# NurseNexus JOURNAL

# NurseNexus Journal

**Izdavač**
Udruženje diplomiranih medicinara zdravstvene njege Republike Srpske, Bosna i Hercegovina



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# RIJEČ GLAVNOG UREDNIKA/ EDITOR`S NOTE

Poštovani,

Sa velikim zadovoljstvom predstavljamo prvi broj naučno-stručnog časopisa NurseNexus Journal, časopisa posvećenog medicinskim sestrama i tehničarima, profesionalcima koji svojim znanjem, humanošću i predanim radom svakodnevno daju nemjerljiv doprinos zdravstvenom sistemu. Osnivanjem i registracijom ovog časopisa želimo stvoriti prostor u kojem će medicinske sestre i tehničari imati priliku da predstave svoja iskustva, stručna dostignuća, istraživanja i ideje usmjerene ka unapređenju sestrinske profesije i zdravstvene njege. Savremeno sestrinstvo danas podrazumijeva mnogo više od same zdravstvene njege pacijenta. Ono uključuje kontinuirano stručno usavršavanje, razvoj profesionalnih kompetencija, naučnoistraživački rad, etičko djelovanje i aktivno učešće u unapređenju kvaliteta zdravstvene zaštite. Upravo zato vjerujemo da će ovaj časopis postati značajna platforma za promociju stručnog i naučnog rada, razmjenu znanja i iskustava, ali i podsticaj za profesionalni razvoj i cjeloživotno učenje medicinskih sestara i tehničara. U prvom broju predstavljamo teme iz različitih oblasti zdravstvene njege, edukativne i stručne članke, prikaze savremenih pristupa u radu sa pacijentima, kao i sadržaje koji mogu doprinijeti unapređenju svakodnevne profesionalne prakse. Naša želja je da ovaj časopis postane mjesto stručnog okupljanja, razmjene iskustava i izvor korisnih informacija za sadašnje i buduće generacije medicinskih sestara i tehničara. Nastavićemo da

Dear,

It is with great pleasure that we present the first issue of a scientific and professional journal NurseNexus Journal, dedicated to nurses and technicians, professionals who, with their knowledge, humanity and dedicated work, make an immeasurable contribution to the healthcare system every day. By founding and registering this magazine, we want to create a space where nurses and technicians will have the opportunity to present their experiences, professional achievements, research and ideas aimed at improving the nursing profession and health care. Modern nursing today encompasses far more than the provision of patient care alone. It includes continuous professional development, the advancement of professional competencies, scientific research, ethical practice, and active participation in improving the quality of healthcare services. For this reason, we believe that this journal will become an important platform for the promotion of professional and scientific work, the exchange of knowledge and experience, and a stimulus for the professional development and lifelong learning of nurses and nursing technicians. In this inaugural issue, we present topics from various fields of nursing care, educational and professional articles, reviews of contemporary approaches to patient care, and content that can contribute to the improvement of everyday professional practice. Our aspiration is for this journal to become a gathering place for professionals, a forum for the exchange of

razvijamo časopis u skladu sa savremenim trendovima i inovacijama u sestrinstvu i zdravstvenoj njezi, nastojeći da naučna i stručna dostignuća približimo svakodnevnoj praksi. Vjerujemo da ćete u objavljenim radovima, edukativnim tekstovima, izvještajima i najavama stručnih skupova pronaći brojne korisne i inspirativne sadržaje koji će doprinijeti jačanju zdravstvene njege zasnovane na dokazima i savremenim stručnim smjernicama. Nadamo se da će NurseNexus Journal postati nezaobilazan naučni arhiv i hronika razvoja sestrinske profesije.

Ovaj uspjeh ne bi bio moguć bez vizije i predanosti onih koji su stvorili temelj časopisa. Posebnu zahvalnost i čast upućujem svim članovima uređivačkog odbora, svim saradnicima, kao i svim autorima i recenzentima na doprinosu, kao i kolektivu Nacionalne i univerzitetske biblioteke Bosne i Hercegovine na podršci.

Ovaj prvi broj jeste ključni forum za dijalog između tradicije i inovacije, ali je i usmjeren ka budućnosti. Pozivamo vas da s nama pogledate naprijed, da u svim radovima koji slijede pronađete inspiraciju za nova istraživanja i da ostanete vjerni misiji naučne radoznalosti u sestrinskoj profesiji. Pozivamo vas da svojim radovima, iskustvima, prijedlozima i idejama zajedno doprinosimo razvoju i jačanju sestrinske profesije. Svako novo izdanje biće prilika da prepoznamo vrijednost znanja, humanosti i predanosti koje medicinske sestre i tehničari svakodnevno pružaju pacijentima, kolegama i društvu. Budimo podrška jedni drugima, jačajmo kroz saradnju, razmjenu znanja i međusobno razumijevanje. Gradimo zajedno autentičan i prepoznatljiv glas sestrinstva, jer zajedničkim radom možemo postići više. Na kraju, želimo da ovaj časopis bude otvoren prostor za sve vas. Pišite nam, postavljajte pitanja i šaljite nam naučne i stručne radove, edukativne članke, izvještaje, smjernice, fotografije i druge sadržaje koji mogu doprinijeti razvoju sestrinstva i zdravstvene njege. Nauka u sestrinstvu je most između znanja i humanosti – svako novo istraživanje može promijeniti način na koji brinemo o životima drugih. Pišući i dijeleći

experiences, and a valuable source of information for current and future generations of nurses and nursing technicians. We will continue to develop the journal in accordance with contemporary trends and innovations in nursing and healthcare, striving to bring scientific and professional achievements closer to everyday practice. We believe that in the published papers, educational texts, reports, and announcements of professional events, you will find a wealth of useful and inspiring content that will contribute to strengthening evidence-based nursing practice and the application of modern professional guidelines, and we hope that the NurseNexus Journal will become an indispensable scientific archive and a chronicle of the development of the nursing profession.

This achievement would not have been possible without the vision and dedication of those who laid the foundation for this journal. I would like to express my special gratitude and appreciation to all members of the Editorial Board, all collaborators, authors, and reviewers for their valuable contributions, as well as to the staff of the National and University Library of Bosnia and Herzegovina for their support.

This first issue serves as a key forum for dialogue between tradition and innovation, while also being firmly oriented toward the future. We invite you to look ahead with us, to find inspiration for new research in the articles that follow, and to remain committed to the mission of scientific curiosity within the nursing profession. We invite you to contribute to the development and strengthening of the nursing profession through your papers, experiences, suggestions, and ideas. Each new issue will provide an opportunity to recognize the value of the knowledge, compassion, and dedication that nurses and nursing technicians bring every day to their patients, colleagues, and society. Let us support one another and grow through collaboration, the exchange of knowledge, and mutual understanding. Together, let us build an authentic and recognizable voice for nursing, because through collective effort we can achieve more. Finally, we want this journal

svoja iskustva i priče, medicinske sestre i tehničari ne samo da unapređuju struku, već ostavljaju trag koji inspiriše buduće generacije. Nadamo se da ćete uživati u ovom prvom ali i u svim narednim brojevima časopisa, koje s velikim ponosom predajemo u vaše ruke.

U ime uredništva, zahvaljujem vam na povjerenju i želim mnogo inspiracije u budućem stvaralaštvu.

Srdačno,

Prof. dr Jelena Pavlović, MD, PhD

to be an open space for all of you. Write to us, ask questions, and submit your scientific and professional papers, educational articles, reports, guidelines, photographs, and other materials that can contribute to the advancement of nursing and healthcare. Nursing science is a bridge between knowledge and humanity every new study has the potential to transform the way we care for the lives of others. By writing and sharing their experiences and stories, nurses and nursing technicians not only advance their profession but also leave a legacy that inspires future generations. We hope that you will enjoy this first issue, as well as all future editions of the journal, which we proudly place into your hands.

On behalf of the editors, I thank you for your trust and wish you a lot of inspiration in your future creativity.

Sincerely,

Prof. Dr. Jelena Pavlović, MD, PhD

## UVODNE RIJEČI ISTAKNUTIH PARTNERA I PORUKE PODRŠKE

*Razvoj svake profesije, pa i profesije medicinskih sestara i tehničara neraskidivo je povezan sa naukom koja predstavlja osnovni temelj i pokretač napretka. Međutim, naučni i profesionalni razvoj ne odvijaju se izolovano, već kroz partnersku saradnju različitih aktera u zdravstvenom i akademskom sistemu. U tom kontekstu, značajnu ulogu imaju brojne institucije, organizacije i asocijacije koje kroz podršku edukaciji, istraživanju i jačanju kapaciteta doprinose unapređenju profesionalne prakse. Zajedničkim djelovanjem i međusobnom podrškom partnerskih organizacija stvara se održiv okvir za profesionalni rast u kojem nauka, praksa i edukacija zajedno doprinose jačanju kvaliteta zdravstvene zaštite i ukupnog razvoja sestrinske profesije, jer sestrinstvo je profesija koja ne prihvata stagnaciju.*

***„Bez istraživanja i nauke nema profesionalnog napretka, jer nauka i praksa zajedno grade profesionalnu izvrsnost“.***
***NurseNexus Journal***

## INTRODUCTORY REMARKS FROM DISTINGUISHED PARTNERS AND MESSAGES OF SUPPORT

*The development of every profession, including the profession of nurses and technicians, is inextricably linked to science, which represents its fundamental basis and driving force of progress. However, scientific and professional development do not take place in isolation, but rather through the partnership and collaboration of various stakeholders within the healthcare and academic systems. In this context, numerous institutions, organizations, and associations play a significant role by supporting education, research, and capacity building, thereby contributing to the improvement of professional practice. Through joint action and mutual support, a sustainable framework for professional growth is created, in which science, education, and partner organizations together contribute to strengthening the quality of healthcare and the overall development of the profession.*

***“Without science there is no professional progress, because science and practice together build professional excellence”.***
**NurseNexus Journal-**

***Riječi Florens Najtingejl:***

***„Za nas koji se bavimo sestrinstvom, ako sestrinstvo ne unapređujemo svake godine, mjeseca i dana, mi ne napredujemo, nego idemo unazad”.***

***Words of Florence Nightingale:***

***“For those of us engaged in nursing, if we do not improve nursing every year, every month, and every day, we are not progressing, but rather going backwards.”***

**FONDACIJA FAMI - ELDIN FIŠEKOVIĆ**

**MENADŽER PROJEKTA „JAČANJE SESTRINSTVA U BOSNI I HERCEGOVINI (PROSES)**

**FAMI FOUNDATION – ELDIN FISEKOVIC**

**PROJECT MANAGER "STRENGTHENING NURSING IN BOSNIA AND HERZEGOVINA (PROSES)"**


## Sestrinstvo u Bosni i Hercegovini - izgradnja profesionalnih mostova

Razvoj sestrinstva u Bosni i Hercegovini u posljednjih petnaest godina moguće je posmatrati kroz proces postepenog uspostavljanja profesionalnih i institucionalnih veza koje ranije nisu postojale ili nisu bile dovoljno razvijene. U sistemu koji je administrativno fragmentiran, profesionalno neujednačen i često opterećen različitim nivoima nadležnosti, razvoj sestrinske profesije dugo je zavisio prvenstveno od pojedinačnih entuzijazama i lokalnih inicijativa. Upravo zbog toga su najvažniji rezultati Projekta jačanja sestrinstva u Bosni i Hercegovini ostvareni u prostoru koji je godinama bio najmanje vidljiv - prostoru povezivanja. Tokom godina, projekat je postepeno uspio uspostaviti mostove između institucija, obrazovanja i prakse, između različitih nivoa vlasti, između profesionalnih udruženja i zdravstvenih ustanova, ali i između samih medicinskih sestara i tehničara koji su dugo djelovali

## Nursing in Bosnia and Herzegovina – Building Professional Bridges

The development of nursing in Bosnia and Herzegovina over the past fifteen years can be viewed as a gradual process of establishing professional and institutional connections that either did not previously exist or were insufficiently developed. In a system characterized by administrative fragmentation, professional inconsistency, and multiple levels of governance, the advancement of the nursing profession long depended primarily on individual enthusiasm and local initiatives. For this reason, the most significant achievements of the Nursing Strengthening Project in Bosnia and Herzegovina have been realized in an area that remained largely unnoticed for years the area of connectivity. Over time, the project successfully built bridges between institutions, education and practice, different levels of government, professional associations and healthcare institutions, as well as among nurses and nursing technicians themselves, who had long

unutar relativno zatvorenih profesionalnih okvira. Takav pristup pokazao se posebno važnim u zemlji poput Bosne i Hercegovine, gdje razvoj zdravstvenih politika često ne zavisi samo od stručnih pitanja, nego i od sposobnosti uspostavljanja saradnje među brojnim akterima sistema. Zbog toga se stvarni značaj projekta ne može posmatrati isključivo kroz broj edukacija, radionica ili razvijenih dokumenata. Njegova najveća vrijednost nalazi se u činjenici da je sestrinstvo prvi put sistemski povezano sa procesima planiranja, upravljanja i razvoja zdravstvene zaštite. Jedan od najznačajnijih primjera takvog pristupa jeste razvoj registra sestrinske radne snage. Iako se na prvi pogled radi o tehničkom i administrativnom procesu, njegova stvarna važnost daleko prevazilazi samu evidenciju zaposlenih. Uspostavljanjem registra sestrinstvo je prvi put dobilo mogućnost da postane vidljivo kroz podatke - kroz broj, strukturu, obrazovanje, raspored i profesionalne karakteristike sestrinske radne snage. Time je uspostavljen most između profesije i zdravstvenih politika, odnosno mogućnost da buduće planiranje ljudskih resursa bude zasnovano na realnim pokazateljima, a ne na procjenama. Sličan značaj imaju i procesi razvoja kompetencija, standardizacije sestrinske prakse i unapređenja kontinuirane edukacije. Dugi niz godina sestrinska praksa u Bosni i Hercegovini razvijala se neujednačeno, često zavisno od lokalnih organizacionih kultura i individualnih pristupa unutar ustanova. Razvoj kompetencija i standardnih operativnih procedura predstavljao je pokušaj uspostavljanja zajedničkog profesionalnog jezika unutar sestrinstva. Na taj način izgrađen je most između teorijskog obrazovanja i svakodnevne kliničke prakse. Poseban doprinos projekta vidljiv je kroz razvoj sestrinstva u zajednici. Uvođenjem novih modela rada medicinskih sestara i tehničara u lokalnim zajednicama otvoren je prostor za drugačije razumijevanje sestrinske uloge - ne samo kao dijela bolničkog sistema, nego i kao važnog aktera u promociji zdravlja, prevenciji bolesti, radu sa ranjivim grupama i podršci stanovništvu izvan zdravstvenih ustanova. U tom procesu sestrinstvo je dobilo novu dimenziju profesionalne autonomije, ali i novu odgovornost. Istovremeno, jedan od manje

worked within relatively isolated professional environments. This approach proved particularly important in a country such as Bosnia and Herzegovina, where the development of healthcare policies often depends not only on professional expertise but also on the ability to establish cooperation among numerous stakeholders within the system. Therefore, the true significance of the project cannot be measured solely by the number of trainings, workshops, or documents developed. Its greatest value lies in the fact that nursing has, for the first time, been systematically integrated into the processes of healthcare planning, management, and development. One of the most notable examples of this approach is the development of the nursing workforce registry. Although it may initially appear to be a technical and administrative process, its importance extends far beyond the simple recording of employees. Through the establishment of the registry, nursing has, for the first time, gained visibility through data—through information on the size, structure, education, distribution, and professional characteristics of the nursing workforce. This has created a bridge between the profession and healthcare policy, enabling future workforce planning to be based on actual evidence rather than estimates. Similarly important are the processes related to competency development, standardization of nursing practice, and enhancement of continuing education. For many years, nursing practice in Bosnia and Herzegovina developed unevenly, often depending on local organizational cultures and individual approaches within healthcare institutions. The development of competencies and standard operating procedures represented an effort to establish a common professional language within nursing. In this way, a bridge was built between theoretical education and everyday clinical practice. A particularly valuable contribution of the project can be seen in the development of community nursing. By introducing new models of nursing practice within local communities, opportunities were created for a broader understanding of the nursing role not only as part of the hospital system but also as a key actor in health promotion, disease prevention, work with

vidljivih, ali vjerovatno najvažnijih rezultata projekta jeste postepeno jačanje profesionalnog samopouzdanja unutar same profesije.

Tokom godina otvoren je prostor da medicinske sestre i tehničari aktivnije učestvuju u stručnim raspravama, edukacijama, razvoju dokumenata, procesima donošenja odluka i međunarodnim profesionalnim mrežama. Takvi procesi ne proizvode brze i spektakularne rezultate, ali dugoročno mijenjaju profesionalnu kulturu. Upravo u tom kontekstu posebno je značajno pokretanje stručnih i naučnih platformi poput NurseNexus Journal-a. Razvoj sestrinske profesije nije moguće posmatrati odvojeno od razvoja sestrinske nauke. Profesija koja ne dokumentuje vlastita iskustva i ne razvija stručnu literaturu teško može dugoročno graditi profesionalnu autonomiju. Sestrinska praksa u Bosni i Hercegovini sadrži veliki broj iskustava, modela rada i stručnih pristupa koji do sada uglavnom nisu bili dovoljno vidljivi u naučnoj i stručnoj literaturi. Time je izgubljen značajan dio profesionalnog znanja koje je moglo biti korisno široj zajednici. Zato uspostavljanje stručnog časopisa ne predstavlja samo novi medij za objavljivanje radova, nego i važan korak u povezivanju sestrinske prakse sa istraživanjem, analizom i stručnom refleksijom. Posebno je važno što takve inicijative dolaze u trenutku kada sestrinstvo u Bosni i Hercegovini postepeno izlazi iz okvira profesije koja je prvenstveno posmatrana kroz operativnu ulogu u zdravstvenom sistemu. Savremeni zdravstveni sistemi sve više zahtijevaju profesionalce koji mogu učestvovati u planiranju, koordinaciji, edukaciji, istraživanju i upravljanju kvalitetom zdravstvene zaštite. Upravo zbog toga budući razvoj sestrinstva neće zavisiti samo od individualne posvećenosti zdravstvenih profesionalaca, nego i od sposobnosti sistema da nastavi ulagati u profesionalnu infrastrukturu koja je posljednjih godina počela da se razvija. Mostovi koji su izgrađeni tokom prethodnog perioda još uvijek nisu završeni niti potpuno stabilni. Međutim, oni danas postoje, a u sistemima kakav je bosanskohercegovački, samo postojanje funkcionalnih profesionalnih i institucionalnih veza

vulnerable populations, and support for individuals outside healthcare institutions. Through this process, nursing gained a new dimension of professional autonomy, along with new responsibilities. At the same time, one of the less visible yet probably most important outcomes of the project has been the gradual strengthening of professional confidence within the profession itself. Over the years, space has been created for nurses and nursing technicians to participate more actively in professional discussions, educational activities, document development, decision-making processes, and international professional networks. Such processes do not produce rapid or spectacular results, but they gradually transform professional culture over the long term. In this context, the launch of professional and scientific platforms such as the *NurseNexus Journal* is particularly significant. The development of the nursing profession cannot be separated from the development of nursing science. A profession that does not document its own experiences and develop its professional literature faces significant challenges in achieving long-term professional autonomy. Nursing practice in Bosnia and Herzegovina encompasses a wealth of experiences, models of care, and professional approaches that have largely remained underrepresented in scientific and professional literature. As a result, a substantial body of valuable professional knowledge has remained inaccessible to the wider community. For this reason, the establishment of a professional journal represents much more than a new outlet for publishing articles. It is an important step toward connecting nursing practice with research, analysis, and professional reflection. It is especially important that such initiatives emerge at a time when nursing in Bosnia and Herzegovina is gradually moving beyond the traditional perception of a profession primarily defined by its operational role within the healthcare system. Modern healthcare systems increasingly require professionals who can participate in planning, coordination, education, research, and quality management. Consequently, the future development of nursing will depend not only on the dedication of individual healthcare professionals but also on the capacity of the system

često predstavlja najvažniji preduslov za dugoročne promjene.

to continue investing in the professional infrastructure that has begun to emerge in recent years. The bridges built during this period are not yet complete, nor are they fully stable. However, they now exist. And in systems such as that of Bosnia and Herzegovina, the very existence of functional professional and institutional connections often represents the most important prerequisite for sustainable, long-term change.

# MIRJANA JANKOVIĆ – DIPLOMIRANI MEDICINAR ZDRAVSTVENE NJEGE VIŠI STRUČNI SARADNIK ZA SESTRINSTVO U MINISTARSTVU ZDRAVLJA I SOCIJALNE ZAŠTITE REPUBLIKE SRPSKE

# MIRJANA JANKOVIC – BACHELOR IN NURSING CARE SENIOR PROFESSIONAL ASSOCIATE FOR NURSING AT THE MINISTRY OF HEALTH AND SOCIAL WELFARE OF THE REPUBLIC OF SRPSKA

**Povodom pokretanja naučno-stručnog časopisa NurseNexus Journal, razgovarali smo sa Mirjanom Janković, diplomiranim medicinarom zdravstvene njege i višim stručnim saradnikom za sestrinstvo u Ministarstvu zdravlja i socijalne zaštite Republike Srpske.**

Mirjana Janković je medicinska sestra koja je svoje višegodišnje kliničko iskustvo zdravstvene njege usmjerila na razvoj profesije. Danas, kao jedina medicinska sestra zaposlena u Vladi Republike Srpske, predstavlja važnu sponu između sestrinske profesije, zdravstvenih ustanova i donosilaca odluka.

**1. Koliko je značajno uključivanje medicinskih sestara i tehničara u naučno-istraživački rad i razvoj stručnih i naučnih publikacija?**

To je značajan i ujedno logičan korak u daljem razvoju sestrinske profesije. Danas više nije dovoljno da medicinske sestre i tehničari budu samo praktičari. Njihovo znanje, iskustvo i rezultati rada treba da budu prepoznati, dokumentovani, istraženi i predstavljeni stručnoj javnosti. Na taj način stvaramo praksu koja se zasniva na dokazima, a ne isključivo na iskustvu. U Republici Srpskoj smo, u

**On the occasion of the launch of the scientific and professional journal NurseNexus Journal, we spoke with Mirjana Janković, Bachelor of Nursing, Senior Professional Associate for Nursing at the Ministry of Health and Social Welfare of the Republic of Srpska.**

Mirjana Janković is a registered nurse who has dedicated her many years of clinical nursing experience to the advancement of the nursing profession. Today, as the only nurse employed by the Government of the Republic of Srpska, she serves as an important link between the nursing profession, healthcare institutions, and policymakers.

**1. How important is the involvement of nurses and nursing technicians in scientific research and the development of professional and scientific publications?**

It is both an important and a logical step in the further development of the nursing profession. Today, it is no longer sufficient for nurses and nursing technicians to be practitioners only. Their knowledge, experience, and professional achievements need to be recognized, documented,

okviru Projekta jačanja sestrinstva u BiH u kojem je Ministarstvo ključan partner, a uz podršku Vlade Švajcarske, u posljednjih petnaestak godina mnogo ulagali u razvoj kompetencija, standardnih operativnih procedura, edukacije i sestrinstva u zajednici. Takođe, rad medicinskih sestara je prepoznat i kroz zakonske okvire poput regulisanja njege u zajednici, mogućnosti da medicinska sestra bude direktor neke zdravstvene ustanove ili uspostavljanje Registra sestrinstva, prvog takvog kod nas. Na osnovu anketa koje smo uradili u okviru javnih zdravstvenih ustanova napravili smo plan izrade specijalizacija za medicinske sestre i tehničare u okviru javnih univerziteta. To je dugoročan, ali važan strateški cilj. Takvi pomaci ranije su se smatrali nezamislivim. Sljedeći korak je regulacija profesije i osnivanje komore. Kao prirodan dio tog procesa vidim veće uključivanje medicinskih sestara u naučno-istraživački rad, jer upravo one svakodnevno prepoznaju potrebe pacijenata i mogu ponuditi rješenja koja unapređuju kvalitet zdravstvene njege i ishode liječenja.

**2. Po Vašem mišljenju, da li novoregistrovani naučno-stručni časopis NurseNexus Journal ima značaj za razvoj sestrinske profesije?**

Apsolutno. Registracija jednog ovakvog časopisa predstavlja važnu prekretnicu za sestrinsku profesiju. To nije samo novo mjesto za objavljivanje stručnih radova, već platforma koja povezuje praksu, obrazovanje i nauku. Nadam se da će koleginice i kolege to prepoznati kao šansu. Sigurna sam da će se kroz ovaj časopis medicinskim sestrama i tehničarima dati prilika da predstave svoja istraživanja, razmijene iskustva sa kolegama iz regiona i svijeta i doprinesu razvoju savremene zdravstvene njege. Time sestrinstvo dodatno potvrđuje svoju autonomnu ulogu ravnopravnog i nezaobilaznog dijela zdravstvenog sistema.

**3. Da li mentorstvo i podrška stručne zajednice mogu pomoći medicinskim sestrama i tehničarima u razvoju naučnog i istraživačkog rada?**

researched, and presented to the professional community. In this way, we build evidence-based practice rather than relying solely on experience. In the Republic of Srpska, through the Strengthening Nursing in Bosnia and Herzegovina Project, in which the Ministry is a key partner and which is supported by the Government of Switzerland, we have invested significantly over the past fifteen years in developing nursing competencies, standard operating procedures, continuing education, and community nursing. The work of nurses has also been recognized through legislative and regulatory frameworks, including the regulation of community nursing services, the possibility for a nurse to serve as the director of a healthcare institution, and the establishment of the Nursing Registry the first of its kind in our country.

Based on surveys conducted across public healthcare institutions, we developed a plan for introducing specialist nursing education programmes for nurses and nursing technicians at public universities. This is a long-term but strategically important objective. Such progress would once have been considered unimaginable. The next step is the formal regulation of the profession and the establishment of a Nursing Chamber. As a natural part of this process, I see greater involvement of nurses in scientific research, because they are the ones who identify patients' needs on a daily basis and can offer solutions that improve the quality of nursing care and treatment outcomes.

**2. In your opinion, how important is the newly established scientific and professional journal NurseNexus Journal for the development of the nursing profession?**

Absolutely. The establishment of a journal of this kind represents an important milestone for the nursing profession. It is not merely a new venue for publishing professional papers, but also a platform that connects clinical practice, education, and research. I hope that our colleagues will recognize it as an opportunity. I am confident that this journal will provide nurses and nursing technicians with the opportunity to present their research, exchange

Sigurno da mogu i rekla bih čak da su presudni. Malo ko ulazi u naučno-istraživački rad bez podrške iskusnijih kolega. Svako od nas snagu je crpio iz znanja, a temelje toga svega dali su nam naši profesori i starije kolege od kojih smo učili. Mentorstvo daje sigurnost, prenosi znanje i motiviše mlade da svoje ideje pretoče u kvalitetna istraživanja. Mi smo kroz razvoj centara za edukaciju, saradnju sa stručnim udruženjima i obrazovnim institucijama pokazali koliko partnerstvo može dati dobre rezultate. Vjerujem da isti model treba primijeniti i kada je riječ o naučnom radu. Kada iskusni stručnjaci podrže mlađe kolege, tada cijela profesija napreduje.

**4. Na koji način ulaganje u nauku i istraživanje može unaprijediti sestrinsku profesiju u narednim godinama?**

Ulaganje u nauku znači ulaganje u kvalitet zdravstvene zaštite. Istraživanja nam omogućavaju da prepoznamo šta funkcioniše, gdje postoje izazovi i kako možemo unaprijediti zdravstvenu njegu. Iskustvo rada na stručnim operativnim procedurama za primarnu, a potom i sekundarnu zdravstvenu zaštitu nam je pokazalo koliko se nauka, napredak i iskustvo moraju „uskladiti“ i da su primjeri dobre prakse neprocjenjiv resurs koji treba iskoristiti i u naučne svrhe. Pred nama su veliki izazovi – starenje stanovništva, porast hroničnih bolesti, nedostatak kadra i migracije zdravstvenih radnika. Na sva ta pitanja ne možemo odgovoriti bez novih znanja i inovativnih rješenja. Zato je važno da sestrinska profesija bude aktivan učesnik u istraživanjima i kreiranju zdravstvenih politika. Samo tako ćemo graditi moderan i održiv zdravstveni sistem u kojem će medicinske sestre imati mjesto koje zaslužuju.

**5. Koju biste poruku uputili medicinskim sestrama i tehničarima povodom registracije naučno-stručnog časopisa?**

Prije svega želim da im čestitam na ovom velikom uspjehu. Registracija naučno-stručnog časopisa nije samo priznanje dosadašnjem radu, već i obaveza da nastavimo razvijati profesiju. Pozivam sve

experiences with colleagues from the region and around the world, and contribute to the advancement of modern nursing care. In doing so, nursing further reinforces its autonomous role as an equal and indispensable part of the healthcare system.

**3. Can mentorship and the support of the professional community help nurses and nursing technicians develop their scientific and research work?**

Without a doubt, they can, and I would even say they are essential. Very few people embark on scientific research without the support of more experienced colleagues. All of us have drawn strength from knowledge, and the foundations of that knowledge were laid by our professors and senior colleagues from whom we learned. Mentorship provides confidence, transfers knowledge, and motivates young professionals to transform their ideas into high-quality research. Through the development of education centres and collaboration with professional associations and educational institutions, we have demonstrated how effective partnerships can produce excellent results. I believe the same model should be applied to scientific research. When experienced professionals support younger colleagues, the entire profession advances.

**4. How can investment in science and research contribute to the advancement of the nursing profession in the years ahead?**

Investing in science means investing in the quality of healthcare. Research enables us to identify what works, where challenges exist, and how nursing care can be improved. Our experience in developing standard operating procedures for primary healthcare, and later for secondary healthcare, has shown us how scientific evidence, innovation, and practical experience must be aligned, and that examples of good practice are an invaluable resource that should also be used for research purposes. Significant challenges lie ahead, including population ageing, the increasing prevalence of chronic diseases, workforce shortages, and the

medicinske sestre i tehničare da pišu, istražuju, objavljuju svoje radove i dijele svoja iskustva. Svaki kvalitetan članak, svako istraživanje i svaka nova ideja doprinose boljoj zdravstvenoj njezi i većem ugledu sestrinske profesije. Sestrinstvo je profesija znanja, odgovornosti i humanosti. Upravo kroz nauku i kontinuirano usavršavanje ostavićete najvrijednije nasljeđe generacijama koje dolaze i dodatno ojačati profesiju koja predstavlja jedan od ključnih stubova svakog zdravstvenog sistema.

migration of healthcare professionals. We cannot address these issues without generating new knowledge and developing innovative solutions. That is why it is essential for the nursing profession to play an active role in research and in shaping healthcare policies. Only in this way can we build a modern and sustainable healthcare system in which nurses occupy the place they rightfully deserve.

**5. What message would you like to convey to nurses and nursing technicians on the occasion of the registration of this scientific and professional journal?**

First and foremost, I would like to congratulate them on this remarkable achievement. The registration of a scientific and professional journal is not only a recognition of the work accomplished so far, but also a responsibility to continue advancing the profession. I encourage all nurses and nursing technicians to write, conduct research, publish their work, and share their experiences. Every high-quality article, every research study, and every new idea contributes to better nursing care and enhances the reputation of the nursing profession. Nursing is a profession founded on knowledge, responsibility, and compassion. Through scientific research and continuous professional development, you will leave the most valuable legacy to future generations while further strengthening a profession that represents one of the fundamental pillars of every healthcare system.

# TATJANA PERIĆ - DIPLOMIRANA MEDICINSKA SESTRA PREDSJEDNICA SAVEZA UDRUŽENJA MEDICINSKIH SESTARA I TEHNIČARA REPUBLIKE SRPSKE

# TATJANA PERIC - BACHELOR OF NURSING PRESIDENT OF THE ASSOCIATION OF NURSES AND NURSING TECHNICIANS OF THE REPUBLIC OF SRPSKA

**1. Koliki značaj registracija naučno-stručnog časopisa ima za razvoj sestrinske profesije i unapređenje zdravstvene njege?**

Registracija prvog naučno-stručnog sestrinskog časopisa u Republici Srpskoj predstavlja istorijski i izuzetno značajan korak za razvoj sestrinske profesije. To nije samo administrativni ili formalni čin, već potvrda da je sestrinstvo profesija koja ima svoje znanje, praksu, iskustvo i naučni identitet. Na taj način medicinske sestre i tehničari dobijaju prostor u kojem mogu predstaviti svoj rad, razmjenjivati iskustva i aktivno učestvovati u razvoju zdravstvenog sistema. Sa aspekta predsjednice Saveza medicinskih sestara i tehničara, ovaj časopis predstavlja važan korak u afirmaciji sestrinske profesije i jačanju njenog položaja u društvu i zdravstvenom sistemu. Godinama govorimo o potrebi da medicinske sestre budu vidljivije, da se njihov glas više čuje i da njihovo znanje dobije prostor koji zaslužuje. Upravo jedan stručni časopis omogućava da iskustvo i stručnost medicinskih sestara budu prepoznati i vrednovani.
Ovakav projekat ima i veliki značaj za jedinstvo profesije. Savez kroz svoje djelovanje kontinuirano radi na povezivanju medicinskih sestara iz svih zdravstvenih ustanova Republike Srpske, a stručni

**1. How important is the registration of a scientific and professional journal for the development of the nursing profession and the improvement of health care?**

The registration of the first scientific and professional nursing journal in the Republic of Srpska represents a historic and extremely significant step for the development of the nursing profession. It is not just an administrative or formal act, but a confirmation that nursing is a profession that has its own knowledge, practice, experience and scientific identity. In this way, nurses and technicians get a space where they can present their work, exchange experiences and actively participate in the development of the health system. From the point of view of the president of the Association of Nurses and Technicians, this magazine represents an important step in the affirmation of the nursing profession and the strengthening of its position in society and the health system. For years we have been talking about the need for nurses to be more visible, for their voice to be heard more and for their knowledge to get the space it deserves. It is precisely a professional magazine that allows the experience and expertise of nurses to be recognized and valued. Such a project is also of great importance for the

časopis može postati zajedničko mjesto okupljanja znanja, ideja i iskustava. Kada dijelimo znanje i podržavamo jedni druge, tada jačamo cijelu profesiju. Časopis doprinosi unapređenju zdravstvene njege jer omogućava prenos savremenih znanja, novih metoda rada i primjera dobre prakse. Kroz objavljene radove medicinske sestre mogu učiti jedne od drugih, pratiti razvoj sestrinstva u regionu i svijetu, ali i prilagoditi stečena znanja potrebama pacijenata u našim zdravstvenim ustanovama. Poseban značaj ogleda se i u jačanju profesionalnog identiteta medicinskih sestara i tehničara. Kada jedna profesija ima svoj stručni časopis, ona pokazuje da je spremna da gradi standard kvaliteta, razvija naučni pristup radu i aktivno učestvuje u unapređenju zdravstvenog sistema. To je važna poruka i mladim ljudima koji se odlučuju za sestrinstvo – da je riječ o profesiji koja se stalno razvija, uči i napreduje.

**2. Na koji način časopisi mogu doprinijeti edukaciji i profesionalnom usavršavanju medicinskih sestara i tehničara?**

Stručni časopisi imaju izuzetno važnu ulogu u kontinuiranoj edukaciji medicinskih sestara i tehničara, posebno danas kada se medicina i zdravstvena njega veoma brzo razvijaju. Znanja i preporuke se mijenjaju, uvode se nove procedure, savremeni pristupi liječenju i novi standardi kvaliteta, zbog čega je neophodno stalno stručno usavršavanje. Kroz stručne časopise medicinske sestre i tehničari imaju mogućnost da prate savremene trendove u zdravstvenoj njezi, upoznaju se sa novim metodama rada, rezultatima istraživanja i iskustvima kolega iz drugih zdravstvenih ustanova. To doprinosi sigurnijem i kvalitetnijem radu sa pacijentima. Sa aspekta Saveza, kontinuirana edukacija predstavlja jedan od ključnih ciljeva djelovanja. Savez godinama organizuje stručne skupove, konferencije, edukacije i predavanja upravo sa ciljem da medicinske sestre imaju mogućnost stalnog profesionalnog razvoja. Naučno-stručni časopis sada dodatno proširuje taj prostor edukacije, jer omogućava da znanje ostane trajno zapisano i dostupno svim kolegama. Poseban značaj časopisa ogleda se u tome što omogućavaju

unity of the profession. Through its activities, the association continuously works to connect nurses from all health institutions of the Republika Srpska, and the professional journal can become a common gathering place for knowledge, ideas and experiences. When we share knowledge and support each other, we strengthen the entire profession. The journal contributes to the improvement of health care because it enables the transmission of modern knowledge, new work methods and examples of good practice. Through published works, nurses can learn from each other, follow the development of nursing in the region and the world, but also adapt the acquired knowledge to the needs of patients in our healthcare institutions. Special importance is reflected in strengthening the professional identity of nurses and technicians. When a profession has its own professional journal, it shows that it is ready to build a quality standard, develop a scientific approach to work and actively participate in the improvement of the health system. This is an important message to young people who decide to become a nurse - that it is a profession that constantly develops, learns and progresses.

**2. In what way can magazines contribute to education and professional development nurses and technicians?**

Professional journals play an extremely important role in the continuing education of nurses and technicians, especially today when medicine and health care are developing very quickly. Knowledge and recommendations change, new procedures, modern treatment approaches and new quality standards are introduced, which is why constant professional training is necessary. Through professional journals, nurses and technicians have the opportunity to follow modern trends in health care, learn about new work methods, research results and experiences of colleagues from other health care institutions. This contributes to safer and better quality work with patients. From the point of view of the Alliance, continuous education is one of the key goals of the activity. For years, the Association has been organizing professional gatherings, conferences, educations and lectures precisely with

povezivanje teorijskog znanja sa praktičnim iskustvom. Često upravo iskustva iz svakodnevnog rada na odjeljenjima mogu biti dragocjena za druge kolege koje se susreću sa sličnim izazovima. Na taj način se stvara prostor za međusobno učenje, razmjenu ideja i profesionalnu saradnju. Časopisi istovremeno podstiču profesionalno jedinstvo i osjećaj pripadnosti profesiji. Kada medicinske sestre iz različitih gradova, ustanova i oblasti rada zajedno učestvuju u stvaranju stručne literature, tada gradimo snažniju i povezaniju profesiju. Stručni časopisi podstiču i razvoj kritičkog razmišljanja. Medicinske sestre ne treba da budu samo izvršioci zadataka, već profesionalci koji razumiju zašto se određene procedure primjenjuju i kako se mogu unaprijediti. Čitanje stručne literature razvija sposobnost analize, donošenja odluka i primjene savremenih standarda u svakodnevnom radu.

**3. Koji su danas najveći izazovi sa kojima se medicinske sestre i tehničari susreću u zdravstvenom sistemu i kako stručna literatura može pomoći u njihovom prevazilaženju?**

Medicinske sestre i tehničari danas predstavljaju stub zdravstvenog sistema i često su prvi i najduži kontakt pacijenta sa zdravstvenom ustanovom. Međutim, uprkos ogromnoj odgovornosti koju nose, suočavaju se sa brojnim izazovima koji otežavaju svakodnevni rad. Jedan od najvećih problema jeste nedostatak kadra, što dovodi do povećanog obima posla, fizičkog i psihičkog opterećenja, ali i profesionalnog sagorijevanja. Medicinske sestre često rade u veoma zahtjevnim uslovima, sa velikim brojem pacijenata i nedovoljno vremena za odmor i edukaciju. Tu su i izazovi poput odlaska zdravstvenih radnika, sve većih očekivanja pacijenata, ubrzanog razvoja medicine i potrebe za stalnim usavršavanjem. Upravo zbog toga danas više nego ikada moramo raditi na međusobnoj podršci, profesionalnom jedinstvu i jačanju položaja medicinskih sestara u zdravstvenom sistemu. Kao Savez, nastojimo kontinuirano ukazivati na probleme sa kojima se medicinske sestre suočavaju, ali i raditi na afirmaciji profesije i unapređenju uslova rada. Veoma je važno da medicinske sestre osjećaju da nisu same i da imaju organizaciju koja

the aim of giving nurses the opportunity for continuous professional development. The scientific-professional journal now further expands that space of education, because it enables knowledge to remain permanently recorded and accessible to all colleagues. The special importance of magazines is reflected in the fact that they enable the connection of theoretical knowledge with practical experience. Often the experiences from everyday work in the departments can be valuable for other colleagues who face similar challenges. In this way, a proctor is created for mutual learning, exchange of ideas and professional cooperation. Magazines simultaneously encourage professional unity and a sense of belonging to the profession. When nurses from different cities, institutions and fields of work participate together in the creation of professional literature, then we build a stronger and more connected profession. Professional journals also encourage the development of critical thinking. Nurses should not only be task makers, but professionals who understand why certain procedures are applied and how they can be improved. Reading professional literature develops the ability to analyze, make decisions and apply modern standards in everyday work.

**3. What are the biggest challenges that nurses and technicians face in the healthcare system today, and how can professional literature help overcome them?**

Today, nurses and technicians represent the pillar of the healthcare system and are often the first and longest contact of a patient with a healthcare facility. However, despite the enormous responsibility they bear, they face numerous challenges that make their daily work difficult. One of the biggest problems is the lack of staff, which leads to an increased volume of work, physical and psychological stress, but also professional burnout. Nurses often work in very demanding conditions, with a large number of patients and insufficient time for rest and education. There are also challenges such as the departure of health workers, increasing expectations of patients, the rapid development of medicine and the need for continuous training. This is precisely why today

zastupa njihove interese, promoviše njihov rad i bori se za dostojanstvo profesije. Tu stručna literatura ima veoma važnu ulogu. Kroz stručne radove, istraživanja i preporuke medicinske sestre mogu pronaći savremena rješenja za izazove sa kojima se susreću u praksi.

Literatura omogućava razmjenu iskustava i prikaz primjera dobre prakse koji mogu pomoći u organizaciji rada, unapređenju komunikacije sa pacijentima i povećanju kvaliteta zdravstvene njege. Takođe, stručni časopisi mogu otvoriti važna pitanja kao što su profesionalno sagorijevanje, zaštita mentalnog zdravlja zdravstvenih radnika, bezbjednost pacijenata i unapređenje uslova rada. Kada se o problemima stručno govori i piše, oni postaju vidljiviji i lakše dolaze u fokus stručne i šire javnosti.

**4. Koliko je važno uključivanje medicinskih sestara i tehničara u naučno-istraživački rad i objavljivanje stručnih iskustava iz prakse?**

Uključivanje medicinskih sestara i tehničara u naučno-istraživački rad od izuzetnog je značaja za razvoj savremenog sestrinstva. Medicinske sestre su svakodnevno uz pacijente, prate njihove potrebe, učestvuju u liječenju i zdravstvenoj njezi i upravo zbog toga posjeduju ogromno praktično iskustvo koje može biti veoma dragocjeno za unapređenje zdravstvene zaštite.

Mnoga važna saznanja nastaju upravo iz svakodnevne prakse. Problemi sa kojima se sestre susreću na odjeljenjima, načini organizacije rada, komunikacija sa pacijentima, prevencija komplikacija i unapređenje zdravstvene njege mogu postati teme stručnih i naučnih radova koji će koristiti cijeloj profesiji. Sa aspekta Saveza, veoma je važno podstaći medicinske sestre da vjeruju u svoje znanje i da budu aktivni učesnici stručnog i naučnog razvoja profesije. Dugo godina je postojalo mišljenje da medicinske sestre nemaju dovoljno prostora za naučni rad, međutim praksa pokazuje upravo suprotno – sestrinstvo posjeduje ogromno iskustvo koje zaslužuje da bude zapisano i predstavljeno stručnoj javnosti. Objavljivanjem stručnih iskustava medicinske sestre dobijaju priliku da njihovo znanje postane vidljivo i prepoznato.

more than ever we must work on mutual support, professional unity and strengthening the position of nurses in the health system. As an Association, we strive to continuously point out the problems that nurses face, but also to work on the affirmation of the profession and the improvement of working conditions. It is very important that nurses feel that they are not alone and that they have an organization that represents their interests, promotes their work and fights for the dignity of the profession. This is where professional literature plays a very important role. Through professional works, research and recommendations, nurses can find modern solutions for the challenges they face in practice. Literature enables the exchange of experiences and the presentation of examples of good practice that can help in organizing work, improving communication with patients and increasing the quality of health care. Also, professional journals can open up important issues such as professional burnout, mental health protection of healthcare workers, patient safety and improvement of working conditions. When problems are professionally discussed and written about, they become more visible and come more easily into the focus of professionals and the general public.

**4. How important is the inclusion of nurses and technicians in scientific and research work and the publication of professional experiences from practice?**

The inclusion of nurses and technicians in scientific and research work is extremely important for the development of modern nursing. Nurses are with patients every day, follow their needs, participate in treatment and health care, and precisely because of this, they possess enormous practical experience that can be very valuable for the improvement of health care. Many important insights arise precisely from everyday practice. Problems faced by nurses in the wards, ways of organizing work, communication with patients, prevention of complications and improvement of health care can become topics of professional and scientific works that will benefit the entire profession. From the perspective of the Association, it is very important to encourage nurses

Time se dodatno jača profesionalni ugled sestrinstva i pokazuje da medicinske sestre nisu samo izvršioci medicinskih procedura, već ravnopravni članovi zdravstvenog tima koji aktivno doprinose razvoju zdravstvenog sistema. Posebno je značajno da kroz časopis stvorimo kulturu međusobne podrške i motivacije, gdje će iskusnije kolege pomagati mlađima da napišu prve stručne radove i uključe se u istraživanja. Samo zajedno možemo graditi snažnije, obrazovanije i vidljivije sestrinstvo.

**5. Koju poruku biste uputili mladim medicinskim sestrama i tehničarima o značaju kontinuiranog obrazovanja, profesionalnog razvoja, publikovanja radova i očuvanja ugleda sestrinske profesije?**

Mladim medicinskim sestrama i tehničarima poručila bih da budu ponosni na profesiju koju su izabrali, jer je sestrinstvo mnogo više od zanimanja – to je poziv koji traži znanje, humanost, odgovornost i veliku posvećenost čovjeku. Važno je da nikada ne prestanu učiti. Medicina i zdravstvena njega se svakodnevno razvijaju i upravo zato kontinuirano obrazovanje predstavlja osnov profesionalnog razvoja. Svaka edukacija, stručno predavanje, konferencija, pročitan stručni rad ili novo iskustvo doprinosi kvalitetnijem radu i sigurnijoj njezi pacijenata. Kao predsjednica Saveza, posebno želim da ohrabrim mlade medicinske sestre i tehničare da budu aktivni, hrabri i uključeni u razvoj profesije. Potrebna nam je nova generacija zdravstvenih radnika koja će donositi nova znanja, ideje i energiju, ali koja će istovremeno čuvati humanost i vrijednosti na kojima sestrinstvo počiva. Takođe, veoma je važno da vjeruju u svoje znanje i da se ne plaše da svoja iskustva podijele sa drugima. Svaka medicinska sestra ima iskustva iz prakse koja mogu biti korisna kolegama i doprinijeti unapređenju profesije. Zato je značajno uključivati se u pisanje stručnih radova, istraživanja i publikovanje iskustava iz svakodnevnog rada. Želim da razumiju da samo jedinstveni možemo jačati položaj sestrinske profesije. Savez postoji upravo zbog medicinskih sestara i tehničara – da ih povezuje, podržava, edukuje i zastupa. Naš cilj je da zajedno gradimo profesiju koja će biti prepoznata po

to believe in their knowledge and to be active participants in the professional and scientific development of the profession. For many years there was an opinion that nurses do not have enough space for scientific work, however, practice shows exactly the opposite - nursing has a huge experience that deserves to be written down and presented to the professional public. By publishing professional experiences, nurses get the opportunity to make their knowledge visible and recognized. This further strengthens the professional reputation of nursing and shows that nurses are not just performers of medical procedures, but equal members of the healthcare team who actively contribute to the development of the healthcare system. It is especially important to create a culture of mutual support and motivation through the journal, where more experienced colleagues will help younger ones to write their first professional papers and get involved in research. Only together can we build a stronger, more educated and more visible sisterhood.

**5. What message would you send to young nurses and technicians about the importance of continuing education, professional development, publishing papers and preserving the reputation of the nursing profession?**

I would tell young nurses and technicians to be proud of the profession they have chosen, because nursing is much more than a profession - it is a calling that requires knowledge, humanity, responsibility and a great commitment to people. It is important that they never stop learning. Medicine and health care are developing every day, and this is precisely why continuous education is the basis of professional development. Every education, professional lecture, conference, professional work read or new experience contributes to better quality work and safer patient care. As president of the Association, I especially want to encourage young nurses and technicians to be active, courageous and involved in the development of the profession. We need a new generation of health workers who will bring new knowledge, ideas and energy, but who will at the same time preserve the humanity and values on which nursing rests. Also, it is very important that

znanju, stručnosti, odgovornosti i humanosti. Posebno je važno očuvati ugled profesije. Medicinske sestre su često prvi oslonac pacijentu u trenucima bolesti, straha i neizvjesnosti. Jedna riječ podrške, razumijevanje i profesionalan odnos mogu imati ogroman značaj za pacijenta i njegovu porodicu. Zato sestrinstvo uvijek mora ostati profesija znanja, empatije, humanosti i dostojanstva.

they believe in their knowledge and that they are not afraid to share their experiences with others. Every nurse has practical experience that can be useful to colleagues and contribute to the improvement of the profession. That is why it is important to get involved in writing professional papers, research and publishing experiences from everyday work. I want them to understand that only by being united can we strengthen the position of the nursing profession. The alliance exists precisely because of nurses and technicians - to connect, support, educate and represent them. Our goal is to build a profession together that will be recognized for its knowledge, expertise, responsibility and humanity. It is especially important to preserve the reputation of the profession. Nurses are often the patient's first support in times of illness, fear and uncertainty. A word of support, understanding and a professional relationship can have a huge impact on the patient and his family. That is why nursing must always remain a profession of knowledge, empathy, humanity and dignity.

# GORAN MOTIKA
# PREDSJEDNIK STRUKOVNOG SINDIKATA MEDICINSKIH SESTARA I TEHNIČARA REPUBLIKE SRPSKE

# GORAN MOTIKA
# PRESIDENT OF THE PROFESSIONAL UNION OF NURSES AND MEDICAL TECHNICIANS OF THE REPUBLIC OF SRPSKA

Strukovni sindikat medicinskih sestara i tehničara Republike Srpske sa radošću očekuje izlazak prvog broja časopisa koji će se baviti isključivo temama vezanim za struku. Budući da je slogan našeg sindikata „Naš motiv je struka“ mislim da to dovoljno govori koliko nas raduju sve aktivnosti koje na bilo koji način pridonose promociji i unapređenju svakog segmenta naše profesije. Stava smo da sestrinstvo u svim svojim oblicima, profilima i nivoima obrazovanja u Republici Srpskoj dobija na značaju, status se polako popravlja, neke teme koje su bile nezamislive prije par godina sada su na pregovaračkom stolu. Ovaj časopis dolazi možda u pravom trenutku, kao pečat jednog procesa koji traje nekoliko godina i koji se mora nastaviti, sve dok status medicinskih sestara i tehničara svih profila i nivoa obrazovanja ne bude na nivou na kom treba da bude! Strukovni sindikat medicinskih sestara i tehničara se prije svega bavi zaštitom pravnog i socio-ekonomskog statusa svih naših članova, ali smo jako svjesni činjenice da što smo i formalno i neformalno edukovaniji i bolji u svom poslu, samim tim možemo tražiti i više prava i bolji položaj. Uvijek smo bili i uvijek ćemo biti na usluzi svim našim kolegama, mislimo da su jedinstvo i brojnost, kako u sindikatu, tako i u strukovnim udruženjima,

The Professional Union of Nurses and Medical Technicians of the Republic of Srpska eagerly awaits the publication of the first issue of a journal dedicated exclusively to topics related to our profession. Since the slogan of our union is “Our Motivation Is the Profession!”, I believe this clearly reflects how much we value and welcome all activities that contribute in any way to the promotion and advancement of every aspect of our profession. We firmly believe that nursing, in all its forms, specializations, and educational levels in the Republic of Srpska, is gaining increasing recognition and importance. Its status is gradually improving, and topics that would have been unimaginable to discuss just a few years ago are now being addressed at the negotiating table. This journal may be arriving at exactly the right moment as a hallmark of a process that has been ongoing for several years and must continue until the status of nurses and medical technicians of all profiles and educational levels reaches the level it rightfully deserves. The Professional Union of Nurses and Medical Technicians is primarily dedicated to protecting the legal and socio-economic rights of all our members. At the same time, we are fully aware that the more educated we are, both formally and informally, and

ono što nam svima treba, da bi mogli biti jači u pregovaračkim procesima, a sve u korist naše profesije, jedne od najljepših, najhumanijih i najodgovornijih struka na svijetu!

Svim urednicima časopisa NurseNexus Journal želimo sretan rad i da slavimo jubileje rada! Jer, naš motiv je struka!

the more competent we become in our work, the stronger our position will be in advocating for greater rights and improved professional standing. We have always been, and will continue to be, at the service of all our colleagues. We believe that unity and strong membership—both within trade unions and professional associations—are essential if we are to strengthen our position in negotiation processes, all for the benefit of our profession, one of the most beautiful, humane, and responsible professions in the world.

We wish the entire editorial team of the NurseNexus Journal every success in their work and many anniversaries to celebrate in the years ahead. Because our motivation is the profession!

***Original scientific article***

# ZDRAVSTVENA PISMENOST OBOLJELIH OD DIABETES MELLITUS-A NA PODRUČJU REGIJE PRIJEDOR

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## APSTRAKT

Uvod. Zdravstvena pismenost predstavlja sposobnost pojedinca da pristupi, razumije i koristi zdravstvene informacije radi donošenja odgovarajućih odluka o zdravlju. Kod osoba oboljelih od diabetes mellitusa ona ima poseban značaj zbog složenosti samokontrole bolesti, pridržavanja terapije i prevencije komplikacija. Cilj ovog rada bio je ispitati nivo zdravstvene pismenosti kod osoba oboljelih od diabetes mellitusa i utvrditi povezanost između sociodemografskih karakteristika i zdravstvene pismenosti.

Materijal i metode**.** Istraživanje je sprovedeno kao studija presjeka u periodu od 1. aprila do 1. juna 2025. godine među 61 članom Udruženja dijabetičara Prijedor. Za procjenu zdravstvene pismenosti korišten je standardizovani upitnik DKQ-24, koji obuhvata pet domena: etiologiju i simptome dijabetesa, srednji nivo njege, komplikacije dijabetesa, dijetu i tretman te osnovnu njegu. Podaci su analizirani primjenom deskriptivne statistike, $\chi^2$ testa, Studentovog t-testa i ANOVA testa, uz nivo statističke značajnosti $p<0,05$.

# HEALTH LITERACY AMONG PATIENTS WITH DIABETES MELLITUS IN THE PRIJEDOR REGION

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## ABSTRACT

Introduction. Health literacy refers to an individual's ability to access, understand, and utilize health-related information in order to make appropriate decisions regarding their health. Among individuals with diabetes mellitus, health literacy is of particular importance due to the complexity of disease self-management, treatment adherence, and prevention of complications. Objective**.** To assess the level of health literacy among individuals with diabetes mellitus and to examine the association between sociodemographic characteristics and health literacy. Material and methods**.** A cross-sectional study was conducted between April 1 and June 1, 2025, among 61 members of the Diabetes Association of Prijedor. Health literacy was assessed using the standardized Diabetes Knowledge Questionnaire (DKQ-24), which comprises five domains: etiology and symptoms of diabetes, intermediate level of care, diabetes-related complications, diet and treatment, and basic care. Data were analyzed using descriptive statistics, the chi-square test, Student's t-test, and

Rezultati. Uzorak je činilo 36,1% muškaraca i 63,9% žena, prosječne starosti 55,26 godina. Najveći nivo znanja ispitanici su pokazali u domenu osnovne njege (Me=2,90), dok je najniži nivo znanja zabilježen u domenu srednjeg nivoa njege (Me=0,87). Statistički značajna razlika prema polu utvrđena je samo u domenu osnovne njege, pri čemu su žene ostvarile bolje rezultate (p=0,012). Nisu utvrđene statistički značajne razlike u zdravstvenoj pismenosti u odnosu na mjesto stanovanja, nivo obrazovanja i starosnu dob (p>0,05). U odnosu na tip dijabetesa, značajna razlika zabilježena je u domenu dijete i tretmana (p=0,042), gdje su ispitanici sa dijabetesom tipa 2 pokazali viši nivo znanja.

Zaključak**.** Ispitanici su pokazali zadovoljavajući nivo znanja o osnovnoj njezi dijabetesa, dok su nedostaci uočeni u segmentu srednjeg nivoa njege. Pol i tip dijabetesa predstavljaju faktore povezane sa pojedinim aspektima zdravstvene pismenosti, dok mjesto stanovanja, obrazovanje i starosna dob nisu pokazali značajan uticaj. Rezultati ukazuju na potrebu za kontinuiranom i ciljano usmjerenom edukacijom osoba oboljelih od dijabetesa.

**Ključne riječi:** zdravstvena pismenost, diabetes mellitus, samoupravljanje bolešću, edukacija pacijenata, hronične bolesti.

## UVOD

Svjetska zdravstvena organizacija je zdravstvenu pismenost definisala kao kognitivne i socijalne vještine i kapacitete potrebne za pristup, razumijevanje i korišćenje informacija na način koji promoviše i štiti dobro zdravlje. Ukratko se može definisati kao sposobnost donošenja adekvatnih odluka, koje se tiču zdravlja u svakodnevnom životu [1,2]. Zdravstvena pismenost je termin od sve većeg značaja u zdravstvenoj zaštiti i javnom zdravlju, a uveden je sedamdesetih godina prošlog vijeka. Ona predstavlja ne samo pozicioniranje vlastitog zdravlja, nego i zdravlja porodice i zajednice, kao i faktora koji utiču na zdravlje. Što je osoba zdravstveno pismenija, ima veću sposobnost da preuzme odgovornost za lično zdravlje, zdravlje porodice i zdravlje šire okoline. Brojne studije su

one-way analysis of variance, with the level of statistical significance set at $p < 0.05$.

Results**.** The study sample consisted of 36.1% men and 63.9% women, with a mean age of 55.26 years. Participants demonstrated the highest level of knowledge in the domain of basic care (Mean = 2.90), whereas the lowest level of knowledge was observed in the intermediate care domain (Mean = 0.87). A statistically significant gender difference was identified only in the domain of basic diabetes care, with women achieving better results than men ($p = 0.012$). No statistically significant differences in health literacy were observed according to place of residence, educational level, or age ($p > 0.05$). Regarding diabetes type, a significant difference was found in the diet and treatment domain ($p = 0.042$), where participants with type 2 diabetes demonstrated higher levels of knowledge.

Conclusion**.** Participants demonstrated a satisfactory level of knowledge regarding basic diabetes care, whereas deficiencies were identified in the domain of intermediate care. Gender and type of diabetes were associated with specific aspects of health literacy, while place of residence, educational attainment, and age showed no significant influence. The findings highlight the need for continuous and targeted educational interventions for individuals living with diabetes.

**Keywords:** health literacy, diabetes mellitus, disease self-management, patient education, chronic diseases.

## INTRODUCTION

The World Health Organization (WHO) has defined health literacy as the cognitive and social skills and capacities required to access, understand, and use information in ways that promote and maintain good health. In brief, it can be defined as the ability to make appropriate health-related decisions in everyday life [1,2]. Health literacy is a term of increasing importance in healthcare and public health, having been introduced in the 1970s. It encompasses not only an individual's own health but also the health of their family and community, as well as the factors that influence health. The more health literate a person is,

pokazale da je nizak nivo zdravstvene pismenosti usko povezan sa učestalijim pozivima hitne službe, većom upotrebom lijekova, povećanim rizikom za hospitalizaciju, većim stopama smrtnosti starijih osoba, kao i slabijom sposobnošću upravljanja hroničnim bolestima kao što je diabetes mellitus [3]. Diabetes mellitus (šećerna bolest), danas predstavlja jednu od najrasprostranjenijih hroničnih bolesti savremenog doba, s konstantnim porastom prevalencije širom svijeta uključujući Bosnu i Hercegovinu i Republiku Srpsku. Karakteriše je poremećaj metabolizma, ugljenih hidrata, masti i proteina, uslijed apsolutnog ili relativnog nedostatka inzulina. Bolest se svrstava među vodeće javnozdravstvene izazove današnjice zbog svoje visoke prevalencije, progresivne prirode i ozbiljnih komplikacija koje značajno utiču na morbiditet, mortalitet i kvalitet života oboljelih [4]. Upravo zbog visokog stepena složenosti, liječenje podrazumijeva i ospežnu edukaciju o samonjezi i samoupravljanju bolešću. Zahtjevi koji se postavljaju pred osobe sa dijabetesom dodatno su otežani činjenicom da se samonjega često zasniva na štampanim edukativnim materijalima i usmenim uputstvima, te zahtijeva razvijene vještine zdravstvene pismenosti [4]. Dosadašnja istraživanja pokazuju da je zdravstvena pismenost važan prediktor uspješnog upravljanja hroničnim bolestima, uključujući diabetes mellitus. Nizak nivo zdravstvene pismenosti povezan je sa slabijom kontrolom bolesti, češćim hospitalizacijama, većim rizikom od komplikacija i lošijim zdravstvenim ishodima. Osobe sa dijabetesom svakodnevno donose odluke vezane za ishranu, terapiju i samokontrolu bolesti, što zahtijeva adekvatno razumijevanje zdravstvenih informacija. Iako je značaj zdravstvene pismenosti u liječenju dijabetesa dobro prepoznat, podaci o njenom nivou među oboljelima u lokalnoj zajednici i dalje su ograničeni. Zbog toga je opravdano sprovesti ovo istraživanje kako bi se procijenio nivo zdravstvene pismenosti i znanja o dijabetesu te identifikovale oblasti u kojima je potrebno unaprijediti

the greater their ability to take responsibility for their own health, the health of their family, and the health of the wider community. Numerous studies have shown that low levels of health literacy are closely associated with more frequent emergency service utilization, increased medication use, a higher risk of hospitalization, higher mortality rates among older adults, and poorer ability to manage chronic diseases such as diabetes mellitus [3]. Diabetes mellitus (DM) is currently one of the most widespread chronic diseases of modern times, with a continuously increasing prevalence worldwide, including in Bosnia and Herzegovina and Republika Srpska. It is characterized by disturbances in the metabolism of carbohydrates, fats, and proteins due to an absolute or relative deficiency of insulin. The disease is considered one of the leading public health challenges today because of its high prevalence, progressive nature, and serious complications that significantly affect morbidity, mortality, and the quality of life of affected individuals [4]. Due to its high level of complexity, treatment also requires extensive education on self-care and self-management. The demands placed on individuals with diabetes are further complicated by the fact that self-care is often based on printed educational materials and verbal instructions, requiring well-developed health literacy skills [4]. Previous research has shown that health literacy is an important predictor of successful management of chronic diseases, including diabetes mellitus. Low levels of health literacy are associated with poorer disease control, more frequent hospitalizations, a greater risk of complications, and worse health outcomes. Individuals with diabetes make daily decisions regarding diet, therapy, and disease self-monitoring, all of which require an adequate understanding of health information. Although the importance of health literacy in diabetes management is well recognized, data on its level among individuals with diabetes in the local community remain limited. Therefore, it is justified to conduct this study in order to assess the level of health literacy and diabetes-related knowledge and to identify areas in which educational interventions and patient support should be improved. The aim of this

edukativne intervencije i podršku pacijentima. Cilj istraživanja je bio da se ispita zdravstvena pismenost oboljelih od diabetes mellitus-a, te da se ispita povezanost između sociodemografskih karakteristika i nivoa zdravstvene pismenosti.

## MATERIJAL I METODE

Istraživanje je sprovedeno kao studija presjeka, u periodu od 1.4. 2025. do 1.6.2025. godine. Studijom je obuhvaćen 61 član Udruženja dijabetičara Prijedor. Kriterijumi za uključivanje u studiju su bili: Dijagnostikovan DM tip 1 ili tip 2, starost 20 i više godina, oba pola, sposobnost da razumije pitanja u upitniku i da dobrovoljno učestvuju u istraživanju. Kriterijumi za neuključivanje su bili: Osobe koje nisu u mogućnosti da samostalno popune upitnik (kognitivna i mentalna oštećenja), osobe mlađe od 20 godina i osobe zdravstvene struke. U istraživanju je korištem DKQ-24 standardizovani upitnik (Diabetes Knowledge Questionnaire) sačinjen od 24 pitanja zatvorenog tipa. To je standardizovani instrument za procjenu znanja osoba o dijabetes melitusu. Sastoji se od 24 pitanja zatvorenog tipa, pri čemu ispitanici biraju tačan odgovor među ponuđenim opcijama. Upitnik je podijeljen u više tematskih oblasti koje obuhvataju ključne aspekte znanja o dijabetesu, uključujući etiologiju i simptome bolesti, osnovnu njegu, srednji nivo njege, komplikacije, dijetetski režim i terapijski pristup. Domena osnovne njege odnosi se na znanja neophodna za svakodnevno upravljanje dijabetesom i održavanje optimalne kontrole bolesti. Ova oblast procjenjuje koliko ispitanici razumiju osnovne principe samonjege, uključujući redovno praćenje zdravstvenog stanja, značaj održavanja odgovarajuće tjelesne težine, pravilnu higijenu, njegu stopala i prepoznavanje ranih znakova pogoršanja bolesti. Poseban naglasak stavlja se na preventivne mjere koje doprinose smanjenju rizika od razvoja komplikacija. Znanje iz ove domene smatra se temeljem uspješnog samoupravljanja dijabetesom, jer omogućava pacijentima da aktivno učestvuju u kontroli svoje bolesti i unapređenju kvaliteta

study was to examine the health literacy of individuals with diabetes mellitus and to investigate the association between sociodemographic characteristics and the level of health literacy.

## MATERIALS AND METHODS

This study was conducted as a cross-sectional study during the period from April 1, 2025, to June 1, 2025. The study included 61 members of the Diabetics Association of Prijedor. The inclusion criteria were: diagnosed type 1 or type 2 diabetes mellitus, age 20 years or older, both sexes, ability to understand the questionnaire items, and willingness to participate voluntarily in the study. The exclusion criteria were: inability to complete the questionnaire independently (due to cognitive or mental impairments), age below 20 years, and healthcare professionals. The standardized DKQ-24 (Diabetes Knowledge Questionnaire) was used in this study. The questionnaire consists of 24 closed-ended questions and is a standardized instrument for assessing individuals' knowledge of diabetes mellitus. Respondents select the correct answer from the offered options. The questionnaire is divided into several thematic domains covering key aspects of diabetes knowledge, including disease etiology and symptoms, basic care, intermediate-level care, complications, dietary regimen, and therapeutic approaches. The basic care domain refers to the knowledge necessary for the daily management of diabetes and the maintenance of optimal disease control. This area assesses the extent to which respondents understand the fundamental principles of self-care, including regular health monitoring, the importance of maintaining appropriate body weight, proper hygiene, foot care, and recognition of early signs of disease deterioration. Particular emphasis is placed on preventive measures that contribute to reducing the risk of complications. Knowledge within this domain is considered the foundation of successful diabetes self-management, as it enables patients to actively participate in controlling their disease and improving their quality of life. The intermediate-level care domain includes more advanced knowledge required for appropriate diabetes management

života. Domena srednjeg nivoa njege obuhvata složenija znanja potrebna za adekvatno upravljanje dijabetesom izvan osnovnih svakodnevnih aktivnosti. Ona uključuje razumijevanje postupaka vezanih za kontrolu glikemije, prepoznavanje i pravilno reagovanje na hipoglikemiju i hiperglikemiju, značaj redovnih medicinskih kontrola, laboratorijskog praćenja vrijednosti glukoze i glikoziliranog hemoglobina (HbA1c), kao i prilagođavanje terapije i životnih navika prema preporukama zdravstvenih radnika. Ova domena procjenjuje sposobnost ispitanika da primijene stečena znanja u različitim situacijama koje zahtijevaju viši nivo razumijevanja bolesti i donošenja odluka vezanih za njeno liječenje. Na osnovu ključa upitnika, tačan odgovor je bodovan sa jednim bodom, a netačan odgovor je dobio nula bodova. U ponuđenim odgovorima je bio i odgovor „Ne znam“ koji je bodovan sa nula bodova, ukoliko je ispitanik odabrao taj odgovor. Maksimalni skor upitnika je 24. Veći skor ukazuje na veći nivo znanja o dijabetesu, dok niži skor ukazuje na slabije poznavanje bolesti, njenog liječenja i samokontrole [5]. Pored validiziranog upitnika, sačinjen je sociodemografski upitnik od 6 pitanja od čega su 2 pitanja otvorenog tipa (godine starosti i dužina trajanja bolesti). Statistička obrada podataka je urađena pomoću SPSS softverskog statističkog paketa (verzija 23.0). Za statističku analizu korištene su metode deskriptivne statistike (Mean), $\chi^2$ test, student t test. Kao nivo statističke značajnosti razlika, uzeta je uobičajena vrijednost $p<0,05$.

## REZULTATI

Tabela 1 prikazuje deskriptivnu statistiku zdravstvene pismenosti ispitanika u pet domena DKQ-24 upitnika**,** na uzorku od N = 61 ispitanika. Za svaki domen prikazani su srednja vrijednost (Mean), standardna devijacija (SD), kao i minimalna i maksimalna ostvarena vrijednost. Najviši prosječan rezultat zabilježen je u domenu etiologija i simptomi dijabetesa (M = 3,70; SD = 1,39)**,** što ukazuje da su ispitanici najbolje poznavali osnovne uzroke i simptome bolesti.

beyond basic daily activities. It encompasses understanding procedures related to glycemic control, recognizing and appropriately responding to hypoglycemia and hyperglycemia, the importance of regular medical check-ups, laboratory monitoring of blood glucose and glycated hemoglobin (HbA1c) levels, as well as adjusting therapy and lifestyle habits according to healthcare professionals' recommendations. This domain assesses respondents' ability to apply acquired knowledge in various situations requiring a higher level of disease understanding and decision-making related to treatment. According to the questionnaire scoring key, each correct answer was awarded one point, while incorrect answers received zero points. The response option "I don't know" was also scored as zero points if selected by the respondent. The maximum possible score was 24. Higher scores indicate a greater level of diabetes knowledge, whereas lower scores indicate poorer understanding of the disease, its treatment, and self-management [5]. In addition to the validated questionnaire, a sociodemographic questionnaire consisting of six questions was developed, two of which were open-ended (age and duration of disease). Statistical data analysis was performed using the SPSS statistical software package (version 23.0). Descriptive statistical methods (mean), the chi-square ($\chi^2$) test, and Student's t-test were used for statistical analysis. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant.

## RESULTS

Table 1 presents the descriptive statistics of respondents' health literacy across the five domains of the DKQ-24 questionnaire in a sample of N = 61 participants. For each domain, the mean (M), standard deviation (SD), and minimum and maximum values are shown. The highest average score was recorded in the domain of diabetes etiology and symptoms (M = 3.70; SD = 1.39), indicating that respondents were most knowledgeable about the basic causes and symptoms of the disease. The next highest mean score was observed in the basic care domain (M = 2.90; SD = 0.30), which also

Sljedeći po prosječnoj vrijednosti je domen osnovna njega (M = 2,90; SD = 0,30)**,** gdje je ujedno uočen i najmanji raspon varijabilnosti, što ukazuje na relativno ujednačeno znanje ispitanika u ovom segmentu. Domen komplikacije dijabetesa pokazuje srednji nivo znanja (M = 2,80; SD = 0,48), dok je niži nivo znanja prisutan u domenima dijeta i tretman (M = 1,84; SD = 0,45) i posebno u srednjem nivou njege (M = 0,87; SD = 0,69)**,** koji predstavlja najslabije rezultate među svim ispitivanim oblastima. Ovi nalazi ukazuju da ispitanici imaju veće znanje o osnovnim aspektima bolesti, dok su složeniji segmenti samoupravljanja, poput terapijskih postupaka i detaljnijih preporuka o liječenju, slabije savladani. Standardne devijacije pokazuju da je najveća varijabilnost prisutna u domenu etiologije i simptoma, što znači da su ispitanici u ovom segmentu imali najrazličitije nivoe znanja. Nasuprot tome, najmanja varijabilnost uočena je u domenu osnovne njege, što ukazuje na relativno homogeno znanje ispitanika u toj oblasti. Minimalne i maksimalne vrijednosti dodatno potvrđuju raspon postignutih rezultata u svakom domenu, pri čemu se vidi da nijedan ispitanik nije ostvario maksimalan skor u svim segmentima, posebno u domenima srednjeg nivoa njege i dijete i tretmana, što dodatno ukazuje na prostor za unapređenje zdravstvene pismenosti u ovim oblastima.

***Tabela 1. Deskriptivna statistika zdravstvene pismenosti ispitanika u domenima DKQ-24 upitnika***

| | **Domeni zdravstvene pismenosti** | | | | |
|---|---|---|---|---|---|
| | **Etiologija i simptomi dijabetesa** | **Srednji nivo njege** | **Komplikacije dijabetesa** | **Dijeta i tretman** | **Osnovna njega** |
| **N** | 61 | 61 | 61 | 61 | 61 |
| **Mean** | 3.70 | 0.87 | 2.80 | 1.84 | 2.90 |
| **SD** | 1.39 | 0.69 | 0.48 | 0.45 | 0.30 |
| **Min** | .00 | .00 | 1.00 | .00 | 2.00 |
| **Max** | 6.00 | 3.00 | 3.00 | 2.00 | 3.00 |

Za procjenu razlika u zdravstvenoj pismenosti između grupa (po polu), korišten je nezavisni t-test za

demonstrated the smallest variability, indicating relatively consistent knowledge among respondents in this area. The diabetes complications domain demonstrated a moderate level of knowledge (M = 2.80; SD = 0.48), whereas lower levels of knowledge were observed in the diet and treatment domain (M = 1.84; SD = 0.45) and particularly in the intermediate-level care domain (M = 0.87; SD = 0.69), which showed the poorest results among all assessed areas. These findings indicate that respondents possessed greater knowledge of the fundamental aspects of the disease, while more complex elements of self-management, such as therapeutic procedures and detailed treatment recommendations, were less well understood. The standard deviations show that the greatest variability was present in the etiology and symptoms domain, suggesting substantial differences in respondents' knowledge levels in this area. In contrast, the smallest variability was observed in the basic care domain, indicating relatively homogeneous knowledge among respondents. The minimum and maximum values further confirm the range of achieved scores in each domain. Notably, no respondent achieved the maximum score across all domains, particularly in the intermediate-level care and diet and treatment domains, highlighting considerable room for improvement in health literacy within these areas.

***Table 1. Descriptive Statistics of Participants' Diabetes Knowledge Across the DKQ-24 Questionnaire Domains***

| | **Health literacy domains** | | | | |
|---|---|---|---|---|---|
| | **Etiology and Symptoms of Diabetes** | **Intermediate-Level Care** | **Diabetes Complications** | **Diet and Treatment** | **Basic Care** |
| **N** | 61 | 61 | 61 | 61 | 61 |
| **Mean** | 3.70 | 0.87 | 2.80 | 1.84 | 2.90 |
| **SD** | 1.39 | 0.69 | 0.48 | 0.45 | 0.30 |
| **Min** | .00 | .00 | 1.00 | .00 | 2.00 |
| **Max** | 6.00 | 3.00 | 3.00 | 2.00 | 3.00 |

To assess differences in health literacy between groups according to sex, an independent-samples t-

svaki od pet segmenata DKQ-24 upitnika: etiologija i simptomi, srednji nivo njege, komplikacije dijabetesa, dijeta i tretman, i osnovna njega. Pretpostavka o jednakosti varijansi testirana je Levene-ovim testom. Rezultati su prikazani u nastavku (tabela 2). Na osnovu rezultata nezavisnog t-testa (tabela 2), razlika u zdravstvenoj pismenosti između posmatranih grupa nije bila statistički značajna u četiri od pet segmenata upitnika. Statistički značajna razlika je utvrđena jedino u domenu osnovne njege dijabetesa, gjde osobe ženskog pola pokazuju viši nivo znanja (p = 0.012).

***Tabela 2. Razlike u zdravstvenoj pismenosti prema polu u domenima DKQ-24 upitnik***

| Segment DQK-24 | t(df) | p |
|---|---|---|
| **Etiologija i simptomi** | -0,476 (59) | 0,636 |
| **Srednji nivo njege** | 0,721 (59) | 0,474 |
| **Komplikacije dijabetesa** | -1,756 (26,27) | 0,091 |
| **Dijeta i tretman** | 1,908 (54,54) | 0,062 |
| **Osnovna njega** | **2,629 (38)** | **0,012** |

Tabela 3 prikazuje rezultate t-testa za nezavisne uzorke kojim su ispitane razlike u zdravstvenoj pismenosti između muškaraca i žena u pet domena DKQ-24 upitnika. Dobijeni rezultati pokazuju da ne postoje statistički značajne razlike između polova u većini ispitivanih domena, jer su sve p-vrijednosti veće od 0,05. To se odnosi na domene etiologija i simptomi (p = 0,588), srednji nivo njege (p = 0,956), komplikacije dijabetesa (p = 0,695) i osnovna njega (p = 0,756)**.** Ovi nalazi ukazuju na to da su muškarci i žene imali približno isti nivo znanja o osnovnim i složenijim aspektima dijabetesa. U domenu dijeta i tretman zabilježena je tendencija ka statističkoj značajnosti (t = -1,803; p = 0,076), ali razlika nije dostigla prag statističke značajnosti (p < 0,05). To može ukazivati na moguće blage razlike u znanju o ishrani i terapijskim mjerama između muškaraca i žena, ali one nisu dovoljno izražene da bi se statistički potvrdile. Sveukupno posmatrano, rezultati ukazuju da je zdravstvena pismenost u ispitivanom uzorku relativno ujednačena između polova, bez značajnih razlika u većini domena DKQ-24 upitnika.

test was performed for each of the five domains of the DKQ-24 questionnaire: etiology and symptoms, intermediate-level care, diabetes complications, diet and treatment, and basic care. The assumption of homogeneity of variances was tested using Levene's test. The results are presented in Table 2. Based on the results of the independent-samples t-test (Table 2), differences in health literacy between the observed groups were not statistically significant in four of the five questionnaire domains. A statistically significant difference was identified only in the domain of basic diabetes care, where female participants demonstrated a higher level of knowledge than male participants (p = 0.012).

***Table 2. Differences in Health Literacy According to Sex Across the DKQ-24 Questionnaire Domains***

| DKQ-24 Domain | t (df) | p |
|---|---|---|
| **Etiology and Symptoms** | -0.476 (59) | 0.636 |
| **Intermediate-Level Care** | 0.721 (59) | 0.474 |
| **Diabetes Complications** | -1.756 (26.27) | 0.091 |
| **Diet and Treatment** | 1.908 (54.54) | 0.062 |
| **Basic Care** | 2.629 (38) | 0.012 |

Table 3 presents the results of an independent-samples t-test examining differences in health literacy between men and women across the five domains of the DKQ-24 questionnaire. The findings indicate that there were no statistically significant sex differences in most of the examined domains, as all p-values exceeded 0.05. This applied to the domains of etiology and symptoms (p = 0.588), intermediate-level care (p = 0.956), diabetes complications (p = 0.695), and basic care (p = 0.756). These findings suggest that men and women had comparable levels of knowledge regarding both the basic and more complex aspects of diabetes. In the diet and treatment domain, a trend toward statistical significance was observed (t = -1.803; p = 0.076), although the difference did not reach the conventional threshold for statistical significance (p < 0.05). This may indicate slight differences in knowledge related to dietary management and therapeutic measures between men and women; however, these differences were not sufficiently pronounced to be statistically

*Tabela 3. Razlike u zdravstvenoj pismenosti prema polu u domenima DKQ-24 upitnika*

| Segment DQK-24 | t(df) | P |
|---|---|---|
| **Etiologija i simptomi** | -0,545 (59) | 0,588 |
| **Srednji nivo njege** | 0,055 (59) | 0,956 |
| **Komplikacije dijabetesa** | 0,394 (59) | 0,695 |
| **Dijeta i tretman** | -1,803 (59) | 0,076 |
| **Osnovna njega** | 0,312 | 0,756 |

Za ispitivanje razlika u zdravstvenoj pismenosti u odnosu na nivo obrazovanja (osnovna škola, srednja stručna sprema, viša i visoka stručna sprema) sprovedena je jednofaktorska analiza varijanse (ANOVA) za pet domena DKQ-24 upitnika. Rezultati su pokazali da ne postoje statistički značajne razlike u prosečnim rezultatima između grupa u nijednom od domena, što je predstavljeno u Tabeli 4. Ovi rezultati ukazuju da nivo obrazovanja ispitanika ne utiče značajno na njihove rezultate u okviru zdravstvene pismenosti za ispitane domene.

*Tabela 4. Razlike u zdravstvenoj pismenosti prema nivou obrazovanja u domenima DKQ-24 upitnika*

| Segment DQK-24 | F(df= 3,57) | p |
|---|---|---|
| **Etiologija i simptomi** | 0,818 | 0,489 |
| **Srednji nivo njege** | 0,045 | 0,987 |
| **Komplikacije dijabetesa** | 0,978 | 0,410 |
| **Dijeta i tretman** | 0,359 | 0,783 |
| **Osnovna njega** | 0,804 | 0,497 |

U tabeli 5 su prikazani rezultati hi-kvadrat testa nezavisnosti, kojim je ispitivana povezanost između starosne dobi ispitanika (mlađa, srednja i starija dob) i nivoa zdravstvene pismenosti u pet segmenata DKQ-24 upitnika. Dobijene p-vrednosti ukazuju da nema statistički značajnih razlika u nivou zdravstvene pismenosti među ispitanicima različitih starosnih kategorija niti u nijednom od ispitivanih domena ($p > 0,05$). Najniža p-vrijednost iznosila je 0,518 u segmentu „Dijeta i tretman“, što takođe nije statistički značajno.

confirmed. Overall, the results suggest that health literacy within the studied sample was relatively similar between sexes, with no significant differences across most DKQ-24 domains.

*Table 3. Differences in Health Literacy According to Sex Across the DKQ-24 Questionnaire Domains*

| DKQ-24 Domain | t(df) | P |
|---|---|---|
| **Etiology and Symptoms** | -0.545 (59) | 0.588 |
| **Intermediate-Level Care** | 0.055 (59) | 0.956 |
| **Diabetes Complications** | 0.394 (59) | 0.695 |
| **Diet and Treatment** | -1.803 (59) | 0.076 |
| **Basic Care** | 0.312 | 0.756 |

To examine differences in health literacy according to educational level (primary school, secondary education, college degree, and university degree), a one-way analysis of variance was conducted for the five domains of the DKQ-24 questionnaire. The results showed no statistically significant differences in mean scores between educational groups in any of the examined domains, as presented in Table 4. These findings indicate that participants' educational attainment did not significantly influence their health literacy scores across the assessed domains.

*Table 4. Differences in Health Literacy According to Educational Level Across the DKQ-24 Questionnaire Domains*

| DKQ-24 Domain | F(df= 3.57) | p |
|---|---|---|
| **Etiology and Symptoms** | 0.818 | 0.489 |
| **Intermediate-Level Care** | 0.045 | 0.987 |
| **Diabetes Complications** | 0.978 | 0.410 |
| **Diet and Treatment** | 0.359 | 0.783 |
| **Basic Care** | 0.804 | 0.497 |

Table 5 presents the results of the chi-square test of independence used to examine the association between participants' age group (younger, middle-aged, and older adults) and the level of health literacy across the five DKQ-24 domains. The obtained p-values indicate that there were no statistically significant differences in health literacy among participants from different age categories in any of the examined domains ($p > 0.05$). The lowest p-value

***Tabela 5. Razlike u zdravstvenoj pismenosti prema mjestu stanovanja u domenima DKQ-24 upitnika***

| Segment DQK-24 | $X^2$ | Df | p |
|---|---|---|---|
| **Etiologija i simptomi** | 10,891 | 12 | 0,538 |
| **Srednji nivo njege** | 3,955 | 6 | 0,683 |
| **Komplikacije dijabetesa** | 2,197 | 4 | 0,700 |
| **Dijeta i tretman** | 2,923 | 4 | 0,518 |
| **Osnovna njega** | 2,197 | 4 | 0,700 |

U tabeli 6 je prikazano poređenje nivoa zdravstvene pismenosti između ispitanika sa tipom 1 i tipom 2 dijabetesa, korištenjem nezavisnog t-testa za svaki od pet segmenata upitnika DKQ-24. Leveneov test homogenosti varijansi pokazao je da za segmente „Komplikacije dijabetesa“, „Dijeta i tretman“ i „Osnovna njega“ varijanse nisu homogene ($p < 0.05$), zbog čega su za ove segmente korišteni rezultati t-testa bez pretpostavke jednake varijanse. Rezultati t-testa ukazuju da postoji statistički značajna razlika samo u segmentu „Dijeta i tretman“ ($t(59) = -2.077$, $p = 0.042$), gdje ispitanici sa tipom 1 dijabetesa pokazuju nešto niži prosjek u odnosu na tip 2. Za ostale segmente razlike nisu bile statistički značajne ($p > 0.05$). Ovi nalazi sugerišu da tip dijabetesa generalno ne utiče na nivo zdravstvene pismenosti u većini domena, osim u segmentu vezanom za dijetu i tretman.

***Tabela 6. Razlike u zdravstvenoj pismenosti prema tipu dijabetesa u domenima DKQ-24 upitnika***

| Segment DQK-24 | t | df | p |
|---|---|---|---|
| **Etiologija i simptomi** | 0,82 | 59 | 0,415 |
| **Srednji nivo njege** | 1,34 | 59 | 0,187 |
| **Komplikacije dijabetesa** | -1,61 | 59 | 0,112 |
| **Dijeta i tretman** | -2,08 | 59 | 0,042 |
| **Osnovna njega** | -1,27 | 59 | 0,209 |

## DISKUSIJA

U uzorku od 61 ispitanika, većinu su činile žene (63,9%), dok je najzastupljenija starosna grupa bila između 36 i 60 godina. Pretežni dio uzorka dolazio je iz ruralnih sredina (60,7%), što je značajno sa aspekta dostupnosti zdravstvenih informacija i edukacije. Prosječno trajanje bolesti je bilo 6,3 godine, a većina ispitanika bolovala je od dijabetesa tipa 2 (72,1%). Rezultati su pokazali da su ispitanici najbolje

was observed in the Diet and Treatment domain ($p = 0.518$), which was also not statistically significant.

***Table 5. Differences in Health Literacy According to Place of Residence Across the DKQ-24 Questionnaire Domains***

| Segment DQK-24 | $X^2$ | Df | p |
|---|---|---|---|
| **Etiology and Symptoms** | 10.891 | 12 | 0.538 |
| **Intermediate-Level Care** | 3.955 | 6 | 0.683 |
| **Diabetes Complications** | 2.197 | 4 | 0.700 |
| **Diet and Treatment** | 2.923 | 4 | 0.518 |
| **Basic Care** | 2.197 | 4 | 0.700 |

Table 6 presents a comparison of health literacy levels between participants with type 1 and type 2 diabetes, using an independent-samples t-test for each of the five DKQ-24 questionnaire domains. Levene's test for homogeneity of variances indicated that the assumption of equal variances was violated for the domains of Diabetes Complications, Diet and Treatment, and Basic Care ($p < 0.05$). Therefore, the t-test results without the assumption of equal variances were used for these domains. The t-test results showed a statistically significant difference only in the Diet and Treatment domain ($t(59) = -2.077$, $p = 0.042$), where participants with type 1 diabetes demonstrated a slightly lower mean score compared with those with type 2 diabetes. No statistically significant differences were observed in the remaining domains ($p > 0.05$). These findings suggest that the type of diabetes generally does not influence health literacy levels across most domains, with the exception of the domain related to diet and treatment.

***Table 6. Differences in Health Literacy According to Type of Diabetes Across the DKQ-24 Questionnaire Domains***

| DKQ-24 Domain | t | df | p |
|---|---|---|---|
| **Etiology and Symptoms** | 0.82 | 59 | 0.415 |
| **Intermediate-Level Care** | 1.34 | 59 | 0.187 |
| **Diabetes Complications** | -1.61 | 59 | 0.112 |
| **Diet and Treatment** | -2.08 | 59 | 0.042 |
| **Basic Care** | -1.27 | 59 | 0.209 |

## DISCUSSION

Among the 61 participants included in the study, the majority were women (63.9%), while the most represented age group was between 36 and 60 years.

poznavali domen osnovne njege (Me=2,90), a najmanje domen srednjeg nivoa njege (Me=0,86). To ukazuje da osnovni pojmovi i svakodnevne radnje vezane za dijabetes, poput kontrole šećera, apliciranja insulina i osnovne higijene, jesu poznati većini ispitanika. S druge strane, nedostatak znanja u domenu srednjeg nivoa njege može ukazivati na slabu edukaciju kada su u pitanju složeniji aspekti samopomoći, kao što su interpretacija glikemijskih vrijednosti i donošenje odluka u kriznim situacijama. Razlike prema polu za zdravstvenu pismenost bile su statistički značajne jedino u domenu osnovne njege, gdje su žene pokazale veći nivo znanja (p=0,012). Ovaj nalaz može se objasniti činjenicom da žene tradicionalno češće preuzimaju aktivnu ulogu u brizi o vlastitom zdravlju, ali i zdravlju članova porodice, zbog čega su više izložene zdravstvenim informacijama i edukativnim sadržajima. Takođe, žene češće koriste preventivne zdravstvene usluge, redovnije odlaze na ljekarske preglede i pokazuju veću spremnost za usvajanje preporuka zdravstvenih radnika, što može doprinijeti boljem poznavanju aspekata osnovne njege. Ovaj podatak je u skladu sa studijom AlSayyad i Abdulrahman [6], koji ističu da žene češće učestvuju u zdravstvenim edukacijama i pokazuju veću zainteresovanost za očuvanje zdravlja. Autori navode da su žene u njihovom istraživanju bile sklonije pohađanju savjetovališta i edukativnih programa, što je rezultiralo višim nivoom zdravstvene pismenosti i boljim razumijevanjem preporuka vezanih za samonjegu i kontrolu bolesti. Veća uključenost žena u procese zdravstvene edukacije može imati značajnu ulogu u sticanju i održavanju znanja potrebnih za svakodnevno upravljanje hroničnim bolestima kao što je dijabetes. Istraživanje koje su sproveli Santos i saradnici [7] takođe je pokazalo viši nivo znanja kod žena, iako razlike između polova nisu bile statistički značajne u većini ispitivanih domena. Ovakvi rezultati ukazuju na to da pol sam po sebi možda nije presudan faktor zdravstvene pismenosti, ali da određene socijalne i bihevioralne karakteristike koje se češće povezuju sa ženama mogu doprinijeti boljem razumijevanju zdravstvenih informacija. S obzirom na to da je statistički značajna razlika u ovom istraživanju

Most participants resided in rural areas (60.7%), which is an important consideration in terms of access to health information and educational resources. The mean duration of diabetes was 6.3 years, and the majority of participants had type 2 diabetes (72.1%). The results showed that participants demonstrated the highest level of knowledge in the domain of basic care (Me = 2.90), whereas the lowest level of knowledge was observed in the domain of intermediate-level care (Me = 0.86). These findings suggest that most participants were familiar with the basic concepts and routine practices related to diabetes management, such as blood glucose monitoring, insulin administration, and basic hygiene. Conversely, the limited knowledge observed in the intermediate-level care domain may indicate insufficient education regarding more complex aspects of self-management, including the interpretation of blood glucose values and decision-making in emergency situations. Gender differences in health literacy were statistically significant only in the domain of basic care, where women demonstrated a higher level of knowledge than men (p = 0.012). This finding may be explained by the fact that women traditionally assume a more active role in managing both their own health and the health of their family members, resulting in greater exposure to health information and educational materials. In addition, women are more likely to utilize preventive healthcare services, attend regular medical check-ups, and adhere to healthcare professionals' recommendations, all of which may contribute to a better understanding of basic diabetes care. These findings are consistent with the study by AlSayyad and Abdulrahman [6], who reported that women participate more frequently in health education programs and show greater interest in maintaining their health. The authors found that women in their study were more likely to attend counseling sessions and educational programs, resulting in higher levels of health literacy and a better understanding of recommendations related to self-care and disease management. Greater involvement of women in health education activities may therefore play an important role in acquiring and maintaining the

utvrđena samo u domenu osnovne njege, može se pretpostaviti da muškarci i žene imaju sličan nivo opšteg znanja o dijabetesu, dok se razlike najviše ispoljavaju u segmentima koji se odnose na svakodnevnu brigu o zdravlju, preventivne aktivnosti i primjenu preporuka u svakodnevnom životu. Ovi nalazi ukazuju na potrebu za dodatnim edukativnim aktivnostima usmjerenim prema muškarcima, kako bi se unaprijedilo njihovo znanje i aktivnije učešće u samoupravljanju bolešću. Zanimljivo je da mjesto stanovanja nije imalo statistički značajan uticaj na zdravstvenu pismenost. Ispitanici iz ruralnih i urbanih sredina pokazali su sličan nivo znanja u svim ispitivanim domenima, što ukazuje da dostupnost informacija i razumijevanje zdravstvenih sadržaja ne zavise isključivo od mjesta stanovanja. Ovakav nalaz je posebno značajan jer se tradicionalno smatra da stanovnici urbanih sredina imaju bolji pristup zdravstvenim ustanovama, specijalističkim službama, edukativnim programima i različitim izvorima zdravstvenih informacija. Međutim, savremeni načini komunikacije i dostupnost digitalnih izvora informacija mogu djelimično objasniti izostanak razlika između ruralne i urbane populacije. Razvoj interneta, društvenih mreža i elektronskih medija omogućio je lakši pristup zdravstvenim informacijama bez obzira na geografsku udaljenost od zdravstvenih centara. Takođe, aktivnosti primarne zdravstvene zaštite, patronažnih službi i porodične medicine mogu doprinijeti ravnomjernijoj dostupnosti zdravstvenog obrazovanja stanovništvu u različitim sredinama. Ovi rezultati su u skladu sa studijom Cicolini i saradnika [8], koja pokazuje da zdravstvena pismenost nije nužno određena geografskom lokacijom, već nizom individualnih i socijalnih faktora. Autori ističu da na nivo zdravstvene pismenosti značajno utiču motivacija pojedinca, sposobnost razumijevanja zdravstvenih informacija, podrška porodice, socioekonomski status, prethodna iskustva sa bolešću i učestalost kontakta sa zdravstvenim radnicima. Osobe koje su aktivno uključene u proces liječenja i koje imaju razvijenu mrežu podrške često postižu viši nivo zdravstvene pismenosti bez obzira na mjesto stanovanja. Dodatno, kod osoba oboljelih od

knowledge required for the effective daily management of chronic diseases such as diabetes. Similarly, the study conducted by Santos et al. [7] demonstrated higher levels of knowledge among women, although gender differences were not statistically significant across most of the domains examined. These findings suggest that gender itself may not be a decisive determinant of health literacy; however, certain social and behavioral characteristics more commonly associated with women may contribute to a better understanding of health information. Given that the present study identified a statistically significant gender difference only in the domain of basic care, it may be assumed that men and women possess comparable overall knowledge of diabetes, while the greatest differences are observed in aspects related to everyday self-care. related to daily health management, preventive behaviors, and the implementation of health recommendations in everyday life. These findings highlight the need for additional educational interventions targeting men in order to improve their knowledge and encourage more active participation in diabetes self-management. Interestingly, place of residence did not have a statistically significant impact on health literacy. Participants from rural and urban areas demonstrated similar levels of knowledge across all assessed domains, suggesting that access to health information and the understanding of health-related content are not determined solely by place of residence. This finding is particularly important because it has traditionally been assumed that urban residents have better access to healthcare facilities, specialist services, educational programs, and various sources of health information. However, modern communication technologies and the widespread availability of digital information resources may partly explain the absence of differences between rural and urban populations. The development of the internet, social media, and electronic media has enabled easier access to health information regardless of geographical distance from healthcare centers. Furthermore, the activities of primary healthcare services, community nursing services, and family medicine may contribute to more equitable access to

dijabetesa važnu ulogu imaju trajanje bolesti i kontinuirana edukacija tokom liječenja. Pacijenti koji duže žive sa dijabetesom imaju više prilika da kroz kontakte sa zdravstvenim radnicima steknu znanja o samokontroli bolesti, pravilnoj ishrani, terapiji i prevenciji komplikacija. Zbog toga se razlike koje bi eventualno proizlazile iz mjesta stanovanja mogu umanjiti ili potpuno izgubiti pod uticajem drugih faktora koji snažnije određuju nivo zdravstvene pismenosti. Nalazi ovog istraživanja ukazuju da intervencije usmjerene na unapređenje zdravstvene pismenosti ne bi trebalo planirati isključivo prema geografskim karakteristikama stanovništva, već uzimajući u obzir individualne potrebe pacijenata, njihov nivo obrazovanja, motivaciju za učenje i dostupnost kontinuirane edukativne podrške. Takav pristup može biti efikasniji u unapređenju znanja i vještina potrebnih za uspješno upravljanje dijabetesom. Kada se razmatra uticaj nivoa obrazovanja, u ovom istraživanju nisu utvrđene statistički značajne razlike u zdravstvenoj pismenosti među ispitanicima različitog obrazovnog nivoa. Ovakav nalaz je donekle neočekivan, s obzirom na to da se obrazovanje u literaturi često navodi kao jedan od najvažnijih prediktora zdravstvene pismenosti. Viši nivo obrazovanja obično se povezuje sa boljim sposobnostima pronalaženja, razumijevanja, procjene i primjene zdravstvenih informacija, kao i sa većom sposobnošću donošenja informisanih odluka o vlastitom zdravlju. Rezultati ovog istraživanja razlikuju se od nalaza Gazmararian i saradnika [9], koji su utvrdili jasnu povezanost između višeg nivoa formalnog obrazovanja i višeg nivoa zdravstvene pismenosti. Prema njihovim nalazima, osobe sa višim stepenom obrazovanja lakše razumiju medicinsku terminologiju, bolje se snalaze u zdravstvenom sistemu i efikasnije koriste dostupne zdravstvene informacije. Međutim, iako formalno obrazovanje može predstavljati važan faktor, ono ne garantuje nužno i visok nivo zdravstvene pismenosti, naročito kada je riječ o specifičnim znanjima vezanim za određenu bolest, kao što je dijabetes. Jedno od mogućih objašnjenja za izostanak statistički značajnih razlika jeste struktura uzorka ispitanika. U istraživanju je dominirala grupa ispitanika sa

health education across different communities. These findings are consistent with the study by Cicolini et al. [8], which demonstrated that health literacy is not necessarily determined by geographical location but rather by a range of individual and social factors. The authors emphasized that health literacy is strongly influenced by individual motivation, the ability to understand health information, family support, socioeconomic status, previous experience with illness, and the frequency of contact with healthcare professionals. Individuals who actively participate in their treatment and have a well-developed support network often achieve higher levels of health literacy regardless of where they live. In addition, among individuals with diabetes, disease duration and continuous education throughout treatment play an important role. Patients who have lived with diabetes for a longer period have more opportunities to acquire knowledge about disease self-management, proper nutrition, treatment, and the prevention of complications through regular interactions with healthcare professionals. Consequently, differences that might otherwise arise due to place of residence may be reduced or even eliminated by the influence of other factors that more strongly determine the level of health literacy. The findings of the present study suggest that interventions aimed at improving health literacy should not be planned solely according to the geographical characteristics of the population. Instead, they should take into account patients' individual needs, educational level, motivation to learn, and access to continuous educational support. Such an approach may be more effective in improving the knowledge and and skills required for effective diabetes self-management. When considering the impact of educational level, no statistically significant differences in health literacy were identified among participants with different levels of formal education. This finding is somewhat unexpected, given that education is frequently cited in the literature as one of the most important predictors of health literacy. Higher educational attainment is generally associated with better abilities to access, understand, evaluate, and apply health information, as well as with an increased capacity to

srednjom stručnom spremom, dok je broj ispitanika sa višim i visokim obrazovanjem bio relativno mali. Takva neravnomjerna raspodjela ispitanika može smanjiti statističku moć analize i otežati otkrivanje stvarnih razlika između grupa. Kada su pojedine kategorije zastupljene malim brojem ispitanika, mogućnost dokazivanja statističke značajnosti postaje ograničena čak i kada određene razlike postoje. Pored toga, zdravstvena pismenost nije isključivo rezultat formalnog obrazovanja, već na nju utiču i brojni drugi faktori, uključujući iskustvo života sa hroničnom bolešću, učestalost kontakta sa zdravstvenim radnicima, pristup edukativnim programima, motivaciju za sticanje novih znanja i podršku porodice. Osobe sa nižim nivoom formalnog obrazovanja koje duži niz godina boluju od dijabetesa mogu kroz kontinuiranu edukaciju i praktično iskustvo steći visok nivo znanja o bolesti i njenom liječenju. S druge strane, viši nivo formalnog obrazovanja ne mora nužno značiti i veće interesovanje za zdravstvene teme ili bolje razumijevanje specifičnih aspekata samokontrole dijabetesa. Dobijeni rezultati stoga sugerišu da formalno obrazovanje samo po sebi možda nije dovoljan pokazatelj zdravstvene pismenosti kod osoba sa dijabetesom. Mnogo važniju ulogu mogu imati kontinuirana edukacija pacijenata, kvalitet komunikacije sa zdravstvenim radnicima i aktivno uključivanje oboljelih u proces liječenja. Zbog toga bi programe unapređenja zdravstvene pismenosti trebalo usmjeriti na sve osobe sa dijabetesom, bez obzira na njihov stepen obrazovanja, kako bi se obezbijedilo adekvatno znanje i vještine potrebne za uspješno upravljanje bolešću. U segmentu „dijeta i tretman“ utvrđena je statistički značajna razlika u korist oboljelih od dijabetesa tip 2 (p=0,042). Ovakav nalaz može se objasniti specifičnostima liječenja i edukacije koje prate dijabetes tip 2. Naime, kod dijabetesa tip 2 osnovu liječenja često čine promjene životnog stila, uključujući pravilnu ishranu, redukciju tjelesne mase, povećanje fizičke aktivnosti i redovno praćenje glikemije. Zbog toga su pacijenti od samog postavljanja dijagnoze izloženi intenzivnijim edukativnim aktivnostima koje se odnose upravo na dijetu i svakodnevno upravljanje bolešću. Tokom

make informed decisions regarding one's own health. The findings of the present study differ from those reported by Gazmararian et al. [9], who demonstrated a clear association between higher levels of formal education and higher levels of health literacy. According to their findings, individuals with higher educational attainment have a better understanding of medical terminology, navigate the healthcare system more effectively, and make more efficient use of available health information. However, although formal education may represent an important determinant of health literacy, it does not necessarily guarantee a high level of health literacy, particularly with regard to disease-specific knowledge, such as that required for diabetes management. One possible explanation for the absence of statistically significant differences is the composition of the study sample. Participants with secondary education constituted the largest proportion of the sample, whereas relatively few participants had college or university education. Such an uneven distribution of participants may reduce the statistical power of the analysis and limit the ability to detect true differences between educational groups. When certain categories are represented by only a small number of participants, demonstrating statistical significance becomes difficult even when actual differences exist. Furthermore, health literacy is not determined solely by formal education but is influenced by numerous other factors, including experience of living with a chronic disease, the frequency of contact with healthcare professionals, access to educational programs, motivation to acquire new knowledge, and family support. Individuals with lower levels of formal education who have lived with diabetes for many years may acquire a high level of knowledge about the disease and its treatment through continuous education and practical experience. Conversely, a higher level of formal education does not necessarily imply greater interest in health-related topics or a better understanding of the specific aspects of diabetes self-management. Therefore, the findings of the present study suggest that formal education alone may not be a sufficient indicator of health literacy among individuals with diabetes. Continuous

redovnih kontrola zdravstveni radnici značajan dio vremena posvećuju savjetovanju o izboru namirnica, rasporedu obroka, kontroli unosa ugljenih hidrata i značaju zdravih životnih navika. Pored toga, dijabetes tip 2 se najčešće dijagnostikuje u srednjoj ili starijoj životnoj dobi, kada su osobe već duži niz godina u kontaktu sa zdravstvenim sistemom zbog drugih zdravstvenih problema. Takvi pacijenti često imaju više prilika da učestvuju u edukativnim programima, savjetovalištima i preventivnim aktivnostima, što doprinosi boljem poznavanju preporuka vezanih za ishranu i liječenje. Takođe, kod mnogih pacijenata sa tipom 2 bolest traje duže prije uključivanja u istraživanje, pa su tokom vremena imali mogućnost da steknu iskustvo i usvoje znanja potrebna za svakodnevnu kontrolu bolesti. Nalaz je u skladu sa istraživanjem Fransen i saradnika [10], koji navode da su osobe sa dijabetesom tip 2 češće izložene edukaciji usmjerenoj na promjenu životnih navika i samoupravljanje bolešću. Za razliku od njih, osobe sa dijabetesom tip 1 često od početka liječenja najveću pažnju usmjeravaju na insulinsku terapiju, izračunavanje doza insulina i kontrolu glikemije. Iako i oni dobijaju edukaciju o ishrani, fokus liječenja je u većoj mjeri usmjeren na pravilnu primjenu insulina i prevenciju akutnih komplikacija. Zbog toga se može pretpostaviti da pacijenti sa tipom 2 razvijaju detaljnije znanje upravo u segmentima koji se odnose na dijetu i nefarmakološke mjere liječenja. Međutim, pri tumačenju ovih rezultata potrebno je uzeti u obzir i strukturu uzorka. Ukoliko je broj ispitanika sa dijabetesom tip 1 bio značajno manji od broja ispitanika sa tipom 2, to je moglo uticati na dobijene rezultate. Takođe, razlike u dužini trajanja bolesti, učestalosti kontrola i dostupnosti edukativnih programa mogu djelimično objasniti uočene razlike između dvije grupe. Starosna dob nije imala statistički značajan uticaj na nivo zdravstvene pismenosti ni u jednom od ispitivanih segmenata. Ovaj nalaz ukazuje da mlađi i stariji ispitanici posjeduju sličan nivo znanja o dijabetesu, njegovom liječenju i samokontroli bolesti. Iako se često pretpostavlja da mlađe osobe lakše usvajaju nove informacije i efikasnije koriste savremene izvore znanja, rezultati ovog istraživanja pokazuju da

patient education, the quality of communication with healthcare professionals, and the active involvement of patients in the treatment process may play a much more important role. Consequently, health literacy improvement programs should be directed toward all individuals with diabetes, regardless of their level of formal education, in order to ensure that they acquire the knowledge and skills necessary for effective disease self-management. In the **"Diet and Treatment"** domain, a statistically significant difference was observed in favor of participants with type 2 diabetes ($p = 0.042$). This finding may be explained by the specific treatment approaches and educational interventions associated with type 2 diabetes. The cornerstone of type 2 diabetes management typically consists of lifestyle modifications, including a healthy diet, weight reduction, increased physical activity, and regular blood glucose monitoring. Consequently, from the time of diagnosis, patients are exposed to more intensive educational interventions focusing specifically on dietary management and the day-to-day management of their disease. During routine follow-up visits, healthcare professionals devote considerable time to counseling patients regarding appropriate food choices, meal planning, carbohydrate intake, and the importance of maintaining healthy lifestyle habits. Moreover, type 2 diabetes is most commonly diagnosed during middle or older adulthood, when individuals have often already been in contact with the healthcare system for many years because of other medical conditions. These patients therefore have more opportunities to participate in educational programs, counseling sessions, and preventive activities, which contributes to a better understanding of recommendations related to nutrition and treatment. Furthermore, many patients with type 2 diabetes have lived with the disease for a longer period before participating in the study, allowing them to gain practical experience and acquire the knowledge necessary for effective daily disease management. This finding is consistent with the study by Fransen et al. [10], who reported that individuals with type 2 diabetes are more frequently exposed to educational interventions focused on

starosna dob sama po sebi nije bila presudan faktor za nivo zdravstvene pismenosti. Jedno od mogućih objašnjenja pružaju Bailey i saradnici [11], koji navode da određene kognitivne funkcije povezane sa obradom i razumijevanjem novih informacija mogu opadati sa starenjem. Međutim, istovremeno stariji pacijenti raspolažu značajnim iskustvom stečenim tokom dugotrajnog života sa bolešću. Dugogodišnje praćenje terapije, redovni kontakti sa zdravstvenim radnicima i suočavanje sa svakodnevnim izazovima koje dijabetes nosi omogućavaju im da razviju praktična znanja i vještine koje nadoknađuju eventualne poteškoće u usvajanju novih informacija. Osim toga, osobe koje duže boluju od dijabetesa često imaju više prilika za edukaciju i ponavljanje ključnih informacija o bolesti. Tokom godina liječenja one usvajaju određene obrasce ponašanja, razvijaju rutine u vezi sa ishranom, terapijom i samokontrolom glikemije, te stiču iskustva koja doprinose održavanju adekvatnog nivoa zdravstvene pismenosti. Zbog toga se razlike koje bi mogle nastati usljed starosti često ublažavaju uticajem iskustva i dugotrajnog kontakta sa zdravstvenim sistemom. Dobijeni rezultati sugerišu da zdravstvenu pismenost kod osoba sa dijabetesom vjerovatno više određuju faktori kao što su trajanje bolesti, učestalost edukacije, motivacija za učenje i aktivno učešće u liječenju nego sama životna dob. Stoga bi edukativne intervencije trebalo planirati prema individualnim potrebama pacijenata, a ne isključivo prema njihovoj starosti. Generalno, rezultati ove studije su u skladu sa većinom literature, iako se u pojedinim segmentima razlikuju, što može biti posljedica uzorka, konteksta lokalne zdravstvene zaštite i pristupa edukaciji. Rezultati potvrđuju značaj kontinuirane i ciljano usmjerene edukacije za osobe sa dijabetesom, pri čemu treba uzeti u obzir pol, tip bolesti, kao i pristup zdravstvenim uslugama.

## ZAKLJUČAK

Dobijeni rezultati ukazuju na značaj razvoja i sprovođenja kontinuiranih, ciljano usmjerenih edukativnih programa čiji je cilj unapređenje zdravstvene pismenosti i vještina samoupravljanja bolešću kod osoba oboljelih od dijabetes melitusa. Ispitanici su pokazali relativno dobar nivo znanja o

lifestyle modification and diabetes self-management. In contrast, individuals with type 1 diabetes tend to focus primarily on insulin therapy, insulin dose calculation, and glycemic control from the very beginning of treatment. Although they also receive dietary education, the primary emphasis of their treatment is placed on the correct administration of insulin and the prevention of acute complications. Consequently, it may be assumed that patients with type 2 diabetes develop more comprehensive knowledge in areas related to diet and non-pharmacological treatment strategies. Nevertheless, the interpretation of these findings should also take the sample structure into account. If the number of participants with type 1 diabetes was substantially smaller than the number with type 2 diabetes, this imbalance may have influenced the results. Furthermore, differences in disease duration, frequency of follow-up visits, and access to educational programs may partially explain the observed differences between the two groups. Age was not significantly associated with health literacy in any of the domains examined. This finding indicates that younger and older participants possessed comparable levels of knowledge regarding diabetes, its treatment, and disease self-management. Although it is often assumed that younger individuals acquire new information more easily and make more effective use of modern sources of information, the findings of the present study indicate that age itself was not a determining factor influencing the level of health literacy. One possible explanation is provided by Bailey et al. [11], who reported that certain cognitive functions involved in processing and understanding new information may decline with advancing age. However, older patients simultaneously possess substantial experience acquired through many years of living with the disease. Long-term adherence to treatment, regular contact with healthcare professionals, and continuous exposure to the daily challenges of diabetes enable them to develop practical knowledge and skills that may compensate for potential difficulties in acquiring new information. Furthermore, individuals who have lived with diabetes for a longer period often have

dijabetes melitusu, pri čemu su najbolji rezultati ostvareni u domenu osnovne njege. S druge strane, niži nivo znanja zabilježen je u domenu srednjeg nivoa njege, što ukazuje na potrebu za dodatnom edukacijom pacijenata o složenijim aspektima samokontrole i upravljanja bolešću. Pol je bio značajan faktor samo u domenu osnovne njege, gdje su žene pokazale statistički značajno viši nivo znanja u odnosu na muškarce (p = 0,012). U ostalim domenima zdravstvene pismenosti nisu utvrđene statistički značajne razlike između muškaraca i žena. Mjesto stanovanja nije imalo značajan uticaj na zdravstvenu pismenost ispitanika. Osobe iz ruralnih i urbanih sredina ostvarile su slične rezultate u svim analiziranim domenima, što ukazuje da geografska pripadnost nije bila presudan faktor za nivo znanja o dijabetesu. Nivo obrazovanja nije pokazao statistički značajnu povezanost sa zdravstvenom pismenošću ispitanika. Ovaj nalaz sugeriše da formalno obrazovanje samo po sebi nije dovoljno za razvijanje znanja potrebnih za uspješno upravljanje dijabetesom, te da važnu ulogu imaju iskustvo sa bolešću, kontinuirana edukacija i podrška zdravstvenih radnika. Utvrđena je statistički značajna razlika prema tipu dijabetesa u domenu „dijeta i tretman“, pri čemu su ispitanici sa dijabetesom tipa 2 pokazali viši nivo znanja u odnosu na ispitanike sa dijabetesom tipa 1 (p = 0,042). Ovaj nalaz može se povezati sa većom izloženošću osoba sa dijabetesom tipa 2 edukativnim programima usmjerenim na ishranu i promjenu životnih navika. Starosna dob nije imala statistički značajan uticaj na nivo zdravstvene pismenosti ni u jednom od pet analiziranih domena, što ukazuje da su mlađi i stariji ispitanici posjedovali sličan nivo znanja o dijabetesu i njegovom liječenju.

more opportunities to receive education and reinforce essential knowledge about their condition. Over the course of treatment, they establish behavioral patterns and routines related to diet, therapy, and blood glucose self-monitoring while accumulating practical experience that contributes to maintaining an adequate level of health literacy. Consequently, differences that might otherwise arise as a result of age are often attenuated by the influence of experience and prolonged interaction with the healthcare system. The findings of the present study suggest that health literacy among individuals with diabetes is likely to be influenced more strongly by factors such as disease duration, the frequency of educational interventions, motivation to learn, and active participation in treatment than by chronological age alone. Therefore, educational interventions should be tailored to the individual needs of patients rather than being based solely on age. Overall, the findings of this study are consistent with most of the existing literature, although discrepancies were observed in certain domains. These differences may be attributable to the characteristics of the study sample, the local healthcare context, and the availability and delivery of educational interventions. The results confirm the importance of continuous and targeted education for individuals with diabetes, while emphasizing that gender, type of diabetes, and access to healthcare services should all be considered when designing educational strategies aimed at improving health literacy and supporting effective diabetes self-management.

## CONCLUSION

The findings of this study highlight the importance of developing and implementing continuous, targeted educational programs aimed at improving health literacy and disease self-management skills among individuals with diabetes mellitus. Participants demonstrated a relatively good level of diabetes-related knowledge, with the highest scores achieved in the Basic Care domain. In contrast, lower levels of knowledge were observed in the Intermediate-Level Care domain, indicating a need for additional patient

education regarding more complex aspects of disease self-management and self-monitoring. Sex was a significant factor only in the Basic Care domain, where women demonstrated significantly higher levels of knowledge than men ($p = 0.012$). No statistically significant sex differences were identified in the remaining health literacy domains. Place of residence did not significantly influence participants' health literacy. Individuals from rural and urban areas achieved similar results across all analyzed domains, indicating that geographical location was not a decisive factor in diabetes-related knowledge. Educational level was not significantly associated with health literacy. This finding suggests that formal education alone may not be sufficient for developing the knowledge required for successful diabetes management and that experience with the disease, continuous education, and support from healthcare professionals play equally important roles. A statistically significant difference according to diabetes type was identified in the Diet and Treatment domain, where participants with type 2 diabetes demonstrated higher levels of knowledge than those with type 1 diabetes ($p = 0.042$). This finding may be related to the greater exposure of individuals with type 2 diabetes to educational programs focusing on nutrition and lifestyle modification. Age was not significantly associated with health literacy in any of the five analyzed domains, indicating that younger and older participants possessed similar levels of knowledge regarding diabetes and its management. These findings emphasize the need for ongoing educational interventions tailored to the specific needs of people with diabetes in order to improve health literacy, promote effective self-management, and ultimately enhance health outcomes.

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***Original scientific article***

# PREVALENCIJA INTRAHOSPITALNIH INFEKCIJA I UPOTREBE ANTIBIOTIKA NA NIVOU OPŠTE BOLNICE

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## ABSTRAKT

Uvod. Intrahospitalne infekcije (IHI) predstavljaju značajan javnozdravstveni problem zbog povećanja morbiditeta, mortaliteta, trajanja hospitalizacije i troškova liječenja. Pored toga, neracionalna primjena antibiotika doprinosi razvoju antimikrobne rezistencije koja predstavlja jedan od najvećih izazova savremene medicine. Cilj ove studije bio je da se utvrde rizici za razvoj IHI, prevalencija intrahospitalnih infekcija u JZU Bolnica „Sveti apostol Luka" Doboj, kao i da se analiziraju najčešće vrste infekcija, uzročnici primjene antimikrobnih lijekova.

Materijal i metode. Sprovedena je studija presjeka prema jedinstvenom protokolu Evropskog centra za prevenciju i kontrolu bolesti (ECDC PPS verzija 6.1).

Rezultati. U istraživanje je uključeno 306 hospitalizovanih pacijenata sa svih 17 bolničkih odjeljenja. Prikupljeni su podaci o demografskim karakteristikama pacijenata, faktorima rizika, invazivnim procedurama, vrstama infekcija i primjeni antibiotika. Prevalencija intrahospitalnih infekcija iznosila je 3,2%, dok je antibiotike primalo 57,2% hospitalizovanih pacijenata. Najveća prevalencija IHI registrovana je na neurologiji i jedinicama intenzivne medicine. Najčešće korišteni

# PREVALENCE OF HEALTHCARE-ASSOCIATED INFECTIONS AND ANTIBIOTIC USE AT THE LEVEL OF A GENERAL HOSPITAL

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## ABSTRACT

Introduction. Healthcare-associated infections (HAI) represent a significant public health problem due to increased morbidity, mortality, length of hospital stay, and treatment costs. In addition, irrational use of antibiotics contributes to the development of antimicrobial resistance, which represents one of the greatest challenges of modern medicine. The aim of this study was to determine the risks for the development of IHI, the prevalence of intrahospital infections in the "Sveti apostol Luka" Hospital in Doboj, as well as to analyze the most common types of infections, the causes of the use of antimicrobial drugs.

Material and methods. A point prevalence study was conducted according to the unified protocol of the European Centre for Disease Prevention and Control (ECDC PPS version 6.1).

Results. The study included 306 hospitalized patients from all 17 hospital departments. Data were collected on patients' demographic characteristics, risk factors, invasive procedures, types of infections, and antibiotic use. The prevalence of healthcare-associated infections was 3.2%, while 57.2% of hospitalized patients were receiving antibiotics. The

antibiotici bili su cefalosporini treće generacije, penicilini proširenog spektra i fluorokinoloni. Produžena hirurška profilaksa registrovana je kod 90% pacijenata.
Zaključak. Rezultati ukazuju na potrebu unapređenja nadzora nad intrahospitalnim infekcijama, racionalnije upotrebe antibiotika i jačanja programa kontrole infekcija.
**Ključne riječi:** intrahospitalne infekcije, prevalencija intrahospitalnih infekcija, prevalencija upotrebe antibiotika.

## UVOD

Intrahospitalna infekcija (infekcija povezana sa zdravstvenom zaštitom, IHI) je infekcija nastala kod pacijenata, osoblja, posjetilaca, učenika ili studenata tokom pružanja usluga zdravstvene zaštite u bolnici ili nekoj drugoj zdravstvenoj ili socijalnoj ustanovi, a koja nije bila prisutna na prijemu, niti je pacijent bio u inkubaciji [1, 2, 3, 4, 5]. Epidemiološki nadzor nad bolničkim infekcijama može biti aktivan i pasivan i može se sprovoditi studijama prevalencije i incidencije. Studije prevalencije, poznate i kao studije presjeka, nude efikasan način prikupljanja visokokvalitetnih podataka o određenim zdravstvenim problemima [6]. Istraživanje prevalencije bolničkih infekcija koje koristi standardizovanu metodologiju i konsenzusne definicije infekcija su relativno jeftina i laka metoda za prikupljanje podataka i mogu pružiti dragocjene informacije [7, 8]. Različite zemlje sa visokim dohotkom [8, 9], kao i zemlje sa niskim i srednjim prihodima izvan Evrope su sprovodile studije prevalencije bolničkih infekcija [10, 11], a dovode do ozbiljnih komplikacija koje utiču na morbiditet, mortalitet i troškove zdravstvene zaštite širom svijeta. Neodgovarajuća upotreba antibiotika i posljedično povećanje antimikrobne rezistencije uzročnika IHI mogu ugroziti ishod liječenja [12]. U nekim zemljama u razvoju udio pacijenata sa IHI može premašiti 25%. Neki su pacijenti tada u težem stanju nego što bi bili u normalnoj situaciji. Jedni zahtijevaju dugotrajnu hospitalizaciju, drugi pate od dugotrajnog invaliditeta, a neki umiru. Osim medicinskih i etičkih posljedica, nose i finansijske

highest prevalence of HAI was recorded in neurology and intensive care units. The most commonly used antibiotics were third-generation cephalosporins, extended-spectrum penicillins, and fluoroquinolones. Prolonged surgical prophylaxis was recorded in 90% of patients.
Conclusions. The results indicate the need to improve surveillance of healthcare-associated infections, more rational use of antibiotics, and strengthening of infection control programs.
**Key words:** healthcare-associated infections, prevalence of healthcare-associated infections, prevalence of antibiotic use.

## INTRODUCTION

A healthcare-associated infection (HAI) is an infection occurring in patients, staff, visitors, pupils or students during the provision of healthcare services in a hospital or another healthcare or social institution, which was not present at admission, nor was the patient in the incubation period [1, 2, 3, 4, 5]. Epidemiological surveillance of hospital infections can be active or passive and can be carried out through prevalence and incidence studies. Prevalence studies, also known as point prevalence studies, offer an efficient way of collecting high-quality data on specific health problems [6]. Prevalence studies of hospital infections using standardized methodology and consensus infection definitions are a relatively inexpensive and easy method for data collection and can provide valuable information [7, 8]. Various high-income countries [8, 9], as well as low- and middle-income countries outside Europe, have conducted prevalence studies of hospital infections [10, 11]. HAI lead to serious complications affecting morbidity, mortality, and healthcare costs worldwide. Inadequate use of antibiotics and the consequent increase in antimicrobial resistance of HAI pathogens may jeopardize treatment outcomes [12]. In some developing countries, the proportion of patients with HAI may exceed 25%. Some patients are then in a more severe condition than they would be in normal circumstances. Some require prolonged hospitalization, others suffer long-term disability,

posljedice po zdravstvene sisteme [13]. Intrahospitalne infekcije pogađaju otprilike 1 od 10 odraslih osoba i 1 od 12 djece u bolnicama za akutnu njegu. Predstavljaju značajnu zabrinutost za sigurnost pacijenata zbog rizika za pacijente, kao i zbog ekonomskih implikacija [14]. Pacijenti primljeni u jedinice intenzine njege izloženi su višem riziku od IHI zbog osjetljivosti povezane sa ozbiljnošću njihovog stanja, ali i invazivnih medicinskih postupaka kojima se podvrgavaju [15]. Radi sagledavanja stanja u pogledu IHI u 2016 - 2017. godini Evropski centar za prevenciju i kontrolu bolesti (ECDC) organizovao je drugu evropsku studiju prevalencije o IHI i upotrebi antibiotika, dok su po istoj metodologiji treću studiju sproveli u 2022 -2023. u bolnicama EU/EEA za akutnu njegu [16, 17, 18]. Osim toga, bile su pozvane i ostale evropske zemlje. Dok su Srbija i Crna Gora učestvovale u studiji, dotle se BiH nije uključila. Obje studije koje su u Srbiji sprovedene u okviru studije u EU obezbijedile su značajne podatke o opterećenju bolničkim IHI, prevalenciji upotrebe antibiotika i rezistenciji uzročnika IHI [19, 20, 3]. Prema programu mjera za sprečavanje i suzbijanje, eliminaciju i eradikaciju zaraznih bolesti za područje Republike Srpske, koji se svake godine donosi za tekuću godinu, u bolnicama je neophodno kontinuirano prikupljati podatke o IHI i infekcijama izazvanim bakterijama rezistentnim na antibiotike. Takođe, programom je predviđeno da se svake treće godine u bolnicama sprovode studije prevalencije, a studije incidencije po potrebi [21]. Međutim, ove aktivnosti se uglavnom zbog nedostatka stručnog kadra ne sprovode u bolnicama Republike Srpske, kako na nacionalnim, tako ni na nivou bolnica ili se periodično sprovode samo na ciljanim odjeljenjima. U JZU Bolnica „Sveti apostol Luka“ do sada nije sprovedena studija prevalencije IHI i upotrebe antibiotika na nivou bolnice, pa je nepoznato opterećenje sa IHI, njihovi uzročnici i rezistencija, kao i upotreba antibiotika. Samim tim, nema dovoljno argumenata za unapređenje nadzora nad BI i za smanjenje opterećenja i antibiotske rezistencije. Cilj ove studije bio je da se utvrde rizici za razvoj IHI, prevalencija intrahospitalnih infekcija u JZU

and some die. Besides medical and ethical consequences, they also carry financial consequences for healthcare systems [13] and affect approximately 1 in 10 adults and 1 in 12 children in acute care hospitals. They represent a significant concern for patient safety due to risks for patients, as well as economic implications [14]. Patients admitted to intensive care units are at higher risk of HAI due to vulnerability associated with the severity of their condition, as well as invasive medical procedures they undergo [15]. In order to assess the situation regarding HAI in 2016–2017, the European Centre for Disease Prevention and Control (ECDC) organized the second European point prevalence study on HAI and antibiotic use, while, using the same methodology, the third study was conducted in 2022–2023 in EU/EEA acute care hospitals [16, 17, 18]. In addition, other European countries were invited. While Serbia and Montenegro participated in the study, Bosnia and Herzegovina did not join. Both studies conducted in Serbia within the EU study provided significant data on the burden of hospital HAI, prevalence of antibiotic use, resistance of HAI pathogens, and prevalence of antibiotic use [19, 20, 3]. According to the program of measures for prevention and control, elimination and eradication of communicable diseases in the territory of the Republic of Srpska, which is adopted each year for the current year, it is necessary for hospitals to continuously collect data on HAI and infections caused by antibiotic-resistant bacteria. The program also envisages that prevalence studies are carried out in hospitals every third year, and incidence studies as needed [21]. However, due to the lack of professional staff, these activities are mostly not carried out in hospitals of the Republic of Srpska, neither at the national level nor at the level of individual hospitals, or they are periodically carried out only in targeted departments. In the Public Health Institution Hospital “Sveti apostol Luka” a prevalence study of HAI and antibiotic use at the hospital level has not yet been conducted, so the burden of HAI, their pathogens and resistance, as well as antibiotic use, remain unknown. Consequently, there is insufficient evidence to

Bolnica „Sveti apostol Luka“ Doboj, kao i da se analiziraju najčešće vrste infekcija i uzročnici primjene antimikrobnih lijekova.

## MATERIJAL I METODE

### Tip studije

Istraživanje je sprovedeno po tipu studije presjeka po jedinstvenom protokolu studije (ECDC PPS, verzija 6.1) uz upotrebu srpskog prevoda jedinstvenih ECDC definicija IHI [22, 1].

### Ispitanici

Kriterijumi za uključivanje/isključivanje pacijenata i odjeljenja su bili u skladu sa metodologijom ECDC. U studiju prevalencije su uključena sva odjeljenja u bolnici, izuzev odjeljenja za prijem i zbrinjavanje urgentnih stanja i dnevne bolnice. U studiju su uključeni svi pacijenti primljeni na odjeljenje prije ili u osam časova ujutru i nisu otpušteni sa odjeljenja u vrijeme izvođenja studije. Iz studije su se isključili: pacijenti podvrgnuti jednodnevnoj terapiji ili operaciji, pacijenti pregledani u ambulanti, pacijenti u onkološkoj dnevnoj bolnici, i pacijenti na dijalizi (ambulantni). Podaci su se prikupljali u jednom danu za svako odjeljenje/jedinicu. Sproveden je epidemiološki nadzor nad pacijentima, uz uvid u dostupnu medicinsku dokumentaciju (istorija bolesti, temperaturna lista, rezultati dijagnostičkih procedura, laboratorijski i mikrobiološki nalaz). Dijagnoze i lokalizacija IHI postavljali su se na osnovu kriterijuma propisanih u priručniku o definicijama intrahospitalnih infekcija [1].

### Instrumenti istraživanja

U cilju prikupljanja podataka koristili su se: upitnik za bolnicu; upitnik za odjeljenje i epidemiološki upitnik za pacijenta. Jedan upitnik se popunjavao za bolnicu, po jedan za svako odjeljenje i po jedan epidemiološki upitnik za svakog pacijenta. Podaci o pacijentima su uključivali osnovne podatke o pacijentima, podatke o faktorima rizika za svakog pacijenta sa ili bez IHI ili antimikrobnog lijeka, podaci o primjeni invazivnih procedura u terapijske svrhe (periferni venski kateter, centralni venski

improve surveillance of HAI and to reduce the burden and antibiotic resistance. The aim of this study was to determine the risks for the development of IHI, the prevalence of intrahospital infections in the "Sveti apostol Luka" Hospital in Doboj, as well as to analyze the most common types of infections, the causes of the use of antimicrobial drugs.

## MATERIAL AND METHODS

### Type of study

The research was conducted as a point prevalence study according to the unified study protocol (ECDC PPS, version 6.1) using the Serbian translation of the unified ECDC HAI definitions [22, 1].

### Participants

The inclusion/exclusion criteria for patients and departments were in accordance with the ECDC methodology. All departments in the hospital were included in the prevalence study, except for the emergency admission and treatment department and the day hospital. All patients admitted to the department before or at eight o’clock in the morning and not discharged from the department at the time of the study were included. The following were excluded from the study: patients undergoing one-day therapy or surgery, patients examined in outpatient clinics, patients in the oncology day hospital, and (ambulatory) dialysis patients. Data were collected on a single day for each department/unit. Epidemiological surveillance of patients was carried out, with access to available medical records (medical history, temperature chart, results of diagnostic procedures, laboratory and microbiological findings). Diagnoses and localization of HAI were established according to the criteria set out in the manual on definitions of healthcare-associated infections [1].

### Research instruments

The following were used to collect data: a hospital questionnaire; a department questionnaire; and an epidemiological questionnaire for the patient. One

kateter, urinarni kateter, intubacija, hirurška intervencija) i McCabe skor. Prikupljali su se podaci o IHI i/ili podaci o upotrebi antimikrobnih lijekova za sve pacijente koji ih primaju.

**Statistička analiza**

Kompjuterska obrada podataka je izvršena u softverskom paketu SPSS 26.0 for Windows. Analiza i obrada podataka obuhvatila je deskripciju pacijenata, prevalenciju pacijenata sa IHI na nivou bolnice i odjeljenja, deskripcija uzročnika IHI, prevalencija pacijenata sa upotrebom antibiotika, deskripcija najčešće korištenih antibiotika. Statistička značajnost varijabli procjenjivala se $\chi 2$ testom i t testom. Radi procjene faktora rizika za nastanak IHI korištena je univarijantna, a zatim multivarijantna logistička regresija. Za zavisno promjenjivu veličinu uzela se pripadnost grupi (pacijenti sa ili bez IHI), a za nezavisne sve ostale varijable. Sva obilježja po kojima su se prema naprijed navedenim testovima grupe statistički značajno razlikovale ušle su u model multivarijantne logističke regresije. Za zavisnu varijablu će se, takođe, uzeti pripadnost grupi (pacijenti sa ili bez BI). Adekvatnost logističkog modela procenjivala se sa vjerovatnoćom $p \leq 0,05$ kao i značajnost nezavisnih varijabli sa vjerovatnoćom $p \leq 0,05$.

**REZULTATI**

Istraživanje u JZU Bolnici "Sveti apostol Luka" sprovedeno je u decembru 2025. Uključeno je 306 hospitalizovanih pacijenata, od kojih je 155 (50,6%) bilo ženskog pola, a 151 (49,4%) muškog pola. Prosječna starost ispitanika iznosila je 61,9 godina. Najzastupljenija starosna grupa bili su pacijenti uzrasta preko 60 godina, pa su tako ispitanici od 60 i više godina činili 68,2% među svim ispitanicima, dok su ispitanici do 18 godina činili svega 5,9%. Najzastupljeniji uzrast bio je 65-74 godine (30,4%), što je prikazano na tabeli 1 i grafikonu 1.

questionnaire was completed for the hospital, one for each department, and one epidemiological questionnaire for each patient. Patient data included basic patient information, data on risk factors for each patient with or without HAI or antimicrobial drugs, data on invasive procedures used for therapeutic purposes (peripheral venous catheter, central venous catheter, urinary catheter, intubation, surgical intervention) and McCabe score. Data on HAI and/or data on antimicrobial drug use were collected for all patients receiving them.

**Statistical analysis**

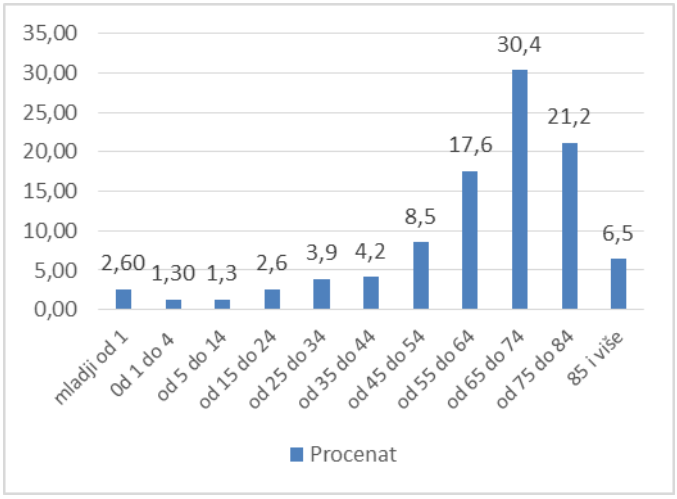
Computer data processing was performed using the software package SPSS 26.0 for Windows. Data analysis and processing included the description of patients, prevalence of patients with HAI at the hospital and department level, description of HAI pathogens, prevalence of patients receiving antibiotics, and description of the most commonly used antibiotics. Statistical significance of variables was assessed using the $\chi 2$ test and t-test. To assess risk factors for the occurrence of HAI, univariate and then multivariate logistic regression were used. The dependent variable was group membership (patients with or without HAI), and independent variables were all other variables. All characteristics for which, according to the above-mentioned tests, the groups differed statistically significantly were entered into the multivariate logistic regression model. The dependent variable was also group membership (patients with or without HAI). Adequacy of the logistic model was assessed with a probability of $p \leq 0.05$, as well as the significance of independent variables with a probability of $p \leq 0.05$.

**RESULTS**

The study in the Public Health Institution Hospital "Sveti apostol Luka" was conducted in December 2025. The study included 306 hospitalized patients, of whom 155 (50.6%) were female and 151 (49.4%) male. The average age of respondents was 61.9 years. The most represented age group was patients over 60 years of age, so patients aged 60 and over accounted for 68.2% of all respondents, while

*Tabela 1. Polna i uzrasna struktura ispitanika*

| Uzrast | Muški (broj) | % | Ženski (broj) | % | Ukupno | % |
|---|---|---|---|---|---|---|
| **0-18** | 9 | 6 | 9 | 5,8 | 18 | 5,9 |
| **19-59** | 32 | 21,2 | 47 | 30,3 | 79 | 25,9 |
| **60 i više** | 110 | 72,8 | 99 | 63,9 | 209 | 68,2 |
| **Ukupno** | 151 | 49,4 | 155 | 50,6 | 306 | 100 |




*Grafikon 1. Uzrast uključenih pacijenata*

Najveći broj hospitalizovanih pacijenata bio je u Internističkoj službi (21,2%), a zatim u Službi za hirurgiju (16,7%) (Tabela 2).

*Tabela 2. Distribucija pacijenata po odjeljenjima*

| Naziv odjeljenja | Muški pol | Ženski pol | Ukupno | % |
|---|---|---|---|---|
| **Služba za hirurgiju** | 25 | 26 | 51 | 16,7 |
| **Služba za anesteziju i reanimaciju** | 3 | 1 | 4 | 1,3 |
| **Služba za ortopediju i traumatologiju** | 8 | 8 | 16 | 5,2 |
| **Služba za ginekologiju i akušerstvo** | 2 | 22 | 24 | 7,9 |
| **Služba za ORL** | 4 | 0 | 4 | 1,3 |
| **Služba za oftalmologiju** | 5 | 3 | 8 | 2,6 |
| **Služba za urologiju** | 10 | 6 | 16 | 5,2 |
| **Interna služba** | 34 | 31 | 65 | 21,2 |
| **Služba za psihijatriju** | 19 | 16 | 35 | 11,4 |
| **Služba za neurologiju** | 11 | 13 | 24 | 7,9 |
| **Služba za pedijatriju** | 7 | 2 | 9 | 3,0 |
| **Sluzba za pulmologiju** | 13 | 9 | 22 | 7,1 |

respondents up to 18 years of age accounted for only 5.9%. The most represented age group was 65–74 years (30.4%), as shown in Table 1 and Figure 1.

*Table 1. Gender and age structure of respondents*

| Age | Male (number) | % | Female (number) | % | Total | % |
|---|---|---|---|---|---|---|
| **0–18** | 9 | 6 | 9 | 5.8 | 18 | 5.9 |
| **19–59** | 32 | 21.2 | 47 | 30.3 | 79 | 25.9 |
| **60 and over** | 110 | 72.8 | 99 | 63.9 | 209 | 68.2 |
| **Total** | 151 | 49.4 | 155 | 50.6 | 306 | 100 |

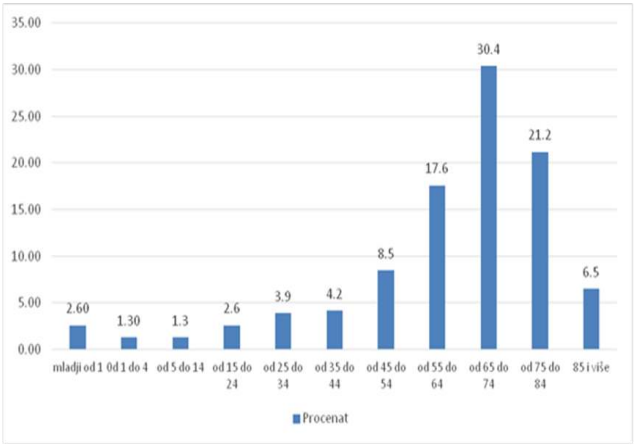



*Figure 1. Age of included patients*

The largest number of hospitalized patients was in the Internal Medicine Service (21.2%), followed by the Surgery Service (16.7%) (Table 2).

*Table 2. Distribution of patients by departments*

| Department name | Male | Female | Total | % |
|---|---|---|---|---|
| **Surgery Service** | 25 | 26 | 51 | 16.7 |
| **Anaesthesia and Resuscitation Service** | 3 | 1 | 4 | 1.3 |
| **Orthopaedics and Traumatology Service** | 8 | 8 | 16 | 5.2 |
| **Gynaecology and Obstetrics Service** | 2 | 22 | 24 | 7.9 |
| **ENT Service** | 4 | 0 | 4 | 1.3 |
| **Ophthalmology Service** | 5 | 3 | 8 | 2.6 |
| **Urology Service** | 10 | 6 | 16 | 5.2 |
| **Internal Medicine Service** | 34 | 31 | 65 | 21.2 |

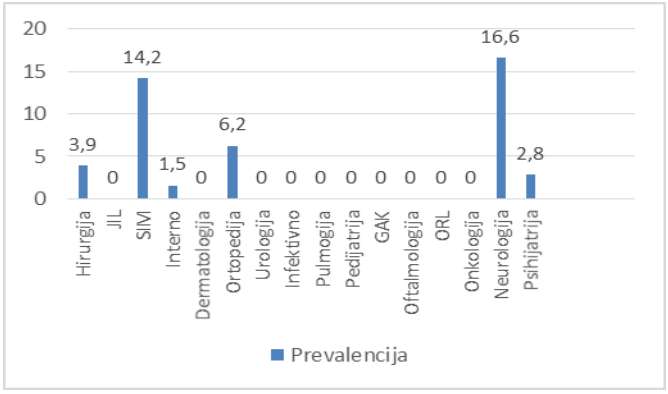
| | | | | |
|---|---|---|---|---|
| **Služba za onkologiju** | 4 | 2 | 6 | 2,0 |
| **Služba za intenzivnu medicinu nehirurških grana** | 3 | 4 | 7 | 2,3 |
| **Služba za infektologiju** | 3 | 5 | 8 | 2,6 |
| **Dermatologija** | 0 | 7 | 7 | 2,3 |
| **UKUPNO** | **151** | **155** | **306** | **100** |

Prosječna dužina hospitalizacije iznosila je 6, 7 dana. Najveći broj pacijenata imao je nefatalnu bolest prema McCabe skoru (Tabela 3).

***Tabela 3. Distribucija pacijenata prema McCabe skoru***

| McCabe skor | Broj | % |
|---|---|---|
| **Nefatalna bolest** | 190 | 62,1 |
| **Fatalna bolest** | 106 | 34,6 |
| **Brzofatalna bolest** | 10 | 3,3 |
| **Ukupno** | 306 | 100 |

Kod 38,2% hospitalizovanih pacijenata bio je plasiran urinarni kateter, dok je centralni venski kateter bio prisutan kod 4,2% pacijenata. Tokom tekuće hospitalizacije operisano je 33,8% pacijenata. U vrijeme sprovođenja studije registrovano je ukupno 10 intrahospitalnih infekcija kod 9 pacijenata. Prevalencija intrahospitalnih infekcija iznosila je 3,2%, dok je prevalencija pacijenata sa najmanje jednom infekcijom iznosila 2,9%. Najveća prevalencija infekcija registrovana je na odjeljenju neurologije (16,6%) i u jedinicama intenzivne medicine nehirurških grana (14,2%). Povišena prevalencija zabilježena je i na ortopediji i hirurgiji (Grafikon 2).




***Grafikon 2. Prevalencija IHI po odjeljenjima***

| | | | | |
|---|---|---|---|---|
| **Psychiatry Service** | 19 | 16 | 35 | 11.4 |
| **Neurology Service** | 11 | 13 | 24 | 7.9 |
| **Paediatrics Service** | 7 | 2 | 9 | 3.0 |
| **Pulmonology Service** | 13 | 9 | 22 | 7.1 |
| **Oncology Service** | 4 | 2 | 6 | 2.0 |
| **Intensive Care Service for Non-surgical Specialties** | 3 | 4 | 7 | 2.3 |
| **Infectious Diseases Service** | 3 | 5 | 8 | 2.6 |
| **Dermatology** | 0 | 7 | 7 | 2.3 |
| **TOTAL** | **151** | **155** | **306** | **100** |

Average length of hospital stay was 6.7 days. The largest number of patients had a non-fatal disease according to the McCabe score (Table 3).

***Table 3. Distribution of patients according to McCabe score***

| McCabe score | Number | % |
|---|---|---|
| **Non-fatal disease** | 190 | 62.1 |
| **Fatal disease** | 106 | 34.6 |
| **Rapidly fatal disease** | 10 | 3.3 |
| **Total** | 306 | 100 |

In 38.2% of hospitalized patients a urinary catheter was inserted, while a central venous catheter was present in 4.2% of patients. During the current hospitalization, 33.8% of patients underwent surgery. At the time of the study, a total of 10 healthcare-associated infections were recorded in 9 patients. The prevalence of healthcare-associated infections was 3.2%, while the prevalence of patients with at least one infection was 2.9%. The highest prevalence of infections was recorded in the neurology department (16.6%) and in intensive care units for non-surgical specialties (14.2%). Increased prevalence was also recorded in orthopedics and surgery (Figure 2).

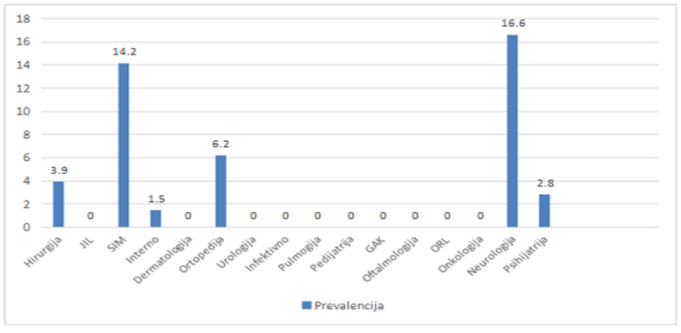
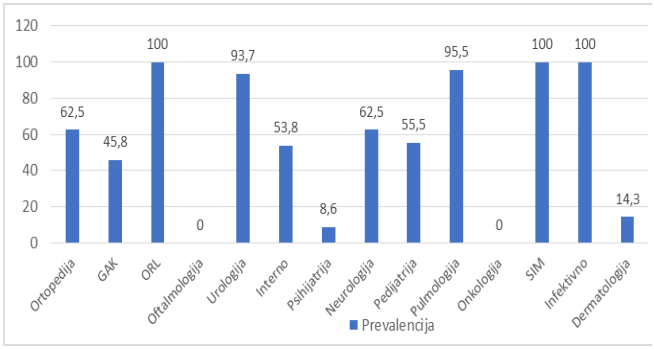



***Figure 2. Prevalence of HAI by departments***

Najčešće registrovane infekcije bile su pneumonije, infekcije gastrointestinalnog trakta izazvane bakterijom Clostridioides difficile, infekcije operativnog polja, infekcije krvi i infekcije mokraćnog sistema. Uzročnici infekcija potvrđeni su u osam slučajeva. Među registrovanim mikroorganizmima dominirali su Acinetobacter spp., Pseudomonas aeruginosa, Staphylococcus aureus (MRSA), Proteus mirabilis i Clostridioides difficile. Antibiotike je primalo 175 hospitalizovanih pacijenata, što predstavlja prevalenciju upotrebe antibiotika od 57,2%. Na infektivnom, ORL i odjeljenju nehirurške intenzivne njege svi pacijenti su primali antimikrobne lijekove, dok na onkologiji i oftalmologiji nije bilo pacijenata sa primjenom antimikrobnih lijekova (Grafikon 3).




***Grafikon 3. Prevalencija upotrebe antimikrobnih lijekova prema odjeljenjima***

Parenteralna primjena antibiotika registrovana je kod 87,3% pacijenata. Najčešće indikacije za primjenu antibiotika bile su liječenje infekcija stečenih u zajednici, hirurška profilaksa i medicinska profilaksa (Tabela 4).

***Tabela 4. Indikacije za primjenu antimikrobnih lijekova***

| Indikacija | Broj pacijenata | % |
|---|---|---|
| **Infekcija stečena u zajednici** | 108 | 61,7 |
| **Infekcija stečena u ustanovi dugotrajnog liječenja** | 1 | 0,6 |
| **Liječenje intrahospitalnih infekcija** | 9 | 5,1 |
| **Hirurška profilaksa** | 40 | 22,9 |
| **Medicinska profilaksa** | 16 | 9,1 |
| **Nepoznat razlog** | 1 | 0,6 |
| **Ukupno** | 175 | 100 |

The most frequently recorded infections were pneumonia, gastrointestinal tract infections caused by Clostridioides difficile, surgical site infections, bloodstream infections, and urinary tract infections. Causative agents of infections were confirmed in eight cases. Among the recorded microorganisms, Acinetobacter spp., Pseudomonas aeruginosa, Staphylococcus aureus (MRSA), Proteus mirabilis, and Clostridioides difficile predominated. Antibiotics were received by 175 hospitalized patients, which represents a prevalence of antibiotic use of 57.2%. At the Infectious Diseases, ENT, and Non-Surgical Intensive Care departments, all patients received antimicrobial drugs, while in the Oncology and Ophthalmology departments there were no patients receiving antimicrobial therapy (Figure 3).

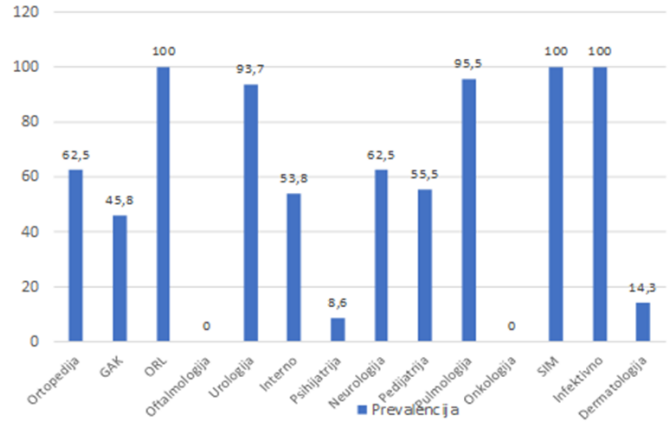


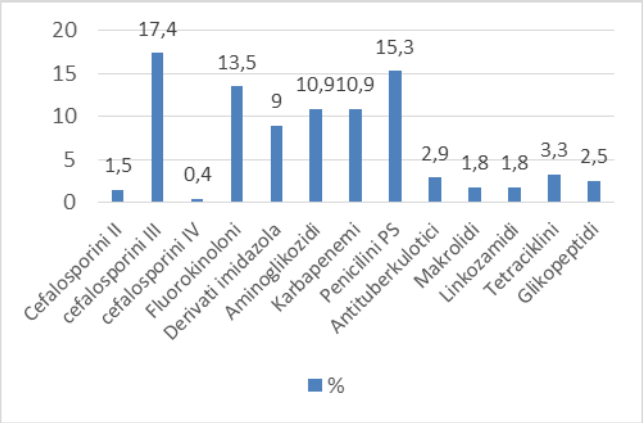

***Figure 3. Prevalence of antimicrobial drug use by departments***

Parenteral administration of antibiotics was recorded in 87.3% of patients. The most common indications for antibiotic use were treatment of community-acquired infections, surgical prophylaxis, and medical prophylaxis (Table 4).

***Table 4. Indications for antibiotic use***

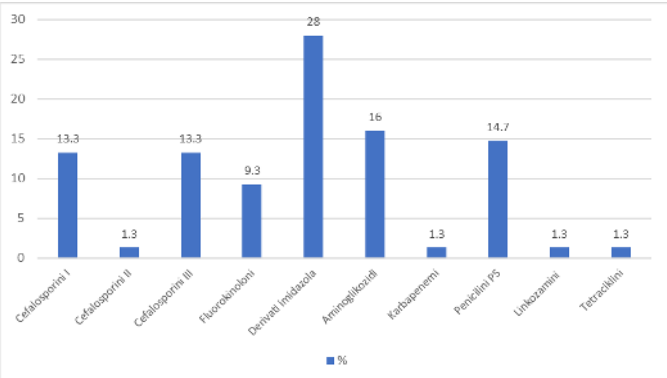
| Indication | Number of patients | % |
|---|---|---|
| **Community-acquired infection** | 108 | 61.7 |
| **Infection acquired in a long-term care facility** | 1 | 0.6 |
| **Treatment of healthcare-associated infections** | 9 | 5.1 |
| **Surgical prophylaxis** | 40 | 22.9 |

Najčešće propisivane grupe antimikrobnih lijekova bili su cefalosporini treće generacije, penicilini proširenog spektra, fluorokinoloni, aminoglikozidi i karbapenemi, što je prikazano na grafikonu 4.




***Grafikon 4. Najčešće propisivane klase antimikrobnih lijekova (AML) u studiji prevalencije***

Kod 90% pacijenata hirurška profilaksa trajala je duže od jednog dana, dok je 10% operisanih pacijenata hirušku profilasku primilo u jednoj dozi. Kada je u pitanju hirurška profilaksa, 40 pacijenata je primalo hirušku profilaksu. Među njima je 5 pacijenata primalo jedan, 22 je primalo 2 antibiotika, a 13 tri antibiotika u hirurškoj profilaksi. Od ukupno 60 antimikrobnih lijekova u hirurškoj profilaksi, 28% otpada na derivate imidazole, aminoglikozidi (16%), 14,7% na peniciline proširenog spektra, i po 13,3% cefalosporina prve i treće generacije (Grafikon 5).




***Grafikon 5. Najčešće propisivani antimikrobni lijekovi u hirurškoj profilaksi***

| | | |
|---|---|---|
| **Medical prophylaxis** | 16 | 9.1 |
| **Unknown reason** | 1 | 0.6 |
| **Total** | 175 | 100 |

The most commonly prescribed groups of antibiotics were third-generation cephalosporins, extended-spectrum penicillins, fluoroquinolones, aminoglycosides, and carbapenems, which is shown on figure 4.

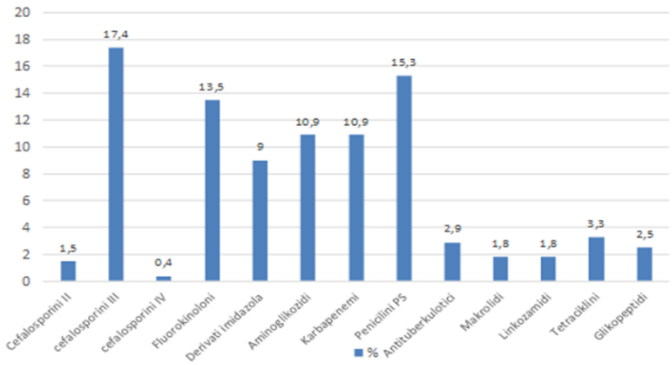



***Figure 4. Most commonly prescribed classes of antimicrobial drugs (AMD) in the prevalence study***

In 90% of patients, surgical prophylaxis lasted longer than one day, while 10% of operated patients received surgical prophylaxis in a single dose. Regarding surgical prophylaxis, 40 patients were receiving surgical prophylaxis. Among them, 5 patients received one antibiotic, 22 received 2 antibiotics, and 13 received 3 antibiotics in surgical prophylaxis. Of a total of 60 antimicrobial drugs used in surgical prophylaxis, 28% were imidazole derivatives, aminoglycosides (16%), 14.7% extended-spectrum penicillins, and 13.3% first and third generation cephalosporins each (Figure 5).

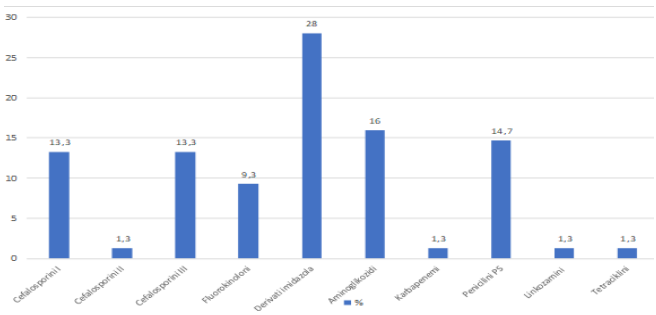



***Figure 3. Most commonly prescribed antimicrobial drugs in surgical prophylaxis***

Univarijantnom logističkom regresijom među faktorima rizika za nastanak IHI identifikovani su produžena hospitalizacija (RR 1,96; 95% CI 1,043-1,153) i centralni venki kateter (RR 6,585; 95% CI 1,726-25,126) (Tabela 5).

***Tabela 5. Faktori rizika za nastanak IHI. Univarijantna logistička regresija***

| Varijabla | Pacijenti | | p | RR (95% CI) |
|---|---|---|---|---|
| | Sa IHI (N=10) | Bez IHI (N=296) | | |
| **Dužina hospitalizacije (dani) *x* ± SD** | 28,3±31,8 | 6,04±6,6 | **0,000** | 1,096 (1,043-1,153) |
| **Centralni venski kateter** | 3 (30%) | 7 (2,3%) | **0,006** | 6,585 (1,726-25,126) |
| **Uzrast** | 67,4±8,946 | 61,723±20,929 | 0,396 | 1,017 (0,978-1,057) |
| **Operacija** | 1 (10%) | 72 (24,3%) | 0,439 | 0,628 (0,194-2,040) |
| **Urinarni kateter** | 6 (60%) | 111 (37,5%) | 0,180 | 2,328 (0,676-8,013) |
| **McCabe – fatalna i brzo fatalna** | 6 (60%) | 110 (37,1) | 0,156 | 2,536 (0,700-9,186) |
| **Intubacija** | 1 (10%) | 9 (3,04%) | 0,375 | 2,350 (0,355-15,545) |

*RR – relativni rizik; CI – interval povjerenja; x ± SD – prosječna vrijednost ± standardna devijacija*

Multivarijantnom logističkom regresijom kao nezavisan faktor rizika za nastanak IHI utvrđena je produžena hospitalizacija (RR 1,008; 95%CI 1,035-1,143) (Tabela 6).

***Tabela 6. Faktori rizika za nastanak IHI, multivarijantna logistička regresija***

| Varijabla | RR | 95%CI | S.E. | p |
|---|---|---|---|---|
| **Dani hospitalizacije** | 1,008 | 1,035-1,143 | 0,025 | **0,001** |

*RR – relativni rizik; CI – interval povjerenja; S.E. – standardna greška*

Using univariate logistic regression, prolonged hospitalization (RR 1.96; 95% CI 1.043–1.153) and central venous catheter (RR 6.585; 95% CI 1.726–25.126) were identified among risk factors for the occurrence of HAI (Table 5).

***Table 5. Risk factors for occurrence of HAI. Univariate logistic regression***

| Variable | Patients | | p | RR (95% CI) |
|---|---|---|---|---|
| | With HAI (N=10) | Without HAI (N=296) | | |
| **Length of hospitalization (days) *x* ± SD** | 28.3 ± 31.8 | 6.04±6.6 | **0.000** | 1,096 (1,043-1,153) |
| **Central venous catheter** | 3 (30%) | 7 (2.3%) | **0.006** | 6,585 (1,726-25,126) |
| **Age** | 67.4 ± 8.946 | 61.723± 20.929 | 0.396 | 1,017 (0,978-1,057) |
| **Surgery** | 1 (10%) | 72 (24.3%) | 0.439 | 0,628 (0,194-2,040) |
| **Urinary catheter** | 6 (60%) | 111 (37.5%) | 0.180 | 2,328 (0,676-8,013) |
| **McCabe – fatal and rapidly fatal** | 6 (60%) | 110 (37.1) | 0.156 | 2,536 (0,700-9,186) |
| **Intubation** | 1 (10%) | 9 (3.04%) | 0.375 | 2,350 (0,355-15,545) |

*RR – relative risk; CI – confidence interval; x ± SD – mean value ± standard deviation*

Using multivariate logistic regression, prolonged hospitalization was identified as an independent risk factor for the occurrence of HAI (RR 1.008; 95% CI 1.035–1.143) (Table 6).

***Table 6. Risk factors for the occurrence of HAI, multivariate logistic regression***

| Variable | RR | 95%CI | S.E. | p |
|---|---|---|---|---|
| **Days of hospitalization** | 1.008 | 1.035–1.143 | 0.025 | **0.001** |

*RR – relative risk; CI – confidence interval; S.E. – standard error*

## DISCUSSION

**DISKUSIJA**

Rezultati sprovedene studije pokazali su da prevalencija intrahospitalnih infekcija u JZU Bolnica „Sveti apostol Luka“ Doboj iznosi 3,2%, što je niže u odnosu na većinu Evropskih studija prevalencije. Prema nalazima Evropske studije prevalencije (2022 - 2023. godine) prevalencija pacijenata s barem jednom HAI u uzorku EU/EEA bila je 7,1% (raspon zemalja: 3,1–13,8%) [18]. Niža prevalencija može se djelimično objasniti kraćom prosječnom dužinom hospitalizacije (6,7 dana), dok je prosječna dužina bolničkog liječenja u Evropskoj studiji bila 8,1 dana. Takođe, u našoj bolnici bile su rjeđe zastupljene visokorizične procedure. U našoj studiji centralni venski kateter imalo je 4,2% pacijenata u odnosu na 9,5% u EU/EEA, iako je procenat intubiranih bio veći (3,3% u našoj u odnosu na 2,4% u EU/EEA). Zabrinjavajuća činjenica je da je 38,2% naših pacijenata imalo urinarni kateter, u odnosu na 20,3% Evropskih pacijenata. U prilog manjoj prevalenciji ide i uzrast naših pacijenata u odnosu na pacijente iz Evropske studije. Prosječan uzrast naših pacijenata bio je 61,9 godina, dok je ova vrijednost u Evropskim zemljama iznosila 67 godina. U našem uzorku pacijenata 3,3% njih je imalo brzo fatalnu bolest, odnosno 5,6% među Evropskim pacijentima. Najveća prevalencija registrovana je na odjeljenjima neurologije (16,6%) i nehirurške intenzivne medicine, što je očekivano zbog prisustva teških pacijenata, češće primjene invazivnih procedura i duže hospitalizacije. Među našim pacijentima najučestalije IHI bile su pneumonije, kao i među Evropskim pacijentima, mada nam mali broj infekcija uskraćuje mogućnost za poređenje sa velikim brojem infekcija. U V nacionalnoj studiji prevalencije bolničkih infekcija i upotrebe antibiotika, koja je u Srbiji sprovedena u okviru EU studije 2022. godine, prevalencija pacijenata sa najmanje jednom IHI iznosila je 4,8% (4,5–5,2%), a prevalencija IHI iznosila je 5,3%. Prevalencija pacijenata sa IHI bila je najmanja na ginekološkim odjeljenjima (1,2%), a najveća u jedinicama intenzivnog liječenja (16,9%). Među najučestalijim IHI bile su infekcije mokraćnog sistema (28,2%), pneumonije (19,4%), infekcije

The results of the conducted study showed that the prevalence of healthcare-associated infections in the Public Health Institution Hospital “Sveti apostol Luka” Doboj is 3.2%, which is lower compared to most European prevalence studies. According to the findings of the European prevalence study (2022–2023), the prevalence of patients with at least one HAI in the EU/EEA sample was 7.1% (country range: 3.1–13.8%) [18]. Lower prevalence can be partially explained by shorter average length of hospital stay (6.7 days), while the average length of hospital treatment in the European study was 8.1 days. Also, high-risk procedures were less represented in our hospital. In our study, 4.2% of patients had a central venous catheter compared to 9.5% in the EU/EEA, although the percentage of intubated patients was higher (3.3% in our study compared to 2.4% in the EU/EEA). A worrying fact is that 38.2% of our patients had a urinary catheter, compared to 20.3% of European patients. The lower prevalence is also supported by the age of our patients compared to patients in the European study. The average age of our patients was 61.9 years, while this value in European countries was 67 years. In our sample, 3.3% of patients had a rapidly fatal disease, versus 5.6% among European patients. The highest prevalence was recorded in the neurology departments (16.6%) and non-surgical intensive care units, which is expected due to the presence of severely ill patients, more frequent use of invasive procedures, and longer hospitalization. Among our patients, the most frequent HAI were pneumonia, as in European patients, although the small number of infections prevents comparison with the large number of infections in European studies. In the Fifth National Prevalence Study of Hospital Infections and Antibiotic Use, conducted in Serbia as part of the EU study in 2022, the prevalence of patients with at least one HAI was 4.8% (4.5–5.2%), and the prevalence of HAI was 5.3%. The prevalence of patients with HAI was the lowest in gynecology departments (1.2%), and the highest in intensive care units (16.9%). The most common HAI were urinary tract infections (28.2%), pneumonia (19.4%), surgical site infections (14.4%), and bloodstream

operativnog polja (14,4%) i infekcije krvi (11,5%) [3]. U studiji prevalencije IHI i upotrebe antibiotika u Opštoj bolnici Sremska Mitrovica, koja je sprovedena u okviru V nacionalne studije u Srbiji prevalencija IHI i prevalencija pacijenata sa IHI iznosila je 4,6%, pri čemu ova bolnica predstavlja opštu bolnicu i ima približan broj kreveta kao naša bolnica [23]. U studiji prevalencije IHI u Kliničkom centru Kragujevac, koja je sprovedena u okviru V nacionane studije u Srbiji, prevalencija pacijenata sa bar jednom IHI iznosila je 8,3%, a prevalencija svih IHI 8,6%. Najviše prevalencije bile su u jedinicama intenzivnog liječenja za odrasle (34,6%) i pedijatrijske/neonatološke pacijente (21,2%). Najčešće su registrovane pneumonije (32,7%), zatim infekcije mokraćnog sistema (28,6%), dok su infekcije operativnog mjesta i infekcije krvi bile podjednako zastupljene (16,3%) [24]. U studiji prevalencije IHI u javnim bolnicama na Novom Zelandu, prevalencija pacijenata sa IHI iznosila je 6,6%. Najčešće infekcije povezane sa zdravstvenom zaštitom bile su: infekcije operativnog polja (25%), infekcije mokraćnog sistema (19%), pneumonije (18%) i infekcije krvi (13%) [25]. U studiji prevalencije u Lombardiji IHI su registrovane kod 10,1% pacijenata. Najučestalije su bile infekcije krvi (18,9%), infekcije mokraćnog sistema (17,1%), infekcije SARS-CoV-2 (17,0%), pneumonije (16,7%) i infekcije operativnog polja (11,0%). Isključujući infekcije SARS-CoV-2, ukupna prevalencija IHI bila je 8,4% [26]. Posebno značajan nalaz predstavlja visoka prevalencija upotrebe antibiotika. Više od polovine hospitalizovanih pacijenata primalo je antibiotike (57,2%), što ukazuje na veoma široku primjenu antimikrobnih lijekova. Dominacija cefalosporina treće generacije i fluorokinolona predstavlja važan epidemiološki problem, jer ove grupe antibiotika značajno doprinose razvoju antimikrobne rezistencije i pojavi infekcija izazvanih bakterijom *Clostridioides difficile*, koje su kod nas bile pozicionirane na drugom mjestu po učestalosti. Prevalencija upotrebe antibiotika se kretala od 35,5% (od 20,8% do 56,5%) u Evropskoj studiji (18), do 42% u Lombardiji (26) I 44,8% u V nacionalnoj studiji prevalencije IHI i

infections (11.5%) [3]. In the prevalence study of HAI and antibiotic use in the General Hospital Sremska Mitrovica, conducted as part of the Fifth National Study in Serbia, the prevalence of HAI and the prevalence of patients with HAI were 4.6%, and this hospital is a general hospital with approximately the same number of beds as our hospital [23]. In the prevalence study of HAI in the Clinical Centre Kragujevac, conducted as part of the Fifth National Study in Serbia, the prevalence of patients with at least one HAI was 8.3%, and the prevalence of all HAI was 8.6%. The highest prevalence was in adult intensive care units (34.6%) and pediatric/neonatal intensive care units (21.2%). The most frequently recorded infections were pneumonia (32.7%), followed by urinary tract infections (28.6%), while surgical site infections and bloodstream infections were equally represented (16.3%) [24]. In the prevalence study of HAI in public hospitals in New Zealand, the prevalence of patients with HAI was 6.6%. The most common healthcare-associated infections were: surgical site infections (25%), urinary tract infections (19%), pneumonia (18%), and bloodstream infections (13%) [25]. In the prevalence study in Lombardy, HAI were recorded in 10.1% of patients. The most common were bloodstream infections (18.9%), urinary tract infections (17.1%), SARS-CoV-2 infections (17.0%), pneumonia (16.7%), and surgical site infections (11.0%). Excluding SARS-CoV-2 infections, overall HAI prevalence was 8.4% [26]. A particularly important finding is the high prevalence of antibiotic use. More than half of hospitalized patients were receiving antibiotics (57.2%), which indicates very extensive use of antimicrobial drugs. The predominance of third-generation cephalosporins and fluoroquinolones represents an important epidemiological problem, as these groups of antibiotics significantly contribute to the development of antimicrobial resistance and the occurrence of infections caused by *Clostridioides difficile*, which in our setting were in second place by frequency. The prevalence of antibiotic use ranged from 35.5% (20.8–56.5%) in the European study [18], to 42% in Lombardy [26], and 44.8% in

upotrebe antibiotika u Srbiji [3]. U našoj studiji produžena hirurška profilaksa registrovana kod 90% pacijenata koji su primali hiruršku profilaksu, što odstupa od međunarodnih preporuka koje predviđaju jednokratnu ili kratkotrajnu primjenu antibiotika u hirurškoj profilaksi. U Evropskoj studiji hirurška profilaksa bila je indikacija za 14,9% pacijenata koji su primali antibiotike, a duže od jednog dana je primalo u 48,3% pacijenata koji su primali kiruršku profilaksu [18]. Među pacijentima koji su primali hiruršku profilaksu u V nacionalnoj studiji u Srbiji, 71,1% je primalo duže od jednog dana [3]. Da je situacija u našoj bolnici povoljnija, ukazuje i činjenica da je samo kod 10,5% pacijenata došlo do promjene antimikrobnih lijekova, pri čemu je u 8,5% promjena registrovana zbog eskalacije, dok je u evropskoj studiji promjena antibiotika nastala u 18,3% pacijenata, pri čemu je to zbog eskalacije učinjeno kod 10,9% pacijenata sa promijenjenim antibiotikom [18]. Naša studija obezbijedila je takođe podatke o uzročnicima IHI i njihovoj rezistenciji. Međutim, zbog ključnog nedostatka studije, koja se odnosi na mali uzorak pacijenata sa IHI, ne možemo postaviti paralelu sa drugim zemljama. Među 8 izolata koji su identifikovani kao uzročnici IHI, svakako zabrinjava rezistencija *Acinetobacter spp*. na karbapeneme, ali ne možemo govoriti o veličini problema. Radi sagledavanja problema, neophodno je pratiti stanje kroz studiju incidencije u našoj bolnici, kao I sprovesti studiju prevalencije na nivou Republike Srpske. Po ugledu na brojne studije, i naša studija se bavila ispitivanjem faktora rizika koji su povezani sa učestalijom pojavom IHI. Multivarijantna logistička regresija identifikovala je sljedeće nezavisne faktore rizika za nastanak IHI u kliničkom centru Kragujevac: produžen boravak u bolnici, lošiji *McCabe* skor, intubacija pacijenata i primjena antimikrobnih lijekova [24]. U multivarijantnoj analizi, u studiji na Novom Zelandu nezavisni faktori rizika za infekcije povezane sa zdravstvenom zaštitom uključivali su prisustvo perifernog (OR=2,0) ili centralnog (OR=5,7) intravenskog katetera [25]. U studiji u Sremskoj Mitrovici među nezavisnim faktorima rizika za nastanak IHI registrovani su produženi

the Fifth National Prevalence Study of HAI and Antibiotic Use in Serbia [3]. In our study, prolonged surgical prophylaxis was recorded in 90% of patients who received surgical prophylaxis, which deviates from international recommendations that foresee single-dose or short-term antibiotic use in surgical prophylaxis. In the European study, surgical prophylaxis was an indication in 14.9% of patients receiving antibiotics, and 48.3% of patients receiving surgical prophylaxis received it for more than one day [18]. Among patients receiving surgical prophylaxis in the Fifth National Study in Serbia, 71.1% received it for more than one day [3]. The fact that only 10.5% of patients had a change in antimicrobial drugs indicates a more favourable situation in our hospital, with 8.5% of changes recorded due to escalation, while in the European study antibiotic changes occurred in 18.3% of patients, with escalation in 10.9% of patients with changed antibiotics [18]. Our study also provided data on HAI pathogens and their resistance. However, due to the main limitation of the study, relating to the small sample of patients with HAI, we cannot draw parallels with other countries. Among the 8 isolates identified as HAI pathogens, carbapenem-resistant *Acinetobacter spp.* is particularly concerning, although we cannot assess the magnitude of the problem. To assess the problem, it is necessary to monitor the situation through an incidence study in our hospital and to conduct a prevalence study at the level of the Republic of Srpska. Following numerous studies, our study also examined risk factors associated with the more frequent occurrence of HAI. Multivariate logistic regression identified the following independent risk factors for the occurrence of HAI in the Clinical Centre Kragujevac: prolonged hospital stay, worse *McCabe* score, intubation of patients, and use of antimicrobial drugs [24]. In multivariate analysis in the study in New Zealand, independent risk factors for healthcare-associated infections included the presence of a peripheral (OR=2.0) or central (OR=5.7) intravenous catheter [25]. In the study in Sremska Mitrovica, prolonged hospital stay and use of antimicrobial drugs were

boravak u bolnici, i primjena antimikrobnoh lijekova [24]. Slično navedenim nalazima, multivarijantnom analizom i u našoj studiji produžena hospitalizacija je registrovana kao nezavisan faktor rizika za nastanak IHI. Sprovedena studija je obezbijedila ključne podatke o učestalosti IHI na nivou naše bolnice, kao i o prevalenciji upotrebe antimikrobnih lijekova. Bez obzira što je studija u kratkom vremenskom intervalu pružila značajne informacije, ona ima i nedostatke. Ključni nedostatak se odnosi na mali uzorak pacijenata sa registrovanom IHI, pa je bilo nemoguće sagledati veličinu problema koja se odnosi na rezistenciju uzročnika IHI. Dobijeni rezultati ukazuju na značaj unapređenja epidemiološkog nadzora nad IHI putem dodatnih studija incidencije, kao i racionalizaciju upotrebe antimikrobnih lijekova.

## ZAKLJUČAK

Prevalencija intrahospitalnih infekcija u JZU Bolnica „Sveti apostol Luka“ Doboj iznosila je 3,2%, dok je prevalencija upotrebe antibiotika bila visoka i iznosila 57,2%. Najveća prevalencija infekcija registrovana je na odjeljenjima neurologije i intenzivne medicine. Najčešće registrovane infekcije bile su pneumonije, infekcije gastrointestinalnog trakta izazvane bakterijom Clostridioides difficile, infekcije operativnog polja, infekcije krvi i infekcije mokraćnog sistema. Uzročnici infekcija potvrđeni su u osam slučajeva. Među registrovanim mikroorganizmima dominirali su Acinetobacter spp., Pseudomonas aeruginosa, Staphylococcus aureus (MRSA), Proteus mirabilis i Clostridioides difficile. Najčešće korišteni antibiotici bili su cefalosporini treće generacije i penicilini proširenog spektra. Rezultati istraživanja ukazuju na potrebu unapređenja sistema nadzora nad intrahospitalnim infekcijama, racionalnije upotrebe antibiotika, smanjenja trajanja hirurške profilakse.

registered among independent risk factors for the occurrence of HAI [24]. Similar to these findings, multivariate analysis in our study identified prolonged hospitalization as an independent risk factor for the occurrence of HAI. The conducted study provided key data on the frequency of HAI at the level of our hospital, as well as on the prevalence of antimicrobial drug use. Regardless of the fact that the study provided important information in a short time interval, it also has limitations. The main limitation concerns the small sample of patients with recorded HAI, making it impossible to assess the magnitude of the problem relating to resistance of HAI pathogens. The obtained results indicate the importance of improving epidemiological surveillance of HAI through additional incidence studies, as well as rationalizing the use of antimicrobial drugs.

## CONCLUSION

The prevalence of intrahospital infections in the "St. Apostol Luka" Doboj Hospital was 3.2%, while the prevalence of antibiotic use was high and amounted to 57.2%. The highest prevalence of infections was registered in the departments of neurology and intensive care medicine. The most frequently registered infections were pneumonia, gastrointestinal tract infections caused by the bacterium Clostridioides difficile, operative field infections, blood infections, and urinary tract infections. The causative agents of infections were confirmed in eight cases. Among the registered microorganisms, Acinetobacter spp., Pseudomonas aeruginosa, Staphylococcus aureus (MRSA), Proteus mirabilis and Clostridioides difficile dominated. The most commonly used antibiotics were third-generation cephalosporins and extended-spectrum penicillins. The research results point to the need to improve the system of monitoring intrahospital infections, more rational use of antibiotics, and reducing the duration of surgical prophylaxis.

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***Original scientific article***

# SUBJEKTIVNA PROCJENA RODITELJA DJECE ŠKOLSKOG UZRASTA O HPV VAKCINACIJI

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## APSTRAKT

Uvod. Humani papiloma virus (HPV) predstavlja jednu od najčešćih polno prenosivih infekcija i glavni je uzročnik karcinoma grlića materice. Informisanost roditelja o HPV infekciji i vakcinaciji ima ključnu ulogu u donošenju odluka o imunizaciji djece. Cilj ovog rada bio je spitati samoprocjenu informisanosti roditelja djece školskog uzrasta o HPV infekciji i HPV vakcinaciji, te utvrditi povezanost sociodemografskih karakteristika sa stepenom informisanosti.

Materijal i metode**.** Sprovedena je deskriptivna studija presjeka na uzorku od 101 roditelja djece uzrasta 9–14 godina sa područja grada Prijedora. Podaci su prikupljeni pomoću originalnog upitnika distribuiranog metodom „snježne kugle". Za obradu podataka korišten je SPSS 26, uz primjenu deskriptivne statistike i hi-kvadrat testa.

Rezultati. Većina ispitanika (91,1%) navela je da je čula za HPV. Nije utvrđena statistički značajna povezanost između pola ispitanika i informisanosti o HPV infekciji (p=0,808). Utvrđena je statistički značajna povezanost između nivoa obrazovanja i

# PARENTS' SUBJECTIVE ASSESSMENT OF HPV VACCINATION IN SCHOOL-AGED CHILDREN

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## ABSTRACT

Introduction. Human papillomavirus (HPV) is one of the most common sexually transmitted infections and the leading cause of cervical cancer. Parents' knowledge about HPV infection and vaccination plays a crucial role in decision-making regarding childhood immunization. The aim of the study was to examine parents' self-assessment of their level of knowledge regarding HPV infection and HPV vaccination among school-aged children, and to determine the association between sociodemographic characteristics and the level of knowledge.

Material and methods. A descriptive cross-sectional study was conducted among 101 parents of children aged 9–14 years in the city of Prijedor. Data were collected using an original questionnaire distributed through the snowball sampling method. Statistical analysis was performed using SPSS version 26, applying descriptive statistics and the chi-square test.

Results. The majority of respondents (91.1%) reported having heard of HPV. No statistically

informisanosti o HPV-u ($\chi^2$=23,909; p<0,001), pri čemu su ispitanici sa višim nivoom obrazovanja bili bolje informisani. Takođe, mjesto stanovanja bilo je značajno povezano sa znanjem o besplatnoj HPV vakcinaciji za djecu školskog uzrasta ($\chi^2$=12,340; p=0,015), pri čemu su ispitanici iz urbanih sredina češće posjedovali ovu informaciju. Postojala je i statistički značajna povezanost između stručne spreme i izvora informacija o HPV vakcini ($\chi^2$=18,5; p=0,005).

Zaključak**.** Roditelji djece školskog uzrasta pokazuju visok nivo opšte informisanosti o HPV infekciji, ali postoje značajne razlike u nivou znanja u odnosu na obrazovanje i mjesto stanovanja. Rezultati ukazuju na potrebu za ciljanim edukativnim intervencijama usmjerenim ka roditeljima sa nižim nivoom obrazovanja i stanovnicima ruralnih područja kako bi se unaprijedila informisanost i povećao obuhvat HPV vakcinacijom.

**Ključne riječi:** Intrahospitalna infekcija, vakcinacija, roditelji, informisanost, javno zdravstvo.

## UVOD

Humani papiloma virus (HPV) predstavlja jednu od najčešćih polno prenosivih infekcija u svijetu i značajan je javnozdravstveni problem zbog svoje povezanosti sa razvojem malignih i premalignih oboljenja. Do danas je identifikovano više od 200 genotipova HPV-a, pri čemu se visokorizični tipovi, naročito HPV 16 i HPV 18, povezuju sa nastankom karcinoma grlića materice, ali i karcinoma vulve, vagine, penisa, anusa i orofarinksa [1]. Prema podacima Svjetske zdravstvene organizacije (WHO), gotovo svi slučajevi karcinoma grlića materice povezani su sa HPV infekcijom, što ovu bolest čini jednom od rijetkih malignih bolesti sa jasno definisanim uzročnikom i mogućnošću efikasne primarne prevencije putem vakcinacije [2]. Karcinom grlića materice i dalje predstavlja značajan uzrok obolijevanja i umiranja žena širom svijeta, posebno u zemljama sa niskim i srednjim prihodima. Procjenjuje se da više od 90% smrtnih slučajeva od karcinoma grlića materice nastaje upravo u ovim zemljama, gdje su programi skrininga

significant association was found between respondents' gender and awareness of HPV infection (p=0.808). A statistically significant association was observed between educational level and HPV-related knowledge ($\chi^2$=23.909; p<0.001), with higher-educated respondents demonstrating better awareness. Place of residence was significantly associated with knowledge that HPV vaccination is provided free of charge for school-aged children ($\chi^2$=12.340; p=0.015), with urban residents being more informed. Furthermore, a significant association was identified between educational level and sources of information about HPV vaccination ($\chi^2$=18.5; p=0.005).

Conclusion**.** Parents of school-aged children demonstrate a high level of general awareness about HPV infection; however, significant differences in knowledge exist according to educational attainment and place of residence. The findings highlight the need for targeted educational interventions aimed at parents with lower educational levels and those living in rural areas in order to improve awareness and increase HPV vaccination coverage.

**Keywords:** HPV infection, HPV vaccination, parents, awareness, public health.

## INTRODUCTION

Human papillomavirus (HPV) is one of the most common sexually transmitted infections worldwide and represents a major public health concern due to its association with the development of malignant and premalignant diseases. To date, more than 200 HPV types have been identified, with high-risk types, particularly HPV 16 and HPV 18, being strongly associated with the development of cervical cancer, as well as cancers of the vulva, vagina, penis, anus, and oropharynx [1]. According to the World Health Organization (WHO), nearly all cases of cervical cancer are linked to HPV infection, making this disease one of the few malignancies with a clearly defined etiological agent and an effective primary prevention strategy through vaccination [2]. Cervical cancer remains a significant cause of morbidity and mortality among women worldwide, particularly in low- and middle-income countries. It

i imunizacije često nedovoljno razvijeni [2]. Zbog toga je WHO 2020. godine pokrenula globalnu strategiju za eliminaciju karcinoma grlića materice kao javnozdravstvenog problema, pri čemu HPV vakcinacija predstavlja jedan od ključnih stubova prevencije [2]. HPV vakcine pokazale su visok stepen efikasnosti u prevenciji infekcija visokorizičnim tipovima virusa i nastanka premalignih promjena grlića materice. Dugoročna istraživanja pokazala su značajno smanjenje incidencije HPV infekcija, genitalnih bradavica i cervikalnih intraepitelnih neoplazija kod vakcinisanih populacija [3]. Pored toga, noviji podaci ukazuju da zemlje sa visokim obuhvatom vakcinacije bilježe značajno smanjenje učestalosti invazivnog karcinoma grlića materice među mladim ženama koje su vakcinisane u adolescenciji [4]. Ovi rezultati potvrđuju da HPV vakcinacija predstavlja jednu od najuspješnijih preventivnih intervencija savremene medicine. Svjetska zdravstvena organizacija preporučuje rutinsku vakcinaciju djevojčica uzrasta od 9 do 14 godina prije početka seksualne aktivnosti, jer je tada imunološki odgovor najizraženiji, a vjerovatnoća prethodne izloženosti virusu minimalna [2]. Posljednjih godina preporuke su proširene i na vakcinaciju dječaka, imajući u vidu značaj HPV infekcije u nastanku različitih malignih oboljenja kod oba pola, kao i doprinos kolektivnoj zaštiti stanovništva [2]. Takođe, novije preporuke ukazuju da jednodozna vakcinacija može pružiti adekvatnu zaštitu kod određenih uzrasnih grupa, što može doprinijeti povećanju dostupnosti vakcine i obuhvata imunizacijom [5]. Uprkos dokazanoj bezbjednosti i efikasnosti HPV vakcina, obuhvat vakcinacijom u mnogim zemljama i dalje nije na zadovoljavajućem nivou. Jedan od najvažnijih faktora koji utiču na prihvatanje vakcinacije jeste nivo informisanosti roditelja. Roditelji imaju ključnu ulogu u donošenju odluke o vakcinaciji djece školskog uzrasta, posebno u sredinama gdje je za imunizaciju potrebna roditeljska saglasnost. Nedovoljno znanje o HPV infekciji, strah od neželjenih efekata vakcine, nepovjerenje prema zdravstvenim institucijama i prisustvo dezinformacija predstavljaju značajne prepreke za

is estimated that more than 90% of cervical cancer-related deaths occur in these countries, where screening and immunization programs are often inadequately developed [2]. For this reason, WHO launched a global strategy in 2020 to eliminate cervical cancer as a public health problem, with HPV vaccination serving as one of the key pillars of prevention [2]. HPV vaccines have demonstrated a high level of effectiveness in preventing infections caused by high-risk HPV types and the development of precancerous cervical lesions. Long-term studies have shown a substantial reduction in the incidence of HPV infections, genital warts, and cervical intraepithelial neoplasia among vaccinated populations [3]. Furthermore, recent evidence indicates that countries with high vaccination coverage have recorded a significant decrease in the incidence of invasive cervical cancer among young women vaccinated during adolescence [4]. These findings confirm that HPV vaccination is one of the most successful preventive interventions in modern medicine. The World Health Organization recommends routine vaccination of girls aged 9–14 years before the onset of sexual activity, as the immune response is strongest at this age and the likelihood of prior exposure to the virus is minimal [2]. In recent years, recommendations have been expanded to include boys, considering the role of HPV infection in the development of various malignancies in both sexes and its contribution to herd immunity [2]. Additionally, newer recommendations suggest that a single-dose vaccination schedule may provide adequate protection for certain age groups, potentially improving vaccine accessibility and immunization coverage [5]. Despite the proven safety and effectiveness of HPV vaccines, vaccination coverage remains suboptimal in many countries. One of the most important factors influencing vaccine acceptance is the level of parental awareness and knowledge. Parents play a crucial role in deciding whether their school-aged children will be vaccinated, particularly in settings where parental consent is required for immunization. Insufficient knowledge about HPV infection, concerns regarding

postizanje optimalnog obuhvata vakcinacijom [6]. U zemljama regiona Zapadnog Balkana HPV vakcinacija je relativno nov preventivni program, zbog čega je istraživanje nivoa informisanosti roditelja od posebnog značaja. Razumijevanje faktora koji utiču na znanje roditelja može pomoći u planiranju ciljanih edukativnih aktivnosti i unapređenju programa imunizacije. Procjena informisanosti roditelja djece školskog uzrasta omogućava identifikaciju područja u kojima postoje nedostaci znanja, kao i razvoj strategija koje će doprinijeti povećanju obuhvata HPV vakcinacijom i smanjenju opterećenja bolestima povezanim sa HPV infekcijom. Cilj ovog rada bio je ispitati samoprocjenu informisanosti roditelja djece školskog uzrasta o HPV infekciji i HPV vakcinaciji, te utvrditi povezanost sociodemografskih karakteristika sa stepenom informisanosti.

## MATERIJAL I METODE

Studija je sprovedena kao deskriptivna, kvantitativna studija presjeka u periodu od 10.11. do 10.12.2025. godine, na teritoriji grada Prijedora. Uzorak istraživanja čine roditelji djece uzrasta od 9 do 14 godina starosti. U istraživanju je učestvovao 101 ispitanik, oba pola. Kriterijumi za uključivanje u istraživanje je da ispitanik ima djecu uzrasta od 9 do 14 godina starosti i da su dali saglasnost za učestvovanje u istraživanju. Kriterijumi za neuključivanje: roditelji djece mlađe ili starije životne dobi, neadekvatno ispunjen upitnik i odbijanje učešća u studiji. Istraživanje je sprovedeno uz pomoć originalnog autorskog upitnika, koji je kreiran na platformi doc.google.com. Upitnik je distribuiran metodom „snježne kugle“. Za statističku obradu podataka korišten je SPSS softverski paket, verzija 26, a za statističku analizu podataka korištene su metode deskriptivne statistike i hi-kvadrat test. Kao nivo statističke značajnosti uzeta je vrijednost $p<0,05$.

## REZULTATI

U istraživanju je učestvovao 101 ispitanik, pri čemu je bila veća zastupljenost ispitanika ženskog pola

vaccine side effects, distrust in healthcare institutions, and the spread of misinformation represent significant barriers to achieving optimal vaccination coverage [6]. In the countries of the Western Balkans, HPV vaccination is a relatively new preventive program, making the assessment of parental awareness particularly important. Understanding the factors that influence parental knowledge can assist in planning targeted educational activities and improving immunization programs. Evaluating the level of awareness among parents of school-aged children enables the identification of knowledge gaps and supports the development of strategies aimed at increasing HPV vaccination coverage and reducing the burden of HPV-related diseases. To examine parents' self-assessment of their level of knowledge regarding HPV infection and HPV vaccination among school-aged children, and to determine the association between sociodemographic characteristics and the level of knowledge.

## MATERIAL AND METHODS

This study was conducted as a descriptive cross-sectional quantitative study between November 10 and December 10, 2025, in the city of Prijedor. The study sample consisted of parents of children aged 9 to 14 years. A total of 101 respondents of both sexes participated in the study. The inclusion criteria were: being a parent of a child aged 9–14 years and providing informed consent to participate in the study. Exclusion criteria included parents of children younger or older than the specified age range, incompletely completed questionnaires, and refusal to participate in the study. Data were collected using an author-developed questionnaire created on the Google Forms platform (doc.google.com). The questionnaire was distributed using the snowball sampling method. Statistical data processing was performed using the Statistical Package for the Social Sciences (SPSS), version 26. Descriptive statistical methods and the chi-square test were used for data analysis. A p-value of less than 0.05 ($p < 0.05$) was considered statistically significant.

(72,3%), dok je prosječna starost ispitanika iznosila 41,67 godina. Većina ispitanika (53,6%) je navela da stanuje u urbanoj sredini. Analiza stručne spreme pokazala je da je najveći broj ispitanika imao završenu srednju stručnu spremu (SSŠ) i to 55 ispitanika (54,5%). Visoku ili višu stručnu spremu (VŠS/VSS) imalo je 39 ispitanika (38,6%), dok je najmanji broj ispitanika imao završenu osnovnu školu (6,9%). Analiza povezanosti pola ispitanika i informisanosti o HPV infekciji pokazala je da je velika većina ispitanika, bez obzira na pol, izjavila da je čula za HPV. Među muškarcima je 92,9% ispitanika navelo da je upoznato sa HPV-om, dok je među ženama taj procenat iznosio 90,4%. Mali procenat ispitanika oba pola naveo je da nije čuo za HPV ili da nije siguran u vezi sa tim, što je predstavljeno u tabeli 1. Hi-kvadrat test nije pokazao statistički značajnu povezanost između pola ispitanika i informisanosti o HPV infekciji ($\chi^2$ = 0,426; p = 0,808), što ukazuje da se nivo osnovne informisanosti o HPV-u ne razlikuje značajno između muškaraca i žena u ispitivanom uzorku.

***Tabela 1.Povezanost pola ispitanika i informisanosti o HPV-u***

| Da li ste čuli za HPV? | Muško N (%) | Žensko N (%) | UKUPNO N (%) | $\chi^2$ | p |
|---|---|---|---|---|---|
| **Da** | 26 (92,9) | 66 (90,4) | 92 (91,1) | 0,426 | 0,808 |
| **Ne** | 1 (3,6) | 5 (6,8) | 6 (5,9) | | |
| **Nisam siguran/a** | 1 (3,6) | 2 (2,7) | 3 (3,0) | | |
| **Ukupno** | **28 (100,0)** | **73 (100,0)** | **101 (100,0)** | | |

U tabeli 2 je predstavljana analiza povezanosti stručne spreme ispitanika i subjektivne procjene nivoa informisanosti o HPV infekciji, gdje je uočena statistički značajna razlika između posmatranih grupa. Većina ispitanika sa osnovnom i srednjom stručnom spremom izjavila je da je nedovoljno informisana o HPV-u, dok je među ispitanicima sa višom ili visokom stručnom spremom najveći broj naveo da je dovoljno dobro informisan. Gotovo svi ispitanici koji su se izjasnili da uopšte nisu

## RESULTS

A total of 101 respondents participated in the study, with a higher proportion of female participants (72.3%). The mean age of respondents was 41.67 years. Most respondents (43.6%) reported living in urban areas. Analysis of educational attainment showed that the largest proportion of respondents had completed secondary education (55 respondents; 54.5%). Higher education (college or university degree) was reported by 39 respondents (38.6%), while the smallest group consisted of respondents with only primary education (7 respondents; 6.9%). Analysis of the association between respondents' sex and awareness of HPV infection showed that the vast majority of respondents, regardless of sex, had heard of HPV. Among male respondents, 92.9% reported being familiar with HPV, while among females this percentage was 90.4%. A small proportion of respondents of both sexes stated that they had not heard of HPV or were unsure, as presented in Table 1. The chi-square test did not reveal a statistically significant association between respondents' sex and awareness of HPV infection ($\chi^2$ = 0.426; p = 0.808), indicating that the level of basic awareness of HPV did not differ significantly between men and women in the study sample.

***Table 1. Association between respondents' sex and awareness of HPV***

| Have you heard of HPV? | Male N (%) | Female N (%) | Total N (%) | $\chi^2$ | p |
|---|---|---|---|---|---|
| **Yes** | 26 (92.9) | 66 (90.4) | 92 (91.1) | 0.426 | 0.808 |
| **No** | 1 (3.6) | 5 (6.8) | 6 (5.9) | | |
| **Not sure** | 1 (3.6) | 2 (2.7) | 3 (3.0) | | |
| **Total** | 28 (100.0) | 73 (100.0) | 101 (100.0) | | |

Table 2 presents the association between respondents' educational level and their self-assessed level of knowledge about HPV infection, revealing a statistically significant difference among

informisani pripadali su grupi sa nižim nivoom obrazovanja. Rezultati hi-kvadrat testa ukazuju na postojanje statistički značajne povezanosti između stručne spreme i nivoa informisanosti o HPV infekciji ($\chi^2$ = 23,909; p < 0,001), što znači da viši nivo obrazovanja prati i viši stepen informisanosti o ovoj temi.

***Tabela 2. Povezanost nivoa stručne spreme i informisanost o HPV-u***

| U kojoj mjeri smatrate da ste informisani o HPV infekciji? | | | | | | |
|---|---|---|---|---|---|---|
| **Stručna sprema** | **Nedovoljno N (%)** | **Dovoljno dobro N(%)** | **Nisam uopšte informisan/a N (%)** | **Ukupno N (%)** | **$\chi^2$** | **p** |
| **OŠ** | 5 (71,4) | 1 (14,3) | 1 (14,3) | 7 (6,93) | 23,90 | **<0,001** |
| **SSŠ** | 38 (69,1) | 17 (30,9) | 0 (0,0) | 55 (54,45) | | |
| **VŠS/ VSS** | 15 (38,5) | 24 (61,5) | 0 (0,0) | 39 (36,62) | | |
| **Ukupno** | 58 (57,4) | 42 (41,5) | 1 (0,99) | 101 (100) | | |

Ispitanici iz urbanih sredina u najvećem procentu su znali da je vakcinacija djece u Republici Srpskoj besplatna (88,6%), dok je među ispitanicima iz prigradskih sredina taj procenat bio 69,8%, a među ruralnim ispitanicima samo 64,3%. U ruralnim područjima primjetan je i veći udio ispitanika koji nisu bili sigurni u ovu informaciju (28,6%), što ukazuje na potencijalnu potrebu za dodatnom edukacijom u tim sredinama. Između ispitanika je uočeno da postoji statistički značajna povezanost u odnosu na mjesto stanovanja i znanja da je HPV vakcina besplatna za djecu školskog uzrasta ($\chi^2$ = 12,340; p = 0,015), što je prikazano u tabeli 3.

***Tabela 3. Povezanost između mjesta stanovanja i znanja o besplatnoj vakcini za djecu školskog uzrasta***

| Da li znate da je vakcina protiv HPV-a besplatna za djecu školskog uzrasta? | | | | | |
|---|---|---|---|---|---|
| **Mjesto stanovanja** | **Da N (%)** | **Ne N (%)** | **Nisam siguran/a N (%)** | **$\chi^2$** | **p** |
| **Urbano** | 39 (88,6) | 4 (9,1) | 1 (2,3) | 12,340 | **0,015** |

the observed groups. Most respondents with primary and secondary education stated that they were insufficiently informed about HPV, whereas the majority of respondents with higher education reported being adequately informed. Nearly all respondents who reported being completely uninformed belonged to the lower educational groups. The chi-square test demonstrated a statistically significant association between educational level and awareness of HPV infection ($\chi^2$ = 23.909; p < 0.001), indicating that a higher level of education was associated with greater awareness of this topic.

***Table 2. Association between educational level and awareness of HPV***

| To what extent do you consider yourself informed about HPV infection? | | | | | | |
|---|---|---|---|---|---|---|
| **Qualifications** | **Insufficiently informed N (%)** | **Adequately informed N (%)** | **Not informed at all N (%)** | **Total N (%)** | **$\chi^2$** | **p** |
| PS | 5 (71.4) | 1 (14.3) | 1 (14.3) | 7 (6.93) | 23.909 | <0.001 |
| SS | 38 (69.1) | 17 (30.9) | 0 (0.0) | 55 (54.45) | | |
| CU | 15 (38.5) | 24 (61.5) | 0 (0.0) | 39 (36.62) | | |
| Total | 58 (57.42) | 42 (41.58) | 1 (0.99) | 101 (100) | | |

Respondents from urban areas most frequently knew that HPV vaccination is provided free of charge for children in Republika Srpska (88.6%), whereas this proportion was 69.8% among respondents from suburban areas and only 64.3% among those from rural areas. Rural respondents also showed a higher proportion of uncertainty regarding this information (28.6%), suggesting a potential need for additional educational activities in these communities. A statistically significant association was found between place of residence and knowledge that the HPV vaccine is free for school-aged children ($\chi^2$ = 12.340; p = 0.015), as shown in Table 3.

| | | | |
|---|---|---|---|
| **Prigradsko** | 30 (69,8) | 9 (20,9) | 4 (9,3) |
| **Ruralno** | 9 (64,3) | 1 (7,1) | 4 (28,6) |
| **Ukupno N (%)** | 78 (77,23) | 14 (13,86) | 9 (8,91) |

Zbog višestrukih odgovora ispitanika na pitanje o izvoru informacija o HPV-u, za analizu su odgovori objedinjeni u tri kategorije: formalni izvori (škola/predavanja, ljekar/medicinsko osoblje), masovni/neformalni izvori (mediji, prijatelji/poznanici) i nisam informisan. Ovaj pristup omogućava pregledniju statističku analizu i upoređivanje učestalosti izvora informacija. Analiza povezanosti između stručne spreme ispitanika i izvora informacija o HPV vakcini pokazala je statistički značajne razlike ($\chi^2$ = 18,5; p = 0,005). Rezultati ukazuju na to da postoji značajna razlika u izboru izvora informacija u zavisnosti od stručne spreme ispitanika. Ispitanici sa osnovnom školom uglavnom su se oslanjali na masovne i neformalne izvore, poput medija i prijatelja, ili su bili neinformisani. U ovoj grupi, veći broj ispitanika nije bio informisan o HPV vakcini, dok su formalni izvori bili gotovo potpuno neiskorišćeni. Ispitanici sa srednjom stručnom spremom najčešće su se informisali putem masovnih/neformalnih izvora, ali je zabilježena i veća učestalost korišćenja višestrukih izvora. Formalni izvori su bili prisutni, ali u manjoj mjeri, dok se manji broj ispitanika iz ove grupe osjećao neinformisano. Ispitanici sa višim ili visokim obrazovanjem koristili su širok spektar izvora informacija, uključujući kako formalne, tako i višestruke izvore. Ova grupa ispitanika imala je najmanji procenat onih koji nisu bili informisani, što ukazuje na viši nivo edukacije i dostupnost pouzdanih izvora (tabela 4).

***Tabela 4. Povezanost glavnog izvora informacija o HPV vakcini i stručne spreme***

| **Stručna sprema ispitanika** | | | | | | |
|---|---|---|---|---|---|---|
| **Izvor informacija** | **OŠ N(%)** | **SSŠ N (%)** | **VŠS/ VSS N (%)** | **Ukupno N** | **$\chi^2$** | **p** |

***Table 3. Association between place of residence and knowledge of free HPV vaccination for school-aged children***

| **Do you know that the HPV vaccine is free of charge for school-aged children?** | | | | | |
|---|---|---|---|---|---|
| **Place of residence** | **Yes N (%)** | **No N (%)** | **Not sure N (%)** | **$\chi^2$** | **p** |
| Urban | 39 (88.6) | 4 (9.1) | 1 (2.3) | | |
| Suburban | 30 (69.8) | 9 (20.9) | 4 (9.3) | 12.34 | 0.015 |
| Rural | 9 (64.3) | 1 (7.1) | 4 (28.6) | | |
| Total | 78 (77.23) | 14 (13.86) | 9 (8.91) | | |

Because respondents could select multiple answers regarding their sources of information about HPV, responses were grouped into three categories for analysis: formal sources (school/lectures, physician/healthcare professionals), mass/informal sources (media, friends/acquaintances), and not informed. This approach enabled clearer statistical analysis and comparison of the frequency of information sources. Analysis of the association between educational level and sources of information about the HPV vaccine revealed statistically significant differences ($\chi^2$ = 18.5; p = 0.005). The results indicate that respondents' choice of information sources differed significantly according to their educational level. Respondents with primary education mainly relied on mass and informal sources such as media and friends or reported being uninformed. In this group, a larger proportion of respondents had no information about the HPV vaccine, while formal sources were almost completely absent. Respondents with secondary education most frequently obtained information from mass/informal sources, although a higher frequency of using multiple sources was also observed. Formal sources were present to a lesser extent, and only a small number of respondents in this group reported being uninformed. Respondents with college or university education used a broad range of information sources, including both formal and multiple sources. This group had the lowest proportion of uninformed respondents, indicating a

| | | | | | | |
|---|---|---|---|---|---|---|
| **Formalni izvori** | 0 (0,0) | 7 (12,7) | 9 (23,1) | 16 | | |
| **Masovni/ neformalni izvori** | 3 (42,9) | 28 (50,9) | 12 (30,8) | 43 | | |
| **Višestruki izvori** | 1 (14,3) | 22 (40,0) | 16 (41,0) | 39 | 18,5 | **0,005** |
| **Nisam informisan** | 3 (42,9) | 4 (7,3) | 2 (5,1) | 9 | | |
| **Ukupno** | 7 | 55 | 39 | 101 | | |

## DISKUSIJA

Rezultati ovog istraživanja pokazuju da je većina roditelja djece školskog uzrasta upoznata sa HPV infekcijom, budući da je 91,1% ispitanika navelo da je čulo za HPV. Ovakav nalaz ukazuje na relativno visok nivo opšte svjesnosti o HPV infekciji među roditeljima. Slični rezultati prikazani su u KAPPAS studiji sprovedenoj u Španiji, gdje je većina roditelja adolescenata navela da je upoznata sa HPV infekcijom i postojanjem vakcine, iako je detaljno znanje o načinima prenosa virusa i prevenciji bilo značajno niže od opšte informisanosti o samom postojanju HPV-a. Autori zaključuju da poznavanje pojma HPV ne mora nužno podrazumijevati adekvatno razumijevanje rizika infekcije i značaja vakcinacije [7]. U našem istraživanju nije utvrđena statistički značajna povezanost između pola ispitanika i informisanosti o HPV infekciji. Slične rezultate navodi Anuforo i saradnici u istraživanju sprovedenom među multietničkom populacijom roditelja u SAD, gdje pol roditelja nije predstavljao značajan prediktor nivoa znanja o HPV vakcinaciji, dok su obrazovanje i socioekonomski faktori imali znatno veći uticaj [8]. Jedan od najvažnijih nalaza našeg istraživanja jeste postojanje statistički značajne povezanosti između nivoa obrazovanja i informisanosti o HPV infekciji. Roditelji sa višim i visokim obrazovanjem značajno češće su smatrali da su dovoljno informisani u odnosu na roditelje sa nižim nivoom obrazovanja. Ovaj nalaz je u skladu sa rezultatima sistematskog pregleda Chen i saradnika, koji pokazuje da viši nivo obrazovanja doprinosi boljem razumijevanju HPV infekcije, većoj zdravstvenoj pismenosti i boljem poznavanju koristi HPV vakcinacije [6]. Autori navode da obrazovanje predstavlja jedan od najdosljednijih prediktora higher level of education and better access to reliable information (Table 4).

***Table 4. Association between the main source of information about the HPV vaccine and educational level***

| | **Examiner's professional qualifications** | | | | | |
|---|---|---|---|---|---|---|
| **Source of information** | **PS N(%)** | **SS N(%)** | **CU N(%)** | **Total N** | **$\chi^2$** | **p** |
| **Formal sources** | 0 (0.0) | 7 (12.7) | 9 (23.1) | 16 | | |
| **Mass/ informal sources** | 3 (42.9) | 28 (50.9) | 12 (30.8) | 43 | | |
| **Multiple sources** | 1 (14.3) | 22 (40.0) | 16 (41.0) | 39 | 18.5 | 0.005 |
| **Not informed** | 3 (42.9) | 4 (7.3) | 2 (5.1) | 9 | | |
| **Total** | 7 | 55 | 39 | 101 | | |

## DISCUSSION

The results of this study indicate that the majority of parents of school-aged children were familiar with HPV infection, as 91.1% of respondents reported having heard of HPV. This finding suggests a relatively high level of general awareness regarding HPV infection among parents. Similar results were reported in the KAPPAS study conducted in Spain, where most parents of adolescents were aware of HPV infection and the existence of the vaccine, although detailed knowledge regarding transmission routes and preventive measures was substantially lower than general awareness of HPV itself. The authors concluded that awareness of HPV does not necessarily imply an adequate understanding of infection risks and the importance of vaccination [7]. In our study, no statistically significant association was found between respondents' sex and awareness of HPV infection. Similar findings were reported by Anuforo et al. in a study conducted among a multiethnic population of parents in the United States, where parental sex was not a significant predictor of HPV vaccination knowledge, while educational and socioeconomic factors exerted a considerably greater influence [8]. One of the most important findings of our study is the statistically

znanja i prihvatanja HPV vakcinacije među roditeljima. Značaj obrazovanja potvrđuju i rezultati KAPPAS studije, u kojoj su roditelji sa višim stepenom obrazovanja imali značajno bolje rezultate na testovima znanja o HPV infekciji i vakcinaciji u poređenju sa roditeljima nižeg obrazovnog nivoa [7]. Ovakvi nalazi ukazuju da zdravstvena pismenost predstavlja važan faktor u razumijevanju preventivnih mjera i donošenju informisanih odluka vezanih za zdravlje djece. U ovom istraživanju utvrđena je statistički značajna povezanost između mjesta stanovanja i znanja o tome da je HPV vakcina besplatna za djecu školskog uzrasta. Roditelji iz urbanih sredina značajno češće su posjedovali ovu informaciju u odnosu na roditelje iz ruralnih područja. Slične razlike između urbanih i ruralnih sredina opisane su u više istraživanja. Studija Dickinson i saradnika sprovedena među roditeljima u ruralnim područjima Oregona pokazala je da roditelji iz ruralnih zajednica imaju ograničeniji pristup informacijama o HPV vakcinaciji i rjeđe razgovaraju sa zdravstvenim radnicima o ovoj temi [9]. Takođe, istraživanje o faktorima povezanim sa HPV vakcinacijom u ruralnim i urbanim područjima SAD pokazalo je da roditelji iz ruralnih sredina imaju niži nivo informisanosti i manju vjerovatnoću da će njihova djeca biti vakcinisana protiv HPV-a u poređenju sa roditeljima iz urbanih sredina. Autori ističu da dostupnost zdravstvenih usluga i kvalitet zdravstvene komunikacije predstavljaju važne faktore koji doprinose ovim razlikama [10]. Posebno značajan nalaz našeg istraživanja odnosi se na izvore informacija o HPV vakcini. Roditelji sa nižim nivoom obrazovanja češće su koristili neformalne izvore informacija, poput medija i prijatelja, dok su ispitanici sa višim obrazovanjem češće koristili formalne izvore ili kombinovali više različitih izvora informisanja. Ovakvi rezultati u skladu su sa istraživanjem McKenzie i saradnika, koje pokazuje da način traženja informacija značajno utiče na stavove roditelja prema HPV vakcinaciji. Roditelji koji informacije dobijaju od zdravstvenih radnika pokazuju veće povjerenje u vakcinu i bolje razumijevanje njenog preventivnog značaja, dok se oslanjanje na društvene mreže i neprovjerene izvore

significant association between educational level and awareness of HPV infection. Parents with higher educational attainment were significantly more likely to consider themselves adequately informed compared with parents with lower educational levels. This finding is consistent with the systematic review by Chen et al., which demonstrated that higher educational attainment contributes to a better understanding of HPV infection, greater health literacy, and improved knowledge of the benefits of HPV vaccination [6]. The authors identified education as one of the most consistent predictors of parental knowledge and acceptance of HPV vaccination. The importance of education is further supported by the findings of the KAPPAS study, in which parents with higher educational attainment achieved significantly better scores on HPV knowledge and vaccination assessments than parents with lower educational levels [7]. These findings suggest that health literacy is a key factor in understanding preventive measures and making informed decisions regarding children's health. This study also identified a statistically significant association between place of residence and awareness that HPV vaccination is free of charge for school-aged children. Parents from urban areas were significantly more likely to possess this information than parents from rural areas. Similar urban-rural differences have been reported in several studies. Dickinson et al., in a study conducted among parents in rural Oregon, found that parents from rural communities had more limited access to information regarding HPV vaccination and were less likely to discuss this topic with healthcare professionals [9]. Furthermore, research examining factors associated with HPV vaccination in rural and urban areas of the United States demonstrated that parents from rural communities had lower levels of awareness and were less likely to have their children vaccinated against HPV compared with parents from urban settings. The authors emphasized that access to healthcare services and the quality of health communication are important contributors to these disparities [10]. A particularly important finding of our study concerns the sources of information about

povezuje sa češćim prisustvom zabluda i nedoumica [11]. Ograničenje ovog istraživanja predstavlja relativno mali i prigodni uzorak ispitanika, kao i primjena metode „snježne kugle“, što može ograničiti mogućnost generalizacije rezultata na širu populaciju roditelja u Republici Srpskoj. Takođe, podaci su prikupljeni samoprocjenom ispitanika, što može dovesti do pojave informacione pristrasnosti. Uprkos navedenim ograničenjima, istraživanje pruža vrijedan uvid u nivo informisanosti roditelja djece školskog uzrasta o HPV vakcinaciji i identifikuje ključne faktore povezane sa znanjem o ovoj važnoj preventivnoj mjeri.

## ZAKLJUČAK

Rezultati ovog istraživanja imaju značajne implikacije za javno zdravstvo. Uočene razlike u informisanosti u odnosu na obrazovanje i mjesto stanovanja ukazuju na potrebu razvoja ciljano usmjerenih edukativnih programa koji će biti prilagođeni specifičnim potrebama različitih grupa stanovništva. Posebnu pažnju potrebno je usmjeriti na roditelje sa nižim nivoom obrazovanja i stanovnike ruralnih područja, kod kojih je identifikovan niži nivo informisanosti o HPV infekciji i mogućnostima vakcinacije.

the HPV vaccine. Parents with lower educational attainment relied more frequently on informal sources of information, such as media and friends, whereas respondents with higher educational attainment more commonly used formal sources or combined multiple information sources. These findings are consistent with the study by McKenzie et al., which demonstrated that information-seeking behavior significantly influences parental attitudes toward HPV vaccination. Parents who receive information from healthcare professionals exhibit greater trust in the vaccine and a better understanding of its preventive value, whereas reliance on social media and unverified sources is associated with more frequent misconceptions and uncertainties [11]. The limitations of this study include the relatively small convenience sample and the use of snowball sampling, which may limit the generalizability of the findings to the broader population of parents in Republika Srpska. Additionally, data were collected through self-report measures, which may introduce information bias. Despite these limitations, the study provides valuable insight into the level of awareness among parents of school-aged children regarding HPV vaccination and identifies key factors associated with knowledge of this important preventive measure.

## CONCLUSION

The findings of this study have important public health implications. The observed differences in awareness according to educational level and place of residence highlight the need for targeted educational programs tailored to the specific needs of different population groups. Particular attention should be directed toward parents with lower educational attainment and residents of rural areas, among whom lower levels of awareness regarding HPV infection and vaccination opportunities were identified.

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***Review article***

# ULOGA MEDICINSKE SESTRE U RADU SA OSOBAMA S OMETENOŠĆU: BARIJERE I IZAZOVI

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## APSTRAKT

Uvod. Osobe s ometenošću su sve prisutnije u opštoj populaciji i česti su korisnici različitih vrsta usluga, poput obrazovnih, socijalnih i zdravstvenih. Zdravstveni radnici, među kojima su i medicinske sestre, imaju važnu ulogu u obezbjeđivanju boljeg kvaliteta života osoba s ometenošću. Iako je tako, istraživački nalazi uglavnom se oslanjaju na iskustva samih osoba s ometenošću i njihovih porodica, a manje na iskustva medicinskog osoblja prilikom pružanja zdravstvenih usluga ovoj populaciji. Cilj ovog rada bio je da pregledom literature ukaže na važnost i ulogu medicinskih sestara u pružanju usluga osobama s ometenošću, kao i da identifikuje glavne barijere i izazove u tom procesu. Pretraga literature vršena je korišćenjem relevantnih baza podataka (*Google Scholar, SCIndeks, ERIH plus, SCOPUS*). Literatura je pretraživana na srpskom i engleskom jeziku, uz upotrebu odgovarajućih ključnih riječi, a u obzir su uzeti radovi koji nisu stariji od 15 godina. Zaključak većeg broja studija jeste da medicinske sestre imaju poteškoće u komunikaciji sa osobama s ometenošću i da se ne osjećaju uvijek prijatno prilikom pružanja zdravstvenih usluga. Pored toga, istaknuto je da nisu dovoljno pripremljene za rad sa ovom populacijom. U svrhu poboljšanja postojećih nalaza predlaže se uvođenje obrazovnih sadržaja koji će da budu

# THE ROLE OF NURSES IN WORKING WITH PERSONS WITH DISABILITIES: BARRIERS AND CHALLENGES

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## ABSTRACT

Introduction**.** People with disabilities are increasingly present in the general population and are frequent users of various types of services, including educational, social, and healthcare services. Healthcare professionals, including nurses, play an important role in ensuring a better quality of life for people with disabilities. However, research findings are mostly based on the experiences of people with disabilities themselves and their families, while less attention has been paid to the experiences of healthcare staff in providing healthcare services to this population. The aim of this paper was to review the literature in order to highlight the importance and role of nurses in providing services to people with disabilities, as well as to identify the main barriers and challenges in this process. The literature search was conducted using relevant databases (*Google Scholar*, *SCIndeks*, *ERIH Plus*, and *SCOPUS*). The literature was searched in both Serbian and English using appropriate keywords, and papers published within the last 15 years were taken into consideration. The conclusions of a large number of studies indicate that nurses experience difficulties in communicating with people with disabilities and do not always feel comfortable when providing healthcare services. In addition, it was emphasized that they are not sufficiently prepared to work with this population. In

osmišljeni sa ciljem upoznavanja budućih medicinskih sestara sa pristupom i načinom komunikacije sa osobama s ometenošću. Takođe, ističe se značaj sticanja neposrednog iskustva u kliničkom okruženju.
***Ključne riječ***i: medicinske sestre, osobe sa ometenošću, zdravstvene usluge, komunikacija.

## UVOD

Jedanaesta revizija Međunarodne klasifikacije bolesti (MKB-11), objavljena 2018. godine i uvedena u primjenu 2022. godine, prvi put prepoznaje neurorazvojne poremećaje kao zasebnu dijagnostičku grupu, odvojenu od mentalnih i bihejvioralnih poremećaja. U tu grupu spadaju: razvojni poremećaji govora i jezika, poremećaj iz spektra autizma, poremećaj pažnje sa hiperaktivnošću, razvojni poremećaj učenja, poremećaj sa stereotipnim pokretima, te razvojni poremećaj motoričke koordinacije i poremećaj intelektualnog razvoja [1]. Osobe s ometenošću su sve prisutnije u opštoj populaciji i česti su korisnici različitih vrsta usluga, poput obrazovnih, socijalnih i zdravstvenih. Pristupi u radu sa djecom sa razvojnim poremećajima zasnivaju se na principima multidisciplinarnosti i holističkog pristupa [2]. Multidisciplinarni pristup podrazumijeva saradnju stručnjaka različitih profila koji zajednički planiraju i sprovode intervencije. S druge strane, holistički pristup podrazumijeva sagledavanje djeteta kao cjelovitog bića, uz uvažavanje njegovih fizičkih, psiholoških, socijalnih i emocionalnih potreba. Zbog toga je neophodno obezbijediti da sva djeca imaju pristup najadekvatnijem sistemu podrške i intervencije [3]. U realizaciji tog procesa uključene su različite kategorije stručnjaka iz oblasti psihologije, socijalne zaštite i medicine [4]. Medicinska sestra ima važnu ulogu u koordinaciji njege i predstavlja vezu između zdravstvenog sistema, porodice i ostalih članova tima [5]. Pored toga, medicinske sestre aktivno učestvuju u postizanju ciljeva rehabilitacije sa naglaskom na motivaciju, samostalnost, uz uvažavanje potreba i mogućnosti korisnika zdravstvenih usluga [6]. Nadalje, zdravstvena njega koju pružaju medicinske

order to improve the existing findings, it is recommended to introduce educational content designed to familiarize future nurses with appropriate approaches and methods of communication with people with disabilities. Furthermore, the importance of gaining direct experience in a clinical setting is emphasized.
***Keywords***: nurses, people with disabilities, healthcare services, communication.

## INTRODUCTION

The eleventh revision of the **International Classification of Diseases (ICD-11),** published in 2018 and implemented in 2022, recognizes neurodevelopmental disorders for the first time as a distinct diagnostic category, separate from mental and behavioural disorders. This group includes developmental speech and language disorders, autism spectrum disorder, attention-deficit/hyperactivity disorder, developmental learning disorder, stereotyped movement disorder, developmental motor coordination disorder, and disorders of intellectual development [1]. Persons with disabilities are increasingly represented in the general population and are frequent users of various services, including educational, social, and healthcare services. Approaches to working with children with developmental disorders are based on the principles of multidisciplinarity and a holistic approach [2]. A multidisciplinary approach involves collaboration among professionals from different disciplines who jointly plan and implement interventions. In contrast, a holistic approach entails viewing the child as a whole person, taking into account their physical, psychological, social, and emotional needs. Therefore, it is essential to ensure that all children have access to the most appropriate support and intervention system [3]. The implementation of this process involves various categories of professionals from the fields of psychology, social welfare, and medicine [4]. Nurses play an important role in coordinating care and serve as a link between the healthcare system, the family, and other members of the multidisciplinary team [5]. In addition, nurses actively contribute to achieving

sestre priprema pacijente za proces rehabilitacije, doprinosi kontinuitetu rehabilitacije, ostvarivanju željenih rehabilitacionih ishoda i poboljšanju kvaliteta života pacijenata [7]. U dosadašnjoj praksi i prema izjavama zdravstvenih radnika primijećeno je da se pristup roditeljima i djeci sa poteškoćama u razvoju još uvijek temelji na medicinskom modelu što se ogleda u predrasudama prema ovoj populaciji, te nedovoljnom uvažavanju njihovih prava i potreba [8]. Zbog toga, osobe sa ometenošću su nerijetko marginalizovana grupa čije je iskustvo sa zdravstvenih sistemom često negativno [9]. Kod ove populacije osoba ponekad se detektuje više neurorazvojnih poremećaja od kojih svaki nosi dodatne komplikacije i komobriditete [10]. Problem može da predstavlja hospitalizacija osoba s ometenošću koja može biti otežana zbog problema u komunikaciji, fizičkog pristupa zdravstvenim ustanovama, kao i potrebe za angažovanjem dodatnog osoblja [11], dok zdravstveni radnici teško odgovaraju na zdravstvene potrebe ovih osoba [12]. Takođe, zdravstveni radnici se mogu osjećati nesigurno ili preopterećeno [13, 14], bez samopouzdanja u komunikaciji sa osobama s ometenošću [15]. Cilj ovog rada bio je da se pregledom dostupne literature analizira uloga medicinskih sestara u pružanju zdravstvenih usluga osobama s ometenošću i identifikuju glavne barijere i izazovi u tom procesu.

## MATERIJAL I METODE RADA

Pretraga literature vršena je korišćenjem relevantnih baza podataka (*Google Scholar, SCIndeks, ERIH plus, SCOPUS*). Kriterijumi za uključivanje odnosili su se na pregledne i istraživačke radove čiji je uzorak obuhvatao zdravstvene radnike (medicinske sestre i ljekare), kao i na radove koji su se bavili pružanjem zdravstvenih usluga populaciji osoba s ometenošću, sa akcentom na barijere i izazove u tom procesu. Literatura je pretraživana na srpskom i engleskom jeziku, uz upotrebu odgovarajućih ključnih riječi (*medicinske sestre, osobe sa ometenošću, zdravstvene usluge, komunikacija, nurses, people with disabilities, health services, communication*), a u obzir su uzeti radovi koji nisu stariji od 15 godina.

rehabilitation goals, with an emphasis on motivation and independence, while respecting the needs and abilities of healthcare service users [6]. Furthermore, the nursing care provided by nurses prepares patients for the rehabilitation process, contributes to the continuity of rehabilitation, facilitates the achievement of desired rehabilitation outcomes, and improves patients' quality of life [7]. In previous practice and according to statements of healthcare professionals, it has been observed that the approach to parents and children with developmental difficulties is still based on the medical model, which is reflected in prejudice toward this population, as well as in insufficient recognition of their rights and needs [8]. Therefore, persons with disabilities are often a marginalized group whose experience with the healthcare system is frequently negative [9]. In this population, multiple neurodevelopmental disorders are sometimes identified, each of them carries additional complications and comorbidities [10]. Hospitalization of persons with disabilities may be difficult due to problems in communication, physical access to healthcare institutions, as well as the need for the engagement of additional staff [11], while healthcare professionals find it difficult to respond to the healthcare needs of these persons [12]. Also, healthcare professionals may feel insecure or overburdened [13,14], lacking confidence in communication with persons with disabilities [15]. The aim of this paper was to analyze, through a review of the available literature, the role of nurses in providing healthcare services to persons with disabilities and to identify the main barriers and challenges in this process.

## MATERIALS AND METHODS

The literature search was conducted using relevant databases (*Google Scholar*, *SCIndeks*, *ERIH Plus*, *SCOPUS*). The inclusion criteria referred to review and research articles whose samples included healthcare professionals (nurses and physicians), as well as articles dealing with the provision of healthcare services to the population of persons with disabilities, with an emphasis on barriers and challenges in this process. The literature was

Dalja pretraga izvršena je na osnovu liste referenci iz radova koji su pronađeni na osnovu primjene prethodno navedenih ključnih riječi.

## REZULTATI

U istraživanju sprovedenom u pokrajini Limburg u Belgiji ispitivan je kvalitet komunikacije zdravstvenih radnika (545 ljekara i 1547 medicinskih sestara) sa osobama sa invaliditetom. Putem elektronskog upitnika učešće u istraživanju uzelo je 6,6% (36 od 545) ljekara opšte prakse i 37,6% (588 od 1.547) medicinskih sestara. Učesnici su samostalno procjenjivali kvalitet komunikacije sa osobama uključenim u brigu o osobama sa invaliditetom i nivo informisanosti o mjerama podrške za osobe sa invaliditetom. Rezultati su pokazali da 68,8% ljekara i 45,8% medicinskih sestra procijenjuje da dobro komuniciraju sa osobama sa invaliditetom, pri čemu su nesporazume uglavnom pripisivali ograničenim intelektualnim sposobnostima ovih osoba. Pored toga, ljekari i medicinske sestre naveli su da dobro komuniciraju sa drugim zdravstvenim radnicima. Međutim, čak 88,3% ljekara i 89% medicinskih sestara kao ključni problem navodi nedovoljnu informisanost u vezi alata za komunikaciju sa osobama sa invaliditetom, dok 44,1% ljekara i 66,9% medicinskih sestara smatra da su nedovoljno informisani o beneficijama i pravima osoba sa invaliditetom [16]. Autori preglednog rada iz 2016. godine [12] analizom savremene literature koja opisuje iskustva medicinskih sestara u njezi osoba sa intelektualnim teškoćama u akutnoj zdravstvenoj zaštiti identifikovali su tri osnovne teme:

1. medicinske sestre se osjećaju nedovoljno pripremljeno za rad sa pacijentima sa intelektualnim teškoćama,
2. medicinske sestre doživljavaju poteškoće u komunikaciji sa osobama sa intelektualnim teškoćama,
3. medicinske sestre imaju nejasna očekivanja od formalnih i neformalnih njegovatelja.

Pregled je obuhvatio istraživačke članke objavljene na engleskom jeziku između 2006. i 2015. godine, u

searched in Serbian and English using appropriate keywords (nurses, persons with disabilities, healthcare services, communication) and articles not older than 15 years were taken into consideration. Further searching was performed based on the reference lists of articles identified through the application of the previously mentioned keywords.

## RESULTS

A study conducted in the province of Limburg in Belgium examined the quality of communication between healthcare professionals (545 physicians and 1,547 nurses) and persons with disabilities. Through an electronic questionnaire, 6.6% (36 out of 545) of general practitioners and 37.6% (588 out of 1,547) of nurses participated in the study. The participants independently assessed the quality of communication with persons involved in the care of persons with disabilities and their level of awareness regarding support measures for persons with disabilities. The results showed that 68.8% of physicians and 45.8% of nurses assessed that they communicated well with persons with disabilities, while misunderstandings were mainly attributed to the limited intellectual abilities of these persons. In addition, physicians and nurses reported that they communicated well with other healthcare professionals. However, as many as 88.3% of physicians and 89% of nurses identified insufficient knowledge regarding communication tools for persons with disabilities as a key problem, while 44.1% of physicians and 66.9% of nurses considered themselves insufficiently informed about the benefits and rights of persons with disabilities [16]. The authors of a review paper published in 2016 [12], through an analysis of contemporary literature describing nurses' experiences in caring for persons with intellectual disabilities in acute healthcare settings, identified three main themes:

1. Nurses feel insufficiently prepared to work with patients with intellectual disabilities;
2. Nurses experience difficulties in communicating with persons with intellectual disabilities;

kojima su učesnici bile medicinske sestre svih nivoa obrazovanja. Nakon uklanjanja duplikata, pretragom je dobijeno ukupno 267 referenci. Pregledani su sažeci tih referenci, a nakon uklanjanja nerelevantnih radova uključeno je 14 članaka u punom tekstu. Na osnovu dobijenih rezultata uočeno je da briga o osobama sa intelektualnim teškoćama zahtijeva da medicinske sestre koriste različite lične i organizacione resurse. Formalno obrazovanje ili obuka smatraju se idealnom pripremom za medicinske sestre koje pružaju njegu osobama sa intelektualnim teškoćama u bolnici, što je često naglašavano u pregledanoj literaturi [12]. U istraživanju koje je realizovano u Australiji grupa autora je sprovela tematsku analizu podataka iz otvorenog pitanja u anketi koja se odnosilo na prepreke u komunikaciji sa osobama sa intelektualnim teškoćama i/ili autizmom. Uzorkom istraživanja obuhvaćeno je 279 registrovanih medicinskih sestara. Rezultati ukazuju na potrebu povećanja obrazovnih sadržaja na osnovnim i postdiplomskim studijama sestrinstva. Nalazi, takođe, ukazuju na značaj obrazovnog pristupa zasnovanog na razumijevanju različitosti u načinu razmišljanja i obrade informacija koje karakterišu oblici neurodiverziteta kod intelektualnih teškoća i poremećaja iz spektra autizma [17]. O značaju edukacije medicinskog osoblja, naročito ljekara i studenata medicine, u pogledu pristupa i komunikacije sa osobama sa invaliditetom govorili su i autori sa Fakulteta za specijalnu edukaciju i rehabilitaciju, Univerziteta u Beogradu. Autori podsjećaju da su osobe sa intelektualnom ometenošću nerijetko marginalizovana grupa čije je iskustvo sa zdravstvenim sistemom često negativno, a poseban problem je hospitalizacija osoba sa intelektualnom ometenošću, koja može biti otežana zbog problema u komunikaciji, fizičkog pristupa zdravstvenim ustanovama i kretanju u okviru nje, potrebe za angažovanjem dodatnog osoblja, kao i finansijskim barijerama. Pregledom savremene literature (zaključno sa 2024. godinom) o edukaciji ljekara i studenata medicine o intelektualnoj ometenosti i inkluziji uočeno je da postoji velika raznolikost programa edukacije, različiti

3. Nurses have unclear expectations of formal and informal caregivers.

The review included research articles published in English between 2006 and 2015, in which the participants were nurses of all educational levels. After removing duplicates, the search yielded a total of 267 references. The abstracts of these references were reviewed, and after excluding irrelevant studies, 14 full-text articles were included. Based on the obtained results, it was observed that caring for persons with intellectual disabilities requires nurses to use various personal and organizational resources. Formal education or training is considered ideal preparation for nurses providing care to persons with intellectual disabilities in hospital settings, which was frequently emphasized in the reviewed literature [12]. In a study conducted in Australia, a group of authors performed a thematic analysis of data from an open-ended survey question related to barriers in communication with persons with intellectual disabilities and/or autism. The study sample included 279 registered nurses. The results indicate the need to increase educational content at undergraduate and postgraduate nursing studies. The findings also indicate the importance of an educational approach based on understanding differences in ways of thinking and processing information that characterize forms of neurodiversity in intellectual disabilities and autism spectrum disorders [17]. Regarding the importance of education of healthcare staff, especially physicians and medical students, in terms of approach and communication with persons with disabilities, authors from the Faculty of Special Education and Rehabilitation, University of Belgrade, have also addressed this issue. The authors point out that persons with intellectual disabilities are often a marginalized group whose experience with the healthcare system is frequently negative, and a particular problem is the hospitalization of persons with intellectual disabilities, which may be difficult due to communication problems, physical access to healthcare institutions and movement within them, the need for additional staff, as well as

metodološki pristupi, ocjene ishoda, profili edukatora, a neki programi su samo izborni. Pokazan je pozitivan efekat adekvatne edukacije o intelektualnoj ometenosti i inkluziji ne samo na medicinsko znanje ljekara i studenata medicine, već i na njihove socijalne i kognitivne kompetencije, kao i povećanje samopouzdanja u brizi o osobama sa intelektualnom ometenošću [18]. Istraživanje, sprovedeno u Hrvatskoj 2012. godine, imalo je za cilj uporediti stavove prema osobama s invaliditetom od strane medicinskih sestara koje se svakodnevno susreću i rade sa osoboma sa invaliditetom i onih koje su rijetko u kontaktu sa njima. U istraživanju je učestvovalo 50 medicinskih sestara iz Zadra. Rezultati ovog istraživanja pokazuju neodlučnost u stavovima medicinskih sestara prema osobama s invaliditetom, ali sa tendencijom da idu u pozitivnom smjeru. Najveći procenat medicinskih sestara (72%) smatra da su osobe s invaliditetom najvulnerabilnija populacija u društvu, dok se 16% medicinskih sestra nije složilo sa tim. Da osobe s invaliditetom mogu dati ravnopravni doprinos društvu slaže se 42% ispitanih medicinskih sestara, 32% se ne slaže, a 22% njih je neodlučno u pogledu ove tvrdnje. Isto tako, 34% ispitanika smatra da je rad s osobama s invaliditetom veoma stresan, dok se 50% ne slaže s tvrdnjom, 14% je neodlučno, a 2% nije odgovorilo. Dakle, bilježe se varijabilni rezultati u pogledu mišljenja zdravstvenih radnika da li je rad sa osobama s invaliditetom stresan ili ne, koji se kreće od 9 do 73% [19]. Naredni pregledni rad [20] imao je za cilj da identifikuje prepreke i olakšavajuće faktore u sestrinskoj njezi osoba sa razvojnim teškoćama i na osnovu toga pruži adekvatne preporuke. Literatura je pretraživana pomoću dvije elektronske baze (ProQuest i EBSKO). Nakon korišćenja odgovarajućih ključih riječi i odbacivanja duplih radova u konačnoj analizu zadržano je 17 radova. Teme identifikovane u ovom pregledu literature organizovane su u sljedeće opšte cjeline: (1) prepreke i izazovi za sestrinske intervencije u njezi osoba sa razvojnim teškoćama; (2) faktori koji olakšavaju sestrinsku njegu u unapređenju zdravlja osoba sa razvojnim teškoćama; i (3) preporuke za obrazovanje, politiku i praksu u sestrinstvu koje se

financial barriers. A review of contemporary literature (up to 2024) on the education of physicians and medical students about intellectual disability and inclusion showed that there is a wide diversity of educational programmes, different methodological approaches, outcome assessments, educator profiles, and that some programmes are only elective courses. A positive effect of adequate education on intellectual disability and inclusion was demonstrated not only on the medical knowledge of physicians and medical students, but also on their social and cognitive competencies, as well as an increase in confidence in caring for persons with intellectual disabilities [18]. A study conducted in Croatia in 2012 aimed to compare attitudes toward persons with disabilities among nurses who regularly encounter and work with persons with disabilities and those who are rarely in contact with them. The study included 50 nurses from Zadar. The results of this study indicate uncertainty in nurses' attitudes toward persons with disabilities, although with a tendency toward a more positive direction. The largest proportion of nurses (72%) considered persons with disabilities to be the most vulnerable population in society, while 16% of nurses disagreed with this view. Regarding the statement that persons with disabilities can make an equal contribution to society, 42% of respondents agreed, 32% disagreed, and 22% were undecided. Likewise, 34% of respondents considered working with persons with disabilities to be very stressful, while 50% disagreed with this statement, 14% were undecided, and 2% did not respond. Therefore, variable findings were recorded regarding healthcare professionals' opinions on whether working with persons with disabilities is stressful or not, ranging from 9% to 73% [19]. The next review paper [20] aimed to identify barriers and facilitating factors in nursing care for persons with developmental disabilities and, based on this, to provide appropriate recommendations. The literature was searched using two electronic databases (ProQuest and EBSCO). After using appropriate keywords and removing duplicate studies, 17 articles were included in the final analysis. The themes identified in this literature

tek razvijaju. Kada je riječ o prvom temi, medicinske sestre su izdvojile ograničeno vrijeme za pružanje prilagođene njege i dodatne odgovornosti prilikom rada sa osobama s ometenošću. Zbog ograničenog vremena, medicinske sestre su često izbjegavale direktnu komunikaciju sa osobama s ometenošću i više su se oslanjale na članove porodice. Osobama sa razvojnim teškoćama često je potrebno više vremena za objašnjenja, pa se zbog toga mogu osjećati požurivano i ne uspjeti u potpunosti razumijeti informacije što može izazvati pojačane emocije sa kojima se teško nose [21]. Takav način komunikacije otežavao je razvoj efikasnih odnosa između pacijenata i osoblja. Isto tako, u hitnim slučajevima to je ometalo organizovanu njegu i dovelo do neadekvatnih pristupa kao što je upotreba fizičkog sputavanja i sedativnih lijekova radi sprečavanja povrede pacijenta. Kao druga značajna barijera izdvojile su se komunikacijske prepreke u radu sa pacijentima sa ometenošću. Iz tog razloga, medicinske sestre su često morale da prate neverbalne znake ili im je upotreba augmentalivne i alternativne komunikacije od strane samih pacijenata pomogla u međusobnom razumijevanju [22, 23]. Kao treća prepreka navodi se nedovoljna edukacije ili izostatak treninga za rad sa osobama s ometenošću naglašavaući da su postojeće obuke na temu invalidnosti nedovoljne. Tako, medicinske sestre su navodile da se osjećaju sigurnije i opuštenije ukoliko su imale prethodno iskustvo sa osobama s ometenošću [24]. Pored identifikovanja glavnih barijera u radu medicinskih sestara sa osobama s ometenošću, u radu se navode i ključni faktore koji medicinskim sestrama olakšavaju pružanje njege pacijentima s ometenošću. Među tim faktorima ubraja se upotreba alata i specijalizovanih resursa za sestrinsku njegu osoba s ometenošću, sestrinske strategije za upravljanje izazovnim ponašanjem, kao i korišćenje strategija koje poboljšavaju saradnju sa porodicom i zdavstvenim timovima [20]. Prethodno navedeni izazovi mogu negativno uticati na kvalitet zdravstvene njege, te dovesti do izbjegavanja kontakta sa osobama s ometenošću, posmatrajući ih kao „teške“ pacijenate, pri čemu pristup zdrastvenoj zaštiti može da bude

review were organized into the following general categories: (1) barriers and challenges to nursing interventions in the care of persons with developmental disabilities; (2) factors facilitating nursing care in the improvement of health in persons with developmental disabilities; and (3) recommendations for education, policy, and practice in nursing that are still developing. Regarding the first theme, nurses identified limited time for providing individualized care and additional responsibilities when working with persons with disabilities. Due to limited time, nurses often avoided direct communication with persons with disabilities and relied more on family members. Persons with developmental disabilities often require more time for explanations, and therefore may feel rushed and fail to fully understand the information, which can lead to increased emotions that are difficult for them to manage [21]. Such communication hindered the development of effective relationships between patients and staff. Likewise, in emergency situations, this interfered with organized care and led to inappropriate approaches such as the use of physical restraints and sedative medications to prevent patient harm. The second major barrier identified was communication difficulties in working with patients with disabilities. For this reason, nurses often had to rely on non-verbal cues, or the use of augmentative and alternative communication by the patients themselves helped facilitate mutual understanding [22, 23]. The third barrier was insufficient education or lack of training for working with persons with disabilities, emphasizing that existing training on disability is insufficient. Thus, nurses reported feeling more secure and relaxed if they had prior experience with persons with disabilities [24]. In addition to identifying the main barriers in nurses' work with persons with disabilities, the study also presents key factors that facilitate the provision of nursing care to patients with disabilities. These factors include the use of tools and specialized resources for nursing care of persons with disabilities, nursing strategies for managing challenging behaviour, as well as the use of

ugrožen i praćen pogoršanjem zdravlja i povećanim brojem hospitalizacija [20]. Da bi se eleminisali neželjeni efekti, istraživački nalazi su gotovo saglasni po pitanju neophodnosti dodatnog edukovanja medicinskih sestara u pogledu upoznavanja sa osnovnim karakteristika osoba s ometenošću, načina komunikacija, pristupa i prilagođavanja načina rada. Takođe, konzistentnost postoji i po pitanju povećanja saradnje između porodice i zdravstvenih radnika, te korišćenja standardizovanih mjernih instrumenata i sticanja neposrednog iskustva u kliničkom okruženju. Tim prije jer studenti medicinskog fakulteta navode da je obuka za rad sa osobama s ometenošću minimalna ili, čak, nepostojeća [25].

## ZAKLJUČAK

Dostupne studije na području Bosne i Hercegovine, ali i okruženja su jako oskudne na ovu temu. Ovaj iznenađujući podatak je ujedno i preporuka za sprovođenje budućih istraživanja i na našim područjima, te da bi dobijeni rezultati dodatno osnažili socijalnu inkluziju osoba s ometenošću. Ljekari opšte prakse i medicinske sestre u primarnoj zdravstvenoj zaštiti smatraju da nemaju dovoljno iskustva i znanja za rad sa osobama s ometenošću i prepoznavanje njihovih potreba, te smatraju da nisu dovoljno upoznati sa načinima komunikacije i pravilima vezanim za primjenu određenih prilagođavanja. Zdravstveni radnici nisu sigurni kako da reaguju na probleme u ponašanju, imaju poteškoće u procjeni njihovog stanja i ponekad imaju predrasude prema ovoj grupi, te se zbog toga mogu osjećati nesigurno ili preopterećeno i manje spremno da za pružanje usluga osobama s ometenošću.

strategies that improve cooperation with families and healthcare teams [20]. The previously mentioned challenges may negatively affect the quality of nursing care and lead to avoidance of contact with persons with disabilities, viewing them as “difficult” patients, whereby access to healthcare may be compromised and accompanied by deterioration in health and an increased number of hospitalizations [20]. In order to eliminate unwanted effects, research findings are almost consistent regarding the necessity of additional education of nurses in terms of familiarization with the basic characteristics of persons with disabilities, communication methods, approaches, and adaptation of working methods. There is also consistency regarding the need to increase cooperation between families and healthcare professionals, as well as the use of standardized measurement instruments and the acquisition of direct experience in clinical settings. This is particularly important since medical students report that training for working with persons with disabilities is minimal or even non-existent [25].

## CONCLUSION

Available studies on the territory of Bosnia and Herzegovina, as well as the environment, are very scarce on this topic. This surprising data is also a recommendation for conducting future research in our areas as well, so that the obtained results would further strengthen the social inclusion of people with disabilities. General practitioners and nurses in primary health care believe that they do not have enough experience and knowledge to work with people with disabilities and recognize their needs, and they believe that they are not sufficiently familiar with the methods of communication and the rules related to the application of certain adjustments. Health professionals are unsure how to respond to behavioral problems, have difficulty assessing their condition and sometimes have prejudices against this group, and may therefore feel insecure or overwhelmed and less prepared to provide services to people with disabilities.

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***Review article***

# NARCIZAM, MAKIJAVELIZAM I PSIHOPATIJA U ZDRAVSTVENOM SEKTORU

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## APSTRAKT

Uvod. Mračna trijada predstavlja skup tri socijalno nepoželjne, ali relativno stabilne crte ličnosti: narcizam, makijavelizam i psihopatiju. Ove osobine karakterišu manipulativnost, emocionalna hladnoća, nedostatak empatije, potreba za dominacijom i usmjerenost ka ličnoj koristi. Iako se najčešće proučavaju u okviru opšte populacije i psihopatologije, sve veći značaj pridaje se istraživanju njihove prisutnosti među zdravstvenim radnicima zbog mogućeg uticaja na profesionalne odnose i kvalitet zdravstvene njege. Cilj ovog rada bio je prikazati značaj, karakteristike i prisustvo dimenzija mračne trijade među zdravstvenim radnicima, u zdravstvenom sektoru. Pregled literature pokazuje da izražene osobine narcizma, makijavelizma i psihopatije mogu biti povezane sa smanjenom empatijom, narušenom timskom saradnjom, profesionalnim konfliktima i kontraproduktivnim ponašanjem na radnom mjestu. Istraživanja sprovedena među ljekarima i medicinskim sestrama ukazuju na povezanost mračne trijade sa agresivnijom komunikacijom, emocionalnom distancom, neetičkim ponašanjem i povećanim rizikom od profesionalnih grešaka. Iako pojedine karakteristike, poput samopouzdanja i odlučnosti, mogu imati funkcionalnu ulogu u određenim situacijama, važno je prepoznati potencijalno negativan uticaj mračnih osobina na radno okruženje i sigurnost pacijenata. Zaključak.

# NARCISSISM, MACHIAVELLIANISM AND PSYCHOPATHY IN THE HEALTHCARE SECTOR

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## ABSTRACT

Introduction. The Dark Triad refers to a set of three socially undesirable but relatively stable personality traits: narcissism, Machiavellianism, and psychopathy. These traits are characterized by manipulativeness, emotional coldness, lack of empathy, a need for dominance, and self-interest orientation. Although they are most commonly studied in the general population and in psychopathology, increasing attention has been given to their presence among healthcare professionals due to their potential impact on professional relationships and the quality of healthcare delivery. The aim of this paper was to show the importance, characteristics and presence of dimensions of the dark triad among health workers in the health sector. A review of the literature shows that pronounced narcissistic, Machiavellian, and psychopathic traits may be associated with reduced empathy, impaired teamwork, workplace conflicts, and counterproductive behavior. Studies conducted among physicians and nurses indicate a link between Dark Triad traits and more aggressive communication, emotional detachment, unethical behavior, and an increased risk of professional errors. Although certain characteristics, such as self-confidence and decisiveness, may have a functional role in specific situations, it is important to recognize the potentially negative impact of dark personality traits on the work environment and patient safety.

Potrebna su dodatna istraživanja kako bi se jasnije definisala zastupljenost i značaj mračne trijade među zdravstvenim radnicima, kao i mogućnosti prevencije i unapređenja profesionalnih odnosa u zdravstvenom sistemu.
**Ključne riječi:** mračna trijada, zdravstveni radnici, zdravstveni sektor.

## UVOD

Proučavanje osobina ličnosti kod zdravstvenih radnika predstavlja nedovoljno istraženo područje, posebno kada su u pitanju takozvane mračne crte ličnosti koje se teško mogu povezati sa empatijom, humanošću i altruizmom – osobinama koje čine osnovu pomagačkih profesija. Koncept mračne trijade obuhvata tri međusobno povezana, ali različita konstrukta: makijavelizam, narcizam i psihopatiju. Ove osobine dijele zajedničke karakteristike poput manipulativnosti, emocionalne hladnoće, nedostatka empatije, agresivnosti i težnje ka ličnoj koristi, zbog čega se smatraju društveno nepoželjnim, iako su relativno stabilne crte ličnosti [1]. Osobine mračne trijade ne podrazumijevaju nužno postojanje psihijatrijskog poremećaja, već ukazuju na obrasce ponašanja koji mogu negativno uticati na profesionalne odnose, etičko postupanje i kvalitet zdravstvene njege. Smatra se da zajedničku osnovu ovih osobina čine nizak nivo empatije, interpersonalni antagonizam, sklonost manipulaciji i eksploataciji drugih, kao i smanjeno poštenje i saradljivost [2]. Cilj ovog rada bio je prikazati značaj, karakteristike i prisustvo dimenzija mračne trijade među zdravstvenim radnicima, u zdravstvenom sektoru.

## DIMENZIJE MRAČNE TRIJADE

Mračna trijada obuhvata tri osnovne dimenzije ličnosti: makijavelizam, narcizam i psihopatiju. Kasnije je ovom konceptu dodat i sadizam, čime je formirana mračna tetrada, ali taj konstrukt nije predmet ovog rada. Zajedničke osobine ovih konstrukata su destruktivnost, potreba za moći, manipulativnost, emocionalna distanca i odsustvo empatije. Povezanost između ovih osobina uočena je mnogo prije nego što je uveden termin „mračna

Conclusion**.** Further research is needed to more clearly define the prevalence and significance of the Dark Triad among healthcare workers, as well as the possibilities for prevention and improvement of professional relationships within the healthcare system.
**Keywords**: Dark Triad, healthcare workers, healthcare sector.

## INTRODUCTION

The study of personality traits among healthcare workers represents under-researched area, especially when it comes to so-called dark personality traits that are difficult to reconcile with empathy, humanity, and altruism qualities that form the foundation of helping professions. The concept of the Dark Triad includes three interrelated but distinct constructs: Machiavellianism, narcissism, and psychopathy. These traits share common characteristics such as manipulativeness, emotional coldness, lack of empathy, aggressiveness, and a tendency toward self-interest, which is why they are considered socially undesirable, although they are relatively stable personality traits [1]. Dark Triad traits do not necessarily imply the presence of a psychiatric disorder, but rather indicate behavioral patterns that may negatively affect professional relationships, ethical conduct, and the quality of healthcare. It is believed that these traits share a common basis consisting of low empathy, interpersonal antagonism, a tendency to manipulate and exploit others, as well as reduced honesty and cooperativeness [2]. The aim of this paper was to show the importance, characteristics and presence of dimensions of the dark triad among health workers in the health sector.

## DIMENSIONS OF THE DARK TRIAD

The Dark Triad consists of three main personality dimensions: Machiavellianism, narcissism, and psychopathy. Later, sadism was added to this model, forming the Dark Tetrad; however, this construct is not the focus of this paper. The common features of these constructs include destructiveness, need for power, manipulativeness, emotional detachment,

trijada“, ali su se tada proučavale odvojeno, uglavnom u okviru psihopatologije. Uvođenje ovog konstrukta omogućilo je sagledavanje mračnih osobina i na subkliničkom nivou, odnosno kod osoba koje ne ispoljavaju kliničke poremećaje ličnosti, ali pokazuju određene neadaptivne obrasce ponašanja [2]. Mračne osobine ličnosti razlikuju se od kliničkih oblika narcizma i psihopatije, koji predstavljaju ekstremne manifestacije i često zahtijevaju stručnu psihološku ili forenzičku intervenciju [1, 2, 3].

**Makijavelizam**

Makijavelizam podrazumijeva manipulativno ponašanje, korištenje drugih radi ostvarivanja sopstvenih ciljeva, kao i izraženu potrebu za moći i kontrolom. U zdravstvenim ustanovama ove osobine mogu se manifestovati kroz prikrivanje grešaka, manipulisanje informacijama ili narušavanje timske saradnje radi lične koristi. Takvo ponašanje posebno je problematično jer može ugroziti povjerenje koje predstavlja osnov profesionalnih odnosa u zdravstvu. Osobe sa izraženim makijavelističkim crtama često karakterišu cinizam, smanjena moralna odgovornost i pragmatičan pristup donošenju odluka. Istovremeno, sposobnost dugoročnog planiranja i kontrolisanja emocija može ih učiniti uspješnim u poslovnom okruženju, gdje nerijetko zauzimaju visoke pozicije. Istraživanja ukazuju na značajnu povezanost makijavelizma i psihopatije, iako se razlikuju po nivou impulzivnosti koja je izraženija kod psihopatije [4, 5].

**Psihopatija**

Psihopatija predstavlja pojam koji se dugo proučava u okviru kliničke psihologije i psihijatrije. Karakterišu je emocionalna hladnoća, impulsivnost, nedostatak griže savjesti i smanjena empatija prema drugima. Kod zdravstvenih radnika, posebno u stresnim radnim uslovima, blaže psihopatske osobine mogu se ispoljiti kroz ravnodušnost prema patnji pacijenata, grubu komunikaciju ili zanemarivanje etičkih principa bez osjećaja odgovornosti. Dosadašnja istraživanja pokazuju da su psihopatske osobine češće izražene kod muškaraca nego kod žena, dok žene rjeđe ispoljavaju

and lack of empathy. The connection between these traits had been observed long before the term “Dark Triad” was introduced, but they were previously studied separately, mainly within psychopathology. The introduction of this construct enabled the examination of dark traits at a subclinical level, meaning in individuals who do not exhibit clinical personality disorders but still demonstrate certain maladaptive behavioral patterns [2]. Dark personality traits differ from clinical forms of narcissism and psychopathy, which represent extreme manifestations and often require professional psychological or forensic intervention [1, 2, 3].

**Machivellianism**

Machiavellianism refers to manipulative behavior, using others to achieve personal goals, as well as a strong need for power and control. In healthcare settings, these traits may manifest through concealing mistakes, manipulating information, or undermining teamwork for personal gain. Such behavior is particularly problematic because it can jeopardize the trust that forms the foundation of professional relationships in healthcare. Individuals with pronounced Machiavellian traits are often characterized by cynicism, reduced moral responsibility, and a pragmatic approach to decision-making. At the same time, their ability to plan long-term and control emotions may make them successful in business environments, where they often occupy higher positions. Research indicates a significant relationship between Machiavellianism and psychopathy, although they differ in the level of impulsivity, which is more pronounced in psychopathy [4, 5].

**Psychopathy**

Psychopathy is a concept long studied within clinical psychology and psychiatry. It is characterized by emotional coldness, impulsivity, lack of remorse, and reduced empathy toward others. Among healthcare workers, especially in high-stress working conditions, milder psychopathic traits may manifest as indifference toward patient suffering,

antisocijalno ponašanje. Takođe, brojna istraživanja ukazuju da su određeni elementi narcizma prisutni kod većine ljudi kao dimenzije ličnosti koje se mogu mjeriti različitim skalama [2, 6].

**Narcizam**

Narcizam se najčešće manifestuje kroz osjećaj superiornosti, grandioznosti i potrebu za divljenjem i priznanjem. Osobe sa izraženim narcističkim crtama često pokazuju smanjenu empatiju prema pacijentima i saradnicima. Kod ljekara se narcizam može ispoljiti autoritativnim stilom rada, ignorisanjem mišljenja drugih članova tima i donošenjem odluka bez konsultacija. Kod medicinskih sestara i tehničara narcističke osobine mogu dovesti do takmičarskog ponašanja, omalovažavanja kolega i emocionalne distance prema pacijentima. Za razliku od vulnerabilnog narcizma, grandiozni narcisi smatraju da zaslužuju poseban društveni status i priznanje, te vjeruju da posjeduju superiorne sposobnosti u odnosu na druge [2, 7, 8].

## PRIKAZ RELEVANTNIH STUDIJA

Dosadašnja istraživanja o mračnoj trijadi uglavnom su bila usmjerena na ispitivanje individualnih razlika u opštoj populaciji, dok su studije koje uključuju zdravstvene radnike znatno rjeđe. Ipak, profesije u zdravstvenom sektoru, posebno ljekarska, često su povezane sa visokim društvenim statusom, odgovornošću i dobrim finansijskim primanjima, zbog čega postoji opravdan interes za proučavanje osobina mračne trijade upravo u ovom profesionalnom okruženju. Rezultati istraživanja pokazali su da u kolektivima sa velikim brojem medicinskih sestara često postoji izražena netrpeljivost i otežana timska saradnja. Ispitanici su posebno isticali povišen nivo verbalne agresivnosti i konflikata u svakodnevnoj komunikaciji. Takvi međuljudski odnosi mogu negativno uticati na radnu atmosferu, smanjiti zadovoljstvo zaposlenih i otežati efikasno obavljanje profesionalnih zadataka. Nedostatak međusobnog poštovanja, podrške i otvorene komunikacije često dovodi do stvaranja podjela unutar tima, što može umanjiti kvalitet saradnje među zdravstvenim radnicima. Pored toga,

harsh communication, or neglect of ethical principles without feelings of responsibility. Previous research shows that psychopathic traits are more commonly expressed in men than in women, while women less frequently exhibit antisocial behavior. Furthermore, many studies indicate that certain elements of narcissism are present in most people as personality dimensions that can be measured using various scales [2, 6].

**Narcissism**

Narcissism is most commonly manifested through a sense of superiority, grandiosity, and a need for admiration and recognition. Individuals with pronounced narcissistic traits often show reduced empathy toward patients and colleagues. In physicians, narcissism may be expressed through an authoritarian working style, ignoring the opinions of other team members, and making decisions without consultation. In nurses and technicians, narcissistic traits may lead to competitive behavior, belittling colleagues, and emotional distance from patients. Unlike vulnerable narcissism, grandiose narcissists believe they deserve a special social status and recognition and consider themselves superior to others [2, 7, 8].

## OVERVIEW OF RELEVANT STUDIES

Most research on the Dark Triad has focused on individual differences in the general population, while studies involving healthcare workers are considerably less common. However, healthcare professions, particularly medicine, are often associated with high social status, responsibility, and good financial compensation, which is why there is justified interest in examining Dark Triad traits within this professional context. The research results showed that in work environments with a large number of nurses, there is often pronounced interpersonal intolerance and impaired teamwork. Participants particularly highlighted increased levels of verbal aggression and conflicts in everyday communication. Such interpersonal relationships can negatively affect the work atmosphere, reduce employee satisfaction, and hinder the efficient

kontinuirana izloženost konfliktima povećava rizik od profesionalnog stresa, sindroma sagorijevanja na poslu i smanjene motivacije za rad. Zbog toga je od posebnog značaja razvijanje kulture međusobnog uvažavanja, jačanje timskog duha i primjena strategija za konstruktivno rješavanje konflikata u zdravstvenim ustanovama [9]. Rezultati druge studije sprovedene među zdravstvenim radnicima ukazali su da osobine psihopatije i narcizma imaju značajan uticaj na kvalitet međuljudskih odnosa u zdravstvenim ustanovama, dok makijavelizam nije pokazao statistički značajnu povezanost sa odnosima u kolektivu [10]. Istraživanje provedeno na uzorku od 400 ljekara u Pakistanu pokazalo je da su izraženije osobine psihopatije, makijavelizma, narcizma i sadizma povezane sa kontraproduktivnim ponašanjem na poslu, uključujući nesavjestan rad, neodgovornost, uzimanje mita i učestala bolovanja [11]. Slični rezultati potvrđeni su i u istraživanju među medicinskim sestrama u Kini, gdje je utvrđena povezanost između osobina mračne trijade i nepoželjnog profesionalnog ponašanja [12]. Prisustvo izraženih osobina mračne trijade među zdravstvenim radnicima može imati brojne negativne posljedice, kao što su smanjen kvalitet zdravstvene njege, loši međuljudski odnosi, konflikti unutar tima, profesionalno sagorijevanje i povećan rizik od stručnih grešaka. Zbog toga je značajno unaprijediti psihološku procjenu zaposlenih, razvijati etičke vrijednosti tokom obrazovanja i podsticati kulturu otvorene komunikacije, međusobnog poštovanja i timskog rada. Razumijevanje mračne trijade ne treba posmatrati kao stigmatizaciju zdravstvenih radnika, već kao mogućnost unapređenja radnog okruženja, zaštite pacijenata i profesionalnog razvoja zaposlenih [3]. Ljekarska profesija u savremenom društvu često nosi visok društveni ugled i finansijsku sigurnost, posebno kada je riječ o specijalističkim granama medicine. Upravo zbog toga postavlja se pitanje da li osobe koje obavljaju ovako odgovorne i društveno cijenjene profesije pokazuju određene specifičnosti u odnosu na osobine ličnosti mračne trijade u poređenju sa opštom populacijom. Pored ljekara, važno je istaći značaj medicinskih sestara, tehničara

performance of professional duties. A lack of mutual respect, support, and open communication often leads to divisions within the team, which may diminish the quality of collaboration among healthcare professionals. Furthermore, continuous exposure to conflicts increases the risk of occupational stress, burnout syndrome, and reduced work motivation. Therefore, fostering a culture of mutual respect, strengthening team spirit, and implementing strategies for constructive conflict resolution are of particular importance in healthcare institutions [9]. Results of another study conducted among healthcare workers indicated that psychopathy and narcissism significantly influence the quality of interpersonal relationships in healthcare institutions, while Machiavellianism did not show a statistically significant association with team relationships [10]. A study conducted on a sample of 400 physicians in Pakistan showed that higher levels of psychopathy, Machiavellianism, narcissism, and sadism were associated with counterproductive workplace behavior, including negligence, irresponsibility, bribery, and frequent absenteeism [11]. Similar findings were confirmed in a study among nurses in China, where a relationship between Dark Triad traits and undesirable professional behavior was established [12]. The presence of pronounced Dark Triad traits among healthcare workers may have numerous negative consequences, such as reduced quality of care, poor interpersonal relationships, team conflicts, professional burnout, and an increased risk of medical errors. Therefore, it is important to improve psychological screening of employees, develop ethical values during education, and promote a culture of open communication, mutual respect, and teamwork. Understanding the Dark Triad should not be viewed as stigmatization of healthcare workers, but as an opportunity to improve the working environment, patient safety, and professional development [3]. The medical profession in modern society often carries high social prestige and financial security, especially in specialist fields of medicine. This raises the question of whether individuals working in such responsible

i ostalog zdravstvenog osoblja koje ima ključnu ulogu u očuvanju zdravlja i pružanju zdravstvene zaštite. Međutim, za razliku od ljekara, ova zanimanja često nemaju isti društveni status niti nivo profesionalnog priznanja, što može dodatno uticati na međuljudske odnose i profesionalno zadovoljstvo zaposlenih. Iako postoje pojedinačna istraživanja na ovu temu, još uvijek nema dovoljno naučnih dokaza koji bi potvrdili da zdravstveni radnici, a posebno ljekari, u većoj mjeri posjeduju osobine mračne trijade u odnosu na druge profesije ili opštu populaciju [13, 14]. Osobine poput izražene potrebe za dominacijom, osjećaja superiornosti, nedostatka empatije, prekomjernog isticanja ličnih uspjeha i težnje ka moći nisu poželjne u profesijama koje se temelje na humanosti i pomoći drugima. Zbog toga je važno prepoznati štetne obrasce ponašanja i usmjeriti pažnju na posljedice koje oni mogu imati na pacijente, kolege i cjelokupan zdravstveni sistem. Neadaptivno ponašanje nije uvijek otvoreno i lako uočljivo, već se može manifestovati kroz prikrivene oblike ponašanja, poput izbjegavanja odgovornosti, uskraćivanja pomoći drugima ili različitih oblika profesionalne neetičnosti. U Bosni i Hercegovini ne postoje studije koje su se bavile istraživanjem dimenzija mračne trijade u zdravstvenom sektoru. Stoga je potrebno dalje istraživati prisustvo osobina mračne trijade kod zaposlenih u zdravstvenom sektoru i njihov uticaj na profesionalno funkcionisanje.

## ZAKLJUČAK

Osobine mračne trijade mogu imati značajan uticaj na međuljudske odnose, profesionalnu komunikaciju i kvalitet rada u zdravstvenom sektoru. Dosadašnja istraživanja pokazuju da izražen narcizam, makijavelizam i psihopatija kod zdravstvenih radnika mogu biti povezani sa manjkom empatije, otežanom timskom saradnjom i češćim konfliktima u radnom okruženju. Ipak, određene osobine poput samouvjerenosti, odlučnosti i sposobnosti djelovanja pod pritiskom mogu u pojedinim situacijama imati i funkcionalnu ulogu. Prepoznavanje i razumijevanje ovih karakteristika važno je za unapređenje profesionalnih odnosa,

and socially respected professions exhibit specific personality traits related to the Dark Triad compared to the general population. In addition to physicians, it is important to emphasize the role of nurses, technicians, and other healthcare staff who play a key role in maintaining health and providing care. However, unlike physicians, these professions often do not have the same level of social status or professional recognition, which may further influence interpersonal relationships and job satisfaction. Although individual studies exist, there is still insufficient scientific evidence to confirm that healthcare workers, particularly physicians, exhibit Dark Triad traits to a greater extent than other professions or the general population [13, 14]. Traits such as a strong need for dominance, feelings of superiority, lack of empathy, excessive self-promotion, and a desire for power are undesirable in professions based on humanity and helping others. Therefore, it is important to recognize harmful behavioral patterns and consider their potential consequences for patients, colleagues, and the healthcare system as a whole. Maladaptive behavior is not always overt and easily noticeable; it may appear in subtle forms such as avoiding responsibility, withholding help, or various forms of professional unethical conduct. In Bosnia and Herzegovina, there are no studies examining Dark Triad dimensions in the healthcare sector. Therefore, further research is needed to investigate the presence of Dark Triad traits among healthcare employees and their impact on professional functioning.

## CONCLUSION

Dark Triad traits can have a significant impact on interpersonal relationships, professional communication, and the quality of work in the healthcare sector. Existing research shows that pronounced narcissism, Machiavellianism, and psychopathy among healthcare workers may be associated with reduced empathy, impaired teamwork, and more frequent workplace conflicts. However, certain traits such as self-confidence,

očuvanje etičkih principa i sigurnosti pacijenata. Zbog nedovoljnog broja istraživanja u ovoj oblasti, neophodno je sprovesti dodatne studije koje bi detaljnije objasnile prisustvo i uticaj mračne trijade među zdravstvenim radnicima.

decisiveness, and the ability to act under pressure may, in some situations, have a functional role. Recognizing and understanding these characteristics is important for improving professional relationships, maintaining ethical principles, and ensuring patient safety. Due to the limited number of studies in this field, further research is necessary to more comprehensively explain the presence and impact of the Dark Triad among healthcare professionals.

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***Review article***

# KVALITET PRUŽENE ZDRAVSTVENE NJEGE: ULOGA EMPATIJE I ALTRUIZMA

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## APSTRAKT

Uvod. Psihosocijalni aspekti sestrinstva predstavljaju značajan segment savremene zdravstvene njege i obuhvataju emocionalne, psihološke, socijalne i komunikacijske dimenzije odnosa između medicinske sestre i pacijenta. Empatija i altruizam imaju važnu ulogu u formiranju kvalitetnog terapijskog odnosa, unapređenju komunikacije i povećanju zadovoljstva pacijenata pruženom njegom. Cilj ovog preglednog rada bio je analizirati značaj psihosocijalnih aspekata sestrinstva, sa posebnim osvrtom na uticaj empatije i altruizma medicinskih sestara na kvalitet zdravstvene njege. Rezultati dostupne literature ukazuju da razvijena empatija doprinosi boljem razumijevanju potreba pacijenata, smanjenju straha, anksioznosti i osjećaja izolovanosti, kao i većem povjerenju između pacijenta i zdravstvenog radnika. Empatičan i human pristup pozitivno utiče na saradnju tokom liječenja, zdravstvene ishode i zadovoljstvo pacijenata. Altruizam, kao nesebičan oblik prosocijalnog ponašanja, doprinosi profesionalnom i humanom odnosu prema pacijentima, te predstavlja važnu osobinu sestrinske profesije. Psihosocijalni aspekti sestrinstva imaju značaj i za same medicinske sestre, jer dugotrajna izloženost stresu i emocionalno zahtjevnim situacijama može dovesti do profesionalnog sagorijevanja i emocionalne iscrpljenosti.

# QUALITY OF NURSING CARE: THE ROLE OF EMPATHY AND ALTRUISM

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## ABSTRACT

Introduction. Psychosocial aspects of nursing represent an important segment of modern health care and include the emotional, psychological, social, and communication dimensions of the relationship between nurses and patients. Empathy and altruism play a significant role in establishing a quality therapeutic relationship, improving communication, and increasing patient satisfaction with the provided care. The aim of this review paper was to analyze the importance of psychosocial aspects of nursing, with special emphasis on the impact of empathy and altruism of nurses on the quality of health care. The results of the available literature indicate that developed empathy contributes to a better understanding of patients' needs, reduction of fear, anxiety, and feelings of isolation, as well as greater trust between patients and health care professionals. An empathetic and humane approach positively affects cooperation during treatment, health outcomes, and patient satisfaction. Altruism, as a selfless form of prosocial behavior, contributes to a professional and humane relationship toward patients and represents an important characteristic of the nursing profession. Psychosocial aspects of nursing are also important for nurses themselves, since prolonged exposure to stress and emotionally demanding situations can lead to professional burnout and emotional

Zaključak. Važno je razvijati emocionalnu inteligenciju, komunikacijske vještine i programe psihološke podrške zdravstvenim radnicima. Unapređenje psihosocijalnih kompetencija doprinosi kvalitetnijoj zdravstvenoj njezi, boljoj profesionalnoj saradnji i većem zadovoljstvu pacijenata i zdravstvenih radnika.
**Ključne riječi:** sestrinstvo, empatija, altruizam, psihosocijalni aspekti, kvalitet zdravstvene njege.

exhaustion. Conclusion. It is important to develop emotional intelligence, communication skills, and psychological support programs for health care workers. Improving psychosocial competencies contributes to higher quality health care, better professional cooperation, and greater satisfaction of both patients and health care professionals.
**Keywords:** nursing, empathy, altruism, psychosocial aspects, quality of health care.

## UVOD

Psihosocijalni aspekti sestrinstva predstavljaju značajnu komponentu savremene zdravstvene njege i obuhvataju emocionalne, psihološke, socijalne i komunikacijske elemente odnosa između medicinske sestre i pacijenta. Osim pružanja stručne i tehničke zdravstvene njege, medicinske sestre imaju važnu ulogu u pružanju emocionalne podrške, razumijevanja i osjećaja sigurnosti pacijentima i članovima njihovih porodica [1, 2]. Sestrinstvo je profesija koja zahtijeva svakodnevni kontakt sa osobama različitih zdravstvenih, emocionalnih i socijalnih potreba, zbog čega su empatija, altruizam, strpljenje, razvijene komunikacijske vještine i sposobnost razumijevanja psihološkog stanja pacijenta od izuzetnog značaja. Empatičan pristup doprinosi izgradnji povjerenja između pacijenta i zdravstvenog radnika, unapređuje saradnju tokom liječenja i pozitivno utiče na zadovoljstvo pacijenata pruženom njegom [2, 3, 4]. Cilj ovog preglednog rada bio je prikazati značaj psihosocijalnih aspekata sestrinstva, sa posebnim osvrtom na uticaj empatije i altruizma medicinskih sestara na kvalitet zdravstvene njege i zadovoljstvo pacijenata.

### Psihosocijalni aspekti sestrinstva

U savremenoj sestrinskoj praksi emocionalna inteligencija predstavlja važan preduslov za kvalitetno i profesionalno pružanje zdravstvene njege. Medicinske sestre koje posjeduju razvijene emocionalne kompetencije sposobne su da prepoznaju i razumiju emocije pacijenata, ali i da kontrolišu vlastite emocionalne reakcije tokom rada. Takve sposobnosti omogućavaju adekvatno suočavanje sa stresnim i emocionalno zahtjevnim

## INTRODUCTION

Psychosocial aspects of nursing represent an important component of modern healthcare and include the emotional, psychological, social, and communication elements of the relationship between nurses and patients. In addition to providing professional and technical healthcare, nurses play a significant role in offering emotional support, understanding, and a sense of security to patients and their family members [1, 2]. Nursing is a profession that requires daily contact with individuals who have diverse health, emotional, and social needs. Therefore, empathy, altruism, patience, well-developed communication skills, and the ability to understand the psychological condition of patients are of exceptional importance. An empathetic approach contributes to building trust between patients and healthcare professionals, improves cooperation during treatment, and positively affects patient satisfaction with the care provided [2, 3, 4]. The aim of this review paper was to present the importance of psychosocial aspects of nursing, with special emphasis on the influence of nurses' empathy and altruism on the quality of healthcare and patient satisfaction.

### Psychosocial Aspects of Nursing

In contemporary nursing practice, emotional intelligence is considered an important prerequisite for providing high-quality and professional healthcare. Nurses who possess well-developed emotional competencies are able to recognize and understand patients' emotions, while also controlling their own emotional reactions during work. Such abilities enable appropriate coping with

situacijama koje su česte u zdravstvenim ustanovama [5, 6]. Sestrinska profesija podrazumijeva brojne kompetencije koje ne uključuju samo stručno i tehničko znanje, već i pružanje psihološke podrške pacijentima. Zbog svakodnevnog kontakta sa patnjom, bolešću i različitim životnim krizama, medicinske sestre su često izložene visokim nivoima stresa i emocionalnog opterećenja. Upravo zbog toga emocionalna inteligencija, sposobnost empatijskog razumijevanja i razvijene komunikacijske vještine imaju veliku važnost u profesionalnom radu [7]. Psihosocijalni aspekti sestrinstva posebno dolaze do izražaja u radu sa pacijentima koji boluju od hroničnih i malignih bolesti, mentalnih poremećaja, kao i kod starijih i terminalno oboljelih pacijenata. U takvim okolnostima medicinska sestra često predstavlja glavni izvor podrške, razumijevanja i ohrabrenja. Kvalitetna komunikacija i human pristup mogu značajno smanjiti osjećaj straha, anksioznosti i socijalne izolacije kod pacijenata. Pored uticaja na pacijente, psihosocijalni aspekti značajno utiču i na same medicinske sestre. Dugotrajna izloženost stresu, profesionalnoj odgovornosti i emocionalno zahtjevnim situacijama može dovesti do profesionalnog sagorijevanja, emocionalne iscrpljenosti i smanjenog zadovoljstva poslom. Zbog toga je važno obezbijediti adekvatnu psihološku podršku zdravstvenim radnicima, razvijati kvalitetne međuljudske odnose unutar tima i unapređivati programe očuvanja mentalnog zdravlja zaposlenih [8]. Psihološke potrebe bolesnika prilikom prijema na odjeljenje, povezane su s nepoznatim okruženjem, kao i s nepoznatim ljudima, uz zabrinutost za tjelesno i/ili psihičko zdravlje, osjećaj tjeskobe i ranjivost u stranom i novoj sredini. Mnogi teoretičari se slažu da se psihološka njega sastoji od dva ključna elementa: jedan se bavi praktičnom i tehničkom djelatnosti, a drugi se bavi načinom na koji se intervencije provode ovisno o pojedinoj medicinskoj sestri. To se označava pod „instrumental vs. expressive care“. Već je dokazano da instrumentalna njega sama po sebi nije dovoljna, tj. ako se samo praktično izvršava zadatak bez adekvatnih ekspresija emocija i interpersonalnih

stressful and emotionally demanding situations commonly encountered in healthcare institutions [5, 6]. The nursing profession involves numerous competencies that include not only professional and technical knowledge but also the provision of psychological support to patients. Due to daily exposure to suffering, illness, and various life crises, nurses are often subjected to high levels of stress and emotional burden. Therefore, emotional intelligence, the ability for empathetic understanding, and developed communication skills are of great importance in professional practice [7]. Psychosocial aspects of nursing are particularly evident in the care of patients suffering from chronic and malignant diseases, mental disorders, as well as elderly and terminally ill patients. In such circumstances, nurses often represent the main source of support, understanding, and encouragement. Quality communication and a humane approach can significantly reduce feelings of fear, anxiety, and social isolation among patients. In addition to their impact on patients, psychosocial aspects also significantly affect nurses themselves. Long-term exposure to stress, professional responsibility, and emotionally demanding situations may lead to burnout, emotional exhaustion, and reduced job satisfaction. Therefore, it is important to provide adequate psychological support for healthcare workers, develop quality interpersonal relationships within healthcare teams, and improve mental health preservation programs for employees [8]. The psychological needs of patients upon admission to a hospital ward are associated with an unfamiliar environment and unfamiliar people, along with concerns about physical and/or mental health, feelings of anxiety, and vulnerability in a new setting. Many theorists agree that psychological care consists of two key elements: one related to practical and technical activities, and the other related to the manner in which interventions are carried out depending on the individual nurse. This is referred to as “instrumental vs. expressive care.” It has already been proven that instrumental care alone is not sufficient; that is, if tasks are performed only practically without

vještina to se ne može nazvati sveobuhvatnom brigom za bolesnika. Postoji jasna razlika između instrumentalne ili praktične i ekspresivne ili psihološke njege (Tabela 1) [4]. Zbog toga je mnogo važan stav Florens Najtingel o holističkom pristupu u sestrinstvu, a sve njene konstruktivne ideje bile su prihvaćene u definiciji Svjetske zdravstvene organizacije 1946. godine prema kojoj se zdravlje definiše kao „stanje potpune tjelesne, mentalne i socijalne dobrobiti, a ne samo odsutnost bolesti i nemoći“. Holističko njegovanje u sestrinstvu može se opisati kao nastojanje da se na potrebe i iskustva pacijenta odgovori sa razumijevanjem, empatijom i uvažavanjem njegove cjelokupne ličnosti [9].

***Tabela 1. Razlika između ekspresivne i instrumentalne njege***

| INSTRUMENTALNA NJEGA | EKSPRESIVNA NJEGA |
|---|---|
| Jasno definisani pokazatelji kliničkog rada | Brojni stavovi i osjećanja |
| Sistematičan pristup kliničkom radu | Pristupačnost i empatija |
| Intervencije koje sprovodi medicinska sestra | Prisustvo motivacije i istinsko interesovanje da se pruži potrebna pomoć drugoj osobi (altruizam) |

Savremeno sestrinstvo sve više naglašava značaj holističkog pristupa pacijentu, koji podrazumijeva sagledavanje čovjeka kao biološkog, psihološkog i socijalnog bića. Psihosocijalni aspekti sestrinstva imaju važnu ulogu u unapređenju kvaliteta zdravstvene njege, zadovoljstva pacijenata i profesionalnog razvoja medicinskih sestara. Razvoj empatije, emocionalne inteligencije i komunikacijskih vještina predstavlja važan segment obrazovanja i profesionalnog usavršavanja u sestrinskoj profesiji [10].

## Empatija

Empatija predstavlja složenu sposobnost razumijevanja i prepoznavanja emocionalnih stanja drugih osoba, što se manifestuje kroz saosjećajno i podržavajuće ponašanje [11]. U sestrinskoj profesiji empatija ima posebno značajnu ulogu jer omogućava medicinskim sestrama da uspostave

adequate emotional expression and interpersonal skills, such care cannot be considered comprehensive patient care. There is a clear distinction between instrumental or practical care and expressive or psychological care (Table 1) [4]. For this reason, Florence Nightingale's perspective on the holistic approach in nursing is highly important, and all of her constructive ideas were incorporated into the definition of the World Health Organization from 1946, according to which health is defined as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity." Holistic nursing care may be described as an effort to respond to patients' needs and experiences with understanding, empathy, and respect for their overall personality [9].

***Table 1. Difference between Expressive and Instrumental Care***

| INSTRUMENTAL CARE | EXPRESSIVE CARE |
|---|---|
| Clearly defined indicators of clinical practice | Various attitudes and emotions |
| Systematic approach to clinical work | Accessibility and empathy |
| Interventions performed by nurses | Presence of motivation and genuine interest in helping others (altruism) |

Modern nursing increasingly emphasizes the importance of a holistic approach to patients, which involves viewing individuals as biological, psychological, and social beings. Psychosocial aspects of nursing play an important role in improving healthcare quality, patient satisfaction, and the professional development of nurses. The development of empathy, emotional intelligence, and communication skills represents an important segment of nursing education and professional advancement [10].

## Empathy

Empathy represents a complex ability to understand and recognize the emotional states of other individuals, manifested through compassionate and

kvalitetan terapijski odnos sa pacijentima i njihovim porodicama. Sestrinstvo kao profesija podstiče razvoj osobina poput iskrenosti, poštovanja, razumijevanja i sposobnosti empatične komunikacije. Empatija se smatra jednim od ključnih elemenata emocionalne inteligencije i predstavlja važan faktor u pružanju kvalitetne zdravstvene njege. Medicinske sestre koje posjeduju visok nivo empatije lakše ostvaruju povjerenje sa pacijentima, bolje razumiju njihove potrebe i efikasnije pružaju emocionalnu podršku [12]. Povjerenje koje se razvija kroz empatičan pristup doprinosi većoj otvorenosti pacijenata prilikom iznošenja svojih tegoba, strahova i očekivanja, što omogućava preciznije planiranje i provođenje zdravstvene njege. Empatija obuhvata kognitivne, emocionalne i bihevioralne sposobnosti koje omogućavaju razumijevanje tuđe patnje i adekvatno reagovanje na nju. Istraživanja pokazuju da empatičan odnos doprinosi boljem iskustvu pacijenata, većem zadovoljstvu zdravstvenom njegom, boljoj saradnji tokom liječenja i smanjenju mogućnosti nastanka grešaka u zdravstvenoj njezi [13]. Pacijenti koji osjećaju da ih zdravstveni radnici razumiju i poštuju češće aktivno učestvuju u procesu liječenja, pridržavaju se preporučene terapije i pokazuju veći stepen zadovoljstva pruženim zdravstvenim uslugama. Pored toga, razvijene komunikacijske vještine medicinskih sestara usko su povezane sa empatijom i emocionalnom inteligencijom. Aktivno slušanje, razumijevanje i kvalitetna verbalna i neverbalna komunikacija doprinose stvaranju pozitivnog odnosa između medicinske sestre i pacijenta. Humanost, empatija i profesionalno znanje zajedno predstavljaju osnov kvalitetne i humane zdravstvene njege [14, 15, 16]. Efikasna komunikacija omogućava pravovremeno prepoznavanje potreba pacijenata, smanjuje nesporazume i unapređuje sigurnost tokom pružanja zdravstvene njege. U savremenom zdravstvenom sistemu, koji je često opterećen velikim brojem pacijenata, nedostatkom kadra i povećanim administrativnim obavezama, očuvanje empatičnog pristupa predstavlja značajan profesionalni izazov. Uprkos tome, empatija ostaje jedna od najvažnijih

supportive behavior [11]. In the nursing profession, empathy plays a particularly important role as it enables nurses to establish a high-quality therapeutic relationship with patients and their families. Nursing as a profession encourages the development of traits such as honesty, respect, understanding, and the ability for empathetic communication. Empathy is considered one of the key elements of emotional intelligence and represents an important factor in providing high-quality nursing care. Nurses who possess a high level of empathy more easily build trust with patients, better understand their needs, and provide more effective emotional support [12]. The trust developed through an empathetic approach contributes to greater patient openness in expressing their complaints, fears, and expectations, enabling more precise planning and implementation of nursing care. Empathy encompasses cognitive, emotional, and behavioral abilities that enable understanding of another person's suffering and appropriate response to it. Research shows that an empathetic relationship contributes to a better patient experience, higher satisfaction with healthcare, better cooperation during treatment, and a reduced likelihood of errors in nursing care [13]. Patients who feel understood and respected by healthcare professionals are more likely to actively participate in the treatment process, adhere to prescribed therapy, and demonstrate a higher level of satisfaction with the provided healthcare services. In addition, the developed communication skills of nurses are closely associated with empathy and emotional intelligence. Active listening, understanding, and high-quality verbal and non-verbal communication contribute to the creation of a positive relationship between the nurse and the patient. Humanity, empathy, and professional knowledge together represent the foundation of quality and humane nursing care [14, 15, 16]. Effective communication enables timely identification of patient needs, reduces misunderstandings, and improves safety during the provision of nursing care. In the modern healthcare system, which is often burdened by a large number of patients, staff shortages, and increased

kompetencija medicinskih sestara jer doprinosi holističkom pristupu pacijentu, u kojem se jednaka pažnja posvećuje fizičkim, psihološkim, socijalnim i duhovnim potrebama osobe. Takav pristup ne samo da unapređuje kvalitet zdravstvene njege, već pozitivno utiče i na ishode liječenja, kvalitet života pacijenata i ukupnu percepciju zdravstvene ustanove. Empatija ima značajan uticaj i na profesionalno zadovoljstvo medicinskih sestara. Rad u okruženju koje podstiče razumijevanje, međusobno poštovanje i podršku doprinosi većoj motivaciji zaposlenih, boljoj timskoj saradnji i smanjenju profesionalnog stresa. Stoga se razvoj empatije i emocionalne inteligencije smatra važnim dijelom obrazovanja i kontinuiranog profesionalnog usavršavanja medicinskih sestara. Kroz edukaciju, refleksivnu praksu i iskustveno učenje moguće je unaprijediti empatične kompetencije, što dugoročno doprinosi višem nivou kvaliteta zdravstvene njege i većem zadovoljstvu pacijenata i zdravstvenih radnika.

**Altruizam**

Altruizam predstavlja nesebičan oblik prosocijalnog ponašanja usmjerenog ka pomoći drugima bez očekivanja lične koristi ili nagrade [17]. U kontekstu sestrinske profesije altruizam se ogleda kroz spremnost medicinskih sestara da pruže pomoć, podršku i njegu pacijentima, često stavljajući potrebe drugih ispred vlastitih interesa. Iako su empatija i altruizam međusobno povezani pojmovi, oni nisu identični. Empatija podrazumijeva sposobnost razumijevanja i dijeljenja emocija drugih osoba, dok altruizam predstavlja konkretno djelovanje motivisano željom da se pomogne drugima. Istraživanja ukazuju na postojanje individualnih razlika u altruističkom ponašanju, koje mogu biti stabilne tokom vremena i u različitim situacijama [18, 19]. Altruizam ima posebno važnu ulogu u sestrinstvu jer doprinosi humanijem pristupu pacijentu, kvalitetnijim međuljudskim odnosima i većem zadovoljstvu korisnika zdravstvenih usluga. Uprkos njegovom značaju, altruizam je još uvijek nedovoljno istražen u medicinskim i zdravstvenim naukama.

administrative demands, maintaining an empathetic approach represents a significant professional challenge. Nevertheless, empathy remains one of the most important competencies of nurses, as it contributes to a holistic approach to the patient, in which equal attention is given to physical, psychological, social, and spiritual needs. Such an approach not only improves the quality of nursing care but also positively affects treatment outcomes, patients' quality of life, and the overall perception of healthcare institutions. Empathy also has a significant impact on the professional satisfaction of nurses. Working in an environment that promotes understanding, mutual respect, and support contributes to higher employee motivation, better teamwork, and reduced occupational stress. Therefore, the development of empathy and emotional intelligence is considered an important part of nursing education and continuous professional development. Through education, reflective practice, and experiential learning, empathetic competencies can be improved, which in the long term contributes to a higher level of nursing care quality and greater satisfaction among both patients and healthcare professionals.

**Altruism**

Altruism represents a form of prosocial behavior characterized by selfless actions aimed at helping others without expecting personal benefit or reward [17]. In the context of the nursing profession, altruism is reflected in nurses' willingness to provide assistance, support, and care to patients, often placing others' needs above their own interests. Although empathy and altruism are closely related concepts, they are not identical. Empathy refers to the ability to understand and share the emotions of others, whereas altruism represents concrete actions motivated by the desire to help others. Research indicates the existence of individual differences in altruistic behavior, which can remain stable over time and across different situations [18, 19]. Altruism plays a particularly important role in nursing as it contributes to a more humane approach to patients, better interpersonal relationships, and

**Kvalitet pružene zdravstvene njege**

Kvalitet zdravstvene njege predstavlja jedan od najvažnijih pokazatelja uspješnosti zdravstvenog sistema, a zadovoljstvo pacijenata smatra se jednim od osnovnih indikatora kvaliteta pruženih usluga. Na zadovoljstvo pacijenata utiču brojni faktori, uključujući kvalitet komunikacije, profesionalan odnos zdravstvenih radnika, dostupnost informacija, sigurnost, higijenske uslove i efikasnost liječenja [20]. Empirijska istraživanja pokazuju da empatičan odnos zdravstvenih radnika pozitivno utiče na zdravstvene ishode kod pacijenata sa različitim oboljenjima, uključujući hronične bolesti, dijabetes i maligna oboljenja. Pacijenti koji se liječe u empatičnom i podržavajućem okruženju često pokazuju niži nivo stresa, anksioznosti i depresije, kao i bolje pridržavanje preporučenog liječenja [21, 22]. Pored toga, osjećaj da su saslušani i da zdravstveni radnici razumiju njihove potrebe doprinosi većem osjećaju sigurnosti i zadovoljstva tokom procesa liječenja. Empatična komunikacija omogućava pacijentima da otvorenije izraze svoje tegobe, zabrinutosti i očekivanja, što zdravstvenim radnicima pruža potpuniji uvid u njihovo zdravstveno stanje i olakšava donošenje odgovarajućih odluka o njezi i liječenju. Empatija i altruizam predstavljaju važne temelje kvalitetne zdravstvene njege jer omogućavaju zdravstvenim radnicima da svakom pacijentu pristupe sa razumijevanjem, poštovanjem i humanošću. Takav pristup doprinosi izgradnji povjerenja između pacijenta i zdravstvenog osoblja, unapređuje saradnju tokom liječenja i povećava ukupno zadovoljstvo pruženim zdravstvenim uslugama [22]. Kada pacijenti osjećaju da su prihvaćeni i da se prema njima postupa sa iskrenom brigom i pažnjom, razvijaju veći stepen povjerenja u zdravstveni sistem i spremniji su da aktivno učestvuju u procesu liječenja i rehabilitacije. Altruizam se u zdravstvenoj profesiji ogleda kroz nesebičnu posvećenost dobrobiti pacijenta, spremnost na pružanje pomoći i stavljanje potreba pacijenta u središte profesionalnog djelovanja. Takvo ponašanje posebno dolazi do izražaja u situacijama kada su

higher satisfaction among healthcare service users. Despite its importance, altruism is still insufficiently researched in medical and health sciences.

**Quality of Nursing Care**

The quality of nursing care is one of the most important indicators of healthcare system performance, and patient satisfaction is considered one of the fundamental indicators of service quality. Patient satisfaction is influenced by numerous factors, including communication quality, professional attitude of healthcare workers, availability of information, safety, hygienic conditions, and treatment efficiency [20]. Empirical research shows that an empathetic relationship among healthcare professionals has a positive impact on health outcomes in patients with various conditions, including chronic diseases, diabetes, and malignant diseases. Patients treated in an empathetic and supportive environment often exhibit lower levels of stress, anxiety, and depression, as well as better adherence to recommended treatment [21, 22]. In addition, the feeling of being listened to and understood by healthcare professionals contributes to a greater sense of safety and satisfaction during the treatment process. Empathetic communication enables patients to express their symptoms, concerns, and expectations more openly, providing healthcare professionals with a more comprehensive understanding of their health condition and facilitating appropriate care and treatment decisions. Empathy and altruism represent important foundations of quality nursing care, as they enable healthcare professionals to approach each patient with understanding, respect, and humanity. Such an approach contributes to building trust between patients and healthcare staff, improves cooperation during treatment, and increases overall satisfaction with healthcare services [22]. When patients feel accepted and treated with genuine care and attention, they develop greater trust in the healthcare system and are more willing to actively participate in treatment and rehabilitation processes. Altruism in healthcare is reflected in the selfless dedication to patient well-being, willingness to provide help, and

pacijenti suočeni sa teškim dijagnozama, hroničnim bolestima, invaliditetom ili terminalnim stanjima. U tim okolnostima podrška, razumijevanje i prisustvo zdravstvenih radnika često imaju jednako važnu ulogu kao i medicinske intervencije. Savremeni koncept zdravstvene njege zasniva se na holističkom pristupu pacijentu, koji podrazumijeva uvažavanje njegovih fizičkih, psiholoških, socijalnih i duhovnih potreba. Empatija i altruizam omogućavaju ostvarivanje takvog pristupa jer podstiču individualizovanu njegu prilagođenu specifičnim potrebama svakog pacijenta. Na taj način zdravstvena njega prevazilazi okvire izvođenja tehničkih procedura i postaje proces usmjeren na cjelokupnu dobrobit osobe. Pored pozitivnog uticaja na pacijente, empatija i altruizam doprinose i unapređenju profesionalnih odnosa među članovima zdravstvenog tima. Radno okruženje zasnovano na međusobnom poštovanju, podršci i razumijevanju podstiče bolju saradnju, smanjuje učestalost konflikata i doprinosi većem zadovoljstvu zaposlenih. Takva organizaciona kultura može imati značajan uticaj na kvalitet pruženih zdravstvenih usluga i sigurnost pacijenata. Zbog svega navedenog, razvoj empatije i altruizma treba da bude sastavni dio obrazovanja i kontinuiranog profesionalnog usavršavanja zdravstvenih radnika. Jačanje ovih vrijednosti doprinosi humanizaciji zdravstvene zaštite, unapređenju kvaliteta zdravstvene njege i ostvarivanju boljih zdravstvenih ishoda, čime se potvrđuje njihov značaj kao nezaobilaznih elemenata savremene zdravstvene prakse.

## ZAKLJUČAK

Psihosocijalni aspekti sestrinstva predstavljaju neizostavan dio savremene zdravstvene njege i imaju značajan uticaj na kvalitet pruženih usluga. Empatija i altruizam kao važne profesionalne i humane osobine medicinskih sestara doprinose uspostavljanju povjerenja, kvalitetnijoj komunikaciji i boljem odnosu između pacijenta i zdravstvenog radnika. Empatičan pristup omogućava bolje razumijevanje potreba pacijenata,

placing the patient's needs at the center of professional practice. Such behavior is particularly evident in situations where patients face severe diagnoses, chronic illnesses, disabilities, or terminal conditions. In these circumstances, support, understanding, and the presence of healthcare professionals often play an equally important role as medical interventions. The modern concept of nursing care is based on a holistic approach to the patient, which includes consideration of physical, psychological, social, and spiritual needs. Empathy and altruism enable the realization of such an approach by promoting individualized care tailored to each patient's specific needs. In this way, nursing care goes beyond technical procedures and becomes a process focused on the overall well-being of the individual. In addition to their positive impact on patients, empathy and altruism also contribute to improving professional relationships among members of the healthcare team. A work environment based on mutual respect, support, and understanding promotes better cooperation, reduces the frequency of conflicts, and increases employee satisfaction. Such an organizational culture can have a significant impact on the quality of healthcare services and patient safety. For all these reasons, the development of empathy and altruism should be an integral part of education and continuous professional development of healthcare workers. Strengthening these values contributes to the humanization of healthcare, improvement of nursing care quality, and achievement of better health outcomes, confirming their importance as indispensable elements of modern healthcare practice.

## CONCLUSION

Psychosocial aspects of nursing represent an indispensable part of modern healthcare and have a significant impact on the quality of healthcare services provided. Empathy and altruism, as important professional and humane characteristics of nurses, contribute to establishing trust, improving communication, and strengthening relationships between patients and healthcare professionals. An

smanjenje straha i anksioznosti, kao i veće zadovljstvo pruženom njegom.

empathetic approach enables a better understanding of patients' needs, reduction of fear and anxiety, and greater satisfaction with the care provided

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***Educational Review***

# SIGURNOST OSOBLJA I PACIJENATA KOD MAGNETSKE REZONANCIJE

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## APSTRAKT

Uvod. Magnetska rezonancija (MRI) predstavlja jednu od najznačajnijih dijagnostičkih metoda savremene medicine zbog superiornog prikaza mekih tkiva i odsustva jonizujućeg zračenja. Tehnologija MRI zasniva se na djelovanju snažnog statičkog magnetskog polja, radiofrekventnih impulsa i gradijentnih polja, što omogućava visokokvalitetne snimke, ali istovremeno nosi i značajne sigurnosne rizike. Cilj ovog rada bio je prikazati osnovne fizikalne principe MRI, uporediti MRI i CT kroz njihove prednosti i nedostatke, te detaljno analizirati sigurnosne procedure, rizike i mjere zaštite pacijenata i osoblja. U radu su opisane glavne opasnosti povezane sa MRI pregledima, uključujući projektilni efekat, zagrijavanje tkiva, opekotine, buku, klaustrofobiju, rizike povezane s implantatima i primjenom kontrastnih sredstava na bazi gadolinija. Posebna pažnja posvećena je sigurnosti implantata i razlikama u rizicima između sistema jačine 1,5 T, 3 T i 7 T. Analizirane su sigurnosne zone MRI odjela, značaj detaljnog screeninga pacijenata, kontrola pristupa MRI sali, kao i važnost MRI kompatibilne opreme. Rezultati ukazuju da većina incidenata u MRI nastaje usljed ljudske greške, neadekvatnog screeninga ili nedovoljne edukacije osoblja. Najveći rizici odnose se na

# SAFETY OF STAFF AND PATIENTS IN MAGNETIC RESONANCE IMAGING

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## ABSTRACT

Introduction. Magnetic resonance imaging (MRI) is one of the most important diagnostic methods in modern medicine due to its superior visualization of soft tissues and the absence of ionizing radiation. MRI technology is based on the action of a strong static magnetic field, radiofrequency pulses, and gradient fields, enabling high-quality imaging while simultaneously presenting significant safety risks. The aim of this paper was to present the basic physical principles of MRI, compare MRI and CT through their advantages and disadvantages, and provide a detailed analysis of safety procedures, risks, and protective measures for patients and healthcare staff. The paper describes the main hazards associated with MRI examinations, including the projectile effect, tissue heating, burns, noise exposure, claustrophobia, risks related to implants, and the use of gadolinium-based contrast agents. Special attention is given to implant safety and differences in risks between 1.5 T, 3 T, and 7 T systems. MRI safety zones, the importance of detailed patient screening, access control to the MRI suite, and the use of MRI-compatible equipment are also analyzed. The findings indicate that most MRI-related incidents result from human error, inadequate screening, or insufficient staff education. The greatest risks are associated with ferromagnetic objects, unverified implants, and failure to follow safety protocols. As magnetic field strength increases, the risks of projectile accidents, tissue heating, peripheral

feromagnetske predmete, neprovjerene implantate i nepoštovanje sigurnosnih procedura. Sa povećanjem jačine magnetskog polja rastu i rizici od projektilnog efekta, zagrijavanja tkiva, periferne nervne stimulacije i oštećenja sluha. Zaključak. Ova metoda je korisna, ali potencijalno opasna dijagnostička metoda ukoliko se sigurnosni protokoli ne primjenjuju dosljedno. Kontinuirana edukacija osoblja, strogo poštovanje sigurnosnih procedura i pravilna procjena pacijenata predstavljaju osnovne preduslove za bezbjedan rad u MRI okruženju.

**Ključne riječi:** kompjuterizovana tomografija, magnetna rezonancija, sigurnost pacijenta.

## UVOD

Magnetska rezonancija (MRI) jedna je od najmoćnijih dijagnostičkih metoda moderne medicine. Za razliku od rendgena ili kompjuterizovane tomografije (CT), MRI ne koristi jonizujuće zračenje. Njegova snaga leži u izuzetno jakom magnetskom polju, radiofrekventnim (RF) impulsima i gradijentnim poljima. Upravo ta tehnologija omogućava vrhunske snimke mekih tkiva – mozga, kičmene moždine, zglobova, mišića, ali istovremeno krije ozbiljne prijetnje ako se ne poštuju stroga sigurnosna pravila [1, 2]. Sigurnost u MRI nije „dodatak“ dijagnostici, ona je njen centralni dio. Većina teških incidenata posljedica je ljudske greške, lošeg skrininga, unošenja zabranjenih predmeta ili nedovoljne edukacije osoblja. Ovaj rad daje cjelovit pregled osnovnih fizikalnih principa, uspoređuje MRI sa CT-om kroz prednosti i nedostatke, a zatim detaljno obrađuje sigurnosne procedure, posebnosti za različite jačine polja (1, 5 T, 3 T i 7 T), te ponašanje različitih implantata u tijelu [3]. Cilj ovog rada bio je prikazati osnovne fizikalne principe MRI, uporediti MRI i CT kroz njihove prednosti i nedostatke, te detaljno analizirati sigurnosne procedure, rizike i mjere zaštite pacijenata i osoblja.

nerve stimulation, and hearing damage also increase. Conclusion. MRI is an extremely valuable but potentially hazardous diagnostic method if safety protocols are not consistently implemented. Continuous staff education, strict adherence to safety procedures, and proper patient assessment are essential prerequisites for safe work in the MRI environment.

**Keywords:** computed tomography, magnetic resonance, patient safety.

## INTRODUCTION

Magnetic Resonance Imaging (MRI) is one of the most powerful diagnostic methods in modern medicine. Unlike X-ray imaging or computed tomography (CT), MRI does not use ionizing radiation. Its strength lies in an extremely strong magnetic field, radiofrequency (RF) pulses, and gradient fields. This technology enables high-quality imaging of soft tissues such as the brain, spinal cord, joints, and muscles while simultaneously posing serious risks if strict safety protocols are not followed [1,2]. Safety in MRI is not an “add-on” to diagnostics; it is a central component of the entire process. Most serious incidents are the result of human error, inadequate screening, introduction of prohibited objects, or insufficient staff training. This paper provides a comprehensive overview of the basic physical principles, compares MRI with CT in terms of advantages and disadvantages, and further discusses safety procedures, specific considerations for different magnetic field strengths (1.5 T, 3 T, and 7 T), as well as the behavior of various implants in the human body [3]. The aim of this paper was to present the basic physical principles of MRI, compare MRI and CT in terms of their advantages and disadvantages, and provide a detailed analysis of safety procedures, risks, and protective measures for patients and healthcare personnel.

### Basic Physical Principles of MRI – A Simple Explanation

To understand why MRI safety is so specific, it is necessary to understand what actually happens inside the scanner. Magnetic resonance imaging does not “photograph” the body like X-rays; instead, it detects

**Osnovni fizikalni principi MRI – jednostavno objašnjenje**

Da bismo razumjeli zašto je sigurnost toliko specifična, moramo znati šta se zapravo događa unutar aparata. Magnetska rezonancija ne „fotografiše" tijelo kao rendgen, on detektuje magnetski odjek protona vodonika [3]. Tri ključne komponente su:

**1. Statičko magnetsko polje ($B_0$)** – ogroman, stalno uključen magnet. On djeluje na atome vodonika u našem tijelu (najviše ih ima u vodi i mastima). Bez polja, protoni su nasumično orijentisani. Kada uđemo u magnet, većina protona se postroji paralelno s poljem – poput igle kompasa prema sjeveru. Što je polje jače (1, 5 T, 3 T, 7 T), to je postrojavanje snažnije i signal je bolji – ali su i opasnosti veće [3, 4].

**2. Radiofrekventni impuls (RF)** – kratki, pažljivo podešeni radio talasi koji se šalju kroz tijelo. On „gurne" protone iz ravnoteže – oni su više okrenuti ka strani. Kada se RF isključi, protoni se vraćaju u prvobitno postrojavanje i pri tom otpuštaju signal koji aparat hvata. Upravo taj proces stvara sliku. Zagrijavanje tkiva (SAR – specifična stopa apsorpcije) nastaje upravo zbog RF energije – dio te energije se pretvara u toplotu [3, 5].

**3. Gradijentna polja** – dodatna, slabija magnetska polja koja se brzo uključuju i isključuju. Njihov zadatak je da označe poziciju – omoguće da znamo iz kojeg dijela tijela dolazi signal. Gradijenti proizvode glasnu buku (do preko 100 dB) jer se zavojnice tresu pod djelovanjem magnetskih sila (Lorenc-ove sile), a mogu stimulisati i nerve (osjećaj trnjenja ili trzaj mišića – periferna nervna stimulacija) [3, 6].

Magnetska rezonancija ne može raditi bez magneta. Zato je magnet uvijek aktivan, čak i kada se ne snima. To je ključna činjenica za sigurnost.

**Upoređivanje MRI i CT – prednosti i nedostaci**

Kompjuterizovana tomografija (CT) koristi rendgensko zračenje – jonizujuće zračenje koje

the magnetic response of hydrogen protons [3]. Three key components are involved:

**1. Static Magnetic Field ($B_0$)**

This is a very strong, continuously active magnet. It affects hydrogen atoms in the human body (which are most abundant in water and fat). In the absence of a magnetic field, protons are randomly oriented. When a person enters the MRI scanner, most protons align parallel to the field—similar to a compass needle pointing north. The stronger the magnetic field (1.5 T, 3 T, 7 T), the stronger the alignment and the better the signal quality, but also the higher the associated risks [3,4].

**2. Radiofrequency (RF) Pulse**

These are short, precisely controlled radio waves transmitted into the body. They temporarily disturb the alignment of protons, moving them away from equilibrium. When the RF pulse is turned off, protons return to their original alignment and release energy, which is detected by the scanner and used to create images. Tissue heating (SAR – Specific Absorption Rate) occurs because part of the RF energy is converted into heat [3,5].

**3. Gradient Fields**

These are additional, weaker magnetic fields that are rapidly switched on and off. Their role is spatial encoding determining where the signal originates within the body. Gradient switching produces loud acoustic noise (often exceeding 100 dB) due to vibration of the coils under Lorentz forces. They can also stimulate peripheral nerves, causing tingling sensations or muscle twitching (peripheral nerve stimulation) [3, 6]. MRI cannot function without its main magnet. Therefore, the magnet remains active at all times, even when scanning is not in progress. This is a fundamental safety consideration.

**Comparison of MRI and CT – Advantages and Disadvantages**

Computed tomography (CT) uses X-rays, a form of ionizing radiation that can damage DNA, although the risk from a single examination is generally low. MRI does not involve ionizing radiation, but it has other limitations. Table 1 summarizes the main differences [7].

može oštetiti DNK, iako je rizik po jednom pregledu mali. Magnetska rezonancija nema tog rizika, ali ima druga ograničenja. Tabela 1 sažima glavne razlike [7].

***Tabela 1. Poređenje MRI i CT***

| Karakteristika | MRI | CT |
|---|---|---|
| **Fizički princip** | Magnetska rezonanca | Rendgensko zračenje (jonizujuće) |
| **Jonizujuće zračenje** | Nema | Ima (mali, ali kumulativni rizik) |
| **Prikaz mekih tkiva** | Odličan – mozak, mišići, ligamenti, tumor | Slab – meka tkiva se slabo razlikuju |
| **Prikaz kostiju** | Slab (tamne su na snimku) | Odličan – detaljna anatomija |
| **Prikaz pluća** | Vrlo težak (malo vodonika) | Odličan – standard za plućne bolesti |
| **Brzina pregleda** | Spor (20–60 minuta) | Brz (nekoliko sekundi do minut) |
| **Buka** | Veoma glasna (90–120 dB) | Tiha (osim rotacije) |
| **Klaustrofobija** | Česta (uski tunel) | Rijetka (otvoreni prsten) |
| **Metal i implantati** | Stroga ograničenja (mogu biti opasni) | Uglavnom bezbedni (samo artefakti) |
| **Cijena i dostupnost** | Skupo, manje dostupno | Jeftinije, široko dostupno |
| **Hitna stanja (trauma)** | Nije praktično (sporo, metal) | Prvi izbor – brzi pregled cijelog tijela |

*Napomena: MRI = magnetska rezonancija; CT = kompjuterizovana tomografija*

## Prednosti MRI u odnosu na CT

· Bez zračenja – može se ponavljati bez straha od kumulativnog oštećenja (npr. praćenje multiple skleroze, djece) [7].

· Superioran prikaz mekih tkiva – razlikuje tumor od edema, sivu i bijelu masu, mijelinizaciju [3].

· Više kontrastnih mehanizama – T1, T2, difuzija, perfuzija, funkcionalni MRI (fMRI) daju podatke o funkciji tkiva, ne samo anatomiji.

· Nema kalcifikacijskih artefakata – bolji za zadnju lobanjsku jamu i moždano stablo.

## Nedostaci MRI u odnosu na CT

***Table 1. Comparison of MRI and CT***

| Characteristic | MRI | CT |
|---|---|---|
| **Physical principle** | Magnetic resonance | X-ray radiation (ionizing) |
| **Ionizing radiation** | None | Present (low but cumulative risk) |
| **Soft tissue visualization** | Excellent – brain, muscles, ligaments, tumors | Poor – low soft tissue contrast |
| **Bone imaging** | Poor (bones appear dark) | Excellent – detailed bone anatomy |
| **Lung imaging** | Very difficult (low hydrogen content) | Excellent – standard for pulmonary diseases |
| **Examination speed** | Slow (20–60 minutes) | Fast (a few seconds to minutes) |
| **Noise** | Very loud (90–120 dB) | Quiet (except gantry rotation) |
| **Claustrophobia** | Common (narrow tunnel) | Rare (open ring design) |
| **Metal and implants** | Strict limitations (may be dangerous) | Generally safe (mostly artifacts) |
| **Cost and availability** | Expensive, less available | Cheaper, widely available |
| **Emergency situations (trauma)** | Not practical (slow, metal sensitivity) | First choice – rapid whole-body assessment |

**Note:** MRI = Magnetic Resonance Imaging; CT = Computed Tomography.

## Advantages of MRI Compared to CT

- No ionizing radiation – MRI can be repeated safely without cumulative radiation risk (e.g., in follow-up of multiple sclerosis or pediatric patients) [7].
- Superior soft tissue contrast – allows clear differentiation between tumor and edema, gray and white matter, and visualization of myelination patterns [3].
- Multiple contrast mechanisms – T1, T2, diffusion, perfusion, and functional MRI (fMRI) provide not only anatomical but also functional information about tissues.
- No calcification artifacts – better visualization of the posterior cranial fossa and brainstem structures.

## Disadvantages of MRI Compared to CT

- Long examination time – requires patient immobility, which is challenging for children, elderly patients, and those in pain.

· Dugačak pregled – zahtijeva nepomičnost, teško za djecu, starije, bolesnike s bolom.
· Kontraindikacije – pejsmejker, klipse, fragmenti – značajan broj pacijenata ne može na MRI [8, 9].
· Klaustrofobija – do 15% pacijenata ne završi pregled bez sedacije.
· Cijena i nedostupnost – CT je brz, jeftin i prisutan u gotovo svakoj bolnici.
· Loš prikaz kostiju i pluća – za frakture i pneumoniju CT je daleko bolji.

**Klinički primjeri – šta odabrati?**
· Sumnja na plućnu emboliju → CT (brzo, vidi plućne arterije)
· Sumnja na tumor mozga → MRI (odličan prikaz mekog tkiva)
· Trauma s višestrukim prijelomima → CT (brzo, cijelo tijelo)
· Bol u koljenu, sum na oštećenje meniskusa → MRI (vidi hrskavicu, ligamente)
· Akutni moždani udar → CT prvo (da se isključi krvarenje), zatim MRI za procjenu zone infarkta.

**Najveća opasnost – magnetsko polje i projektilni efekat**
Magnetsko polje kliničkih skenera najčešće iznosi 1, 5 T ili 3 T, dok je Zemljino polje svega 0,00005T. Dakle, MRI magnet je desetinama hiljada puta jači. On je stalno aktivan, čak i kada se ne snima [1, 2]. Zato je najpoznatija i najdramatičnija opasnost projektilni efekat: feromagnetski predmet (makaze, boca s kisikom, invalidska kolica, ključevi, infuzione pumpe, telefoni, čak i makaze za zavoje) može naglo poletjeti prema magnetu ogromnom silom, uzrokovati teške povrede ili smrt i oštetiti aparat [3]. Zbog toga je cijela MRI zona strogo kontrolisana. Postoje četiri sigurnosne zone (prema standardu American College of Radiology) [1, 2]:
· Zona I – javni prostor (čekaonice, hodnici).
· Zona II – prijem pacijenata, mjesto gdje se obavlja početni screening.

- Contraindications – pacemakers, aneurysm clips, and metallic fragments exclude a significant number of patients from MRI examination [8,9].
- Claustrophobia – up to 15% of patients cannot complete the scan without sedation.
- Cost and availability – CT is faster, cheaper, and more widely available in most hospitals.
- Poor bone and lung imaging – CT is significantly superior for fractures and pulmonary conditions.

**Clinical Examples – What to Choose?**
- Suspected pulmonary embolism → CT (fast, excellent visualization of pulmonary arteries)
- Suspected brain tumor → MRI (superior soft tissue contrast)
- Major trauma with multiple fractures → CT (rapid whole-body assessment)
- Knee pain with suspected meniscal injury → MRI (excellent for cartilage and ligaments)
- Acute stroke → CT first (to exclude hemorrhage), followed by MRI for detailed infarct evaluation.

**The Greatest Hazard – Magnetic Field and Projectile Effect**
The magnetic field strength in clinical scanners is typically 1.5 T or 3 T, whereas the Earth's magnetic field is approximately 0.00005 T. This means that MRI systems are tens of thousands of times stronger. Importantly, the magnet is always active, even when imaging is not being performed [1,2]. The most well-known and dramatic hazard is the projectile effect: ferromagnetic objects (such as scissors, oxygen cylinders, wheelchairs, keys, infusion pumps, mobile phones, and even bandage scissors) can be violently pulled toward the magnet with extreme force, potentially causing severe injury, death, and equipment damage [3]. For this reason, the entire MRI environment is strictly controlled. According to the standard zoning system of the American College of Radiology, the MRI suite is divided into four safety zones:
- Zone I – Public area (waiting rooms, corridors)
- Zone II – Patient reception and initial screening area

·Zona III – kontrolisana zona. Pristup samo obučenom osoblju. Ovdje počinje stroga kontrola feromagnetskih predmeta.
· Zona IV – sama MRI sala s magnetom. Neprovjeren predmet ne smije ući.
Pacijent se iz Zone II vodi u Zonu III i IV samo nakon što je potpuno provjeren. Screening pacijenta jeste najvažnija sigurnosna procedura. Prije svakog pregleda pacijent (ili njegov zakonski zastupnik) mora ispuniti detaljan upitnik. Medicinska sestra ili tehničar provjeravaju [1, 5, 10]:
· Pejsmejker ili ICD (implantabilni kardioverter-defibrilator)
· Aneurizmatske klipse u mozgu
· Kohlearni implantat
· Neurostimulator (npr. za Parkinsonovu bolest, hronični bol)
· Metalni fragmenti u oku ili drugim dijelovima tijela (posebno od starih ratnih povreda ili industrijskih nesreća)
· Stentovi, filteri za krvne sudove [10]
· Ortopedski implantati (proteze, vijci, pločice)
· Insulinska pumpa ili senzor za kontinuirano mjerenje glukoze
· Trudnoća (prvo tromjesečje – relativna kontraindikacija).
Nikada se ne smije pretpostavljati. Ako dokumentacija o implantatu ne postoji ili je nepotpuna, pregled se odlaže dok se ne dobiju tačne informacije od proizvođača ili hirurga [3].
Implantati – detaljna procjena po jačinama polja. Ponašanje implantata ovisi o materijalu, obliku, položaju i jačini magnetskog polja. Postoje tri kategorije [10, 11]:
· MR Safe – potpuno bezbjedan u svim MRI okruženjima (npr. titanijske proteze, keramika, plastika).
·MR Conditional – bezbjedan samo pod određenim uslovima (npr. maksimalna jačina polja, maksimalni SAR, specifične sekvence).
· MR Unsafe – nikako ne smije u MRI. Tabela 2 jasno prikazuje sigurnost implantata [8, 9, 10, 11, 12].

- Zone III – Controlled access area; only trained personnel allowed. Strict ferromagnetic control begins here.
- Zone IV – MRI scanner room; no unverified objects are permitted.

Patients are transferred from Zone II to Zones III and IV only after complete screening. Patient screening is the most critical safety procedure. Before every scan, the patient (or legal guardian) must complete a detailed questionnaire. Nurses or radiology technologists verify [1, 5,10]:
- Pacemaker or ICD (implantable cardioverter-defibrillator)
- Aneurysm clips in the brain
- Cochlear implants
- Neurostimulators (e.g., for Parkinson's disease or chronic pain)
- Metallic fragments in the eyes or body (especially from old war injuries or industrial accidents)
- Vascular stents and filters [10]
- Orthopedic implants (prostheses, screws, plates)
- Insulin pumps or continuous glucose monitoring systems
- Pregnancy (first trimester – relative contraindication).

Assumptions must never be made. If documentation regarding an implant is missing or incomplete, the examination must be postponed until accurate information is obtained from the manufacturer or surgeon [3].

**Implant Safety – Evaluation by Field Strength**

Implant behavior depends on material, shape, position, and magnetic field strength. According to standardized classification systems developed by organizations such as American Society for Testing and Materials (ASTM International), implants are categorized into three groups:
- MR Safe – completely safe in all MRI environments (e.g., titanium prostheses, ceramics, plastics)
- MR Conditional – safe only under specific conditions (e.g., field strength limits, SAR limits, specific imaging protocols)
- MR Unsafe – must never enter the MRI environment.

*Tabela 2. Sigurnost implantata na 1,5 T, 3 T i 7 T*

| Tip implantata | 1,5 T | 3 T | 7 T | Ključni rizik i napomena |
|---|---|---|---|---|
| **Srčani pejsmejker / ICD** | **Conditional** | **Conditional** | **Unsafe** | Kvar, neovlaštena stimulacija, zagrijavanje elektroda [5, 6]. |
| **Neurostimulator** | **Conditional** | **Conditional** | **Unsafe** | Isto kao pejsmejker. |
| **Kohlearni implant** | **Conditional** | **Conditional** | **Unsafe** | Rizik od dislokacije magneta; noviji modeli do 3 T uz zavoj [12]. |
| **Aneurizmatska klipsa** | **Safe / Conditional** | **Safe / Conditional** | **Unsafe** | Ako nije poznat model – apsolutna kontraindikacija [8]. |
| **Ortopedska proteza** | **Safe** | **Safe** | **Nije testirano** | Minimalan rizik (titanijum); artefakti. |
| **Dentalni implantati** | **Safe** | **Safe** | **Povećan rizik** | Većina titanijumska – sigurna. |
| **Intraokularno strano tijelo** | **Unsafe** | **Unsafe** | **Unsafe** | Apsolutna kontraindikacija! |
| **Stentovi** | **Safe*** | **Safe*** | **Nije standardizovano** | Nakon endotelizacije su sigurni [8]. *Nakon 6–8 sedmica. |
| **Insulinska pumpa / CGM** | **Unsafe** | **Unsafe** | **Unsafe** | Moraju se ukloniti prije ulaska u MRI salu. |

**Legenda: Safe** = MR siguran | **Conditional** = MR kondicionalan | **Unsafe** = MR nesiguran

*Napomena: Za svaki implantat neophodna je provjera tačnog modela i konzultacija baze podataka (npr. mrisafety.com) prije snimanja.*

Postupak sa implantatom:

1. Identifikovati tačan model i proizvođača.
2. Konsultovati dokumentaciju ili on-line bazu podataka
3. Provjeriti uslove: maksimalno polje (T), maksimalni SAR, dozvoljene sekvence.

Table 2 provides a detailed overview of implant safety across different magnetic field strengths [8,9,10,11,12].

***Table 2. Safety of Implants at 1.5 T, 3 T, and 7 T MRI Systems***

| Implant Type | 1.5 T | 3 T | 7 T | Key Risk and Remarks |
|---|---|---|---|---|
| **Cardiac pacemaker / ICD** | Conditional | Conditional | Unsafe | Device malfunction, unintended stimulation, lead heating [5,6]. |
| **Neurostimulator** | Conditional | Conditional | Unsafe | Similar risks as pacemakers. |
| **Cochlear implant** | Conditional | Conditional | Unsafe | Risk of magnet displacement; newer models may be scanned up to 3 T with appropriate head bandaging [12]. |
| **Aneurysm clip** | Safe / Conditional | Safe / Conditional | Unsafe | If the exact model is unknown, MRI is absolutely contraindicated [8]. |
| **Orthopedic prosthesis** | Safe | Safe | Not tested | Minimal risk (titanium); image artifacts may occur. |
| **Dental implants** | Safe | Safe | Increased risk | Most are made of titanium and are generally considered safe. |
| **Intraocular foreign body** | Unsafe | Unsafe | Unsafe | Absolute contraindication. |
| **Stents** | Safe* | Safe* | Not standardized | Considered safe after endothelialization [8]. *After 6–8 weeks. |
| **Insulin pump / CGM** | Unsafe | Unsafe | Unsafe | Must be removed before entering the MRI suite. |

Safe = MR Safe | Conditional = MR Conditional | Unsafe = MR Unsafe; **Note:** For every implant, verification of the exact model and consultation of a dedicated

4. Ako bilo koji uslov nije ispunjen ili nije poznat – ne skenirati [3, 11].

**Opasnost od zagrijavanja i opekotina**

Radiofrekventna energija (RF) tokom snimanja zagrijava tkivo. Što je polje jače, veća je i apsorbovana energija (SAR). Opekotine su jedna od češćih komplikacija. Posebno rizično [5]:

· Kablovi i elektrode koji formiraju petlju (indukcija struje)

· Metalni dijelovi odjeće (patentni zatvarači, dugmad, ukrasi)

· Mokra koža (znoj, urin) – smanjuje otpor i povećava zagrijavanje

· Kontakt kože s kožom (npr. butine, podlaktice)

· Tetovaže i trajna šminka – pigmenti mogu sadržavati metalne okside

Prevencija:

· Ukloniti svu metalnu odjeću i nakit.

· Postaviti kablove ravno, bez petlji, i odvojiti ih od kože.

· Koristiti izolacijske jastučiće između dijelova tijela.

· Pratiti SAR vrijednosti na konzoli i ne prelaziti propisane granice [5].

**Buka i zaštita sluha**

Gradijentna polja proizvode glasne zvuke zbog brzog uključivanja i isključivanja (Lorencove sile tresu zavojnice). Nivo buke može biti [3, 6]:

· 1, 5 T: do 110 dB

· 3 T: do 120 dB

· 7 T: i preko 120 dB

Ove vrijednosti su iznad praga bola i mogu izazvati trajno oštećenje sluha. Obavezna zaštita: pacijent i osoblje koje ulazi u Zonu IV moraju koristiti čepiće ili zaštitne slušalice. Kod malih pacijenata i novorođenčadi dodatno se postavljaju duple zaštite [3].

**Klaustrofobija i psihološka sigurnost**

Uski tunel, buka, dugotrajno nepokretno ležanje i osjećaj gušenja izazivaju anksioznost i paniku kod značajnog broja pacijenata. Osoblje treba [5]:

MRI safety database (e.g., MRIsafety.com) are essential before imaging is performed

**Procedure for Managing Patients with Implants**

1. Identify the exact implant model and manufacturer.
2. Consult the manufacturer's documentation or an online MRI safety database.
3. Verify the required conditions: maximum field strength (T), maximum SAR, and permitted imaging sequences.
4. If any condition is not met or cannot be confirmed, the patient must not be scanned [3,11].

**Heating Hazards and Burns**

Radiofrequency (RF) energy used during MRI examinations can cause tissue heating. The stronger the magnetic field, the greater the absorbed energy (SAR). Burns are among the most common MRI-related complications. Particularly high-risk situations include [5]:

- Cables and electrodes forming loops (current induction)
- Metallic components in clothing (zippers, buttons, decorative elements)
- Wet skin (sweat, urine), which reduces resistance and increases heating
- Skin-to-skin contact (e.g., between thighs or forearms)
- Tattoos and permanent makeup, as pigments may contain metallic oxides.

**Prevention:**

- Remove all metallic clothing, jewelry, and accessories.
- Position cables straight, without loops, and keep them away from direct skin contact.
- Use insulating pads between body parts that may touch.
- Monitor SAR values on the scanner console and ensure recommended limits are not exceeded [5].

**Acoustic Noise and Hearing Protection**

Gradient magnetic fields generate loud sounds due to rapid switching on and off, causing coil vibration through Lorentz forces. Noise levels may reach [3,6]:

- 1.5 T: up to 110 dB
- 3 T: up to 120 dB

· Prije pregleda detaljno objasniti šta će se dešavati.
· Održavati glasovni kontakt tokom snimanja.
· Dati pacijentu signalnu kuglu (panic ball) da može prekinuti pregled.
· Procijeniti potrebu za laganom sedacijom ili anestezijom kod visoko anksioznih pacijenata, djece ili pacijenata s kognitivnim smetnjama.

**Kontrastna sredstva – gadolinij**

MRI kontrastna sredstva na bazi gadolinija (npr. gadobutrol, gadopentetat) poboljšavaju vidljivost tumora, upala i vaskularnih lezija. Rizici [7]:
· Alergijske reakcije (osip, mučnina, rijetko anafilaksija)
· Nefrogena sistemska fibroza – teška, ponekad fatalna bolest koju dobijaju bolesnici s teškom bubrežnom insuficijencijom. Zato se prije kontrasta mora provjeriti kreatinin i procijeniti eGFR. Posebno oprezni kod dijabetičara, starijih i hroničnih bubrežnih bolesnika.
· Dugoročna retencija gadolinija u mozgu i kostima – klinički značaj još nije u potpunosti razjašnjen, ali se preporučuje upotreba samo kada je klinički indicirano [7].

Posebnosti prema jačini polja: 1, 5 T, 3 T i 7 T.

a. 1,5 Tesla – standardni nivo rizika

Najčešći skener u kliničkoj praksi. Sigurnosni protokoli su dobro poznati, većina implantata testirana je upravo na 1, 5 T. Projektilni efekat postoji, ali je predvidljiv. Zagrijavanje se kontroliše standardnim SAR granicama. Buka do 110 dB. Iako se čini „najbezbednijim“, i dalje je neophodan temeljan screening [1, 3].

b. 3 Tesla – značajno povećani rizici

Na 3 T magnetska sila je četiri puta veća nego na 1, 5 T. Male feromagnetske čestice ili predmeti postaju opasni projektil. SAR može biti dva do četiri puta veći za iste sekvence – veći rizik od opekotina. Mnogi implantati koji su kondicionalni na 1, 5 T nisu odobreni za 3 T; oni koji jesu često zahtijevaju strože uvjete (kraće sekvence, niži SAR). Periferna nervna stimulacija javlja se češće [3, 5]. Buka prelazi

- 7 T: more than 120 dB.

These levels exceed the threshold of pain and may result in permanent hearing damage. Therefore, hearing protection is mandatory. Patients and any personnel entering Zone IV must wear earplugs or protective headphones. For pediatric patients and neonates, double hearing protection is recommended [3].

**Claustrophobia and Psychological Safety**

The narrow tunnel, loud noise, prolonged immobility, and sensation of confinement may provoke anxiety and panic in a considerable number of patients. Healthcare personnel should [5]:

- Provide a detailed explanation of the procedure before the examination.
- Maintain verbal communication with the patient throughout the scan.
- Provide the patient with an emergency call device (panic ball) to stop the examination if necessary.
- Assess the need for mild sedation or anesthesia in highly anxious patients, children, or individuals with cognitive impairment.

**Contrast Agents – Gadolinium**

Gadolinium-based contrast agents (e.g., gadobutrol, gadopentetate) enhance the visualization of tumors, inflammatory processes, and vascular lesions. Potential risks include [7]:

- Allergic reactions (rash, nausea, and, rarely, anaphylaxis)
- Nephrogenic Systemic Fibrosis (NSF) – a severe and sometimes fatal condition occurring in patients with advanced renal insufficiency. Therefore, serum creatinine levels and estimated glomerular filtration rate (eGFR) should be assessed before contrast administration. Particular caution is required in diabetic patients, older adults, and individuals with chronic kidney disease.
- Long-term gadolinium retention in the brain and bones. Although its clinical significance remains unclear, gadolinium should be used only when clinically indicated [7].

115 dB. Trudnoća se na 3 T ne preporučuje rutinski – ako postoji izbor, 1, 5 T je poželjniji. Osoblje na 3 T mora dodatno provjeravati: tetovaže, trajnu šminku, kablove i elektrode, te dvostruko osigurati da nema neprovjerenog metala.

c. 7 Tesla – ultravisiona polja, nova sigurnosna paradigma

Skeneri od 7 T još su uglavnom istraživački, rijetko klinički. Magnetska sila je oko 20 puta veća nego na 1, 5 T. Projektilni efekat je ekstreman – čak i nemagnetni metali mogu pokazivati interakciju. Pri kretanju kroz polje (ulazak ili izlazak) pacijenti i osoblje mogu osjetiti vrtoglavicu, mučninu i magnetofosfene – bljeskove svjetlosti izazvane stimulacijom retine [4, 6]. Zagrijavanje tkiva dostiže kritične nivoe; mnoge sekvence nisu dozvoljene. Gotovo nijedan implantat nije kondicionalan za 7 T – pejsmejkeri, klipse, stentovi, pa čak i titanijumske proteze predstavljaju apsolutnu kontraindikaciju [4, 10]. Trudne osobe (pacijentice ili osoblje) ne smiju ulaziti u Zonu IV. Osoblje mora proći specijalnu obuku, a radnici s implantatima nemaju pristup. Tabela 3 prikazuje jasno poređenje rizika po jačini polja [3, 4, 6].

***Tabela 3. Poređenje rizika po jačini polja***

| Rizik | 1,5 T | 3 T | 7 T |
|---|---|---|---|
| **Projektilna sila (relativno)** | 1× | ~4× | ~20× |
| **SAR / rizik od opekotina** | Nizak | Umjeren do visok | Vrlo visok |
| **Implantati** | Dobro testirani | Djelimično testirani | Skoro nikako testirani |
| **Periferna nervna stimulacija** | Rijetka | Povremena | Česta |
| **Magnetofosfeni** | Ne | Rijetko | Često (pri kretanju) |
| **Buka** | Do 110 dB | Do 120 dB | >120 dB |
| **Klinička upotreba** | Standardna | Široka | Istraživačka |
| **Edukacija osoblja** | Standardna | Proširena | Specijalna |

*Napomena: SAR = specifična stopa apsorpcije; podaci su relativni i okvirni; stvarni rizici ovise o specifičnom protokolu i opremi.*

**MRI Safety According to Magnetic Field Strength: 1.5 T, 3 T, and 7 T**

a. 1.5 Tesla – Standard Risk Level

The 1.5 T scanner is the most commonly used MRI system in clinical practice. Safety protocols are well established, and most implants have been tested at this field strength. Although the projectile effect remains a concern, it is generally predictable. Tissue heating can be controlled using standard SAR limits, and noise levels may reach up to 110 dB. Despite being considered the "safest" MRI field strength, thorough patient screening remains essential [1,3].

b. 3 Tesla – Significantly Increased Risks

At 3 T, magnetic forces are substantially greater than at 1.5 T. Even small ferromagnetic particles or objects can become dangerous projectiles. SAR may be two to four times higher for identical imaging sequences, increasing the risk of burns. Many implants classified as MR Conditional at 1.5 T are not approved for use at 3 T; those that are approved often require stricter conditions, including lower SAR limits and shorter imaging sequences. Peripheral nerve stimulation also occurs more frequently [3, 5]. Noise levels commonly exceed 115 dB. Routine MRI during pregnancy at 3 T is generally not recommended when a 1.5 T alternative is available. Personnel working with 3 T systems should pay particular attention to:

- Tattoos and permanent makeup
- Cables and electrodes
- Verification that no unapproved metallic objects enter the MRI environment.

c. 7 Tesla – Ultra-High Field MRI and a New Safety Paradigm

Seven-Tesla MRI systems remain primarily research tools, with limited clinical use. Magnetic forces are dramatically higher than those encountered at 1.5 T. The projectile effect becomes extremely powerful, and even some non-ferromagnetic metals may exhibit interactions with the magnetic field. During movement into or out of the magnetic field, patients and personnel may experience dizziness, nausea, and magnetophosphenes (flashes of light caused by retinal stimulation) [4,6]. Tissue heating can reach critical levels, and many imaging sequences are restricted. Very few implants have been approved for use at 7 T,

**Sigurnost osoblja**

Osoblje koje radi u MRI mora biti [1, 2, 5]:

· Edukovano – poznavati fizikalne osnove, zone, procedure u hitnim stanjima.

· Redovno obučavano – najmanje jednom godišnje simulacije incidenata (projektil, quench, kardiopulmonalna reanimacija u zoni IV).

· Upoznato sa sopstvenim implantatima – član osoblja s pejsmejkerom, klipsom ili kohlearnim implantom ne smije ulaziti u Zonu III i IV.

· Trudne radnice – mogu raditi u zoni II i III uz oprez, ali ne smiju biti u zoni IV tokom snimanja (posebno na 3 T i 7 T). Nema dokazanog rizika od polja na fetus, ali se primjenjuje princip opreza [5].

MRI kompatibilna oprema – u Zonu IV smije samo oprema koja je izričito označena kao MR Safe ili MR Conditional za tu jačinu polja. Obična kolica, infuzione pumpe, ventilatori, boce s kiseonikom – mogu poletjeti prema magnetu ili prestati raditi [1].

**Hitna stanja u MRI**

Ako pacijent kolabira, dobije aritmiju, prestane disati – najvažnije pravilo glasi: ne unositi standardnu reanimacionu opremu u MRI salu. Standardni defibrilator, kolica, boce s kiseonikom su feromagnetni. Postupak [1, 3]:

1. Odmah izvući pacijenta iz Zone IV (magnetske sale) u Zonu III ili van prostora.
2. Tek onda započeti kardiopulmonalnu reanimaciju i koristiti defibrilator.
3. Pozvati hitnu pomoć.

**Quench – hitno gašenje magneta**

Quench se pokreće isključivo u slučajevima ozbiljne opasnosti (npr. kada je osoba priklještena ili postoji neposredna životna ugroženost). Tokom quench-a tečni helijum naglo isparava, magnet gubi svoju supraprovodljivost, a magnetno polje se urušava. Potencijalne opasnosti uključuju:

- gušenje usled istiskivanja kiseonika gasovitim helijumom,

and many devices considered safe or conditional at lower field strengths require individual evaluation before scanning [4,10]. Pregnant patients and pregnant staff members should not enter Zone IV. Personnel working with 7 T systems require specialized training, and staff members with implants are generally restricted from entering the ultra-high-field MRI environment. Table 3 presents a detailed comparison of risks associated with different MRI field strengths [3,4,6].

***Table 3. Comparison of Risks According to MRI Field Strength***

| Risk Factor | 1.5 T | 3 T | 7 T |
|---|---|---|---|
| **Projectile force (relative)** | 1× | ~4× | ~20× |
| **SAR / burn risk** | Low | Moderate to high | Very high |
| **Implant compatibility** | Well tested | Partially tested | Rarely tested |
| **Peripheral nerve stimulation** | Rare | Occasional | Frequent |
| **Magnetophosphenes** | No | Rare | Common (during movement) |
| **Noise level** | Up to 110 Db | Up to 120 dB | >120 Db |
| **Clinical use** | Standard | Widespread | Primarily research |
| **Staff training requirements** | Standard | Advanced | Specialized |

**Note:** SAR = Specific Absorption Rate. The values presented are approximate and relative; actual risks depend on the specific MRI protocol, scanner design, and equipment used.

## Staff Safety

Personnel working in MRI environments must be [1,2,5]:

- Educated – with a thorough understanding of MRI physics, safety zones, and emergency procedures.
- Regularly trained – including at least annual simulation exercises covering incidents such as projectile accidents, quench events, and cardiopulmonary resuscitation (CPR) in relation to Zone IV.
- Aware of their own implants – staff members with pacemakers, aneurysm clips, cochlear implants, or other potentially unsafe devices must not enter Zones III and IV.

- hladne povrede i promrzline (temperature niže od −250 °C),
- smanjenu vidljivost,
- paniku i dezorijentaciju.

Osoblje mora biti upoznato sa evakuacionim putevima, alarmnim sistemima i procedurama za vanredne situacije i ne sme ostati u prostoriji sa MR skenerom tokom događaja gašenja magneta (quench). Osoblje mora biti upoznato sa evakuacionim putevima, alarmnim sistemima i procedurama za postupanje u vanrednim situacijama i nikada ne sme ostati u prostoriji sa MR skenerom tokom događaja gašenja magneta (quench) [1].

**Prevencija i kontrola infekcija**

MR zavojnice (kalemovi), sto za pacijenta, slušalice i prateća oprema svakodnevno dolaze u kontakt sa velikim brojem pacijenata. Mere za prevenciju i kontrolu infekcija obuhvataju [5]:

- rutinsku dezinfekciju svih kontaktnih površina između pregleda pacijenata;
- upotrebu jednokratnih ili zaštitnih navlaka za MR zavojnice (kalemove), kada je to potrebno;
- primenu standardnih mera predostrožnosti, uključujući higijenu ruku i upotrebu zaštitnih rukavica.

**Edukacija – temelj bezbednosti u magnetnoj rezonanci**

Bezbednost u magnetnoj rezonanci zavisi manje od tehnologije, a mnogo više od ljudskog ponašanja. Možda je najopasnija izjava u odeljenju za magnetnu rezonancu: „Pretpostavljam da je bezbedno.“ Zbog toga su kontinuirana edukacija, simulacije vanrednih situacija, jasno definisani protokoli i efikasna timska komunikacija ključni elementi bezbednosti u magnetnoj rezonanci [2,3].

Svaki novi član osoblja treba da završi formalnu obuku iz bezbednosti u magnetnoj rezonanci pre nego što počne samostalno da radi, a godišnja obnova znanja kroz dodatnu obuku trebalo bi da bude obavezna.

- Pregnant employees – may work in Zones II and III with caution but should not remain in Zone IV during scanning, particularly in 3 T and 7 T environments. Although no proven harmful effects of MRI fields on the fetus have been demonstrated, the precautionary principle is applied [5].

Only equipment explicitly labeled as MR Safe or MR Conditional for the specific field strength may enter Zone IV. Standard wheelchairs, infusion pumps, ventilators, and oxygen cylinders may become dangerous projectiles or malfunction in the magnetic field [1].

**Emergency Situations in MRI**

If a patient collapses, develops a cardiac arrhythmia, or stops breathing, the most important rule is:

Never bring standard resuscitation equipment into the MRI scanner room.

Conventional defibrillators, emergency carts, and oxygen cylinders are often ferromagnetic and therefore hazardous in the MRI environment.

Emergency Procedure [1, 3]

1. Immediately remove the patient from Zone IV (the magnet room) to Zone III or another safe area.
2. Initiate cardiopulmonary resuscitation (CPR) and use a defibrillator only after the patient has been removed from the magnetic field.
3. Activate the emergency response system and summon emergency medical assistance.

**Quench – Emergency Magnet Shutdown**

A quench is initiated only in cases of severe danger (e.g., entrapment of a person or life-threatening emergency). During a quench, liquid helium rapidly evaporates, the magnet loses its superconductivity, and the magnetic field collapses. Potential hazards include:

- Asphyxiation due to oxygen displacement by helium gas
- Cold injuries and frostbite (temperatures below −250°C)
- Reduced visibility
- Panic and confusion.

Personnel must be familiar with evacuation routes, alarm systems, and emergency procedures and should

## ZAKLJUČAK

Magnetska rezonancija je izuzetno korisna, ali potencijalno veoma opasna tehnologija ako se ne poštuju sigurnosna pravila. Njene prednosti – odsustvo jonizujućeg zračenja i superioran prikaz mekih tkiva – dolaze po cijenu stroge kontrole magnetskog polja, RF energije i implantata. CT ostaje nezamjenjiv za brze preglede, kosti, pluća i traumu, dok MRI dominira u neurologiji, ortopediji i onkologiji mekih tkiva. Sigurnost podrazumijeva dobar screening svakog pacijenta, kontrolu pristupa kroz četiri zone, edukaciju cjelokupnog osoblja, pravilnu opremu (samo MRI kompatibilnu), stalni nadzor pacijenta tokom pregleda, pripremljenost za hitna stanja (reanimacija izvan sale, quench procedure). Većina nesreća u MRI može se spriječiti, ali samo ako se sigurnosna pravila poštuju bez izuzetka. Sigurnost nije dodatak dijagnostici – ona je centralni dio rada sa magnetskom rezonancom.

never remain inside the scanner room during a quench event [1].

### Infection Prevention and Control

MRI coils, patient tables, headphones, and accessories come into contact with numerous patients each day. Infection control measures include [5]:

- Routine disinfection of all contact surfaces between patients
- Use of disposable or protective covers for coils when appropriate
- Adherence to standard precautions, including hand hygiene and glove use.

### Education – The Foundation of MRI Safety

MRI safety depends less on technology than on human behavior. Perhaps the most dangerous statement in an MRI department is: *"I assume it is safe."* For this reason, continuous education, incident simulations, clearly defined protocols, and effective team communication are essential components of MRI safety [2,3]. Every new staff member should complete formal MRI safety training before working independently, and annual refresher training should be mandatory.

## CONCLUSION

Magnetic Resonance Imaging (MRI) is an extremely valuable diagnostic tool but can become potentially hazardous if safety regulations are not strictly followed. Its major advantages the absence of ionizing radiation and superior soft-tissue visualization come at the cost of rigorous control of magnetic fields, radiofrequency energy, and implant-related risks. Computed Tomography (CT) remains indispensable for rapid assessment, trauma imaging, bone evaluation, and pulmonary diagnostics, whereas MRI is the imaging modality of choice in neurology, musculoskeletal imaging, and soft-tissue oncology. MRI safety requires comprehensive patient screening, controlled access through the four MRI safety zones, continuous education of all personnel, the exclusive use of MRI-compatible equipment, ongoing patient monitoring throughout the examination, and preparedness for emergency situations, including resuscitation outside the scanner room and proper

management of quench events. Most MRI-related accidents are preventable, but only when safety procedures are followed without exception. Safety is not an addition to diagnostic imaging it is an integral and essential component of MRI practice.

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***Case report***

# PRIKAZ SLUČAJA PACIJENTA OBOLJELOG OD DEPRESIJE PO PROCESU ZDRAVSTVENE

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## APSTRAKT

Uvod. Depresija predstavlja jedan od najčešćih mentalnih poremećaja savremenog društva koji značajno utiče na psihičko, fizičko i socijalno funkcionisanje oboljelih osoba. Cilj ovog rada bio je prikaz pacijenta oboljelog od depresivnog poremećaja kroz proces zdravstvene njege, sa posebnim naglaskom na identifikaciju sestrinskih dijagnoza, planiranje i sprovođenje intervencija, te evaluaciju postignutih rezultata. Prikazan je slučaj pacijenta muškog pola, starosti 32 godine, hospitalizovanog na psihijatrijskom odjeljenju zbog simptoma depresije i anksioznosti, uključujući bezvoljnost, nesanicu, gubitak apetita i otežano svakodnevno funkcionisanje. Tokom hospitalizacije primijenjen je holistički pristup zdravstvenoj njezi, koji je obuhvatio kontinuirano praćenje psihičkog i fizičkog stanja pacijenta, uspostavljanje terapijskog odnosa, primjenu ordinirane terapije, edukaciju pacijenta i porodice, kao i mjere prevencije komplikacija, uključujući rizik od samoubistva i socijalne izolacije. Rezultati ukazuju na postepeno poboljšanje psihičkog stanja pacijenta, smanjenje anksioznosti i djelimičnu stabilizaciju raspoloženja tokom hospitalizacije. U zaključku se ističe značaj pravovremenog prepoznavanja simptoma depresije i ključna uloga medicinske sestre u pružanju kvalitetne, individualizovane i sveobuhvatne zdravstvene njege.

# CASE REPORT OF A PATIENT WITH DEPRESSION ACCORDING TO THE NURSING PROCESS

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## ABSTRACT

Introduction. Depression is one of the most common mental disorders in modern society and significantly affects the psychological, physical, and social functioning of affected individuals. The aim of this study was to present a patient with depressive disorder through the nursing process, with special emphasis on the identification of nursing diagnoses, planning and implementation of interventions, and evaluation of achieved outcomes. A case of a 32-year-old male patient hospitalized in a psychiatric ward due to symptoms of depression and anxiety is presented, including apathy, insomnia, loss of appetite, and impaired daily functioning. During hospitalization, a holistic nursing care approach was applied, which included continuous monitoring of the patient's psychological and physical condition, establishing a therapeutic relationship, administration of prescribed therapy, patient and family education, as well as preventive measures for complications, including the risk of suicide and social isolation. The results indicate a gradual improvement in the patient's psychological condition, reduction of anxiety, and partial stabilization of mood during hospitalization. In

**Ključne riječi:** depresija, zdravstvena njega, medicinska sestra, sestrinske intervencije, psihijatrijska njega.

## UVOD

Depresija predstavlja jedan od najčešćih mentalnih poremećaja današnjice i značajan je javnozdravstveni problem zbog sve veće učestalosti i posljedica koje ostavlja na fizičko, psihičko i socijalno funkcionisanje oboljelih osoba [1]. Karakteriše se dugotrajnim osjećajem tuge, gubitkom interesa za svakodnevne aktivnosti, smanjenom energijom, poremećajem sna i apetita, otežanom koncentracijom, kao i osjećajem bezvrijednosti i beznađa [2]. Osim što utiče na kvalitet života pacijenta, depresija značajno opterećuje porodicu, zdravstveni sistem i društvo u cjelini [3]. U savremenoj zdravstvenoj njezi medicinska sestra ima veoma važnu ulogu u prepoznavanju simptoma depresije, praćenju psihičkog stanja pacijenta i pružanju kontinuirane zdravstvene njege i podrške [4]. Zbog svakodnevnog kontakta sa pacijentima, medicinska sestra često prva uočava promjene u ponašanju, raspoloženju i socijalnom funkcionisanju oboljele osobe. Profesionalan odnos, empatija, razumijevanje i dobra komunikacija predstavljaju osnovu kvalitetne sestrinske njege kod osoba oboljelih od depresije [4, 5]. Etiologija depresije je multifaktorska i uključuje djelovanje bioloških, psiholoških i socijalnih faktora [1]. Među najčešće faktore rizika ubrajaju se genetska predispozicija, stresni životni događaji, hronične bolesti, socijalna izolacija i traumatska iskustva [2]. Zbog složenosti same bolesti, pristup liječenju zahtijeva multidisciplinarnu saradnju ljekara, psihologa, medicinskih sestara i drugih zdravstvenih radnika [4]. Uloga medicinske sestre u procesu liječenja depresivnih pacijenata obuhvata procjenu potreba pacijenta, planiranje i sprovođenje zdravstvene njege, praćenje efekata terapije, edukaciju pacijenta i porodice, kao i pružanje emocionalne podrške [3, 4]. Poseban značaj ima uspostavljanje terapijskog odnosa sa pacijentom, jer osjećaj povjerenja i sigurnosti može doprinijeti boljoj saradnji i uspješnijem liječenju. Pored toga, medicinska sestra učestvuje u prevenciji komplikacija depresije, uključujući rizik od

conclusion, the importance of timely recognition of depressive symptoms and the key role of nurses in providing high-quality, individualized, and comprehensive nursing care is emphasized.

**Keywords:** depression, nursing care, nurse, nursing interventions, psychiatric care.

## INTRODUCTION

Depression is one of the most common mental disorders today and represents a significant public health problem due to its increasing prevalence and the consequences it leaves on the physical, psychological, and social functioning of affected individuals [1]. It is characterized by persistent feelings of sadness, loss of interest in daily activities, reduced energy, sleep and appetite disturbances, impaired concentration, as well as feelings of worthlessness and hopelessness [2]. In addition to affecting the patient's quality of life, depression places a significant burden on families, the healthcare system, and society as a whole [3]. In modern nursing care, nurses play an important role in recognizing symptoms of depression, monitoring the patient's psychological state, and providing continuous care and support [4]. Due to daily contact with patients, nurses are often the first to notice changes in behavior, mood, and social functioning. A professional relationship, empathy, understanding, and good communication are the foundation of quality nursing care for patients with depression [4,5]. The etiology of depression is multifactorial and includes biological, psychological, and social factors [1]. The most common risk factors include genetic predisposition, stressful life events, chronic diseases, social isolation, and traumatic experiences [2]. Due to the complexity of the disease itself, treatment requires multidisciplinary cooperation between physicians, psychologists, nurses, and other healthcare professionals [4]. The role of nurses in the treatment process of patients with depression includes assessing patient needs, planning and implementing nursing care, monitoring treatment effects, educating patients and families, and providing emotional support [3,4]. Establishing a therapeutic relationship

samopovređivanja i suicida [5]. S obzirom na rastuću učestalost depresije i njen uticaj na svakodnevno funkcionisanje pojedinca, neophodno je kontinuirano unapređivati znanja i kompetencije medicinskih sestara u oblasti mentalnog zdravlja [6]. Pravovremeno prepoznavanje simptoma, adekvatna zdravstvena njega i individualizovan pristup pacijentu imaju značajnu ulogu u procesu oporavka i poboljšanja kvaliteta života oboljelih osoba. Cilj ovog rada je prikaz pacijenta oboljelog od depresije kroz proces zdravstvene njege, utvrđivanje njegovih potreba za njegom, kao i prikaz sestrinskih intervencija kod posmatranog pacijenta.

## PRIKAZ SLUČAJA

U ovom radu prikazan je klinički slučaj pacijenta muškog pola, starosti 32 godine, hospitalizovanog na psihijatrijskom odjeljenju Univerzitetske bolnice Foča zbog depresivne epizode „ nepsihotičnog tipa.” Pacijent je primljen zbog izraženih simptoma u vidu sniženog raspoloženja, gubitka interesovanja za svakodnevne aktivnosti, bezvoljnosti, nesanice, smanjenog apetita, anksioznosti i otežanog svakodnevnog funkcionisanja. Tokom prijema pacijent je bio svjestan, orijentisan u vremenu, prostoru i prema osobama. Uočen je psihomotorni nemir, izražena unutrašnja napetost i anksioznost, uz prisutnu emocionalnu labilnost. Vitalni parametri bili su uredni i u okviru fizioloških referentnih vrijednosti. U psihičkom statusu dominiralo je depresivno raspoloženje, usporen tok mišljenja, smanjena voljna aktivnost i oslabljena motivacija za svakodnevne aktivnosti. Iz anamneze se saznaje da su se simptomi razvijali postepeno, a značajno su se intenzivirali nakon stresnih životnih događaja i porodičnih gubitaka. Pacijent ranije nije bio psihijatrijski liječen niti hospitalizovan. Živi u porodičnoj zajednici sa članovima porodice i ima zadovoljavajuće socijalne i stambene uslove, međutim, navodi smanjeno interesovanje za društvene i rekreativne aktivnosti u posljednjem periodu. Tokom hospitalizacije primijenjen je proces zdravstvene njege usmjeren na holistički pristup pacijentu. Identifikovane su sestrinske dijagnoze koje su uključivale: poremećen ritam sna, anksioznost, umor, gubitak apetita,

is of particular importance, as feelings of trust and safety can improve cooperation and treatment outcomes. In addition, nurses participate in preventing complications of depression, including the risk of self-harm and suicide [5]. Given the increasing prevalence of depression and its impact on daily functioning, it is necessary to continuously improve the knowledge and competencies of nurses in the field of mental health [6]. Timely recognition of symptoms, adequate nursing care, and an individualized approach play an important role in recovery and improving the quality of life of affected individuals. The aim of this study is to present a patient with depression through the nursing process, determine his care needs, and present nursing interventions applied to the observed patient.

## CASE REPORT

This study presents a clinical case of a 32-year-old male patient hospitalized in the Psychiatric Department of the University Hospital Foča due to a non-psychotic depressive episode. The patient was admitted due to pronounced symptoms including low mood, loss of interest in daily activities, apathy, insomnia, reduced appetite, anxiety, and impaired daily functioning. Upon admission, the patient was conscious, oriented in time, place, and person. Psychomotor agitation, pronounced inner tension, and anxiety were observed, along with emotional lability. Vital signs were within normal physiological limits. The mental status examination revealed a dominant depressive mood, slowed thought process, reduced volitional activity, and decreased motivation for daily activities. From the history, it was found that symptoms developed gradually and significantly intensified after stressful life events and family losses. The patient had no previous psychiatric treatment or hospitalization. He lives in a family household with adequate social and housing conditions; however, he reported reduced interest in social and recreational activities in recent period. During hospitalization, a nursing process based on a holistic approach was applied. Identified nursing diagnoses included: disturbed sleep pattern, anxiety, fatigue, loss of appetite, reduced physical

smanjenu fizičku aktivnost, nedovoljnu informisanost o terapijskim i dijagnostičkim postupcima, kao i visok rizik za samoubistvo. Sestrinske intervencije bile su usmjerene na uspostavljanje terapijskog odnosa zasnovanog na povjerenju i empatiji, kontinuirano praćenje psihičkog i fizičkog stanja pacijenta, smanjenje anksioznosti kroz adekvatnu komunikaciju, edukaciju pacijenta i porodice, te obezbjeđivanje sigurnog i strukturisanog bolničkog okruženja. Poseban naglasak stavljen je na prevenciju suicidalnog ponašanja kroz pojačan nadzor i kontinuiranu procjenu rizika. Tokom boravka na odjeljenju zabilježen je postepen klinički napredak, izražen kroz smanjenje anksioznosti, poboljšanje saradnje sa pacijentom i djelimičnu stabilizaciju raspoloženja, uz poboljšanje svakodnevnog funkcionisanja.

activity, insufficient knowledge regarding therapeutic and diagnostic procedures, and high risk of suicide. Nursing interventions were focused on establishing a therapeutic relationship based on trust and empathy, continuous monitoring of the patient's psychological and physical condition, reducing anxiety through appropriate communication, educating the patient and family, and ensuring a safe and structured hospital environment. Special emphasis was placed on suicide prevention through increased supervision and continuous risk assessment. During hospitalization, gradual clinical improvement was observed, manifested through reduced anxiety, improved cooperation, and partial stabilization of mood, as well as improved daily functioning.

## DISKUSIJA

Depresija je veoma učestala bolest modernog doba i kao takva predstavlja značajan javnozdravstveni problem koji utiče na sve aspekte života oboljele osobe. Prema podacima Svjetske zdravstvene organizacije, depresivni poremećaji su u stalnom porastu, posebno u populaciji radno aktivne dobi, što je u skladu i sa prikazanim slučajem pacijenta starosti 32 godine [7,8]. U prikazanom slučaju dominirali su klasični simptomi depresivne epizode nepsihotičnog tipa, uključujući sniženo raspoloženje, anhedoniju, nesanicu, smanjen apetit, psihomotorne promjene i anksioznost. Ovi simptomi su u skladu sa dijagnostičkim kriterijumima DSM-5 klasifikacije, gdje se naglašava prisustvo najmanje pet simptoma u periodu dužem od dvije sedmice, uz značajno narušeno socijalno i profesionalno funkcionisanje [9]. Etiološki posmatrano, kod pacijenta su bili prisutni izraženi stresni životni događaji i porodični gubici, što potvrđuje biopsihosocijalni model depresije. Ovaj model ističe interakciju genetskih predispozicija, neurobioloških promjena i psihosocijalnih stresora u nastanku depresivnog poremećaja [10]. Slični nalazi opisani su u literaturi, gdje se stresni događaji navode kao značajan okidač za razvoj prvih epizoda depresije, posebno kod osoba bez prethodne psihijatrijske anamneze [11]. Uloga medicinske sestre u ovom slučaju bila je od ključnog značaja, naročito u ranom

## DISCUSSION

Depression is one of the leading causes of disability worldwide and a major public health problem affecting all aspects of an individual's life. According to the World Health Organization, depressive disorders are continuously increasing, especially in the working-age population, which is consistent with the presented case of a 32-year-old patient [7,8]. The presented case showed classical symptoms of a non-psychotic depressive episode, including low mood, anhedonia, insomnia, reduced appetite, psychomotor changes, and anxiety. These symptoms are consistent with DSM-5 diagnostic criteria, which require at least five symptoms persisting for more than two weeks, along with significant impairment in social and occupational functioning [9]. From an etiological perspective, the patient experienced significant stressful life events and family losses, supporting the biopsychosocial model of depression. This model emphasizes the interaction of genetic predisposition, neurobiological changes, and psychosocial stressors in the development of depressive disorders [10]. Similar findings in the literature identify stressful events as important triggers for the onset of depression, especially in individuals without previous psychiatric history [11]. The role of nurses in this case was crucial, particularly in early

prepoznavanju promjena u ponašanju, procjeni rizika i uspostavljanju terapijskog odnosa. Peplauina teorija interpersonalnih odnosa u sestrinstvu naglašava da je terapijska komunikacija osnovni alat u mentalno-zdravstvenoj njezi, što je potvrđeno i u ovom slučaju kroz poboljšanje saradnje i smanjenje anksioznosti pacijenta [12]. Posebno važan segment sestrinske intervencije odnosio se na procjenu i prevenciju suicidnog rizika. Literatura ukazuje da su suicidalne misli i ponašanja česta kod pacijenata sa teškim depresivnim epizodama, te da kontinuirani nadzor i strukturisana procjena rizika značajno smanjuju mogućnost suicidalnog ishoda [13]. U ovom slučaju primijenjene mjere pojačanog nadzora i sigurnog okruženja bile su u skladu sa savremenim smjernicama kliničke prakse [14]. Edukacija pacijenta i porodice predstavlja još jedan važan segment sestrinske njege. Povećanje informisanosti o bolesti, terapiji i očekivanom toku liječenja doprinosi boljoj adherenciji i smanjenju stigme, što je posebno značajno u mentalnom zdravlju [15]. U prikazanom slučaju, edukativne intervencije su doprinijele boljem razumijevanju stanja i aktivnijem učešću porodice u procesu oporavka. Tokom hospitalizacije zabilježeno je postepeno poboljšanje stanja pacijenta, što je u skladu sa literaturnim podacima koji ukazuju da kombinacija farmakoterapije, psihosocijalne podrške i kvalitetne sestrinske njege dovodi do značajnog kliničkog poboljšanja kod većine pacijenata sa depresijom [16, 17, 18]. Ipak, depresija se često karakteriše mogućnošću relapsa, što zahtijeva dugoročno praćenje i kontinuiranu podršku nakon otpusta iz bolnice. Uloga patronažne i zajedničke sestrinske njege u ovom kontekstu je od izuzetnog značaja [18, 19]. Sve navedeno potvrđuje da medicinske sestre imaju centralnu ulogu u holističkom pristupu pacijentima sa depresijom, posebno u segmentima emocionalne podrške, sigurnosti i kontinuirane procjene stanja. [18, 19, 20].

## ZAKLJUČAK

Prikazani slučaj pacijenta sa depresivnom epizodom nepsihotičnog tipa pokazuje kompleksnost ovog poremećaja i njegov značajan uticaj na psihičko, emocionalno i svakodnevno funkcionisanje oboljele

recognition of behavioral changes, risk assessment, and establishment of a therapeutic relationship. Peplau's theory of interpersonal relations in nursing emphasizes therapeutic communication as a fundamental tool in mental health nursing, which was confirmed in this case through improved cooperation and reduced anxiety [12]. A particularly important aspect of nursing intervention was the assessment and prevention of suicide risk. Literature shows that suicidal thoughts and behaviors are common in patients with severe depressive episodes, and continuous monitoring and structured risk assessment significantly reduce the risk of suicide [13]. In this case, increased supervision and a safe environment were implemented in accordance with current clinical guidelines [14]. Patient and family education is another important component of nursing care. Increasing knowledge about the illness, treatment, and expected course of recovery improves adherence and reduces stigma, which is especially important in mental health care [15]. In this case, educational interventions contributed to better understanding of the condition and greater family involvement in the recovery process. During hospitalization, gradual improvement was observed, which is consistent with literature indicating that a combination of pharmacotherapy, psychosocial support, and quality nursing care leads to significant clinical improvement in most patients with depression [16,17,18]. However, depression is often characterized by a risk of relapse, requiring long-term follow-up and continuous support after discharge. Community and home-based nursing care plays an important role in this context [18, 19]. All of the above confirms that nurses play a central role in the holistic approach to patients with depression, particularly in emotional support, safety, and continuous assessment of patient status [18,19,20].

## CONCLUSION

The presented case of a patient with a non-psychotic depressive episode demonstrates the complexity of this disorder and its significant impact on psychological, emotional, and daily functioning. Dominant symptoms of low mood, anxiety,

osobe. Dominantni simptomi sniženog raspoloženja, anksioznosti, nesanice i gubitka motivacije zahtijevali su individualizovan i kontinuiran pristup u okviru procesa zdravstvene njege. Primjenom sestrinskih intervencija, koje su uključivale uspostavljanje terapijskog odnosa, praćenje psihičkog stanja, edukaciju pacijenta i porodice, te mjere za prevenciju suicidalnog rizika, postignuto je postepeno poboljšanje kliničkog stanja i funkcionalnosti pacijenta.

insomnia, and loss of motivation required an individualized and continuous nursing care approach. Through nursing interventions, including establishment of a therapeutic relationship, monitoring of mental status, patient and family education, and suicide prevention measures, gradual improvement in the patient's clinical condition and functioning was achieved.

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## IZVJEŠTAJ SA SKUPA – MEĐUNARODNI KONGRES SESTRINSTVA

**„Multikulturalno sestrinstvo – identitet, integritet i autonomija”**
**Međunarodni kongres sestrinstva**
**11-12.05.2026. godine. Medicinski fakultet, Foča, Univerzitet u Istočnom Sarajevu, Republika Srpska, Bosna i Hercegovina**

Međunarodni kongres sestrinstva je održan u periodu 11-12.05.2026. godine na Medicinskom fakultetu u Foči. Organizatori su bili Medicinski fakultet u Foči - Katedra za zdravstvenu njegu, Udruženje diplomiranih medicinara zdravstvene njege Republike Srpske, u saradnji sa Univerzitetskom bolnicom u Foči i Udruženjem medicinskih sestara i tehničara regije Foča. S obzirom na oblasti koje pokriva, Međunarodni kongres sestrinstva je bio tematski veoma raznolik i bogat kongres, a posvećen je Međunarodnom danu medicinskih sestara u znak sjećanja na Florens Najtingel. Tema koju je Međunarodno vijeće medicinskih sestara-tehničara (ICN) odabralo za obilježavanje ovogodišnjeg praznika je „Naše medicinske sestre. Naša budućnost. Osnažene medicinske sestre spašavaju živote”. Tema naglašava važnost medicinskih sestara i tehničara ne samo za zdravstvene sisteme i zdravstvenu njegu pacijenata. Ostvaren je cilj ovogodišnjeg kongresa u Foči - da se prikažu najnovija iskustva iz multikulturalnog sestrinstva u praksi, iskustva iz nauke i otvore novi putevi za integraciju različitih sestrinskih intervencija u skladu sa njihovim kompetencijama. Više od 150 učesnika na Medicinskom fakultetu u Foči okupilo se 11-12. maja 2026. godine na Međunarodnom kongresu sestrinstva. Kroz plenarna predavanja, promociju univerzitetskog udžbenika za master studije i novoregistrovanog časopisa za medicinske sestre i tehničare, stručne i naučne radove brojnih autora, studentsko takmičenje, kao i zdravstveno vaspitne intervencije sa građanima proslavio se 12. maj – dan kada medicinske sestre i tehničari slave svoju profesiju, svoj poziv. Predavači su bili iz Saudijske Arabije, Švedske, Slovenije, Njemačke, Srbije, Crne Gore, Bosne i Hercegovine. Timska saradnja učesnika kreirala je naredne korake s ciljem unapređenja sestrinske profesije.

## MEETING REPORT – THE INTERNATIONAL CONGRESS OF NURSING

**"Multicultural nursing - identity, integrity and autonomy" International Nursing Congress**
**11-12.05.2026. year. Faculty of Medicine, Foča, University of East Sarajevo, Republika Srpska, Bosnia and Herzegovina**

The International Congress of Nursing was held in the period 11-12 May 2026. at the Faculty of Medicine in Foča. The organizers were the Faculty of Medicine in Foča - Department of Health Care, the Association of Medical Graduates in Health Care of the Republic of Srpska, in cooperation with the University Hospital in Foča and the Association of Nurses and Technicians of the Foča Region. Considering the areas it covers, the International Nursing Congress was thematically very diverse and rich, and it was dedicated to the International Nurses Day in memory of Florence Nightingale. The theme chosen by the International Council of Nurse Technicians (ICN) to mark this year's holiday is "Our Nurses. Our Future. Empowered Medical nurses save lives". The topic emphasizes the importance of nurses and technicians not only for healthcare systems and patient healthcare. The goal of this year's congress in Foča was achieved - to present the latest experiences from multicultural nursing in practice, experiences from science and open new ways for the integration of various nursing interventions in accordance with their competencies. More than 150 participants at the Faculty of Medicine in Foča gathered on May 11-12, 2026 at the International Congress Through plenary lectures, the promotion of a university textbook for nurses and technicians, professional and scientific works by numerous authors, as well as health education interventions with citizens, May 12 was celebrated - the day when nurses and technicians celebrate their profession, their vocation. The lecturers were from Saudi Arabia, Sweden, Slovenia, Serbia, Montenegro and Bosnia and Herzegovina. The team cooperation of the participants created the next steps with the aim of improving the nursing profession.

Najsrdačnije se zahvaljujemo autorima radova, predavačima po pozivu, koleginicama i kolegama, suorganizatorima, kao i studentima. Organizatori kongresa posebnu zahvalnost duguju članovima Naučnog i Organizacionog odbora, kao i ostalim koleginicama i kolegama koji su dali veliki doprinos realizaciji ovog kongresa u Foči. Ovakvi skupovi imaju važnu ulogu u translaciji naučnih dostignuća u svakodnevnu kliničku praksu i doprinose unapređenju sestrinske profesije i kvalitetu zdravstvene zaštite. Stručni auditorijum kongresa pored novih znanja i vještina sa sobom nosi prijatne brojne uspomene, nove kolegijalne interakcije, ali i prilike za nove konekcije kako u kliničkom tako i u naučno-istraživačkom smislu.

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***Republika Srpska, Bosna i Hercegovina***

We would like to express our sincere thanks to the authors of the papers, invited lecturers, colleagues, co-organizers, and students. The organizers of the congress owe special thanks to the members of the Scientific and Organizational Committee, as well as to other colleagues who made a great contribution to the realization of this congress in Foča. Such gatherings play an important role in the translation of scientific achievements into everyday clinical practice and contribute to the improvement of the nursing profession and the quality of health care. In addition to new knowledge and skills, the professional audience of the congress brings with it numerous pleasant memories, new collegial interactions, but also opportunities for new connections both in the clinical and scientific-research sense.

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## U SJEĆANJU / IN MEMORIAN

Prof. dr Maja Račić[+]

Postoje ljudi o kojima je teško govoriti u prošlom vremenu. To je primjer sa Majom Račić, profesoricom koja je u sebi nosila toliko životne energije da je njen prerani odlazak ostavio veliku prazninu za sve one osobe koje su je poznavale.

Maja Račić rođena je 29.11.1972. godine u Sarajevu. Osnovnu školu i gimnaziju završila je u Sarajevu. Zbog ratnih dešavanja, napustila je Sarajevo i otišla u Kragujevac u Srbiji, gdje je diplomirala na Medicinskom fakultetu u Kragujevcu 1997. godine. Nakon studija, vratila se u Bosnu i Hercegovinu. Nakon diplomiranja, Maja je svoju karijeru započela u Sokocu 1997. godine, u Domu zdravlja, na planini Romaniji, gradu sa tada ukupno 15.500 stanovnika koji su se suočavali sa velikim poteškoćama zbog dostupnosti najbližoj bolnici. Istovremeno, svakodnevno je putovala iz Sarajeva u Foču - 70 km od Sarajeva, do Medicinskog fakulteta, snalazeći se vrlo izazovnim saobraćajnim putem. Specijalizaciju iz porodične medicine završila je 2002. godine. Magistrirala je 2005. godine na Medicinskom fakultetu Univerziteta u Beogradu. U zvanju asistenta na predmetu Porodična medicina birana je u zvanje asistenta na Medicinskom fakultetu u Foči 2006. godine. Doktorirala je 2007. godine na Medicinskom fakultetu Foča. U zvanje docent, uža naučna oblast Porodična medicina izabrana je na Medicinskom fakultetu Foča 2008. godine, a 2013. godine u zvanje vanrednog profesora. Bila je prodekan za nauku i istraživanje u periodu od 2012. do 2017. godine, sprovodeći brojne međunarodne

There are people about whom it is difficult to speak in the past tense. Maja Račić was one of them—a professor who carried so much vitality within her that her untimely passing left a profound void in the lives of all who knew her.

Maja Račić was born on November 29, 1972. in Sarajevo. She finished elementary school and high school in Sarajevo. Due to the events of the war, she left Sarajevo and went to Kragujevac in Serbia, where she graduated from the Faculty of Medicine in Kragujevac in 1997. After her studies, she returned to Bosnia and Herzegovina. After graduating, Maja started her career in Sokolac in 1997, in the Health Center, on Mount Romanija, a town with a total of 15,500 inhabitants at the time who faced great difficulties due to the availability of the nearest hospital. At the same time, she traveled daily from Sarajevo to Foča - 70 km from Sarajevo, to the Faculty of Medicine, navigating a very challenging road. She completed her specialization in family medicine in 2002. She obtained her master's degree in 2005 at the Faculty of Medicine of the University of Belgrade. In 2006, she was selected as an assistant at the Faculty of Medicine in Foča as an assistant in the Family Medicine course. She received her doctorate in 2007 at the Faculty of Medicine in Foča. In 2008, he was elected to the position of assistant professor, narrower scientific field of Family Medicine at the Faculty of Medicine in Foča, and in 2013, to the position of associate professor. She was vice dean for science and research in the period from 2012 to 2017,

projekte i privlačeći vrhunske stručnjake iz različitih zdravstvenih i medicinskih nauka širom BiH, pa i u mali grad Foča, a onda je svoju karijeru nastavila u SAD na Mejo klinici i Državnom univerzitetu u Ohaju. Bila je član više udruženja: Udruženje ljekara porodične medicine Republike Srpske, Evropska akademija nastavnika porodične medicine (EURACT), Svjetsko udruženje ljekara opšte-porodične medicine (WONCA), Internacionalno psihogerijatrijsko udruženje (IPA) i Američka akademija porodične medicine (AAFP). Pružala je veliku podršku brojnim stručnim i naučnim asoscijacijama jer je vidjela snagu u zajedničkom i timskom pristupu. Bila je učesnik brojnih međunarodnih i domaćih projekata, kao i predavač po pozivu na domaćim i inostranim univerzitetima. Objavila je i prezentovala veliki broj naučnih radova i brojnih drugih publikacija u vodećim međunarodnim časopisima i naučnim konferencijama, sa citiranošću više od 1000 puta. Bila je član odbora različitih naučnih i stručnih skupova nacionalnog i međunarodnog značaja, kao i mentor na brojnim fakultetima, specijalističkim i doktorskim studijama.

Desetine kolega iz jugoistočne Evrope i širom svijeta 28.10.2024. godine suočeni su sa velikim njenim gubitkom. Sa dubokim poštovanjem i tugom opraštamo se od naše profesorice, mentorke i naučnice, čiji je život bio posvećen znanju, humanosti i stvaranju budućnosti kroz obrazovanje. Prof. dr Maja Račić bila je više od predavača – bila je inspiracija! Svojim primjerom učila nas je da nauka nije samo profesija, već poziv koji zahtijeva predanost, etiku i neprekidnu potragu za odgovorima. Njena stručnost, mudrost, ali i velika skromnost ostavili su trag koji će živjeti u generacijama brojnih studenata i kolega. Za Katedru za zdravstvenu njegu, na Medicinskom fakultetu u Foči njene riječi, djela i naučni doprinosi ostaju kao svjetionik u akademskoj zajednici. Bila je osoba koja je vidjela potencijal u drugima i nesebično je svima pomagala. Imala je nježnost prema čovjeku i srce da u njega primi mnogo ljudi, mnogo sudbina, da

implementing numerous international projects and attracting top experts from various health and medical sciences throughout Bosnia and Herzegovina, including in the small town of Foča, and then she continued her career in the USA at the Mayo Clinic and Ohio State University. She was a member of several associations: the Association of Family Medicine Physicians of the Republic of Srpska, the European Academy of Family Medicine Teachers (EURACT), the World Association of General Family Medicine Physicians (WONCA), the International Psychogeriatric Association (IPA) and the American Academy of Family Medicine (AAFP). She provided great support to numerous professional and scientific associations because she saw the strength in a joint and team approach. She was a participant in numerous international and domestic projects, as well as an invited lecturer at domestic and foreign universities. She has published and presented a large number of scientific papers and numerous other publications in leading international journals and scientific conferences, with more than 1000 citations. She was a member of the board of various scientific and professional gatherings of national and international importance, as well as a mentor at numerous faculties, specialist and doctoral studies.

Dozens of colleagues from Southeast Europe and around the world 28.10.2024. year they were faced with her great loss. It is with deep respect and sadness that we say goodbye to our professor, mentor and scientist, whose life was dedicated to knowledge, humanity and creating the future through education. Prof. Dr. Maja Račić was more than a lecturer - she was an inspiration! By her example, she taught us that science is not just a profession, but a vocation that requires dedication, ethics and a continuous search for answers. Her expertise, wisdom, and great modesty left a mark that will live on in generations of numerous students and colleagues. For the Department of Nursin, at the Faculty of Medicine in Foča, her words, deeds and scientific contributions remain as a beacon in the academic community. She was a person who saw the potential in others and selflessly helped everyone.

pomogne i pruži savjet i da nikada nikome ne dozvoli da klone. Taj optimizam je bio neumoljiv.

Mnogi od nas nose dio njenog znanja, njenog pristupa poslu i njenog plemenitog pogleda na svijet. Njena odluka da svoj rad i život posveti unapređenju nauke i obrazovanja učinila je našu profesiju sestrinstva u Foči bogatijom. Učila, i naučila je sve one koji su bili spremni za saradnju sa njom, mnoge vrlo važne stvari za razvoj kako ličnog, isto tako i profesionalnog identiteta. Na zajedničkoj putanji, naučila je mnoge da je titula važna jer govori o trudu, disciplini i odricanju, ali i to da ne smijemo nikad zaboraviti gdje prestaje zvanje, a počinje ličnost. Baš takva, bila je i prof. dr Maja Račić – bila je jedinstvena i neponovljiva enciklopedija znanja, pa i za našu sestrinsku profesiju. Imala je svoje univerzalne priče, poseban odnos prema drugima. Svakodnevno je pokazivala da se vrijednost čovjeka ne mjeri titulom, priznanjima, već sposobnošću da se ostane čovjek. Bila je svakodnevno dostupna svima, njena prisutnost donosila je snagu, mir i neizmjernu podršku – a nikada nije tražila ništa zauzvrat. Takvi ljudi nisu samo prijatelji ili kolege, oni su dar koji život učine plemenitijim i ljepšim. Zanimljivo, i veoma izazovno za mnoge u vrijeme današnjice, a to je baš upravo ono što je i činilo profesoricu Maju Račić - istinski kredibilnom.

Vjerujemo da bi bila ponosna što ideja znanja, humanosti i profesionalnog razvoja medicinskih sestara nastavlja da živi kroz osnivanje ovog časopisa. U našem sjećanju u Foči, a smatramo i dalje, uvijek će ostati njena snaga, toplina, miran osmijeh i neiscrpna posvećenost nauci, učenju i studentima. Zahvalni smo što smo je poznavali. Neka počiva u miru.

***Katedra za zdravstvenu njegu - Medicinski fakultet Foča, Univerzitet u Istočnom Sarajevu***

She was a person who saw potential in others and selflessly helped everyone. She had a deep compassion for people and a heart large enough to embrace many individuals and many destinies, to help, to offer advice, and to never allow anyone to lose hope. That optimism was unwavering.

Many of us carry a part of her knowledge, her approach to work and her noble view of the world. Her decision to dedicate her work and life to the advancement of science and education made our profession of nursing in Foca richer. She taught, and she taught all those who were ready to cooperate with her, many very important things for the development of both personal and professional identity. On the common path, she taught many that the title is important because it speaks of effort, discipline and renunciation, but also that we must never forget where the title ends and the personality begins. Prof. was just like that. Dr. Maja Račić - was a unique and unrepeatable encyclopedia of knowledge, even for our nursing profession. She had her own universal stories, a special attitude towards others. She showed every day that the value of a man is not measured by a title or recognition, but by the ability to remain a man. She was available to everyone every day, her presence brought strength, peace and immense support - and she never asked for anything in return. Such people are not just friends or colleagues, they are a gift that makes life nobler and more beautiful. Interesting, and very challenging for many in today's time, and that is exactly what made Professor Maja Račić - truly credible.

We believe that she would be proud that the idea of knowledge, humanity, and the professional development of nurses continues to live on through the establishment of this journal. In our memory in Foča, and we believe that her strength, warmth, calm smile and inexhaustible dedication to science, learning and students will always remain. We are grateful to have known her. May he rest in peace.

***Department of Nursing, Faculty of Medicine, Foča, University of East Sarajevo***

# UPUTSTVO AUTORIMA ZA PRIPREMU RUKOPISA

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**Kratko ili prethodno saopštenje** – originalni naučni rad sličan radu punog formata, ali manjeg obima ili preliminarne prirode. Sadrži naučne rezultate koji zahtijevaju brzo objavljivanje, ali ne moraju nužno omogućiti potpunu provjeru ili ponavljanje rezultata.

**Naučna kritika / polemika** – stručna rasprava o određenoj naučnoj temi zasnovana isključivo na naučnim argumentima i primjeni odgovarajuće metodologije.

**Stručni rad** – rad koji predstavlja značajan doprinos kroz prikaz iskustava iz profesionalne prakse. Ovi radovi ne moraju biti zasnovani na originalnim istraživanjima, već se fokusiraju na primjenu i

and biochemical results should be expressed in units of the International System of Units (SI).

Devices used should be identified by their trade (manufacturer's) names, with the manufacturer's name and location provided in parentheses. Only generic drug names should be used when referring to medications.

**Manuscript Length**

The manuscript including title page, abstract, introduction, methods, results, discussion, references, and legends (tables, photographs, graphs, diagrams, etc.) may contain: up to 3000 words for original articles, up to 2000 words for short communications, up to 5000 words for review articles, up to 1500 words for professional reports, up to 1000 words for other contributions. The total number of tables, figures, diagrams, drawings, and graphs should not exceed half the number of typed manuscript pages.

**Manuscript Structure**

The manuscript should contain the following sections: title, authors and their affiliations, abstract in Serbian with keywords, introduction, methods (method, material, instruments), results, discussion, references, and abstract with keywords in English. A review article should include the following sections: introduction, literature review, conclusion, and references. All section headings should be written in capital letters using bold font.

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**Review Article** – A paper that provides an original, detailed, and critical overview of a specific research problem or field in which the author has contributed. It presents a comprehensive overview based on previously published works that are collected, analyzed, and interpreted.

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provjeru postojećih znanja u cilju unapređenja prakse i širenja stručnih saznanja.

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ustanova i mesta iz kojih su autori, uključuje i sadržaj rada do 250 riječi. U sažetku se navode bitne činjenice, kratak prikaz problema i osnovni zaključak, bez navođenja literature. Sažetak originalnog rada treba da sadrži: uvod, cilj, metod rada, zaključak i najmanje 3-5 ključnih riječi prema MESH odrednicama. Sažetak može biti strukturiran (uvod, cilj, metode, rezultati sa diskusijom, zaključak) ili nestrukturiran (jedinstveni paragraf), zavisno od kategorije rada.

**Uvod**. U uvodu originalnih radova naznačiti značaj problema koji se ispituje, teorijske osnove na kojima je zasnovano istraživanje i ciljeve studije.

**Materijal i metode**. Opisati opšti dizajn istraživanja, mjesto i vrijeme istraživanja, studijsku populaciju/uzorak, načine objektivizacije praćenih ishoda i tehničke informacije, etičke aspekte i statističku analizu.

**Rezultati.** Rezultate strukturisati shodno logičnom toku istraživanja. Navesti najznačajnije karakteristike studijske populacije ili uzorka, priložiti precizne i što detaljnije podatke shodno njihom tipu i prirodi. U rezultatima ne ponavljati podatke koji su već prezentovani u prilozima (tabele i slike).

**Diskusija.** U dijelu diskusija prezentovati najznačajnije zaključke studije u svjetlu dosadašnjih saznanja, naznačiti moguća metodološka i druga ograničenja i dati završni zaključak uzimajući u obzir uži i širi naučno-stručni okvir.

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Izvještaji sa kongresa i stručnih skupova, stručne vijesti, prikazi stručnih knjiga i praktikuma, pisma uredništvu i dopisi „u spomen“ treba da sadrže: sažetak koji opisuje problem do 250 riječi kao i ključne riječi, uvod, podnaslove u skladu sa tematikom i zaključak.

**Title Page**

On a separate page, provide the title of the paper in capital letters without abbreviations. Below the title, list the authors' names (without titles), indexed by numbers corresponding to the names and addresses of the institutions where the authors are employed. At the bottom of the page, provide details of the corresponding author: full name, complete postal address, telephone number, and email address.

**Abstract.** Original articles, review articles, or communications must include a short abstract on a separate page, including the title, author names, institutions, and locations, with a maximum of 250 words. The abstract should present key facts, a brief description of the problem, and the main conclusion, without references. The abstract of an original article should include: introduction, objective, methods, and conclusion, with at least 3–5 keywords according to MeSH terms. The abstract may be structured (introduction, objective, methods, results with discussion, conclusion) or unstructured (single paragraph), depending on the manuscript category.

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**Discussion.** In the discussion section, present the most significant findings in light of existing knowledge, identify methodological and other

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Primjeri citirane literature:

*a.Udžbenik - Marinković Lj. Menadžment u zdravstvenim organizacijama, 2 izdanje, Beograd, 2011; posle godine staviti pp (papir page-od strane do strane) 230-234.*

*b. Nučni rad – Popović Ilić T, Stanković V, Ilić I, Hadži Ilić S. Razlike u indeksu telesne mase i navikama u ishrani studenata Fakulteta za sport i fizičko vaspitanje. Acta medica Medianae. 2019; 58(2):51-5.*

*c. Disertacija - Radosavljević V. Faktori rizika za nastanak malignih tumora mokraćne bešike.*

limitations, and provide a final conclusion within the broader scientific and professional context.

**Conclusion.** Provide brief concluding remarks with a clear message derived from the research results, in accordance with the study objectives.

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*Doktorska disertacija. Univerzitet u Beogradu, 1999.*

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*c. Dissertation – Radosavljević V. Risk factors for the development of malignant bladder tumors. Doctoral dissertation. University of Belgrade, 1999.*

For other types of references, consult the latest recommendations of the National Library of Medicine (NLM).

**Tables, Graphs, Figures, Drawings, and Diagrams.** Tables should be presented on separate pages and numbered with Arabic numerals according to their order of appearance in the text. The table title should describe its content. All abbreviations used in tables must be explained in the table legend. Tables must be created exclusively in Microsoft Word.

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