consensual written "Agreement", nurses arrived to the National Hospital in Sarajevo on 13 March 1919. There were 12 of them, and they were accompanied by the superior, Msgr. M Seigerschmied. Their first superior was Sister Mirjana Bostijančić (1919 - 1921). The aforementioned "Agreement" resolved all important issues related to the life and work of the sisters at the National Hospital, primarily the issue of the hospital's chaplain, or the hospital chapel. The rights of the superior as the head of the sisters were also precisely determined: "The headmistress can replace nurses in the departments, but must inform the management accordingly".

The first nurses worked in surgery and in the outpatient clinic at the Department of Dr. Kostića. On 29 December of the same year, 12 more sisters arrived at the hospital and started their work at the beginning of 1920 (16).

The administration made efforts to have the sisters on as many positions as possible, as they were convinced that they were fully committed to their duties, as expected. In 1923, the Director, Dr. Ivan Jakovljević, organized a nursing course which lasted from December 1923 to June 1924. In addition to their work, the course was attended by 15 Sisters of Charity (16).

The second similar course, also in organization of Director Dr. Jakovljević, lasted from March to October 1925, and was attended by 8 Sisters of Mercy. After passing the exams, the sisters were issued the proper certificate for both the first and second course (16).

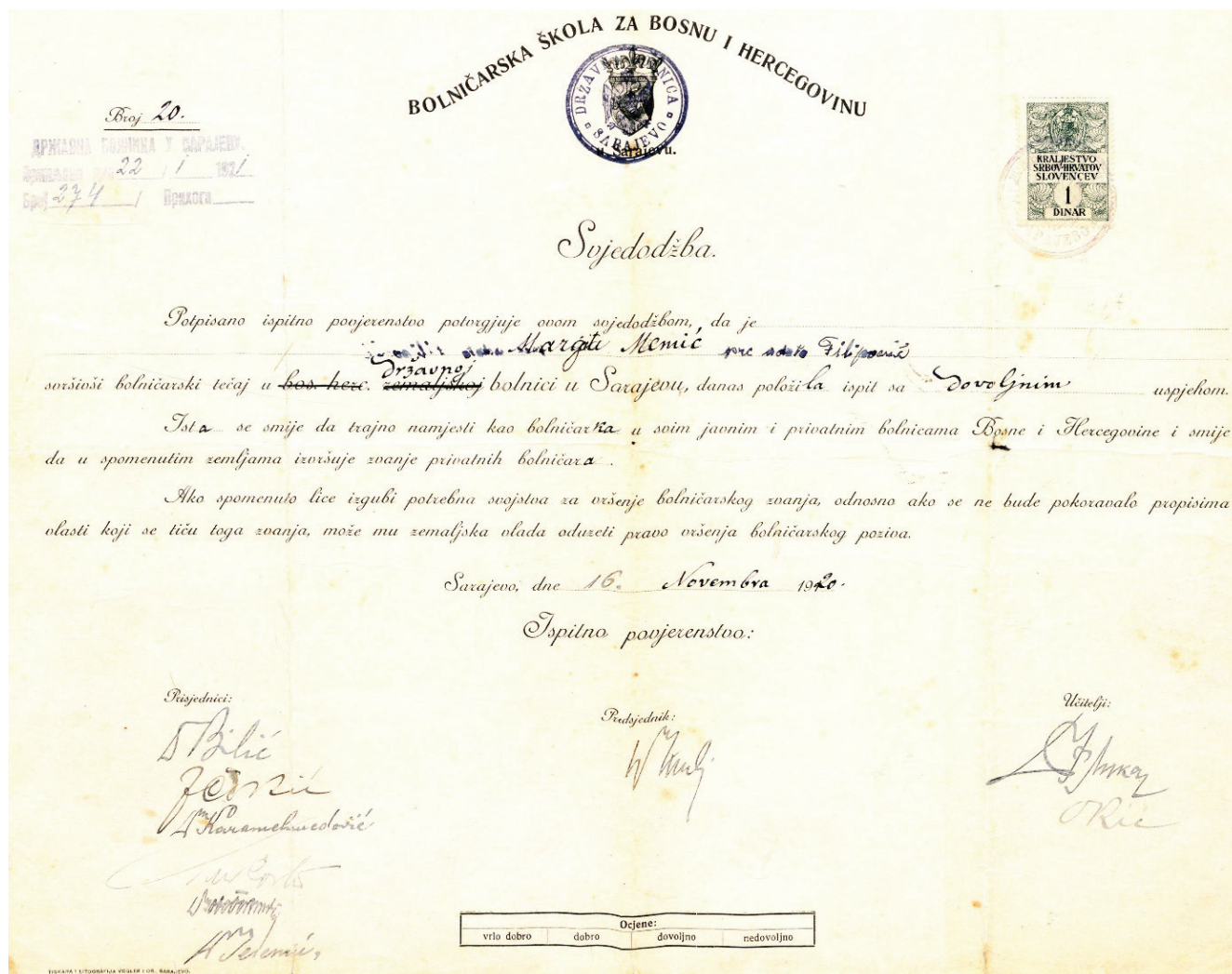


Figure 1 Certificate from 1920, also signed by Dr. Karamehmedović – Private archive of Tomislav Kovačević.



Figure 2 Certificate from 1924, also signed by Dr. Jakovljević – Private archive of Tomislav Kovačević.

Number of nurses from Bosnia and Herzegovina went to Zagreb for training in order to obtain the title of nursing assistant. Documentation of the State Archives in Sarajevo, contains requests from sisters for financial assistance for the purpose of education and continuing education in schools for sisters in Zagreb. Appointing Prof. Andrija Štampar as Minister of Health of the Kingdom of Yugoslavia enabled number of health workers from Bosnia and Herzegovina to obtain education in Zagreb, with an orientation for social health work, whereas some nurses obtained education for hospital work in Belgrade.

Nurses in BiH were trained with the following basic goals: to improve the health of the population; prevent diseases; restore health and ease the suffering of seriously ill. Respect for life, dignity and human rights was essential for the nursing profession. The nursing profession should not be limited by national, racial or religious origin, skin color, sex, political affiliation or social status (17).

At the request of the hospital administration, 19 new nurses arrived to the Sarajevo hospital in 1932 and 1933. Until 1931 the legal status of the hospital nurses was based on the "Agreement of 1919". Meanwhile, in 1926, the Zagreb Ministry of Health, with the chief, Dr. Katičić, drafted a contract form for all sisters of mercy working in state hospitals. The form was also received by the Sarajevo State Hospital. The agreement between the Ministry of Social Policy and Public Health, represented by the Director of the State Hospital in Sarajevo, Dr. Hamdija Karamehmedović, under the authorization of the Minister from 11 December 1931, and the leadership of the Congregation of the Sisters of Mercy St. Vinko Paulovski in Zagreb, represented by the supreme superior, Reverend Mother Ignacija Pavičić, was signed in Sarajevo on 30 December 1931. The contract was valid until 1938, and on 25 June 1941, on the initiative of the Reverend Mother Tekla Delač, a new contract was adopted (16).

The first trained nurses in BiH with a diploma signed by Dr. Štampar were: Marija Bačić - Hotić and Tonka Blažević - Džafić. Sister Krista Kostić was one of the main nurses in the syphilis eradication action in BiH led by Academician Ernest Grin (17). Nurse Emina Hadži Hamzić was the president of the Drina Banovina Sisters Assembly, held in Sarajevo in 1934.

The article "News about Sarajevo" was published in the magazine *Sestrinska riječ* in 1935: Sarajevo newspaper reported on establishing the Drina Banovina Section of the JDDS organization. This step of our sisters in Bosnia has pleased us immensely, and we believe that their joint fight for our common rights will be effective for the general well-being of the society and people in Bosnia. The first Muslim sister, Emina Hadži Hamzić, was appointed the president of the section. The vice-president was nurse Nada Grković, who had been working in Sarajevo for many years, the section secretary was, nurse Lidija Pertot from the Military Hospital, and the treasurer was, nurse Manja Pavković, who worked in the same hospital (18).

The Assembly of the Yugoslav Association of Graduate Nurses was held on 10 May 1936 in Sarajevo. The gathering was attended by approximately 50 nurses from six provinces and from Belgrade, and the event itself was held at the premises of the Public University. The Section Committee, under the presidency of nurse Emine Hadži-Hamzić, made sure that the guests' stay was pleasant and organized a tour of Sarajevo's famous institutions and buildings, including the National Museum, Craft School, Bašćaršija, Banovina carpet weaving, City Hall, Jewish Sephardic Temple in the Moorish style and Hygiene Institute. The participants of the gathering emphasized that their stay in Sarajevo had been extremely pleasant and enjoyable.

The Assembly decided that the next annual assembly would be held in Zagreb. Also, a new board was appointed with: president nurse Antonija Schiffrer, vice president nurse Emina Hadži-Hamzić, secretary nurse Milena Janić and treasurer nurse Anka Došen. The Assembly reached the following conclusions: elimination of unqualified persons from the position of nurse, request to the Ministry of Health to appoint a nurse to the position of officer for class issues, proposed costs for nursing sanitary clothing in the Ministry of Health budget, and the introduction of annual leave of 30 days, which would gradually increase (19).

During the World War II, the hospital administration sent requests for an increase in the number of nurses, and the Supreme Administration tried to comply

as much as possible. Thus, on 14 June 1941, the Administration requested 15 nurses, followed by the request for two more, which resulted in over 90 nurses working in the hospital, certainly the largest number of nurses in the institution (20).

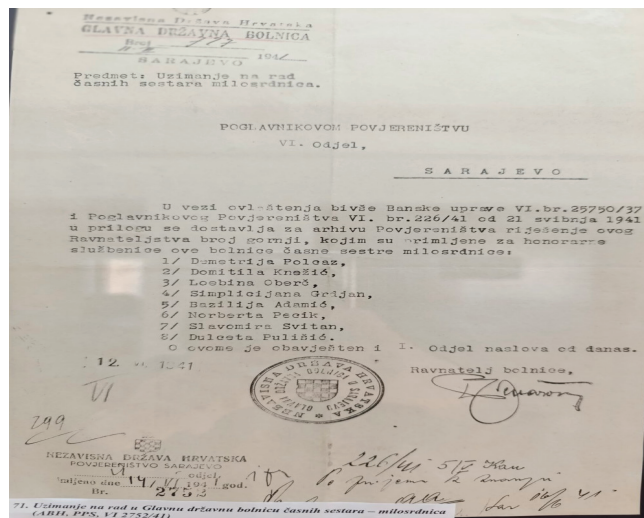


Figure 4 Hiring Sisters of Mercy - Archive of the Institute for Research and Development (NIR).

Immediately after the occupation, an imposed regime of fear, torture, stalking and mistrust dominated in the Koševo Hospital, the largest medical center in the city and Bosnia and Herzegovina. The first personnel measure, which the NDH government introduced after the occupation, was the appointment of new management. Despite the constant surveillance of the Germans and the NDH authorities, the hospital increasingly became a refuge for affected illegal immigrants and number of citizens who were in danger and needed protection under false diagnoses. Medical assistance was also provided to fighters who were illegally stationed in the city. Many National Liberation Movement (NOP) activists, who were prisoners, were housed and treated at the Koševo Hospital. Health workers provided them with special assistance and care (21).

After the World War II, Bosnia and Herzegovina, including Sarajevo, underwent significant political and social changes. One of the key changes was the development of the health system, which underwent major transformations, and medical institutions established in previous periods, such as the Turkish and Austro-Hungarian periods, were reorganized. They educated the first independent healthcare

professionals in Bosnia and Herzegovina, who would be a significant support for better and higher quality organization of healthcare services (22).

The Faculty of Medicine in Sarajevo resumed its work and started classes on 16 November 1946. The General State Hospital became the teaching base of the faculty, which in 1950 changed its name to Clinical Hospital of the Faculty of Medicine, and the former departments of the hospital were transformed into clinics (23).

Applying the constitutional amendments, Koševo Clinical Hospital adopted a new management system (OOUR), which integrated work organizations on the basis of a self-management agreement. Based on that the previous organization of the health service was abandoned and modernized approach to management was introduced. Between 10 and 15 January 1979, through a referendum, the workers of the Basic Organizations of Associated Labour (OOUR), in accordance with the Law on Associated Labour from 1977, adopted a self-governing agreement on association in the Composite Organization of Associated Labour (SOUR), University Medical Center (UMC) Sarajevo. The organization was based on socialist principles of self-management, with workers' participation in the decision-making process (24).

The development of the High Medical School - Jezero Sarajevo began immediately after the World War II, specifically on 26 September 1946, when the professional two-year "School for Midwives" was established within the Obstetrics and Gynecology Clinic "Jezero".

The names of the schools and educational profiles changed over the time. With the education reform in 1971, the schools became part of the School Health Center. On 28 September 1946, the Secondary Medical School in Sarajevo was established (17).

By decision of the Sarajevo Faculty of Medicine Council No. 01-3438/73, on 10 May 1973 the High Medical School was founded, which became operational on 19 December 1973 based on the approval of the Republic Secretariat for Education, Culture and Physical Culture No. UP-1-14-612/17. In the initial phase, entire education took place within the Faculty of Medicine.

Immediately after establishing in 1973, the Medical School of Higher Education had four orientations: senior medical technicians, senior laboratory technicians, senior sanitary technicians, and senior radiological technicians. Nine years after the establishment of

the Medical School of Higher Education in Sarajevo, the senior physiotherapy technicians' orientation was opened, and in the same year, 1982, the senior sanitary technicians' orientation was closed. In 1990, the Medical School of Higher Education introduced a three-year study program and the obligation of graduation thesis drafting. Since the 1990/91 academic year, the Medical School of Higher Education introduced the name department instead of orientation. The Medical School of Higher Education was renamed to the Public Institution "High Medical School" in Sarajevo by the decision of the Sarajevo Cantonal Court No. UF/I-1034/03 of 12 December 2003.

On 5 March 2008 the High Medical School in Sarajevo was renamed to the Public Institution „Faculty of Health Studies“ in Sarajevo by Decision on Registration No. 065-0-Reg-08-000387 of the Municipal Court in Sarajevo.

In the academic 2009/10, the first generation of students enrolled at the Faculty of Health Studies in Sarajevo, studying in accordance with the principles of the Bologna Declaration for duration of 4+1 years. Under the influence of different factors, the role of nurses, technicians and other health professionals has gradually evolved, moving from an assisting to an independent activity (25).

The beginning of the war in Bosnia and Herzegovina brought new health challenges, as a large number of health workers left the country. The health service inside the besieged Sarajevo during the 1992-1995 aggression was completely unprepared. At that moment, an organizational transformation started and on 9 November 1992 the University Medical Center (UMC) was renamed to the Clinical Center University of Sarajevo (CCUS). Basic organizations of associated labor became Organizational Units (OU), and CCUS became an equal member of the University. During the war, in the period from 1992 to 1995, 2,597 employees left the CCUS, while 2,271 employees remained (26).

Since 1995, the Clinical Center University of Sarajevo (CCUS) has gone through significant changes and improvements. After the war, the reconstruction and modernization of facilities began, and the spectrum of medical services was expanded. In 2003, the CCUS became a member of the University of Sarajevo, which strengthened its role in education and research. In the following years, investments were made in the development of new medical centers and laboratories, and new technologies in treatment were adopted. Also, the CCUS has actively participated in number

of international projects and collaborations, thereby improving the quality of healthcare and becoming recognizable at the regional level (27).

During the COVID-19 pandemic, nurses and technicians in Sarajevo, especially in the Clinical Center University of Sarajevo (CCUS), were faced with number of challenges. They were on the front lines fighting against the virus, faced with an increasing number of patients, limited resources and under continuous stress. In addition to the physical effort, they had to adapt to new protection protocols, simultaneously continuing to provide high-quality care. Unfortunately, many nurses and technicians became victims of the COVID-19 infection and some lost their lives in the line of duty. In addition to physical burden, they were also faced with emotional stress due to uncertainty, loss of lives and difficult working conditions. Despite all that, they remained dedicated to their task, providing the necessary care in extremely difficult conditions, in accordance with medical ethics, professional rules and healthcare standards, ensuring quality and safe care for patients (28).

Nowadays, health workers in BiH have their own Associations, Chambers, Trade Unions which they join and exercise their rights in the health care system, strengthening their profession through various types of education. Chambers of Health Technicians and Engineers cooperate with experts of the same professions outside Bosnia and Herzegovina, providing the opportunity for education to their members in the countries of the region and wider, and establishing memorandums of cooperation.

Thanks to the training of nurses and technicians of all profiles and levels of education, health technicians of all profiles and levels of education and graduated health engineers of all profiles, the health sector is strengthened, and thus the satisfaction of patients with the service provided.

Nowadays, the Clinical Center University of Sarajevo employs approximately 1,600 nurses and technicians and health technicians of all profiles and levels of education.

„On 1 July 1894, the doors of the new National Hospital in Koševi were opened, to the sick and the suffering, to seek cure for their pain within these walls, and health for their bodies“.

Just as it was 131 years ago, we still....

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The Relationship between Conflict and Assertiveness among Nurses at the Tertiary Healthcare Level

Odnos sukoba i asertivnosti medicinskih sestara/tehničara na tercijarnom nivou zdravstvene zaštite

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ABSTRACT

Introduction: the role of nurses involves interaction and communication with patients, colleagues, and other healthcare workers. In their workplace, nurses are exposed to numerous conflict situations. Assertive skills play a crucial role in resolving such situations. Assertive behavior is of utmost importance and is essential for the effective resolution of conflicts.

Aim: to determine the participants' awareness of the concepts of assertiveness and conflict, to analyze the level of assertiveness, to correlate the level of assertiveness among nurses with the sociodemographic variables of the participants, to examine the perception of conflict in the workplace, and to establish the relationship between assertiveness and the perception of conflict in the workplace among nurses.

Materials and methods: the research was descriptive-analytical, a cross-sectional study. The study included 253 nurses employed at the Clinical Center University of Sarajevo during January and

February 2025. The research instrument was an adapted questionnaire on assertiveness and the perception of conflict in the workplace. The results were thoroughly elaborated and documented, presented in absolute and relative numbers, and statistical values using statistical indicators, and displayed in simple and understandable tables and figures.

Results: participants who are familiar with the concept of assertiveness are more assertive than those who are not. Assertiveness does not depend on the gender or age structure of the participants, or on their length of work experience, but it does depend on their professional qualifications. More assertive participants tend to resolve conflicts immediately and personally, have higher self-assessment in conflict resolution, and are less likely to avoid resolving conflicts.

Keywords: communication, conflict, assertiveness, nurses

SAŽETAK

Uvod: uloga medicinske sestre/tehničara uključuje interakciju i komunikaciju sa pacijentima, kolegama i drugim zdravstvenim radnicima. Na svome radnom mjestu medicinske sestre/tehničari izloženi su brojnim konfliktnim situacijama. U rješavanju takvih situacija važnu ulogu imaju asertivne sposobnosti. Asertivno ponašanje od izrazite je važnosti i neophodno je za kvalitetno rješavanje sukoba.

Cilj: utvrditi informisanost ispitanika o pojmovima asertivnost i sukoba, analizirati nivo asertivnosti, dovesti u vezu nivo asertivnosti kod medicinskih sestara/tehničara sa sociodemografskim varijablama ispitanika, ispitati precepciju sukoba na radnom mjestu te utvrditi povezanost između asertivnosti i percepcije sukoba na radnom mjestu kod medicinskih sestara/tehničara.

Materijali i metode: istraživanje je deskriptivno-analitičko, studija presjeka. U istraživanje je uključena 253 medicinska sestra/tehničar, zaposleni u Kliničkom centru Univerziteta u Sarajevu tokom januara i februara 2025 godine. Instrument za provođenje istraživanja je prilagođeni upitnik o asertivnosti i percepciji sukoba na radnom mjestu. Rezultati su detaljno razrađeni i dokumentirani, prezentirani apsolutnim brojevima, relativnim brojevima, statističkim vrijednostima uz korištenje statističkih pokazatelja, a prikazani jednostavnim i razumljivim tabelama i grafikonima.

Rezultati: ispitanici koji poznaju pojam asertivnosti su asertivniji od ispitanika koji ne poznaju pojam asertivnost. Asertivnost ne zavisi od spolne i dobne strukture ispitanika, te dužine radnog staža, dok zavisi od stručne spreme ispitanika. Asertivniji ispitanici češće rješavaju sukobe odmah i lično, imaju veću samoprocjenu u rješavanju sukoba, te rjeđe pribjegavaju izbjegavanju rješavanja sukoba.

Ključne riječi: komunikacija, sukob, asertivnost, medicinske sestre

INTRODUCTION

Communication in medicine and healthcare is primarily an integral part of the relationship with the patient and their family, but the importance of communication among healthcare workers, whether within the team or in the form of interdisciplinary cooperation, should not be overlooked (1). Conflict is

defined as a process that arises, develops, and prevails in the interaction of disagreement between at least two subjects having an interest in the same values (2). Conflicts, categorized according to their consequences, are called constructive and destructive conflicts, and those which division is based on the participants can be: intrapersonal (internal) and interpersonal (between individuals or groups) (3).

There are two approaches to conflict: traditional and modern. According to the traditional approach, conflict was considered undesirable, harmful, and unacceptable, and thus needed to be avoided, suppressed or hidden (4). According to the modern view, conflict is natural, inevitable and an integral part of any change. It is not a danger, but an opportunity to identify problems, find solutions, prevent stagnation, enhance curiosity, stimulate change, and help strengthen the identity of the individual and the group. Therefore, conflict should not be avoided, suppressed, or feared (5). To manage conflict, certain styles have been developed based on the desire to satisfy one's own concerns in relation to the concerns of the other party. For this purpose, a special model has been developed, characterized by two main dimensions - assertiveness and cooperativeness (6). Assertiveness is a form of behavior in social interactions that allows us to express our feelings, desires, stand up for our rights, reject unreasonable demands without fear or guilt, in a way that does not cause psychological or physical harm to another person (7). The ability to communicate is a very important skill and a vital part of providing healthcare. It helps us become better at our jobs, harmonize relationships with others, and reduce our own stress and dissatisfaction (8). Nurses are exposed to numerous conflict situations in the workplace. Assertive skills play a significant role in resolving such situations. Assertiveness is essential for better communication, whether it is communication between colleagues or nurse-patient, so developing these skills can improve trust in the profession (9). Research on the topic of assertiveness in nurses and the perception of workplace conflict is rather rare in our country. Therefore, the results of this study will provide a picture of the level of assertiveness in nurses necessary for adequately recognizing and resolving conflicts in the workplace.

AIM

The aim of the study was to determine the awareness of nurses about the concepts of assertiveness and conflict; to analyze the level of assertiveness among nurses and relate it to their knowledge about it; to correlate the level of assertiveness among nurses with the sociodemographic variables of the respondents (age, gender, work experience, education level) and to examine the perception of conflict among nurses in the workplace.

MATERIALS AND METHODS

The study included 253 nurses employed at the Clinical Center University of Sarajevo during January and February 2025. The research was descriptive-analytical and a cross-sectional study. The instrument used for the research was an adapted questionnaire on assertiveness and perception of conflict in the workplace, prepared by Stojčić Ž, et al. (10). The questionnaire consists of several parts: sociodemographic variables of the respondents, questions about the concept of assertiveness and the definition of conflict, and section which measures assertiveness, consisting of 16 statements describing assertive behavior. The task of the respondents was to assess how often they exhibit the stated behaviors using a Likert scale, ranging from 1 (never) to 5 (always). The research was approved by the Ethics Committee of the Clinical Center University of Sarajevo.

Upon completion, statistical data processing was carried out. The results were presented in tabular and graphical form, showing the number of cases, arithmetic mean with standard deviation, and the range of values depending on the type of data. Difference testing was performed using one-way analysis of variance (ANOVA) and Student’s t-test, while the relationship between assertiveness and variables indicating conflict resolution methods was tested using Pearson’s correlation coefficient.

The test results were considered statistically significant with $p < 0.05$ or at a confidence level of 95%. The analysis was conducted using the statistical package for sociological research IBM Statistics SPSS v 25.

RESULTS

The research included a total of 253 nurses employed at the Clinical Center University of Sarajevo, who completed an online questionnaire during January and February 2025.

Table 1 Overview of basic sociodemographic characteristics of respondents.

		N	%
Age structure	M	43.01	
	SD	10.16	
	Min.	20	
	Max.	63	
Sexual structure	Male	36	14.2
	Female	217	85.8
Level of education	High school	161	63.6
	Higher education	5	2.0
	University degree	73	28.9
	Academic title	14	5.5
Years of work experience	M	19.94	
	SD	10.29	
	Min.	0	
	Max.	39	

The average age of the respondents was 43.01 ± 10.16 years, with the youngest respondent being 20 and the oldest 63. In terms of gender distribution, women were more represented in our sample, 217 (85.8%) women compared to 36 (14.2%) men.

Regarding education, the majority of respondents had high school diploma, 161 (63.6%), followed by respondents with university degree, 73 (28.9%). 14 (5.5%) respondents had an academic title, while the smallest number of respondents had a higher degree, 5 (2.0%).

The average length of work experience was 19.94 ± 10.29 years, with the shortest recorded work experience being 2 months and the longest 39 years.

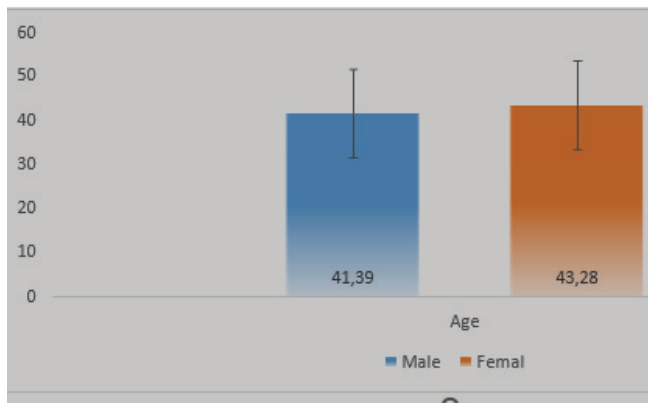


Figure 1 Age structure of respondents in relation to gender.

Using an independent t-test, we obtained the results that men were slightly younger, with average age of 41.39 ± 10.11 years, while the age of women was 43.28 ± 10.17 years, with no statistical significance $p=0.303$.

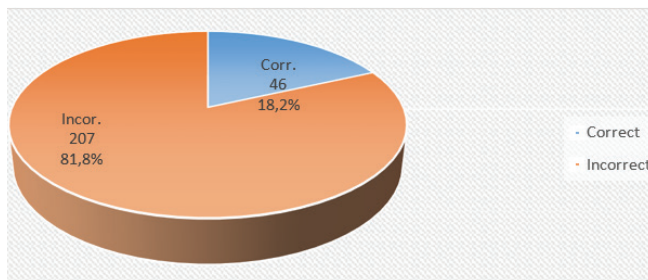


Figure 2 Definition of conflict.

To define a conflict, respondents were offered three possible answers: the statement that conflict was a situation in which there was a disagreement of opinions, desires, needs or ways of their achievement between people was taken as correct. The remaining two statements were incorrect. 46 (18.2%) respondents provided correct answers, while 207 (81.8%) respondents offered incorrect answers.

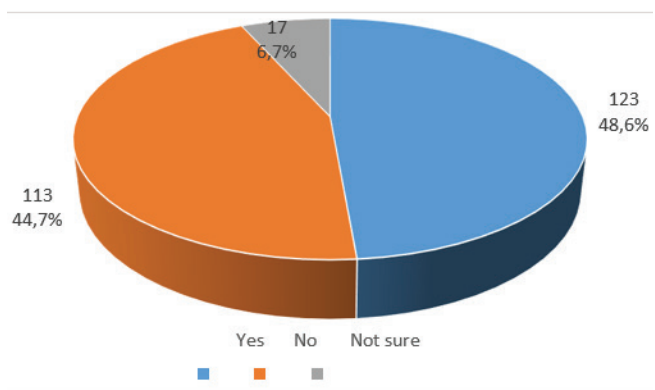


Figure 3 Definition of assertiveness.

From the total number of respondents ($N=253$), 123 (48.6%) respondents were familiar with the definition of assertiveness, 113 (44.7%) were not sure about the meaning of assertiveness, while 17 (6.7%) respondents did not have a clue what the assertiveness meant.

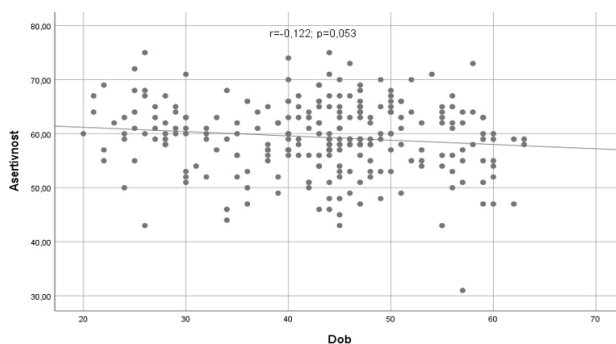


Figure 4 Dispersion diagram of the mutual dependence of assertiveness on the age of respondents.

Figure 4 presents a dispersion diagram of the interdependence of assertiveness in relation to the age of the respondents. Assertiveness is not correlated with the age of the respondents, $p=0.053$.

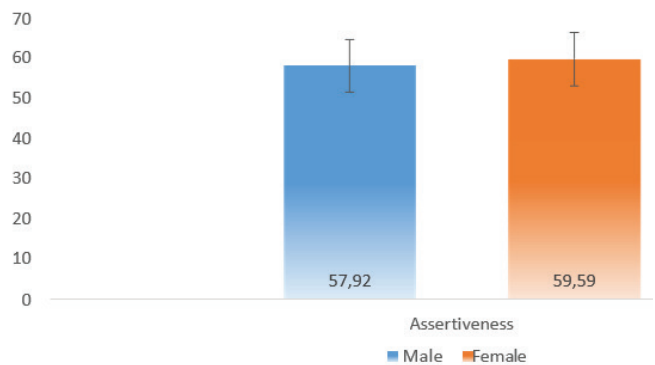


Figure 5 Assertiveness in relation to the respondents' gender.

Women showed a slightly higher degree of assertiveness with an average score of 59.59 ± 6.64 compared to men with an average score on the assertiveness scale of 57.92 ± 6.54 , but with no statistically significant difference.

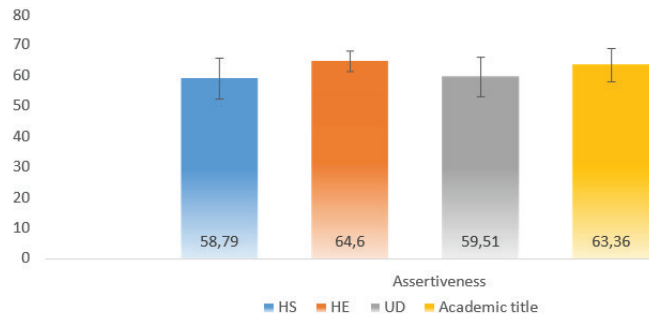


Figure 6 Level of education in relation to assertiveness.

In relation to the level of education, statistically significant difference was recorded in the sense that respondents with a college degree showed the highest level of assertiveness with an average score of 64.6 ± 3.34 , and respondents with an academic degree with an average score of 63.36 ± 5.40 compared to respondents with a high school degree - 58.79 ± 6.69 and a college degree - 59.51 ± 6.43 .

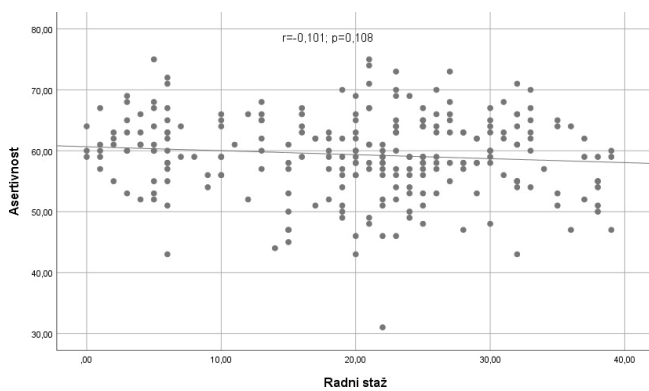


Figure 7 Dispersion diagram of mutual dependence of assertiveness.

Figure 7 presents a dispersion diagram of the interdependence of assertiveness and the respondents' length of service (years of work experience). Assertiveness was not correlated with the length of service, $p = 0.108$.

Table 2 Presentation of descriptive statistical indicators of the questionnaire.

	N	Min.	Max.	TR	M	SD	Chrom-ba-ch's α
Assertiveness	253	31	75	16-80	59.36	6.64	0.757
Perception of problematic behavior of associates	253	21	78	16-80	46.00	10.95	0.924
Confronting due to problematic behavior of colleagues	253	16	80	16-80	28.79	7.98	0.900
Perception of problems in the work organization	253	9	44	9-45	27.72	7.32	0.867
Frequency of conflicts with managers	253	1	5	1-5	1.77	0.85	
Frequency of conflicts with associates	253	1	5	1-5	1.87	0.78	
Frequency of conflicts with subordinates	253	1	5	1-5	1.57	0.72	
Frequency of conflicts with patients	253	1	5	1-5	1.38	0.63	
Conflict resolving - immediately	253	1	5	1-5	3.62	1.32	
Conflict resolving - later	253	1	5	1-5	2.22	0.95	
Not taking action to resolve conflict	253	1	5	1-5	2.07	1.13	
Conflict resolving - directly	253	1	5	1-5	3.40	1.25	
Hierarchical conflict resolution	253	1	5	1-5	3.01	1.28	
Self-assessment of performance in conflict resolution	253	1	5	1-5	3.09	0.79	

The parts of the questionnaire related to the respondents' assertiveness, their perception of conflicts or problematic behaviors of colleagues, entering into conflicts due to problematic behaviors of colleagues, and the perception of problems in the organization of work were subject to internal consistency testing. The reliability of internal consistency (internal consistency) for individual question groups was expressed by the Cronbach's α coefficient. If Cronbach's Alpha > 0.7 , the questions were meaningful and the answers were related.

For 16 questions related to assertiveness, the respondents showed a degree of question coherence

with Cronbach’s Alpha = 0.757 (Cronbach’s α coefficient was higher than seven, >0.7). Measured on a scale from 16 to 80, the respondents in our sample (N = 253) showed a high degree of assertiveness with a mean score of 59.36 ± 6.64 .

For 16 questions related to the perception of problematic behaviors of colleagues, the respondents showed a degree of coherence with Cronbach’s $\alpha = 0.924 (>0.7)$.

On the scale from 16 to 80, the respondents in our sample (N = 253) showed a moderate perception of problematic behaviors of colleagues with a mean score of 46.00 ± 10.95 .

For 16 questions related to conflict due to problematic behaviors of colleagues, the respondents showed a degree of coherence with Cronbach’s $\alpha = 0.900 (>0.7)$.

On the scale from 16 to 80, the respondents in our sample (N = 253) showed low conflict due to problematic behaviors of colleagues with a mean score of 28.79 ± 7.98 .

For 9 questions related to the perception of problems in the work organization, the respondents showed a degree of coherence with Cronbach’s $\alpha = 0.867 (>0.7)$.

On the scale from 9 to 45, the respondents in our sample (N = 253) showed a moderate perception of problems in the work organization with a mean score of 27.72 ± 7.32 .

The following indicators were obtained based on a single question:

The frequency of conflict with superiors on the scale from 1-5 in our sample was 1.77 ± 0.85 . The frequency of conflict with colleagues on the scale from 1-5 in our sample was 1.87 ± 0.78 . The frequency of conflict with subordinates on the scale from 1-5 in our sample was 1.57 ± 0.72 . Resolving conflicts immediately on the scale from 1-5 in our sample was 3.62 ± 1.32 . Resolving conflicts later on the scale from 1-5 in our sample was 2.22 ± 0.95 . Conflict with patients or their families on the scale from 1-5 in our sample was 1.38 ± 0.63 . Resolving conflicts directly on the scale from 1-5 in our sample was 3.40 ± 1.25 . Resolving conflicts hierarchically on the scale from 1-5 in our sample was 3.01 ± 1.28 . Self-assessment of conflict resolution success on the scale from 1-5 in our sample was 3.09 ± 0.79 .

Table 3 Correlation analysis between assertiveness and perception of conflict in the workplace.

		Assertiveness
Perception of problematic behavior of associates	ro	0.019
	p	0.765
Conflict due to problematic behavior of co-workers	ro	0.042
	p	0.507
Perception of problems in work organization	ro	-0.023
	p	0.719
Frequency of conflicts with managers	ro	0.034
	p	0.591
Frequency of conflicts with associates	ro	0.072
	p	0.253
Frequency of conflicts with subordinates	ro	0.067
	p	0.290
Conflict resolving - immediately	ro	0.217**
	p	0.000
Conflict resolving - later	ro	-0.004
	p	0.951
Not taking action in conflict resolution	ro	-0.172**
	p	0.006
Conflict resolving - directly	ro	0.305**
	p	0.000
Hierarchical conflict resolution	ro	0.063
	p	0.316
Self-assessment of performance in conflict resolution	ro	0.334**
	p	0,000
**.		Significant correlation at the level of $p < 0.01$
*.		Significant correlation at the level of $p < 0.05$

Assertiveness was correlated with conflict resolution - immediately. More assertive respondents more often resolve conflicts immediately, $r=0.217$; $p=0.0001$

Assertiveness was correlated with avoiding conflict resolution. More assertive respondents less often avoiding conflict resolution, $r=-0.172$; $p=0.006$

Assertiveness was correlated with resolving conflicts personally. More assertive respondents more often resolve conflicts directly, $r=0.305$; $p=0.0001$

Assertiveness was correlated with self-assessment of conflict resolution success. More assertive respondents more often had a higher self-assessment in conflict resolution, $r=0.334$; $p=0.0001$

DISCUSSION

Our research was conducted during January and February 2025 and was a cross-sectional study involving 253 nurses employed at the Clinical Center University of Sarajevo. The average age of the respondents was 43.01 ± 10.16 years, with the youngest respondent being 20 and the oldest 63. In terms of gender distribution, women were more represented in the sample, specifically, 85.8% of women compared to 14.2% of men. According to educational qualifications, the largest number of respondents had high school diploma (63.6%), followed by respondents with university degree (28.9%), an academic title (5.5%), and the smallest group had a higher education degree (2.0%). The average length of service was 19.94 ± 10.29 years, with the shortest recorded service duration being 2 months and the longest 39 years. Stojčić Ž, et al., in their study conducted on a sample of 87 nurses employed at the General Hospital in Bjelovar, reported that almost two-thirds of the respondents were women (87%), and the proportion of men was 13%, which corresponded to the results of our study. Similar results were obtained by authors from Nigeria, who also found that most of their respondents had completed secondary education. Our first objective was to determine the nurses' awareness of the concepts of conflict and assertiveness. To define conflict, respondents were given three possible answers, with the statement that a conflict was a situation in which there was a disagreement of opinions, desires, needs, or ways of achieving them between individuals considered to be correct. The remaining two statements were incorrect. Only 18.2% of respondents provided correct answers, while 81.8% of them offered incorrect responses. Our results were consistent with the research conducted in Croatia, which reported that 54% of nurses understood conflict as dangerous, unpleasant, and threatening situation. Based on the results of our research on the concept of conflict, it could be concluded that the majority of respondents did not know how to define conflict in the workplace. The concept of assertiveness was known to 48.6% of respondents, 44.7% were unsure about its meaning, and 6.7% of the sample was not familiar with the term. A study conducted in Maribor stated that 68% of respondents knew what assertiveness meant, while 32% did not know or were not familiar with the concept.

Our second goal was to link the level of assertiveness among nurses with sociodemographic variables. The results of our research showed that assertiveness is not dependent on the gender, age, or length of service of the respondents. Regarding educational qualifications, a statistically significant difference was observed in that respondents with higher education showed the highest level of assertiveness, with an average score of 64.6 ± 3.34 .

Participants with academic degree had an average score of 63.36 ± 5.40 compared to participants with a high school degree – 58.79 ± 6.69 and those with a higher education degree – 59.51 ± 6.43 . Comparing this study with research on the assertiveness levels of nurses in India, in the city of Punjab hospitals, which included 220 participants, it was found that older participants with higher education and work experience had a higher level of assertiveness, which aligns with the educational status results of our study (12). Our third goal was to examine the perception of workplace conflict among nurses. On 16 questions, which reflected the perception of problematic behaviors of colleagues, participants scored on the scale from 16 to 80. The participants showed a moderate perception of problematic colleague behavior (46.00 ± 10.95) and a low confrontation regarding problematic behavior (28.79 ± 7.98). On 9 questions, which reflect the perception of problems in job organization, participants scored on the scale from 9 to 45, showing a moderate perception of organizational problems (27.72 ± 7.32). Stojčić Ž, et al., in their research indicated that participants who were more frequently engage in conflicts due to colleagues' behavior, not only noticed these problematic behaviors more often, but also identified more problems in job organization (10).

The results obtained in research conducted in the Republic of South Africa by Koesnell A, et al., show that the larger number of department or clinic nurse managers' the more frequent conflicts within the team in when there is cases of lack of resources or poor or disrupted communication among staff (13). Furthermore, research conducted in Cyprus shows that organizational factors and poor communication are leading causes of conflict (14).

Our fourth goal was to determine the relationship between assertiveness and the perception of workplace conflict among nurses. In that regard it was found that more assertive participants were more likely to resolve conflicts immediately and personally, had a higher self-

assessment in conflict resolution, and were less likely to avoid resolving conflicts.

Authors from Bjelovar, in their research, state that more assertive participants more frequently notice behaviors that can be a source of conflict and work organization problems. At the same time, they are more likely to enter into conflicts due to these behaviors, which indicate that more assertive participants are bolder and more confident. More assertive participants, due to their boldness and confidence, are also more frequently engaged in conflicts with managers, whereas they less frequently confront their subordinates. They do not believe in delayed conflict resolution, but most often resolve conflicts immediately and personally and consider themselves more successful in resolving conflicts, which corresponds to the results of our research (10).

Nowadays, there is no progress without communication, and without progress, no results will be achieved. To avoid these problems, we must learn to express ourselves properly and share our views and opinions without any fear. To succeed in this, we need to work on ourselves. The best way to change the things that bother us is to start by changing ourselves. If we want to achieve something in a peaceful way, without conflicts, we must be assertive, aware of our needs, and express them in a healthy way. If we want to become better, both in individual and team work, we must practice our communication skills.

CONCLUSION

In our study, 48.6% of respondents were familiar with the concept of assertiveness, 44.7% were unsure about the meaning of assertiveness, while 6.7% of the sample was not familiar with the concept of assertiveness. The majority of respondents defined conflict exclusively as negative, unpleasant, and dangerous situation (81.8%), while only 18.2% of them defined it correctly. Assertiveness does not depend on the gender and age structure of the respondents or the length of their work experience. There was a statistically significant difference in terms of education level, with respondents holding a higher education showing the highest level of assertiveness, with an average score of 64.6 ± 3.34 . Respondents with an academic degree had an average score of 63.36 ± 5.40 , compared to those with a high school degree scoring 58.79 ± 6.69 and those with a university degree scoring 59.51 ± 6.43 .

Respondents in our sample, on the scale from 16 to 80, had a medium perception of problematic behavior of colleagues (46.00 ± 10.95) and were less likely to engage in conflicts due to that behavior (28.79 ± 7.98). The results of our study showed that respondents had a medium perception of organizational problems at work (27.72 ± 7.32) measured on the scale from 9 to 45. More assertive respondents tended to resolve conflicts immediately and personally, had a higher self-assessment in conflict resolution, and were less likely to avoid conflict resolving.

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Patient Satisfaction with Healthcare Services Provided on the Territory of the Federation of Bosnia and Herzegovina

Zadovoljstvo pacijenata pruženim zdravstvenim uslugama na teritoriji Federacije Bosne i Hercegovine

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ABSTRACT

Introduction: satisfaction with the provided health care is one of its quality indicators and it affects the general individual state of health, but also the wider social community.

Aim: to determine the degree of satisfaction with the length of providing health services; to examine the respondents' satisfaction with the professional attitude of the healthcare staff; to determine the degree of satisfaction with hospital services (environment, treatment, health care and length of hospitalization, hospital nutrition); to assess the degree of satisfaction with the possibility of personal participation in the process of final decisions making, treatment and health care; to analyze the impact of sociodemographic and treatment parameters on overall patient satisfaction.

Materials and methods: the study is descriptive, analytical and comparative. Induction, deduction, compilation methods were used as research methods.

Results: analyzing the average satisfaction of the respondents, it was found that on a scale of 1-5, the respondents highly rated all aspects of hospital treatment from 4.04 to 4.61. **Conclusions:** respondents were most satisfied with the kindness and helpfulness of the nurses, their professionalism, the attention shown by the staff, hospital treatment and doctors' professionalism.

Keywords: patient satisfaction, health care services, Federation of Bosnia and Herzegovina

SAŽETAK

Uvod: zadovoljstvo pruženom zdravstvenom zaštitom jedan je od pokazatelja njezine kvalitete, a utiče na opće zdravstveno stanje pojedinca, ali i šire društvene zajednice.

Cilj: utvrditi stepen zadovoljstva dužinom čekanja na ostvarivanje zdravstvene usluge; ispitati zadovoljstvo ispitanika profesionalnim odnosom zdravstvenog osoblja; utvrditi stepen zadovoljstva bolničkim uslugama (ambijent, liječenje, zdravstvena njega i dužina boravka u bolnici, bolnička ishrana); ocijeniti stepen zadovoljstva mogućnošću lične participacije u procesu donošenja konačnih odluka u procesu liječenja i zdravstvene njege; izvršiti analizu uticaja sociodemografskih i parametara tretmana na ukupno zadovoljstvo pacijenata.

Materijali i metode: istraživanje je deskriptivno, analitičko i komparativno. Kao metode istraživanja koristile su se metoda indukcije, dedukcije, kompilacije.

Rezultati: analizom prosječnog zadovoljstva ispitanika, utvrđeno je da su ispitanici na skali od 1-5 ocijenili vrlo visokom ocjenom sve aspekte bolničkog tretmana, od 4,04 do 4,61.

Zaključak: ispitanici su najviše zadovoljni ljubaznošću i susretljivošću medicinskih sestara - tehničara, potom profesionalnošću medicinskih sestara - tehničara, ukazanom pažnjom od strane osoblja, tretmanom u bolnici, profesionalnošću ljekara.

Ključne riječi: zadovoljstvo pacijenata, zdravstvene usluge, Federacija Bosne i Hercegovine

INTRODUCTION

Patient satisfaction in measuring health care quality is necessary due to the increasingly present transformation of health care, from the field of passive supply to the field of active demand for health care, where the patient's needs are those defining a part of its quality.

Patient satisfaction refers to their belief and expression of attitude about the health care service they received. It depends on a number of components including expectations, previous experiences and the emotional or cognitive response based on the post-consumption experience. Therefore, it is a subjective assessment of the patient's cognitive and emotional reactions that are the result of the interaction between their expectations and the perception of the actual care they received (1).

Patient's characteristics such as older age, higher education and economic attainment, previous hospital visit or admission experience, more comorbidities, behavioral factors such as higher expectations and negative attitudes toward hospital services, and hospital-related factors such as hospital size, location, environment, patient-to-staff ratio, communication with hospital staff, etc., can influence patient's satisfaction levels (2).

Many authors agree that the image of the hospital has a direct and indirect influence on patient loyalty, that is, a positive image of the hospital not only directly increases loyalty, but also improves patient satisfaction by increasing the perceived quality of services, which leads to an increase in the patient's desire to return to the hospital (3).

The quality of health care services, their effectiveness and accessibility depend on the efficiency of health workers providing services, so it is important to consider staff motivation and development as a central issue in health care (4).

The quality of services provided in healthcare institutions directly affects the incidence of certain injuries, conditions and diseases, as well as the average life expectancy of the population, as well as other indicators or indicators of the health status of the population (5).

Before consulting with doctors, many patients use Internet sources to obtain information. In order for this information to be adequately evaluated, at least half of the patients would have to undergo comprehensive training on the health literacy (6,7).

Patient satisfaction with health care is a crucial element of the health care service received quality. It has a potential impact on the state of health, as a result of the provided health care service and the patient's communication with the doctor or nurse (8).

Promoting equality is very important in all social aspects, especially in health and social care settings where many people are vulnerable. Equality means health and social care that meets the needs of absolutely everyone and is fully inclusive without discrimination (9).

According to evidence-based practice, every single interaction in a doctor's office or hospital can affect patient satisfaction, from the waiting room design to how your receptionist greets the patient and what you wear. But the most important element is communication, especially between the patient and the doctor (10).

Given that the quality of patient safety is affected by the manner an organization manages the threats against it, the work station of a nurse is an important factor influencing the way in which nurses can ease patient's safety threats. Thus, the working environment of nurses significantly affects professional nursing practice (11).

The health care professionals must recognize a responsibility primarily to patients, as well as to society, other health care professionals, and to themselves. The principles, adopted by the American Medical Association (AMA), are not laws but rather standards of conduct that define the foundations of honorable conduct for health care professionals (12,13).

Every person has the right to quality healthcare and good reason. This right is becoming increasingly important in today's era of limited material resources. Healthcare management in nursing practice is a coordinated activity aimed at providing the highest quality healthcare to the client or service beneficiary, be it individual sick or healthy person, a family and community (14).

Waiting time is the time for a patient to receive treatment after being referred to hospital. It can be affected by a various things. This includes the type of condition and the way it is being treated (15).

Communication is an important part in health care provision. It leads to higher and better health care standard. A nurse spends a lot of time communicating with patients. The main goal of her professional communication with patients is to establish a relationship in which they can express their needs without fear or hesitation (16).

More frequent study of patients' hospital experiences is recommended. It is believed that information about patients' experiences with the services provided in the hospital should be included, which would be useful for improving the quality and safety of all services provided in hospitals (17).

AIM

The aim of the work was to determine the degree of satisfaction with the length of waiting for health services; to examine the respondents' satisfaction with the professional attitude of the healthcare staff; to determine the degree of satisfaction with hospital services (environment, treatment, health care and length of stay in the hospital); to assess the degree of satisfaction with the possibility of personal participation in the process of final decisions making, treatment and health care; to analyze the impact of sociodemographic and treatment parameters on overall patient satisfaction.

MATERIALS AND METHODS

The study was conducted among hospitalized patients in the period from 1 May to 30 December 2022, on the territory of the Federation of Bosnia and Herzegovina. The selection of respondents was made by the method of random selection and included 142 patients.

The study was descriptive, analytical and comparative. As a research instrument, an original author's questionnaire was used, which was created on the basis of a review of scientific and professional literature, and supplemented with questions from the existing standardized questionnaires of the Agency for Quality and Accreditation in Healthcare (AKAZ). The survey questionnaire was anonymous and the identity of the respondents could not be determined from the answers received.

All ethical principles related to the protection of the identity of the respondents and the data obtained through the questionnaire were respected. No respondent was included without a previously signed Informed Consent.

The results are presented in tables through the number of cases and percentages, while Spearman's rank correlation test was used to test the impact. The

test results were considered statistically significant at 95% confidence level, i.e. with values of $p < 0.05$. The SPSS for Windows software system (version 13.0, SPSS Inc, Chicago, Illinois, USA) was used for statistical analysis of the obtained data.

RESULTS

The research included a total of 142 respondents who adequately answered the questionnaire.

Table 1 Overview of the sociodemographic characteristics of the respondents.

		N	%
Gender	Male	39	27.5
	Female	103	72.5
Age		44,25±12,69 (17-82)	
Average monthly income in BAM	Less than 500 BAM	22	15.5
	501-1000 BAM	39	27.5
	1001-1500 BAM	38	26.8
	1501-2000 BAM	29	20.4
	More than 2000 BAM	14	9.9
Education level	Without any education	1	.7
	Elementary school	8	5.6
	High school	75	52.8
	College	9	6.3
	University	36	25.4
	Master's or doctorate degree	13	9.2

An overview of the sample's gender structure shows that significantly more women responded to the questionnaire - 72.5% compared to men - 27.5%.

The average age of respondents in the sample was 44.25±12.69 years, with the youngest respondent who completed the online questionnaire being 17, and the oldest was 82 years of age.

The analysis of average income shows that the largest number of respondents (27.5%) had income from 501 to 1000 BAM, the smallest number of respondents (9.9%) had income over 2000 BAM, whereas 15.5% of respondents had incomes under 500 BAM.

In relation to the level of education, the largest number of respondents (52.8%) had a high school education, followed by university, 25.4%. The smallest number of respondents was with no education, only one - 0.7%.

Table 2 Overview of the waiting period for services.

	Mean±SD	Min.-Max.
Average waiting time for admission to hospital (hours)	125.3±100.32	12-1250
Waiting time from admission to surgical procedure (hours)	25.32±10.23	0-120
Waiting time from admission to the first examination by a doctor	5.2±1.03	0-11
Waiting time from admission to carrying out diagnostic procedures	6.8±2.03	0-12

The average time from referral to hospital admission was 125.3±100.32 hours or 5.2 days. The average time from admission to surgery for patients who underwent the procedure (N=41) was 25.32±10.23 hours. The average waiting time from admission to doctor’s examination was 5.2±1.03 hours. The average waiting time from admission to carrying out diagnostic procedures was 6.8±2.03 hours.

Table 3 Overview of average satisfaction of respondents.

	Mean	SD
Satisfaction with privacy protection regarding diagnosis	4.33	1.08
Satisfaction with knowledge of rights regarding disease treatment	4.20	1.08
Satisfaction with the possibility of disagreement regarding treatment	4.04	1.07
Satisfaction with the ability to express care related disagreement	4.18	1.06

Satisfaction with the possibility of disagreements regarding nutrition and diet	4.09	1.10
Satisfaction with the possibility of disagreement regarding hygiene	4.21	1.06
Satisfaction with verbal messages or explanation for further treatment	4.27	1.01
Satisfaction with the attention given by the staff	4.55	0.79
Satisfaction with the doctor’s professionalism	4.37	0.96
Satisfaction with the kindness and affability of the doctor	4.30	0.99
Satisfaction with the professionalism of the nurses	4.58	0.80
Satisfaction with the kindness and helpfulness of the nurses	4.61	0.74
Satisfaction with hospital treatment	4.41	0.90
Satisfaction with the hospital treatment cost	4.24	1.05

An analysis of average patient satisfaction on a scale from 1 to 5, where 1 indicates poor and 5 indicates excellent, from the aspect of hospital treatment shows that respondents rated all aspects with a fairly high average score from 4.04 to 4.61.

The best rated aspect was “Satisfaction with the kindness and helpfulness of the nurses” with an average score of 4.61±0.74.

The last place in terms of satisfaction was “Satisfaction with the possibility of disagreement regarding treatment” with an average score of 4.04±1.07.

Table 4 Overview of the cost of hospital treatment perception in relation to what was done for the patient.

	N	%
The cost of hospital treatment compared to what was done for the patient was...	Too expensive	7 4.9
	Expensive	30 21.1
	Not expensive	105 73.9
	Total	142 100.0

Analysis of the perception of the cost of hospital treatment in relation to what was done for the patient showed that the largest number of patients (73.9%), were of the opinion that it was not expensive.

Table 5 Correlation analysis based on overall satisfaction.

	rho	p
Average monthly income in BAM	-0.265	0.001
Education level	-0.209	0.013
Waiting time from admission to the first examination by a doctor	-0.386	0.000
Waiting time from admission to carrying out diagnostic procedures	-0.281	0.001

Correlation analysis of the impact on overall patient satisfaction showed that average monthly income and level of education had an impact, in the sense that respondents with higher monthly income and higher level of education showed less overall satisfaction with hospital services.

Likewise, the length of waiting until the first examination by a doctor, performing diagnostic procedures and waiting for surgical procedures had a negative effect on overall patient satisfaction in the sense that respondents who waited longer showed less overall satisfaction with hospital services.

DISCUSSION

Analyzing the average satisfaction of the respondents, it was found that on the 1-5 scale, the respondents gave a very high rating to all aspects of hospital treatment, from 4.04 to 4.61. Respondents were most satisfied with the kindness and friendliness of the nurses, their professionalism, attention shown by the staff, treatment provided in the hospital and doctors' professionalism.

Karabatić S, et al., concluded that patients rated communication with nurses positively, and that the respondents were informed about their illness and the method of treatment when leaving the hospital, regardless of the length of stay in the hospital (18).

Authors Ovčina A, et al., proved that respondents were satisfied with hospital nutrition in most cases. Satisfaction with food in the hospital represents an important segment that affects the general satisfaction with the health services provided in the hospital (17).

Parat K, et al., stated that patient's satisfaction was one of the qualities of health care parameters. Involvement of patients in the improvement of health care was desirable, and according to the World Health Organization it was socially, economically and technically necessary (19).

In their study, Kovacevic P, et al., stated that the respondents were mostly or completely satisfied with communication with nurses. Patients' perception of health behavior with regard to successful communication with nurses did not show statistically significant differences in patient satisfaction (20).

CONCLUSION

Based on the results of the survey, it could be concluded that patients were satisfied with hospital treatment aspects, with an average rating of "Satisfied" on the 1-5 scale. Also, it was shown that sociodemographic and psychographic characteristics of patients determined the level of satisfaction with health services, where it was found that the level of education affected the level of satisfaction of respondents, specifically, correlation analysis proved that respondents with a higher level of education showed less overall satisfaction with hospital services. Analysis of the perception of the hospital treatment costs in relation to the services provided showed that the largest numbers of patients (74.6%) were of the opinion that it was not expensive, namely, they were satisfied. Patients also expressed a high level of satisfaction with the professional relationship between doctors and nurses, thus the best rated aspect of satisfaction among respondents was actually satisfaction with the kindness and helpfulness of nurses and their professionalism. It is important to point out that patients were satisfied with the length of waiting for a therapeutic procedure and the length of hospital treatment, given that the largest number of respondents (45 or 31.7% of them) answered that the waiting time was 30-60 minutes, and a slightly smaller number answered that they were immediately admitted for diagnostic procedures after admission.

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Place, Role and Significance of a University-Educated Nurse

Mjesto, uloga i značaj univerzitetski obrazovane sestre

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ABSTRACT

Introduction: nursing is both an art and science, requiring the rational application of knowledge and skills specific to the profession. It is grounded in knowledge and techniques from the human, physical, social, medical, and biological sciences. A nurse assumes responsibility and the necessary authority to provide direct nursing care. They are independent practitioners and accountable for the care they provide. They are also responsible for identifying their needs for further education in management, teaching, clinical practice, and research and actively pursuing further education.

Aim: to define the required level and type of education in nursing based on clinical practice, to determine the place and role of a university-educated nurse within the healthcare system, to establish the professional and social significance for the development of nursing.

Materials and methods: the respondents comprised clusters of nurses categorized according to their professional education level: 50 nurses and technicians. The study was based on triangulation method, including: Qualitative method - focus groups; Quantitative method - surveys; Quantitative method - review of medical documentation. The study was conducted in the Sarajevo Canton.

Results: nursing is an undervalued profession. The degradation of nurses is most apparent in their work compensation. Nurses are disadvantaged by collective agreements, unrecognized coefficients, unpaid overtime, and an expanded scope of duties not reflected in their salaries.

Conclusion: elevating nursing as a profession is the primary task of university-educated nurses. It can be achieved through new perspectives, an work organization aligned with European standards, and clear nursing development plans. An educated nurse serves both as public and professional educator. They represent an alternative between illness and health within society.

Keywords: nursing, nurse status, university-educated nurse

SAŽETAK

Uvod: sestrištvo je podjednako umijeće i znanost, te zahtijeva racionalno praćenje i primjenu znanja, vještina specifičnih za struku. Opstaje na znanju i tehnikama izvedenih iz humanističkih, fizičkih, društvenih, medicinskih i bioloških znanosti. Sestra

preuzima odgovornost i potreban autoritet u izravnom pružanju sestrinske zaštite. Ona je samostalna praktičarka, odgovorna za zaštitu koju daje. Odgovorna je odrediti svoje lične potrebe u daljnjem obrazovanju za menadžment, nastavu, kliničku praksu i istraživanja, i te potrebe aktivno realizirati.

Cilj: definisati potrebu stepena i profila obrazovanja u sestrinstvu na temelju iskustva u praksi, definisati mjesto i ulogu univerzitetski obrazovane sestre u sistemu zdravstvene zaštite, odrediti profesionalni i društveni značaj razvoja sestrinstva.

Materijali i metode: klasteri medicinski sestara, definisani prema profilu stručne spreme: ukupno 50 medicinskih sestara i tehničara. Istraživanje je vršeno metodom triangulacije: Kvalitativni metod-fokus grupe, Kvantitativni metod-anketa, Kvantitativni metod-pregled medicinske dokumentacije. Istraživanja je provedeno u Kantonu Sarajevo.

Rezultati: sestrinstvo je nedovoljno cijenjen poziv. Nigdje se tako dobro ne vidi degradacija sestara kao kroz nagrađivanje za rad. Oštećene su kolektivnim ugovorom, nepriznatim koeficijentima, nisu plaćene za prekovremeni rad, za širi obim poslova, itd.

Zaključak: podizanje sestrinstva kao profesije prvi je zadatak sestara sa univerzitetskim obrazovanjem. Svojim novim stavovima, organizacijom usklađenom sa evropskim standardima, te jasnim planovima razvoja sestrinstva. Obrazovana sestra je edukator stanovništva i profesije. Ona je društvu alternativa između bolesti i zdravlja.

Ključne riječi: sestrinstvo, status sestara, univerzitetski obrazovana sestra

INTRODUCTION

Improving health, disease prevention, and caring for the sick and dying have been ancient human occupations. Medical treatment and medical care constitute an inseparable process, continuously carried out on patients throughout their illness. Observing the development of patient care throughout history, it can be noted that it has been in constant evolution, with transitions from one stage to another sometimes taking centuries. It developed alongside medicine; the same person who treated patients also provided medical care. Treatment and care are mentioned, according to archaeological findings and written records, in the civilizations of the ancient world. The achievements of

Greek medicine were transferred to Rome, but they were behind those of Greece, even though hygiene was more advanced (1).

When establishing cities and military camps, the Romans built aqueducts and sewage systems and paid special attention to the care and treatment of sick soldiers by setting valetudinarian hospitals. In ancient Rome, women were allowed to care not only for numerous members of their families but also for the weak and powerless outside their homes. Under the influence of monotheism, more women began to engage in caregiving with compassion for the sick and elderly. Many institutions were established alongside temples: deaconries for receiving pilgrims, xenodochia as shelters for the poor, nosocomia as shelters for the sick, etc. In these institutions, more attention was given to the healing of the afflicted soul than to the sick body (2).

Development of Nursing

In the Middle Ages, special institutions—the predecessors of today's hospitals—were established to accommodate travelers and the sick. These institutions were linked to temples and monasteries. Only those who joined monasteries and took religious vows could be engaged in caregiving. They dedicated themselves entirely to patient care, significantly improving its quality by implementing hygiene measures, better food preparation, and collecting medicinal herbs.

In larger European cities, hospitals were built based on the model of churches (initially in the shape of a cross, featuring large halls decorated with frescoes) but were not well suited to their purpose (3). Religious orders were abolished during the Reformation, and hospital conditions deteriorated further. Patient's care was poor, hospital rooms were untidy and dirty, and patients were treated inhumanely. In the 18th century, the construction of better-equipped hospitals began, but the level of care remained low.

From the 17th to the 19th century, there were multiple attempts to reform the nursing service. One such effort was led by Agnès de Gasparin, who founded the institution "La Source" in Lausanne. She wrote about nurses and advocated for them to be educated, compensated for their work, and independent rather than bound by religious vows. Similar efforts were made by deaconesses in Germany and nurses in England (4).

English woman Florence Nightingale introduced new principles and laid the foundations of modern nursing. Born in Florence, Italy, she came from an upper-class English family, which helped break the existing prejudices about caregivers. Known as “The Lady with the Lamp” by wounded soldiers, she gained admiration and respect in her homeland and worldwide, and her work had a far-reaching impact after her reforms in Crimea and improvements in hospital conditions in Scutari, her ideas on the importance of cleanliness, good sanitary facilities, well-planned meals, and the cleanliness of clothing and bedding spread throughout England, continental Europe, and the United States. She established the first nursing school in 1860 at St. Thomas’ Hospital in London, which still exists today (5). A fund for nursing education was established, called the “Nightingale Fund,” intended to support the training of nurses worldwide. Florence Nightingale set principles that nursing schools around the world still follow. In 1859, she published the first nursing textbook, titled *Notes on Nursing*. Since then, many universities worldwide have established nursing faculties, where nurses serve as professors of the subject (6).

Healthcare Nursing- Purpose and Meaning

Healthcare nursing is dedicated to caring for individuals, families, and communities during their lives and under different health conditions. It focuses on maintaining individual, familiar, and communal health, preventing diseases, and caring for physically and mentally ill individuals.

When writing a nursing textbook in 1922, Canadian nurse Berta Harmer defined nursing as follows: “Nursing is rooted in the needs of humanity and is based on the ideal of service. Its purpose is not only to treat the sick and heal the wounded but also to achieve health and peace, provide relief and comfort to both body and soul, offer protection, care, and other forms of support, and assist all those who are helpless or disabled, young or old, immature or frail” (7).

Nursing aims to prevent disease and preserve health, connecting it to every other social institution working toward these objectives. A nurse cares for individuals and contributes to the population’s overall health. In the *Medical Encyclopedia* of 1963, nursing was defined as: “...knowledge that originated from the care of the sick and the support of the poor and abandoned, from professions that for centuries

primarily reflected upon philanthropy or religious devotion, often as part of the vows of certain religious orders” (8).

Today, the role of nursing includes both caring for the sick and protecting the healthy. Until the 1980s, the primary task of nurses was referred to as “patient care.” It encompassed seven key functions: maintaining personal hygiene (patient care), monitoring patients, ensuring proper nutrition, administering therapy, participating in or performing medical-technical procedures, recognizing emergency conditions, providing first aid, and promoting health education. In professional terminology, the term “medical care” has been used in recent decades to define the core duties of a nurse.

The shift from “patient care” to “medical care” is not merely a change in terminology but reflects a more profound transformation in the perception of nursing as a profession. Today, in secondary medical schools, nursing is taught over four years within the framework of general and specialized nursing education. Interestingly, Florence Nightingale, in her writings on nursing, treated nursing as a distinct field separate from medicine and established the necessary education for nurses to fulfill this role (9).

Using these definitions, Virginia Henderson directly or indirectly answers seven key questions:

- Who assists? – A nurse;
- To whom is assistance provided? – A healthy or sick individual;
- In what way is assistance provided? – By addressing basic human needs;
- When is assistance provided? – When the person lacks the necessary strength, will, or knowledge;
- How is assistance provided? – Through various forms: physical, psychological, spiritual, and educational support;
- What is the purpose of assistance? – To maintain health, aid recovery, or ensure a peaceful passing;
- What is the guiding principle of assistance? – To foster independence as quickly as possible (10).

As early as 1953, the World Health Organization (WHO) stated, “Nursing is an essential part of the overall healthcare system.” It is directed toward improving, preserving, restoring health, and holistically addressing human needs.

Tasks and Responsibilities of a Nurse

The tasks and responsibilities of a nurse stem from their vocation and the place of nursing in society.

1. **First Responsibility - Nurse as a Practitioner:** A nurse practitioner is responsible for providing and managing nursing care for individuals, families, and communities to improve disease prevention and treatment, rehabilitation, and support.
2. **Second Responsibility - Nurse as an Educator:** A nurse educator is responsible for teaching patients and other healthcare workers.
3. **Third Responsibility - Nurse as a Process Designer:** A nurse acts as a process designer within the healthcare team.
4. **Fourth Responsibility - Nurse as a Manager and Researcher:** A nurse manager and researcher is responsible for developing nursing practice through critical evaluation and research.

AIM

The aim of the study was to determine the professional and social significance of the nursing development; to define the need for different levels and profiles of nursing education based on clinical experience; to define the place and role of university-educated nurses in the healthcare system.

MATERIALS AND METHODS

Subject

The study respondents consisted of clusters of nurses categorized by their level of education and professional qualifications. The sample included 50 nurses from the Canton of Sarajevo, covering all work and education levels.

Methods

The research was conducted using the triangulation method:

- **Qualitative method** – Focus groups;
- **Quantitative method** – Survey based on the Likert scale;
- **Quantitative method** – Review of medical documentation.

Exclusion Criteria

Respondents who do not meet the predetermined inclusion criteria were excluded from the study.

Time and Place of the Study

The study was conducted among nurses in the Sarajevo Canton.

Study Type - A comparative, descriptive-analytical study.

Research Instruments

The study used a modified and combined closed-ended and open-ended questionnaire based on the Likert scale.

Ethical Aspects

The study was conducted according to the basic principles of the Helsinki Declaration (last revised in 2008). Participation in the survey was voluntary and anonymous, and the participants' data were not included in the survey questionnaires.

RESULTS

Qualitative Methods – Focus Group Discussions

A total of four focus groups participated in this research. The groups worked separately but discussed the same topics. A common characteristic of all groups was their high level of interest, knowledge, active participation, and insightful, creative suggestions based on experience.

An analysis of the qualitative method used in the focus groups highlighted the following key findings:

1. **Current State of Nursing – Perspective** While some positive changes have occurred in nursing since the post-war period, the overall situation is still far from ideal. Even with educated nurses, the current healthcare system structure offers limited opportunities for significant improvement.

2. **Work Process Organization** The work process is the most crucial aspect of the profession and serves as a measure of progress and knowledge. The organization of this complex process often depends on individuals, as there is no standardized system for all procedures.
3. **Skills and Expertise** Skills and expertise form the profession’s foundation, making it essential to analyze and improve them continuously.
4. **Position of Nurses in the Healthcare Team** Due to the current organization of work and the complexity of the processes in which nurses are involved, there are no clearly defined roles and responsibilities within the healthcare team. As a result, nurses often fill in gaps where needed but are not considered equal team members.
5. **Errors in the Work Process** The issue of concealing errors remains prevalent. It must be addressed, as analyzing mistakes is essential for eliminating their root causes.
6. **Nurses and Resource Allocation** The devaluation of nurses is most evident in their compensation. Collectiv agreements, unrecognized pay coefficients, unpaid overtime, and an expanded scope of work without appropriate compensation disadvantage them.
7. **Nurses in Decision-Making and Planning** Nurses play no role in decision-making or planning processes. Instead, they receive direct orders and act solely as executors.
8. **Nurses’ Awareness and Personal Responsibility for their Status** Nurses acknowledge their responsibility for their professional status but also express a sense of demoralization regarding the possibility of significant changes in the nursing profession.
9. **Nursing from an Educational and Awareness Perspective** Education is crucial for the overall healthcare system, and nurses must recognize the necessity of further education and the advancement of their profession through learning.
10. **Professional Significance of Nursing Development** Although the profession has progressed, it fall back significantly behind the European region. Nurses are key drivers of their profession and are responsible for their advancement and continuous development.
11. **Social Significance of Nursing Development** Society does not perceive nursing as an independent profession but as an extension of medical work.

This unfair and demeaning attitude toward the profession has had a significant impact.

12. **Nursing in Government Institutions and Political Engagement** There are insufficient nursing representatives in government institutions. There is a general opinion that nurses should engage in politics to improve their professional status.
13. **Nursing as an Independent Profession** Nursing is an independent profession, yet nurses remain part of the healthcare team caring for patients in certain aspects of their work.
14. **University-Educated Nurses: their Role, Place, and Importance** The primary responsibility of university-educated nurses is to elevate the nursing profession. They should introduce new perspectives, implement organizations aligned with European standards, and establish clear plans for nursing development. As public and professional educators, they serve as a bridge between illness and health.

Analysis of the Quantitative Research Method – Survey

Based on the demographic data of the respondents, there were 92% of the women, indicating that nursing were predominantly female profession. The respondents were primarily middle-aged, with 38% of them aged between 30 and 40 and the largest group (44%) consisted of respondents over 40. Based on education status of the respondents, 44% of them completed secondary vocational education (SSS), 46% had higher professional education (VŠS), and 10% held a university degree (VSS). 28% of the respondents worked in Primary Health Care (PZZ), 16% in secondary Health Care (SZZ), and 56% in Tertiary Health Care (TZZ).

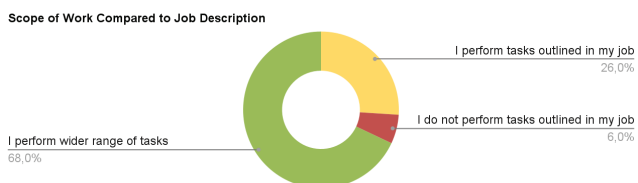


Figure 1 Scope of Work Compared to Job Description.

68% of the respondents reported to perform a wider range of tasks than outlined in their jobs.

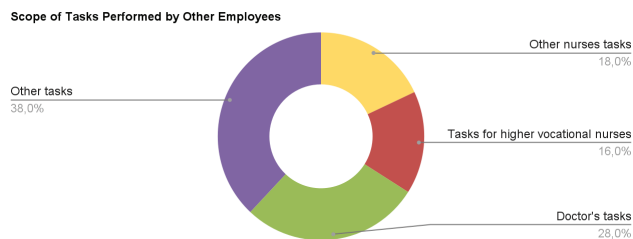


Figure 2 Scope of Tasks Performed by other Employees.

Figure 2 shows the distribution of tasks performed by the respondents: other nurses – 18%, higher vocational nurses (VŠS) - 16%, doctors’ tasks - 28%, and other tasks (e.g., courier, administrative) - 38%.

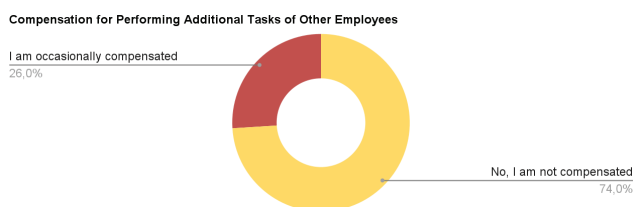


Figure 3 Compensation for Performing Additional Tasks of other Employees.

Figure 3 reveals that 74% of respondents were not compensated for performing additional tasks, while 26% were occasionally compensated.

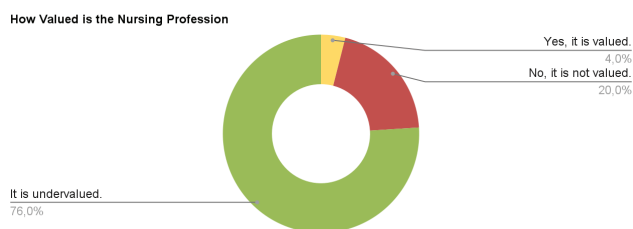


Figure 4 Evaluation in the Nursing Profession.

Figure 4 demonstrates that nursing was underappreciated. 76% of the respondents felt the profession was undervalued, and 20% did not find it as such.

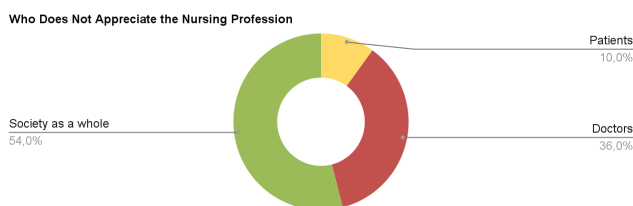


Figure 5 Who Does not Appreciate the Nursing Profession.

Results from Figure 5 show that nursing was underappreciated by society (54%), doctors (36%), and patients (10%).

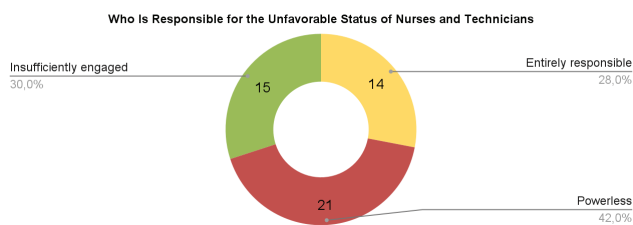


Figure 6 Who is Responsible for the Unfavorable Status of Nurses and Technicians.

According to Figure 6, 28% of the respondents believed nurses were responsible for their status, 30% felt insufficiently engaged, and 42% thought they were powerless.

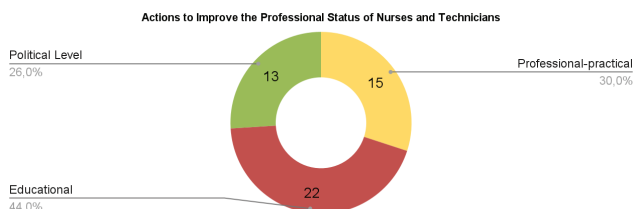


Figure 7 Actions to Improve the Professional Status of Nurses and Technicians.

Figure 7 indicates that respondents believed improving the professional status of nursing required increased engagement, particularly in education (44%), professional-practical work (30%), and political involvement (26%).

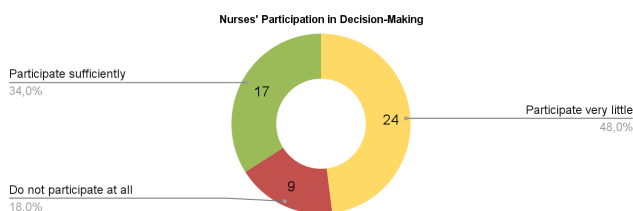


Figure 8 Nurses’ Participation in Decision-Making.

According to Figure 8, nurses felt they participate very little in decision-making, with 48% stating their minimum participation, 18% their lack of participation, and 34% stating they participated adequately.

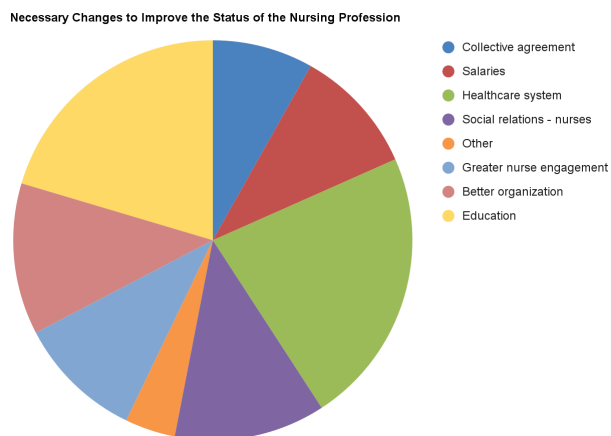


Figure 9 Necessary Changes to Improve the Status of the Nursing Profession.

Figure 9 shows that the following changes were considered necessary to improve the status of nursing: healthcare system reform (22%), increasing education (20%), improving organization (12%), societal relationships/laws (12%), salary increases (10%), greater involvement of nurses (10%), and collective agreements (8%).

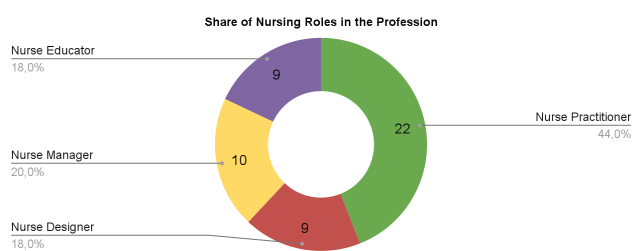


Figure 10 Share of Nursing Roles in the Profession.

In the overall work, the roles of nurses was distributed as follows: practitioner - 44%, designer - 18%, manager - 20%, educator - 18%.

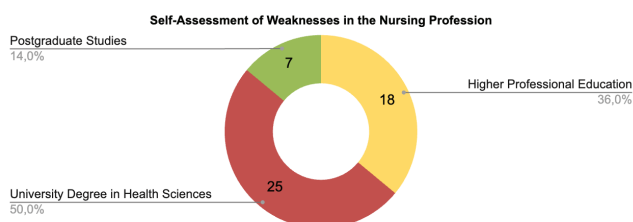


Figure 11 Nurses' Views on Higher Education after Completing Secondary School.

Regarding further education after secondary school, 36% of nurses believed they should pursue higher education, 50% thought they should obtain a university degree, and 14% believed post-graduate education was necessary.

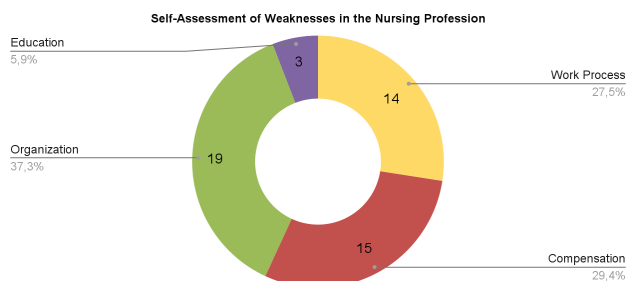


Figure 12 Self-Assessment of Weaknesses in the Nursing Profession.

According to self-assessments, the weakest aspects of the nursing profession included poor organization (38%), work process (28%), inadequate compensation (30%), and education (6%).

Quantitative Methods Analysis - Review of Medical Documentation

By analyzing the survey conducted on the scope of work of the study participants, the following results were obtained:

- Participants performed their prescribed tasks according to the scope of work.
- They also performed additional tasks outside the prescribed scope.
- The tasks performed by others include doctors, nurses, and non-medical staff.

Further analysis of the medical documentation review resulted in the following conclusions:

- The tasks mentioned in the documentation were primarily the responsibility of medical staff.
- The documentation was disorganized and outdated, making it difficult to determine who performed an intervention and at what time. As a result, it was unclear whether a nurse or a doctor completed the task.
- Some records indicated that a nurse completed a task in the therapy or duty handover logs.
- A few clinics had slightly better-adapted nursing documentation, but it remained insufficient.

DISCUSSION

Nursing has seen some positive changes, but unfortunately, insufficient. Even with a qualified and educated nurse, drastic changes are unlikely in the current organization of the healthcare system. The work process is the most critical segment of the profession and a key indicator of its progress and knowledge. The organization of this complex process often depends on the individual nurse, as there is no unified system for organizing all nursing procedures. The profession consists of 92% women, highlighting that nursing is female-dominated. Skills and expertise are the foundation of the profession, which is why continuous education and improvement of knowledge are crucial.

The nurses in this study were primarily middle-aged and had a medium level of education (78%). Respondents report performing a broader range of tasks than their official job descriptions specify (68%), including tasks of other nurses due to staff shortages (18%), functions of higher-educated nurses (16%), tasks typically assigned to doctors (28%), and administrative or courier tasks (38%).

94% of these tasks were not compensated. In this kind of work organization, where there were no clear boundaries between the roles of each team member, nurses filled all the gaps and, therefore, did not feel like equal team members.

96% of respondents indicated that their profession was undervalued. Nurses believed that they were undervalued by society (54%), doctors (36%), and patients (10%). The devaluation was also visible in how nurses were rewarded and compensated. They were disadvantaged by collective agreements, unrecognized coefficients, unpaid overtime, and unpaid expanded scope of work tasks.

Nurses did not have any role in decision-making and planning; they simply received and executed orders. 48% felt they participate very little in decision-making, 18% did not participate, and 34% felt they participated sufficiently. Regarding this unfavorable status within the medical team, 28% believed that they were responsible, 30% felt inadequate, and 42% of them felt powerless. To improve this status, they believed additional efforts should be focused on education (44%), professional-practical training (30%), and political engagement (26%). Nurses believed that there were personal responsibility for their status, but there was also demoralization for any significant changes in the nursing profession.

Education is crucial for the entire healthcare system, and nurses must recognize the need for education and improve their profession using this tool.

Nurses identified the profession's weakest points as poor organization (38%), work process (28%), inadequate pay (30%), and education (6%). Nursing is an independent profession, but a part of it is in being an integral part of the overall healthcare team.

Nursing is developing in our country but is still behind the European region. Nurses are carriers of their profession and are responsible for its development and improvement. Society does not view nursing as independent but as part of medical work. This inhumane and unjust attitude toward the profession takes its toll on its workers.

There is insufficient representation of the nursing profession in public institutions. There was a belief that nurses needed political engagement to improve their status in the workplace. To enhance the status of nursing, participants believed that several changes needed to be made, such as changes to the healthcare system (22%), increased education (20%), better organization (12%), better social representation and laws (12%), higher salaries (10%), more involvement of nurses in the work process (10%), and improvements to collective agreements (8%).

In their overall work, nurses performed as practitioners (44%), designers (18%), managers (20%), and educators (18%). Our environment is neither more favorable, better organized or better paid. Regarding further education after high school, 36% aimed for higher education, 50% sought a university degree, and 14% pursued postgraduate studies.

Raising the status of nursing as a profession is the primary task of nurses with a university education. They can bring about change through their new perspectives, an organization aligned with European standards, and transparent development plans for nursing. They are educators for both the population and the profession. They are the difference between illness and health in society.

CONCLUSION

Implementing a reorganized education program in secondary schools should enable our young associates to master nursing skills. The level of education that would fulfill all the required segments of the work process is as follows:

- **Secondary Vocational School (SSS):** for patients' care tasks.

- **Higher Vocational Education (VSS):** the first degree from the Faculty of Health Studies for tasks in all areas, such as therapy application, department organization, specialized diagnostic procedures, and nursing documentation management.

The second degree of VSS provides knowledge and competencies as follows:

The role, position, and significance of a university-educated nurse (VSS) with knowledge and abilities:

- University-educated nurses in primary healthcare are responsible for health protection through preventive measures for mothers and children in specialized institutions.
- Trained to conduct health education in primary and secondary schools as a subject teacher in educational institutions.
- Plans healthcare for the population at the municipal level and analyzes the health status of the municipality's population.
- Organizes and implements education for the working population to change individual, familial, and communal attitudes toward health preservation.
- Plans and implements programs to improve nursing practice and raise awareness among employees.
- Reorganizes the service process to ensure efficiency.
- Plans healthcare processes, designs workflows, manages processes, and evaluates planned tasks with colleagues while maintaining partnership relations.
- Continuously improve their knowledge with additional skills, especially communication skills.
- Responsible for recognizing the needs of their profession and opportunities for further development by following related sciences, applying that knowledge in the profession, keeping up with nursing research, and participating in it.
- A well-educated nurse should be recognized by society and the organizations where they work as an expert in their profession and present new educational programs for health preservation.
- A university-educated nurse is primarily an educator, manager, and designer in their field.

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Declaration of patient consent: The authors certify that they have obtained the appropriate patient consent form. In the form, the patient consents to the publication of her images and other clinical information in the journal.

Authors' Contributions NM, SDž, IM, AA, MČ and MG contributed substantially to the conception or design of the article and the acquisition, analysis, and interpretation of data for the work. Each author had a role in article drafting and the revision process. Each author gave final approval of the version to be published and agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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The Impact of the COVID-19 Pandemic on the Psychophysical Health of Surgical Nurses

Uticaj pandemije COVID-19 na psihofizičko zdravlje hirurških medicinskih sestara

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ABSTRACT

Introduction: after the COVID-19 outbreak in March 2020 resulted in a global pandemic, a state of emergency was declared in Bosnia and Herzegovina, and in other countries around the world.

Aim: to assess the psychosocial impact of the COVID-19 pandemic on surgical nurses and to analyze symptoms.

Materials and methods: the study included healthcare workers who experienced high levels of stress due to workload caused by the pandemic and their working conditions, specifically nurses who worked in operating theatres and were in direct contact with COVID-positive patients.

Results: analysis of the DASS-21 mental health self-assessment instrument and three subscales produced the following data: due to the COVID-19 pandemic, 66% of surgical nurses and technicians experienced depressive disorders; 12% of them experienced mild depressive disorder, 16% moderate, 6% serious and 22% extremely serious disorders, which was a significant percentage. With regard to stress, the study showed that the largest number of respondents, 59% of them, were not under stress, 1% was exposed to

mild stress, 9% of them to moderate, 15% to serious and 16% of them were exposed to extremely serious stress. Analysis of the anxiety subscale showed that statistically significant number of respondents, 71% of them experienced some sort of anxiety disorder: 39% of them extremely serious form of anxiety, 24% moderate, 6% serious, 2% of the respondents experienced mild form of anxiety, whereas 29% of them did no experience any form of anxiety.

Conclusion: based on the study results and the set goals, it can be concluded that nurses working in surgical theaters were exposed to the psychosocial effects of the COVID-19 pandemic.

Keywords: COVID-19, mental disorders, surgical nurse

SAŽETAK

Uvod: nakon što je izbijanje COVID-19 u martu 2020. godine dovelo do globalne pandemije, u Bosni i Hercegovini, kao i u drugim zemljama širom svijeta proglašeno je vanredno stanje..

Cilj: procjena psihosocijalnog uticaja pandemije COVID -19 na hirurške medicinske sestre-tehničare, kao i kvantificiranje simptoma.

Materijali i metode: predmet istraživanja predstavljaju zdravstveni radnici koji doživljavaju visok nivo stresa zbog preopterećenja poslom koje pandemija stvara i uslova u kojima rade. Objekat istraživanja su medicinske sestre koje rade u hirurškim salama i u direktnom su kontaktu sa COVID pozitivnim pacijentima

Rezultati: analizom instrumenta za samoprocjenu mentalnih poteškoća DASS-21, i njegove tri podskale došli smo do sljedećih podataka u ovom istraživanju. Usljed pandemije COVIDA 19, hirurške medicinske sestre i tehničari su imali depresivne poremećaje u 66% slučajeva. Od toga njih 12% blagi depresivni poremećaj, 16% umjereni, 6% ozbiljni i 22% ekstremno ozbiljni, što je značajan procenat. Kada je u pitanju stres, u ovom istraživanju smo došli do podatka da najveći broj ispitanika njih ukupno 59% nije bio pod stresom. Njih 1% pod blagim stresom, 9% pod umjerenim, 15% ozbiljnim i 16% pod ekstremno oubiljnim stresom. Analizom podskale anksioznosti došli smo do podataka u ovom istraživanju da je statistički značajan procenat ispitanika njih 71% imalo neki oblik anksioznog poremeaja od toga 39% je imalo ekstremno ozbiljan oblik anksioznosti, zatim 24% umjeren, 6% ozbiljan, 2% blagi oblik. Dok je 29% ispitanika bilo bez anksioznosti.

Zaključak: na osnovu rezultata provedenog istraživanja i postavljenih ciljeva možemo zaključiti da su medicinske sestre koje su zaposlene u hirurškim salama izložene psihosocijalnim efektima COVID 19 pandemije.

Ključne riječi: COVID-19, mentalni poremećaji, hirurške medicinske sestre-tehničari

INTRODUCTION

Emerging viral diseases have become a major threat to public health in the world in recent years. Over the past two decades, outbreaks of several viral diseases have been reported, including coronavirus

acute respiratory syndrome (SARS) in 2002, H1N1 flu in 2009, Middle East respiratory syndrome MERS-CoV in 2012, Ebola virus disease EVD in 2013, and Zika virus in 2015.

The latest and persistent viral disease caused by the new coronavirus has seriously threatened public health worldwide (1). Healthcare workers are exposed to additional stress, they are at increased risk of infection and illness, and at increased mortality risk. In addition, infection protection measures, such as social restrictions, are associated with indirect health consequences, and significant psychological distress, especially anxiety and depression (2,3).

After the COVID-19 outbreak in March 2020 resulted in a global pandemic, a state of emergency was declared in Bosnia and Herzegovina, and in other countries around the world. The COVID-19 epidemic has led to additional health problems such as stress, anxiety, depressive symptoms, insomnia, denial, anger and fear on a global scale. Collective concern affects daily behavior, economics, prevention strategies, and decision-making by policymakers, health organizations, and medical centers, which may weaken COVID-19 control strategies and result in globally increased morbidity and mental health needs (4).

With the rapid spreading of COVID-19, global health systems are experiencing critical challenges in preventing infection, identifying and managing COVID-19 cases, and ensuring effective strategies in public health protection. These challenges, although primarily deriving from infectious disease with physical health consequences, can also profoundly affect mental health (5).

Previous studies indicate that depression, anxiety disorders, substance abuse, increased suicidal tendencies, and PTSD tend to follow major economic crises or natural disasters. Deteriorating mental health among vulnerable individuals will additionally burden the existing health care system (5).

COVID-19 may also affect the mental health and well-being of healthcare workers, particularly those working as health care providers. Given that COVID-19 cases affect the capacity of healthcare systems globally, many healthcare providers work outside of their regular shifts to meet the increased demand for critical care. Therefore, healthcare providers are subject to anxiety, depression, burnout, and insomnia (5,6).

AIM

The aim of this study was to assess the psychosocial impact of the COVID-19 pandemic on surgical nurses, to analyze the magnitude of depressive symptoms, anxiety and stress in the study group.

MATERIALS AND METHODS

The study was comparative cross-sectional and it included surgical nurses and technicians of all level of education, employed at the Clinical Center University of Sarajevo, a total of 109 respondents.

The study was conducted between 15 July and 15 August 2021. Having in mind the complete epidemiological situation and in order to prevent the infection spreading, we decided to use a cross-sectional internet survey and data collection. An anonymous survey was conducted and all participants provided verbal informed consent prior to enrollment. The study commenced by sending an electronic version of the survey to the participants with a short explanation and purpose of the survey. Clicking on the link would automatically open the survey. The participants were allowed to interrupt the survey at any time, if they decided not to proceed with the research. The research was completely voluntary and non-commercial.

The study instrument was a questionnaire consisting of sociodemographic data section designed for the needs of this particular research and the standard DASS-21 questionnaire. Basic demographic data consisted of three questions which included gender, age and length of service data.

The DASS-21 Depression, Anxiety, and Stress Scale - 21 items is a set of three self-report scales designed to assess emotional state, depression, anxiety, and stress. Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. The Depression Scale assesses dysphoria, hopelessness, devaluation of life, self-denial, lack of interest/involvement, anhedonia, and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic nonspecific arousal, assessing difficulty in relaxing, nervous excitement and easy agitation/restlessness, irritability/overreactivity and impatience. Scores for depression, anxiety, and stress are calculated by compiling the scores for the relevant

items. Recommended limiting values for conventional severity labels (normal, moderate, severe) are listed in the Table. In order to get the final score, the scores on the DASS-21 must be multiplied by 2.

Data are presented in the form of tables and figures, using classical methods of descriptive statistics, depending on the nature of the data and the measurement scale.

RESULTS

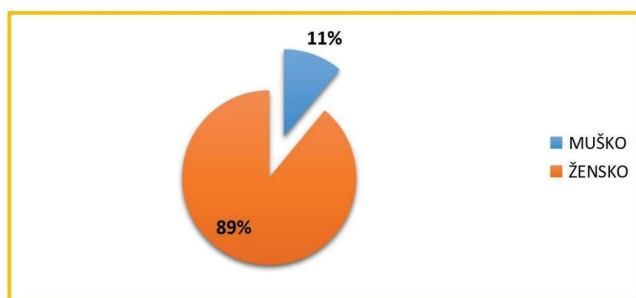


Figure 1 Gender structure of the respondents.

The study is dominated by the female population, with a total of 89% of respondents (Figure 1). With regard to the respondents' age structure, the largest number of respondents, even more than half of them, was in the 36 to 45 age group, followed by the 26 to 35 age group. The youngest respondent was 21, and the oldest was 61 (Figure 2).

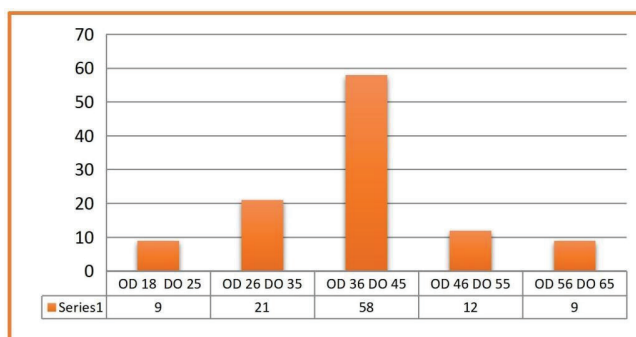


Figure 2 Age structure of the respondents.

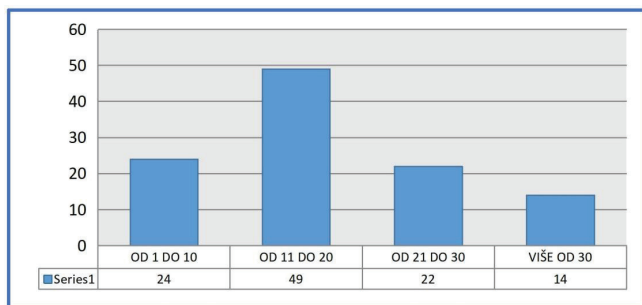
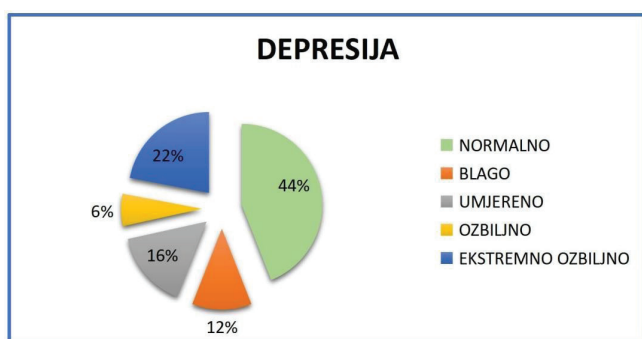


Figure 3 Work experience of the respondent.

The largest number of the study respondents was in the group with a length of service of 11 to 20 years, a total of 49 of them, followed by the group of 1 to 10 years, 24 of them. The minimum length of service was 1 year, and the maximum was 38 years.



Analysis of the DASS-21 survey questionnaire

Figure 4 Degree of depression according to DASS-21.

Analysis of the DASS 21 depression scale questionnaire, it was found that a total of 66% of the study respondents had some form of depressive disorder. Out of that number, 12% had mild depressive disorder, 16% moderate, 6% serious and 22% of them had extremely serious disorder, which was a statistically significant percentage.

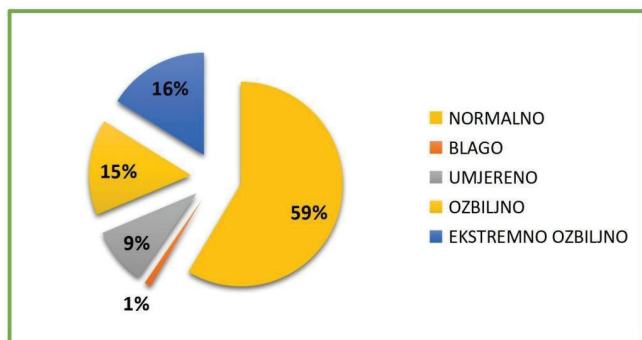


Figure 5 Stress level according to DASS-21.

With regard to stress, it was found that the largest number of respondents, 59% of them, were not under stress, 1% of them were under mild stress, 9% under moderate stress, 15% under severe stress and 16% of the respondents were under extremely serious stress.

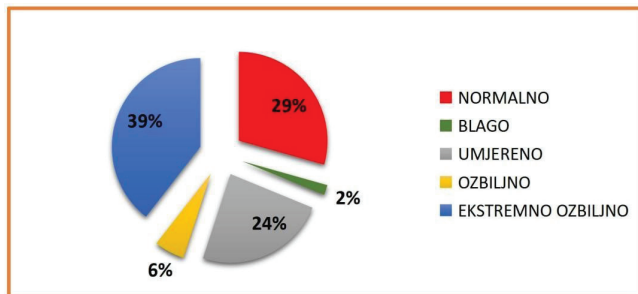


Figure 6 Level of anxiety.

Analysis of the anxiety subscale showed that a statistically significant percentage of respondents, 39% of them, experienced an extremely serious level of anxiety, 24% of them moderate, 6% of them serious, and 2% of the respondents experienced mild level of anxiety, whereas 29% of the did not experience any form of anxiety.

DISCUSSION

By analyzing the sociodemographic data of the respondents, the following data were obtained. The female population was dominant in this study, with a total of 89%. With regard to the respondents' age structure, the largest number of respondents, even more than half of them, was in the 36 to 45 age group, followed by the 26 to 35 age group. The youngest respondent was 21, and the oldest was 61. The largest number of the study respondents was in the group with a length of service of 11 to 20 years, a total of 49 of them, followed by the group of 1 to 10 years, 24 of them. The minimum length of service was 1 year, and the maximum was 38 years.

By analyzing the instrument for self-assessment of mental difficulties DASS-21, and its three subscales, the study obtained the following data. Due to the COVID-19 pandemic, surgical nurses and technicians experienced episodes of depressive disorders in 66% of cases. Out of that number, 12% had mild depressive disorder, 16% moderate, 6% serious and 22% of them had extremely serious disorder, which was a statistically

significant percentage. With regard to stress, it was found that the largest number of respondents, 59% of them, were not under stress, 1% of them were under mild stress, 9% under moderate stress, 15% under severe stress and 16% of the respondents were under extremely serious stress.

Analysis of the anxiety subscale showed that a statistically significant percentage of respondents, 39% of them, experienced an extremely serious level of anxiety, 24% of them moderate, 6% of them serious, and 2% of the respondents experienced mild level of anxiety, whereas 29% of the did not experience any form of anxiety.

The risk of stigma among healthcare workers had been previously highlighted. A recent study by Ramaci T, et al., conducted on a sample of 260 healthcare workers in an Italian hospital, analyzed the impact of stigma on work outcomes. The study results show that stigma positively predicts burnout and fatigue, and negatively predicts satisfaction, highlighting the importance of discriminatory behavior. In this perspective, the application of human resources practices to reduce the severity of discrimination becomes crucial (7).

A prospective cohort study conducted by Sampaio F, et al. conducted three surveys among nurses - examining personal factors, working conditions, family dynamics, and attitudes toward COVID-19 in the period between 31 March and 4 May 4 2020. The mental health of nurses was assessed using the Depression Anxiety Stress Scale - Short Version (DASS-21), their sleep quality was assessed through a 5-point Likert survey question. In the study results, the authors state that the quality of sleep of nurses and symptoms of depression, anxiety and stress represented a positive correlation in relation to the outbreak of COVID-19, which correlates with the results of this study (8).

In a study conducted by Salopek-Žiha D, et al., who also used the DASS-21 scale to assess the mental status of their respondents, 11% of healthcare workers reported moderate to very severe depression, 17% moderate to extremely severe anxiety, and 10% moderate to extremely severe stress. A total of 67% of medical staff were concerned. No statistically significant differences were found in the depression, anxiety and stress scales between nurses and doctors, but they were found on the subscales (9).

Objective of the study conducted by Shen YJ, et al. was to investigate the prevalence of mental problems and social support among nurses during the COVID-19

epidemic and their the correlation. They conducted a large-sample multicenter study in Chongqing (China), with participation of a total of 848 neonatal nurses. The results showed that 104 nurses (12.3%) had symptoms of depression, 133 (15.7%) had symptoms of anxiety and 45 (5.3%) nurses had symptoms of stress (10).

Based on an insight into the research results of other authors, we can say that our results are in correlation with literature data.

CONCLUSION

Based on the results of the conducted study and the set goals, the following conclusions can be made:

- Surgical nurses were exposed to the psychosocial effects of the COVID 19 pandemic.
- In the study group, a total of 66% of respondents had some form of depressive disorder. Out of that number, 12% had mild depressive disorder, 16% moderate, 6% serious and 22% of them had extremely serious depressive disorder, which was a significant percentage. Thus, it could be conclude that surgical nurses had a significant degree of depression due to their work with COVID-19 patients.
- By analyzing the anxiety subscale, it was concluded that a significant percentage of nurses, even 71% of them, developed an anxiety state, which confirmed that surgical nurses had a significant degree of anxiety due to their work with COVID-19 patients.
- This research revealed that 39% of nurses had an extremely severe form of anxiety, 24% had a moderate form, 6% severe form, 2% mild form, while a total of 29% did not experience any form of anxiety.
- In this study, the largest number of respondents, 59% of them, were not under any form of stress, which partially confirmed that surgical nurses were exposed to stress due to their work with COVID-19 patients. Of the total number of the study respondents, we obtained data that 1% of them were under mild stress, 9% under moderate, 15% under severe and 16% of the respondents were under extremely severe stress.

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Quality of Life of Crohn's Disease Patients

Kvalitet života oboljelih od Morbus Crohna

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ABSTRACT

Introduction: Crohn's disease is a chronic illness which significantly affects one's health status. Intestinal and extra-intestinal illness, surgical interventions, side effects caused by medication and psychosocial factors all have a negative effect on quality of health.

Aim: to show significant impact of Morbus Crohn on physical health, including pain, digestion problem and possible surgical procedure.

Materials and methods: the research was a prospective-comparative study which included 100 respondents divided into 2 groups. The first (experimental) group consisted of 50 respondents diagnosed with Crohn's disease, whereas the second (control) group consisted of 50 respondents not diagnosed with Crohn's disease. The main instrument of the research was a questionnaire on social-demographic data (age, sex, level of education, marital status, work ability) drafted by the authors, and the Inflammatory Bowel Disease Questionnaire (IBDQ).

Results: the control group respondents were older with an average age of 42,6 years, compared to the experimental group respondents with an average age of 34,6 years. With regard to the level of education, a statistically significant difference was observed between the groups ($p < 0,05$), meaning that the large number of the control group respondents were with poor level of school education, with secondary education, an university degree whereas the large number of the experimental group respondents had higher school degree. Analysis of the influence of marital status on the total and individual scores indicated that married respondents had statistically

insignificantly higher scores. Analysis on the influence of the level of education on the total and individual scores on some subscales indicates that there was no statistically significant influence. In the experimental group it was evident that employed respondents had the highest scores on all scales with a statistically significant difference on the scales related to the function of the intestines and basic symptoms.

Conclusion: according to the total IBDQ score, those diagnosed with Crohn's disease had a statistically significant lower quality of life compared to the healthy respondents. The IBDQ was influenced by age, level of education, marital status and employment status, whereas sex did not have any influence.

Keywords: Crohn's disease, quality of life, IBD questionnaire

SAŽETAK

Uvod: Morbus Chron je hronična bolest koja značajno utiče na zdravstveni status. Intestinalna i ekstra-intestinalna bolest, hirurške intervencije, nuspojave izazvane lijekovima i povezani psihosocijalni faktori negativno utiču na kvalitet života.

Cilj: pokazati značajan uticaj Morbus Crohna na fizičko zdravlje, uključujući bol, probleme s probavom i mogući hirurški zahvat.

Materijali i metode: istraživanje je provedeno kao presječna, prospektivno – komparativna studija koja je

uključila 100 ispitanika podjeljenih u dvije grupe. Prvu (eksperimentalnu) grupu čini 50 ispitanika oboljelih od Morbus Chrona, dok se kontrolna grupa sastoji od 50 ispitanika bez oboljenja Morbus Chrona. Kao instrument istraživanja korišten je anketni upitnik o sociodemografskim podacima (dob, spol, nivo obrazovanja, bračno stanje, radnu sposobnost) kreiran od strane autora, te IBDQ (upitnik o kvalitetu života oboljelih od upalnih bolesti crijeva).

Rezultati istraživanja: Ispitanici kontrolne skupine su bili stariji sa prosječnom dobi od 42,6 g.a u odnosu na ispitanike eksperimentalne skupine sa prosječnom dobi od 34,6g. U odnosu na stepen obrazovanja zabilježena je statistički signifikantna razlika između promatranih skupina ($p < 0,05$) u smislu da je u kontrolnoj skupini zabilježen veći broj ispitanika sa NSS, SSS i VSS a u eksperimentalnoj sa VŠS. Analiza uticaja bračnog statusa na ukupni i skorove pojedinih skala ukazuje da, iako bez statistički signifikantnog uticaja više skorove pokazuju oženjeni/udate.

Analiza uticaja stepena obrazovanja na ukupni i skorove na pojedinim subskalama ne pokazuje statistički signifikantan uticaj.

U eksperimentalnoj skupini primjetno je da zaposleni pokazuju najviše skorove na svim skalama uz statistički signifikantnu razliku na skalama funkcije crijeva i opštih simptoma.

Zaključak: Prema ukupnom IBDQ skor, oboljeli od M. Crohn su imali statistički signifikantno manji kvalitet života u odnosu na zdrave ispitanike. Na IBDQ skor uticaj je pokazala dob, stepen obrazovanja, bračni status, zaposlenost, dok spol nije pokazao uticaj.

ključne riječi: Morbus Chron, kvalitet života, IBD upitnik

INTRODUCTION

Morbus Chron is a chronic disease that significantly impacts health status. Intestinal and extra-intestinal disease, surgical interventions, side effects caused by medications, and associated psychosocial factors negatively affect the quality of life. The activity indices developed to achieve a significant concentration of clinical diseases mostly relate to physical and biological aspects but do not recognize the impact of Crohn's disease on patients' perception of quality of life, particularly on emotional and social well-being (1). Modern medicine prefers a holistic approach to

the patient. It consists of clinical assessment, physical examination, and quality of life evaluation (2).

Quality of life is a highly complex concept addressed by various scientific disciplines. Given the layers and multitude of perspectives through which the concept is considered, it is nearly impossible to define it unambiguously (3). Over the past three decades, quality of life has become an important research subject in various disciplines. Nowadays, quality of life assessment is an integral part of evaluating rehabilitation and therapeutic procedures. The World Health Organization's (WHO) defines quality of life in the context of the culture in which a person lives with personal goals, expectations, and concerns. Quality of life is observed under the influence of physical health, psychological condition, level of independence, relationships with others, and the environment (4). Research results also show that the quality of life is significantly lower in patients suffering from Crohn's disease compared to healthy people (5).

AIM

The aim of this paper was to show significant impact of Morbus Crohn on physical health, including pain, digestion problem and possible surgical procedure.

MATERIALS AND METHODS

The research was conducted as a cross-sectional, prospective-comparative study. The study used a questionnaire on sociodemographic data (age, gender, education level, marital status, work ability) created by the authors, as well as the IBDQ (Inflammatory Bowel Disease Questionnaire). The study was conducted in the period from 8 May to 13 July 2017. The participants were informed about the research protocol, and all signed an informed consent form for participation in the study.

RESULTS

Analysis of Sociodemographic Characteristics of Participants

The analysis of gender distribution shows that, both in the total sample and in specific groups, female participants were more represented. The average age of the participants in the total sample (N=100) was 38.6 ± 12.5 years, with the youngest participant being 19 and the oldest 68. Respondents in the control group were older, with an average age of 42.6 ± 12.4 years (range 19-68 years), compared to respondents in the experimental group, whose average age was 34.6 ± 11.4 years (range 19-58 years). Age group analysis showed that the majority of respondents in both groups were between 26-45 (56% in the control group and 50% in the experimental group), but the control group had more older respondents aged 45-65 and over 65, while the experimental group had more respondents aged 19-25. The majority of respondents in both groups were married (72% in the control group and 48% in the experimental group), followed by those who were single (20% in the control group and 34% in the experimental group). Although the majority of respondents in the total sample had high school degree, a statistically significant difference was recorded between the observed groups ($p < 0.05$), as the control group had a higher number of participants with completed secondary school, higher education, and vocational education, while the experimental group had more respondents with higher education diploma.

It was evident that a larger number of the control group respondents were employed (82%) compared to the experimental group respondents (58%), while a larger percentage of the experimental group respondents were unemployed (36%) compared to the control group (10%).

Analysis of the IBDQ questionnaire

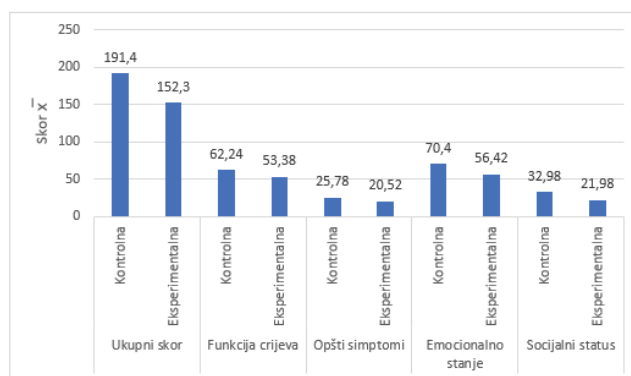


Figure 1 Analysis of comparison of scores by groups.

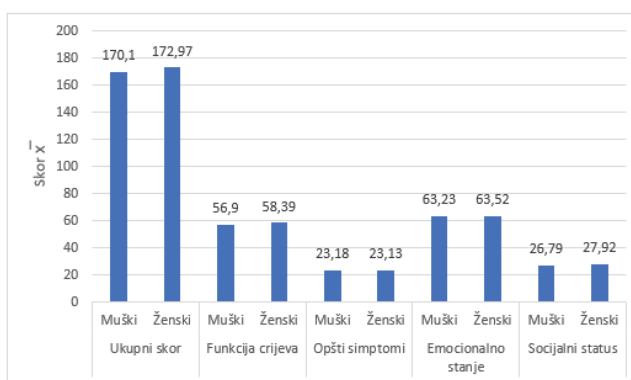


Figure 2 Analysis of the influence of gender in the total sample.

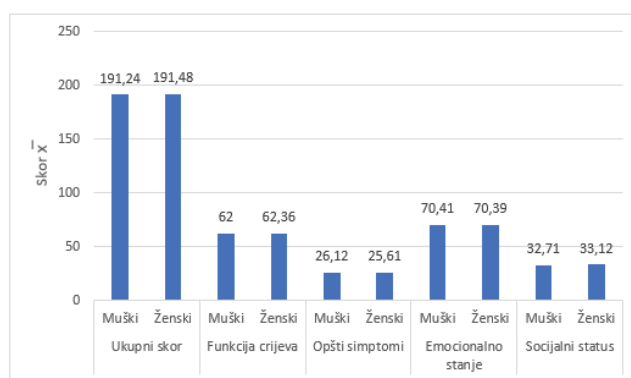


Figure 3 Analysis of the influence of gender in the control group.

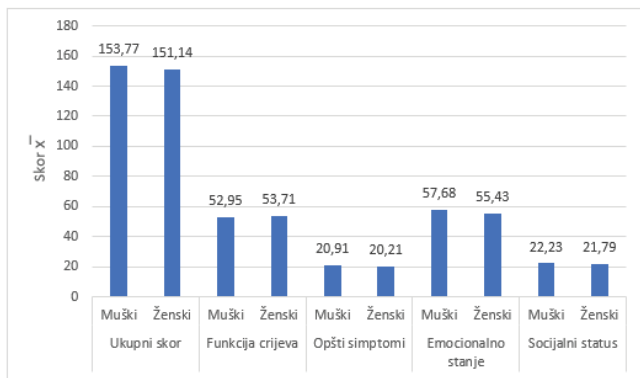


Figure 4 Analysis of the influence of gender in the experimental group.

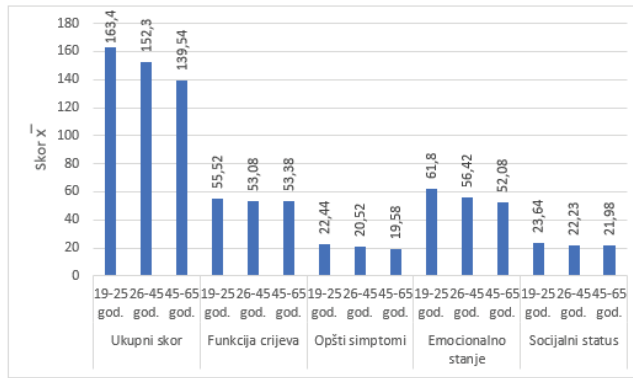


Figure 7 Analysis of the influence of age in the experimental group.

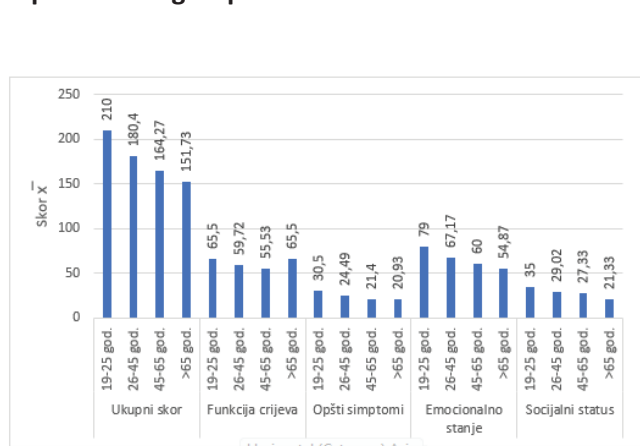


Figure 5 Analysis of the influence of age in the total sample.

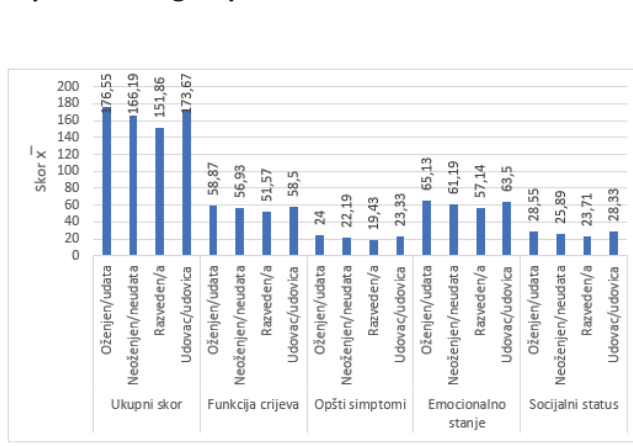


Figure 8 Analysis of the influence of marital status in the total sample.

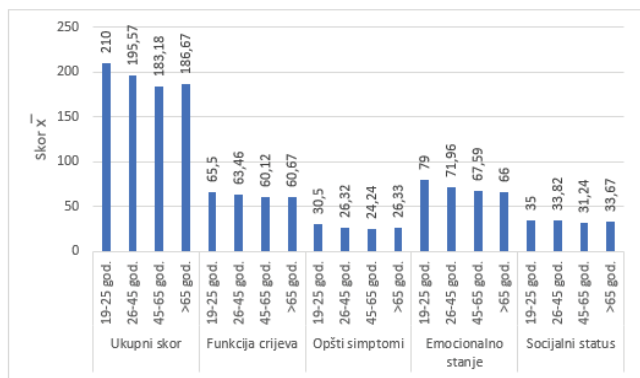


Figure 6 Analysis of the influence of age in the control group.

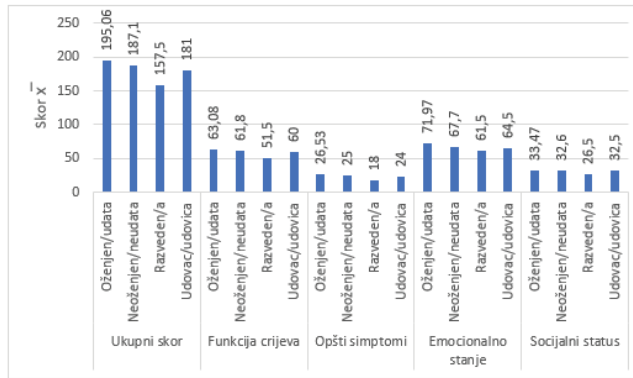


Figure 9 Analysis of the impact of marital status in the control group.

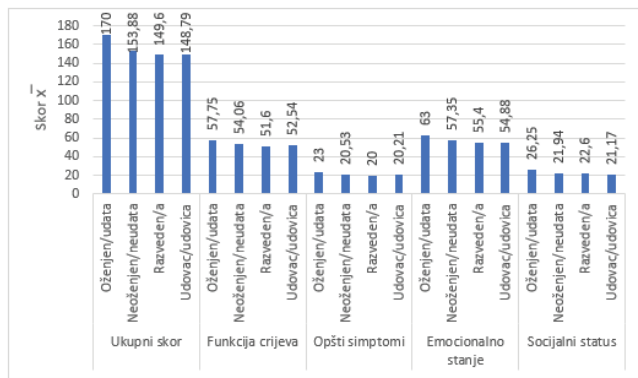


Figure 10 Analysis of the impact of marital status in the experimental group.

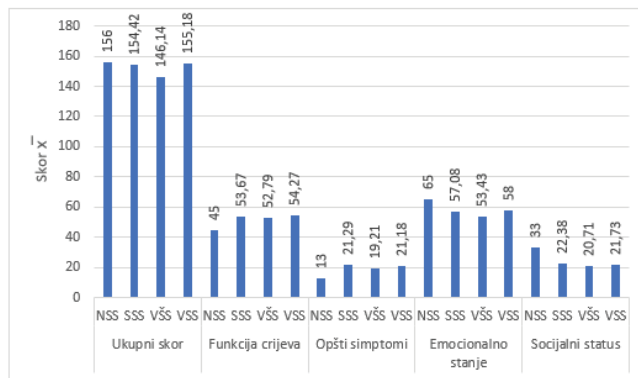


Figure 13 Analysis of the influence of the level of education in the experimental group.

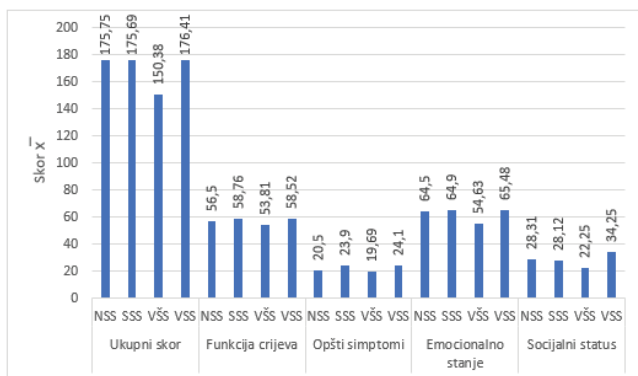


Figure 11 Analysis of the impact of level of education in the total sample.

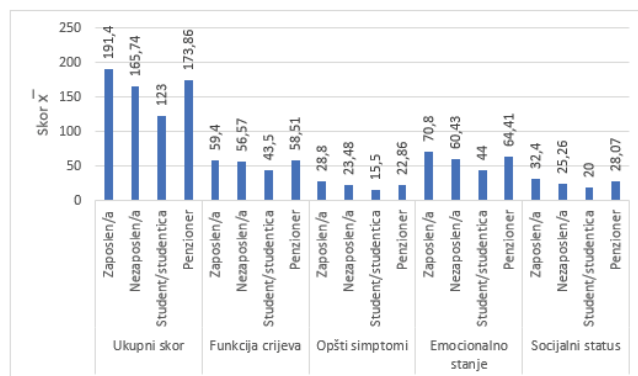


Figure 14 Analysis of the impact of employment status in the total sample.

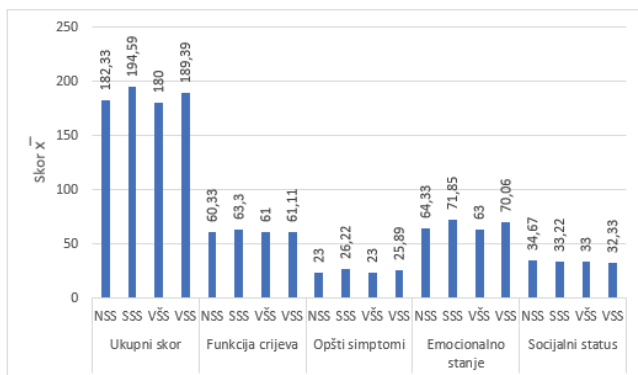


Figure 12 Analysis of the influence of level of education in the control group.

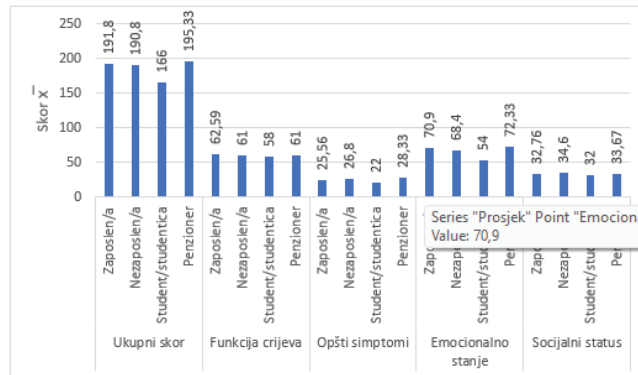


Figure 15 Analysis of the influence if employment status in the control group.

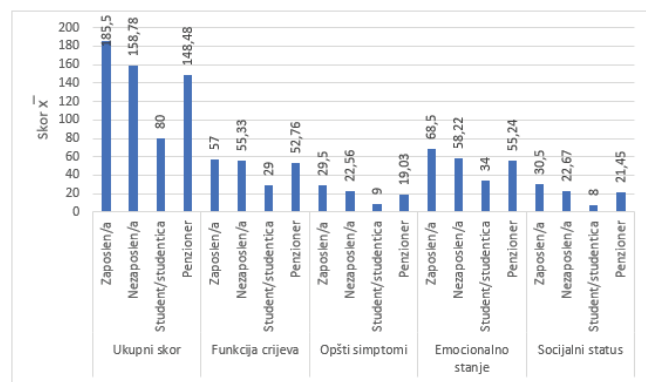


Figure 16 Analysis of the influence if employment status in the experimental group.

DISCUSSION

Our study examined the quality of life of patients with Crohn's disease, comparing it with the healthy population, and the impact of age, gender, education, employment, and marital status on the quality of life, using the IBDQ questionnaire. Its values ranged from 32 to 224, with a higher score indicating better quality of life. Guyatt G, et al., were among the first to assess the quality of life in Crohn's disease patients using the IBDQ questionnaire. The Guyatt IBDQ consists of 32 items evaluating four aspects of the patient: symptoms related primarily to bowel function disorders, general symptoms, emotional status, and social characteristics (6,7).

In this study, a higher incidence of Crohn's disease was observed among female participants, with no statistical significance. Similar results were shown in the study by Calkins BM, et al., (8) and the study by Saibeni S, et al., where the impact of gender and disease activity on quality of life was analyzed (9). Some studies indicate a lower quality of life score in female Crohn's disease patients compared to male patients (10-12).

The peak age at which Crohn's disease typically occurs is between 15 and 25 years and again between 55 and 65 years. In our study, the average age of the total sample was 38 ± 12 years.

Several tests for measuring the quality of life of patients with inflammatory bowel diseases have been found in the literature (13,14) and the IBDQ was used in this study. Using the IBDQ questionnaire, Crohn's disease patients had lower scores compared to control respondents, indicating that patients with Crohn's disease have a

poorer quality of life in all subscales compared to the healthy population. Marriage has a protective effect on quality of life, as individuals in a marital union showed better IBDQ scores in this study. Similar results were found in the study by Li G, et al. (15), where marital status had a greater impact on male participants.

The majority of participants in our study were highly educated, especially in the experimental group, but no impact of education on the quality of life of Crohn's disease patients was observed. These results were also shown in the study by Huppertz-Hauss G, et al. on the quality of life of patients 10 years after diagnosis (16). Employment is a very important determinant of quality of life. In our study, employed participants had the highest scores in the total sample, as well as in the control and experimental groups. Similar results were found in the study by Vazquez C, et al., where it was shown that employed individuals had a better quality of life compared to unemployed patients with Crohn's disease (17).

Our study identified important variables significantly associated with lower quality of life in Crohn's disease patients, suggesting that assessing quality of life plays a crucial role in understanding the impact of the disease on patients' lives and also an important role in developing new strategies to improve the quality of life for these individuals. The ideal questionnaire for quality of life remains a subject of further research in similar studies.

CONCLUSION

The average IBDQ score for patients with Crohn's disease was 152.3 ± 35.3 , indicating a low quality of life for patients with Crohn's disease. The average IBDQ score in the control group of respondents without Crohn's disease was 191.4 ± 24.2 . Comparing the total score and individual subscale scores, it was noticeable that control group respondents had statistically significantly ($p < 0.05$) higher average scores compared to experimental group respondents. A comparison of IBDQ scores in both respondent groups was made in relation to gender, age, education level, employment, and marital status. In the group of patients with Crohn's disease, it was evident that employed individuals showed the highest scores across all scales, with statistically significant differences ($p < 0.05$) in the bowel function and general symptoms scales, making employment a protective factor in certain way.

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- Declaration of Patient's Consent:** the authors certify that they have obtained the appropriate patient consent forms. In the form, the patients have granted their permission for the images and other clinical information to be reported in the journal.
- Authors' Contributions:** MČ, EM, NM, MG and EL contributed significantly to the conception and design of the article, as well as the acquisition, analysis,

and interpretation of data for the work. Each author had a role in drafting of the article and the revision process. Each author gave final approval of the version to be published and agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Intravitreal Therapy with Bevacizumab in Patients with Diabetic Macular Edema and Senile Macular Degeneration

Intravitrealna terapija bevacizumabom kod bolesnika sa dijabetičkim makularnim edemom i senilnom makularnom degeneracijom

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ABSTRACT

Introduction: Intravitreal injections are one of the most commonly used techniques for treating eye diseases in the world, and their use is increasing year over year.

Aim: to examine the effect of the initial three injections of bevacizumab in the observed groups on best corrected visual acuity (BCVA) and optical coherence tomography (OCT) findings, to compare differences in the observed groups, to compare adverse drug effects and to analyze specific biomarkers in OCT.

Materials and methods: this was a prospective cohort study and it included 70 people over 18 years old, both sexes, who were divided into 2 groups: patients with exudative senile macular degeneration (ARMD) and patients with diabetic macular edema (DME). Each patient underwent OCT before, 1, 2, and 3 months after bevacizumab administration, during which time the patient received three intravitreal injections.

Results: out of a total of 35 subjects with DME, 22 (63 %) had type I diabetes. The retina in the

foveolar area is significantly thicker in subjects with DME compared to subjects with ARMD.

BCVA is significantly higher in subjects with DME compared to subjects with ARMD. Out of a total of 22 (63 %) subjects with intraretinal cysts (IRC), significantly more, 15 (31 %) were from the DME group. In the group of subjects with ARMD 16 (46 %) subjects have elevated retinal pigment epithelium. 17 (49 %) subjects

with DME have hyperreflective points (HRF) present.

Conclusion: the initial three injections of bevacizumab were positively correlated with BCVA

improvement. IRC can be considered a reliable indicator that usually negatively correlates with the success of therapy, while for HRF the results of research are still not completely unique.

Keywords: diabetic macular edema, senile macular degeneration, optical coherence tomography

SAŽETAK

Uvod: intravitrealne injekcije jedna su od najčešće korištenih tehnika liječenja očnih bolesti u svijetu, a njihova je uporaba iz godine u godinu sve veća

Cilj: posmatranje efekta 3 inicijalne injekcije bevacizumaba u kontrolnim grupama na najbolju korigovanu vidnu (BCVA) oštrinu i na nalaze OCT-a, upoređivanje razlika u posmatranim grupama, poređenje neželjenih efekata lijeka, kao i analiziranje karakterističnih biomarkera na OCT snimku.

Materijali i metode: ovo je prospektivna kohortna studija koja je obuhvatila 70 osoba starosti preko 18 godina, oba spola, koji su podijeljeni u 2 grupe: pacijenti sa vlažnom senilnom makularnom degeneracijom i pacijenti sa dijabetičkim makularnim edemom. OCT snimak je rađen prije primjene lijeka, te svaki mjesec

nakon aplikacije bevacizumaba, gdje su pacijenti primili ukupno 3 intravitrealne injekcije.

Rezultati: od ukupno 35 ispitanika sa DME, 22 (63%) imaju dijabetes tip I. Retina u foveolarnoj regiji je značajno deblja kod ispitanika sa DME u poređenju sa ispitanicima koji imaju ARMD. BCVA je značajno veća kod ispitanika sa DME u poređenju sa ispitanicima koji imaju ARMD. Od ukupno 22 (63%) ispitanika sa intraretinalnim cistama (IRC), značajno više, 15 (31%) su iz grupe sa DME. U grupi ispitanika sa ARMD-om, 16 (46%) ispitanika su imali odignut retinalni pigmentni epitel. 17 (49%) ispitanika sa DME imaju hiperreflektivna područja (HRF).

Zaključak: inicijalne tri doze bevacizumaba su pozitivno povezane sa poboljšanjem BCVA. IRC može biti pouzdan pokazatelj koji se inače negativno povezuje sa poboljšanjem terapije, dok za HRF rezultati istraživanja nisu u potpunosti jedinstveni.

Cljučne riječi: dijabetički makularni edem, senilna makularna degeneracija, optička koherentna tomografija

INTRODUCTION

Intravitreal injections are one of the most commonly used techniques for treating eye diseases in the world, and their use is increasing year over year (1).

Some indications for the use of this therapy are: neovascular age-related macular degeneration (ARMD), diabetic macular edema (DME), retinal vein occlusions, uveitis, endophthalmitis, choroidal neovascular membrane as a result of multiple retinal diseases, cystoid macular edema (2). There are numerous drugs that are currently used for the purpose of intravitreal therapy, the most common of which are: bevacizumab (Avastin), aflibercept (Eylea), ranibizumab (Lucentis), brolocizumab (Beovu), corticosteroid preparations, and antibiotics for the treatment of endophthalmitis (2).

In the 1980s, the use of intravitreal therapy in the form of antibiotics began to increase, and it was used as a standard therapy for the treatment of postoperative endophthalmitis. The first intravitreal anti-VEGF injection was administered in 1999 (3).

Diabetic macular edema

Diabetic macular edema (DME) is characterized by the accumulation of fluid within the central part of the retina, which occurs as a result of damage to the blood-retinal barrier (5). The prevalence of diabetic macular edema is increasing worldwide every day (5). This disease has become one of the leading causes of vision loss in the working population (5). Diabetic macular edema occurs in about 12% of patients with diabetic retinopathy (6).

The risk factors for the development of this disease include: the duration of diabetes, pregnancy, nephropathy, glycemic control, systemic hypertension, age, smoking, obesity and hyperlipidemia (7). The duration of diabetes is the highest risk factor (7). Another important factor to be highlighted is glycemic control (7). People with HbA1C > 8 have a high risk of developing the disease (7).

Diabetic macular edema is a common complication of diabetic retinopathy, and it can manifest as either a proliferative or non-proliferative form of the disease (8). DME is more common in patients with type II diabetes and less common in those with type I diabetes, who more often develop the proliferative form of diabetic retinopathy (8).

Senil macular degeneration

Age-related macular degeneration (ARMD) is a progressive, chronic, and multifactorial retinal disease, primarily characterized by a decline in visual acuity, and it occurs in individuals of older age (60 years and older) (9). This disease is often associated with at least one of the following signs: drusen, depigmentation and hyperpigmentation of the RPE, RPE atrophy, neovascularization, exudation, and hemorrhage (7). ARMD is a disease that progresses from milder to more severe stages, which can be divided into two main forms: dry macular degeneration and wet or exudative macular degeneration (9). Although most patients suffer from the dry form of ARMD (about 80%), those with the wet form of the disease have a much higher risk of vision loss (up to 90%) (9). The wet form of ARMD is characterized by choroidal neovascularization (CNV) and the presence of fluid in the macula, specifically in its foveal region (9). Choroidal neovascularization is a pathological form of angiogenesis that leads to fluid accumulation in the retina, subretinally or beneath

the RPE, resulting in edema (9). Other features that occur include: RPE defects, hemorrhages, hard exudates, and the formation of fibrous scar tissue, most commonly in the later stages of the disease (9).

The dry form manifests as the formation of drusen, hypo/hyperpigmentation, RPE atrophy, and geographic atrophy (7). Risk factors contributing to the development of ARMD include: older age, a positive family history, cataracts, light-colored irises, obesity, smoking, hypercholesterolemia, and hypertension (7).

Diagnostic

The diagnosis of diabetic retinopathy and age-related macular degeneration is based on optical coherence tomography (OCT), fluorescein angiography, and optical coherence tomography angiography (OCT-A) (12).

Optical coherence tomography

OCT is one of the most widely used tools in ophthalmology. OCT has revolutionized the diagnosis, treatment, and monitoring of various diseases, including DME and ARMD. It is a noninvasive and rapid technology that provides in vivo retinal imaging (5). OCT is the most widely used tool today for evaluating and monitoring individual treatment responses in patients receiving anti-VEGF therapy, because OCT detects fluid accumulation as a result of active leakage in DME and ARMD (5).

Fluorescein angiography

Fluorescein angiography (FA) has been an important diagnostic tool for decades and is recognized as a crucial factor in determining the pathology and location of retinal changes (5). FA requires the use of a fundus camera equipped with specific filters (13). The fluorescein dye is administered intravenously, most commonly through the antecubital vein, at a rate that allows high-contrast images to be produced in the early stages of the angiogram (13).

FA remains a frequently used and approved test for distinguishing the type of microaneurysms, various microvascular intraretinal abnormalities, and clearly outlines areas of capillary nonperfusion zones and

similar conditions. Its advantage over standard OCT is a dynamic test and can display retinal ischemia and the expansion of the foveal avascular zone. Furthermore, FA is capable of showing leakage from incompetent macular microcirculation and regions where capillary dilations and similar abnormalities occur. FA is recommended to be performed before starting therapy in order to outline and determine the stage of diseases such as DME and AMD. If necessary, FA can also be used as a tool for monitoring the disease and determining the patient's response to treatment (5).

Optical coherence tomography-angiography

OCT-angiography is a non-invasive technique for imaging the microvasculature of the retina and vasculature, which uses the reflection of laser light from the surface of erythrocytes to precisely visualize blood vessels (14). The main advantage over fluorescein angiography (FA) is the ability to capture images in multiple layers of the retina (5). This test also eliminates the need for intravascular dyes and contrast agents, making it non-invasive (14). OCT-A is more focused on the perfusion of blood vessels rather than structural features (5). OCT-A can be used as a complementary test alongside FA due to its potential to offer better insight into capillary loss and the attribution of superficial or deep capillary plexus, which is a result of the non-invasive nature of this test (5). It primarily has significant value in visualizing choroidal neovascularizations, while fluorescein angiography has the advantage for assessing capillary perfusion in diabetic retinopathy and DME.

VEGF and anti-VEGF

VEGF is vascular endothelial growth factor, a signaling protein that stimulates the formation of blood vessels both during embryonic development (vasculogenesis) and the formation of blood vessels from existing ones (angiogenesis) (4). The signal for VEGF secretion is typically triggered after injuries, in muscles after exercise, and the formation of collateral vessels in cases of blood vessel obstruction (4). Serum levels of VEGF are elevated in individuals with diabetes mellitus and bronchial asthma, as well as in conditions where oxygen levels in tissues are reduced (1). Excessive VEGF production can cause changes

in the blood vessels of the retina, as well as in other areas of the body. Anti-VEGF drugs such as Aflibercept, Bevacizumab, and Ranibizumab inhibit the action of VEGF, reducing progression and helping with better disease control (19).

Therapy

The treatment of ARMD (Age-Related Macular Degeneration) and DME (Diabetic Macular Edema) has made significant progress with the introduction of anti-VEGF therapy, i.e., inhibitors of vascular endothelial growth factor (VEGF) (10). However, although this therapy has become the standard for these diseases, not all patients show a satisfactory response to the treatment (10). The medicaments themselves work by blocking the binding of VEGF to the appropriate receptors, and the earlier they are administered, the better the prognosis for the disease, i.e., visual acuity (12).

Bevacizumab treatment is carried out by initially administering the medicament intravitreally, usually in three sessions, with each injection spaced four weeks apart (12). The medicament is administered in an operating room under strict aseptic rules (12). Prior to the procedure, the areas around the eyes are rinsed with povidone-iodine, which is previously instilled into the conjunctival sac (12). The medicament is injected with a 27-gauge needle vertically into the sclera using a slow intravitreal technique (12). Although anti-VEGF therapy is now the standard treatment for ARMD and DME, not all patients will respond the same way to the therapy (10). Some patients may not have a good response to the initial treatment, and resistance can develop at any point during the treatment (10,12). Patients who do not respond adequately to the therapy are called non-responders (10). A person who does not show a satisfactory response to therapy after the first three initial injections of the anti-VEGF drug has a low likelihood of further treatment leading to improvement, i.e., showing a satisfactory effect (10,12).

Treatment outcomes monitoring

There are several biomarkers based on OCT, including: central subfoveal thickness (CSFT), presence of intraretinal fluid (IRF) or intraretinal cysts (IRC),

subretinal fluid (SRF), and pigment epithelium detachment (PED) (9). These markers are considered to be associated with visual acuity and response to anti-VEGF therapy (9). A criterion for retreatment with injection is a reduction in CSFT by less than 25% (9). If the cause of CSFT is mostly retinal fluid, treatment with anti-VEGF factors will have a good outcome. However, if epiretinal membranes are present or there is accumulation of fibrous or drusen-like material, the prognosis is worse (9).

Early response to anti-VEGF injection treatment has been shown to be an important predictor of visual acuity recovery in ARMD and DME (9). Visual acuity after three months of intravitreal injections is a better predictive factor than the initial visual acuity value (9). Additionally, early morphological changes in the previously mentioned OCT biomarkers are an important predictive factor for the final treatment outcome (9). Therefore, the analysis of OCT biomarkers and visual acuity in the early phase of treatment is crucial for optimizing therapy during treatment, with the goal of achieving visual function recovery (9).

MATERIALS AND METHODS

The research was conducted entirely at the Eye Disease Clinic of the Clinical Center University of Sarajevo during 2023 and 2024. The study involved 70 regular patients from the outpatient clinic for the posterior segment of the eye, all over the age of twenty, of both genders, divided into two groups, both of which would receive this medication due to their underlying condition. The first group consisted of patients with age-related macular degeneration (ARMD), and the second group consisted of patients with diabetic macular edema. The participants were patients who had not previously received intravitreal therapy, specifically they were starting the treatment at the Clinic in order to monitor the initial response to the therapy.

Methods

Before the administration of Bevacizumab, all patients were provided with a specific form that informing them about the type of therapy and the procedure, general risks associated with the procedure, success of the treatment, and the

recommended behavior for the patient in the early period after medicament administration. This form was routinely given to each and every patient when scheduling for the Bevacizumab administration at the Department of Ophthalmology. A detailed medical history was taken from each patient, visual acuity was assessed using Snellen optotypes, and intraocular pressure values were recorded using the applanation tonometry method. The fundus examination was performed with an indirect non-contact lens, and the relevant data were documented. Each patient underwent optical coherence tomography (OCT) before the treatment and 1, 2, and 3 months after Bevacizumab administration, during which the patient received three doses of the medication. All patients being treated for the underlying condition were given intravitreal Bevacizumab (Avastin) 1.25 milligrams at least three times every four weeks.

The intravitreal administration of the medicament was performed in strict aseptic conditions in an operating room, using a 27-gauge sterile needle, 3 to 4 millimeters from the limbus in the lower temporal quadrant of the bulbar conjunctiva, with topical anesthesia using tetracaine drops instilled into the conjunctival sac before and during the procedure.

Aseptic preparation for the procedure included washing the surgical area with 10% povidone-iodine and rinsing the conjunctival sac with a 5% povidone-iodine solution.

RESULTS

The research was conducted on 70 outpatient clinic patients for the posterior segment of the eye, of which 35 (50%) suffered from ARMD, and the same number of patients suffered from DME. Regarding gender, 40 (57%) respondents were women and 30 (43%) were men.

Table 1 Respondents with ARMD and DME.

Group of patients included in the study	Number	%
Exudative senile macular degeneration	35	50
Diabetic macular edema	35	50
Total	70	100

Table 2 Respondents by gender.

Gender	Number	%
Women	40	57
Men	30	43
Total	70	100

Table 3 Respondents with DME type of diabetes.

Type of diabetes	Number	%
Type I	22	63
Type II	13	37
Total	35	100

There was significantly thicker retina in the foveolar area in subjects with DME compared to subjects with ARMD, both at the initial and in all three other measurements.

Table 4 Differences in retinal thickness in the foveolar region between ARMD and DME groups.

Thickness retina in foveolar area	Median (interquartile range) ARMD	Median (interquartile range) DME	Difference (95 % range reliability)
Initial measurement	284,5 (247 – 411)	372 (312 – 434)	63 (16 -107)
1. measurement	290 (256 – 363)	360 (309 – 421)	57 (12 – 95)
2. measurement	284,5 (250 – 320)	352,5 (299 – 390)	58 (20 – 93)
3. measurement	271,5 (248 – 321)	335 (283 – 381)	53,5 (18 – 90)

Table 5 Differences in best-corrected visual acuity between ARMD and DME groups.

Best corrected Visual acuity	Median (interquartile range) ARMD	Median (interquartile range) DME
Initial measurement	0,150	0,345
1. measurement	0,205	0,400
2. measurement	0,205	0,500
3. measurement	0,205 (0,08 –0,40)	0,500 (0,40 0,70)

Table 6.1 Distribution of respondents according to OCT features with regard to groups.

Intraretinal cysts	ARMD	DME	Total %
None	28	20	67
Exist	7	15	31

Table 6.2

Elevation of the retinal pigment epithelium	ARMD	DME	Totalo%
None	19	-	54
Exist	16	-	46

Table 6.3

Subfoveal elevation	ARMD	DME	Total %
None	-	22	63
Exist	-	13	37

Table 6.4

Hyperreflective points	ARMD	DME	Total %
None	-	18	51
Exist	-	17	49

ARMD – Exudative senile macular degeneration;
DME – Diabetic macular edema

DISCUSSION

The study was conducted on 70 patients from the posterior segment eye clinic, of which 35 (50%) were diagnosed with ARMD, and the same number of patients were diagnosed with DME.

Many large studies have shown that the incidence of DME increases proportionally with the duration of diabetes mellitus, with two peaks (15). The first occurs around 14 years, and the second after 30 years or more (15). On average, the incidence of DME is about 30% in patients who have been suffering from diabetic retinopathy for over 20 years (16). 35 patients with diabetic maculopathy, 22 (63%) have Type I diabetes (Table 3). Clinical signs of diabetic maculopathy are often present for years after the onset of diabetes, but it should be emphasized that in Type II diabetes, paradoxically, clinical signs may be present, while the underlying diabetic condition may remain undiagnosed for years (17). This is likely why most patients in the DME group suffer from Type I diabetes, as Type II is often diagnosed later. Most patients in the DME group had insulin-dependent diabetes, but were initially on oral therapy, specifically their primary condition was Type II diabetes. A higher percentage of Type II diabetic patients develop DME, while Type I more often develops diabetic retinopathy as a retinal complication, particularly in younger individuals who develop proliferative forms.

Regarding gender, 40 (57%) were women and 30 (43%) were men. Some similar studies failed to find a connection between gender and disease progression (18). However, other studies determined that women were more likely to experience faster progression of ARMD than men (18). The reason for this result is likely due to the fact that the progression of ARMD in women may be accompanied by various processes influenced by sex hormones, such as estrogen (18).

Studies also show that women who actively used hormone replacement therapy had a lower risk of developing ARMD, while women who entered menopause at an earlier age had an increased risk of ARMD (19).

The retinal thickness was significantly greater in the foveal region in DME patients compared to ARMD patients, both at the initial measurement and in all subsequent measurements. This result was understandable given the etiology of DME, where there was intense fluid accumulation in the intraretinal space due to the breakdown of the blood-retinal barrier. On the other hand, with ARMD, the appearance of the OCT findings is more important, and the amount of fluid accumulation is not necessarily crucial (19).

In ARMD, CSFT reduction occurred only after the third injection, which suggested the possibility of needing a higher number of injections at the initial dose to achieve a better therapeutic response. It is also important to note that this study relates to the initial effect of intravitreal therapy as a predictor for further treatment, and therefore, prolonging therapy may lead to different results (19).

The best-corrected visual acuity was significantly higher in DME patients compared to ARMD patients. In the DME group, the values were significantly lower in the initial and first measurements compared to the second and third measurements (Table 5). The initial response in visual acuity recovery for both groups was satisfactory, but the recovery was greater in DME patients, which corresponded with the increased amount of intraretinal fluid at the start of treatment, as intravitreal therapy had a better effect on it.

Out of the total of 22 (31%) patients with intraretinal cysts, significantly more (35%) belonged to the DME group (Table 6.1).

DME patients did not have retinal pigment epithelium detachment, while 17 (49%) had hyper-reflective spots (Table 6.2 and 6.4). In the ARMD group, 16 (46%) patients had retinal pigment epithelium detachment (Table 6.2).

Bevacizumab therapy is very important for patients with DME and ARMD. It helps answer the question of whether patients are non-responders and whether their therapy needs to be changed earlier. Considering the availability of several types of anti-VEGF drugs, it is crucial to determine whether a new drug should be administered sooner, or if corticosteroid therapy should be added in the case of DME.

It is also important to provide the first intravitreal

therapy as early as possible after diagnosis and follow the regular rhythm of therapy during the loading dose with bevacizumab. The earlier the therapeutic response is better, the better the overall prognosis for treatment and preservation of visual acuity, considering that retinal layer degeneration inevitably occurs with years of inadequate treatment.

CONCLUSION

Following the research and analysis of the results, the following conclusions could be made:

- The first three injections of Bevacizumab positively correlated with the improvement of BCVA (best corrected visual acuity) in both groups of participants.
- IRC (intraretinal cysts) could be considered a reliable indicator of treatment outcomes, which typically negatively correlated with the success of therapy, while for HRF (hyperreflective foci), the research results were still not completely consistent regarding HRF as a prognostic factor for treatment.
- The recovery of BCVA was greater in participants with DME, which was the result of an increased amount of intraretinal fluid, on which intravitreal therapy had a better effect.
- The study showed no adverse effects in either group of participants.

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How to Implement a High-quality Pre-preanalytical Phase in Laboratory Diagnostics?

Kako provoditi kvalitetnu pred - predanalitičku fazu laboratorijske dijagnostike?

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ABSTRACT

Biochemical laboratories are independent organizational units established in healthcare institutions of both public and private sectors, with the goal of conducting laboratory diagnostic procedures based on scientifically grounded and repeatable analyses. The division of laboratory diagnostics into pre-analytical, analytical, and post-analytical phases facilitates the monitoring of the entire laboratory process and the identification of potential errors. Based on evidence from global and European leaders in laboratory medicine, the pre-analytical phase of the entire laboratory process represents the weakest link in the possibility of errors, which range from 60-80% in percentage. The majority of problems occur in the pre-pre-analytical phase, where laboratory professionals have no insight. All of the above can be influenced by standardizing the pre-analytical phase, which can be achieved through education, training, the adoption of verified global and European documents, and close collaboration between laboratory staff and healthcare personnel. In this way, pre-analytical errors can be minimized. The duties and responsibilities of laboratory professionals include educating clinical staff, patients, and other users about all procedures that contribute to sample quality.

Keywords: pre-analytical errors, sample quality, hemolysis, biological samples

SADRŽAJ

Medicinsko-biohemijske laboratorije su samostalne organizacione jedinice koje se osnivaju u zdravstvenim ustanovama javnog ili privatnog sektora, sa ciljem provođenja laboratorijskog dijagnostičkog postupka zasnovanog na naučno utemeljenim i ponovljivim analizama. Podjela laboratorijske dijagnostike na predanalitičku, analitičku i postanalitičku fazu olakšava praćenje cjelokupnog laboratorijskog procesa i pojavu mogućih grešaka. Na temelju dokaza svjetskih i evropskih lidera za laboratorijsku medicinu predanalitička faza cjelokupnog laboratorijskog procesa predstavlja najslabiju kariku mogućnosti greške koje se procentualno kreću od 60-80%. Većina problema se dešava u pred-predanalitičkoj fazi u kojoj laboratorijski profesionalci nemaju uvida. Na sve navedeno se može uticati standardizacijom predanalitičke faze koja bi se kroz edukacije, obuke, usvajanja provjerenih svjetskih i evropskih dokumenata, uskom suradnjom laboratorijskog osoblja sa zdravstvenim kadrom i na taj način predanalitičke greške svesti na minimum. Dužnosti i obaveze laboratorijskih profesionalaca su edukacija kliničkog osoblja, pacijenata i ostalih korisnika za sve postupke koji doprinose kvaliteti uzoraka.

Ključne riječi: predanalitičke greške, kvaliteta uzorka, hemoliza, prikupljanje bioloških uzoraka

INTRODUCTION

Medical laboratory diagnostics serve to confirm or exclude diseases through early recognition and diagnosis, monitoring the course of diseases, treatment efficacy, and prognosis. It is believed that up to 80% of medical decisions are based on laboratory test results. Laboratory diagnostics are expected to be analytically reliable, clinically useful, and economically justified. Maintaining good laboratory practices (GLP), through the evaluation and standardization of laboratory methods, represents the technical aspect of the work that includes the experience of laboratory professionals. GLP encompasses planning, organization, verification methods, as well as the functioning of the entire laboratory cycle (1).

By respecting quality standards in medical-biochemical laboratories and through continuous education of laboratory professionals and medical staff involved in patient preparation and sampling, cooperation between laboratory personnel and family medicine and clinical staff can significantly impact the alignment of the pre-analytical phase and reduce error rates (2). The pre-analytical phase is characterized by two separate sub-phases. The pre-pre-analytical phase includes the physician's decision on the type of test, patient preparation for testing, biological sample collection, and transport to the laboratory. The second part of the pre-analytical phase takes place within the laboratory itself and involves sample reception and preparation for the analytical process. Most errors are caused by human factors and the lack of process alignment (3,4).

Errors occurring outside the boundaries of medical-biochemical laboratories are evident through a lack of education among healthcare workers and insufficient cooperation between medical-biochemical laboratory staff, family medicine, and clinical personnel (5,6,7). Recognizing the extent of the problem, umbrella organizations direct activities toward organizing conferences and creating documents with clear recommendations on factors that affect the pre-analytical phase (8,9).

Physical activity, body posture, and fasting state during blood sampling are important issues for patient preparation standardization. It has been proven that food intake before laboratory testing and physical activity can lead to clinically significant changes in results (10).

Venipuncture is classified as a moderately invasive procedure in biochemical laboratories, and in 2013, the Working Group for the Preanalytical Phase (WGPRE) distributed a special document for education and training on venipuncture in European countries, with the goal of improving it (11).

The document H3-A6 Procedures for the Collection of Diagnostic Blood Specimens by Venipuncture, published by the Clinical and Laboratory Standards Institute (CLSI), provides accurate guidelines for blood collection from veins and guidelines related to the pre-analytical phase (12).

According to the European Federation of Clinical Chemistry and Laboratory Medicine (EFLM) and the Working Group for the Preanalytical Phase (WGPRE), blood for laboratory testing should be taken between 7:00 and 9:00 AM, the patient should fast for at least 12 hours, and physical activity should be avoided 24 hours before due to various effects on metabolism. An exception is made for patients in emergency conditions (13,14). The laboratory professional is required to determine whether the patient has been properly prepared for laboratory testing. In cases of deviations from the guidelines, the laboratory professional must document them to ensure proper interpretation of the test results (13).

It has been established that changes in body posture during blood sampling can affect the concentration of certain analyses. It is recommended that outpatient patients rest in a seated position for 20 minutes before sampling. For hospitalized patients, blood should be collected in the position they have been in for the last 20 minutes (11). For proper and accurate assessment of laboratory results, it is necessary to understand all biological (physiological) and methodological factors (the procedure for blood collection, sample storage, analytical method, quality control, etc.). Long-term or unchangeable biological factors cannot be influenced, while short-term or changeable biological and methodological factors significant for clinical decision-making can be influenced through proper patient preparation and standardization of all sample collection procedures (14).

Patient Preparation for Laboratory Testing and Identification

Standardization of patient preparation for laboratory analyses is the first contribution to reducing

pre-analytical errors. Errors that can occur during sample collection are of a “technical nature,” including prolonged use of a tourniquet, incorrect choice of sampling site, improper needle size, incorrect tube selection, improper order of tube filling, improper or insufficient mixing of tubes, and insufficient sample volume. Prolonged use of a tourniquet leads to hemoconcentration and hypoxia, so the recommendation is to keep the tourniquet on for up to 2 minutes, i.e., it should be released during the filling of the first sample tube. When discussing needle size, it refers to its internal diameter, and the choice depends primarily on the selected puncture site (14).

The standard for the proper order of tubes when drawing blood is as follows:

1. Sample for blood culture
2. Tube with blue cap
3. Tube with red cap
4. Tube with green cap
5. Tube with black cap
6. Tube with purple cap
7. Tube with gray cap

Tubes come in different volumes, with a label indicating vacuum. The volume can impact laboratory tests if the ratio of anticoagulant to blood is incorrect. An acceptable sample has 10% of the defined volume. Samples must be properly mixed; insufficient or improper mixing can lead to potential clotting of the sample, while excessive mixing can cause hemolysis. Laboratory standards require 5-10 mixes for all tubes with additives.

Incorrect choice of sampling site, often encountered with hospitalized patients when venous blood samples are taken from existing venous systems, can lead to dilution of the sample, increased concentrations of substances administered intravenously to the patient, or contamination with heparin. Contrast agents administered during radiological tests can affect laboratory results, and it is recommended to collect blood for laboratory diagnostics 24-48 hours after the administration of contrast media (13).

Sample Transport and Storage

The recommended time for sample delivery is within 2 hours of collection. During transport, care should be taken with thermolabile and sensitive analytes. Whole blood samples (those collected with

anticoagulants without centrifugation) can only be cooled if there are valid reasons, such as ensuring the stability of analytes in such samples (e.g., parathyroid hormone). In other cases, whole blood should not be cooled. Cooling is done by placing the tubes in crushed ice or a mixture of ice and water.

Criteria for Accepting and Rejecting Biological Samples

The creation of Standard Operating Procedures (SOPs) is an activity that monitors the quality of work in medical-biochemical laboratories. Written documents contain instructions on handling hazardous materials such as human materials, chemicals, and toxins. Their purpose is to ensure proper execution of laboratory operations, particularly during activities that require additional safety measures (15-17). Each biochemical laboratory must establish, document, and apply criteria for accepting and rejecting primary samples, which are clear indicators of the quality of the pre-analytical phase. The most common reasons for rejecting biological samples include: patient not being properly prepared for sample collection, blood sample collected in inappropriate tubes or incorrect volume for requested tests, improperly labeled samples, absence of a proper request for tests, coagulated blood samples taken in tubes with anticoagulants, exceeding the allowable time from collection to delivery to the laboratory, hemolytic samples (not accepted for determining K⁺, Mg²⁺, LD, AST, ALT, alkaline phosphatase, CK, GGT, cholesterol, triglycerides, bilirubin, total proteins, troponin, NSE), and factors that can cause sample hemolysis, such as strong tourniquet tightening, large diameter needles, transferring blood from syringes through needles into tubes, strong mixing of samples, prolonged standing of whole blood, delayed centrifugation, excessive centrifugation, temperature effects during transport, and freezing of whole blood. Lipemic samples are not accepted for the determination of amylase, total calcium, iron, LD, total proteins, hemoglobin, and K⁺ and Na⁺ if determined by flame photometry or indirect potentiometry.

Gaur K, et al., aimed to assess the types and frequencies of preanalytical errors occurring in a tertiary care diagnostic center and to evaluate any differences, if present, among groups (outpatient data vs. inpatient data, type of requested test (complete blood count vs. Coagulation) and laboratory (routine

vs. emergency cases). A prospective study was conducted over a nine-month period (August 2017 April 2018), and all samples received in the clinical hematology department were included in the analysis. Categories of preanalytical errors were defined, including insufficient, clotted, diluted, and lipemic samples. Technical errors, such as incorrect/missing labeling of samples, discrepancies between request forms and samples, and wrong tube selection, were also documented. All errors in each category were recorded as numbers and corresponding percentages (proportions). A two-tailed z-test was applied to assess the significance of differences in proportions across all groups. During the period mentioned, 189,104 samples were received in the clinical hematology laboratory, of which 4,052 (2.14%) samples had preanalytical errors. Inadequate sample volume was the most common preanalytical error in their laboratory (1.11% of total samples), followed by clotted samples (0.88%). No significant differences were found in the frequency of errors between outpatient and inpatient samples. The error rate was higher in routine samples compared to emergency samples, as well as in samples sent for coagulation testing compared to complete blood count test (18).

A subsequent study was conducted by Arul P, et al., to determine the prevalence and types of preanalytical errors in a tertiary care hospital in South India. In this cross-sectional study, a total of 118,732 samples (62,474 outpatient and 56,258 inpatient) were analyzed in the hematology laboratory. These samples were assessed for preanalytical errors such as incorrect identification, wrong tubes, inadequate samples, clotted samples, diluted samples, and hemolyzed samples. The overall prevalence of preanalytical errors found was 513 samples, accounting for 0.43% of all samples received. The most common preanalytical error was inadequate samples, followed by clotted samples. The overall frequencies of preanalytical errors such as incorrect identification, incorrect tubes, inadequate samples, clotted samples, diluted samples, and hemolyzed samples were 0.02%, 0.05%, 0.2%, 0.12%, 0.02%, and 0.03%, respectively. The authors concluded that inaccurate phlebotomy techniques due to lack of awareness were the primary cause of preanalytical errors. These errors can be avoided through proper communication and coordination between laboratories and departments, adequate training, and continuous medical education programs for laboratory and medical staff, as well as awareness

of intervention factors that may affect laboratory results (19).

A similar study was conducted by Harsimran Kaur VN, et al., where all samples received in the hematology laboratory of Dayanand Medical College and Hospital, Ludhiana, India, during one year (July 2013 - July 2014) were included in the study. Of the 471,006 samples received in the laboratory, preanalytical errors were found in 1,802 samples. The most common error was clotted samples (1,332 samples, 0.28% of total samples), followed by insufficient volume (328 samples, 0.06%), incorrect sample (96 samples, 0.02%), missing label (24 samples, 0.005%), and incorrect labeling (22 samples, 0.005%) (20).

Dikmen ZG, et al. conducted a study aimed at assessing the sample rejection rates based on types of preanalytical errors in an urgent laboratory. Samples sent to the emergency laboratory during 12 months (from January to December 2013) included 453,171 samples, of which 27,067 were rejected. The rejection rate for samples was 2.5% for biochemical tests, 3.2% for complete blood count, 9.8% for acid-base status, 9.2% for urinalysis, 13.3% for coagulation tests, 12.8% for therapeutic drug monitoring, 3.5% for cardiac markers, and 12% for hormone tests. The most common reasons for sample rejection were fibrin clots (28%) and inadequate volume for biochemical tests (9%). Clots (35%) and inadequate volume (13%) were the primary reasons for rejection in coagulation tests, acid-base status analysis, and complete blood count. The rejection rate was higher in the emergency laboratory (40%) compared to intensive care units (30%) and inpatient services (28%). The highest rejection rate was recorded in neurological departments (14%) in intensive care units and internal services (10%) in inpatient clinics. The authors concluded that the sample rejection rate of 6% in the emergency laboratory could be reduced below 2% with proper training for healthcare personnel, improving overall laboratory management quality in emergency cases, and increasing patient safety (21).

Challenges in Medical Laboratory Quality Control

Quality improvements over recent decades have been steadily advancing, yet clinical laboratories are still under significant pressure to achieve efficiency, timeliness, safety, and effective services aimed at

patient care. To meet patient health needs, laboratory tests are essential for predicting sensitivity, preventing disease, achieving early diagnosis and effective monitoring of diseases, determining prognosis, and personalizing treatment to achieve the best outcomes. A special issue remains the still insufficiently developed responsibility for samples, or the lack of cooperation among healthcare professionals. Potential errors encompass increased risks for patients (e.g., incorrect diagnoses, unnecessary subsequent diagnostics or treatments), wastage of economic resources (e.g., new blood and blood cell collections due to inappropriate samples), and organizational issues (e.g., time lost identifying and managing preanalytical problems) (16, 22-24).

Laboratory diagnostics are essential for managing infectious and non-infectious diseases, monitoring emerging infectious threats (such as COVID-19), and ensuring the safe and rational use of essential medications. Studies show that improved diagnostic approaches double the rate of appropriate control of infectious and non-infectious diseases (25).

Establishing and maintaining laboratory quality standards is crucial. These standards ensure quality and traceability of patient results, support clinical and public health decision-making, provide training programs, ensure quality assurance, meet compensation requirements for national insurance schemes, and comply with national or international accreditation and licensing systems (15).

CONCLUSION

This review article emphasizes the importance of analyzing preanalytical errors in biochemical laboratories, which can lead to a loss of patient trust in diagnostic services, decrease the laboratory's reputation, and increase overall operational costs for both laboratories and hospitals. Compliance with good laboratory practice can significantly reduce the frequency of preanalytical errors.

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The Importance of Monitoring Quality and Safety Indicators in the Clinical Center University of Sarajevo

Značaj praćenja indikatora kvaliteta i sigurnosti u Kliničkom centru Univerziteta u Sarajevu

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ABSTRACT

Introduction: high allocations for healthcare, along with the simultaneous increased demand for healthcare services, have led to a situation where healthcare institutions are required to be more accountable to the public. Demand has resulted in the publication of performance indicators serving as bases for healthcare institutions comparison. Performance indicators have a dual value: they provide information for prioritizing quality improvements and a detailed description of how public funds are used. Defining good quality (clinical performance) indicators is challenging, as indicators must provide reliable, objective and meaningful information on important issues (i.e., they must be evidence-based); they must also be sensitive to changes in performance; they must be specific to the situation being analyzed and they must be easily calculated from available data. The costs of data collection, accumulation, analysis and publication must also be taken into account. The key elements for implementing a performance indicator system include establishing an appropriate system for data collection, teamwork, defining the target people and teams who will use the indicators and manner in which they will use them, as healthcare professionals often feel threatened if they are monitored and measured. However, this is not about individual, concrete performance - which require an explanation - but about

measuring the process and outcomes of care after data accumulation and anonymization. Furthermore, good coordination of data collection throughout the organization is a prerequisite to achieving integration and uniformity. One person or team should be appointed within the healthcare institution to lead the development of indicators and coordinate work at the institutional level. That will avoid duplication and encourage healthcare professionals to share usable data and achieve successful results. In any case, top management must agree with heads of departments/services and teams which data will be collected and which indicators will be routinely used for the entire institution..

Aim: to determine the monitoring of the quality and safety of health services in Clinical Center University of Sarajevo, to show the benefits of collecting quality indicators and to determine shortcomings in the process of administering quality indicators, where each measures different aspects of quality and provides management with complete information.

Materials and methods: Agency for Quality and Accreditation in Healthcare in the Federation of Bosnia and Herzegovine has been collecting data on quality and safety indicators since 2015 and has an impressive database on quality and safety indicators for clinical centers and hospitals in the Federation of Bosnia and

Herzegovina. The deadline for submitting all data on quality and safety indicators is May 15th of each year, and the data submitted always refers to the previous year.

Results: Department for Quality and Safety of Healthcare Services of the Clinical Center University of Sarajevo has established a high-quality system for collecting all mandatory quality indicators prescribed by the Agency for Quality and Accreditation in Health in the Federation of Bosnia and Herzegovina since 2016. At the same time, the Department has been developing and collecting specific indicators at the Clinical Center University of Sarajevo (more than 130 specific quality indicators). These specific quality indicators are divided into several categories: 60 new specific indicators for patients, 34 new indicators for staff, 15 new indicators for the Department of Gynecology and Obstetrics, and 21 new indicators for services, education and clinical research. The list of specific quality indicators is expanding every year, and all mandatory and specific indicators are submitted to the Agency for Quality and Accreditation in Healthcare in the Federation of Bosnia and Herzegovina within the required deadline.

Conclusion: We live in a time when data is the most valuable resource, and data on the quality and safety levels of healthcare institutions, as well as their financial and organizational capacity, are essential for any reformative actions in the healthcare system.

Keywords: indicators, quality, safety, collection, reporting, agency

SAŽETAK

Uvod: visoka izdvajanja za zdravstvenu zaštitu, uz istovremenu povećanu potražnju zdravstvenih usluga, dovela su do situacije u kojoj se od zdravstvenih ustanova traži više odgovornosti prema javnosti. Potražnja je rezultirala objavljivanjem indikatora izvedbe na temelju kojih se zdravstvene ustanove mogu porediti. Indikatori izvedbe imaju dvostruku vrijednost: daju informacije za prioritizaciju poboljšanja kvaliteta i detaljan opis na koji se način koriste javni fondovi.

Definiranje dobrih indikatora kvalitete (kliničke izvedbe) je zahtjevno, budući da indikatori moraju dati pouzdane, objektivne i značajne informacije o važnim pitanjima (dakle, trebaju biti zasnovani na dokazima); oni također moraju biti osjetljivi na promjene u izvedbi; moraju biti specifični za analiziranu situaciju

i moraju se jednostavno izračunati iz dostupnih podataka. Moraju se uzeti u obzir i troškovi prikupljanja podataka, njihovog agregiranja, analize i objavljivanja. Ključni elementi implementacije sistema indikatora izvedbe su uspostavljanje odgovarajućeg sistema za prikupljanje podataka, timski rad, definiranje ciljnih ljudi i timova koji će koristiti indikatore i kako će ih koristiti budući da se zdravstveni profesionalci često osjećaju ugroženima, ako ih neko nadzire i mjeri. Međutim, nije riječ o pojedinačnoj, konkretnoj izvedbi – a to treba objasniti – već o mjerenju procesa i ishoda zaštite nakon agregiranja i anonimiziranja podataka. Nadalje, preduvjet su i dobra koordinacija prikupljanja podataka kroz cijelu organizaciju radi postizanja integralnosti i jednoobraznosti. Jednu osobu ili tim trebalo bi zadužiti u zdravstvenoj ustanovi da vodi aktivnosti razvoja indikatora i da koordinira rad na nivou ustanove. To će izbjeći dupliciranja i stimulirati zdravstvene profesionalce da razmjenjuju uspješne rezultate. U svakom slučaju, top menadžment mora dogovoriti sa šefovima odjela/službi i timovima koji će se podaci prikupljati i koji indikatori će se rutinski koristiti za cijelu ustanovu.

Cilj: utvrditi monitoring kvaliteta i sigurnosti zdravstvenih usluga u KCUS, prikazati benefite prikupljanja indikatora kvaliteta, te utvrditi nedostatke u procesu administriranja indikatora kvaliteta od kojih svaki mjeri različite vidove kvaliteta i menadžmentu daje potpune informacije.

Materijali i metode: AKAZ prikuplja podatke o indikatorima kvaliteta i sigurnosti od 2015. godine i raspolaže reprezentativnom bazom podataka o indikatorima kvaliteta i sigurnosti za kliničke centre i bolnice u Federaciji Bosne i Hercegovine. Krajnji rok za dostavljanje svih podataka o indikatorima kvaliteta i sigurnosti je 15. maj svake godine, a podaci koji se dostavljaju se uvijek odnose na prethodnu godinu.

Rezultati: OJ za kvalitet i sigurnost zdravstvenih usluga Kliničkog centra Univerziteta u Sarajevu je od 2016.godine uspostavila kvalitetan sistem prikupljanja svih obaveznih indikatora kvaliteta propisanih od strane Agencije za kvalitet i akreditaciju i zdravstvu u FBiH, ali je istovremeno razvijala i prikupljala specifične indikatore u Kliničkom centru Univerziteta u Sarajevu (više od 130 specifičnih indikatora kvaliteta). Specifični indikatori kvaliteta su podijeljeni u više kategorija: 60 novih specifičnih indikatora za pacijente, 34 nova indikatora za osoblje, 15 novih indikatora Klinike za ginekologiju i akušerstvo, 21 novi indikator za usluge, edukacije i klinička ispitivanja. Lista specifičnih

indikatora kvaliteta se proširuje svake godine, a svi obavezni i specifični indikatori se u roku dostavljaju Agenciji za kvalitet i akreditaciju u zdravstvu u FBiH.

Zaključak: Živimo u vremenu kada su podaci najvrijedniji resurs, a podaci o stepenu kvaliteta i sigurnosti zdravstvenih ustanova, finansijskoj i organizacijskoj kapacitiranosti zdravstvenih ustanova, neophodni su za bilo kakvo reformsko djelovanje u zdravstvenom sistemu.

Ključne riječi: indikatori, kvalitet, sigurnost, prikupljanje, izvještavanje, agencija

INTRODUCTION

Performance indicators represent a powerful tool for assessing the adequacy of healthcare services and identifying problematic areas, and are therefore an integral part of good management and professional practice. To assess and improve the quality of healthcare, management must apply its quality goals into measurable quality indicators for staff performance and the entire organization. For this purpose, different types of indicators should be used, each measuring different aspects of quality and providing management with comprehensive information. Following Donabedian's trilogy, it is possible to measure structure indicators, process indicators, and performance outcomes (1).

Defining good quality indicators (clinical performance) is challenging, as indicators must provide reliable, objective, and meaningful information on important issues (i.e., they should be evidence-based); they must also be sensitive to changes; must be specific to the analyzed situation, and should be easily calculable from available data (2).

Agency for Quality Improvement and Accreditation in Healthcare in Federation of BiH has been collecting data on quality and safety indicators since 2015 and has an impressive database of quality and safety indicators for hospitals. However, after years of experience, it has become clear that it is necessary to expand quality and safety indicators in order to obtain more impressive data on the actual state of the healthcare system in FBiH (3).

The quality of healthcare is on the agenda in most healthcare systems. A large part of this interest in the quality of care has developed in response to recent dramatic transformations in healthcare systems,

accompanied by new organizational structures and reimbursement strategies that may affect the quality of care. The assessment of care quality is becoming increasingly important for service providers, regulators, and patients. "In recent years, service providers have begun to be interested in evidence-based medicine, and patients have started to focus on the cost-effectiveness of healthcare in creating health outcomes" (4).

AIM

The quality of healthcare services is measured based on standardized performance, process, and outcome indicators. Indicators are objective and relevant measuring instruments for various comparisons between departments, healthcare institutions, regions, and countries. In a way, indicators serve as professional stimuli for better performance.

MATERIALS AND METHODS

The research is qualitative, exploratory and overview. The research used secondary data and reports that are administered during the year in the Department for Quality and Safety of Health Services. Part of the data collected for the purpose of this research was taken from the report on indicators of quality and safety of health services for hospitals in the FBiH, which is administered by the Agency for Quality and Accreditation in Health Care in the FBiH (5).

Indicators for evaluating the quality of healthcare services represent a measuring instrument, screening, monitoring, evaluating, and improving the quality of healthcare, and support services and organizational functions affecting the final outcome. In addition to public health indicators, clinical practice measurements are performed using routine indicators and indicators that signal serious adverse events. The quality of healthcare services or treatment is measured based on standardized performance, process, and outcome indicators (6).

Each clinic at the Clinical Center University of Sarajevo has one or two appointed quality coordinators who closely cooperate with the Department for Quality and Safety of Healthcare Services. Therefore, they are required to submit data on quality indicators for the previous year by 31 January. The Department for Quality and Safety has created a separate form for

each clinic or committee to fill in the mandatory and specific quality indicators (7).

Indikatori kvaliteta i sigurnosti za bolnice za 2024.god	
KLINIKA ZA BOLESTI SRCA, KRVNIH ŽILA I REUMATIZAM	
Ime i prezime koordinatora kvaliteta:	
Kontakt telefon:	Email:

Lista obaveznih indikatora kvaliteta i sigurnosti		
Redni broj	Naziv obaveznog indikatora	Broj slučajeva
1.	Ukupan broj hospitaliziranih pacijenata na svim odjelima	
2.	Ukupan broj otpusta, uključujući umrle	
3.	Broj ponovnih prijema unutar 30 dana od dana otpusta zbog neočekivanih komplikacija	
4.	Broj svih pacijenata primljenih u jedinicu intenzivne njege	
5.	Broj pacijenata koji su ponovo primljeni u jedinicu intenzivne njege unutar 48 sati od premještanja na niži nivo njege	
6.	Broj uboda osobija iglom i drugim oštrim predmetima	
7.	Ukupan broj hospitaliziranih pacijenata (starijih od 15 godina) na Klinici sa primarnom dijagnozom akutnog infarkta miokarda	
8.	Broj pacijenata (starijih od 15 godina) koji su umrli unutar 30 dana od dana hospitalizacije, a primljeni su sa primarnom dijagnozom akutnog infarkta miokarda	
9.	Zbir bolničkih dana za sve pacijente primljene sa primarnom dijagnozom akutnog infarkta miokarda	
10.	Ukupan broj pacijenata koji su umrli na Klinici	
11.	Broj pacijenata umrlih u 48 sati od prijema u zdravstvenu ustanovu	
12.	Ukupan broj kreveta za hospitalizaciju pacijenata u bolnici	
13.	Ukupan broj umrlih u roku od 48 sati nakon izvršene bilo koje hirurške intervencije u bolnici	
14.	Broj pacijenata sa tromboembolijskim komplikacijama u posmatranoj godini	
15.	Ukupan broj preoperativnih dana pacijenata koji su podvrgnuti hirurškim intervencijama	
16.	Broj osoblja potvrđenih kliconoša	
17.	Broj osoblja sa potvrđenim hroničnim oboljenjem	

Figure 1 Quality indicators for the Clinic of Heart Diseases, Blood Vessels and Rheumatism.

At the beginning of each year, the Department for Quality and Safety of Healthcare Services provides each clinic and committee with a blank quality indicator form requiring them to return the completed form by 31 January.

After all clinics and committees submit the completed forms, the Department for Quality and Safety of Healthcare Services prepares a final report for the Director of the Discipline for Research and Development, the General Manager of the Clinical Center University of Sarajevo and the The Agency for Quality and Accreditation in Healthcare in the Federation of BiH. The final report to the Agency for Quality Improvement and Accreditation in Healthcare in Federation of BiH is submitted in Excel comprising several quality indicators categories, as follows:

- **Mandatory reporting** (number of meetings of various committees, survey research, etc.);
- **Adverse events** (wound infections, pressure ulcers, burns, surgical errors, etc.);
- **Organizational indicators** (number of employees, professional division, average age, etc.);
- **Financial indicators** (annual budget, salary expenses, quality expenses, etc.);
- **Quality indicators** (number of patients, number of surgeries, mortality rate, transplants, etc.);
- **Safety indicators** (unplanned readmissions, immunization, hospital infections, etc.);
- **Elective indicators** (patient falls, medication administration errors, laboratory test errors, antibiotic use, absenteeism, etc.);
- **Specific indicators for patients** (falls, verbal and physical conflicts, injuries and self-harm, adverse drug reactions, extravasation of medication, patient death before or during an intervention, property theft, damage or destruction of property, patient's escape from the hospital, patients' complaints, neglect of patient's needs, inappropriate behavior, impersonation, abuse of medical documentation, equipment malfunctions, traffic accidents, and all other situations related to patients);
- **Specific indicators for staff** (falls, chronic diseases, infectious diseases carriers, verbal or physical conflicts, property theft, damage or destruction of property, fires, floods, work-related injuries, supply problems, abuse of position, impersonation, and all other situations related to staff);
- **Specific indicators for the Clinic of Gynecology and Obstetrics** (number of newborns, preterm births, vaccination of newborns, cesarean section rate, postpartum women with psychological difficulties, newborns with malformations, maternal or neonatal death, pregnant women infected with HIV, undernourished and overweight pregnant women, adolescent pregnancies, etc.);
- **Specific indicators for services, education, and the library** (number of outpatient services, number of outpatient surgeries, number of laboratory and radiological tests, number of anesthesia procedures, number of oncology therapies, number of planned and implemented educational sessions, number library service users and online medical databases, number of visits by foreign experts, etc.) (8).

NEPOVOLJNI DOGAĐAJI KOJI SE OBAVEZNO PRIJAVLJUJU U AKAZ		
2	Indikator	Unos podataka
2.1.	Postoperativna infekcija rane	
	Broj pacijenata kod kojih su se nakon čistog operativnog zahvata pojavili znaci infekcije rane	0
	Ukupan broj pacijenata podvrgnutih operativnom zahvatu	19335
	Proporcija postoperativne infekcije rane na 1000 operisanih pacijenata	0,00
2.2.	Dekubitus	
	Broj hospitaliziranih pacijenata kod kojih je nakon prijema došlo do pojave dekubitusa u toku izvještajne godine	49
	Ukupan broj hospitaliziranih pacijenata u toku izvještajne godine	46042
	Proporcija dekubitusa na 1000 hospitaliziranih pacijenata	1,06
2.3.	Opekotine pacijenata	
	Broj hospitaliziranih pacijenata koji su zadobili opekotine u bolnici u toku terapijskih procedura (termokauteri, galvanске struje, laseri i dr.) u toku izvještajne godine	0
	Ukupan broj hospitaliziranih pacijenata u toku izvještajne godine	46042
	Proporcija opekotina na 1000 hospitaliziranih pacijenata	0,00
2.4.	Tranfuzijska reakcija	
	Broj pacijenata kod kojih je došlo do akutne ili odložene transfuzijske reakcije u toku izvještajne godine	0
	Ukupan broj hospitaliziranih pacijenata u toku izvještajne godine	46042
	Proporcija transfuzijskih reakcija na 1000 pacijenata	0,00
2.5.	Smrt majke povezana sa porodom	
	Broj smrti majki povezanih sa porodom u toku izvještajne godine	0
	Ukupan broj akušerskih otpusta, uključujući umrle, u toku izvještajne godine	4825
	Procenat smrti majki od ukupnog broja akušerskih otpusta	0,00
2.6.	Samoubistvo u bolnici	
	Broj samoubistava u bolnici u toku izvještajne godine	0
	Ukupan broj hospitaliziranih pacijenata u toku izvještajne godine	46042
	Proporcija samoubistava na 10000 hospitaliziranih pacijenata	0,00
2.7.	Pokušaj samoubista u bolnici	
	Broj pokušaja samoubistva u bolnici u toku izvještajne godine	0
	Ukupan broj hospitaliziranih pacijenata u toku izvještajne godine	46042
	Proporcija pokušaja samoubistva na 10000 hospitaliziranih pacijenata	0,00
2.8.	Hirurški zahvat proveden na pogrešnom pacijentu	
	Navesti broj hirurških zahvata provedenih na pogrešnom pacijentu u toku izvještajne godine i objašnjenje	0
2.9.	Hirurški zahvat proveden na pogrešnom dijelu tijela ili organu	
	Prijaviti broj hirurških zahvata provedenih na pogrešnom dijelu tijela ili organu u toku izvještajne godine i objašnjenje	0
2.10.	Instrument ili predmet ostavljen na mjestu hirurškog zahvata što zahtijeva novi operativni zahvat ili dodatnu proceduru	
	Prijaviti broj slučajeva u kojima je instrument ili predmet ostavljen na mjestu hirurškog zahvata što zahtijeva novi operativni zahvat ili dodatnu proceduru u toku izvještajne godine i objašnjenje.	1
2.11.	Verbalni ili fizički napad na osoblje	
	Ukupan broj napada na osoblje u toku izvještajne godine	28

Figure 2 The Adverse Events Indicators - Report to the Agency.

RESULTS

The Department for Quality and Safety of Healthcare Services monitors over 250 quality indicators, with the most frequently highlighted indicator being “Pressure Ulcers”, given that all clinics email the Department for Quality and Safety of Healthcare Services information on new cases of pressure ulcers (skin changes) on daily bases. Separate databases are maintained for all reported pressure ulcers cases for each clinic, and monthly reports are generated and sent to the Director of the Discipline for Research and Development and the Head Nurse of Clinical Center University of Sarajevo.

GODIŠNJI IZVJEŠTAJ O PRIJAVLJENIM DEKUBITUSIMA ZA 2024.GOD U KLINIČKOM CENTRU UNIVERZITETA U SARAJEVU			
KLINIKA	BROJ PACIJENATA PRIMLJENIH SA DEKUBITUSOM	BROJ PACIJENATA KOD KOJIH JE DEKUBITUS NASTAO NA KLINICI	UKUPNO
Klinika za ortopediju i traumatologiju	87	12	99
Klinika za bolesti srca, krvnih žila i reumatizam	53	6	59
Klinika za infektivne bolesti	47	2	49
Klinika za nefrologiju	40	4	44
Klinika za plućne bolesti i tuberkulozu	27	7	34
Klinika za endokrinologiju i dijabetes	23	0	23
Klinika za anesteziju i reanimaciju	12	10	22
Klinika za onkologiju	11	1	12
Klinika za opštu i abdominalnu hirurgiju	10	1	11
Klinika za torakalnu hirurgiju	10	0	10
Klinika za urologiju	5	2	7
Klinika za neurologiju	7	0	7
Klinika za fizik. medicinu i rehabilitaciju	7	0	7
Klinika za neurohirurgiju	5	1	6
Klinika za pedijatriju	2	2	4
Klinika za gastroenterohepatologiju	3	0	3
Klinika za hematologiju	2	0	2
Klinika za psihijatriju	1	0	1
Klinika za rekon. i plastičnu hirurgiju	0	1	1

IZVJEŠTAJ O DEKUBITUSIMA ZA PERIOD 2017 - 2024.GOD

	2017	2018	2019	2020	2021	2022	2023	2024
Ukupno prijavljenih dekubitusa na KCUS	204	248	250	408	448	532	437	401
Broj pacijenata primljenih sa dekubitusom	189	210	236	344	396	442	397	352
Dekubitusi nastali na kliničkama KCUS	15	38	14	64	52	90	40	49

IZVJEŠTAJ SAČINIO:

Hazim Štikovac, MBA
Samostalni stručni saradnik za kvalitet nemedicinskih usluga i statistiku

v.d. DIREKTOR DISCIPLINE ZA NAUKU I NASTAVU

Prim. dr. sci. med. Sanko Pandur

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Figure 3 Pressure Ulcer Report for 2024 and Pressure Ulcer Report for the 2017-2024 period.

This system of collecting and analyzing quality indicators allows the Department for Quality and Safety of Healthcare Services to easily and efficiently identify clinics which do not provide accurate data on quality indicators. Clinics that did not submit relevant data have their reports returned, with a note that all data must correspond to the actual situation.

CONCLUSION

Monitoring of indicators of quality and safety is important for several reasons:

- Patient safety;
- Patient trust and selection of health institution/team;
- Practice audits and establishment of new clinical guidelines;
- Evaluation of health workers' work and improvement of quality documents;
- Marketing in a competitive health market;
- Our previous practice of monitoring indicators

of quality and safety of health services has yielded positive results because, based on the results, modern work concepts and standardized work processes have been established, which continuously improve the quality of work (4).

As a result, critical points have been marked, potential risks in practice have been mapped, and key quality documents that health workers apply have been established. In this way, it can be concluded that indicators are also corrective factors in work. Hospital staff, in accordance with the results of their work, also change the culture of their business (9).

We live in a time when data is the most valuable resource, and data on the quality and safety levels of healthcare institutions, as well as their financial and organizational capacity, are essential for any reformative actions in the healthcare system. The Agency for Quality and Accreditation in Healthcare in the Federation of Bosnia and Herzegovina intends to participate in these changes with positive proposals that will encourage the development of a quality culture and the achievement of the necessary level of excellence for the benefit of all actors within the healthcare system. All healthcare institutions in the Federation of Bosnia and Herzegovina are required to submit the Quality Indicators Report to the Agency for Quality and Accreditation in Healthcare in FBiH in electronic form. Department for Quality and Safety of Healthcare Services of the Clinical Center University of Sarajevo was awarded the "Recognition for Excellence" in 2019 by the Agency for Quality and Accreditation in Healthcare in FBiH and developed the best system for collecting and reporting quality indicators in the Federation of Bosnia and Herzegovina.

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Pseudoaneurysm of the Aortic Arch Presented by Computed Tomographic Angiography of the Thoracic Aorta: A Case Report

Pseudoaneurizma luka aorte prikazana kompjuteriziranom tomografskom angiografijom torakalne aorte: prikaz slučaja

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ABSTRACT

Introduction: pseudoaneurysm or false aneurysm of the aorta occurs after vascular injury or blunt chest trauma (1,2). It represents a rare and life-threatening complication, with an incidence of 2% to 5% (3).

Aim: to highlight the excellent diagnostic capabilities of CT angiography in diagnosing pseudoaneurysms and prevent fatal consequences for the patient's life.

Materials and methods: the case presentation is of a prospective type. Medical documentation, computed tomography images, and standard radiographic images were used for the case presentation. The course of medical treatment and the final outcome of the patient's treatment were followed.

Results: the paper presents the finding of a pseudoaneurysm of the aortic arch after trauma in a 59-year-old male, diagnosed through computed tomographic angiography of the thoracic blood vessels following intravenous contrast administration. The diagnosis of a pseudoaneurysm with a typical clinical picture is relatively easy. However, the subtle symptoms of a pseudoaneurysm tend to result in misdiagnosis or failure to diagnose (4).

Conclusion: the hidden nature of a pseudoaneurysm may go undetected in a timely manner, leading to the development of a chronic pseudoaneurysm that can ultimately threaten the patient's life. CT angiography provides excellent diagnostic capabilities for preventing the development of chronic pseudoaneurysms, and CT screening should be an integral part of the diagnosis and management of patients with blunt chest trauma in all trauma centers.

Keywords: pseudoaneurysm, computed tomographic angiography

SAŽETAK

Uvod: pseudoaneurizma ili lažna aneurizma aorte nastaje nakon vaskularne ozljede ili tupe traume grudnog koša (1,2). Predstavlja rijetku i po život opasnu komplikaciju sa incidencom od 2% do 5% (3).

Cilj: ukazati na odlične mogućnosti CT angiografije kod dijagnosticiranja pseudoaneurizme te spriječavanje nastanka fatalnih posljedica po život pacijenta.

Materiali i metode: prikaz slučaja je prospektivnog tipa. Za prikaz slučaja korištena je medicinska dokumentacija, snimci kompjuterizirane tomografije te standardni radiografski snimci. Praćen je tok medicinskog tretmana i krajnji ishod liječenja pacijenta.

Rezultati: u ovom radu predstavljamo nalaz pseudoaneurizme luka aorte nakon traume, kod 59-godišnjeg muškarca, dijagnostikovane kompjuteriziranom tomografskom angiografijom krvnih sudova toraksa, nakon intravenske aplikacije kontrastnog sredstva. Dijagnoza pseudoaneurizme sa tipičnom kliničkom slikom je relativno laka, ali neočigledni simptomi pseudoaneurizme skloni su pogrešnoj dijagnozi ili nedijagnostikovanju iste (4).

Zaključak: skrivena priroda pseudoaneurizme može biti pravovremeno neotkrivena, te prelazi u hroničnu pseudoaneurizmu koja može u krajnjem ishodu ugroziti život pacijenta. CT angiografija pruža odlične dijagnostičke mogućnosti za spriječavanje nastanak hronične pseudoaneurizme, te u svim traumatološkim centrima CT skrining treba biti sastavni dio dijagnoze i zbrinjavanja pacijenata sa tupom traumom grudnog koša.

Ključne riječi: pseudoaneurizma, kompjuterizovana tomografska angiografija

INTRODUCTION

The aorta is the largest artery, supplying the entire body with oxygen-rich blood. A pseudoaneurysm occurs due to damage to the inner layers of the blood vessel, the tunica intima and tunica media, usually while the tunica adventitia remains intact. It can also involve all three layers of the vessel wall, into which blood enters, whereas in a true aneurysm, all three layers remain intact (1,2). The most commonly affected area by a pseudoaneurysm is the aortic isthmus (5). It is important to highlight the hidden nature of traumatic injury to the thoracic aorta, which can be undiagnosed and incidentally discovered as a chronic post-traumatic pseudoaneurysm, unless it ruptures in the meantime, endangering the patient's life. A pseudoaneurysm should be considered in patients with blunt chest trauma and suspicious chest radiographic findings. CT angiography is a fast, safe, and non-invasive diagnostic method that can prevent the formation of a late-stage thoracic aortic pseudoaneurysm, with excellent visualization of the aneurysmal sac, calcifications, and thrombus within the pseudoaneurysm. According to reference data, approximately 90% of injuries involve the area of the aortic arch, immediately distal to the ligamentum arteriosum, and the left subclavian artery with damage to the aortic arch vessel wall. Over time, calcifications develop around the pseudoaneurysm, which have been found in 62.5% of cases, mostly in patients with pseudoaneurysms older than 2 years. According to available data, 2% to 5% of patients are discharged from the hospital without being diagnosed with traumatic thoracic aortic pseudoaneurysm (6).

AIM

The aim of this paper was to highlight the excellent diagnostic capabilities of CT angiography in diagnosing pseudoaneurysms and prevent fatal consequences for the patient's life

CASE REPORT

We present A case of a 59-year-old male with polytrauma. Following a chest X-ray, the findings indicated suspicious cardiovascular injuries, prompting additional radiological diagnostic testing with contrast-enhanced computed tomography (CT) of the lungs.

Intravenous (IV) contrast of 90 mL was administered through the cubital vein, and with a timely and proper selection of the screening method, a pseudoaneurysm was diagnosed on the posterior part of the aortic arch, at the level of the left subclavian artery, on the medial wall, directed to the right, pressing against the trachea. The size of the aneurysm was 27 (antero-posterior) x 18 (latero-lateral) x 34.7 (cranio-caudal) at a wide base, where there was a disruption in the continuity of the vessel wall, measuring approximately 2.5 x 1.5 cm. In addition to the pseudoaneurysm, the patient was diagnosed with bilateral tibial fractures, lateral left hip dislocation, serial rib fractures (V-VII) on the right, spiral fracture of the right tibia, and L5 vertebral fracture. After completing orthopedic treatment, the patient underwent therapeutic treatment for the pseudoaneurysm of the aortic arch. Thanks to the capabilities of computed tomography, which allows for the diagnosis of certain hidden conditions such as traumatic pseudoaneurysms, the life of the patient was not threatened.

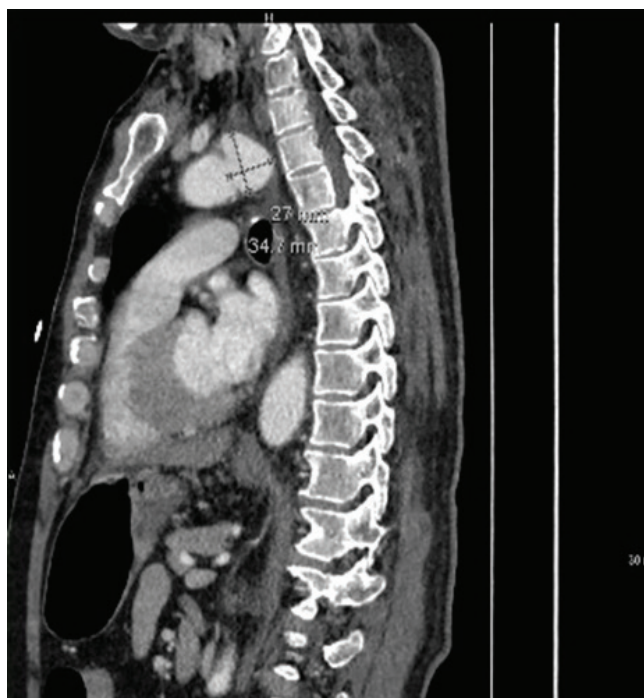


Figure 1 Traumatic pseudoaneurysm on computed

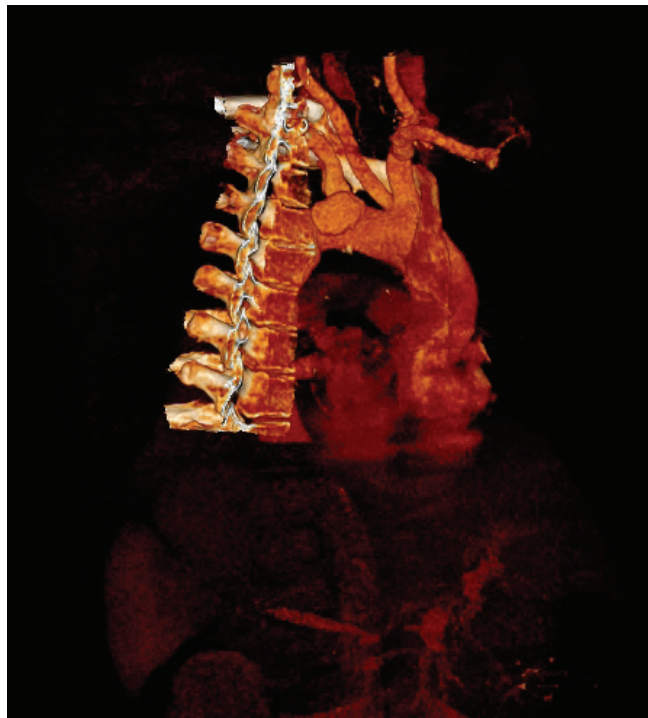


Figure 2 **Presentation of traumatic pseudoaneurysm on tomography (sagittal image). 3D reconstruction.**

DISCUSSION

An increased number of traffic accidents lead to a higher incidence of severe traumatic injuries. In Ireland, the annual mortality rate caused by vascular injuries to the thoracic vessels during accidents was approximately 3% for the 1995-1998 period. In 1966, Greendyke reported numerous victims whose bodies were subjected to an autopsy, 10% of whom had sustained aortic injuries, mainly due to traffic accidents (7,8). In their study, Quaini E, et al. report that blunt trauma to the chest can cause injuries to the thoracic aorta, resulting in serious conditions with a very high mortality rate. Only about 2.5% of individuals with thoracic aorta injuries survive without treatment (9). In patients who survive, an aortic pseudoaneurysm can develop, which can rupture at any time, causing severe bleeding and death (10). Other life-threatening conditions in trauma patients can mask the pseudoaneurysm and make it difficult to diagnose (11).

Computed tomography (CT) angiography is an effective diagnostic modality for vascular imaging of the chest. In addition to providing excellent visualization of blood vessels, CT angiography allows

for the assessment of adjacent anatomical structures and is currently most commonly used for diagnosing vascular emergencies in the thorax following blunt trauma (12).

CONCLUSION

Traumatic pseudoaneurysm of the thoracic aorta is a rare condition, but one that can occur as a result of blunt trauma in severely injured patients. The hidden nature of the pseudoaneurysm may go undetected in a timely manner, progressing to a chronic pseudoaneurysm, which can ultimately threaten the patient's life. The modern radiological methods of choice for diagnosing and visualizing such a condition are MR and CT angiography. CT angiography provides excellent diagnostic possibilities for preventing the development of chronic pseudoaneurysm, and CT screening should be an integral part of the diagnosis and treatment of patients with blunt chest trauma in all trauma centers.

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gave final approval of the version to be published and agreed to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Conflict of Interest: there are no conflicts of interest.

Declaration of Patient's Consent: the authors certify that they have obtained the appropriate patient's consent form. In the form, the patient has granted his/her permission for the images and other clinical information to be reported in the journal.

Authors' Contributions: SŠ and AP contributed significantly to the conception and design of the article, as well as the acquisition, analysis, and interpretation of data for the work. Each author had a role in drafting of the article and the revision process. Each author

INSTRUCTIONS TO AUTHORS

Journal „Bosnian Journal of Health Sciences and Technologies“ publishes original research articles, professional, review and educative articles, case reports, criticism, reports professional news and other articles in the field of health sciences and technologies.

The journal is referral based, it follows a relevant database and is published three times a year: January, May and September.

Articles are written in extenso exclusively in English. Authors take responsibility for all the statements and attitudes in their articles. If an article is written by several authors, it is necessary to provide full contact details (telephone number and email address) of the corresponding author for the cooperation with the Editorial Board during preparation of the text to be published. The maximum number of authors is 7.

Authors should indicate whether the procedures carried out on humans were in accordance with the ethical standards of medical deontology and the Declaration of Helsinki (mandatory proof of the data obtaining methodology, informed consent of minor respondents, etc.).

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Along with their work, the authors should enclose a cover letter, containing a handwritten statement signed by all authors, to the Editorial Board of the “Bosnian Journal of Health Sciences and Technologies” stating that:

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ARTICLE CONTENT**TITLE**

Should be concise and meet the objectives of the work, written in B/H/C and English language.

NAME AND SURNAME OF AUTHOR AND CO-AUTHOR

Name and full address of the institution where the author/co-author is employed, contact address.

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Written in B/H/C and English language, containing a total of 200-250 words. Keywords are mandatory.

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The introduction is a short, concise part of the work containing the purpose of the work/problem in relation to other published works with a similar topic. It is necessary to define the problem, the aim of the research and/or set the work hypotheses. All is cited from the original literature.

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This part should contain a description of the original or modification of known scientific methods. If it is about the previously described method, it is sufficient to provide references in the literature. It is important that the research contains information about the type and period of the research.

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The main results of the research and the level of statistical significance should be quoted.

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The results must be statistically processed.

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Discussion is concise and refers to own results which are then compared with other similar researches published in reference scientific databases. The discussion ends with confirmation or denial of the given goal or hypothesis.

CONCLUSION

It should be short and clear, mostly relate to crucial research data.

REFERENCES

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