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15 YEARS OF ACADEMIC EDUCATION IN NURSING AND THE DEPARTMENT OF NURSING AT THE FACULTY OF MEDICINE, UNIVERSITY OF NOVI SAD

15 GODINA AKADEMSKOG OBRAZOVANJA MEDICINSKIH SESTARA I KATEDRE ZA ZDRAVSTVENU NEGU MEDICINSKOG FAKULTETA UNIVERZITETA U NOVOM SADU

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THE HISTORY OF NURSING EDUCATION IN SERBIA AND DEVELOPMENT OF A DEPARTMENT OF NURSING

ISTORIJAT AKADEMSKOG OBRAZOVANJA MEDICINSKIH SESTARA U SRBIJI I RAZVOJ KATEDRE ZA ZDRAVSTVENU NEGU

Dragana MILUTINOVIĆ and Ilija ANDRIJEVIĆ

Introduction

In addition to the introduction of new methods of nursing standards, one of the biggest advances made in the field of nursing in the second half of the 20th century was definitely the founding of nursing faculties in developed countries worldwide. In the time of former Yugoslavia there were several schools of higher professional education in Belgrade, Zagreb, Rijeka, Ljubljana and Sarajevo, and afterwards the others were also founded. Nevertheless, the number of senior nurses was disproportionate when compared with the number of nurses with secondary education, which certainly affected the quality of professional work and thus contributed to the development of the profession. The complexity of care in the nursing profession and the need to maintain competency and professional responsibility have forced many nurses to acquire the relevant knowledge at the related faculties (pedagogy, defectology, i.e. special education and rehabilitation or healthcare management) in an arduous and indirect way [1].

History of Academic Nursing Education in Serbia

In order to enable nurses to obtain required higher nursing education as approved by professional associations, with the signing of the Bologna Declaration and preparing the guidelines for the new Law on Higher Education, Scientific-Teaching Council of the Faculty of Medicine in Novi Sad adopted a curriculum and a Nursing Four-Year Academic Program at a session held in April 2003. At the time, these studies were the first of their kind in the Republic of Serbia and in their immediate surroundings, designed according to similar studies in Western countries, such as Australia, Canada, the United States and some western European countries. Two years later, the Faculty of Medicine in Priština, headquartered in Kosovska Mitrovica, established Basic Academic Studies in Nursing designed according to the curriculum in Novi Sad. The curriculum of studies in nursing of the Faculty of Medicine in Novi Sad has also become the conceptual basis for academic studies in nursing in the Republic of Srpska (Banja Luka and Foča) [2].

By adopting the Law on Higher Education in September 2005, which regulates the system and activities in the field of higher education, the accreditation process of higher education programs was initiated and the National Council for Higher Education has been established. Matters within the competence of the National Council included defining the list of professional, academic and scientific titles among other things. The nursing studies' curriculum at the Faculty of Medicine in Novi Sad passed the accreditation process successfully, and the academic title that was acquired after the completion of this program was an organizer of health care.

Education of nurses in the Republic of Serbia in all educational institutions should be organized in the compliance with Directives 2005/36/EC and 2013/55/EU which applies to professional qualification recognition of regulated professions, as well as in accordance with. It should also follow the Bologna Process while respecting Serbian National Qualifications Framework for Higher Education (NQFS). In the process of joining the European Union, the Republic of Serbia has committed itself to adoption of the law on regulated professions and the recognition of professional qualifications that will have deferred effect, i.e. it will enter into force following the accession to EU. The preliminary draft

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of this law regulates minimum training and education requirements in the Republic of Serbia for access and performance of the so-called sectoral professions, including general nurses. For these professions, the European Union has prescribed the minimum content of higher education, and even allocated the number of teaching hours for some of them, so that all study programs in the European Union should comply with these requirements. As for nurses responsible for general care, education curriculum, the hours of theoretical and clinical nursing education are clearly defined.

Taking into account the above mentioned, the Faculty of Medicine in Novi Sad has successfully revised the academic study program in nursing with accreditation adopted in 2014 which determines the title of a graduate nurse upon completion of this program. The new curriculum comprises the study of all subjects introduced in order to reach the required 4,600 hours, which enables the acquisition of competences defined in the NQFS.

Development of the Department of Nursing

Academic studies in nursing were introduced in 2003 at the initiative of Professor Stevan Popović, MD, PhD, the President of the Teaching-Scientific Council of the Faculty of Medicine and Faculty Dean at that time, and the Department of Nursing was founded. The first Department Chairman was Professor Tomislav Cigić, MD, PhD and the first and the only assistant at the 2003/04 academic year was Dragana Milutinović, now a doctor of medical science, associate professor and the current chairperson of this Department. Soon more teaching assistants were engaged at the Department: Ivica Lalić, MD, Ilija Andrijević, MD, Dragan Živković, MD, Jovan Matijašević and Nensi Lalić, MD and Associate Professor Feodora Popić Paljić. Prof Đurica Matić, PhD, was engaged as a research associate.

Being not only competent but also exceptionally able to perceive the reality of the moment, benevolent and willing to cooperate Prof. Tomislav Cigić was a role model for all teaching assistants as well as students of nursing until 2007, when the chair was taken over by Assist. Prof. Đorđe Gajdobranski. The best first-generation students: Branislava Brestovački, Dragana Simin (today PhDs in medical sciences and assistant professors) and Snežana Bulatović acquired the title of teaching assistant of Science in Nursing in 2008. Up to the present time, 15 years since it was established, the Department has gradually increased and now it has twenty members (2 associate professors, 10 assistant professors and 8 teaching assistants). For the purpose of realization of classes related to clinical practice, the Chairperson also hires Nurse Practitioner Associates from teaching bases.

Professors and associates of the Nursing Department participate in the realization of 8 compulsory and 8 elective courses in basic studies, 2 subjects in master academic and doctoral studies. Since the founding of medical rehabilitation and radiological technology studies the courses of Nursing in Physiotherapy and Medical Radiology and the Patient Safety in Radiological Practice have also been given. Since the academic 2017/18 year we have been participating in teaching students of medicine in English programme the Introduction to Clinical Practice , as well as Interprofessional Education Assist Prof. Dragana Simin has made a significant contribution to the teaching content and the modes of delivery of the latter. Accordingly, the teachers' and associates' pedagogical work has always been highly rated by students.

When analyzing professional and scientific work of the professors of the Department, we can be proud since almost all of them are authors of papers published in best-ranked international journals, among which they are ranked in the category M21a. Some of the professors are authors of textbooks and manuals in the field of nursing, written in cooperation with the professors of the Faculty of Medicine in Novi Sad, as well as other faculties. Managing and participating in long-term and short-term projects of the Provincial Secretariat for Higher Education and Science is the regular activity of most professors at the Department. In addition to participating in scientific projects, the professors at the Department were also the project managers financed by the City Administration for Health and participants of TEMPUS and Erasmus + programs. With our creative workshops, we participated four times at the Science Festival as part of the team of the Faculty of Medicine, and our assistants Andrea Božić, Ivana Dondo and Milena Mikić took active part in the implementation of compulsory first aid training for students of the University of Novi Sad.

During these fifteen years we have been working on improving international cooperation. Prof. Majda Pajnkihar, Professor and the Dean of the Faculty of Health Sciences in Maribor is our Visiting Professor, and Prof. Dragana Milutinović was elected in 2016 a Visiting Professor of the Faculty of Medicine at the Josip Juraj Strossmayer University of Osijek. Within academic mobility program, we hosted teaching assistants of the Faculty of Health Sciences from Maribor and Ljubljana.

Despite the significant achievements of our students and teachers, there are still unfinished tasks as might be expected, which will certainly be completed in the coming years.

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NEW STRATEGY IN EDUCATION OF HEALTH PROFESSIONALS IN SERBIA: ANALYSIS OF STUDENTS' READINESS FOR INTER-PROFESSIONAL EDUCATION

NOVA STRATEGIJA U OBRAZOVANJU ZDRAVSTVENIH PROFESIONALACA U SRBIJI: ANALIZA SPREMNOSTI STUDENATA ZA INTERPROFESIONALNU EDUKACIJU

Dragana SIMIN[1]; Budimka NOVAKOVIĆ[2]; Branislava BRESTOVAČKI SVITLICA[1], Sanja VUJKOV[3] and Dragana MILUTINOVIĆ[1]

Summary

Introduction. Inter-professional education is the first step towards the effective collaborative practice of future health care workers and one of the prerequisites for the highest quality health care. Therefore, the aim of this study was to assess the readiness for inter-professional education among medical science students. **Material and Methods.** The research was conducted as a descriptive cross sectional study by surveying 406 students of five study profiles at the Faculty of Medicine at the University of Novi Sad. The Serbian version of The Readiness for Inter-professional Learning Scale and questionnaire on sociodemographic data were used as research instruments. The Readiness for Inter-professional Learning Scale comprises a total of 19 items grouped into two sub-scales: "teamwork, collaboration and shared learning" and "role and responsibilities". The methods of descriptive and inferential statistics were used, and statistically significant values were considered significant at the $p < 0.05$ level. **Results.** The mean the Readiness for Inter-professional Learning Scale total score was 73.9, which indicates that students are generally ready for shared learning. The highest scores, that is, greater readiness for inter-professional learning was among physiotherapist students, female students and those who had previously completed secondary medical school. Medical students had significantly more negative attitudes towards this educational strategy. **Conclusion.** Despite the observed differences, attitudes of the majority of students in relation to all study profiles indicate their readiness to accept inter-professional education.

Key words: Education, Public Health Professional; Serbia; Students, Nursing; Attitude of Health Personnel; Interprofessional Relations; Cooperative Behavior

Sažetak

Uvod. Interpofesionalna edukacija je prvi korak ka efektivnoj kolaborativnoj praksi budućih zdravstvenih radnika i preduslov je najvišeg kvaliteta zdravstvene zaštite. Stoga je cilj ovog istraživanja bio da se proceni spremnost studenta medicinskih nauka prema interpofesionalnoj edukaciji. **Materijal i metode.** Istraživanje je sprovedeno kao deskriptivna studija preseka anketiranjem 406 studenata pet studijskih profila Medicinskog fakulteta Univerziteta u Novom Sadu. Kao instrumenti istraživanja koristili su se srpska verzija Skala spremnosti za interprofesionalno učenje (*The Readiness for Interprofessional Learning Scale)* i upitnik o sociodemografskim podacima. Skala spremnosti za interprofesionalno učenje sadrži ukupno 19 ajtema grupisanih u dve supskale: „Timski rad, saradnja i zajedničko učenje" i „Uloge i odgovornosti". Primenjene su metode deskriptivne i inferencijalne statistike, a statistički značajnim smatrane su vrednosti nivoa značajnosti $p < 0,05$. **Rezultati.** Prosečni ukupni skor prema *The Readiness for Interprofessional Learning Scale)* bio je 73,9 što ukazuje da su studenti generalno spremni za zajedničko učenje. Najviši skor, odnosno veću spremnost za interprofesionalno učenje su imali studenti fizioterapije, studenti ženskog pola i oni koji su prethodno završili medicinsku školu. Studenti medicine su značnjno negativnijeg stava prema ovoj obrazovnoj strategiji. **Zaključak.** I pored uočenih razlika, stavovi većine studenata svih studijskih profila ukazuju na njihovu spremnost za prihvatanje interprofesionalne edukacije.

Ključne reči: obrazovanje zdravstvenih profesionalaca; Srbija; studenti zdravstvene nege; stavovi zdravstvenih radnika; interprofesionalni odnosi; kooperativnost

Introduction

In response to all the challenges arising from rapid demographic and epidemiological transitions, modern health care systems are becoming increasingly complex and expensive, and consequently imposing additional requirements onto healthcare professionals [1]. The World Health Organization (WHO) in the Framework for Action on Inter-professional Education & Collaborative Practice identifies inter-professional collaboration in education and practice as an innovative strategy that will play a significant role in addressing the current problems of health workers around the world. As indicated in one of the conclusions of this report, inter-professional education (IPE) is an important step in preparing health professionals to work in a collaborative practice [2]. Inter-professional education as an educational strategy includes interventions where members of more than one health or social care profession, or both, learn interactively together with the aim to improve inter-professional collaboration and patient outcomes [3]. The term collaborative practice involves

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Abbreviations

WHO – World Health Organization
IPE – Inter-professional education
RIPLS – Readiness for Inter-professional Learning Scale
ReFEEHS – Reinforcement of the Framework for Experiential Education in Healthcare in Serbia

collaboration of health workers from different professional backgrounds with patients, their families, and/or their communities to deliver the highest quality of care across settings [2].

When students of medical faculties study traditionally, uni-professionally, only with students from their study group/discipline, with little (or no) opportunities to learn with students from other groups/disciplines they are deprived of a chance to get to know what students from other professions know and their ways of thinking. In addition, in this kind of educational system, stereotypes about other professions can be developed which form barriers in the effective delivery of comprehensive care for patients [4]. Due to fragmented, outdated and static curricula vocational education produces "ill-equipped graduates" with systemic problems such as mismatch of competencies to solve patient problems, poor teamwork and a narrow technical focus without broader contextual understanding. However, the development of most of these problems comes from the so-called tribalism of the professions or the tendencies of various professions to act in isolation from or even in competition with each other [1]. On the contrary, the results of the research collected over more than five decades indicate that the IPE provides effective collaborative practice that optimizes health services, strengthens the health system and improves health outcomes [2].

Despite being internationally recognized as an important educational strategy, the integration of IPE into the standard curriculum remains a significant challenge [5]. Numerous barriers in implementation and achievement of positive IPE outcomes are described in the literature, and students' baseline attitudes such as stereotyping and prejudice are often cited as the biggest barrier of all [6–8]. Negative students' attitudes can be a major barrier in the learning process, and it is important to know the concept of "the readiness for IPE", that is, to assess students' attitudes towards IPE because it underlies the essence of accepting this educational strategy [8]. The implementation of IPE requires a rigorous assessment that must start at the very beginning of curriculum development process [9, 10]. The Readiness for Inter-professional Learning Scale (RIPLS) is often used to assess students 'readiness for IPE [9, 11].

The Initiative to introduce the strategy of inter-professional learning and innovate traditionally, uni-professionally and biomedically oriented higher education of health professionals in Serbia started in 2015. This initiative is a part of activities under Erasmus + KA2 project titled "Reinforcement of the Framework for Experiential Education in Healthcare in Serbia" (ReFEEHS) [11].

Considering the above mentioned, the aim of this study was to assess the readiness of students of different study profiles towards IPE, based on the analysis of their attitudes.

Material and Methods

Study Design and Participants

The survey was conducted as a cross-sectional study by interviewing the students at the Faculty of Medicine of the University of Novi Sad during October and November 2016. The study included students of five study profiles: integrated study of medicine, pharmacy and dentistry, basic academic studies of nursing and physiotherapy. The criterion for choosing the year of study was that students started their clinical practice in actual settings.

Instrument

The Serbian version of The Readiness for Inter-professional Learning Scale (RIPLS) was used as a research instrument [12]. The authors of the original 19-item scale, Parsell and Bligh, used a 5-point Likert scale for evaluation, from 1 = strongly disagree to 5 = strongly agree [12]. The total score on the scale ranges from 19 to 95, with a higher score indicating more positive attitudes and greater students' willingness towards inter-professional learning [13, 14].

The validity of RIPLS, i.e. its factor structure was not the same in various contexts and cultures [4, 9, 11]. The Serbian version of RIPLS, based on the results of exploratory factor analysis, confirms a two-factor structure. The subscales of "teamwork, collaboration, shared learning" and "role and responsibilities" were singled out [11].

Procedure

The research was conducted at the start of the theory class in the lecture rooms of the Faculty of Medicine. The authors contacted the subject teachers of all study profiles and jointly determined the best period for conducting the research. The authors first briefly presented the concept of inter-professional learning to the students, then they explained the purpose of the research and how to fill in the questionnaires. All present students were invited to participate in the research. The questionnaire was distributed in paper form, and the planned amount of time for filling it out was 20 minutes.

Data Analysis

The Statistical Package for Social Sciences, version SPSS 23, was used for statistical data processing. Only questionnaires completely filled-in were processed statistically. The reliability of RIPLS was analyzed using the Cronbach's alpha (α) coefficient. Descriptive and inferential statistics were applied.

Demographic data and results for each statement in the RIPLS scale were analyzed by means of descriptive analysis including frequency, percentage, mean and standard deviation (SD). In order to calculate the RIPLS total score, the responses were first reversed for the statements with negative connotation [6, 11, 14].

Mean total scores and subscale scores were compared by t-test for two different groups. Mean values

Table 1. Demographic characteristics of students
Tabela 1. *Demografske karakteristike studenata*

Variable *Varijabla*	All students *Svi studenti* (n = 377)		Medicine *Medicine* (n = 136)		Nursing *Sestrinstva* (n = 51)		Dentistry *Stomatologije* (n = 70)		Pharmacy *Farmacije* (n = 80)		Physiotherapy *Fizioterapije* (n = 40)	
Mean age/*Prosek godina (SD)*	22.6 (2.1)		23.5 (1.6)		21.5 (1.1)		22.1 (2.1)		22.5 (2.5)		22.8 (2.4)	
	n (%)		n (%)		n (%)		n (%)		n (%)		n (%)	
Gender/*Pol*												
Male/*Muški*	102	(27.1)	54	(39.7)	10	(19.6)	17	(24.3)	9	(11.3)	12	(30.0)
Female/*Ženski*	275	(72.9)	82	(60.3)	41	(80.4)	53	(11.3)	71	(88.8)	28	(70.0)
Study year/*Godina studija*												
3rd year/*3. god.*	91	(24.1)	0	(0.0)	51	(100.0)	40	(57.1)	0	(0.0)	0	(0.0)
4thyear/*4. god.*	150	(39.8)	0	(0.0)	0	(0.0)	30	(42.9)	80	(100.0)	40	(100.0)
5th year/*5. god.*	136	(36.19)	136	(100.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)
Previously completed education/*Prethodno završena škola*												
Grammar School/*Gimnazija*	149	(39.5)	70	(51.5)	4	(7.8)	29	(41.4)	40	(50.0)	6	(15.0)
Secondary Medical school *Medicinska škola*	228	(60.5)	66	(48.5)	47	(92.2)	41	(58.6)	40	(50.0)	34	(85.0)

obtained from several different groups were compared using the one-way analysis of variance (ANOVA) with Tukey's post hoc test. A partial eta squared (η^2) and Cohen's d coefficient were used to determine the magnitude of the impact. Multivariate linear regression was used to identify factors that affect the total RIPLS score. Standardized beta coefficient was used to discriminate the effects of each factor. By calculating the semi partial correlation coefficients, a unique contribution of each factor was established. Statistically significant values were considered significant at the $p < 0.05$ level.

Results

Out of 406 students included in the study, 377 (92.9%) answered all questions. All questions were answered by 96.4%, of student pharmacists (that being the highest percentage), 93.0% of physiotherapy students and 92.6% of nursing students. A slightly lower percentage of dentistry students (89.6%) responded to all questions in the questionnaire and the lowest response was among medical students (88.3%). Distribution of demographic data for the whole sample as well as in relation to the study program is given in **Table 1.**

The value of Cronbach's alpha for the RIPLS scale on the whole was 0.87 with the optimal mean inter-item correlation (0.34). Internal consistency was confirmed for the teamwork, collaboration and shared learning subscales ($\alpha = 0.93$), whereas a mean inter-item correlation of 0.44 indicated that the correlation between items was strong. Although the value of the Cronbach's alpha for role and responsibilities was small (0.44), the mean inter-item correlation was 0.21, which is acceptable for a scale with fewer items.

The analysis of attitudes that indicate the readiness for inter-professional learning among students of different study programs is shown in **Table 2.** Nursing, medical and dentistry students had the most positive attitude towards the statement that "small-group learning to work helps students develop trust and mutual respect". The statement that most students in all educational programs agreed with was that teamwork

Table 2. Mean scores for each RIPLS item
Tabela 2. *Prosečni skorovi za svaku tvrdnju RIPLS*

Item/*Tvrdnja*	All Students/*Svi studenti*	Medicine *Medicine*	Nursing *Sestrinstva*	Dentistry *Stomatologije*	Pharmacy *Farmacije*	Physiotherapy/*Fizioterapije*
	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD	M ± SD
Learning with other students will help me become a more effective member of a health care team/*Učenje sa studentima drugih studijskih profila pomoći će mi da postanem efikasniji član zdravstvenog tima*	4.1 ± 0.9	3.8 ± 1.0	4.2 ± 0.7	4.2 ± 0.6	4.4 ± 0.7	4.5 ± 0.6
Patients would ultimately benefit if health-care students worked together to solve patient problems/*Pacijenti bi imali korist ako bi studenti različitih studijskih profila radili zajedno*	4.3 ± 0.8	4.0 ± 0.9	4.5 ± 0.6	4.4 ± 0.7	4.5 ± 0.6	4.6 ± 0.6

Shared learning with other health-care students will increase my ability to understand clinical problems *Zajedničko učenje sa studentima drugih studijskih profila povećalo bi moju sposobnost da shvatim klinički slučaj*	4.1 ± 0.9	3.6 ± 1.0	4.3 ± 0.8	4.3 ± 0.7	4.4 ± 0.7	4.5 ± 0.6
Learning with health-care students before graduation would improve relationships after graduation/*Učenje sa studentima drugih studijskih profila pre diplomiranja poboljšalo bi odnose posle diplomiranja*	4.1 ± 0.9	3.9 ± 1.0	4.2 ±0.7	4.1 ± 0.8	4.3 ± 0.6	4.4 ± 0.6
Communication skills should be learned with other health-care students/*Komunikacijske veštine bi trebalo da se uče zajedno sa studentima drugih studijskih profila*	3.9 ± 0.9	3.5 ± 1.0	4.2 ± 0.9	3.9 ± 0.8	4.1 ± 0.8	4.2 ± 0.7
Shared learning will help me to think positively about other professionals/*Zajedničko učenje sa studentima drugih studijskih profila će mi pomoći da razmišljam na pravi način o svim zdravstvenim profesionalcima*	3.9 ± 0.8	3.7 ± 0.9	3.9 ± 0.5	4.1 ± 0.8	4.2 ± 0.7	4.1 ± 0.7
For small group learning to work, students need to trust and respect each other/*U malim grupama koje uče da rade, studenti treba da razvijaju poverenje i međusobno poštovanje*	4.4 ± 0.7	4.3 ± 0.8	4.6 ± 0.5	4.6 ± 0.6	4.4 ± 0.7	4.6 ± 0.6
Team-working skills are essential for all health care students to learn/*Veštine timskog rada studenti svih studijskih profila treba da nauče pre diplomiranja*	4.3 ± 0.8	4.2 ± 1.0	4.6 ± 0.4	4.5 ± 0.7	4.4 ± 0.7	4.5 ± 0.6
Shared learning will help me to understand my own limitations/*Zajedničko učenje sa studentima drugog studijskog profila će mi pomoći da razumem sopstvene mogućnosti i ograničenja*	3.7 ± 0.9	3.5 ± 1.0	3.9 ± 0.9	3.7 ± 0.8	3.9 ± 0.8	4.0 ± 0.9
I don't want to waste my time learning with other health-care students/*Ne želim da gubim svoje vreme učeći sa studentima drugih studijskih profila*	2.0 ± 0.9	2.4 ± 1.0	1.8 ± 0.7	1.8 ± 0.8	1.8 ± 0.8	1.7 ± 0.8
It is not necessary for undergraduate health-care students to learn together/*Nije neophodno da studenti različitih studijskih programa zdravstvenih nauka uče zajedno*	2.3 ± 0.9	2.6 ± 1.0	2.2 ± 1.0	2.4 ± 0.9	2.0 ± 0.8	2.1 ± 0.9
Clinical problem-solving skills can only be learned with students from my own department/*Veštine rešavanja kliničkih problema mogu se jedino učiti sa studentima sopstvenog studijskog profila*	2.2 ± 1.0	2.4 ± 1.1	1.8 ± 0.8	2.3 ± 1.0	1.8 ± 0.8	2.1 ± 0.9
Shared learning with other health-care students will help me to communicate better with patients and other professionals/*Zajedničko učenje sa studentima drugih studijskih profila pomoći će mi da bolje komuniciram sa pacijentima i ostalim stručnjacima*	3.8 ± 0.9	3.5 ± 1.0	3.9 ± 1.1	4.0 ± 0.6	4.0 ± 0.7	4.1 ± 0.9
Clinical problem-solving skills can only be learned with students from my own department/*Pozdravio/la bih mogućnost da učestvujem u nekim opštim predavanjima ili radionicama sa studentima drugog studijskog profila*	3.9 ± 0.9	3.7 ± 1.0	4.0 ± 0.8	4.1 ± 0.7	4.2 ± 0.8	4.2 ± 0.6
Shared learning with other health-care students will help me to communicate better with patients and other professionals/*Zajedničko učenje sa studentima drugih studijskih profila će mi pomoći da razjasnim suštinu zdravstvenih problema pacijenata*	3.7 ± 1.0	3.1 ± 1.1	3.8 ± 0.8	4.0 ± 0.7	4.2 ± 0.7	4.1 ± 0.8
Shared learning before graduation will help me become a better team worker/*Zajedničko učenje sa studentima drugih studijskih profila će mi pomoći da postanem bolji timski radnik*	4.0 ± 1.0	3.7 ± 1.1	4.2 ± 0.7	4.1 ± 0.7	4.2 ± 0.7	4.2 ± 0.9
The function of nurses and therapists is mainly to provide support for doctors/*Uloga medicinskih sestara je uglavnom da obezbede podršku za doktore*	2.6 ± 1.1	2.8 ± 1.2	2.0 ± 1.1	2.7 ± 1.0	2.7 ± 1.2	2.2 ± 0.9
I'm not sure what my professional role will be/*Nisam siguran/a šta je i šta će biti moj profesionalni zadatak*	2.4 ± 1.2	2.0 ± 1.1	2.4 ± 1.2	1.9 ± 0.8	2.5 ± 1.1	2.9 ± 1.0
I have to acquire much more knowledge and skills than other health-care students/*Moram usvojiti mnogo više znanja i veština nego studenti drugog studijskog profila*	3.3 ± 1.2	4.0 ± 1.0	2.9 ± 1.1	3.0 ± 1.0	2.9 ± 1.0	3.1 ± 1.1

Table 3. RIPLS'scores: differences in relation to students' demographic characteristics
Tabela 3. *RIPLS skor: razlike povezane sa demografskim karakteristikama studenata*

Demographic characteristics *Demografske karakteristike*	Total RIPLS/*Ukupni RIPLS*			TC & SL/*TRS & ZU*			R & R/*U & O*		
	M ± SD	95% CI		M ± SD	95 % CI		M ± SD	95% CI	
		Lower *Donja*	Upper *Gornja*		Lower *Donja*	Upper *Gornja*		Lower *Donja*	Upper *Gornja*
All students/*Svi studenti* (n=377)	73.9 ± 10.5	72.9	74.9	64.2 ± 9.6	63.2	65.2	9.5 ± 2.3	9.4	9.8
Study group/*Studijska grupa*									
Medicine/*Medicine*	68.0 ± 11.5	66.1	70.0	59.1 ± 11.1	57.2	61.1	8.8 ± 2.3	8.4	9.2
Nursing/*Sestrinstva*	77.2 ± 8.9	74.7	79.7	66.5 ± 8.6	64.1	69.0	10.5 ± 2.3	9.8	11.2
Dentistry/*Stomatologije*	76.1 ± 8.3	74.2	78.0	65.6 ± 7.2	64.0	67.6	10.3 ± 2.0	9.7	10.8
Pharmacy/*Farmacije*	77.8 ± 7.7	76.1	79.6	68.1 ± 7.3	66.4	69.8	9.6 ± 2.1	9.1	10.1
Physiotherapy/*Fizioterapije*	78.2 ± 7.5	75.6	80.6	68.5 ± 7.0	66.1	70.6	9.7 ± 2.4	8.8	10.5
$F_{(df)}$, p-value	$21.11_{(4, 372)}$, 0.000			$18.08_{(4, 372)}$, 0.000			$8.73_{(4, 372)}$, 0.000		
η^2 (d)	0.18†			0.16†			0.08**		
Gender/*Pol*									
Male/*Muški*	69.1 ± 12.3	-9.3	-3.8	60.1 ± 11.9	-8.2	-3.1	8.9 ± 2.4	-1.5	-0.5
Female/*Ženski*	75.7 ± 9.0			65.7 ± 8.4			9.9 ± 2.3		
$t_{(df)}$, p-value	$-5.67_{(375)}$ 0.000			$-4.39_{(375)}$ 0.000			$-3.67_{(375)}$ 0.000		
η^2(d)	0.08**			0.05*			0.04*		
Previously completed education/*Prethodno završena škola*									
Grammar School/*Gimnazija*	72.2 ± 9.7	-5.1	-0.7	62.3 ± 9.2	-4.3	-0.3	9.1 ± 2.1	-4.3	-0.3
Secondary Medical school *Medicinska škola*	75.1 ± 10.8			65.1 ± 9.9			9.9 ± 2.3		
$t_{(df)}$, p-value	$-2.67_{(375)}$ 0.008			$-2.25_{(375)}$ 0.025			$-2.50_{(375)}$ 0.012		
η^2(d)	0.02*			0.01*			0.02*		

TC&SL = teamwork, collaboration and shared learning; R&R = role and responsibility; M = mean; SD = standard deviation; CI = Confidence interval; F = ANOVA; t = t-test; df = degrees of freedom; η^2= eta squared; d = Cohen's d indicator (*small effect; ** medium effect; † large effect)/*TRS & ZU = timski rad, saradnja i zajedničko učenje; U & O = uloge i odgovornosti, M = prosek; SD = standardna devijacija; CI = Interval poverenja; F = ANOVA; t = t-test; df =stepen slobode; η^2= eta kvadrat; d = Cohen indikator (* mala; ** srednja; † velika)*

skills should be taught to students of all study programs before graduation. As for their future professional roles and responsibilities, students of medicine and dentistry were the most confident of all.

The mean score for the teamwork, collaboration and shared learning subscale was 64.2 (SD = 9.6), and 9.5 (SD = 2.3) for the role and responsibilities subscale, while the mean RIPLS total score was 73.9 (SD = 10.5) (**Table 2**). Significant differences were found among the students of different study programs regarding the value of the mean RIPLS total score (F (4.372) = 21.11, p = 0.000). Subsequent comparisons using the Tukey's HSD test showed that only mean score of medical students (M = 68.0, SD = 11.5) differed from the students of other study programs, and the difference was big according to Cohen's indicator **(Table 3).**

Significantly more positive attitudes towards inter-professional learning were among females (t (375) = -5.67, p = 0.000) and students who had previously completed secondary medical school (t (375) = -2.67, p = 0.008). Although the differences in the

Table 4. Multiple linear regression model for the prediction of the RIPLS total score
Tabela 4. *Model višestruke regresione analize predviđanje vrednosti ukupnog RIPLS*

	Unstandardized coefficient *Nestandardizovani koeficijent*		Standardized coefficient *Standardizovani koeficijent*	t	p	F	p
	ß	SE	Beta				
Constant/*Konstanta*	55.243	2.535		24.794	0.000		
Gender/*Pol*	5.269	1.107	0.224	4.761	0.000		
Study group/*Studijska grupa*	2.387	0.347	0.325	6.875	0.000	30.754	0.000
Previously completed education *Prethodno završena škola*	2.143	0.996	0.100	2.151	0.032		

mean RIPLS total score and both subscales were statistically significant, Cohen's indicator points to a medium or small effect of these variables.

In **Table 4**, the results of standard multiple linear regressions show that all three independent variables were significantly related to the total RIPLS score. Based on the values of beta coefficients, it is noted that the study program (beta = 0.325, p = 0.000) individually contributes the most to the explanation of the RIPLS score.

The multiple regression analysis model explains 19.8% (adjusted R^2 = 19.2%) variance of the overall RIPLS score. A further analysis calculated semi partial correlation coefficients, which was the basis to determine the unique contribution of each independent variable. The obtained results indicate that 12.5%, 4.9 and only 1% of the variance value of the total RIPLS score was accounted for by the study program, gender, and previously completed school, respectively.

Discussion

The implementation of IPE as an educational strategy requires overcoming many structural and organizational barriers, but it is difficult to alter ambivalent or negative students' attitudes [2, 4, 5]. Making this alteration is also one of the primary objectives in planning IPE outcomes aimed at improving teamwork and developing collaborative practice [4, 5, 7]. Therefore, the assessment of the students' baseline attitudes is significant for the initial steps towards integration of this educational strategy into curricula [4, 5].

Students' attitudes among five educational profiles in this study, assessed by RIPLS, indicate students' readiness for IPE. Similar results were obtained in previous studies as well [4–9, 11–18]. Accordingly, there were differences among students' attitudes based on their study profile both in our study and studies conducted in other countries [4, 6, 7, 11–20]. Namely, medical students were less open towards IPE, while nursing, pharmacy, and physiotherapy students demonstrated greater readiness for IPE.

The results of this study show that female students are more ready to accept shared learning. Some authors suggest that these results reflect different learning styles between men and women. Namely, women are more ready to accept the IPE because they are more inclined to listen, understand and accept attitudes of other people [6, 11, 18].

Students with previously completed secondary medical school are more prepared for IPE, probably due to longer contact with the actual setting during schooling. However, our results are not comparable with the results of studies conducted in most countries, because their education system is different from the one in Serbia. In these countries, studies at faculties of health and social care are preceded only by general and not vocational medical education.

One of the prerequisites for this research was that students started lectures on clinical subjects, i.e. in a real clinical setting. This is important because teamwork prevails in such a setting, whereby a team comprises different professionals, with varying number of members, a collaboration time frame, circumstances under which they were formed and the way they solve their common task. It is important to emphasize that most students of all profiles fully agreed with statements which indicated the shared learning benefits from teamwork.

The largest number of students believed that trust and mutual respect developed through small group shared learning. Such results are not surprising as the students had the opportunity to feel the benefits of this work during their previous education. Namely, while the education system in Serbia is still dominantly traditional, group work as teaching and learning methodology has been included in education since elementary school. Students also occasionally work and study together in groups. However, these are uni-professional groups comprising at least 10 students, and problem-solving tasks are a major characteristic of their professional domain.

There is a question in literature whether it is better to introduce inter-professional education before or after graduation. Our students seem to like the idea of acquiring the skills necessary for the team work during their studies, i.e. before graduation. The initiators of the implementation of the IPE education strategy consider it to be a part of professional development of students, which begins with acquiring qualifications/diplomas and continues throughout their professional career [21]. According to a WHO report, the IPE enables students to acquire knowledge and skills required to become a collaborative practice-ready health worker [2].

The lowest mean score in this study was recorded for the statement indicating that students did not consider learning together with students of different study profiles to be a waste of time. On the contrary, they generally consider shared learning to be necessary, specifically emphasizing its importance for acquiring the skills to solve clinical problems. However, students of medicine and dentistry are still more focused on uni-professional learning, especially when it comes to acquiring the skills to solve clinical problems. In several previous studies, similar results were obtained, which could be explained by the realistic conflict theory according to which, hostile and discriminatory inter-group relationships are the result of negative attitudes [22]. A similar interpretation is also found by Hind, who analyzed the interpersonal perceptions of students of medical faculties and found that individuals who identified strongly and positively with their own professional group tended to be more negative towards students of other groups [20]. Certainly, the aim of the IPE strategy is not to equate students' attitudes and opinions, but to approach the problem/task from different perspectives and positions, while respecting different attitudes of students of different and/or the same profile [2, 5, 21]. Barr points out that inter-professional education is assumed to provide students an opportunity to see that intervention by one profession at one "point of the system will affect the functioning of the system as a whole" [21].

Compared to the previous research conducted at the Faculty of Medicine in Novi Sad [12], students of nursing are now more confident about their professional tasks. However, although academic studies of nursing in Serbia were established fifteen years ago, current legislation within the health care system has not yet fully "recognized" this profile. The least confident in their future professional tasks in our study are students of physiotherapy, which is one of the latest academic study profiles, also "unrecognized". The uncertainty of pharmacy students regarding their future tasks in our study is not a solitary case in the literature. The authors of comprehensive review studies explain similar results by the fact that the traditional occupational tasks of pharmacists (drug issuing and compounding) are changing due to the rapid development of pharmaceutical practice [23]. The contribution of pharmacists in clinical practice in the form of providing professional advice to patients and members of the health team, preventing adverse drug effects and monitoring drug use considerably increases the safety and efficacy of drug administration, which further decrease treatment expenses and results in changes in clinical teamwork. This significantly increases the safety and efficacy of drug use, which contributes to reducing the cost of treatment, but also leads to changes in clinical teamwork. Due to these changes, team members have to change attitudes towards traditional tasks of pharmacists and accept new ones [15,23]. In contrast, dentistry students know very well what their future professional tasks will be.

Students of medicine, in our and several previous studies, were least opposed to the statement that the role of nursing technicians was to provide full support to doctors. However, students of nursing and other study profiles had significantly different attitudes not only in our study but in previous studies as well as [Horsburg, el Zub]. Such results indicate that the roles of nurses continue to be accepted stereotypically (as subordinate members of the health team who mostly act merely as persons who carry out doctors' orders) [16]. Certainly, IPE is not a panacea for every challenge that the healthcare system encounters [2]. However, an effective implementation that respects the basic provisions is based on mutual respect of students of various study profiles and provides the possibility of reducing negative stereotypes, as well as eliminating them [2, 8, 21].

Conclusion

The attitudes of most students of all study profiles, participating in this study, indicate that our students are ready to accept IPE as a new educational strategy. In addition, a more detailed analysis of responses of the students' of each profile allows us to perceive all potential barriers and find solutions in due time in order to integrate IPE into the curriculum of all study profiles of the Faculty of Medicine, specified in the ReFEEHS project activities. The effective integration of IPE would contribute to the development and acceptance of collaborative practice as the underlying model of healthcare workers in Serbia as well.

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SLEEP QUALITY IN RELATION TO SLEEP HYGIENE KNOWLEDGE AND PRACTICE, CHRONOTYPE AND LIFESTYLE BEHAVIOUR AMONG HEALTHCARE STUDENTS

POVEZANOST KVALITETA SPAVANJA STUDENATA ZDRAVSTVENIH NAUKA SA ZNANJEM I PRAKSOM HIGIJENE SPAVANJA, HRONOTIPOM I ŽIVOTNIM STILOM I NAVIKAMA

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Summary

Introduction. The purpose of this study was to evaluate sleep quality among healthcare science students and to assess its association with sleep hygiene knowledge and practices, circadian typology and lifestyle factors. **Material and Methods**. The research was conducted as a cross-sectional questionnaire-based internet study on a sample of 268 students. The Pittsburgh Sleep Quality Index and The Self-Morningness-Eveningness Questionnaire were applied as research instruments to assess sleep quality and chronotypes respectively, while evaluation of the other variables was conducted using he Sleep Hygiene Knowledge Questionnaire, socio-demographic questionnaire and the questionnaire of lifestyle factors. **Results.** The average of the Pittsburgh Sleep Quality Index global score for all students was 6.9 ± 3.2. The poor sleep quality (The Pittsburgh Sleep Quality Index > 5) was reported in 62.7% of students. Sleep efficiency less than 85% was found in 43.0% of students, and 78% of students reported daytime dysfunctionality. Sleep quality was significantly worse among female students; coffee, alcohol and energy drink consumers and long-term cell phone users. Only 11.9% of students were classified as the morning chronotype and they had the best quality of sleep and the best sleep hygiene knowledge and practices, whereas the evening chronotype had the worst quality of sleep. A significant negative correlation was identified between sleep hygiene knowledge (r = - 0.133) and practice (r = 0.501) and sleep quality whereby the lower t he Sleep Hygiene Knowledge Questionnaire and Sleep Hygiene Practice Scale scores follow a higher the Pittsburgh Sleep Quality Index score. **Conclusion.** Majority of students had a suboptimal level of overall sleep quality, satisfactory knowledge of sleep hygiene, but they did not have the sleep hygiene practices which suggests that knowledge is not a factor of deterring from unhealthy behaviors.

Key words: Sleep Hygiene; Circadian Rhythm; Health Knowledge, Attitudes, Practice; Life Style; Students, Nursing; Surveys and Questionnaires; Chronobiology Disorders

Sažetak

Uvod. Cilj ove studije bio je da se proceni kvalitet spavanja studenata zdravstvenih nauka i ispita njegova veza sa znanjem i praksom higijene spavanja, cirkadijalnom tipologijom i faktorima životnog stila. **Materijal i metode.** Istraživanje je sprovedeno kao studija preseka onlajn anketiranjem 268 studenta. Kao instrumenti istraživanja koristili su se Pitsburški indeks kvaliteta spavanja za procenu kvaliteta spavanja, Upitnik o samoproceni „jutarnjosti/večernjosti" za procenu diurnalne sklonosti, a za evaluaciju ostalih varijabili korišten je Upitnik znanja o higijeni spavanja i Skala prakse higijene spavanja, sociodemografski upitnik i upitnik o životnom stilu i navikama. **Rezultati.** Prosečan ukupni skor Pitsburškog indeksa kvaliteta spavanja svih studenata iznosio je 6,9 ± 3,2. Loš kvalitet spavanja (Pitsburški indeks kvaliteta spavanja > 5) imalo je 62,7% studenata. Efikasnost spavanja manju od 85% imalo je 43% studenata, a 78% je prijavilo dnevnu disfunkcionalnost. Studenti ženskog pola, konzumenti kafe, alkohola i energetskih napitaka, kao i oni koji duže koriste mobilne telefone, imali su značajno lošiji kvalitet spavanja. Samo 11,9% studenata je pripadalo jutarnjem hronotipu i imali su najbolji kvalitet spavanja i najbolja znanja i praksu iz higijene spavanja, a večernji najlošije. Utvrđena je značajna negativna povezanost znanja (r = - 0,133; p < 0,05) i prakse higijene spavanja (r = 0,501; p < 0,001) sa kvalitetom spavanja pri čemu niži Upitnik znanja o higijeni spavanja i skor skale prakse higijene spavanja prati viši skor na Pitsburški indeks kvaliteta spavanja. **Zaključak.** Većina studenata je imala suboptimalni ukupni kvalitet spavanja, zadovoljavajuće znanje o higijeni spavanja, ali ne i praksu higijene spavanja, što ukazuje da znanje nije faktor odvraćanja od nezdravog ponašanja.

Ključne reči: higijena spavanja; cirkadijalni ritam; znanje o zdravlju, stavovi, praksa; stil života; studenti zdravstvene nege; istraživanja i upitnici; hronobiološki poremećaji

Introduction

Sleep is an integral part of human biological rhythm and it is essential for optimal health and maintenance of cognitive and psychosocial functioning. Sleep pattern is regulated by the interaction of three major factors: homeostatic, internal circadian and behavioral factors [1, 2]. Given that behavioral factors, such as sleep hygiene, often exceed the homeostatic and circadian factors in the regulation of sleep, it is

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Abbreviations
PSQI – The Pittsburg Sleep Quality Index
SHKQ – Sleep Hygiene Knowledge Questionnaire
SHPS – Sleep Hygiene Practice Scale
Self-ME – The Self-Morningness/Eveningness

important to know those behaviors that affect its quality and which may possibly cause sleep disorders [3].

Sleep hygiene is defined as a set of behaviors and environmental rules that aim to ensure a restorative and good quality sleep in order to avoid certain sleep disorders [4]. Previous studies indicate that sleep hygiene practice is associated with sleep quality, and the results of the interaction between sleep hygiene knowledge and sleep quality were found to be inconsistent [4–7]. Having thoroughly studied literature, we have found that sleep hygiene knowledge does not affect sleep quality [4, 5], or that people with better sleep hygiene knowledge report better sleep quality [5, 6], or that there is a weak, negative correlation between sleep hygiene knowledge and sleep quality [7]. However, sleep hygiene knowledge, defined by some authors as "sleeping beliefs" [8], does not have to be related to sleep quality, but the adherence to the implementation of sleep hygiene recommendations serves as a mediator between "sleeping beliefs" and sleep quality [9].

Some of the individual differences that may affect the effectiveness of sleep hygiene knowledge and practices are circadian typology differences (referred as chronotype) [5]. Although these differences are somewhat innate, the individual inclination to a certain sleeping pattern, vigilance and better cognitive and physical activity enable the classification of individuals by their chronotype as morning, evening, and intermediate chronotypes [10]. Data on the association between circadian typology and sleep hygiene knowledge are inconsistent. Although some authors find that people with morning chronotype have more accurate knowledge of sleep hygiene than intermediate and evening types [8] the others find no correlation [6].

Student population is particularly vulnerable to sleep disorders caused by external factors such as change of the surroundings, responsibility for lifestyle self-management, changing of daily schedule, stress caused by a greater scope of academic and social commitments. These factors are associated with reduced sleep duration, resulting in poor sleep quality and excessive daytime sleepiness [4, 5]. In particular, the circadian rhythm can be disrupted during the exam period, night-time learning and prolonged exposure to light associated with the excessive use of computer, which contribute to irregular sleep patterns and poor sleep quality [5]. The latest reports show that the recommendation of The National Sleep Foundation requiring 7 to 9 hours of sleep per night is respected by less than 50% of students [9], and only about 40% of students reported a good sleep quality [11].

Taking into account the significance of sleep quality in student population primarily, this study has been aimed at evaluating sleep quality among health science students and assessing its association with sleep hygiene knowledge and practices, circadian typology and lifestyle factors.

Material and Methods

Study Design and Participants

The research was conducted as a cross-sectional questionnaire-based internet study among students of Faculty of Medicine in Novi Sad during the winter semester of the academic 2016-17 year. The study link was shared across social networks within closed groups of Faculty students. The study sample consisted of 268 students divided into two groups: n = 174 students of basic studies (nursing, medical rehabilitation and special rehabilitation and education) and n = 94 students of integrated studies (medicine, dentistry and pharmacy).

Instruments

In order to achieve study goals, a questionnaire was designed to cover socio-demographic issues related to gender, age, place of residence and study (the area of study, average grade), as well as a questionnaire of lifestyle factors affecting sleep (including consumption of alcohol, tobacco, coffee, and caffeinated energy drinks, implementation of physical activity and mobile phone use).

The Pittsburg Sleep Quality Index (PSQI) was used to measure sleep quality. PSQI is a 19-item standardized instrument for evaluating sleep quality over the previous month through 7 components: sleep latency, sleep duration, habitual sleep efficiency and sleep disturbances, subjective sleep quality, use of sleeping pills, and daytime dysfunction. The components are evaluated on a scale of 0–3, and then totaled to yield a global PSQI score, ranging from 0 to 21. A global score > 5 indicates a poor sleep quality. PSQI showed good psychometric characteristics and differentiation between good and bad sleepers [12]. In our study, the Cronbach's alpha coefficient was 0.64.

Sleep hygiene knowledge and practices were assessed by the questionnaires designed for the purpose of this research, and on the basis of literature data on the activities that can affect sleep patterns positively or negatively [2, 4, 6, 13]. The 17-item Sleep Hygiene Knowledge Questionnaire (SHKQ) was used to assess knowledge of activities that help or interfere with sleep patterns, where 1 point was given for each correct response, 0 for incorrect, whereas the global score ranged from 0 to 17. Higher score reflected better sleep hygiene knowledge. In this research, the questionnaire was found to be reliable (Cronbach's alpha: 0.80).

Sleep Hygiene Practice Scale (SHPS) comprised 22 items to evaluate how many nights per week a respondent was engaged in certain activities known to promote or disrupt sleep. Responses ranged from 0 ("never") to 7 ("7 times a week"). Items that indicated a poor sleep hygiene practice were reversed scored. The global score ranged from 0 to 154, with higher scores indicating better implementation of sleep hygiene practices. In this study, the questionnaire showed a satisfactory level of reliability. The Cronbach's Alpha coefficient was 0.70.

The Self-Morningness/Eveningness (Self-ME) was used to estimate diurnal preferences/chronotypes. Self-ME was based on the 19th question which was singled out of the Morningness-Eveningness Questionnaire (MEQ) [14], according to which the respondents were self-classified into a definitely morning, definitely evening or intermediate chronotype.

Statistical Data Analysis

IBM SPSS statistics software, Version 23 was used for data analysis. Data processing included descriptive and inferential statistics. A comparison of differences between means from two groups was performed by t-test, whereas one-factor analysis of variance (ANOVA) was used to compare the means of multiple groups with LSD post-hoc test. Effect sizes (d and η2) were also calculated for quantifying the difference between mean scores. Pearson correlation coefficient was used to determine the relationship between variables. The cut off level for statistical significance was $p < 0.05$.

Table 1. The global PSQI score: differences in relation to socio-demographic characteristics and lifestyle factors among students

Tabela 1. *Ukupni PSQI skor: razlike u odnosu na sociodemografske karakteristike i faktore životnog stila studenata*

	n (%)	Mean ± SD	t / F	95%CI	p	d / η^2
Gender/*Pol*						
Female/*Žensko*	222 (82.8)	7.1 ± 3.2	-2.065	-2.076 – -0.050	0.040	0.36*
Male/*Muško*	46 (17.2)	6.0 ± 2.9				
Study group/*Studijska grupa*						
Basic study/*Osnovne studije*	174 (64.9)	5.9 ± 3.8	2.647	0.325 – 2.213	0.009	0.35*
Integrated study *Integrisane studije*	94 (35.1)	4.6 ± 3.6				
Average grade/*Prosečna ocena* (n = 191)						
7.00 – 7.99	53 (27.7)	6.6 ± 3.0	3.265	5.77 – 7.43	0.040	0.03··
8.00 – 8.99	92 (48.2)	7.1 ± 3.1		6.48 – 7.75		
9.00 – 10	46 (24.1)	5.7 ±3 .2		4.74 – 6.65		
Use of mobile phone/*Upotreba mobilnog telefona*						
Up to an hour/*Do sat vremena*	31 (11.6)	6.5 ± 3.4	3.047	5.26 – 7.77	0.029	0.03··
2 to 3 hours per day *2 do 3 sata dnevno*	76 (28.4)	6.1 ± 3.2		5.38 – 6.83		
3 do 5 hours per day *3 do 5 sati dnevno*	72 (26.9)	7.0 ± 2.9		6.32 – 7.73		
Over 6 hours/*Preko 6 sati*	89 (33.2)	7.6 ± 3.2		6.8 – 8.22		
Doze off during the lecture/*Dremanje tokom predavanja*						
Yes/*Da*	114 (42.5)	8.2 ± 3.3	5.253	1.237 – 2.720	0.000	0.70**
No/*Ne*	154 (57.5)	6.0 ± 2.9				
Tobacco consumption/*Konuzumiranje duvana*						
Yes/*Da*	61 (22.8)	8.3 ± 3.1	4.194	1.005 – 2.785	0.000	0.58**
No/*Ne*	207 (77.2)	6.5 ± 3.1				
Coffee consumption/*Konzumiranje kafe*						
Yes/*Da*	190 (70.9)	7.2 ± 3.3	2.624	0.278 – 1.953	0.009	0.36*
No/*Ne*	78 (29.1)	6.1 ± 2.8				
Alcoholic beverage consumption/*Konzumiranje alkoholnih napitaka*						
Yes/*Da*	160 (59.7)	7.3 ± 3.3	2.724	0.297 – 1.846	0.007	0.32*
No/*Ne*	108 (40.3)	6.2 ± 2.9				
Caffeinated energy drinks consumption/*Konzumiranje energetskih napitaka sa kofeinom*						
Yes/*Da*	131 (48.9)	7.3 ± 2.9	2.181	0.082 – 1.610	0.030	0.25*
No/*Ne*	137 (51.1)	6.5 ±3.4				
Regular physical activity/*Redovna fizička aktivnost*						
Yes/*Da*	125 (46.6)	6.53 ± 2.9	-1.694	-1.429 – 0.107	ns	ns
No/*Ne*	143 (53.4)	7.2 ± 3.4				

Effect size: Cohen's d* = small; d** = medium; Eta-squared η2…= small

Veličina uticaja: Cohen's d = mala; d** = srednja; Eta-squared η2...= mala*

Results

Socio-Demographic Characteristics and Lifestyle Behavior in Students

Of the total sample of 268 students, 17.2% were male and 82.8% were female. The average age of students was 21.6 ± 3.0, ranging from 18 to 46 years. More than half of them, i.e. 156 (58.2%) lived without parents in a rented apartment, 60 (22.4%) students had a steady or occasional job while studying. As for the field of medical sciences, the majority were students of nursing 143 (53.4%), medicine 65 (24.3%), and the fewest were students of medical rehabilitation 4 (1.5%). Among the students who gave the answer regarding the average grade during the studies (n = 191), almost half had an average grade between 8.00 and 8.99.

Sleep quality was affected by the following lifestyle factors as reported by the respondents: regular consumption of coffee in 70.9% of students, consumption of caffeinated energy drinks in 48.9% of students, and consumption of alcoholic beverages in 53.4% of students. One hundred and seventy-eight students (66.5%) slept less than 7 hours, whereas 114 (42.5%) said that it had happened to them to doze off during the lectures. Almost a third of students (33.2%) used the mobile phone for more than six hours during the day and sent 134 messages by mobile phones on average through social networks.

Sleep Quality

The average PSQI global score for all students was 6.9 ± 3.2 ranging from 0 to 16. The poor sleep quality (PSQI > 5) was reported by 168 (62.7%) students, whereas a hundred students said they were good sleepers (37.3%). On average, students slept 6.4 ± 1.3 hours with a sleep latency of 20.0 ± 16.1 minutes. One hundred and fifteen students (43.0%) reported having poor sleep efficiency (less than 85%), and 45 (16.8%) used sleeping pills. Two hundred and nine students (78.0%) reported daytime dysfunctionality. Of the nine factors that could cause sleep difficulties, the respondents most often reported: the inability to fall asleep within 30 minutes (n = 84; 31.3%), wakening up during the night or very early in the morning (n = 74; 27.6%) and experiencing bad dreams (n = 47; 17.5%). The average values of the global PSQI score differed significantly in relation to gender, type of study, average grade, and lifestyle factors among students **(Table 1)**.

Table 2. Distribution of students' responses to SHKQ questions
Tabela 2. *Distribucija odgovora studenata na pitanja iz SHKQ*

Items *Stavke*	Correct *Pravilno*		Wrong *Pogrešno*	
	n	%	n	%
Take a nap during the day/*Dremanje tokom dana*	136	50.7	132	49.43
Smoke a cigarette within 4 hours of bedtime *Konzumiranje cigareta 4 sata pre odlaska na spavanje*	104	38.8	164	61.2
Use sleep medication/*Uzimanje tableta za spavanje*	102	38.1	166	61.9
Take beer (or other drinks with alcohol) within 4 hours of bedtime *Konzumiranje piva (ili drugog napitka sa alkoholom) 4 sata pre odlaska na spavanje*	77	28.7	191	71.3
Eat heavy night snack before bedtime/*Konzumiranje jakog večernjeg obroka pre spavanja*	235	87.7	33	12.3
Drink caffeinated beverages after 2 p.m./*Konzumiranje pića koja sadrže kofein posle 14 h*	127	47.4	141	52.6
Drink a glass of milk before bedtime*/*Popiti čašu mleka pre odlaska pred spavanje**	130	48.5	138	51.5
Perform active exercises within 2 hours of bedtime *Baviti se aktivnim telesnim vežbanjem 2 sata pre odlaska na spavanje*	111	41.4	157	58.6
Go to bed hungry/*Otići na spavanje gladan*	252	94.0	16	6.0
Go to bed thirsty/*Otići na spavanje žedan*	259	96.6	9	3.4
Studying intensively before bedtime/*Intenzivno učiti pre odlaska na spavanje*	155	57.8	113	42.2
Use of bed for things other than sleep (watching TV, reading, learning, eating, etc.) – except for sexual activities/*Koristiti krevet za stvari koje nisu spavanje (gledanje TV, čitanje, učenje, uzimanje obroka i sl.) – izuzev seksualnih aktivnosti*	204	76.1	64	23.9
Sleep in the optimal room temperature*/*Spavati u sobi optimalne temperature**	209	78.0	59	22.0
Perform relaxing exercises before bedtime* *Primeniti relaksirajuće vežbe ili aktivnosti pre spavanja**	198	73.9	70	26.1
Sleep for approximately the same time each day*/*Spavati otprilike jednako dugo svake noći**	195	72.8	73	27.2
Go to bed at the same time each day*/*Odlaziti na spavanje svako veče u isto vreme**	192	71.6	76	28.4
Wake up at similar time each day*/*Ustati svako jutro u isto vreme**	179	66.8	89	33.2
Total score/*Ukupni skor 10.7 ± 2.6 (SD)*				

* Correct sleep hygiene knowledge/* *Pravilno poznavnaje higijene spavanja*

Table 3. Distribution of students' responses to SHPS questions
Tabela 3. *Distribucija odgovora studenata na pitanja iz SHPS*

Items *Stavke*	Mean *Prosek*	Stand. dev. *Stand. dev.*
Take a nap during the day/O*dremate tokokom dana*	4.9	1.8
Smoke a cigarette within 4 hours of bedtime/*Konzumirate cigarete 4 sata pre odlaska na spavanje*	5.9	2.2
Use sleep medication/*Koristite tablete za spavanje*	6.9	0.4
Take beer (or other drinks with alcohol) within 4 hours of bedtime *Konzumirate alkoholna pića 4 sata pre odlaska na spavanje*	6.3	0.9
Eat heavy night snack before bedtime/*Pojedete jak večernji obrok pre spavanja*	5.6	1.5
Drink caffeinated beverages after 2pm/*Konzumirate pića koja sadrže kofein posle 14 časova*	4.6	2.5
Drink a glass of milk before bedtime/*Popijete čašu mleka pre odlaska na spavanje*	0.9	1.3
Perform active exercises within 2 hours of bedtime *Praktikujete intenzivnu fizičku aktivnosti 2 sata pre odlaska na spavanje*	6.1	1.3
Go to bed hungry/*Odlazite na spavanje gladni*	5.9	1.4
Go to bed thirsty/*Odlazite na spavanje žedni*	6.7	0.8
Go to bed and replay the day's events over and over in your mind *Ležete u krevet i razmišljate o dnevnim dešavanjima iznova i iznova*	3.5	2.4
Go to bed and think about things you need to do the next day *Ležete u krevet i razmišljate o obavezama koje Vas čekaju naredni dan*	3.0	2.3
Go to bed worrying/*Ležete u krevet sa brigama*	4.2	2.3
Study intensely until you go to bed/*Intenzivno učite sve do odlaska na spavanje*	4.9	1.8
Use bed for things other than sleep (watching TV, reading, learning, eating, etc.) – except for sexual activities/*Koristite krevet za stvari koje nisu spavanje (gledanje TV, čitanje, učenje, uzimanje obroka i sl.) – izuzev seksualnih aktivnosti*	3.5	2.5
Sleep in the optimal room temperature/*Spavate u sobi prijatne temeprature*	5.1	2.4
Fall asleep in a bedroom which is too bright/*Zaspite u previše osvetljenoj sobi*	6.2	1.7
Sleep in a noisy bedroom/*Spavate u bučnoj sobi*	6.5	1.3
Find the time to relax or perform relaxing exercises before bedtime *Izdvojite vreme za opuštanje ili izvođenje relaksirajućih vežbi pre spavanja*	1.3	1.7
Sleep for approximately the same time each day/*Spavate otprilike jednako dugo svake noći*	2.9	2.3
Go to bed at the same time each day/*Odlazite na spavanje u isto vreme svako veče*	2.8	2.4
Wake up at similar time each day/*Budite se u isto vreme svakog dana*	2.7	2.3
Total score/*Ukupni skor*	100.5	15.0

Sleep Hygiene Knowledge and Practices

The average SHKQ score for the whole sample was 10.7 ± 2.6 (ranging from 3 to 17). The percentage of correct or incorrect answers to SHKQ questions indicates that there are misconceptions about sleep hygiene **(Table 2)**.

The average SHKQ score differed in relation to groups of students (t = -3.069; df = 266; p = 0.002), whereby the students of integrated studies had a significantly higher score (11.3 ± 2.3) compared to the students of basic health studies (10.3 ± 2.7), but this difference was small (Cohen's d = 0.4).

The average SHPS score for the whole sample was 100.5 ± 15.0 or 4.6 per item **(Table 3)**.

The average SHPS score differed in relation to the groups of students (t = 2.020; df = 266; p =

Table 4. The total SHKQ, SHPS and PSQI score: differences in relation to circadian typology
Tabela 4. *Ukupni SHKQ, SHPS i PSQI skor: razlike u odnosu na cirkadijalnu tipologiju*

Variable *Varijabla*	Mean ± SD/*Prosek ± SD*			F	95% CI	p	η2
	Morning chronotype *Jutarnji hronotip*	Evening chronotype *Večernji hronotip*	Intermediate chronotype *Intermedijarni hronotip*				
SHKQ	12.0±2.3	10.2±2.5	10.6±2.6	5.369	10.38–11.00	0.005	0.03
SHPS	112.2±14.2	91.9±14.6	101.3±13.6	24.567	98.64–102.26	0.000	0.15
PSQI	5.2±2.8	8.2±2.6	6.8±3.3	9.950	6.50–7.27	0.000	0.70

Effect size: Eta-squared $\eta^{2\dagger}$= small, $\eta^{2\dagger\dagger}$= medium/*Veličina uticaja: Eta-squared* $\eta^{2\dagger}$*= mala,* $\eta^{2\dagger\dagger}$*= srednja*

Table 5. Correlation of sleep quality (total PSQI score) and sleep hygiene knowledge and practice scores
Tabela 5. *Povezanost kvaliteta spavanja (ukupni PSQI skor) i skora na testu znanja i prakse o higijeni spavanja*

Variable/*Varijabla*	PSQI	SHKQ	SHPS
PSQI	1	-0.133*	-0.501**
SHKQ	-0.133*	1	0.190**
SHPS	-0.501**	0.190**	1

*p < 0.05; **p<0.001

0.044), whereby the students of integrated studies had a significantly higher score (103.0 ± 16.3) compared to the students of basic health studies (99.1 ± 14.2), but the difference was small (Cohen's d = 0.3).

Circadian Typology

As for the chronotype, the students were classified as the intermediate chronotype (67.2%), evening chronotype (20.9%) and morning chronotype (11.9%). A significant difference between sleep hygiene knowledge and practices and sleep quality in relation to circadian typology was determned **(Table 4)**.

Correlation Between Sleep Hygiene Knowledge and Practices and Sleep Quality

We found a significant negative correlation between sleep hygiene knowledge and practices and sleep quality, whereby the lower SHKQ and SHPS scores followed a higher PSQI score **(Table 5).**

Discussion

Previous studies suggest that students generally sleep less than the general population because of the exposure to academic stressors and numerous academic demands. They are therefore at risk of having poor sleep quality, daytime dysfunction and cognitive impairment. Although a large number of them strive to adapt their daily activities to academic, social and other obligations, only a small number of students manage to align their obligations with the circadian regulated sleep-wake rhythm [11,15]. Accordingly, students in our study slept for about 6.4 hours on average, with sleep latency within 20 minutes, and almost half of them had sleep efficiency less than 85%, whereas two-thirds reported daytime dysfunction.

The global PSQI score of all students was 6.9 ± 3.2, whereby the "poor sleepers" accounted for the majority (62.7%). Similar results were obtained in studies on the students from Iran [16], Hong Kong [13], and USA [11], while the students from China [17], Ethiopia [18] and Lebanon [10] could be classified as "better sleepers". However, differences in the results of the abovementioned studies can be culturally conditioned.

In this study, as in the previous ones, sleep quality was worse among the female students compared to the male students [17, 18]. A traditional role of females in the family and society, cognitive differences between genders, and the fact that women for physiological reasons need more sleep than men can explain this difference [2, 4].

Comparing two groups of health science students, we found that the students of basic studies had poorer sleep quality compared to the students of integrated studies. This result could be explained by the fact that the students of basic studies are overloaded with a large number of hours of practical skill training [19], and that a certain number of them work and study [15, 20], or perhaps by the fact that those who study integrated studies use better strategies for solving their academic obligations [2]. Also, the students with an average grade between 8.00 and 8.99 had poor sleep quality. Probably the need of this group of students to get an average grade that would enable them to enroll at a higher level of study has led them to compensate their academic performance by means of unhealthy sleep patterns [21].

The consequence of poor sleep quality in the student population is a feeling of day-time sleepiness that results in a decline in cognitive abilities (attention, concentration and decision-making) [15, 22], which has been confirmed by the results of this study. Namely, the students who said that it had happened to them to doze off during lectures had significantly lower sleep quality than those who did not. This finding is of high public health significance because poor sleep quality and unintended sleep episodes of dozing off in future health professionals increase the risk of mistakes in the patients' care [23].

In our sample, the students who reported to consume coffee, alcohol and energy drinks had a poorer sleep quality, which was in agreement with literature data, but we did not find a significant correlation between regular physical activities and sleep quality [18]. Namely, Lemma et al. [18] found a weak negative correlation between physical activities and sleep quality. However, their study does not explain which physical activities are in question and at what time of the day they are being practiced. Besides, the longer use of mobile phones and computers associated with poor sleep quality was confirmed in several studies [3, 21, 24]. In the same way, this study has shown that the sleep quality deteriorates significantly with the increasing level of excessive mobile phone use.

The average score of SHKQ in our sample was 10.7 ± 2.6 and the correct answers were given by 62.9% of students, which is very similar to the results of the research carried out in Croatia [5], and slightly worse than the results of Hong Kong students [13]. Most of our students had the misconceptions about sleeping during the day, sleeping pills, alcohol, caffeinated drinks, and that doing 2 hours of exercise before bedtime did not interfere with the quality of

sleep, or that the consumption of a glass of milk positively affected the sleep quality. The average SHPS score for the entire sample in our study was 100.5 ± 15.0 (4.6 per item), which indicates that students performed all activities regarding sleep hygiene on average 4.6 times a week, which is similar to the results of the Hong Kong study [13]. The students of Integrated Healthcare Studies had better knowledge and practice of sleep hygiene compared to the students of basic studies and therefore better sleep quality. This is probably the result of a difference in the study curriculum, due to the fact that the students of integrated studies have more knowledge about the sleep physiology and the impact of sleeping on the quality of life in individuals.

In our research, a significant negative correlation between sleep hygiene knowledge and practices and sleep quality was determined, whereby lower SHKQ and SHPS scores were followed by a higher PSQI score, indicating that there was also a higher probability for students who had poor sleep hygiene knowledge and practices to have poor sleep quality. Unlike data from this study, the results of a number of studies indicate that sleep hygiene practice is associated with sleep quality unlike the level of knowledge [4, 6, 13]. The differences in methodological research procedures can explain this inconsistency. Furthermore, in our research, a weak positive correlation between sleep hygiene knowledge and practices was established, which was supported by the findings of the Croatian study [5], while Felix et al. [9] claimed the opposite.

By analyzing diurnal sleep preferences among our students, sleep quality was to be the highest in the morning chronotype, whereas in the evening chronotype it was the worst. The same applies to sleep hygiene knowledge and practices. Our findings are in accordance with literature data indicating a poorer sleep quality in those with the evening chronotype [3, 5, 7, 25], more accurate knowledge on sleep hygiene in the morning chronotype compared to the evening chronotype [8], and less adherence to good sleep hygiene practices in the evening chronotypes in relation to the morning chronotype [26]. Diaz-Morales et al. [8] believe that less adherence to good sleep hygiene practices correlates the evening chronotype with lower sleep quality.

Limitations of the study

This study has some limitations which have to be pointed out. The research was conducted on-line, and it is possible that the reasons for students' involvement were pre-existing poor sleep quality or higher levels of sleep hygiene knowledge. We could not collect data from students who did not have access to the Internet, therefore, caution should be taken in generalizing the results.

Conclusion

An average sleep quality score indicates that a large proportion of Novi Sad University students experience a suboptimal level of overall sleep quality according to the PSQI criterion. Although satisfactory sleep hygiene knowledge was found in a high percentage of students, many of them reported unhealthy practices indicating that knowledge was not a factor of deterring from unhealthy behaviors. Interventions on sleep hygiene practices must focus on changing and applying behavioral factors, and not just learning about sleep hygiene.

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FATIGUE ASSESSMENT IN CANCER PATIENTS

PROCENA UMORA KOD ONKOLOŠKIH PACIJENATA

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Summary

Introduction. Fatigue in cancer patients is one of the most frequent symptoms present irrespectively of the kind of malignant tumor, its localization, stage and/or treatment modality. One of the most often used definition of fatigue emphasizes a disturbing, persistent, subjective feeling of physical, emotional and/or cognitive fatigue, or tiredness, connected with the carcinoma and/or its therapy, that is not proportional with the patients' activities and therefore impairs their daily functioning. The study has been undertaken with the aim of determining the levels of fatigue in cancer patients during radiotherapy. **Material and Method.** The study was conducted as a cross-sectional study, by interviewing 80 hospitalized patients at the Institute for Oncology of Vojvodina in Sremska Kamenica, Clinic for Radiotherapy. Perform Questionnaire with 12 item describing fatigue over the previous two weeks was used as a study instrument. For the statistical analysis of data we used method of descriptive statistics and inferential statistics. Statistical significance was determined at the level of $p<0.05$. **Results.** The highest average values of the general Perform questionnaire score were recorded in the patients diagnosed with the central nervous system carcinoma [38.9± 14.6], while the lowest were recorded in the group of patients with prostate cancer [17.0±4.6]. Simultaneous administration of radiotherapy and chemotherapy leads to major limitations of physical performances, daily life activities and patient attitudes. **Conclusion.** All participants included in this study experienced fatigue, although it differed in separate domains, as well as by the type of therapy, primary diagnosis and intensity over the previous two weeks; however, it was present at the moment of estimation.

Key words: Self-Assessment; Fatigue; Neoplasms; Activities of Daily Living; Signs and Symptoms; Surveys and Questionnaires

Sažetak

Uvod. Umor kod onkoloških bolesnika jedan je od najčešćih simptoma prisutan nezavisno od vrste malignog tumora, lokalizacije i stadijuma i/ili medicinskih modaliteta lečenja. Jedna od najčešće korišćenih definicija umora naglašava uznemirujući, perzistentni, subjektivni osećaj fizičkog, emocionalnog i /ili kognitivnog umora, odnosno iscrpljenosti, povezanog sa kancerom i/ili terapijom karcinoma, koji nije srazmeran s bolesnikovim aktivnostima te ometa svakodnevno funkcionisanje. Studija je sprovedena sa ciljem utvrđivanja nivoa umora kod onkoloških pacijenata tokom radioterapije. **Materijal i metode.** Ispitivanje je sprovedeno kao studija preseka, anketiranjem 80 hospitalizovanih pacijenta na Klinici za radioterapiju Instituta za onkologiju Vojvodine u Sremskoj Kamenici. Za utvrđivanje umora korišćen je *Perform Questionnaire* – Perform upitnik koji se sastoji od 12 stavki na osnovu kojih se procenjuje umor u protekle dve nedelje. Za statističku obradu podataka primenjene su metode deskriptivne i inferencijalne statistke, a statistička značajnost određivana je na nivou $p < 0,05$. **Rezultati.** Najveće prosečne vrednosti ukupnog skora upitnika Perform imali su pacijenti sa dijagnozom tumora centralnog nervnog sistema (38,9 ± 14,6), dok su najniže vrednosti zabeležene u grupi pacijenata sa dijagnozom karcinoma prostate (17 ± 4,6). Istovremena primena radioterapije i hemioterapije dovodi do većih ograničenja u domenima fizičkih performansi, aktivnostima dnevnog života i stavovima pacijenata. **Zaključak.** Umor kod onoloških pacijenata obuhvaćenih ovim istraživanjem razlikovao se u različitim domenima, prema vrsti terapije, primarnoj dijagnozi, intenzitetu i prisutnosti tokom poslednje dve nedelje ali u trenutku procene bio je prisutan kod svih ispitanika.

Ključne reči: samoprocena; umor; neoplazme; aktivnosti svakodnevnog života; znaci i simptomi; istraživanja i upitnici

Fatigue in cancer patients has many definitions. In professional literature the most often used definition indicates an unsettling, persistent, subjective feeling of physical, emotional and/or cognitive fatigue or exhaustion associated with the basic illness and/or therapy but disproportionate to the patient's activities so it hinders the patient's everyday activities [1]. The basic characteristics of fatigue in cancer patients are the lack of energy followed by exhaustion and weakness. The difficulties in defining fatigue of those diagnosed with and being treated for a malignant disease arise from a complex, multifactorial etiology of fatigue. The causes and mechanisms can be connected with the basic underlying disease and/or medical modalities of treatment, but also with potential genetic predispositions and following physical and/or mental illnesses, behavioral and environmental factors [2-6]. Because of this a wide spectrum of causes and influences – somatic affective, cognitive and psychosocial, which are often indistinguishable, equally contribute to fatigue.

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Abbreviations
PHL – physical limitations
ADL – daily life activities
AB – attitudes and beliefs
WHO – World Health Organization

It is not just that fatigue is dominantly present irrespectively of the type of malignant tumor, but it is also present as a side effect of all forms of medical treatment modalities, including bone marrow transplantation and stem cell treatment, hormonal and biological therapy and not just radiotherapy and chemotherapy. Research has shown that fatigue is present in most patients regardless of different origin, localization, stages and consequences of malignant disease and/or consequences of treatment. Data from literature point out that fatigue is one of the symptoms in the population of those suffering from and being treated for carcinoma with the greatest negative effect on daily life [2, 4].

Results of studies have shown that fatigue is present in 50% of patients suffering from cancer at the moment of diagnosis and that 80% of the patients feel fatigue during at least half of their treatment regardless of treatment modality. In patients having metastasis at the time of diagnosis, fatigue incidence grows to 75% [7]. Different data from the available literature about fatigue prevalence in cancer patients can be explained by differences in methodological approaches to measuring fatigue. Healthcare workers are recommended to approach patients directly when identifying and assessing fatigue, which should be done regularly during treatment [1]. Fatigue incidence is often measured by self-report questionnaires. Those that contain items about different dimensions of fatigue (somatic, affective, cognitive) are considered the "golden standard" [8]. This study was performed in order to determine the level of fatigue in cancer patients during radiotherapy.

Material and Methods

We performed a cross-sectional study at the Clinic for Radiotherapy, Institute for Oncology of Vojvodina in Sremska Kamenica during July 2018. All patients hospitalized for planned radiotherapy were included in the survey. The total study sample consisted of 80 patients who signed the written consent form (N=80), thus confirming their wish to participate in this study. The Perform questionnaire was used as the study instrument. The questionnaire is a short scale consisting of 12 items created for the purpose of evaluating fatigue over the previous two weeks in cancer patients. The psychometric characteristics of items included in this questionnaire are indicative of good feasibility, good reliability of testing, internal consistency, convergent validity and sensitivity to changes [9]. The participants can answer every item by choosing an option on a five point Likert scale (never, sometimes, often, mostly and always). The items are distributed into three domains: physical limitations (PHL), daily life activities (ADL) and attitudes/beliefs toward fatigue (AB). The maximal score of this questionnaire is 60, ranging from 1–12 no fatigue; 13–24 sometimes feels fatigue; 25–36 often feels fatigue; 37–48 mostly feels fatigue; 49–60 maximal fatigue always present. Sub scores for three dimensions range from 4 to 20, where high scores indicate the presence of fatigue.

For the statistical analysis of data we used method of descriptive statistics and inferential statistics. Statistical significance was determined at the level of $p<.05$.

Results

Table 1 shows that 52 participants (65%) were women, 49 patients (61.2%) were over 60 years of age, 51 patients (63.8%) were retired and 49 patients (61.2%) had secondary education.

Student's t-test was used to determine the sociodemographic differences in fatigue. The average score values in all scale domains (PHL, ADL, AB) were higher in the participants with grade school level education. Statistically significant differences in scores with regards to education were found in the PHL do-

Table 1. Demographic characteristics of participants
Tabela 1. *Demografske karakteristike ispitanika*

	n (%)
Gender/*Pol*	
Male/*Muški*	28 (35)
Female/*Ženski*	52 (65)
Age group/*Starosno doba*	
41-60 years/*godina*	31 (38.8)
Over 60 years/*Preko 60 godina*	49 (61.2)
Education level/*Nivo obrazovanja*	
Grade school/*Osnovna škola*	29 (36.3)
High school/*Srednja škola*	49 (61.2)
University degree/*Viša/visoka škola*	2 (2.5)
Employment/*Zanimanje*	
Employed/*Zaposlen*	16 (20)
Unemployed/*Nezaposlen*	13 (16.3)
Retired/*Penzioner*	51 (63.8)

Table 2. Clinical characteristics of the participants
Tabela 2. *Kliničke karakteristike ispitanika*

Diagnosis/*Dijagnoza*	n	%
Breast cancer/*Karcinom dojke*	23	28.8
Cancer of the gynecological region/*Karcinomi ginekološke regije*	11	13.8
Carcinoma of the head and neck /*Karcinomi glave i vrata*	35	43.8
Prostate cancer/*Karcinom prostate*	11	13.8
Therapy/*Terapija*		
Radiotherapy/*Radioterapija*	37	46.3
Radiotherapy and chemotherapy/*Radioterapija i hemioterapija*	43	53.7

Table 3. Total average score of the Perform questionnaire by domains: differences with regards to type of therapy
Tabela 3. *Ukupni prosečni skor na Perform upitniku u domenima: razlike prema vrsti terapije*

Domain questionnaires Perform *Domen Perform upitnika*	Therapy/*Terapija*			
	RT (n=37)	RT+HT (n=43)	t	p
	Mean±SD	Mean±SD		
Physical limitations/*Fizička ograničenja*	5.6±1.5	9.7±4.4	5.3	0.00
Daily life activities/*Aktivnosti dnevnog života*	6.8±2.4	10.7±3.5	5.7	0.00
Attitudes and beliefs/*Stavovi i verovanja*	6.2±3.3	11.5±4.9	5.5	0.00
Total/*Ukupno*	18.6±6.0	31.8±11.2	6.4	0.00

RT – Radiotherapy/*Radioterapija,* RT+HT – radiotherapy and chemotherapy/*Radioterapija i hemioterapija*

main (t=2.68; p<0.00) and in the general score (t=2.00; p=0.04). There was no statistical difference in scores with regards to other measured socio-demographic characteristics of the sample.

Table 2 shows that most of the participants had a confirmed diagnosis of carcinoma of the head and neck, 21 patients (26.3%) had carcinoma of the oral cavity and 14 patients (17.5%) had carcinoma of the central nervous system. Almost one third of the patients had a confirmed diagnosis of breast cancer 23 (28.8%), and 11 patients (13.8%) were diagnosed with a gynecological carcinoma or prostate cancer.

As for the modality of treatment more than a half of participants (43 (53.7%)) were treated by a combined radiotherapy and chemotherapy protocol and the rest, i.e. 37 patients (46.3%) received only radiotherapy.

Average values of scores in all domains (PHL, ADL, AB) were significantly higher in the participants who had undergone both radiotherapy and chemotherapy. There was a statistically significant difference in the score level between treatment modalities in all measured domains PHL (t=5.30; p<0.00), ADL (t=5.77; p<0.00), AB (t=5.57; p<0.00), as well as in the Perform general score (t=6.39; p<0.00) **(Table 3)**.

The data analysis has shown that the average score values in all Perform domains (PHL, ADL, AB) were significantly higher in the participants diagnosed with carcinoma of the central nervous system. The lowest average values were recorded in the participants with breast and prostate cancers. A statistically significant difference was detected in the domain of physical functioning PHL (F=7,55; p<0.001), in the domain of ADL

Table 4. Total average score of the Perform questionnaire by domains: differences between diagnostic categories
Tabela 4. *Ukupni prosečni skor na Perform upitniku u domenima: razlike prema dijagnozi*

Domain questionnaires Perform *Domeni upitnika Perform*	Distribution of patients by diagnosis/*Distribucija pacijenata prema dijagnozi*					F	p
	Breast cancer *Karcinom dojke* (n=23)	Prostate cancer *Karcinom prostate* (n=11)	Carcinoma of the oral cavity *Karcinom usne duplje* (n=21)	Carcinoma of the central nervous system/*Tumori centralnog sistema* (n=14)	Cancer of the gynecological region/*Karcinomi ginekološke regije* (n=11)		
	Mean±SD	Mean±SD	Mean±SD	Mean±SD	Mean±SD		
PHL*	5.7±1.4	5.0±1.3	8.9±3.1	10.9±6.3	8.5±2.9	7.5	0.00
ADL*	6.7±2.1	6.0±1.5	10.1±2.8	12.2±4.5	9.6±2.7	11.7	0.00
AB*	5.7±1.8	5.8±2.8	10.2±3.7	15.8±5.4	8.7±2.8	21.9	0.00
Total/*ukupno*	18.1±4.4	17.0±4.6	29.3±8.1	38.9±14.6	26.8±5.6	18.0	0.00

PHL/FD – Domain of physical limitations/*Domen fizičkog ograničenja;* ADL/ADŽ – Domain of activities of daily life/*Domen aktivnosti dnevnog života;* AB/VS – Domain of attitudes and beliefs toward fatigue/*Domen stavovi i verovanja*

(F=11,71; p<0.001), in the domain of beliefs and attitudes ABB (F=21,98; p<0.001), and in the summary score (F=18,06; p<0.001) **(Table 4).**

Discussion

Facing and accepting the diagnosis, treatment and long term recovery from malignant diseases is a complicated process and it can take months, or perhaps even several years to be achieved. A large variation in age defines the population of the affected with their changed expectations, roles, responsibilities and concerns during their life cycle which confront with demands of the unpredictable disease.

According to the principles of the World Health Organization cancer patients are defined as chronically ill [10]. They face a high level of physical, psychological and social stress from the moment of being diagnosed and throughout all phases of medical care. Symptoms and unwanted effects of the illness and/or medical modalities of treatments decrease the psychophysical well-being and life quality of patients [11, 12]. Fatigue is a common symptom in cancer patients and it causes the limitation of physical activity [8, 9] and hinders professional, familial and social roles [5–9, 11]. In our research we have detected a difference between education levels and domain of physical functioning PHL (t=2.7; p<0.00) and general questionnaire score (t=2.0; p=0.04); we have not found a statistically significant difference between fatigue and age, as has been described before [6]. Average score values for all Perform questionnaire domains (PHL, ADL, AB) are higher in the participants with lower education levels. Diverse manifestations of fatigue in the domain of physical functioning mostly cited by the patients include the feeling of exhaustion and lack of energy with the loss of interest. The patients who feel fatigue are very different in the way they express and describe the problems they are experiencing. Such results in our research are in concordance with the results of a qualitative study that have shown that clinical traits are highly individual and there are barely even two similar patients [13]. It is interesting to note that during earlier surveys, a connection between symptoms and antecedent activities could not be made. The results of the study also state the fact that unlike fatigue and exhaustion in non-oncological patients, cancer patients do not feel refreshed after rest or sleep [14]. Numerous symptoms such as pain, sleeping disorders, lack of appetite or nausea tend to have a negative influence on cancer patients; however, fatigue-related symptoms are considered most pronounced [13]. Fatigue considerably diminishes the ability of cancer patients to perform physical activities. It is believed that the causes of decreased physical performance result from changes in the cortical and spinal sensory centers, in the energy metabolism and in the process of muscle activation [3]. Depending on the severity of the underlying diseases the negative effects of fatigue in the domain of physical activity can range from temporary disability in the sense of limited movement, disorders in coordination and gait, decreased independence in daily activities, inadequate dealing with everyday life and social withdrawal up to inability to do ones job and earn for a living that leads to economic difficulties for the patient and additional economic burden for the whole society [8, 12]. In our study, differences in the patient's feeling of fatigue with regard to the type of therapy show that the average values of all domain scores and the general score are higher in the patients who underwent the combined therapy (radiotherapy and chemotherapy). These results are in concordance with many findings of earlier studies. [11, 12, 15–18]. It is known and well described that a string of side effects resulting from chemotherapy, i.e. of antineoplastic therapy, often become more pronounced in intensity and frequency when it is combined with radiotherapy. Nausea and tiredness with a loss of appetite are the most frequent symptoms after chemotherapy and have a negative effect on fatigue in the patients who are also on radiotherapy [15–18].

The lowest average value of the summary general score of the Perform questionnaire was recorded in the patients diagnosed with prostate cancer (17.0±4.6) and breast carcinoma (18.0±4.4), and almost identical average score values were found in the domain of physical activities (5.0±1.3vs5.7±1.4); the domain of daily life activity (6.0±1.6 vs 6.6±2.2) and the domain of attitudes and beliefs (5.8±2.8 vs 5.6±1.8). By the questionnaire categories and in relation with the average score, the results of our study show that the patients with breast and prostate carcinoma diagnosis have sometimes felt fatigue. Such results are in accordance with those from similar studies that also document lower fatigue-related difficulties in the patients with breast and/or prostate carcinoma [19].

The analysis of the results from the group of patients with carcinoma of the head and neck has shown that the average values are higher in all domains and in the general score. The patients with oral cavity carcinoma have a higher average value of general score in two domains, the domain of daily life activities and the domain of attitudes and beliefs (10.2±2.8 vs 10.2±3.8), unlike the domain of physical activity, the average value being 8.9±3.1, which suggests that fatigue due to physical limitations is almost absent. Primary localization of the carcinoma and the incidence of side effects during radiotherapy and/or chemotherapy (changes in the oral cavity such as mucositis, stomatitis, impaired chewing and/or swallowing) have contributed to greater limitations in the domain of daily life activities, so this particular domain and that of attitudes and beliefs are the most frequent reasons for the presence of fatigue in this population of participants. Although our research did not include the assessment of the oral cavity, the participants themselves reported hardships they were facing, so in item 5 of the Perform questionnaire (When I am fatigued, I must stop what I am doing in order to rest and then carry on) they often said that during the intake of food they had to make pauses because of fatigue, since it

was hard for them to chew and/or swallow food. The average value of the general Perform questionnaire score indicated that the participants with oral cavity carcinoma (29.3±8.1) were often tired.

The highest values obtained in our study were those in the domain of beliefs and attitudes in the patients with tumors of the central nervous system (15.8±5.6). The items of this domain reflect the personal perception of fatigue and its influence on life. High average values in this domain show that the patients with tumors of the central nervous system feel that they cannot lead regular lives because of their illness. Average values in other domains of PHL and AB (10.9±6.3 vs 12.2±4.5) as well as of the general score (38.9±14.6) indicate that the patients felt tired in the previous two weeks.

Frequent presence of fatigue during the previous two weeks is characteristic for patients with carcinoma of the gynecological region, and this is indicated by the average general score of (26.8±6.0). It is interesting to note that there is virtually no difference when these participants are analyzed regarding the scores on PHL, ADL and AB domains (8.5 ± 2.9 vs 9.6±2.7 vs 8.7±2.8) of the Perform questionnaire. Such results suggest equal participation of physical performance, existence of limitation in daily activities and negative subjective perception of patients when fatigue in the previous two weeks is concerned.

Conclusion

All participants included in this study experienced fatigue, although it differed in separate domains, as well as by the type of therapy, primary diagnosis, and intensity over the previous two weeks and at the moment of estimation; however, it was the constant follower of these patients.

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EVALUATION OF COMFORT LEVEL IN PATIENTS WITH IMMOBILIZATION

PROCENA NIVOA KOMFORA PACIJENATA SA POSTAVLJENOM IMOBILIZACIJOM

Dragana MILUTINOVIĆ[1], Milena MIKIĆ[1], Dragoslava RAKIĆ[2], Dušanka CVIJANOVIĆ[3] and Dragana ŽIVKOVIĆ[1]

Summary

Introduction. In our modern "high–tech""society, comfort of the patient is often forgotten because the practice is usually performed according to the bio-medical model and focused only on solving the physical problems of the patient rather than on a holistic approach. Therefore, the objective of this study was to assess the comfort level of patients hospitalized with the immobilization. **Material and Methods**. The study was conducted as an observational, analytical cross-sectional study by interviewing 124 patients hospitalized at the Clinical Centre of Vojvodina. Comfort Immobilization Questionnaire with 20 individual statements that describe the current good or bad condition of the patient was used as an instrument of research. Descriptive and inferential statistics methods were applied for statistical data processing and statistical significance was determined at $p < 0.05$. **Results**. The immobilized orthopedic patients reported a high level of comfort in the socio-cultural and spiritual context, which was, however, insufficient in the physical context and the immediate environment context. A low level of comfort was reported by the patients between the ages of 36 and 59 years and the patients with immobilization of the upper extremities. Comfort level was conditioned by the intensity of pain and applied analgesic therapy rather than the duration of applied immobilization. **Conclusion**. The results of this study indicate that the patients' comfort level is significantly affected by modifying factors such as hospital facilities as well as the type of immobilization and their age. Comfort Immobilization Questionnaire has proven to be a simple and reliable questionnaire for testing the patients comfort level in different contexts.

Key words: Patient Comfort; Immobilization; Patient Satisfaction; Pain; Age Factors; Nursing Care; Surveys and Questionnaires

Sažetak

Uvod. U današnjem tehnološkom svetu često se zaboravlja na komfor pacijenta jer se uglavnom praksa obavlja po bio-medicinskom modelu i usmerena je na rešavanje najčešće telesnih problema pacijenta, a ne na holističkom pristupu. Stoga je cilj ove studije bio da se proceni nivo komfora hospitalizovanih pacijenata sa postavljenom imobilizacijom. **Materijal i metode.** Ispitivanje je sprovedeno kao opservativna, analitička studija preseka, anketiranjem 124 hospitalizovana pacijenta u Kliničkom centru Vojvodine. Upitnik komfora u imobilizaciji sa 20 tvrdnji koje opisuju trenutno dobro ili loše stanje pacijenta koristio se kao instrument istraživanja. Za statističku obradu podataka primenjene su metode deskriptivne i inferencijalne statistke, a statistička značajnost određivana je na nivou $p < 0,05$. **Rezultati.** Imobilisani ortopedski pacijenti su iskazali visok nivo komfora u društveno-kulturološkom i duhovnom kontekstu, a nedovoljan u fizičkom i kontekstu neposrednog okruženja. Nizak nivo komfora imali su pacijenti populacije između 36 i 59 godina i pacijenti sa imobilizacijom gornjih ekstremiteta. Nivo komfora bio je uslovljen jačinom bola i primenjenom analgetskom terapijom, a ne dužinom primenjene imobilizacije. **Zaključak.** Rezultati ovog istraživanja ukazuju da na nivo komfora pacijenta značajno utiču modifikujući faktori kao što su uslovi hospitalizacije, ali i tip imobilizacije i godine života. Upitnik komfora u imobilizaciji se pokazao kao jednostavan i pouzdan upitnik za ispitivanje nivoa komfora pacijenata u različitim kontekstima.

Ključne reči: komfor pacijenta; imobilizacija; zadovoljstvo pacijenta; bol; starosna dob; zdravstvena nega; istraživanja i upitnici

Introduction

The main goal of nursing as a professional discipline is to provide the patients with quality care based on their different needs. Nursing interventions that contribute to the above mentioned assess the comfort status of patients and provide comfort interventions that would create, maintain and improve the comfort [1].

Patient comfort is usually defined as the absence of discomfort and/or feeling of physical or mental pleasure [2]. The feeling of comfort is an important element of everyday life, and is of utmost importance during sickness and hospitalization. Research has shown that the patient who has experienced a greater degree of comfort accepts recommended health behavior more easily, which suggests that comfort is a good predictor of the recovery. As for the relationship between the comfort and health, we can conclude that providing the comfort for the patients is a mandatory part of holistic and culturally adapted nursing care [3]. In order to keep the focus of nursing care on providing comfort to the patients and keeping them comfortable it is necessary to redesign many nursing procedures [1–3].

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Abbreviations
ICQ – Immobilization comfort questionnaire

The comfort theory created by Katharine Kolcaba (1994) could be used as a guide in the process of improving nursing care [4]. Kolcaba defined the concept of comfort and set its taxonomic structure. Her taxonomic structure of comfort recognizes three types of comfort (relief, ease and transcendence) that should be provided to the patients, as well as four contexts in which it is provided. In order to ensure materialization of the level of comfort in patients with casts, Kolcaba (2003) revised her comfort theory [5]. According to that theory, three types of comfort could not be regarded as separate and they represent a unique component, and only together they can have a positive effect on the patient. Four contexts that should ensure improvement and development of the comfort are four fields on which a nurse can and should have an impact, and those are: physical and psycho-spiritual condition of the patient, socio-cultural needs of the patient, and environment as the fourth context [6, 7].

Physical context refers to the bodily needs of the patient such as the feeling of being well-rested and relaxed, satiated and of having the gastrointestinal tract functioning properly (absence of constipation) etc. Pain is also one of the factors of the physical context that can influence the feeling of comfort. Psycho-spiritual context of the feeling of comfort refers to the interpersonal relations, and includes both mental and emotional component. For example, expressed emotional reactions of the patients can lead to an increase or decrease of anxiety that can further affect the entire recovery. Components of socio-cultural context of comfort include the need for education and information. Information that we provide, and the way we educate the patient must be in accordance with the patient's habits and customs as well as the religious beliefs of the patients and their family. Context of the environment includes the influence of the light, noise, smell, color of the walls, the temperature in the room and safety of the surroundings, all of them affecting the feeling of comfort [4–6].

Orthopedic patients are in most cases forced to stay immobilized for a certain period of time, and during that time they are dependent on nurses. Taking into account that many patients have a certain form of immobilization, the level of comfort, as an important element determining the quality of life for a certain period of time, is significantly changed. Elastic bandage of the lower extremities is usually used for soft tissue injuries, after ligament reconstruction in sportsmen, and after total knee replacement in elderly as a support [7]. Cast immobilization and orthotics are present as initial treatment and as a preventive measure in postoperative recovery until the complete healing of the fracture. The Dessault-type arm and shoulder orthotics for immobilization of the shoulder joint and upper extremity is applied immediately after the surgery and could be worn up to four weeks. All of those (cast, orthotics) used for immobilization can be a cause of discomfort for the patient. Discomfort could be caused by pressure, swelling and skin damage that each on its own reduces everyday activities of the patient related to self care, feeding and toiletries [8]. Therefore we designed this study with the aim to assess the level of comfort in all four contexts in hospitalized patients with different types of immobilization.

Material and Methods

The study was conducted as an observational, analytical cross sectional study. The questionnaire was given to the patients hospitalized at the Clinic for Orthopedic Surgery and Traumatology over the period from December 2016 until January 2017. The Clinic has the capacity of 70 beds, and both traumatized patients as well as those with degenerative changes of joints are treated there.

Our study included 124 patients aged 18–88 years.

Study Instruments

Immobilization comfort questionnaire – ICQ and a general questionnaire were used in order to obtain socio-demographic data (age and gender), as well as data regarding the hospitalization (type, position and duration of immobilization, analgesics used etc). ICQ has been created by Kolcaba, and the questionnaire was translated and adapted with the author's consent for this study. The translated questionnaire is equivalent to the original.

The questionnaire contains 20 statements that describe the current good or bad condition of the patient. The answers for every statement are ranked on a six degree Likert's scale: 1= I disagree; up to 6= I agree completely. Minimal and maximal results obtained on the questionnaire range from 20–120. The original questionnaire has neither defined subscales nor referent values. Psychometric testing of the ICQ in the existing studies has shown that the questionnaire has good internal consistency. The values of Cronbach's alpha (α) ranged from 0.74 – 0.82. The structural validity of the questionnaire, which was tested with exploratory factor analysis, confirmed the single factor structure of the questionnaire [9, 10].

Having been translated forward and backward and culturally adapted, the questionnaire showed good reliability with $\alpha = 0.75$ in this study.

Statistical Data Analysis

Descriptive statistics was used to determine the average values, standard deviation (SD), minimal (Min) and maximal (Max) values, 95% confidence interval; i.e. absolute frequency of appearance with the corresponding percentage depending on the nature of the variables. The quality of distribution was confirmed by Kolmogorov-Smirnov test ($p>0.05$). The average values for the two groups were compared with t-test, and one-way analysis of variance (ANOVA) was used to compare the average values of several groups, with Tukey post hoc test. Statistical analysis was done with statistical analysis package software IBM SPSS 23 Statistics, and statistical significance was determined at the level of $p < .05$.

Results

Out of 124 patients included in the study, 73 (58.9%) were male and 51 (41.1%) were female patients. The average age of the patients was 47.5±19.5 years (SD).

The most commonly used type of immobilization was elastic bandage in 82 (66.1%) patients, mostly on lower extremities 105 (84.7%) **(Table 1)**.

The average duration of the immobilization was 3.1±23.4 (SD) days, the shortest and the longest duration of the immobilization being 1 day and 13 days, respectively.

The following analgesic support was given to the patients: Paracetamol®, Diklofen®, Zodol® and Trodon®, alone or in combination (2, 3 or 4 at the same time). Single analgesic was taken by 60 patients (48.4%), two analgesics were given to 53 patients (42.7%), while a combination of three analgesics was taken by 8 (6.5%) patients. The combination of all four analgesics was administered in two (1.6%) patients, while only one patient (0.8%) did not receive any analgesic support postoperatively.

Analysis of the Level of Comfort

The average total score on ICQ was 79.2±14.9 (SD), ranging from 39 to 104. According to the descriptive analysis, the hospitalized patients said that they felt that their family cared for them 5.1±1.7 (SD), they felt well-rested 5.0±1.4 (SD) and they had enough information about their condition 4.8±1.7(SD). The factors that influenced a decrease in the level of comfort were noise in the environ-

Table 1. Distribution of patients according to the type and site of immobilization
Tabela 1. *Distribucija pacijenata prema tipu i mestu imobilizacije*

		n	%
Type of immobilization/support *Tip imobilizacije/podrške*	Elastic bandage/*Elastični zavoj*	82	66.1
	Cast/*Gips*	31	25.0
	Other (fixator or orthotics)/*Drugo (fiksator ili ortoza)*	11	8.9
Total/*Ukupno*		124	100
Site of immobilization *Mesto imobilizacije*	Lower extremities/*Donji ekstremiteti*	105	84.7
	Upper extremities/*Gornji ekstremiteti*	19	15.3
Total/*Ukupno*		124	100

n = absolute frequency/*apsolutna učestalost*; % = relative frequency/*relativna učestalost*

Table 2. Distribution of answers of the patients on statements from ICQ
Tabela 2. *Distribucija odgovora pacijenata na tvrdnje iz ICQ*

	M	SD
I feel relaxed right now./*Osećam se opušteno.*	4.7	1.5
The sounds keep me from resting./*Zbog buke u okruženju ne mogu da se odmorim.*	3.4	1.9
Pain in my back bothers me./*Muči me bol u leđima.*	3.9	2.1
I am constipated right now./*Imam opstipaciju (zatvor).*	4.6	1.9
I feel healthy right now./*Trenutno se osećam dobro.*	4.8	1.5
It is easy to eat in this position./*Nije mi problem da jedem u ovom položaju.*	4.4	1.8
I feel depressed./*Trenutno sam bezvoljan.*	4.5	1.8
My pain is difficult to endure./*Teško podnosim bol.*	3.6	1.8
I have a loved one(s) who makes me feel cared for./*Osećam da se moja porodica brine za mene.*	5.1	1.7
I feel numbness in my legs./*Osećam da su mi noge utrnule.*	4.3	1.9
I am not hungry./*Nisam gladan.*	3.8	2.2
My groin/leg feel tender./*Imam osećaj nelagodnosti u preponama.*	4.6	1.8
I feel dependent on others./*Osećam se zavisnim od drugih osoba.*	4.2	2.0
The temperature in this room is fine./*Temperatura u bolesničkoj sobi je u redu.*	4.7	1.6
I feel comfortable in this position./*Osećam se udobno u ovom položaju.*	3.9	1.8
I need to feel good again./*Potrebno mi je da se opet osećam dobro.*	1.6	1.3
My muscles ache from being in one position./*Bole me mišići jer sam stalno u jednom položaju.*	3.8	2.0
I feel peaceful./*Potpuno sam smiren.*	5.0	1.4
I have enough information about my test results./*Imam dovoljno informacija o svom zdravstvenom stanju.*	4.7	1.7
Total/*Ukupno*	79.2	14.9

M = mean/*prosek*; SD = standard deviation/*standardna devijacija*

ment 3.4±1.9 (SD), pain 3.6±1.8 (SD) and uncomfortable hospital bed 3.5±1.9 (SD) **(Table 2).**

The female patients felt a lower level of comfort 77.1±16.9 (SD) compared to the male patients 80.6±13.2 (SD), but this difference was not statistically significant $t_{(122)} = -1.304$, $p > 0.05$.

In relation to the age of the patients, the highest level of comfort was recorded in the youngest patients (under 35 years) 83.6±10.5 (SD), then the patients over 60 years of age 77.6±15.5 (SD), while the lowest level of comfort was reported by the patients aged 35–59 years 76.2±17.2 (SD). The difference in the level of comfort related to the age of the patients was statistically significant $F=(2, 121) = 2.967$, $p < 0.05$.

In relation to the type of immobilization, the highest level of comfort was observed in the patients with external fixations or orthotics 82.9±12.4 (SD), then the patients with elastic bandage as support 80.8±14.1 (SD), while the lowest level of comfort was reported in the patients with cast immobilization 73.4±16.6 (SD). The difference in the level of comfort related to the type of immobilization was statistically significant $F = (2, 121) = 3.346$, $p < 0.05$.

The patients having the upper extremities immobilized reported a lower level of comfort 77.8±13.4 (SD) compared to the patients with immobilization of the lower extremities 9.4±15.2 (SD), but the difference was not statistically significant $t_{(122)} = -0.406$, $p > 0.05$).

The analysis of the level of patient comfort related to the duration of the immobilization (longer than 4 days) showed that 77.1±14.9 (SD) patients had a lower level of comfort than the patients in whom immobilization lasted for two days or less 80.4±14.8 (SD), but the difference was not statistically significant $F = (2, 121) = 0.586$, $p > 0.05$.

The highest level of comfort related to the applied analgesic support was reported by a patient who did not receive any analgesics (94.2), while the lowest level of comfort was reported in the patients receiving a combination of four analgesics [82.2±26.7 (SD)]. The difference in the level of comfort related to the received analgesics was statistically significant $F = (4, 119) = 3.358$, $p < 0.01$.

Discussion

In our modern "high–tech" society the imperative is to return the comfort principle on the top of priority list of nursing care, especially in immobilized patients. Respecting the framework of the comfort theory and periodical assessment of the quality of care it is possible to achieve the patient satisfaction, as well as nursing staff satisfaction [11].

However, in the available literature there are not many studies which have examined the level of comfort related to the immobilization used. Most of the studies evaluated the level of pain in the postoperative recovery using visual analogue (VAS) and verbal rating scale (VRS) or by assessing comfort theory and validity [9, 10, 12]. Thus, Howlin et al. [12] assessed the level of comfort of head restraints and thermoplastic masks during radiotherapy only by VAS scale. It is a question whether we can define comfort just by the absence of pain. If a patient is free of pain, has he satisfied the concept of comfort that relates to the physical component? Some authors used the scale of everyday activities as an indicator of the level of comfort [13].

Among the rare studies focusing on the level of comfort is a study published by Monument et al. In this study the researchers tested the level of comfort between the two groups of patients with a forearm cast depending on the number of layers applied on the cast (2 or 3). They did not find statistically significant differences in the level of comfort between the two groups [14].

The lack of studies regarding the level of comfort in immobilized orthopedic patients using ICQ has prompted us to analyze our own results without comparison to the other studies. Our study suggests that the level of comfort of immobilized orthopedic patients is high when considering socio-cultural and psychospiritual context. Our patients confirm that they were calm during hospitalization and immobilization, and the reason for that was the feeling that the family cared for them, and they were well informed about their own health condition. Even though visitation at the Clinic was restrictive (due to flu epidemics), and could last for only few minutes, those visits helped the patients to feel as a part of a caring family. Besides, the frequent phone calls provided a sense of security to those patients whose family was unable to visit.

A cause of discomfort for the patients was the presence of pain, as well as some elements from their immediate surroundings: noise and uncomfortable hospital bed. Unfortunately, hospital building was not built for the purpose of Orthopedic & Traumatology Clinic, and the last reconstruction was done 60 years ago. There is no sound isolation, and in every hospital room there are more patients than planned. Hospital beds are not adapted for orthopedic patients (which makes adequate positioning of the patients impossible), and we are not surprised by the patients answers.

The lowest level of comfort was reported by the patients between 39 and 59 years of age, i.e. the patients of working age who were probably responsible for financing the family. Their hospitalization separated them form the family and aggravated their financial situation. An injury that disabled them for a longer period of time, either because of prolonged hospitalization or prolonged immobilization, disturbed their life as well as the life of their families, resulting in the feeling of unease and weakness [8].

The patients with external fixators or orthotics reported a higher level of comfort since this kind of immobilization enabled easier movement of the patient, and the adequate placement of the immobilization reduced the pain significantly. The patient without pain is generally oriented towards faster recovery and rehabilitation [8]. The patients with hip fracture (fractura colli femoris) and cast immobilization reported the lowest level of comfort. We must not forget that these patients are bed-ridden over the period of 4 weeks. This type of fracture is typical for patients over 60 years of age.

Immobilization of the upper extremities resulted in a lower level of comfort, which can be related to inability to care for oneself. Namely, if a patient has immobilization on a dominant hand, he/she would need assistance in all everyday activities.

The analysis of the level of comfort related to the duration of immobilization has revealed no statistically significant difference. These results are comparable to the ones obtained in the study by Schippinger et al. [15] in which they analyzed the patients with elbow dislocation. In that study the patients were treated conservatively with cast application, and they were divided in three groups depending on the duration of the immobilization (2, 3, or more than 3 weeks) The study confirmed that the patients were more comfortable if the immobilization lasted shorter [15].

Analgesics support was given to the patients according to the accepted Clinic's protocol. A combination of two or more analgesics from the group of non-steroid anti-inflammatory drugs and opioids is in accordance with accepted guidelines [16], but nevertheless the lowest level of comfort was reported in the patients who received a combination of several analgesics.

Conclusion

Modern concept of nursing care is the holistic approach that includes providing the patient with the highest level of comfort possible. Our study has shown that immobilized orthopedic patients have a high level of comfort in context of their socio-cultural and spiritual needs, but insufficient level of comfort in the domain of physical needs and environment. Different levels of comfort have been reported regarding the type of immobilization and age of the patients.

The obtained results emphasize the need for quality improvement in the domain of health care structure since this structure is an important prerequisite of quality, even though it is not the guarantee of it, because the quality is a feature of systemic functioning. Using the comfort theory of Katharine Kolcaba and a very simple ICQ, we can provide reliable and applicable evidence important for nursing care, which could help them provide the best possible care and comfort for the patients.

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SPIRITUAL SUPPORT AS A PART OF PALLIATIVE CARE OF LUNG CANCER PATIENTS

DUHOVNA PODRŠKA KAO DEO PALIJATIVNOG ZBRINJAVANJA PACIJENATA SA KARCINOMOM PLUĆA

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Summary

Introduction. Healthcare workers should check if an oncology patient would like to be visited by a priest and if there are any religious rituals that would ease the treatment and eliminate the stress of people close to them. The aims of study have been to check if a lung cancer patient requires help from a priest during palliative oncological treatment and if a team for palliative care requires the presence of a priest. **Material and Methods.** The study included 200 lung cancer patients treated between 2015 and 2017 at the Institute for Pulmonary Diseases of Vojvodina. The sample was divided into two groups: patients with I, II, IIIA stage of carcinoma and the other with stadium of IIIB and IV. The research was performed by using a questionnaire to be completed by the patients. **Results.** A statistical significance was determined for the question "Do you think that the priest can participate in your treatment?" The percentage of male and female patients who answered positively was 38.9% and 71.6%, respectively ($p<0.001$). As for the patients with the stage of the disease IIIA and stage IIIB and IV, that percentage was 24.4%, and 71.1%, respectively ($p<0.001$). **Conclusion.** Lung cancer patients need help from a priest which is more common in females and in patients in later stages of the disease. The team for palliative care of lung cancer patients also needs the participation of a priest in their work with these patients.

Key words: Spirituality; Lung Neoplasms; Palliative Care; Quality of Life; Social Support; Religious Personnel; Surveys and Questionnaires; Pain; Anxiety; Depression

Sažetak

Uvod. Zdravstveni radnici treba da provere da li je onkološki pacijent naklonjen duhovnosti, da li bi želeo da ga poseti duhovnik i da li postoje neki verski rituali koji bi mu olakšali lečenje i negu, kao i njegovoj najbližoj okolini. Cilj studije bio je da proveri da li pacijent sa karcinomom pluća zahteva pomoć duhovnika u toku palijativnog onkološkog zbrinjavanja kao i da li tim za palijativno zbrinjavanje zahteva prisustvo duhovnika. **Materijal i metode.** Istraživanje je uključilo 200 pacijenata sa karcinomom pluća koji su lečeni u periodu od 2015. do 2017. godine u Institutu za plućne bolesti Vojvodine. Uzorak je podeljen na dve grupe: pacijente u I, II i IIIA stadijumu bolesti, a drugu grupu su sačinjavali pacijenti u IIIB i IV stadijumu bolesti. Istraživanje je sprovedeno preko anketnog upitnika koji su ispunjavali pacijenti. **Rezultati.** Od ponuđenih 20 pitanja statistička značajnost je utvrđena za pitanje: „Da li mislite da sveštenik može učestvovati u vašem lečenju?" Muškarci su pozitivno odgovorili sa 38,9%, a žene sa 71,6%, ($p < 0,001$). Pacijenti u stadijumu bolesti od I do IIIA su pozitivno odgovorili sa 24,4%, stadijumu IIIB i IV sa 71,1% ($p < 0,001$). **Zaključak.** Pacijentima obolelim od karcinoma pluća potrebna je pomoć duhovnika pri čemu tu potrebu više pokazuje žene, kao i pacijenti u odmaklijim fazama bolesti. Tim za palijativno zbrinjavanje onkoloških pacijenata iskzuje potrebu za učešćem duhovnika kod pojedinih pacijenata.

Ključne reči: duhovnost; neoplazme pluća; palijativna nega; kvalitet života; socijalna podrška; sveštena lica; istraživanja i upitnici; bol; anksioznost; depresija

Introduction

With the aging of the population and a longer life expectancy, the number of those suffering from malignant and other severe chronic diseases is increasing yearly in Serbia. Accordingly, the number of people in need of palliative care is increasing. [1]. Medical staff encounters patients with advanced chronic incurable diseases at their deathbed and they must deliver diagnosis to the patients and family member. Unfortunately, in Serbia as well as in the world, the importance of psychosocial and spiritual aspect of care for patients and their family in terminal phases of the diseases is not adequately recognized and understood.

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Everyone has a spiritual dimension of his/her life. Health care workers rarely explore that universal dimension of human experience, and studies show that patients gladly accept discussion on this subject. There is a possibility that patients experience spiritual growth and satisfaction of spiritual needs in last stages of their lives [2]. Health care workers should check if the patient, that has a cancer or some other severe chronic illness, who is spiritually inclined, would like to be visited by a priest, if s/he has already been visited by a priest, and whether there are any religious rituals that would ease his/her treatment and care, and help those close to him/her who participate in the patient's palliative care. Palliative care should not be left to health care services alone, but the whole community should take part in it. As a part of activities of the entire community in the field of palliative care, the involvement of the local government as well as of educational and social services institutions is a necessity. The church and priests should also be engaged, and the mutual cooperation of all of the above is of the utmost importance [3].

The feeling of losing the connections with the community and their earlier way of life can bring into question one's perception of the meaning of purpose of life in oncological patients. If these problems are not recognized, we cannot make appropriate plans for palliative patient care. We must not forget that the spiritual component is universal and influences the quality of life significantly. Therefore the aim of this paper is to: 1. Check if there are spiritual questions in patients suffering from malignant diseases and how pronounced they are. 2. If an oncological patient needs the help from a priest in treatment and care 3. If the team for palliative care of oncological patients requires the help from a priest/spiritual counselor and in what way that person would be included in the active process of palliative care The working hypothesis, in other words the expected results are: 1. Some lung cancer patients want the involvement of a priest/spiritual counselor in their treatment and care. 2. The patients would have spiritual benefit from such help, and as a whole cumulative benefit during their treatment. 3. An expected result is a positive role of a priest/spiritual counselor as a part of the team for palliative care.

Material and Methods

The research was prospective and retrospective in character and it included 200 patients diagnosed with lung carcinoma treated at the Institute for Pulmonary Diseases of Vojvodina or in the regional oncology centers of Vojvodina. The research was performed at the Institute for Pulmonary Diseases of Vojvodina, the Clinic of Lung Oncology and the Oncological Commission of the Institute.

Criteria for inclusion in the study were: age over 18, cytologically and pathohistologically confirmed primary or metastatic lung carcinoma, without a psychiatric disease, general state of the patient according to ECOG (European Cooperative Oncology Group) scale of 1, 2 and 3. Criteria for exclusion were the age under 18, suspected but not confirmed lung carcinoma, existence of psychiatric comorbidity and extremely bad general state – ECOG scale 4.

Measurement Instruments

The sample was divided into two subgroups on the basis of stage disease, with the first group consisting of stage I, II, IIIA patients and the second group included the patients with stage IIIB and IV carcinoma. A self-administered questionnaire was distributed to the patients after they had been given information about the research and upon their signing the informed consent to participate in the study. Demographic data included the age, gender, education level and religiosity of the patients. The sample included patients who had been diagnosed with cancer and started treatment during 2015 and 2016, and the research itself lasted from June 2016 until December 2017.

Statistical Data Analysis

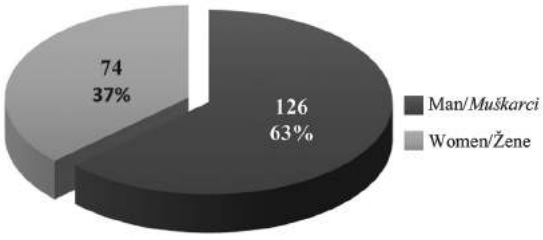
The collected data were analyzed by SPSS for windows (SPSS Inc., Chicago IL, USA). Standard methods of descriptive statistics were used in data analysis such as: percentages, variable coding, average values with standard deviation and range. Numeric variables were compared by means of parametric tests (Student's t test and ANOVA analysis), and nonparametric methods when necessary (Mann-Whitney U test and Kruskal-Wallis test). Descriptive variables were analyzed by using the χ^2 test.

Research was realized as a part of determining the needs of lung cancer patients for spiritual aid. By combining these data by means of the questionnaire, the study goals were statistically established. We then compared our results with those obtained in different similar studies. Afterwards, we considered applying this research in work with oncological patients who were receiving palliative treatment and care.

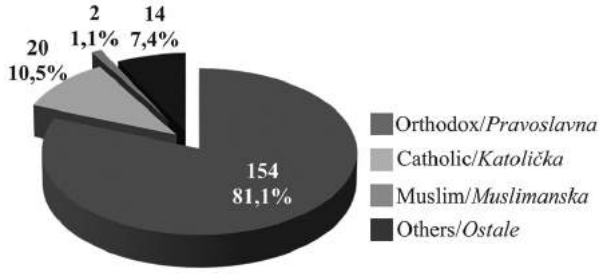
Results

The research, which was done in the period from 2015 to 2017, included 200 participants who satisfied the inclusion criteria. Out of the study sample, 126 (63%) were men and 74 (37%) were women **(Graph 1)** and their average age was 60.6 years (SD=10.3, ranging from 31 to 7). The most represented age groups were between 61 and 70 years of age (45.5%), 51–60 years of age (28.5%) and 41–50 years of age (12%).

Concerning the education level, 70% of participants completed secondary school, 15% graduated from a vocational high school, 10% graduated from a faculty and 5% did not graduate from elementary school. Ten participants did not give details about their religious background. Most of the participants declared themselves to be Eastern Orthodox Christians (81%), then Catholics (10.5%), There were 1.1% Muslim believers and 7.4% had different religious beliefs **(Graph 2)**.



Graph 1. Distribution of participant by gender
Grafikon 1. *Distribucija ispitanika po polu*



Graph 2. Religious affiliation of participants
Grafikon 2. *Verska pripadnost ispitanika*

Analysis of Data Collected by Questionnaire

The questionnaire consisted of questions concerning the patient – healthcare worker relationship, patients' religious beliefs, and inclusion of priests/spiritual counselors into the treatment/palliative care of lung carcinoma patients.

The items in the questionnaire regarding the patient-healthcare worker relationship were about the amount of time dedicated to the patient during treatment, displayed interest of healthcare workers for the patient's personal problems, the patients need to get explanation from the healthcare worker about the particularities of the treatment process and their lifestyle during their disease. Also, a number of items were about the availability of the healthcare worker to talk about the patient's personal issues, if the physician or the nurse was listening to them carefully, if the details about their illness were kept confidential. The items also covered topics such as if healthcare workers helped the patients to feel bet-

Table 1. *Responses of participants on items regarding their relationship with healthcare workers (in %)*
Tabela 1. *Odgovori ispitanika o odnosu sa zdravstvenim radnicima (u %)*

Question/*Pitanje*	n	Yes/*Da* %	No/*Ne* %	I do not know *Ne znam* %
Do you have enough time to consult with your physician/nurse about your illness and treatment?/*Imate li dovoljno vremena da se posavetujete sa lekarom/medicinskom sestrom o Vašoj bolesti i lečenju?*	200	94.0	5.5	0.5
Does your physician/nurse show an interest in your personal problems? *Zanimaju li lekara/medicinsku sestru Vaši lični problemi?*	200	73.0	7.5	9.5
Can you tell them your problems?/*Možete li im ispričati Vaše probleme?*	200	86.0	10.5	3.5
Does your physician/nurse listen to you attentively? *Sluša li Vas Vaš lekar/medicinska sestra pažljivo?*	200	74.0	1.5	24.5
Has your physician/nurse acquainted you with the necessary mode of treatment and lifestyle?/*Da li Vas Vaš lekar/medicinska sestra upoznaju sa potrebnim načinom lečenja i načinom života?*	200	93.5	4.0	2.5
Do they help you worry less about your illness? *Pomažu li Vam u otklanjanju zabrinutosti zbog bolesti?*	200	80.0	19.5	0.5

n = Absolute frequency/*Apsolutna učestalost;* % = Relative frequency/*Relativna učestalost*

Table 2. *Responses of participants regarding religious issues (in %)*
Tabela 2. *Odgovori ispitanika o verskim pitanjima (u %)*

Question/*Pitanje*	n	Yes/*Da* %	No/*Ne* %	I do not know *Ne znam* %
Have you been raised in a family that observes religious customs? *Da li ste odgajani u porodici koja neguje verske običaje?*	200	90.5	9.5	0.0
Are you a believer and do you participate in prayer customs? *Da li ste vernik i učestvujete li u molitvenim običajima?*	200	72.0	28.0	0.0
Before your illness, were you a supporter of including priest in the care and treatment of patients?/*Pre Vašeg oboljenja jeste li bili pristalica uključivanja sveštenih lica u negu bolesnika i u njihovo lečenje?*	200	24.5	73.0	2.5

n = Absolute frequency/*Apsolutna učestalost;* % = Relative frequency/*Relativna učestalost*

ter, if the patients were informed well enough about their disease and if healthcare workers helped patients to eliminate the worry. The results of this part of the questionnaire are presented in **Table 1**.

A great majority of patients (90.5%) responded that they were brought up in a religious family, and only 9.5% gave the answer "No"; when asked if they participated in prayers, 72% said yes and 28 % said no. When asked if they approved of priests being involved in their treatment, 73% of participants answered "No", 24.5% answered "Yes" and 2.5% answered "I do not know" **(Table 2).** After falling ill, 51% of participants allowed priests to take part in caring of oncological patients and in their treatment (34% answered "No" and 15% said "I do not know"). Most of the participants (79%) did not have a personal priest/spiritual counselor, and 21% had one. Most of the patients who had their own priest (83.5%) said that their priest was not aware of their disease and the course of treatment. Priest knew about the disease and the course of treatment in 16% of these patients.

Analysis Regarding the Age Structure and Education Level

There was no statistically significant difference (p>0.05) in the distribution of answers about the relationship between the healthcare worker and patient by the patients' age nor in the distribution of answers about religous beliefs (p>0.05) by the patients' age. The same applies to the group of questions regarding the inclusion of priest/spiritual counselor in the palliative care of cancer patients.

The participants were divided into two groups according to their education level: lower education level (LEL) –150 participants (75%) and high education level, including those with vocational and faculty diploma (HEL–50) participants (25%). In the group of questions regarding the relationship with healthcare workers there were no statistically significant differences (p<.05) in distribution by education levels. In the group of questions about the inclusion of priests in the treatment there were statistically significant differences in distribution by education levels in two questions. When asked "Do you think a psychologist, together with a priest, should participate in overcoming your disease?" 60% and 40% of those with lower education levels (LEL) and with higher education levels, respectively responded positively 40% of LEL and 60% of HEL responded with "No" (p=0.013). The question "Do you consider that priests can help your closest relatives to correctly comprehend and accept your disease and treatment, and its possible consequences?" was answered positively by 56% of participants with lower education levels (LEL) and by 40% of those with higher education levels (HEL); (22.7% LEL participants and 40% of HEL participants answered with "No") (p=0.049).

Analysis of Results by Gender

In the group of questions about the relationship with healthcare workers there were no statistically significant differences (p>0.05) by gender except when asked if the physician kept the patient's data confidential (p=0.013). The positive answer was given by 63.5% of male participants and 77% of female participants (20.3% of male and 36.5% of female participants answered with "I do not know").

In the group of questions about inclusion of priests in the treatment there were statistically significant differences in the distribution by gender **(Table 3)**.

Analysis of Results by the Stage of Disease

The participants were divided into two groups according to their disease stage (TNM stage[1]): TNM stage up to level IIIA (<IIIA – 86 participants (43%)) and TNM stage IIIB and IV (114 participants (57%)). In the group of questions about the relationship between the participants and healthcare workers there were no statistically significant differences (p>0,05) in the distribution by the disease stage.

In the group of questions about inclusion of priests in the treatment **(Table 4)** there were statistically significant differences in the distribution by the stage of disease.

Table 3. *Responses of participant about inclusion of priests in the treatment (in %) by gender*
Tabela 3. *Odgovori ispitanika o uključivanju verskih lica u tretman (u %) u odnosu na pol ispitanika*

Question *Pitanje*	Gender *Pol*	Yes- *Da* %	No *Ne* %	I do not know/*Ne znam* %	p
Do you think that a psychologist along with a priest should participate in overcoming your illness?/*Mislite li da i psiholog, zajedno sa sveštenim licima, treba da učestvuje u savladavanju Vaše bolesti?*	Male *Muški*	43.7	32.5	23.8	<0.001
	Female *Ženski*	74.3	12.2	13.5	
Do you maintain that priests can help your closest surroundings to properly understand and accept your treatment, and the possible consequences of the treatment?/*Smatrate li da sveštena lica mogu pomoći Vašem najbližem okruženju da pravilno shvati i prihvati lečenje od bolesti, kao i eventualne posledice terapije?*	Male *Muški*	40.5	34.1	25.4	<0.001
	Female *Ženski*	71.6	14.9	13.5	

% = Relative frequency/*Relativna učestalost*

Table 4. *Responses of participants about inclusion of priests in the treatment (in %) by their disease stage*
Tabela 4. *Odgovori ispitanika o uključivanju verskih lica u tretman (u %) u odnosu na stadijum bolesti ispitanika*

Question/*Pitanje*	Stage *Stadijum*	Yes/*Da* %	No/*Ne* %	Do not know *Ne znam* %	p
Do you think that a psychologist along with a priest should participate in overcoming your illness?/*Mislite li da i psiholog, zajedno sa sveštenim licima, treba da učestvuje u savladavanju Vaše bolesti?*	<IIIA	25.6	46.5	27.9	<0.001
	IIIB+	77.2	8.8	14.0	
Do you maintain that priests can help your closest surroundings to properly understand and accept your treatment, and the possible consequences of the treatment?/*Smatrate li da sveštena lica mogu pomoći Vašem najbližem okruženju da pravilno shvati i prihvati lečenje od bolesti, kao i eventualne posledice terapije?*	<IIIA	25.6	46.5	27.9	<0.001
	IIIB+	71.9	12.3	15.8	
Do you recommend to their patients to "without prejudices" accept a priest as part of a team that will care for them and provide them treatment?/*Preporučujete li drugim bolesnicima da „bez predrasuda" prihvate da u tim za lečenje i negu budu uključeni i verski službenici?*	<IIIA	16.3	80.2	3.5	<0.001
	IIIB+	54.4	42.1	3.5	

Legend: <IIIA (stage I, II, IIIA); IIIB+ (stage IIIB i IV)/*Legenda: <IIIA (stadijum I, II, IIIA); IIIB+ (stadijum IIIB i IV); %* = Relative frequency/*Relativna učestalost*

Discussion

Lung carcinoma is still one of the most frequent malignancies in the world both in men and in women. It is the leading cause of mortality in Europe [4] and in the United States of America [5]. According to the statistical data of the World Health Organization (WHO) lung carcinoma is the most frequent carcinoma in males and the second most frequent in females just after breast cancer. The rise in incidence among women is associated with the ever increasing smoking habit in the female population. Hormonal status (estrogen status) is stated as one of the possible factors which affect the increasing trend in cancer rate in women although the percentage of female smokers among the lung cancer patients is still lower than of the male smokers.

About 85% of lung carcinoma is non-small-cell carcinoma (NSCLC), and it is mostly diagnosed as a locally advanced disease or a metastatic disease. Average survival time in these patients is 8 months, and even with specific oncological therapy 5-year-survival is recorded in 14%. Small-cell lung carcinoma (SCLC) has an even lower survival rate, it is a more aggressive type of lung carcinoma with an even more frequent potential for creating metastasis [7].

Palliative care plays a role in the treatment of patients with advanced and metastatic lung carcinoma. Numerous studies have shown that early inclusion of patients with advanced lung carcinoma in palliative care does not influence survival rate but greatly influences the quality of life of these patients [8, 9]. A cancer diagnosis and the treatment that follows can cause great physical and emotional distress. Regardless of cancer stage, patients are likely to experience fear and uncertainty about the risk of side effects, the effectiveness of treatment, and the outcome these factors will have on their future and their self perception. These emotions begin at the time of being diagnosed with cancer and continue and change throughout the course of having cancer. At the start of treatment, patients may ask, "Will I lose my hair? Will I feel normal? Will I still be able to work?" [10].

Some patients have specific religious beliefs that give them the framework in which "things make sense". Their religious rituals are a part of this sense making, by which they help themselves in fighting with their hardships. Some patients start doubting their religious framework as the disease progresses and their death comes closer. It is important that the patient has someone from the same religious tradition to talk to. The realization that life is coming to an end causes suffering in many patients, and fuels the desire to recognize the priority and to reach for the things they consider really true and worthy [11, 12].

In this paper we wanted to find out how ready the patients are to accept the role of a priest or spiritual counselor in the team for palliative care. Out of the basic demographic characteristics we analyzed gender, and age of participants: expectedly, male participants have been taken ill more often and the average age of the participants is over 60 years. These findings are a reflection of epidemiological characteristics that characterize lung carcinoma, thus verifying our sample. Ten participants did not state their religious affiliation and consequently, they were considered atheists, although in the follow up analysis some of these participants did give the positive answer to the questions about the presence of priests in the team for palliative care of patients with lung carcinoma. Most participants were Eastern Orthodox Christians (81.1%), then Catholics (10.5%). There were 1.1% Muslims and 7.4% of participants took the option "other", and this partially reflects the religious map of the province of Vojvodina.

The section of the research that encompassed the analysis of the data collected by the questionnaire was divided into two parts. In the first part the questions asked about the relationship between the patients and healthcare personal (physician/nurses). Having analyzed the data, we determined a high

level of trust between the participants and healthcare workers with regards to patient care on all levels, without statistically significant differences associated with gender, religious affiliation, and education level and disease stage. Similar data were found in studies done by other authors. Joshua A. Williams found in his study that religious patients and those experiencing more severe pain were more likely to desire and to have discussions of spiritual concerns with their doctors and nurses. The patients who had discussions on R/S (religion and spirituality) concerns were more likely to rate their care at the highest level on four different measures of patient satisfaction, regardless of whether or not they said they had desired such a discussion (odds ratios 1.4–2.2, 95% confidence intervals 1.1–3.0) [13]. A multicentre study was presented in the work by J. Cooper et al. They randomized lung cancer patients (n = 203) at three local hospitals and one cancer hospital, stratified to hospital and treatment intent. They studied patient satisfaction in palliative care according to the person who delivered that care. The main findings were that the nurse-led follow-up was acceptable to lung cancer patients and general practitioners and resulted in positive outcomes. General practitioners reported 46% preference in follow-up care provided by both an oncologist and clinical nurse [14]. One of the studies however did not show patient trust towards healthcare workers. It was the study performed by Hubbell, Woodard, and Barksdale-Brown which demonstrated that despite professing a belief that spiritual care is an important component of health care, health care providers did not routinely and consistently provide spiritual care to their patients [15].

The second part of our analysis collected data by means of the questionnaire and was aimed at determining the attitudes of patients towards religious questions and towards the need for the presence of priest/spiritual counselor in palliative oncological care team. We have followed statistical differences in the obtained data with regards to gender, religious affiliation, education level and the stage of disease. We have found similar data regarding the ration of believers in the study of Delgado-Guay performed on 100 advanced patients Anderson palliative care outpatient clinic in Houston. Almost all patients considered themselves spiritual (98%) and religious (98%), with a median intensity of 9 (interquartile range 7–10) of 10 and 9 (range 5–10) of 10, respectively. Spiritual pain was reported in 40 (44%) of 91 patients, with a median score of 3 (1–6) among those with spiritual pain. Spiritual pain was significantly associated with lower self-perceived religiosity (7 vs. 10, P = 0.002) and spiritual quality of life (FACIT-Sp-Ex 68 vs. 81, P = 0.001) [16].

In the group of questions about including priests in oncological treatment there were statistically significant differences in answers between the genders on all three questions. When asked if a priest should participate in the team for palliative care, if a priest could help in overcoming the disease and if they would recommend the spiritual support of a priest to other patients, the female participants have a significantly different attitude than the males. The explanation for these results was found in the studies that had shown a higher sensitivity of a female oncological patient, more pronounced depression symptoms than in males, and therefore, a greater need for spiritual support. This was shown in the study of the European Association of Oncological Nurses that examined common symptoms (pain intensity, fatigue, and depression) in regard to their ability to predict QOL in male and female oncology patients with cancer pain. In the study sample of 114 oncology outpatients, there were 34 males and 80 females with pain. The female patients reported a significantly lower psychological dimension of QOL than their male counterparts (p=0.009). In addition, a negative correlation was found in the females between pain intensity and QOL (r=-0.504, p<0.0001), as well as positive correlations between pain intensity and fatigue (r=0.421, p<0.0001) and depression (r=0.368, p<0.0001) [17]. In our study we found pronounced statistical differences in responses about spiritual support associated with the stage of disease. Participants with advanced disease were more inclined to have the priests in the team for palliative care than those at a lower disease stages. A similar response was found in Murray's study: Three-monthly qualitative interviews for up to one year with 20 patients with inoperable lung cancer and 20 patients with end-stage heart failure and their informal carers were performed. They conducted 149 in-depth interviews. Spiritual concerns were important for many patients in both groups, later in the illness progression. Whether or not patients and their carers held religious beliefs, they expressed needs for love, meaning, purpose and sometimes transcendence. The different experiences of lung cancer and heart failure raised contrasting patterns of spiritual issues and needs [18].

Conclusion

A vast majority of advanced cancer patients receiving palliative care considered themselves spiritual and religious. The barriers to providing spiritual care must be overcome so that comprehensive care can be given without compromise. Spiritual assessments and care must become consistent in oncology practice from the time of being diagnosed with cancer, throughout treatment, and into survivorship and end-of life care. Spirituality is not necessarily dependent on having religious preferences or beliefs. The patients with advanced lung cancer have a need for help from a priest, which is stronger in women as well as in the patients at a more advanced stage of the disease. The team for the palliative care of lung cancer patients needs the participation of priests in the treatment of some patients.

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THE ASSESSMENT OF PATIENT SAFETY CULTURE – THE PSYCHOMETRIC STUDY OF THE SERBIAN VERSION OF THE QUESTIONNAIRE HOSPITAL SURVEY ON PATIENT SAFETY CULTURE

PROCENA KULTURE BEZBEDNOSTI PACIJENATA – PSIHOMETRIJSKA EVALUACIJA SRPSKE VERZIJE UPITNIKA O KULTURI BEZBEDNOSTI PACIJENATA

Branislava BRESTOVAČKI SVITLICA[1], Dragana MILUTINOVIĆ[1], Andrea BOŽIĆ[1], Srđan MALETIN[2] and Ivica LALIĆ[3]

Summary

Introduction. The advancement of patient safety culture within a health institution is the basic component of reduction of errors and the improvement of the general quality of healthcare. The aim of this study was to assess the patient safety culture by means of Hospital Survey on Patient Safety Culture in the Serbian setting. **Material and Methods.** The survey was conducted in five health institutions in the form of cross section study, which included 1,435 health care workers. **Results.** Nine dimensions have been selected out of 37 items by explorative factor analysis. The total percentage of positive response was 51%. The highest (70%) and the lowest (33%) percentage of positive responses were obtained in the dimensions "Overall perceptions of safety" and "Nonpunitive response to errors", respectively. More than half of the respondents assessed the patient safety as excellent/very good. In the last 12 months, more than half of the respondents have not reported an adverse event. **Conclusions.** The survey results indicate that changes are necessary in all domains of patient safety culture. Healthcare policy makers have to take responsibility for the implementation of safety culture in every health institution. Patient safety culture can be observed and advanced by full commitment of all those involved in the health care system, understanding both the causes of adverse events and errors, as well as by applying efficient methods to reduce them to the minimum.

Key words: Patient Safety; Safety Management; Quality of Health Care; Quality Assurance, Health Care; Hospitals; Medical Errors; Psychometrics; Serbia

Sažetak

Uvod. Unapređenje kulture bezbednosti u zdravstvenoj ustanovi osnovna je komponenta smanjenja grešaka i unapređenja opšteg kvaliteta zdravstvene zaštite. Cilj ove studije je procena kulture bezbednosti pacijenata pomoću Upitnika o kulturi bezbednosti pacijenata u Srbiji. **Materijal i metode.** Istraživanje je sprovedeno u pet zdravstvenih ustanova u obliku studije preseka, anketiranjem 1.435 zdravstvenih radnika. **Rezultati.** Eksplorativnom faktorskom analizom izdvojeno je devet dimenzija sa 37 ajtema. Ukupan procenat pozitivnih odgovora je 51%. Najveći procenat pozitivnih odgovora (70%) je u dimenziji Ukupna percepcija bezbednosti, a najmanji (33%) u dimenziji Nekažnjavajuće reakcije uprave na grešku. Više od polovine ispitanika ocenilo je bezbednost pacijenata kao odličnu/vrlo dobru. U poslednjih 12 meseci više od polovine ispitanika nije prijavilo nijedan neželjen događaj. **Zaključak.** Rezultati istraživanja ukazuju na neophodnost promena u svim oblastima kulture bezbednosti pacijenata. Odgovorni za kreiranje zdravstvene politike moraju da preuzmu odgovornost za implementaciju kulture bezbednosti u svakoj zdravstvenoj ustanovi. Održavanje kulture bezbednosti pacijenata zahteva posvećenost svih aktera u sistemu zdravstvene zaštite, razumevanje uzroka neželjenih događaja i grešaka, kao i efikasnih načina da se one svedu na minimum.

Klučne reči: bezbednost pacijenta; upravljanje bezbednošću; kvalitet zdravstvene nege; obezbeđenje kvaliteta zdravstvene nege; bolnice; medicinske greške; psihometrija; Srbija

Introduction

Studies which have been conducted in the last decade in most countries around the world, with different socio-economic and cultural context, indicate that patient safety is an international problem. One of the definitions explains the safety culture as a result of individual and group values, attitudes, understanding, abilities, style and professionalism in managing the safety of an organization [1, 2].

Patient safety culture include several different dimensions, such as the leadership support for patient safety, teamwork, adverse event reporting, open communication, organizational learning, just culture approach and shared belief in the importance of safety [3].

In healthcare, patient safety culture is a crucial element of healthcare quality and safety. In order to develop patient safety culture within an organization, the first step is to assess the actual culture, that is, to evaluate the attitudes of the health care workers towards

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Abbreviations
HSOPSC– Hospital Survey on Patient Safety Culture

patient safety [1]. The questionnaire Hospital Survey on Patient Safety Culture (HSOPS) is a good choice for a comprehensive assessment of patient safety culture. It is well-structured and it has passed through a large number of confirmations of validity and reliability, with certain modifications when applied in different cultural context and different health systems. The results obtained by this questionnaire provide important information about the attitudes of health care workers, which can be used for planning the measures for the advancement of patient safety culture [4].

The assessment of patient safety culture can be conducted in all health institutions – it is simple, easily accessible and it provides significant data about the work methods of health care workers in the existing working conditions [5] and identifies areas for improvement and raises the awareness about patient safety.

Patient Safety Culture in the Republic of Serbia

The Republic of Serbia joined the programme of the World Health Organization (WHO) for the global patient safety in 2008. The Ministry of Health defined the Strategy for the continuous advancement of the quality of health care and patient safety in 2009 [6], and in 2010, the Ministry modified the Rulebook on the indicators of quality of health care from 2007 [6], where the indicators on patient safety were defined and the obligation about reporting adverse events was introduced. The agency for the accreditation of health institutions started to apply the procedure for the accreditation of health institutions on all levels of health care in 2011. The accreditation is voluntary and it includes the assessment of the quality of work according to the previously defined standards with the aim of continuous advancement of the quality of work and patient safety. Although in Serbia, which is a developing country, there are previously stated documents, the knowledge about the importance of patient safety culture is still insufficient.

According to the previously mentioned, the objectives of this paper are: to assess the validity and reliability of Hospital Survey on Patient Safety Culture on the surveyed population and to assess the dimensions of patient safety culture.

Material and Methods

Sample

The survey was conducted in the form of cross sectional study, by surveying health care workers on the territory of the Province of Vojvodina in the Republic of Serbia. Two institutions are general hospitals of the secondary level of health care. Three institutions are of tertiary level, being the teaching bases of the Faculty of Medicine in Novi Sad at the same time.

The survey was conducted in the second half of the year of 2013. The target group included the health care workers who were directly or indirectly involved in the treatment and healthcare of patients (physicians and nurses, and those working in pharmacy, laboratory, radiological diagnostics).

Taking into consideration the probability of the low level of responses [7], the questionnaires were distributed to all health care workers who met the criteria for the study participation, which finally came to 2,750 questionnaires. The response rate to the survey was 52% (N-1435).

The Study Instrument

Hospital Survey on Patient Safety Culture (HSOPS) was developed by the Agency for Healthcare Research and Quality, AHRQ in 2003/04). The questionnaire was translated from English into Serbian by an expert for the English language, using the instructions of AHRQ for the translation of the questionnaire. The questionnaire was then translated back into English by another independent expert, who had not seen the original one. The questionnaire consists of 42 questions and the five-graded Likert scale is used to respond to most of the questions by giving the answers either "completely agree(5)/completely disagree (1)" or "never(1)/always(5) and two questions that ask respondents to provide an overall grade on patient safety for their unit and the number of events they have reported over the past 12 months. According to the authors, and based on the psychometric analysis, the questionnaire contains three measuring categories: ward-level, hospital-level aspects of patient culture, and patient safety outcome variables, distributed in 12 dimensions [7].

Statistical Analysis

The authors used the following descriptive statistics for describing the sample on the studied variables; Kaiser-Meyer-Olkin Measure of Sampling Adequacy, Bartlett's Test of Sphericity; Pearson coefficients of correlation for determining the correlation degree of two numeric variances; Exploratory factor analysis with principal component analysis (PCA) with Varimax rotation for the construct validity of the questionnaire; Cronbach alpha coefficients and inter-item correlations for testing the questionnaire reliability.

For Hospital Survey on Patient Safety Culture the percentage of positive replies is calculated, so that the five-degree scale is turned into the three-degree Likert scale. The total score of replies "I completely agree/I agree" or "always/often" is calculated for positive items, depending on the category of the reply. The questionnaire contains 18 items whose negative replies "I completely disagree/I disagree" or "never/rarely" are converted into positive replies. The third degree is the neutral reply "neither" or "sometimes". The percentage is calculated in total for the whole questionnaire, for each item separately (in order to avoid the items which greatly deviate or only few respondents replied to them), as well as for each dimension of the safety culture (each dimension has three to four items). According to the authors of this questionnaire, the percentage of positive responses being ≥75% is arbitrarily determined as

'strong/high level' of safety culture, and in the percentage of positive replies ranging from 66 to 74%, it is of medium strength, with the room for improvement; whereas in the items where the percentage of positive replies is ≤50%, there is a need for changes and the advancement of safety culture [6].

Results

Most of the respondents (N-965, i.e. 68%) were nurses; the number of technicians (pharmacy, laboratory, radiological) and physicians was N-248 (17%) and N-222 (15%), respectively. One-third of the survey participants had work experience of 11–20 years (N- 488, i.e. 34%) and they were mostly non-managerial staff (N- 1270, i.e. 89%).

The Kaiser-Meyer-Olkin coefficient = 0.876, indicating common variance among the items and the Bartlett test of sphericity (χ^2 =19604.42, df =1128, p=0.000) demonstrating inter-item correlations, are sufficient for conducting the factor analysis. By means of the techniques of PCA with Varimax rotation, totally 9 factors/subscales with 37 items were extracted (plus two more with additional questions E and G). These factors account for 52.17% of the total variance. The dimension Staff with its items (A2; A5.r; A7.r) was excluded from the analysis due to unacceptable values. The item A11, which belonged to the dimension Team work in a ward, was also excluded from the questionnaire; the item F9.r, within the dimension Hospital management support for patient safety, was excluded, as well.

Outcome dimensions remained the same as in the original model, and the dimensions on the level of hospital: Hospital management support for patient safety and Teamwork across hospital wards were grouped into one; Hospital handover and transfer remained the same, with added items F2r and F6r. The ward dimension: Organizational learning – Continuous improvement and Teamwork within ward were grouped into one dimension; Communication openness and Feedback and communication about error were also grouped into one dimension, with an added item A13; Manager expectations and actions promoting patient safety was divided into two dimensions, with the added item C6, and the dimension Non-punitive response to errors remained the same, with the added item A14 **(Table 1)**.

Cronbach alpha for the whole questionnaire (including items E1 – Patient safety grade and G1-Number of events reported) was 0.87, and without the items E1 and G1 it was 0.88. Cronbach alpha values by dimensions are shown in **Table 1.**

The total percentage of positive responses was 51%. The highest (70%) and the lowest (33%) percentage of positive responses were in the dimension Overall perceptions of safet, and Non-punitive response to error, respectively **(Table 1)**.

There was a significant positive correlation among almost all dimensions of the questionnaire, **(Table 2).** The lowest correlation was 0.06 between the dimensions Frequency of reported events and Non-punitive response to errors. The highest correlation was 0.56 between the dimensios Organizational learning – Continuous improvement & Teamwork within a ward and Manager's expectations.

Patient safety was assessed as very good, excellent and bad by N-564 (40%), N-363 (25%) and N-18 (1%) respondents, respectively. Seven hundred and twenty-one (52%) respondents did not report a single adverse event for the previous 12 months.

Discussion

Hospital Survey on Patient Safety Culture was first used in the USA, where it was created, and since then it has been widely used in about 30 countries around the world and translated into 18 languages [7–9]. By means of Explorative factor analysis in this study, 9 factors with 37 items were separated, and it can be noticed that there is a certain grouping of some dimensions with a few items which changed the original layout, which is acceptable for further analysis. Most authors who did the assessment of safety culture with the questionnaire HSOPS obtained similar result, with 8 [10], 9 [11], 10 [12, 13] and 11 factors [14–16], where there were also some items in the questionnaire which changed the original layout, and some dimensions were grouped.

In this survey, the dimension Staff was excluded from further analysis because Cronbach alpha coefficient is lower than it is acceptabl, if it is present in the analysis. Blegen (2009 also excluded this dimension from the analysi, although it represents an important perception of health workers about the organization of staff, which definitely influences patient safety [14]. Taking into consideration the fact that this dimension has the lowest Cronbach alpha coefficient in several other studies [17, 18], it is recommended to modify the items in this dimensio, in order to obtain more relevant data about staff [15, 16].

Outcome dimensions with the item Number of reported events and Patient safety grade are in a negative correlation with other dimensions of patient safety culture. The reason for the negative correlation could be the fact that this dimension has one item, while others have more items in their structure. Similarly to this study, neither has Ito (2011) found a strong relationship between these two dimensions and other dimensions of patient safety culture, which is explained by the fact that a large number of respondents has reported 'none' or '1-2 adverse events' for the previous 12 months [8]. Most authors have a similar explanation for a weak relationship with other dimensions. This item could be taken more as a descriptive variable than the outcome dimension [9, 10, 16, 18, 19].

The Assessment of Patient Safety Culture

The total percentage of positive responses of the surveyed sample is 51%. Similar results can be found in several studies as well, regardless of the differently organized health care system and cultural differences [12, 19–21]. In this research there is no dimension with a percentage of positive re-

Table 1. Factor analysis of ″Hospital Survey on Patient Safety Culture″ (HSOPSC)
Tabela 1. *Faktorska analiza Bolničkog upitnika o bezbednosti pacijenata (HSOPSC)*

Item *Stavka*	F1	F2	F3	F4	F5	F6	F7	F8	F9	Cronbach α	Average % of positive responses/*Prosečan % pozitivnih odgovora*
Organizational learning – Continuous improvement & Teamwork within ward *Učenje u organizaciji/kontinuiranost unapređenja i timski rad na odeljenju*										0.76	63
A1. People support each other in a ward./*Na odeljenju ljudi podržavaju jedni druge.*	0.70										
A3. When a lot of work has to be done quickly, we work as a team to do the work./*Kada mnogo posla treba da se uradi brzo, mi radimo kao tim da bi se završio posao.*	0.64										
A4. In this ward, people treat each other with respect./*Na odeljenju ljudi se međusobno ophode sa poštovanjem.*	0.74										
A6. We are actively doing things to improve patient safety./*Mi aktivno radimo na poboljšanju bezbednosti pacijenata.*	0.39										
A9. Noticed errors lead to positive changes in the ward./*Uočene greške su dovele do pozitivne promene na odeljenju.*	0.31										
Hospital handover and transfer*/Primopredaja i premeštaj pacijenta sa jednog odeljenja na drugo*										0.78	51
F2. r Hospital wards do not cooperate well among each other./*Bolnička odeljenja međusobno ne sarađuju dobro.*		0.50									
F3. r Things “fall between the cracks” when transferring patients from one ward to another./*Kada se pacijenti premeštaju sa jednog odeljenja na drugo, dolazi do propusta.*		0.67									
F5. r Important patient care information is often lost during shift changes./*Važne informacije o pacijentu se često gube u primopredaji smene.*		0.71									
F6. r It is often unpleasant to work with the staff from another ward of the hospital./*Često je neprijatno raditi sa osobljem sa drugog odeljenja bolnice.*		0.64									
F7. r Problems often occur in the exchange of information across hospital wards./*Problemi se često javljaju u razmeni informacija između odeljenja.*		0.75									
F11 r Shift changes are problematic for patients in this hospital./*Promena smene je često problem za pacijenta.*		0.51									
Frequency of events reported*/Učestalost izveštavanja o neželjenom događaju*										0.91	53
D1 When a mistake is made, but is caught and corrected before affecting the patient, how often is this reported?/*Kada se napravi greška, ali je uočena i ispravljena pre nego što je naškodila pacijentu, koliko često ju prijavite?*			0.92								
D2 When a mistake is made, but has no potential to harm the patient, how often is this reported?/*Kada se napravi greška, ali ne postoji nikakva potencijalna šteta po pacijenta, koliko često prijavite?*			0.93								
D3 When a mistake is made that could harm the patient, but does not, how often is this reported/*Kada se napravi greška koja bi mogla da nanese štetu pacijentu, ali nije, koliko često prijavite?*			0.88								

Non-punitive response to error/*Nekažnjavajuće reakcije uprave na grešku*		0.54	33
A8.r Staff feel like their mistakes are held against them./*Osoblje oseća da im se njihove greške pripisuju kao njihov nedostatak.*	0.53		
A12.r When 'an event' is reported, the emphasis is on the person, not on the problem./*Kada se „događaj" prijavi, akcenat je na osobi a ne na problemu.*	0.46		
A14.r We work in "crisis mode" trying to do too much, too quickly./*Mi radimo u „kriznom režimu", pokušavajući da uradimo previše i isuviše brzo.*	0.58		
A16. r Staff worry that mistakes they make are kept in their personnel file./*Osoblje brine da će greške koje su napravili biti sačuvane u dosijeima u kadrovskoj službi.*	0.59		
Overall perception of safety/*Ukupna percepcija bezbednosti*		0.55	70
A10.r It is just by chance that more serious mistakes don't happen around here./*Samo je slučajnost što se ovde ne dešavaju ozbiljne greške.*	0.39		
A15. Patient safety is never sacrificed so as to do more work./*Bezbednost pacijenata nikad nije žrtvovana da bi se obavilo više posla.*	0.53		
A17.r We have patient safety problems in this ward. *Pacijentova bezbednost je problem na ovom odeljenju.*	0.50		
A18. Our procedures and systems are good at preventing errors from happening/*Naše procedure i sistem rada su dobri u sprečavanju grešaka.*	0.36		
Feedback and communication about error/*Otvorena komunikacija o greškama i povratan odgovor*		0.74	46
C1. We are given feedback about changes put into place based on event reports./*Dobijamo povratne informacije o promenama na osnovu izveštaja o neželjenim događajima.*	0.59		
C2. Staff will freely speak up if they see something that may negatively affect patient care./*Osoblje će slobodno reći ako vide da nešto može negativno uticati na negu pacijenata.*	0.64		
C3. We are informed about errors that happen in this ward./*Svi smo informisani o greškama koje se dešavaju na ovom odeljenju.*	0.69		
C4. Staff feel free to question the decisions or actions of those with more authority./*Osoblje slobodno preispituje odluke i postupke onih sa više ovlašćenja.*	0.56		
C5. In this ward, we discuss ways to prevent errors from happening again/*Na ovom odeljenju razgovaramo o načinima da sprečimo ponavljanje grešaka.*	0.59		
A13. After we make changes to improve patient safety, we evaluate their effectiveness./*Nakon što uvedemo promene da bismo poboljšali bezbednost pacijenta, mi procenimo njihovu delotvornost.*	0.41		
Hospital management support for patient safety and Teamwork across hospital wards *Podrška bolničkog rukovodstva bezbednosti pacijenata i timski rad između odeljenja*		0.74	49
F1. Hospital management provides a work climate that promotes patient safety./*Menadžment bolnice omogućava radnu klimu koja potpomaže bezbednost pacijenata.*	0.65		
F4 There is good cooperation among hospital wards that need to work together./*Postoji dobra saradnja između odeljenja koja treba da rade zajedno.*	0.46		

F8. The actions of hospital management show that patient safety is a top priority./*Postupci uprave bolnice pokazuju da je bezbednost pacijenata od najvećeg značaja.*	0.67		
F10 Hospital wards work well together to provide the best care for patients./*Odeljenja dobro funkcionišu zajedno da bi se obezebdila najbolja nega pacijentima.*	0.58		
Activities of the manager for the promotion of safety *Aktivnosti rukovodilaca na promociji bezbednosti*		0.49	43
B3r. Whenever pressure builds up, my superiors wants us to work faster, even if it means taking shortcuts./*Kad god se pojača pritisak, pretpostavljeni želi da radimo brže, iako to znači korišćenje prečica.*	0.72		
B4r.My superior overlooks patient safety problems that happen over and over./*Moj pretpostavljeni previđa probleme u pogledu bezbednosti pacijenata koji se ponavljaju.*	0.73		
Manager's expectations/*Očekivanja rukovodilaca*		0.69	52
B1 My superior says a good word when he/she sees a job done according to established patient safety procedures./*Moj pretpostavljeni pohvali dobro obavljen posao koji je u skladu sa ustanovljenim procedurama.*	0.74		
B2. My superior seriously considers staff suggestions for improving patient safety./*Moj pretpostavljeni ozbiljno razmatra predloge osoblja za poboljšanje bezbednosti pacijenata.*	0.75		
C6.r Staff are afraid to ask questions when something does not seem right./*Osoblje se boji da postavlja pitanja kada im se učini da nešto nije u redu.*	0.38		

* r- negatively formulated items whose replies were converted into positive ones/*stavke koje su konvertovane*
Items which changed the original layout are highlighted in bold/*boldovani ajtemi su promenili originalan raspored u dimenzijama*

sponses ≥75% which is arbitrarily determined as a high level of safety culture.

The value of the dimensions which are related to the managing staff and open communication implies that there is a need for changes and that there should be a traditional concept of management. Managers of health institutions in Serbia are doctors with years of experience in healthcare, but without experience in the field of management. Similar results, in the sense of inadequate support of the management, were obtained by a few other researchers [19, 22, 23]. Low values of positive responses in the dimensions *Frequency of reported events* and *Non-punitive response to error* have also been obtained by other researchers [12, 14, 19, 22]. The system of reporting adverse events and errors is not sufficiently developed in health institutions where the survey was conducted. The readiness of health workers to report an adverse event depends on their belief that those events will be analyzed and that appropriate changes will be conducted, which could prevent adverse events and errors [24]. In most studies staff expresses justified concern that they would be punished, so they rarely report adverse events [22–25].

The outcome dimension *Overall perception of safety* has the highest values of positive responses. This domain has been identified in several studies as a problematic one [12, 22]. Differences in culture may be the reason why the attitude of our respondents is more positive; and another reason could the unwillingness of the staff to express a negative opinion about their workplace, which can be confirmed by the fact that more than one half of the respondents assess patient safety as excellent/very good.

Respondents reported that there was a good team work within one ward, but they did not show willingness to work with colleagues from other wards. This is a field with the highest percentage of positive responses in most studies [12, 17–19, 22]. Pronovost and associates (2003) state that although the nurses are not worried about team work, they still express a negative opinion about their relationship with physicians and other nurses [26]. When they talk with physicians or people at managing positions about errors, they think their opinion is not appreciated enough. No profession by itself can adequately and efficiently respond to the complexity of many needs of the service users who are assured of receiving safety by the highest possible standards. There is a need for open communication among health workers in order to find optimal solutions to improve patient safety. For managing structures, it is essential to recognize that it is not always possible to achieve a perfect clinical outcome or the care outcome. When an error happens, the most important problem is not ″who is guilty″, but

Table 2. Correlation matrix by dimensios
Tabela 2. *Korelaciona matrica po dimenzijama*

Dimension/*Dimenzija*	1	2	3	4	5	6	7	8	9	10
Organizational learning – Continuous improvement & Teamwork within a ward/*Učenje u organizaciji/ kontinuiranost napređenja i timski rad na odeljenju*										
Hospital handover and transfer/*Primopredaja i premeštaj pacijenta sa jednog odeljenja na drugo*	0.26*									
Frequency of reported events *Učestalost izveštavanja o neželjenom događaju*	0.17*	0.10*								
Non-punitive response to error *Nekažnjavajuće reakcije uprave na grešku*	0.20*	0.31*	0.06*							
Overall perception of safety *Ukupna percepcija bezbednosti*	0.44*	0.37*	0.15*	0.29*						
Feedback and communication about error/*Otvorena komunikacija o greškama i povratan odgovor*	0.51*	0.30*	0.30*	0.22*	0.35*					
Hospital management support for patient safety and Teamwork across hospital wards/*Podrška bolničkog rukovodstva bezbednosti pacijenata i timski rad između odeljenja*	0.45*	0.46*	0.15*	0.19*	0.36*	0.42*				
Activities of the manager for the promotion of safety/*Aktivnosti rukovodilaca na promociji bezbednosti*	0.14*	0.26*	0.09*	0.26*	0.26*	0.13*	0.08*			
Manager's expectations/*Očekivanja rukovodilaca*	0.56*	0.32*	0.12*	0.26*	0.35*	0.52*	0.42*	0.15*		
Patient safety grade *Ocena bezbednosti pacijenata na odeljenju*	-0.37*	-0.33*	-0.17*	-0.19*	-0.42*	-0.37*	-0.39*	-0.13*	-0.31*	
Number of events reported *Broj prijavljenih neželjenih događaja*	-0.10*	-0.09*	0.14*	-0.04	-0.15*	0.01	-0.08*	-0.01	-0.09*	0.10*

*p<0.05

"how and why the error happened" [27]. One of the problems is that certain errors are realy such that those who have made them should be blamed for them and held responsible.

Limitations of the study

Since this is the first survey on the topic of safety culture in Serbia, it can be a starting point for raising the consciousness about the importance of patient safety culture. In this study, there is a remarkably larger number of nurses who participated in this survey, which can be noticed in other surveys as well. Apart from the fact that nurses make the majority of the employees in health institutions, there is a dilemma in the survey results interpretation whether the obtained results are attitudes of health workers or attitudes of nurses and a small number of physicians.

Conclusion

The study results suggest that safety culture is yet to be developed, as there are several areas for improvement including error reporting, non-punitive response to error, communication, activities and support of the hospital manager and teamwork across hospital units. Survey results indicate that those who are responsible for the creation of health policy in Serbia have to take responsibility for the implementation of safety culture in every health institution. Further research is needed to study the association between patient safety culture and clinical outcomes, financial indicators, quality, patient satisfaction and job satisfaction. The advancement of patient safety culture has to be a priority strategic goal of a health institution.

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ATTITUDES AND BELIEFS OF NURSES AND TECHNICIANS TOWARDS COMPLEMENTARY-ALTERNATIVE MEDICINE

STAVOVI I UVERENJA MEDICINSKIH SESTARA I TEHNIČARA PREMA KOMPLEMENTARNO-ALTERNATIVNOJ MEDICINI

Sanja TOMIĆ[1], Goran MALENKOVIĆ[1], Ivica LALIĆ[1,2], Slobodan TOMIĆ[3] and Nensi LALIĆ[1]

Summary

Introduction. Complementary and alternative medicine is used more and more in the communities but there are differences in attitudes, beliefs and knowledge about it among and within different medical professions. The aims of this study are to determine the attitude of nurses and medical technicians towards methods of complementary and alternative medicine and to determine the levels of personal use and willingness to recommend their patients methods of complementary and alternative medicine that have been adopted by the Health Ministry of the Republic of Serbia. **Material and Methods.** The research included 126 nurses and technicians. The survey was conducted at the General Hospital in Subotica. The Complementary and alternative medicine Health Belief Questionnaire was used to determine the attitudes of nurses and technicians towards complementary and alternative medicine. A custom questionnaire was designed for this study in order to determine the willingness to recommend complementary and alternative medicine to their patients. **Results.** The average score on the Health Belief Questionnaire suggested the positive attitudes of nurses and technicians. There was a positive correlation between the attitudes and recommendations given to the patients to accept diagnostic and treatment methods and rehabilitation methods. The most recommended methods to the patients were those used by the participants themselves. **Conclusion.** Most of the nurses and technicians have the positive attitude towards complementary and alternative medicine, and this can be a result of positive personal experience and at the same time a reason that explains the recommendations given to the patients.

Key words: Health Knowledge, Attitudes, Practice; Complementary Therapies; Attitude of Health Personnel; Nursing Staff; Surveys and Questionnaires; Medicine, Traditional; Phytotherapy; Homeopathy

Sažetak

Uvod. Komplementarna i alternativna medicina se sve više koristi, međutim postoje razlike u znanju, verovanju i stavovima između i unutar različitih zdravstvenih profesija. Ciljevi ove studije odnose se na procenu stavova medicinskih sestara i tehničara prema metodama komplementarne i alternativne medicine i utvrđivanje lične primene i spremnosti medicinskih sestara i tehničara za davanje preporuka pacijentima o primeni metoda komplementarno-alternativne medicine koje su priznate od Ministarstva zdravlja Republike Srbije u Opštoj bolnici u Subotici. **Materijal i metode.** Istraživanje je obuhvatilo 126 medicinskih sestara i tehničara. Anketiranje je sprovedeno u Opštoj bolnici u Subotici. Za utvrđivanje stava prema komplementarno-alternativnoj medicini korišćen je *CAM Health Belief Questionnaire*, a za utvrđivanje primene i spremnosti medicinskih sestara i tehničara za davanje preporuka pacijentima o primeni metoda komplementarno-alternativne medicine upitnik dizajniran za potrebe ove studije. **Rezultati.** Ukupan prosečan skor na upitniku komplementarne i alternativne medicine *Health Belief Questionnaire* ukazuje na pozitivan stav medicinskih sestara i tehničara. Postoji pozitivna korelacija između stavova i preporuka pacijentima o primeni kako metoda dijagnostike i lečenja tako i metoda rehabilitacije. One metode koje su najčešće koristili, ispitanici su i najviše preporučivali svojim pacijentima. **Zaključak.** Većina medicinskih sestara i tehničara je imala pozitivan stav prema komplementarnoj i alternativnoj medicini, što može biti rezultat pozitivnog ličnog iskustva, a ujedno i razlog koji objašnjava preporuke date pacijentima.

Ključne reči: znanje o zdravlju, stavovi, praksa; komplementarna medicina; stavovi zdravstvenih radnika; zdravstveni radnici; istraživanja i upitnici; tradicionalna medicina; fitoterapija; homeopatija

Introduction

Complementary and alternative medicine is the term that has officially been introduced by the World Health Organization (WHO). It implies "Health practices, approaches, knowledge and beliefs that are concerned with preparation of plant, mineral or animal origin, spiritual therapies, and manual techniques and exercises that are persued individually and/or in combination for the purpose of healing, diagnostics and disease prevention i.e. the preservation of well-being" [1, 2]. The abbreviation CAM – complementary and alternative medicine is used by the professional public and it entails the following: "Group of systems and products that are used for the purpose of providing health care together with conventional medicine but are not currently considered a part of it" [1, 2]. Apart from complementary and alternative medicine the

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Abbreviations
WHO – World Health Organization
CAM – Complementary and alternative medicine
TM – traditional medicine
CHBQ – CAM Health Belief Questionnaire

WHO uses the term traditional medicine (TM). The term of traditional medicine includes things that have their own tradition and history (for instance Chinese traditional medicine, Indian Ayurveda, Tibetan medicine, Unani – Arabic medicine and so on). It is a general term and it is related to the culture of a specific nation [1, 2]. On the territory of the Rublic of Serbia TM and CAM are integrated in the healthcare system in accordance with the Healthcare Law of Serbia (Legal Gazette no. 107/05) [3]. The law has equated TM and CAM with conventional medicine and given the patients the right to be informed about alternative treatment methods, thus obliging healthcare workers to give respective information. All TM and CAM that can be used on all three levels of health care on the territory of the Republic of Serbia are divided into two categories: Diagnostic methods and treatments and Rehabilitation methods (for the advancement of health) [3].

Information about the attitudes of nurses on the utilization of TM and CAM come foremost from the developed parts of the world [4–10]. In our country, the knowledge about the attitudes of healthcare workers, especially nurses and technicians, towards TM and CAM is limited. According to our literature review only one research has been done on attitudes toward CAM (which was published in 2013), but the participation of nurses in that research was limited to only six participants [11]. Therefore, it is the aim of our paper to determine the attitudes and beliefs of nurses and medical technicians about the application of CAM and TM, personal application of CAM and their recommendations to the patients about the usage of CAM at the General Hospital in Subotica.

Material and Methods

The study, planned as a cross-sectional survey, was performed at the General Hospital in Subotica from November 2016 to July 2017. A hundred and twenty-six nurses and medical technicians participated in the research. The survey was performed on the voluntary basis irrespectively of years of service and education levels. Nurses and medical technicians that were on their residency or volunteering at the General Hospital in Subotica were excluded from the survey. The study was approved by the Ethics Board of the General Hospital in Subotica and the Ethics Committee of the Faculty of Medicine Novi Sad, University of Novi Sad.

Study Instruments

We used the CAM Health Belief Questionnaire – CHBQ instrument to determine the attitudes of nurses and medical technician about CAM. This questionnaire is widely applied by the population of health workers in hospital conditions. It consists of 10 items that are answered by a seven-point Likert scale (from 1 – I absolutely disagree, to 7 – I absolutely agree). Items 6, 7 and 8 are reverse scored in order to minimize the influence of disinterest in participants. By adding up points from each item we get the general score that represents the attitudes of a participant. It can be positive, neutral and negative. The maximum and the minimal possible score that can be achieved is 70 and 10, respectively. The authors have defined the value of 35 as an indicator of a neutral stance, scores above 35 point to a positive attitude and those under 35 go towards a negative attitude [12]. The authors of this paper redesigned this questionnaire for the purposes of this study in order to determine which CAM modality were recommended by the nurses and medical technicians to their patients and used themselves.

Statistical Data Analysis

The indicators of descriptive statistics used in this study were calculated by means of univariate analysis, measures of central tendency, variability measures and methods of bivariate analysis (correlation and regression coefficients). The following comparative statistics methods were used: Student's t-test to determine the gender differences between mean values of two samples and the Z-test to determine the significance of proportion differences between two samples. The obtained results were interpreted as statistically significant if p values were lower than 0.05 or highly significant if lower than 0.01.

Test validity was proved by analyzing the correlations between the scores of the CHBQ questionnaire and answers regarding the usage and recommendations of modalities. Statistical processing was performed by using the IBM SPSS Statistics 22 package.

Results

Out of 123 distributed questionnaires, 83 were returned to be processed, which means that the response rate was 65.87%. **Table 1** presents the socio-demographic characteristics of the participants. Most of the answers were given by nurses (91.6%) aged between 35 and 39 years, with 11 do 16 years of service (26.5%) and high school education level (79.5%). The youngest and the oldest participant were 20 and 56 years old, respectively. The average age of nurses and medical technicians that participated in the survey was 37.3±9.89(SD) with the average length of service of 14.10±8.37(SD) years.

According to the data presented in **Table 2** the nurses and medical technicians most often used local traditional medicine (56.6%), then phytotherapy (43.4%) and homeopathy (19.3%) from the group Diagnostics methods and treatments group. In addition, they recommended their patients the very same methods they used themselves. By analyzing the socio-demographic characteristics of the participants it was observed that the nurses and medical technicians aged 38 and older recommended diagnostic and treatment methods more readily than the younger participants (Z=2.15; p=0.03).

Table 1. Socio-demographic characteristics of participants
Tabela 1. *Socio-demografske karakteristike uzorka*

	n (%)
Gender/*Pol*	
Female/*Ženski*	76 (90.1)
Male/*Muški*	7 (9.9)
Lifetime intervals in years/*Intervali životnog doba u godinama*	
20–29	19 (22.9)
30–39	31 (37.3)
40–49	19 (22.9)
55–59	14 (16.9)
Years of service in yearly intervals/*Intervali dužine radnog staža u godinama*	
0–4	19 (22.9)
5–10	7 (8.5)
11–16	22 (26.5)
17–22	16 (19.4)
23 i više	18 (21.7)
Education levels/*Stepen obazovanja*	
High school/*Srednja škola*	66 (79.5)
Vocational school/Graduate degree *Viša škola/fakultet*	17 (20.4)
Total/*Ukupno*	83 (100)

n = Absolute frequency/*Apsolutna učestalost;* % = Relative frequency/*Relativna učestalost*

Table 2. The frequency of usage and recommending of the most commonly practiced complementary-alternative methods.
Tabela 2. *Distribucija primene i preporuka najčešćih komplementarno-alternativnih metoda*

CAM accordance with the Healthcare Law of Serbia *CAM prema Ministarstvu zdravlja Republike Srbije*	Use/*Primena*		Recommendation/*Preporuka*	
	Da/*Yes*	Ne/*No*	Da/*Yes*	Ne/*No*
	n (%)	n (%)	n (%)	n (%)
Diagnostic and treatment methods/*Metode dijagnostike*				
Homeopathy/*Homeopatija*	16 (56.6)	67 (80.7)	45 (54.2)	67 (32.5)
Phytotherapy/*Fitoterapija*	36 (43.4)	47 (56.6)	52 (62.7)	47 (37.3)
Local traditional medicine/*Tradicionalna domaća medicina*	47 (19.3)	36 (43.4)	56 (67.5)	36 (45.8)
Rehabilitation methods/*Metode rehabilitacije*				
Apitherapy/*Apiterapija*	45 (54.2)	38 (78.5)	57 (68.7)	26 (31.3)
Aromatherapy/*Aromaterapija*	30 (37.5)	53 (63.9)	39 (47)	44 (53)
Yoga exercises/*Joga vežbe*	31 (36.1)	52 (62.5)	45 (54.2)	38 (45.8)
Constellation Work/*Porodični raspored*	18 (21.7)	65 (45.8)	44 (53)	39 (47)

n = Absolute frequency/*Apsolutna učestalost*; % = Relative frequency/*Relativna učestalost*

As for Rehabilitation methods, most of the nurses used apitherapy in personal life (54.22%), 37.35% of them practiced yoga, 36.14% used aromatherapy and 21.69% applied constellation work. Besides, most of the participants recommended the same methods to their patients.

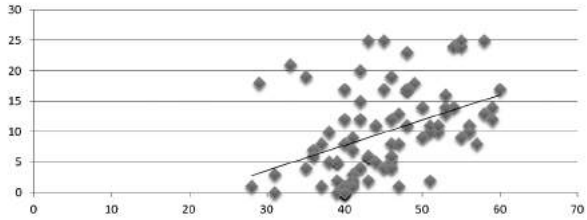
On average 15.42% of the participants used some of diagnostic and treatment methods and 20.36% of them applied some of the methods for rehabilitation and health improvement. The participants chose methods of rehabilitation and health improvement more frequently (Z=2.91; p=0.03).

The highest positive value with respect to the CAM effects was achieved on the item 5 of the questionnaire (4.9±1.4(SD)) while the lowest one was recorded for the item 7 (3.8±1.5(SD)). Other results can be seen in **Table 3.** The mean score value of the participants on the CAM attitude evaluation questionnaire was 44.8±1.3 (SD), which suggests the positive attitude. The regression correlation coefficient was calculated to assess the correlation between the attitudes and recommendations of nurses and medical technicians towards CAM. The obtained value of regression coefficient (r=0.413; t=4.21; p=0.00) was suggestive of

Table 3. Distribution of answers of the nurses on statements from CHBQ Questionnaire
Tabela 3. *Distribucija odgovora medicinskih sestara na tvrdnje iz CHBQ upitnika*

CAM Health Belief Questionnaire/*CHBQ/Upitnik CHBQ*	
Items/*Stavke*	Mean±SD *Prosek±SD*
1. The physical and mental health are maintained by an underlying energy or vital force *Fizičko i mentalno zdravlje su odraz vitalne energije tj. vitalne sile.*	4.5±1.5
2. Health and disease are a reflection of balance between positive life-enhancing forces and negative destructive forces/*Zdravlje i bolest su odraz (narušene) ravnoteže između pozitivnog stava o životu i njegovim promenama i negativne destruktivne sile.*	4.6±1.5
3. The body is essentially self-healing and the task of a health care provider is to assist in the healing process/Telo je u suštini samoisceljujuće i zadatak zdravstvenog radnika je da učestvuje u procesu ozdravljenja.	4.4±1.6
4. A patient's symptoms should be regarded as a manifestation of general imbalance of dysfunction affecting the whole body/*Simptome pacijenta treba posmatrati kao generalnu neravnotežu funkcija koje zahvataju ceo organizam.*	4.7±1.6
5. A patient's expectations, health beliefs and values should be integrated into the patient care process *Očekivanja pacijenta, zdravstvena uverenja i vrednosti treba da budu integrisani u proces zdravstvene nege pacijenta.*	4.9±1.4
6. *Complementary therapies are a threat to public health/CAM terapije ugrožavaju javno zdravlje.*	4.6±1.2
7. Treatments not tested in a scientifically recognized manner should be discouraged/*Komplementarno-alternativne terapije koje nisu testirane na naučno priznat način treba zabraniti.*	3.8±1.5
8. Effects of complementary therapies are usually the result of a placebo effect/*Efekti CAM i terapija su uglavnom rezultati placebo efekta.*	4.3±1.3
9. Complementary therapies include ideas and methods from which conventional medicine could benefit/*CAM i terapije uključuju ideje i metode iz kojih bi konvencionalna medicina mogla imati koristi.*	4.5±1.0
10. Most complementary therapies stimulate the body's natural therapeutic powers/*Većina CAM i terapija stimuliše prirodnu terapijsku moć tela.*	4.6±1.1
Mean score value/*Ukupna prosečna vrednost skora*	44.8±1.3

the positive correlation; the increased score on CHBQ questionnaire increases the average number of YES responses regarding the recommendation of CAM methods by 0.413. The scree plot and the regression line are shown in **Graph 1.**



Graph. 1. Scree plot representing participant CHBQ score and number of recommendations to patients for the usage of complementary and alternative methods.
Grafikon 1. *Dijagram disperzije ispitanika prema CHBQ skoru i broju preporuka za primenu CAM*

Horizontal axes: achieved CHBQ score; Vertical axes: frequency of CAM use recommendations to patients; ascending line: estimated regression line
Horizontalna osa: postignuti CHBQ skor; Vertikalna osa: frekvencija preporuka pacijentima za korišćenje CAM; Rastuća prava: ocenjena regresiona linija

Discussion

The interest for and the availability of traditional medication and complementary – alternative methods make them more and more appealing, as shown by the results from many studies which reported that TM and CAM usage was continuously on the rise in the last decade of the 20th century. The reasons for the increased use of CAM in the general population differ in literature and include the improvement function of the immune system [13–15], decrease of adverse effects [15, 16], pain control [17], belief that CAM is safer than conventional medication [17]. Personal experience, knowledge and education have been pointed out as factors that contribute most to forming attitudes towards CAM in the population of nurses and medical technicians, and to their willingness to recommend them to the patients [5–11, 14]. The results of our study show that more than half of the nurses and technicians themselves use the methods of local traditional medicine and apitherapy (56.6% vs 54.2%), then homeopathy (19.3%), phytotherapy (43.4%), yoga (37.5%), constellation work (21.7%) and aromatherapy (36.1%). The analysis of sociodemographic predictors for the personal use and professional recommendation of CAM in the category of Diagnostic and treatment methods and Rehabilitation methods revealed that the personal use of CAM dom-

inated among the nurses and medical technicians aged 38 and older, who worked for 15 years or longer. With regards to the recommendations given to patients, a little less than half of the nurses and technicians (43.3%) recommended CAM methods of diagnostics and treatment. Such results are in accordance with a study published in 2016 where the authors pointed out that the nurses did not often use CAM in practice [17]. The results obtained in our study are not surprising, given the fact that there are many obstacles for including CAM into clinical practice on the nursing level. One of the obstacles is the absence of education opportunities for nurses and medical technicians in the field of applied CAM modalities and the insufficient number of nurses licensed to perform CAM according to the current standards and rulebooks. It is also worth noting that only homeopathy out of all Methods of diagnostics and treatment and Methods of rehabilitation approved by the Ministry for Health of the Republic of Serbia has found its application in clinical-hospital situations at the General Hospital in Subotica, where this research was conducted.

The methods most recommended to patients by nurses and technicians are those that they themselves have used. The results of a study performed in the United States of America have also shown that the CAM modalities used by nurses themselves are those that are most recommended to patients by nurses, which further corroborates our claims [4]. A significant number of experts claim that the personal use of CAM by healthcare workers is the main determinant in moving towards integrative care, the fusion of CAM and allopathic medicine [4–8, 17].

Nevertheless, considering the average score of the CHBQ questionnaire (44.8±1.38 (SD)), it can be said that the attitude of nurses and technicians in our country toward CAM is positive. Research results suggest that nurses and technicians are aware of the fact that patients should be viewed as a union of the body, mind and soul, and that the integration of the patients' expectations, beliefs and values is crucial for adequate healthcare.

The highest communality among the participants was achieved on the CHBQ 5 item 5 (4.9±1.4(SD)), and the lowest was on the CHBQ item 7 (3.8±1.5 (SD)). Such results are in accordance with the results obtained by previous studies and they suggest that the majority of nurses and medical technicians respect the expectations and beliefs of their patients. However, they also suggest that the absence of scientific evidence to prove the efficiency and safety of certain CAM can be the reason for the low communality on the item 7 [16–18].

When comparing the results of our study and the studies performed in eight cities in Serbia during 2010 and 2011 we can conclude that the nurses and technicians in the General Hospital in Subotica have lower average scores on CHBQ when compared with medicine and dentistry students (50.26 ± 7.92(SD) vs 50.26 ± 7.92(SD)) and university professors (50.29 ± 9.50(SD)) [11]. Nevertheless, the participants in both studies have shown positive attitudes towards CAM on the whole.

Conclusion

Most of the nurses and medical technicians have the positive attitude towards CAM, and this is a consequence of positive personal experience. Their experience is also the reason for making recommendations to patients. The results show that nurses and technicians are ready for further integration of CAM categorized as Methods of diagnostics and treatment and Methods of rehabilitation in the clinical-hospital practice in the General Hospital in Subotica.

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FREQUENCY OF APPLICATION AND LEVEL OF NURSES' KNOWLEDGE ON ADMINISTERING INTRAMUSCULAR INJECTIONS INTO THE VENTROGLUTEAL SITE

UČESTALOST PRIMENE I NIVO INFORMISANOSTI MEDICINSKIH SESTARA O DAVANJU INTRAMUSKULARNE INJEKCIJE U VENTROGLUTEALNO MESTO

Dragana MILUTINOVIĆ[1], Sanja TOMIĆ[1], Valentin PUŠKAŠ[2], Branislava BRESTOVAČKI SVITLICA[1], Dragana SIMIN[1]

Summary

Introduction. The most recent literature data and studies have recommended the middle gluteal muscle or the ventrogluteal side as the site for the application of intramuscular injection. Although it has been recommended for many years because of its many advantages it is rarely used in the clinical practice. The aim of this study was to evaluate the frequency of application of intramuscular injection and the level of nurses' of knowledge on how to give injections at the ventrogluteal site. **Material and Methods.** This study was conducted as an observational, analytical cross-sectional study at two healthcare institutions of different medical care levels on a sample of 96 nurses. The Questionnaire on the level of knowledge concerning the Ventrogluteal Site for Intramuscular Injection was used as a research instrument. **Results.** A quarter (28.1%) of the nurses knew that the ventrogluteal site or the middle gluteal muscle was the recommended site for intramuscular injection, while in their clinical practice only 20.8% of the nurses used it. The average score on the Questionnaire on the level of knowledge concerning the Ventrogluteal Site for Intramuscular Injection was 8.8 ± 4.1 (SD), the maximum score being 22. **Conclusion.** The results of the study show that the ventrogluteal site for administering intramuscular injections is rarely used, and the level of knowledge which the nurses from the study sample have shown about the procedure and the advantages of using the ventrogluteal site for intramuscular injections is rather low.

Key words: Health Knowledge, Attitudes, Practice; Nursing Staff; Injections, Intramuscular; Muscle, Skeletal; Buttocks; Evidence-Based Nursing

Sažetak

Uvod. Prema najnovijoj literaturi i istraživanjima preporučeno mesto za davanje intramuskularnih injekcija je srednji glutealni mišić odnosno njegova ventroglutealna strana. Iako se već dugi niz godina preporučuje, zbog svih prednosti koje ima, u kliničkoj praksi se retko koristi. Cilj ove studije bio je da se proceni učestalost korišćenja ventroglutealnog mesta i nivo informisanosti medicinskih sestara o intramuskularnoj injekciji u ventroglutealno mesto. **Materijal i metode.** Istraživanje je sprovedeno kao opservativna, analitička studija preseka u dve zdravstvene ustanove različitog nivoa zdravstvene zaštite na uzorku od 96 medicinskih sestara. Kao instrumenti istraživanja korišćen je upitnik za procenu znanja o ventroglutealnom mestu za davanje intramuskularne injekcije. **Rezultati.** Da je ventroglutealno mesto, odnosno srednji glutealni mišić mesto izbora za intramuskularnu injekciju znalo je četvrtina (28,1%) medicinskih sestara, a u kliničkoj praksi ga koristi samo 20,8% medicinskih sestara. Prosečan skor na upitniku znanja medicinskih sestara o ventroglutealnom mestu za intramuskularnu injekciju bio je 8,8 ± 4,1 (SD) od maksimalno mogućeg skora 22. **Zaključak.** Rezultati sprovedene studije su pokazali da se ventroglutealno mesto za davanje intramuskularnih injekcija retko koristi, kao i da je nivo znanja medicinskih sestara o proceduri i prednostima intramuskularne injekcije u ventroglutealno mesto ograničeno.

Ključne reči: znanje o zdravlju, stavovi, praksa; zdravstveni radnici; intramuskularne injekcije; skeletni mišić; glutealni mišić; zdravstvena nega zasnovana na dokazima

Introduction

Intramuscular (IM) injections represent the parenteral application of medication through the skin and subcutaneous tissue into the big muscles of the body by means of the appropriate syringe and needle for prophylactic (vaccinations) and therapeutic purposes (antibiotics and hormones) [1]. Until the late 1960s this procedure was done exclusively by physicians when antibiotic therapy was being administered; however, it has become a common practice for nurses since then [2]. According to the estimations of the World Health Organization (WHO) around 12 billion injections are given annually, and about 50% are not preformed safely and present a health risk [1, 2].

Until recently the application of IM injections was mostly based on the theoretical and practical knowledge of nurses gained during their formal clinical education and their personal preferences and habits. Today the applications of intramuscular injections have to be in line with the current best practice guidelines, which are periodically revised according to the existing evidence obtained by studies [1, 3, 4].

To perform IM injections adequately and safely it is necessary to select a sterile needle of the correct

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length, so the tip of the needle can reach the deep muscles. The needle length depends on the application site, amount of medicine given, patients' age, body weight, muscle mass and the thickness of the subcutaneous fatty tissue at the application site [5–7]. The most commonly used needles for most adults are 21G (green) or 23G (blue), the length of the needle being from 3 to 5 centimeters. It is recommended to use two needles to give an injection, where one is used during the preparation of the medicine and the second one for the application. The changing of the needle reduces pain, and should prevent unwanted complications [7].

The current literature mentions five muscles as potential sites for IM injections: *m. gluteus maximus* (its dorsal side (DG)), *m. gluteus medius* ventrogluteal side (VG)), *m. vastus lateralis*, *m. rectus femoris* and *m. deltoideus* [8]. According to the most recent studies and literature the recommended site for the application of IM injections for adults and children older than 7 months is the ventrogluteal site [1–3, 7, 9]. For infants below 7 months of age the recommended site for IM injections is the *m. vastus lateralis* because it is well developed after birth [7, 9].

Every site recommended for IM injections is rich in nerves and blood vessel, but only the ventrogluteal site does not contain large blood vessels and big nerves, it is far away from bone structures, it has a large muscle surface, the chances of injecting the medicine into the subcutaneous tissue are low and the site can be easily anatomically determined [1, 2]. The results of conducted studies show that injections into the ventrogluteal site are the least painful and there is almost no bleeding. Compared to the dorsogluteal site, the positioning of the patient is easier, and the risk of contamination with feces and urine is lower [2, 10].

The ventrogluteal site can be located by using either V or G method. If the injection is to be administered to the left side by using V method, the nurse positions her right wrist parallel to the patient's left femur and places the palm of her right hand over the patient's greater trochanter and spreads the index and middle finger. The index finger is pointing to the anterosuperior iliac spine, the middle finger is then pointed toward the iliac crest. The index and middle fingers create a V-shape, and the injection site is the middle of the V-shape. If the injection is given on the patient's right-side, nurses use their left hand and vice versa [2, 7].

The Geometric method (G method) to determine the VG site was proposed by Meneses [12], who claimed that its reliability was 100%. To determine the puncture point when using the G method, the bony prominences and imaginary lines are drawn in between them to be used as orientation points. The first imaginary line is drawn from the greater trochanter to the iliac crest, then the second one from the iliac crest to the anterosuperior iliac spine, and the third line from the greater trochanter to the anterosuperior iliac spine. Thus, a triangle is created by imaginary lines. After that, the median lines are drawn for every single corner of triangle. The convergence point of the three median lines is the needle entry point for the injection [2, 11, 12].

The site for the application of IM injections which nurses use most often is the dorsogluteal site also known as *m. gluteus maximus* [13]. When administering medicine into this muscle there is a great chance of unwanted complications such as: hematoma, abscess, muscle fibrosis, injury of the gluteal artery or the sciatic nerve [2, 5, 13]. None of the sites used for IM injections are 100% safe and without the risk of injury, but the dorsogluteal site is the most disadvantageous [13].

Although the ventrogluteal site has been the recommended site for the administration of IM injection because of its many advantages, very few nurses use it, and the most common reasons for avoiding this site the nurses have mentioned are that the site is anatomically too small, it is hard to locate, they are afraid they might hurt the patient, or they are not accustomed to using this site as well as the lack of training after completing their formal education [2, 13]. The inconsistent information given in the textbooks which are used during the education of nurses is also a contributing factor. The dorsogluteal site is mentioned as a favourable injection site in almost every textbook. However, the VG site has been recommended for the application of IM injections in the Fundamentals of Nursing textbook since the seventh edition published in 2010 while the dorsogluteal site and *m. rectus femoris* are not mentioned et al. [7].

Therefore, the aims of this study were to evaluate the frequency of using the ventrogluteal site for intramuscular injections in the everyday clinical practice of nurses and to evaluate the nurses' level of knowledge about giving intramuscular injections at the ventrogluteal site.

Material and Methods

The study was conducted in November and December, 2017 as an observational, analytical cross-sectional study, and included nurses from two healthcare institutions, one of the primary level and the other one of the secondary level. The sample size was N = 96 nurses (n = 20 nurses from the primary level and n = 76 nurses from the secondary level institution).

Study Instruments

The questionnaire on the level of knowledge concerning the Ventrogluteal Site for Intramuscular Injection by Gulnar and Çalışkan was used as the study instrument [13]. The questionnaire consisted of 22 items on administering injections in the ventrogluteal site, and the nurses could answer with one of three given choices (true, false, don't know). Eleven items were true, and eleven items were false. The reliability of the questionnaire was confirmed with Cronbach's alpha coefficient (α) which in Sari and colleagues' study was 0.84 [2]. In this study after translation and cultural adaptation α was equal to 0.90.

The authors also used a questionnaire for nurses to gather information about the most frequently used injection site for intramuscular injections, to identify the frequency of use of the ventrogluteal site, to determine the level of knowledge about recommendations from

contemporary nursing literature and a questionnaire to gather sociodemographic data (sex, age, length of work experience expressed in years, educational level).

Statistical Data Analysis

Descriptive statistics were used to determine the average values, standard deviations (SD), minimal (Min) and maximal (Max) values, 95% confidence interval that is the absolute frequency of occurrences with corresponding percentages depending on the nature of the variable. The normalness of the distribution of data was confirmed with the Kolmogorov Smirnov test (p>0,05). The comparison of the average values from two different groups was done with the t-test, and ANOVA was used to compare average values of multiple groups. Statistical analysis of the results was accomplished with the statistical package IBM SPSS 23 Statistics, and statistical significance was determined at $p < 0.05$.

Results

Most of the nurses participating in the study were female (91.7%) and high school graduates (94.8%) **(Table 1)**.

The nurses' average age was 37.3 (SD = 10.7). The youngest nurse was 19 years old, while the oldest one was 59 years of age. The average length of work experience was 16.7 (SD = 10.6) years, ranging from minimum 1 and a maximum 38 years.

Over half (n = 63; 65.6%) of nurses thought that according to current literature the dorsogluteal site is the best for giving IM in injections and most of them (85.4%) use it in their daily clinical practice. Only 28.1% of the nurses knew that the ventrogluteal site or *m. gluteus medius* was the recommended site for IM injections, and only n = 20 nurses (20.8%) used it in their clinical practice. Being not accustomed to using the VG site was the reason why 51.7% of nurses did not

Table 1. Distribution of nurses according to sociodemographic characteristics
Tabela 1. *Distribucija medicinskih sestara u odnosu na sociodemografske karakteristike*

Sociodemographic characteristics of nurses/*Sociodemografske karakteristike medicinskih sestara*		n	%
Gender/*Pol*	Male/*Muško*	8	8.3
	Female/*Žensko*	88	91.7
Total/*Ukupno*		96	100.0
Educational level *Nivo obrazovanja*	High school/*Srednja škola*	91	94.8
	Associate degree/*Viša škola*	2	2.1
	Professional bachelor/*Strukovne studije*	3	3.1
Total/*Ukupno*		96	100.0

n - absolute frequency/*apsolutna učestalost*, % - relative frequency/*relativna učestalost*

Table 2. The distribution of nurses according to the characteristics of giving intramuscular injections
Tabela 2. *Distribucija medicinskih sestara prema karakteristikama davanja intramuskularne injekcije*

Data on application of intramuscular injections/*Podaci o primeni intramuskularne injekcije*		n	%
Most frequently used site/*Najčešće korišćeno mesto*	Dorsogluteal site/*Dorzoglutealno mesto*	82	85.4
	Ventrogluteal site/*Ventroglutealno mesto*	8	8.3
	m. rectus femoris/*Mišić rectus femoris*	6	6.3
Total/*Ukupno*		96	100.0
Site recommended by the latest literature *Mesto davanja preporučeno po savremenoj literaturi*	Dorsogluteal site/*Dorzoglutealno mesto*	63	65.6
	Deltoid muscle/*Deltoidni mišić*	1	1.0
	Ventrogluteal site/*Ventroglutealno mesto*	27	28.1
	m. rectus femoris/*Mišić rectus femoris*	5	5.2
Total/*Ukupno*		96	100.0
Have you given injections to the VG site in your professional life? *Da li u vašem profesionalnom radu dajete IM injekciju u ventroglutealno mesto?*	Yes/*Da*	20	20.8
	No/*Ne*	76	79.2
Total/*Ukupno*		96	100.0
Reasons for not using the VG site (only nurses that do not use the VG site) *Razlozi za nekorišćenje VG mesta* *(samo med. sestre koje ne koriste VG mesto)*	I'm not used to it./*Nisam naviknut/a na to.*	46	51.7
	I don't have enough information to use the VG site./*Nemam dovoljno znanja za primenu injekcije na tom mestu.*	29	32.6
	Other/*Drugi razlog*	14	15.7
Total/*Ukupno*		89	100.0

n - absolute frequency/*apsolutna učestalost*, % - relative frequency/*relativna učestalost*

Table 3. Distribution of the responses given by nurses to the knowledge questionnaire about intramuscular injections into the ventrogluteal site
Tabela 3. *Distribucija odgovora medicinskih sestara na upitniku znanja o intramuskularnoj injekciji u ventroglutealnom mestu*

Statement about IM injections into the VG site *Tvrdnje o IM injekciji u VG mesto*	Correct answer *Tačan odgovor*	n	%
After entering the tissue and before administering the medicine, a blood check is made by drawing back the piston./*Posle ulaska u tkivo, a pre davanja leka proverava se prisutnost krvi aspiracijom.*	True/*Tačno*	91	94.8
The injection site is wiped with an antiseptic pad in a circle of 5 cm diameter from the injection site. *Mesto davanja injekcije se dezinfikuje antiseptikom u krugu sa dijametrom od 5 cm oko ulaznog mesta igle.*	True/*Tačno*	87	90.6
The injection is given after the antiseptic solution has dried. *Injekcija se daje kada se antiseptik osušio.*	True/*Tačno*	79	82.3
Injection at the VG site is safe because it is far from large blood vessels and nerves./Davanje *injekcije na VG mestu je bezbedno zato što je daleko od velikih krvnih sudova i nerva.*	True/*Tačno*	68	70.8
To establish the injection site, the nurse places the lower part of the palm of her hand on the greater trochanter of the femur./*Da bi se odredilo mesto injekcije medicinska sestra postavlja dlan šake na veliki trohanter femura.*	True/*Tačno*	53	55.2
After the injection, the injection site is massaged./*Posle davanja injekcije mesto davanja se masira.*	False/*Netačno*	16	16.7
Injection to the VG site may be difficult in very overweight patients because the greater trochanter cannot be found./*Davanje injekcije na VG mestu može biti otežano kod jako gojaznih pacijenata zato što se ne može pronaći veliki trohanter femura.*	True/*Tačno*	41	42.7
For injection to the VG site, the patient may be lain on the back, prone, or on the side. *Za davanje injekcije na VG mestu pacijent može da leži na leđima, na stomaku i/ili na boku.*	True/*Tačno*	40	41.7
The risk of contamination of the VG site with feces is high. *Rizik od kontaminacije VG mesta fecesom je veliki.*	False/*Netačno*	65	67.7
High volume muscles such as the VG site can take up to 4 ml of medicine./*Mišići velike zapremine, kao onaj u VG mestu mogu primiti do 4 ml leka.*	True/*Tačno*	29	30.2
In the VG site, it is difficult for the needle to reach the muscle because of the thickness of the subcutaneous fatty layer./*Kod davanja injekcije u VG mesto, igla teško dolazi do mišićne mase zbog velike debljine supkutanog masnog tkiva.*	False/*Netačno*	22	22.9
The commonest complication in the VG area is damage to the sciatic nerve./*Najčešća komplikacija kod davanja injekcije u VG mesto je oštećenje ishijadičnog nerva.*	False/*Netačno*	40	41.7
At the VG site, injection-related complications such as fibrosis, nerve damage, abscesses, tissue necrosis and pain do not occur./*Kod davanja injekcije u VG mesto komplikacije kao što su: fibroza, povreda nerva, apscesi, nekroza tkiva i bol se ne javljaju.*	True/*Tačno*	35	36.5
Patients are recommended to exercise the leg after the injection. *Pacijentima je preporučeno da rade vežbe posle davanja injekcije u VG mesto.*	True/*Tačno*	8	8.3
Use of the VG muscle is recommended in children of over 7 months because it is well developed./*Primena injekcije u VG mesto se preporučuje kod dece starije od 7 meseci.*	True/*Tačno*	16	16.7
Medication is injected quickly in a few seconds. *Prilikom davanja injekcije lek se ubrizgava brzo, tokom nekoliko sekundi.*	False/*Netačno*	39	40.6
The VG site is not recommended for the administration of irritants or oily solutions. *G-mesto se ne preporučuje za davanje iritantnih lekova i masnih solucija.*	False/*Netačno*	30	31.3
In order to determine the injection site, the nurse should use her right hand in the patient's right hip, and her left hand on the left hip./*Za određivanje VG mesta medicinska sestra koristi desnu ruku na pacijentovom desnom kuku, i levu ruku na pacijentovom levom kuku.*	False/*Netačno*	28	29.2
The VG site is palpated using imaginary lines and the DG site by the use of bone structure./*VG mesto se locira korišćenjem nevidljivih linija, dok se DG mesto locira palpiranjem koštanih str.uktura.*	False/*Netačno*	3	3.1
The VG site is used only with adults./*Injekcija u VG mesto se koristi samo kod odraslih.*	False/*Netačno*	33	34.4
The tissue at the injection site is grasped between the thumb and the forefinger. *Tkivo na mestu davanja injekcije prilikom davanja leka treba obuhvatiti palcem i kažiprstom.*	False/*Netačno*	14	14.6
The injection site is the area below the iliac crest and above an imaginary diagonal line connecting the posterior superior iliac spine and the greater trochanter of the femur./*Mesto davanja injekcije je površina ispod karličnog grebena (spina iliaca) i iznad zamišljene dijagonalne linije koja povezuje zadnju gornju ilijačnu bodlju (spina iliaca posterior superior) i veliki trohanter femura.*	False/*Netačno*	5	5.2

Table 4. *Total average score on the knowledge questionnaire: differences regarding the sociodemographic characteristics of the nurses*
Tabela 4. *Ukupni prosečni skor na upitniku znanja: razlike u odnosu na sociodemografske karakteristike medicinskih sestara*

	Average ± SD *Prosek ± SD*	t/F	95% CI	p
Age/*Godine života*				
19 – 30 years (n = 32)	9.5 ± 3.6		8.2806 – 10.8444	
31 – 40 years (n = 34)	8.8 ± 3.8	1.312**	7.4502 – 10.1380	> 0.05
> 40 years (n = 30)	7.9 ± 4.7		6.1504 – 9.65922	
Place of employment/*Radno mesto*				
Health Centre/*Dom zdravlja* (n = 20)	8.8 ± 4.9	0.036*	-1.99653 – 2.07022	> 0.05
Hospital/*Bolnica* (n = 76)	8.7 ± 3.8		-2.40404 – 2.47773	
Length of work experience/*Godine radnog staža*				
1 – 19 years (n = 33)	9.1 ± 3.6		7.8113 – 10.3705	
20 – 30 years (n = 31)	9.2 ± 3.7	0.874**	7.8543 – 10.5973	> 0.05
> 30 years (n = 32)	8.0 ± 4.7		6.2917 – 9.7083	

t-test *; ANOVA **

use it and 32.6% of nurses said that they were not sufficiently informed about the VG site **(Table 2).**

The mean score of knowledge of all nurses about intramuscular injection into ventrogluteal site was 8.8 ± 4.1 out of maximum 22 (the lowest score was 0, and the highest 17).

The average score on the knowledge questionnaire revealed that the lowest percentage of correct answers was given to the items related to the technique of giving an intramuscular injection (items number 19 and number 22). Although almost all of the nurses (94.8%) knew that after entering the tissue, and before injecting the medicine, the presence of blood is checked with aspiration, only 16.7% knew that after the application of the medicine the site should not be massaged. The correct answers for the items regarding the theoretical knowledge about the application of injections into the VG site were under 50% **(Table 3)**.

Although there was a difference in the average score on the knowledge questionnaire about IM injections into the VG site among the nurses when their sociodemographic characteristics were analyzed, it was not statistically significant **(Table 4)**.

Discussion

According to the most recent literature the ventrogluteal site is recommended as the safest site for the application of intramuscular injections [1–3, 5–8, 14]. In every healthcare system the best quality service and maximal safeness of the patients is the priority. The aim of this study was to examine the frequency of using ventrogluteal site for intramuscular injections and the nurses' level of knowledge on giving intramuscular injections at the ventrogluteal site.

The results of our study show that only 28.1% of nurses are informed that the most recent studies have recommended the ventrogluteal site for intramuscular injections and only 20.8% of them have used this site during their clinical practice. The most commonly used injection site by the nurses who participated in this study was the dorsogluteal site (65.5%). The authors of a study conducted in Turkey have concluded that the number of nurses using the ventrogluteal site for intramuscular injections is low [2]. Similar results have been found in studies conducted in Australia, Ireland and Jordan [3, 14, 15].

Although 70.8% of nurses know that the ventrogluteal site is safe, because it is far from big blood vessels and nerves, most of them still use the dorsogluteal site as their primary choice for the application of intramuscular injections. The dorsogluteal site is thought to be the site with the highest risk of complications when administering an intramuscular injection because it is rich in blood vessels; it is close to the sciatic nerve and the subcutaneous tissue layer is thicker. Sciatic nerve injuries most commonly occur during intramuscular injections at the dorsogluteal site [5, 13]. It has been estimated that 86% of cases of sciatic nerve injuries occur while the injection is being given [13]. The sciatic nerve is the most commonly hit nerve, especially in children, older patients and thin patients. Also, the absorption of medicine is much slower after DG application, because of the thicker layers of fatty tissue [10, 14].

As the most common reason for not using the ventrogluteal site when applying medicine intramuscularly, nurses said that they were not accustomed to using that site (51.7%). These results are comparable with the results of a study conducted with nurses in Turkey. They have also said that the most common reason for not using the ventrogluteal site is that they are not accustomed to using that site [2]. These results reveal a strongly rooted traditional approach to clinical practice, and IM injection skills are passed down from generation to generation [1, 4].

Insufficient knowledge on how to administer IM injection into the VG site was stated by 32.6% of the nurses as the second most common reason for avoiding

the ventrogluteal site. The reason for insufficient knowledge may be the fact that even though nurses were taught how to use this site during their education they have never seen it in practice [11]. The teacher themselves are often not confident in their skills of giving IM injections into the VG site and cannot influence their students to opt for this site of administering IM injections [14].

In the knowledge questionnaire used in this study the percentage of correct answers was low for the items related to the location and finding of the ventrogluteal site. According to some studies done in Turkey and Ireland nurses have similar problems and find it hard to locate correctly the puncture site for IM injections at the VG site [2, 11, 14].

The average score on the knowledge questionnaire was 8.8, the maximum being 22. Such a low score confirms that the knowledge of this procedure is insufficient. The percentage of correct answers to some individual statements regarding the technique of intramuscular injections was satisfactory, but the percentage of correct answers regarding the statements about theoretical knowledge of administering IM injections at the VG site was under 50%. Although in the study of Sari and his colleagues the nurses had a higher average score on the knowledge questionnaire ($\bar{X}$ = 14.4) [2], our results are comparable. However, unlike the nurses in Serbia, a high percentage of Turkish nurses (77.6%) knew that the application site should not be massaged after the injection [2]. Massaging of the application site after the application of IM injections was once recommended with the explanation that it would make the absorption of medicine faster and prevent the reaction of local tissues. However, massaging is not recommended anymore because it causes the irritation of the tissue [1, 7].

Conclusion

Based on the results obtained in this study it can be concluded that nurses do not have sufficient knowledge regarding individual elements of the application of intramuscular injections into the ventrogluteal site, such as locating the injection site by using V or G method. Besides, the generally low score achieved on the knowledge questionnaire reveals that the method used by nurses for the application of intramuscular injections lags behind the corpus of current theoretical knowledge.

However, the quality of care and treatment of patients could be improved with the implementation of appropriate additional educational program, which is mandatory for healthcare workers and with the creation of good clinical practice guidelines for IM injections.

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INFLUENCE OF PERSONAL CHARACTERISTICS ON THE OCCURRENCE OF LUMBAR PAIN IN NURSES

UTICAJ PERSONALNIH KARAKTERISTIKA NA POJAVU LUMBALNOG BOLA KOD MEDICINSKIH SESTARA/TEHNIČARA

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Summary

Introduction. Even though lumbar pain is one of the most common medical problems of today, it is difficult to determine its precise origin. When identifying the risk factors for developing lumbar pain, one should also take into account the personal characteristics such as gender, age, body mass index, smoking habits, physical activities etc. The basic goal of this study was to assess the relationship between the socio-demographic characteristics (age, gender, level of education), the body mass index, smoking habits, and lumbar pain in nurses. **Material and Methods.** This cross-sectional study was conducted in five healthcare institutions in the area of Vojvodina by interviewing nurses by means of the modified Nordic questionnaire. **Results.** The participants were predominantly female, the majority of them having secondary school degree. The study revealed a statistically significant relationship between lumbar pain and the increase of age and body mass index, while smoking habits did not influence the occurrence of lumbar pain. **Conclusion.** A better organization of work in relation to the age and gender as well body mass control would reduce the risk of lumbar pain.

Key words: Low Back Pain; Nursing Staff; Risk Factors; Surveys and Questionnaires; Body Mass Index; Smoking; Age Factors; Sex Factors

Sažetak

Uvod. Iako lumbalni bol predstavlja jedan od najučestalijih zdravstvenih problema današnjice, teško je utvrditi tačan izvor nastanka. Prilikom identifikacije faktora rizika za nastanak lumbalnog bola treba uzeti u obzir i personalne karakteristike kao što su: pol, starost, indeks telesne mase, pušenje, fizička aktivnost, itd. Osnovni cilj ovog istraživanja bio je da se ispita povezanost između sociodemografskih karakteristika (godine života, pol, stepen stručne spreme), indeksa telesne mase, pušenja i lumbalnog bola kod medicinskih sestara/tehničara. **Materijal i metode.** Istraživanje je sprovedeno u pet zdravstvenih ustanova sa područja Vojvodine u obliku studije preseka, anketiranjem medicinskih sestara/tehničara. Za ispitivanje je korišćen modifikovani Nordijski upitnik. **Rezultati.** Ispitanici su bili uglavnom ženskog pola. Najveći broj ispitanika imao je srednju stručnu spremu. Istraživanjem je utvrđeno da postoji statistički značajna povezanost lumbalnog bola sa porastom godina života i indeksa telesne mase, dok pušenje ne utiče na pojavu lumbalnog bola. **Zaključak.** Boljom organizacijom posla u odnosu na starost i pol medicinskih sestara/tehničara kao i regulisanjem telesne mase, smanjio bi se rizik od nastanka lumbalnog bola.

Ključne reči: lumbalni sindrom; zdravstveni radnici; faktori rizika; istraživanja i upitnici; indeks telesne mase; pušenje; starosna dob; pol

Introduction

Lumbar pain is one of the most common health problems of today and the most frequent cause of temporary inability to work. According to the epidemiological data for our area, the greatest occurrence of lumbar pain in the urban population is between the ages of 50 and 59 years, and it is the cause of inability to work in over 25% of people under 45 years of age [1]. The connection between lumbar pain and the working conditions in the nursing profession shows that it occurs in up to 90% in a hospital environment [2]. The exact cause of lumbar pain is difficult to identify. Personal characteristics, such as gender, age, body mass index, smoking habit, physical activity, years of service in this profession etc. should all be taken into account when identifying risk factors for the occurrence of lumbar pain [2–4]. Since pain is a multidimensional experience, the difference in the prevalence and the manifestation of pain between the genders can appear on more than one level. Men and women have anatomical and physiological differences in the nervous system which transfers or modifies the pain signals. They also differ in the perceptual style and their cognitive and emotional experience of

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pain, as well as how they deal with the existence of pain, i.e. their assessment of pain [5–7].

Lumbar pain can occur also as a consequence of the physiological process of aging, which causes the intervertebral disc to contain less water and lose its strength and elasticity, thus reducing its role in pressure amortization. The degenerative processes on the spine start around the age of 20, and after the age of 50 years the disc becomes completely fibrous and enveloped in the connective tissue. The prevalence of lumbar pain increases with age. Nurses over 50 years of age suffer from pain more often than those younger than 35 [8].

Body mass index (BMI) is the ratio between the weight and height and it is an indicator of the level of nourishment. Normal values are between 18.50 and 24.99 (in kg/m^2). In nurses, obesity can influence the occurrence of lumbar pain in two ways [9]. Not only nurses but patients as well are gaining weight so that additional effort is required when lifting and transferring patients [10]. Healthcare workers with body mass index of approximately 30 have a 60% higher chance of developing lumbar pain [8, 11].

Smoking is considered to be one of the risk factors for developing lumbar pain because it leads to a decrease of perfusion and nourishment of intervertebral discs by means of vasoconstriction, i.e. atherosclerosis. Modified blood flow to the spinal structures can cause degenerative lesions in the discs. Smoking increases the level of circulating proinflammatory cytokines leading to pain, as well as a decrease of disc oxygenation and inhibition of fibrinolytic activities [12]. Therefore, the aim of this study was to investigate the relationship of socio-demographic characteristics (age, gender, degree of education), body mass index, smoking habit and lumbar pain in nurses.

The starting point of this study was the hypothesis that there was a positive connection between the age, increased body mass index, smoking and lumbar pain in nurses and that lumbar pain was much more frequent in female nurses and nurses with four-year level degree of education.

Material and Methods

The study was conducted at the Institute for Child and Youth Health Care of Vojvodina, Clinical Center of Vojvodina (Clinic of Gynecology and Obstetrics, Clinic of Internal Diseases, Clinic of Neurology and the Polyclinic of the Clinical enter of Novi Sad), General Hospital in Sombor, General Hospital in Subotica and General Hospital in Sremska Mitrovica, in the period from March to July 2015, by interviewing nurses through questionnaires. The study was approved by the Ethics Committees of all healthcare institutions in which it was conducted as well as by the directors of all these institutions and the Ethics Committee of the Faculty of Medicine.

The distribution of the questionnaires and the collection of data were conducted by the researcher herself, with the help of head nurses of these healthcare institutions. All the participants gave their informed consent to participate in the study. The respondents remained anonymous.

The criteria for the inclusion in the study were the following: the nurses involved in the healthcare of patients and employees dealing with the organization of healthcare. The criteria for non-inclusion in the study were the following: those with previous injuries and diseases of the spinal column, nurses who had worked in healthcare for less than a year and pregnant women.

Data on of lumbar pain in nurses were collected by means of the Modified Nordic questionnaire for the analysis of musculoskeletal symptoms, based on the Standardized Nordic questionnaire for the analysis of musculoskeletal symptoms [13]. The data obtained during the study were statistically processed.

Results

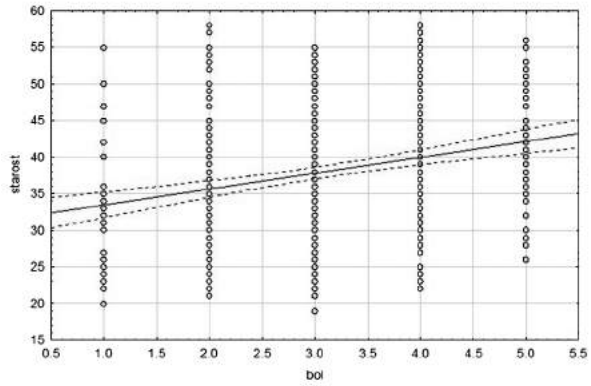
Out of the total of 550 interviewed participants, 38 (6.91%) failed to meet criteria and were excluded from the study, and 512 (93.09%) of them were included in the study.

In the age group of up to 30 and over 50 years of age, 89.4% and 98.5%. of participants suffered from lumbar pain, respectively. A statistically very significant dependency was found between the age groups and the occurrence of lumbar pain: z=34.77, df=12, p=0.00, so the hypothesis was not dismissed. The correlation between the age and lumbar pain was examined by Spearman's correlation coefficient. The value $\rho = 0.25$ was obtained, with the corresponding p-value p»0.00, which means that there was a statistically very significant positive correlation between the age and pain **(Graph 1)**.

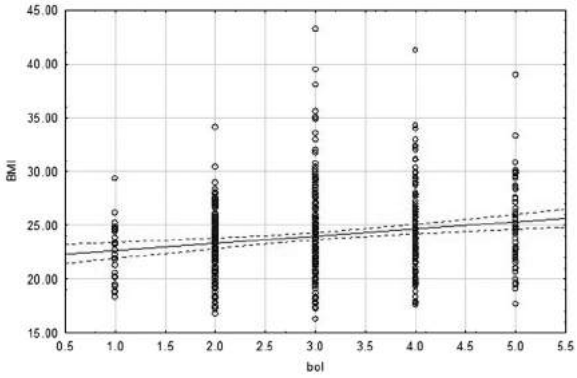
Pain was present in 94.74% of female and 87.50% of male participants. The presence of lumbar pain related to gender was determined on reduced data by using a chi-squared test. The resulting value was z=3.41, with a corresponding p-value of 0.06, which means that there was no statistically significant dependence between the genders and lumbar pain. Since the p-value was close to the limit of 0.05, a difference of proportion test was conducted as well. The statistical significance of the one-sided test p=0.01 shows that the hypothesis was not dismissed with a threshold of significance of 0.05, i.e. that there was a significant difference in the presence of lumbar pain between the genders **(Table 1)**.

The majority (94.96%) of participants with a secondary school diploma suffered from lumbar pain, while that percentage of the participants with a college or faculty degree was somewhat lower, 88.16%. The statistical significance of the test p=0.00 shows that the hypothesis was not dismissed with a significance threshold of 0.05, i.e. that there was a statistically high significant difference in the presence of lumbar pain between the group with the secondary school diploma and the group with other, higher level degrees **(Table 1)**.

Lumbar pain was reported by all the participants with a BMI of over 30, i.e. the obese participants, where-



Graph 1. Correlation between age and lumbar pain
Grafikon 1*. Korelacija lumbalnog bola sa dobnim grupama*
* p»0.00
Starost = Age/*Godine života;* Bol = Low back pain/*Lumbalni bol*



Graph 2. Correlation between body mass index and lumbar pain
Grafikon 2. *Korelacija između indeksa telesne mase i lumbalnog bola*
*p = 0.00; BMI = Body Mass Index/*Indeks telesne mase;* Bol = Low back pain/*Lumbalni bol*

Table 1. The difference in the percentage of lumbar pain in relation to gender, level of education and smoking
Tabela 1. *Razlika procentualne zastupljenosti lumbalnog bola u odnosu na pol, nivo obrazovanja i pušenje*

Risk factors *Faktori rizika*	LBP Sufferers/*Ispitanici sa lumbalnim bolom* n (%)	p value/*p-vrednost*
Gender/*Pol* Women/*Žene* Men/*Muškarci*	 432 (94.74) 49(87.50)	 0,01
Level of education/*Nivo obrazovanja* Secondary education/*Srednja stručna sprema* High professional education/*Viša ili visoka stručna sprema*	 414 (94.96) 67 (88.16)	 0,00
Smoking/*Pušenje* No smokig/*Nepušači* Smoking/*Pušači*	 222 (95.28) 239 (92.28)	 0,09

n = Absolute frequency/*Apsolutna učestalost*; % = Relative frequency/*Relativna učestalost*

as 91% of the participants with ideal body mass had the lowest level of lumbar pain. The hypothesis that there was a statistically significant difference between the BMI and the presence of lumbar pain was confirmed: z=24.48, df=4, p=0.017. The correlation between body mass index and lumbar pain was tested by Spearman's correlation coefficient. The value ρ= 0.17 was obtained, with the corresponding p-value p = 0.00, which means that there was a statistically very significant positive correlation between BMI and pain **(Graph 2)**.

Lumbar pain was reported by 92.28% of participants who were smokers and 95.28% of participants who were non-smokers. The one-sided proportion difference test was applied. The statistical significance of the test was p=0.09, which shows that the hypothesis was dismissed with a significance threshold of 0.05, i.e. there was no statistically significant difference in the presence of lumbar pain between smokers and non-smokers. The check with the chi-squared test: the resulting value (with the Yates correction) was z=1.40, with a corresponding p value of p=0.24, which means that there was no statistically significant difference **(Table 1)**.

Discussion

Pain in the lower back is very common in nurses, but the etiology of this pain is mostly unknown, even though it represents a global problem of today. According to our research, there is a statistically significant difference in 94.74% of women and 87.50% of men reporting the presence of lumbar pain. Furthermore, there is a significant correlation in the research of Sikiru et al, where 78.46% of women and 64.86% of men reported lumbar pain, similar to the research conducted by Homaid et al, where 87.1% of women and 69.7% of men suffered from lumbar pain [14, 15]. The reason for the more frequent occurrence of lumbar pain in women is the anatomical and physiological difference between genders. Women have less muscle fibers, muscle weakness happens more often in women, as well as the stretching and straining of the lumbar part of the spine, especially [16]. This could be related to the fact that the majority of nurses are females who, due to the lack of male nurses, have to do jobs which demand more physical strength [17].

Our research shows a high statistically significant correlation between lumbar pain and age. When looking at the age groups, 98.5% of participants over 50 and 89% of participants under 30 suffer from lumbar pain. In the study conducted by Mohamed Moussa et al, there was a high statistical correlation of lumbar pain and age, where 44.3% of nurses under 30 reported the presence of lumbar pain but only 1 nurse out of 107 of those over 40 did not suffer from lumbar pain [18]. The correlation of lumbar pain and age can occurs also due to the existence of degenerative processes and the accumulation of damage on the spine column [19].

When it comes to the influence of the level of education of nurses on the occurrence of lumbar pain, opinions differ. A statistically significant difference between lumbar pain and the level of education can be found in the studies conducted by June et al [20] and Vieir et al [21], who explain this statistical difference by the fact that highly educated nurses devote more time to patient care, i.e. put more emphasis on their professional role [22]. Our research has shown opposite results, i.e. there is a statistically significantly higher occurrence of lumbar pain in less educated nurses. The results we have obtained could have been influenced by a small number of participants with a higher degree of education.

In our research there is a statistically very significant positive correlation between BMI and lumbar pain. All of the participants whose BMI was over 30, i.e. who were obese, suffered from lumbar pain, whereas 91% of the participants with ideal body mass had the lowest level of lumbar pain, which represents a statistically significant difference. In the research conducted by Barkhordari et al, the occurrence of lumbar pain was much more frequent in persons whose BMI was over 25 than in other participants [23]. A significant correlation of lumbar pain and BMI shows the need for an ideal body mass in nurses. For that reason, it would be recommendable that the facilities have conditions for regular physical activities in order to provide their employees with means to achieve and maintain an ideal body mass [24].

When it comes to the influence of smoking on the occurrence of lumbar pain, we have come across different views in the literature. Our research shows no statistically significant correlation between consuming cigarettes and the occurrence of lumbar pain since as many as 95.28% of non-smoking participants suffer from lumbar pain, which is similar to the results of the studies conducted by Wong et al and Asadi et al, where 94.7% and 98.4% of non-smoking participants reported having lumbar pain [4, 25]. However, in the research conducted by Vieira there was a correlation between smoking and lumbar pain. 80% of nurses working in orthopedics and 90% of them working in intensive care, all of them non-smokers, did not report having lumbar pain [21]. In the study done by Keriri et al, 33.3% of smokers and 50% of ex-smokers had lumbar pain, but no statistically significant difference was found [17]. The correlation between smoking and lumbar pain is explained by the fact that smoking reduces the nutrition of the disc, making it vulnerable to outside influences, and disturbs the blood flow, which can lead to slower healing and prolonged pain [26].

Conclusion

Our research shows a statistically high significant correlation between the increase of age and BMI and lumbar pain. This correlation shows a need for the regulation of body mass in nurses. Smoking was not significantly related to the occurrence of lumbar pain. A significantly higher occurrence of lumbar pain has been reported in female participants and those with a four-year secondary school education. This can be explained by the fact that in our country nurses with a secondary degree of education are more engaged in patient care, unlike nurses with a higher level of education, who primarily deal with the organization of work.

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THE EFFECT OF SMOKING ON ASTHMA PREVALENCE AND CONTROL

UTICAJ PUŠENJA NA PREVALENCIJU I KONTROLU ASTME

Sanja HROMIŠ[1,2], Ilija ANDRIJEVIĆ[1,3], Jovan MATIJAŠEVIĆ[1,3], Nensi LALIĆ[1,4], Mirjana JOVANČEVIĆ DRVENICA[5] and Jelena CRNOBRNJA[2]

Summary

Introduction. Determinants of asthma and its clinical course include the interaction between various intrinsic and extrinsic factors, of which exposure to harmful tobacco particles is one of the most important preventable causes of increased morbidity and mortality related to asthma. However, it is surprising that the prevalence of cigarette smoking among patients with asthma is equivalent to prevalence among the general population. **Smoking as a Risk Factor for Development of Asthma**. Exposure to tobacco smoke stimulates the immune response that can co-occur with asthma, lead to the development of bronchial hyperactivity and chronic inflammation of the respiratory tract, thus favoring the onset of asthma during childhood, as well as adulthood. **Asthma Control in Relation to Smoking Habits**. Continuous exposure to noxious particles of tobacco smoke, dysfunction of small airways as well as an altered inflammatory response result in irreversible changes. The worsening symptoms and signs of illness can easily remain unnoticed since they develop gradually, so the patients are often unaware of the severity of illness. **The Prevalence of Asthma Symptoms Among Smokers**. Compared to non-smokers, smokers have more prevalent and severe symptoms at all stages of disease, which is usually related to body weight and overall duration of smoking**. Cigarette Smoking as a Risk Factor for Asthma Exacerbation**. Current and former smokers are almost twice as likely to have asthma exacerbations and frequent relapses over a short period of time which increases the risk of requiring intensive care treatment **The Effect of Smoking on Lung Function**. Reduced airway sensitivity to the application of standardized inhalation therapy and the need for additional medications to achieve disease control can lead to irreversible changes and the development of fixed bronchial obstruction.

Key words: Smoking; Asthma; Prevalence; Risk Factors; Signs and Symptoms; Respiratory Function Tests; Disease Progression

Sažetak

Uvod. Tok i ishod astme zavise od udruženosti različitih intrinzičnih i ekstrinzičnih faktora, od kojih je izlaganje štetnim česticama duvanskog dima jedan od najznačajnih preventabilnih uzroka povećanog morbiditeta i mortaliteta astme. Međutim, iznenađuje podatak da je prevalencija aktivnih pušača među pacijentima sa astmom jednaka prevalenciji u opštoj populaciji. **Pušenje kao faktor rizika za nastanak astme.** Duvanski dim stimuliše imunoodgovor koji može biti udružen sa astmom, dovodi do razvoja bronhijalne hiperreaktivnosti i hronične inflamacije u disajnim putevima, što pogoduje nastanku astme u dečjem dobu, ali i u adultnom periodu. **Kontrola astme u odnosu na naviku pušenja.** Stalna izloženost štetnim partikulama duvanskog dima, disfunkcija malih disajnih puteva i izmenjen inflamatorni odgovor vremenom dovode do ireverzibilnih promena. Pogoršani simptomi i znaci bolesti se lako mogu prevideti s obzirom da se razvijaju postepeno, pa pacijenti često nisu svesni težine svoje bolesti. **Učestalost simptoma astme kod pušača.** U odnosu na nepušače, pušači imaju učestalije i teže simptome u svim stadijumima bolesti, što je obično povezano sa težinom i dužinom pušenja. **Pušenje kao faktor rizika pogoršanja astme.** Aktivni i bivši pušači imaju gotovo dvostruki rizik od nastanka pogoršanja i česte relapse u kratkom vremenskom period koji povećavaju rizik od potrebe za lečenjem u jedinici intenzivne nege. **Uticaj pušenja na plućnu funkciju.** Smanjena senzitivnost na primenu standardne inhalatorne terapije i potreba za dodatnim lekovima radi postizanja kontrole bolesti mogu dovesti do ireverzibilnih promena i razvoja fiksirane bronhoopstrukcije.

Ključne reči: pušenje; astma; prevalenca; faktori rizika; znaci i simptomi; ispitivanje respiratorne funkcije; pogoršanje bolesti

Introduction

Asthma is a chronic inflammatory disorder of the airways presenting with respiratory symptoms such as cough, shortness of breath, wheezing and chest tightness [1]. The symptoms vary over time in their occurrence and in intensity due to variable expiratory airway obstruction. Pathobiologically, asthma is characterized by a complex chronic inflammation that causes airway remodeling and hyperresponsiveness of bronchial smooth muscles. Hyperresponsiveness manifests itself as direct or indirect effects to stimuli, such as: allergens, viral infections, air pollution, tobacco smoke, stress, exercise, and others [2].

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The primary goal of asthma treatment is to achieve good results in disease control, which means controlling actual symptoms (previously called current clinical control) and controlling the risks associated with adverse disease outcomes [1]. Assessment of symptom control has been carried out for the last 4 weeks, involving the absence of day and nighttime symptoms, the need for medications to eliminate symptoms more rapidly and no limitations in daily-life and workplace activities. Estimates are made on the basis of different questionnaires, among which Asthma Control Test [3] and Asthma Control Questionnaire [4] are the most commonly used. The presence of symptoms is often a predictor for disease worsening, but on their own they are not sufficient to predict risks. Namely, symptoms can be treated (and therefore may be completely absent) by using quick relief medications without affecting the time course of inflammation and the development of subsequent exacerbation [5] or may be present not because of asthma exacerbation but due to the presence of other related diseases (rhinosinusitis, obstructive sleep apnea, and similar) [6]. Another important domain related to asthma control assessments contains: (i) the risk of severe exacerbations, (ii) progressive and irreversible loss of pulmonary function, and (iii) the risk of developing adverse events caused by medications [1].

Generally, cigarette smoking is one of the most important preventable risk factors for morbidity and premature mortality [7]. Although the decrease in smoking prevalence in highly developed countries has been observed over the last decade [8], the number of smokers in the world has been rising steadily due to the increasing consumption of tobacco products in low- and middle-income countries [7]. The average prevalence of active smokers in the EU countries, according to the 2012 Eurobarometer survey requested by the European Commission was 28% (32% of male and 24% of female), but a high variability was observed among different countries (the prevalence in Russia was 60.2% and in the UK 22.4%) [8]. The number of smokers in Serbia is still high, according to the WHO data from 2013, the prevalence of smoking was 38.1% among men and 29.9% among women [9]. The surprising fact is that the percentage of smokers with asthma is almost the same as in the general population [10]. Although advice on smoking cessation is a part of daily practice, it is often forgotten that smoking is not only a bad habit, but also an addictive disease (MKB-10; F17.2) that causes mental and behavioral disorders, and relapses which commonly occur after smoking cessation. Thus, the aim of this paper is to point out the potential harmful effects of being a smoker with asthma and the need for more intense anti-smoking campaigns among these patients.

Smoking as a Risk Factor for Asthma

Smoking has a detrimental effect on the respiratory tract in infants and adults, in addition to irritant, toxic and carcinogenic effects [11], it stimulates the immune response that can be associated with asthma. Namely, exposure to tobacco smoke causes the activation of Th2 lymphocytes [12, 13], an increase in total IgE [14], allergic sensibilization [15], and an increase in bronchial hyperresponsiveness (BHR) [16]. In a study done by Pallasaho and associates [17], which involved 292 participants, a significant increase in BHR (p, 0.001) was associated with the onset of smoking before the age of 20, and the weight gain paralleled an increase in the number of packs/years ($p = 0.001$). In a multivariate analysis after the correction of independent determinants involving also a damaged lung function, smoking remained an independent risk factor for BHR (15 packs/year yielded OR 3; CI 95%, 1.33-6.76). In a study performed by Gilliland and associates [18] which included school children aged 8-15 years (during 8-year monitoring period), active smoking of at least 300 cigarettes per year coincided with 3.9–fold increased risk (95% CI, 1.7-8.5) for newly diagnosed cases of asthma. Compared with children without atopic disease, smokers were 5.2 (95% CI, 2.4-10.9) times more likely to develop asthma, and if they were also exposed to maternal smoke during gestation, the risk for asthma was nearly 9 times higher (RR, 8.8; 95% CI, 3.2-24.0). Children of non-smokers who were exposed to secondhand tobacco smoke at home also had an increased risk (OR, 1.22; 95% CI, 1.04-1.44), with the risk being higher in children exposed at pre-school age than at school age (OR 1.44 vs. 1.26). One of the first studies, published in 2004 by Piipari and associates [19], supported the hypothesis that smoking causes developing adult onset asthma and indicated that the risk of developing asthma was significantly higher among current (OR 1.33; CI 95%; 1.00-1.77) and former smokers (OR 1.49; 1.12-1.97) compared to non-smokers. Another interesting observation was that female smokers can have more adverse health effects to tobacco smoke and more severe nicotine addiction than men [20]. Risk of asthma among smokers is also associated with increased body mass index, but it is interesting that there is a positive correlation in women only (not in men) [21]. With respect to the incidence of asthma in adult women smokers, no statistically significant difference was found between white and black women [22].

Relationship between Smoking Habit and Asthma Control

Smoking has been cited as one of the most significant risk factors associated with poor asthma control, in addition to the severity of disease [23], female gender and presence of comorbidities. In a telephone survey conducted in the US, it was recorded that smokers had more nighttime symptoms (OR 1,785); 95% CI, 1.119-2.847) and disease exacerbations (OR 1.2; CI95%, 1.0-1.4) compared to non-smokers; moreover, a significant correlation was

found between disease control and the number of cigarettes smoked per day ($p < 0.001$) [24]. Despite the fact that cigarette smoking undoubtedly increases asthma severity and morbidity [25], frequent visits made to an infirmary and school absenteeism ($p \geq 0.05$ to $p < 0.01$), there is not always a clear correlation between Asthma Control Questionnaire and Asthma-specific Quality of Life Questionnaire and these events. This may be explained by patient's adaptation to illness over time, and that questionnaires on the whole are not sensitive enough to measure control parameters over an extended time period.

Prevalence of Asthma Symptoms in Smokers

Studies conducted in Sweden in 1996 and 2006 [26] recorded a strong correlation among respiratory symptoms, cigarette smoking and asthma. Symptoms ranged from 9.8% to 25.5%, while current, as well as former smoking were continuously associated with recurrent wheeze in the chest. The increase in the Symptom Score was proportional to the number of cigarettes smoked per day, and the highest values were found in those smoking more than 14 cigarettes a day (OR> 3). European Community Respiratory Health Survey (ECRHS) 1991-1993 (ECRHS) [27] and 1999-2002 (ECRHS II) studied 9,092 subjects without and 1,045 with asthma. The most common respiratory symptoms were chronic coughing and coughing up ($p < 0.01$), and both current and former smokers with asthma had statistically significantly higher symptom scores ($p < 0.001$) than non-smokers. It is noteworthy that there was no positive correlation between the effects of smoking on FEV1 decline and the presence of asthma [28]. According to a study conducted in Belgrade [29], based on ECRHS screening questionnaire, the most frequent respiratory symptoms were longstanding cough (32.2%), sputum production (30.4%) and wheezing (30.3%). and the majority of respiratory symptoms were associated with current or former smoking (37.5% versus 17.5%). Contrary to these studies, Boulet [30] obtained a statistically insignificant difference between smokers and non-smokers regarding asthma control, quality of life, FEV1, bronchodilator and methacholine responsiveness, number of exacerbations, use of prednisolone or absenteeism in the workplace, while there was a statistically significant difference to the advantage of smokers in terms of respiratory symptoms ($p < 0.05$), the FEV1 / FVC ratio, diffusing capacity, sputum induction, and high-resolution chest CT. The author stated that smokers with asthma have features that are more characteristic of COPD than of asthma.

The increase in symptoms and the worsening of asthma control in smokers is probably the result of changes in the respiratory epithelium that becomes thickened and proliferated with increased number of foam and mast cells and lower eosinophil values [31]. These changes are less visible in former smokers, whereas in non-smokers they are not visible, which leads to the conclusion that these changes can be at least partially reversible. The cause of the occurrence of a number of symptoms may also be the dysfunction of small respiratory tract, since tobacco smoke particles are 2.5-0.1 mcg in diameter. This is supported by studies that examined the efficacy of systemic anti-inflammatory therapy [32] distributed equally to small and large airways, as well as the application of inhalation therapy with fine and ultrafine particles distributed to small airways [33, 34] compared to standard inhalation therapy.

Smoking as a Risk Factor for Asthma Exacerbation

The frequency and severity of asthma exacerbation are significant factors associated with asthma control because it directly influences the quality of life, costs of asthma treatment and asthma-related mortality. Exacerbations more often develop in severe forms of the disease in the patients with impaired lung function; however, it should not be forgotten that they are not rare even in the patients with a mild form of asthma and these patients account for up to 40% of visits to emergency departments [35].

Thereby, the risk of exacerbation in current and former smokers is twice as great in comparison with non-smokers (RR, 1.71; 95% CI, 1.48-1.97) [36]. In a retrospective study conducted in the United States and the United Kingdom, including 5,167 and 2,904 patients, respectively, which focused on asthma-related ED visits/hospitalizations, it was defined that 9.2 of American study sample patients and 4.7% of British study sample patients had asthma-related re-admissions within 30 days due to disease exacerbation [37], whereas one of the most important predictors was exacerbation frequency (apart from disease severity) which increased with the number of exacerbations in the previous period. Accordingly, Kauppi mentioned that independent risk factors for severe exacerbations requiring treatment in intensive care units are former (HR 1.9, CI 1.3-3.1) and current smoking (HR 3.6, CI 1.6-8.2), poor quality of life (HR 2.5, CI 1.5-4) and poor lung function (FEV1 < 65%, HR 2.2, CI 1.3-3.7) [38]. Rabinovitch and associates performed a five-month study on a sample of asthmatic children that suggested that passive exposure to tobacco smoke led to an increased urinary excretion of LTE4, which is a predictor of potential exacerbations [39].

The Effect of Smoking on Lung Function

One of the key features of asthma is the presence of completely reversible bronchoopstruction, which implies a preserved pulmonary function found during a stable phase of disease. In practice, however, we often come across patients with fixed airway obstruction and irreversible changes arising from airway remodeling, which is the risk factor for poor disease control and frequent exacerbations. These changes have been linked with longer disease duration, cigarette smoking and neutrophilic inflammation. FEV1 values <60% are considered to be a risk factor for the occurrence of exacerbation [40] and

have a better predictive value than disease symptoms. ICS has a protective effect on a mean annual FEV1 decline (The Forced Expiratory Volume at first second), but it disappears in long-time smokers. In a longitudinal study done by Dijkstre and associates [41] the patients were followed up for more than 23 years, and consequently the initiation of ICS led to a reduction in mean annual decline in FEV1. As a result, annual FEV1 decline in men was 20.6 ml ($p = 0.011$), whereas in women it was 3.2 ml. The recorded FEV1 changes were highly statistically dependent on the dosing and administration of ICS. The author of the study identified sex hormones, uneven airway caliber and inhaled air distribution inequalities between males and females as potential causes of this phenomenon. However, this significant protective effect of ICS was observed only in non-smokers or former smokers with less than 5 packs/ years of smoking, while in long-standing former smokers and current smokers it disappeared.

There is no doubt that cigarette smoking has a detrimental effect on the course and outcome of asthma. Therefore, it is imperative that all health professionals should be aware of this problem and accordingly assess patients with asthma regularly, pointing out negative effects of cigarette smoking habit as well as benefits of quitting it.

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THE PERCUTANEOUS DILATATIONAL TRACHEOSTOMY IN THE INTENSIVE CARE UNIT – OUR EXPERIENCE

PERKUTANA DILATACIONA TRAHEOSTOMIJA U JEDINICI INTENZIVNE TERAPIJE – NAŠE ISKUSTVO

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Summary
Percutaneous tracheostomy is a commonly carried out procedure in patients in the Intensive Care Unit. Percutaneous dilatational tracheostomy consists of the introduction of a tracheal cannula from the front of the neck, through blunt dissection of the pretracheal tissues, using a guide by Seldinger technique. When percutaneous dilatational tracheostomy procedure was introduced in routine clinical practice in the Clinical Center of Vojvodina, procedural protocol was established. This Protocol includes: 1. indications, contraindications and timing for percutaneous dilatational tracheostomy, 2. assessment of the patient, 3. preparation of the patient and equipment, 4. procedure description, 5. potential complications and complication management. At our institution percutaneous dilatational tracheostomy is performed on an individual patient basis assessment within 5-7 days following translaryngeal intubation. Routinely the platelet count, activated prothrombin time and prothrombin time are checked. The patient's neck is assessed clinicaly and by the use of fiberoptic bronchoscope and ultrasound. At our institution we use the modified Ciaglia technique of the percutaneous dilatational tracheostomy– Ciaglia Single Dilatator method with the TRACOE® experc Set vario which includes spiral reinforced tracheal cannula. At the end of procedure fiberoptic evaluation of the tracheobroinchial tree is made and chest X-ray is done. Percutaneous dilatational tracheostomy is a simple, safe, and effective procedure performed in the Intensive Care Unit. It is the preferred technique of airway management in the Intensive Care Units in the patients requiring prolonged mechanical ventilation, tracheobronchial hygiene and weaning from mechanical ventilation.
Key words: Intubation, Intratracheal; Tracheostomy; Critical Illness; Intensive Care Units; Airway Management; Bronchoscopy; Ultrasonography; Respiration, Artificial

Sažetak
Perkutana traheostomija je najčešće izvođena procedura kod bolesnika u jedinici intenzivne terapije. Tehnika izvođenja perkutane dilatacione traheostomije sastoji se od plasiranja trahealne kanile tupom dilatacijom prednjeg zida vrata, pomoću Seldingerovog vodiča. Od kada je u rutinsku kliničku praksu u KliničKi centar Vojvodine uvedena tehnika perkutane dilatacione traheostomije, napravljen je protokol za njeno izvođenje. Ovaj protokol sadrži sledeće postupke: 1. postavljanje indikacije za izvođenje intervencije, kontraindikacije za izvođenje intervencije i vreme izvođenja intervencije, 2. procena bolesnika, 3. priprema bolesnika i opreme, 4. opis procedure, 5. potencijalne komplikacije i zbrinjavanje komplikacija. Vreme izvođenja perkutane dilatacione traheostomije se u našoj ustanovi određuje na osnovu individualne procene bolesnika, u roku od 5 do 7 dana nakon endotrahealne intubacije. Pre intervencije se rutinski proverava broj trombocita, aktivno protrombinsko vreme i protrombinsko vreme. Procena mesta izvođenja perkutane dilatacione traheostomije se izvodi kliničkim pregledom, primenom ultrazvuka i fiberoptičkog bronhoskopa. U našoj ustanovi se koristi modifikovana *Ciaglia* tehnika perkutane dilatacione traheostomije koju izvodimo pomoću fabrički dostupnog seta TRACOE® experc Set vario koji, pored dilatatora, sadrži i armiranu endotrahealnu kanilu. Nakon završene intervencije, radi se fiberoptička bronhoskopija traheobronhijalnog stabla i rendgenski snimak srca i pluća. Perkutana dilataciona traheostomija je jednostavna, sigurna i efikasna intervencija zbrinjavanja disajnog puta kod bolesnika smeštenih u jedinici intenzivne terapije kod kojih je potrebna produžena mehanička ventilacija pluća, toaleta traheobronhijalnog stabla i odvajanje od mehaničke ventilacije pluća.
Ključne reči: endotrahealna intubacija; traheostomija; kritično oboleli; jedinica intenzivne nege; zbrinjavanje disajnih puteva; bronhoskopija; ultrasonografija; mehanička ventilacija

Introduction

Percutaneous tracheostomy is a commonly carried out procedure in patients at the Intensive Care Unit (ICU) in order to maintain their airway, to remove excessive airway secretions and to enable mechanical ventilation to be gradually withdrawn. It is performed by anaesthetists and intensive care physicians as a bedside procedure [1, 2]. Percutaneous dilatational tracheostomy (PDT) consists of the

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introduction of a tracheal cannula from the front of the neck, through blunt dissection of the pretracheal tissues, using a guide by Seldinger technique [1,3].

In the Clinical Center of Vojvodina we perform PDT with one of the commercially available set, under endoscopic and ultrasound guidance.

History of the Percutaneous Dilatational Tracheostomy

The first alternative to open surgical technique of tracheostomy was described by Shelden and colleagues [4]. Untill now, several techniques of percutaneous tracheostomy have been described. Some of them belong to the history of medicine.

In 1985 Ciaglia and colleagues performed percutaneous tracheostomy using a guide wire (Seldinger technique) and multiple dilatators [4]. Few years later, Schachner designed special percutaneous tracheostomy tool which slided over the guidewire into the trachea. The intercartilaginous space was enlarged by squeezing the handles of this tool, securing the placement of cannula into the trachea [4]. A simple percutaneous tracheostomy technique with the guidewire and modified Kelly's forceps was published by Griggs in 1990 [4]. Fantoni described tracheostomy technique through translaryngeal approach in 1997 [5]. Later, Ciaglia modified his own PDT technique: the novel technique include the use of single tapered tracheal dilator instead of multiple dilatators use [4]. Frova invented a single-step technique with screw-like dilator. Dilatation is performed by clockwise rotation of the screw, until it reaches the trachea [4]. Zgoda and colleagues reported on balloon dilatational technique of PDT in 2005 [4].

Percutaneous Dilatational Tracheostomy in the Clinical Center of Vojvodina

PDT procedure was first introduced in routine clinical practice in the Clinical Center of Vojvodina on March 8th 2017, according to PDT Protocol which was established at the same time. Since then, more than 200 PDT have been performed at our institution. The Protocol includes: 1. indications, contraindications and timing for PDT, 2. assessment of the patient, 3. preparation of the patient and equipment, 4. procedure description, 5. potential complications and complication management.

Indications, contraindications and timing for PDT

The decision to perform a PDT in the ICU patients is made by an anaesthesiologist-intensivist at our institution . It is based on indications, contraindications and timing as well as the assessment of the patient.

The general indications of PDT are: 1. the need for prolonged ventilatory support (up to 24% patients in the ICU) [4], 2. compromised pulmonary and/or tracheobronchial toilet [6], 3. adjunct to weaning from mechanical ventilation [6], 4. airway protection and prevention of the pulmonary aspiration in a patient with poor protective airway reflexes (severe alteration of the conscious, neuromuscular diseases, diseases of the central nervous system) [2], 5. upper airway obstruction [7], 6. head and neck surgery or trauma [8].

Contraindications of PDT can be absolute and relative. Absolute contraindications of PDT include: 1. pediatric patients (below 10 years of age), 2. local infection of the neck tissues, 3. unstable cervical spine injuries, 4. extreme coagulopathies, 5. inexperienced anaesthesiologist – intensivist [9, 10].

Relative contraindications include: 1. enlarged thyreoid gland, 2. obvious pulsating blood vessel under the skin at the operation site, 3. gross distortion of the neck anatomy (short neck, obesity, local malignancy, tracheal deviation, limited neck extension), 4. burns of the skin at and near the operation site, 5. need for high positive end-expiratory pressure (PEEP) of more than 10 cmH_2O or high level of inspiratory oxygen concentration (FiO_2 >70%), 6. previous neck injury or previous tracheostomy, 7. high positioned innominate artery, 8. cervical ratiotherapy four weeks before performing PDT, 9. controlled local infection of the neck [9–12].

The number of relative contraindications is decreased when PDT is performed by a trained and experienced anesthesiologist-intensivist and when PDT is performed under the control of fiberoptic bronchoscope (FOB) in conjunction with ultrasound (US) [8].

The timing of insertion of the PDT in the ICU still remains a debate topic. There is no consensus in the literature what insertion time of tracheal cannula is considered early or late. Prolonged translaryngeal intubation is associated with mucosal damage to the larynx and vocal cords. If endotracheal tube is removed within 3 – 7 days, complete healing of laryngeal injuries is possible [13]. If translaryngeal intubation is prolonged, for more than one week, laryngeal injury progresses with scar formation and functional abnormality in voice [14]. Although complications of the PDT are rare, some of them may be serious [8,9]. The decision involves a comparison of the risks and benefits of performing a PDT compared with the risks and benefits of continued endotracheal intubation [15]. According to the results of The TracMan Randomized Trial, in which 909 patients were included, early tracheostomy within 4 days versus late within 10 days or more after admission into ICU was not associated with an improvement in 30-day mortality or other important secondary outcomes. There were no significant difference in use of the antibiotics, ventilator associated pneumonia (VAP) or ICU length of stay. The authors found a moderate reduction in sedative use [16]. Novel Danish Guidelines for PDT in the ICU suggest that optimal timing of tracheostomy insertion should be determined on an individual patient basis (2B) [9].

At our institution, PDT is performed on an individual patient basis assessment, within 5–7 days following translaryngeal intubation.

Assessment of the Patient

The careful patient assessment is performed before PDT. The platelet count, activated prothrombin time

(aPTT) and prothrombin time (PT) are routinely checked. If the platelet count is less than 50 x 10^9 cells•l^{-1} and if aPTT and/or PT are more than 1.5 times the reference range, PDT is not performed. However, Kluge and colleagues have concluded that percutaneous tracheostomy is safe even in the patients with severe thrombocytopenia if the procedure is performed by experienced personel, with bronchoscopic guidance and if platelets are administered before intervention [17]. When assessing the patient's neck, we look for anatomical features that suggest that the PDT may be difficult or that we should perform surgical tracheostomy. Low neck extension, neck oedema, gross overweight, and goitre make identification of the lokal lendmarks at larynx and trachea more difficult [18].

Preparation of the Patient and Equipment

In order to prevent aspiration of the stomach contents into the airway according to our Protocol enteral nutrition is stopped 2 hours before the planned time of PDT.The stomach content is emptied by the active suction of the nasogastric tube just before the procedure.

During the PDT procedure continuous electrocardiography monitoring, pulse oxymetry, and monitoring of the arterial blood pressure (non-invasive and/or invasive) are used.

In case of accidental extubation of the patient and airway emergencies during the procedure, the Difficult Airway Trolley is always readily available at the bedside. All patients are preoxigenated with 100% oxygen. The patients are mechanicaly ventilated. The frequency, Tidal volume and maximum airway pressure on the ventilator are adjusted to compensate for the air leak during the procedure. Inspiratory fraction of the oxygen (FiO_2) is kept on 1.0. PDT is carried out under general anaesthesia, or under adequate analgesia and sedation, with muscle relaxation at our institution. When adequate sedation and muscle relaxation of the patient is achieved, the suction of secretions from the tracheobronchial tree is performed. Proper position and adequate extension of the neck is achieved by placing a firm roll under the patient's shoulders. Anatomical landmarks are assessed clinicaly and by the use of FOB and US.

Clinical Aassessment of Anatomical Landmarks

When palpating from the chin downwards in the midline, the hyoid bone can be easily felt [19]. The thyroid cartilage is the next palpated anatomical structure in the midline of the anterior neck. Its most prominent part, the laryngeal prominence (the Adam's apple), is more prominent in men than in women and children. Cricotyroid membrane (CTM) is followed by laryngeal prominence. CTM has a trapezoid shape with the width ranging from 27 to 32 mm and the height ranging from of 5 to 12 mm [20].

The cricoid cartilage is the strongest cartilage of the larynx. It lies directly below the thyroid cartilage and it represents the anatomic lower limit of the larynx. Since the cricoid cartilage is the only complete cartilaginous ring in the airway (shaped like signet ring), it has the important role to support the larynx [21]. The transverse cricothyroid artery is placed at the upper half of the CTM. Due to such position of the transverse cricothyroid artery, it might be easily injured. When it is injured, massive hemorrhage could occur, since the transverse cricothyroid artery is a branch of the superior thyroid artery [22]. PDT performed just below the cricoid cartilage may later lead to the development of subglottic tracheal stenosis [23]. Because of all above mentioned anatomical features, PDT should not be performed right below the cricoid cartilage or through the cricothyreoid membrane.

The trachea begins at the cricoid cartilage and ends at the level of sternal angle by dividing into the right and left principal bronchi. In an adult, the trachea is 11 to12 cm long and its internal diametar is 12 – 17 mm. It contains 15 to 20 C-shaped cartilaginous incomplete rings, which are 2 – 6 mm high. The distance between two cartilages is 2 – 3 mm. Posteriorly, trachea consists of a membrane of smooth muscle and fibroelastic tissue joining the ends of the cartilages. Each tracheal ring is anteriorly individually connected by an annular ligament. The trachea goes to the depth of 2.0 to 2.5 cm from the skin surface. The depth of the trachea increases on its moving into thorax, especially in older people. At the level of the second or third tracheal ring the trachea is covered by the isthmus of the thyroid gland Therefore, the safest place to perform the PDT is under the third tracheal ring because the puncture of the isthmus of the thyroid gland is avoided [23]. A proximal placement of the tracheal cannula increases the risk of tracheal stenosis. A more distal placement of the tracheal cannula increases the risk of errosion of the great vessles in the mediastinum [9].

The Use of Fiberoptic Bronchoscope

The first important role played by FOB is discovering and evaluation of possible injuries involving larynx and trachea which might be present before tracheostomy, as a consequence of translaryngeal intubation [26]. Secondly, according to our experience, better suction of secretions from the tracheobronchial tree is achieved by means of the FOB. In order to provide real-time visualisation of the carina, tracheal rings and carina, and in order to confirm identification of the correct puncture site at the front of the neck for PDT canula placement, FOB is used at our Institute. Transillumination of neck soft tissues allows us to recognize the front of the neck vessels running across the neck midline and maybe to change the puncture site in order to avoid bleeding complications. The successful introduction of the needle into the trachea under direct visualisation minimize the risk of posterior tracheal wall injury [27]. The FOB is performed to control the guidewire progression, dilatation of tracheal stoma and correct placement of tracheostomy cannula. At the end of PDT procedure with FOB the tracheal cannula position is checked, a possible clot

from tracheobronchial tree is removed and the occlusion or herniation of the cannula cuff is noticed.

The Use of Ultrasound

The use of the ultrasound (US) as a possible adjunct to the PDT is suggested by current guidelines [9, 28]. The advantage of the preprocedural US use are as follows: 1. defining the relevant anatomy and identifying tracheal midline, 2. identifying aberrant blood vessels and avoiding immediate vascular complications, 3. estimating trachea depth from the skin surface and tracheal diameter (this helps in proper selection of tracheostomy tube size and length especially in patients with an increased pre-tracheal soft tissue diameter), 4. ensuring accurate placement of needle into the trachea. To summarize, the preprocedural use of the US may help to identifypatients unsuitable for PDT, to decreasthe number of immediate complications, and shortenthe procedure time [9, 28, 29].

Procedure Description

At our institution we use the modified Ciaglia technique of the PDT– Ciaglia Single Dilatator method with the TRACOE® experc Set vario which includes spiral reinforced tracheal cannula (TRACOE medical GmbH, Nieder-Olm, Germany). The set consists of a scalpel, 10 ml syringe, 14 G puncture needle with teflon catheter, Seldinger guide wire made of kink resistant nitinol with inserter, 14 Ch/Fr short dilator, guiding catheter with safety stop, TRACOE experc dilator with hydrophilic coating which slides easily after moistening, 4 compresses and spiral-reinforced, with adjustable neck flange, cuff and atraumatic insertion system tracheostomy cannula. Preparation of the PDT set consists of 1. choosing the size of the tracheal cannula which is done according to the clinical judgement; 2. tracheal cannula cuff leakage test; 3. lubrication of the tracheal cannula cuff; 4. filling the syringe with 5 ml of saline; 5. preparation of the dilation set: the hydrophilic coating of the dilatator is activated by means of a saline solution and kept moist until used.

When the anatomical landmarks are identified and the proper place of PDT insertion is marked, an intensivist prepares the operation site. The operation site is cleaned with coloured antiseptic 2-propanol-1-propanol-biphenyl-2-ol solution (Kodan® tincture forte coloured, Schülke&Mayr Gmb, Norderstedt, Germany) and 2 minutes contact time are waited. After the operation site is properly cleaned, sterile covering of the operating field is carried out. The bronchoscopy swivel adapter with a snug FOB diaphragm opening is placed by the anaesthesiologist in charge of airway management. The use of bronchoscopy swivel adapter allow us mechanical ventilation of the patient without air leakage. Bronchoscope is introduced just to the tip of the endotracheal tube, so that anatomical structures of the trachea could be visualized. The fixation strips of the endotraheal tube are untied and the cuff of the endotracheal tube is deflated. The endotracheal tube is carefully withdrawn together with the FOB until transillumination is obtained at the selected operation site at the front of the neck. Then the cuff of the endotracheal tube is carefully reinflated to the original volume. In order to prevent any damage to the FOB that could be caused by the intensivist's needle during the procedure of the PDT, it is very important to keep the flexible tip of the FOB just to the tip of the endotracheal tube.

Before puncturing the anterior tracheal wall, some authors advocate infiltration of the local anaesthetic containing adrenaline at the chosen level of the front of the neck in order to reduce bleeding from the skin to the trachea [9, 30]. The local anaesthetic containing adrenaline at the place of percutaneous cannula insertion is not infiltrated by an intensivist at our institution because horizontal skin incision is minimal and blunt dissection of the subcutaneous and deeper tissues according to our protocol is not anticipated, so thus bleeding possibility is minimal.

Anterior tracheal wall is punctured with a 14-gauge needle with teflon catheter right on the central line under the FOB. The hollow needle is pushed forward until the tracheal entry of the cannula is confirmed by aspiration of air into the saline-filled syringe and by direct bronchoscopic visualization. The puncture needle is removed but the teflon catheter remains in situ. The Seldinger "J" tip guidewire robust against buckling is inserted into the teflon catheter and moved forward and downwards into the trachea. The teflon catheter is removed and horizontal skin incision is made using scalpel from both sides of the guidewire. The 14-French initial dilator is advanced over the Seldinger guide wire in order to start a tracheal stoma formation. This is called predilation. When performing predilation, care should be taken to see that the short dilatator is tilted cranially to ensure safe dilation. The second reason why the short dilatator should be tilted cranially is to prevent puncture of the posterior tracheal wall. Following predilation, the short dilator is removed and the Seldinger guide wire stays in situ. A moisturized hydrophilic dilator slides easily over the guide wire and advances slowly into the trachea. Attention has to be paid on the proximal mark of the Seldinger guide wire, which must be visible at the proximal end of the white guiding catheter. Dilation is performed by moving the dilation unit forward several times until 38 Fr is reached which should become visible with FOB to the anaesthesiologist in charge of airway management. Dilation with moving dilation unit forward until 38 Fr is eunogh to place the cannula size 8 (8.0 internal diameter). During the process of dilation, care should be taken to ensure that the positions of the guiding catheter and the Seldinger guidewire remain constant in relation to the dilator. The dilator is removed and Seldinger guidewire stil remains in situ. The mark at the proximal end of the Seldinger guidewire must be visible. The tracheal cannula is pushed forward under the FOB view through the Seldinger guidewire. When the neck flange has reached the skin level, the inserter, the guiding catheter and Seldinger guide wire are removed all in one action. On removal, all of three components (the inserter, the

guiding catheter and Seldinger guidewire) are checked in order to ensure that all of them are complete. The cuff is inflated and the ventilator to the tracheal cannula is attached. Tracheostomy cannula cuff pressure is maintained in the range of 20–25 mmHg. At the end of procedure, FOB is placed by the anaesthesiologist in charge of airway management through the tracheal cannula in order to ensure that distance from the tip of the tracheostomy cannula and the tracheal carina is sufficient. FOB is also used to evaluate the respiratory tract below the tracheal cannula and to remove possible blood clots from the tracheobronchial tree. The tracheal cannula is secured by tapes and the proper dressing is placed at the skin wound site. Chest X-ray is done at the end of the PDT intervention.

Complications of the PDT

Complications following PDT can be categorized as immediate, early and late [8, 9]. Immediate complications include: bleeding, hypoxia caused by loss of the airway, fracture of the tracheal cartilage, surgical emphysema, injury of the posterior tracheal wall, paratracheal placement of the tracheal cannula, pneumothorax, laryngeal nerve damage [8, 9, 31, 32]. Bleeding, hypoxia, emphysema, pneumothorax, blockage or/and displacement of the tracheal cannula, local infection can be considered as early complications [32, 33]. Late complications include: bleeding, hypoxia, blockage or/and displacement of the tracheal cannula, local infections, voice changes, tracheal stenosis, persistent stoma, dysphagia, disfiguring scar, and tracheomalacia [34].

The frequency of most reported complications is inversely proportional to the experience of the anaesthesiologist/intensivist [8].

Conclusion

PDT is a simple, safe, and effective procedure performed in the ICU. In the hands of a skilled anaesthesiologist and intensivist it is the preferred technique of airway management in the ICU in patients requiring prolonged mechanical ventilation, tracheobronchial hygiene and weaning from mechanical ventilation. Proper selection of patient and the use of procedural adjuncts decrease the complication and failure rates.

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CESAREAN SECTION SCAR ENDOMETROSIS

ENDOMETRIOZA NAKON CARSKOG REZA

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Summary
Endometriosis is defined as a functional endometrial tissue outside the uterine cavity. The ectopic endometrial tissue has been identified after gynecologic laparoscopy or laparotomy procedures in the skin, subcutaneous tissues, abdominal and pelvic wall musculature, and it represents amayor cause of acute or chronic recurrent abdominal or pelvic pain resembling the menstrual cycle. The frequency of abdominal wall endometriosis is approximately 1% of all women who had a cesarean delivery. A 39-year-old patient with a history of one prior Cesarean section, presented with continuous cyclical focal pain at the left part of cesarean scar site for the past 16 months, 23 months after Cesarean section. The patient underwent a mini laparotomy, when endometrioma was completely removed surgically. The PH diagnosis of endometriosis was based on the presence of all elements of the endometrial mucosa (glands, stroma and signs of fresh and old hemorrhage) in an inadequate place (anterior abdominal wall). Endometriosis is difficult to diagnose and it is often mistaken for other conditions such as a suture granuloma, incisional hernia, primary or metastatic cancer. Endometriosis can be prevented only with good surgical techniques and clinical practice as well as the proper care during primary surgery.
Key words: Cesarean Section; Cicatrix; Abdominal Wall; Endometriosis; Postoperative Complications; Laparoscopy; Diagnosis, Differential; Ultrasonography

Sažetak
Endometrioza se definiše kao prisustvo funkcionalnog tkiva endometrijuma van materične duplje. Ektopično tkivo endometrijuma je identifikovano nakon laparoskopske i otvorene hirurgije regije ginekoloških organa, u koži, supkutanom tkivu, mišićima abdominalnog i pelvičnog zida, predstavljajući glavni uzrok akutnog ili hroničnog rekurentnog abdominalnog ili pelvičnog bola. Učestalost javljanja endometrioze prednjeg trbušnog zida je oko 1% kod svih žena koje su imale porođaj carskim rezom. Pacijentkinja stara 39 godina, sa istorijom jednog pređašnjeg carskog reza, javila se sa kontinuiranim cikličnim fokalnim bolom u levom segmentu ožiljka nakon carskog reza, u trajanju od 16 meseci, a ukupno 23 meseca nakon carskog reza. Putem mini-laparotomije po ožiljku nakon carskog reza, u celosti je odstranjen endometriom. Prisustvo svih elemenata endometralne mukoze (žlezde, stroma i znakovi svežeg i starog krvarenja) na ektopičnom mestu (prednji trbušni zid) uticalo je na postavljanje patohistološke dijagnoze. Endometrioza se često teško dijagnostikuje i predstavlja dijagnostičku dilemu u odnosu na granulom, incizionu herniju, primarni ili metastatski karcinom. Jedino dobra hirurška tehnika, dobra klinička praksa i odgovarajuća nega tokom hirurškog tretmana mogu pomoći u prevenciji endometrioze.
Ključne reči: carski rez; ožiljak; trbušni zid; endometrioza; postoperativne komplikacije; laparoskopija; diferencijalna dijagnoza; ultrasonografija

A 39-year-old patient with a history of one prior cesarean section presented with continuous cyclical focal pain at the left part of cesarean scar site for the past 16 months, 23 months after Cesarean section. On examination, it was found that the patient had a palpable mass of about 40x30 mm in the left part of healthy Pfannenstiel scar. Ultrasonography showed a subcutaneous nodule of 45x23 mm with irregular borders, having heterogeneous echo texture with internal scattered hyper echoic echoes typical for scar endometriosis. The patient underwent a mini laparotomy by entering abdomen through the previous Cesarean section scar with elevated abdominal flap. An endometrioma involved the right rectus sheath and muscle, and it was completely surgically removed **(Figure 1)**. The abdominal wall defect was reconstructed by suturing by anatomical layers from the depth to the surface. Macroscopic histopathological examination showed two fragments of pink-brown tissue, whose total weight was 6 g, with blurred surfaces, designated as parts of the abdominal wall, with colorful cross-section appearance, sinewy-elastic consistency and vague structure **(Figure 1)**.

Histological examination of the sample material revealed numerous and confluent focuses of endometrial mucosa in the form of dilated endometrial glands, surrounded by stromal cells with regular morphological features **(Figure 2)**.

In some places signs of fresh and old hemorrhage were observed, intraluminal as well as periglandular, which induce the production of fibrous tissue **(Figure 3)**.

Freshly produced fibrous tissue, in the form of anastomosed strips, surrounds the muscles of the anterior abdominal wall, performing their progressive destruction **(Figure 4)**.

The PH diagnosis was based on the presence of all elements of the endometrial mucosa (glands,

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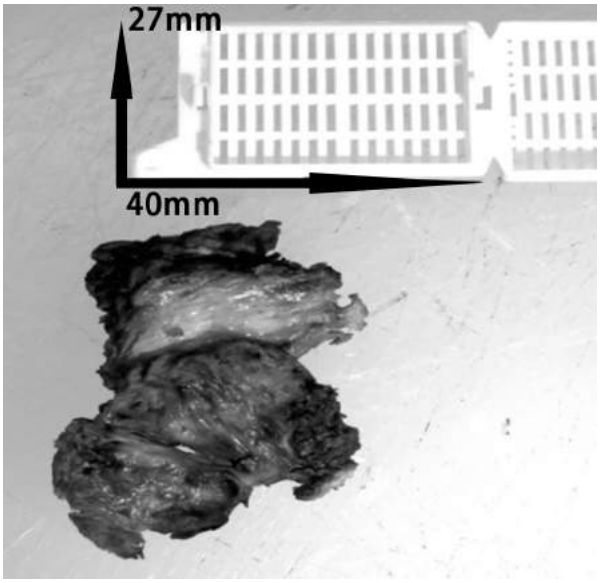

Figure 1. Extrusion of the anterior abdominal wall fragment diffusely permeates the zones of hemorrhage and fibrosis
Slika 1. *Ekstirpirani fragment prednjeg trbušnog zida difuzno prožet zonama hemoragije i fibroze*

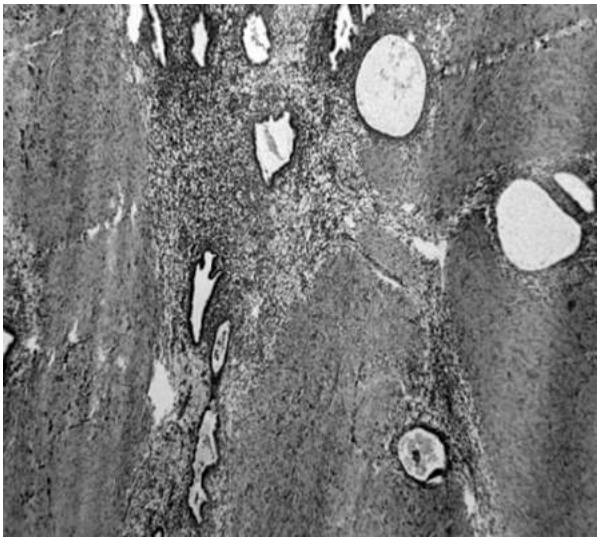

Figure 2. Confluent endometriosis focuses in the connective tissue of the abdominal wall (HE, 10x10)
Slika 2. *Konfluentni fokusi endometrioze uklopljeni u vezivno tkivo trbušnog zida (HE, 10x10)*

stroma and signs of fresh and old haemorrhage) in an inadequate place (anterior abdominal wall).

Discussion

Endometriosis is a common gynecologic problem in women of reproductive age. As a benign disease, endometriosis is characterized by the normal endometrial tissue outside the uterine cavity.

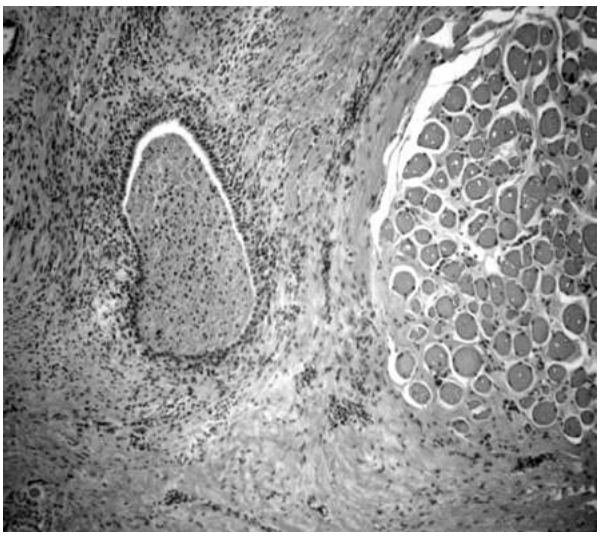

Figure 3. Endometrial gland, localized in the connective tissue near the muscular beam, with signs of old stromal hemorrhage (HE, 10x25)
Slika 3. *Endometrijalna žlezda, lokalizovana u vezivnom tkivu blizu mišićnog snopa, sa znacima stare stromalne hemoragije (HE, 10x25)*

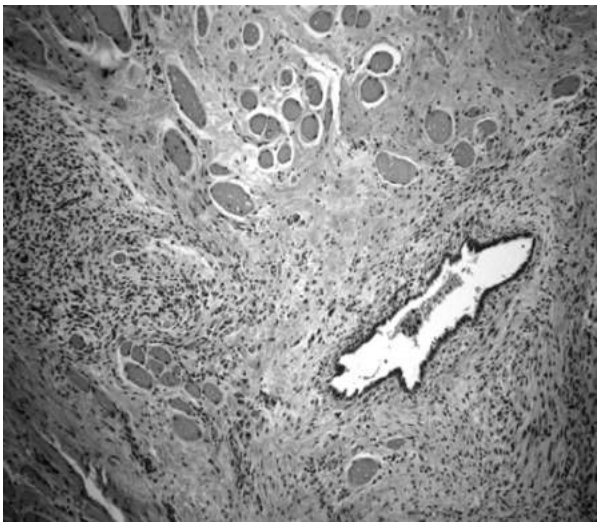

Figure 4. Fibrous destruction of the muscular beam induced by confluent endometriosis zones (HE, 10x25)
Slika 4. *Fibrozna destrukcija mišićnog snopa, indukovana konfluentnim zonama endometrioze (HE, 10x25)*

Extrapelvic endometriosis can be found intra-abdominally as well as in the abdominal wall. Endometrioma of Cesarean section scars are the most common site of anterior abdominal wall endometriosis, the incidence going up to 1% of all women who had a cesarean delivery [3, 7].

Cesarean section in the first place as well as increased menstrual flow and alcohol consumption have been determined as risk factors for developing endometriosis in many studies, whereas high parity is considered as protective factor. It is often misdi-

agnosed because condition such as keloids, stitch granuloma, hematoma, abscess, primary or metastatic adenocarcinoma, nodular melanoma and incisional hernia cause diagnostic dilemma [3]. According to the literature, the time from Cesarean section to the onset of symptoms varies from months to 17.5 years, with an average of 30 months [8].

Pathogenesis of abdominal wall endometriosis is explained by many theories. The most exploited and popular theory is the theory of direct implantation. During the surgical procedure, when the uterine cavity is opened, endometrial tissue is implanted into the surgical scar [9]. When endometrial tissue is implanted, it proliferates under the same hormone influences as the endometrium in the uterus or induces metaplasia of the surrounding fascial tissue and results in endometrioma. Many patients with scar endometriosis do not have signs or a history of peritoneal endometriosis, which supports the theory that it is caused by dissemination of endometrial cells into the wound at the time of surgery [10].

One of the postulates is that primitive pluripotential mesenchymal cells may undergo specialized differentiation to form endometriomas under the right circumstances. Endometriosis of the surgical scar often infiltrates the deeper layers, not only superficial layers of the abdominal or pelvic wall but the rectus muscle as well. The most characteristic clinical symptoms of endometriosis occur at the time of menstruation and include abdominal or pelvic recurrent pain and swelling [11]. Cyclical pelvic pain is usually ill-defined and spreads within the abdominal wall. The noncyclic nature of pain in endometriosis of the abdominal wall is atypical, which may explain why it is clinically often misdiagnosed. Patients also presented with a palpable mass at the site of maximum tenderness in the region of the surgical scar which is usually rubbery to the touch and may be multiloculated, with contents similar to that of chocolate ovarian cysts [12]. Patients also may be asymptomatic, and anterior abdominal and pelvic wall endometriosis can be incidentally discovered at imaging examinations performed for other reasons. Abdominal wall endometriosis may be identified at sonographic and color Doppler examinations, computer tomography, magnetic resonance imaging and sonographically guided fine-needle aspiration.

On ultrasound, abdominal wall endometriosis appears as a solid, heterogeneous hypoechoic mass with inner echogenics pots which is a result of cystic changes due to intralesional bleeding associated with menstruation and fibrous components of the lesions. Color Doppler ultrasound may demonstrate vascularity, single vascular pedicle or dilated feeding vessels at the periphery of the mass [13]. When compared with computer tomography, magnetic resonance imaging provides better contrast resolution with clear delineation between the muscles and abdominal subcutaneous tissues and infiltration of abdominal and pelvic wall structures in this way provides safe surgical resection [14]. Sonographically guided fine-needle aspiration is a diagnostic procedure which may help to prove a preoperative diagnosis of endometriosis and exclude malignancy. [15, 16]. Histopathological analysis is the only way to make the definitive diagnosis of endometriosis. Diagnosis of endometriosis may only be confirmed on the basis of the presence of endometrial glands and stroma within the lesion [10]. Endometrial ducts lined with cuboidal to columnar cells, surrounded by focal areas of chronic inflammation, fibrous tissue, and hemosiderin with presence of hemosiderin-filled macrophages are highly indicative of endometriosis. Therapeutic options for abdominal wall endometriosis include medical therapy with hormonal agents or surgical excision. Progestogens, danazol, oral contraceptive pills and gonadotropin-releasing hormone (GnRH) analogs have been tried with partial response and recurrence when these drugs are discontinued. Therefore, more definitive treatment - wide local surgical excision with clear margins to prevent local recurrence as the treatment of choice is required [14, 17]. Abdominoplasty and reconstruction with or without polypropylene mesh should be taken into consideration if a defect in the abdominal wall occurs [18]. In cases of continual recurrence and long-standing recurrence, the possibility of malignancy needs to be ruled out.

Conclusion

Anterior abdominal wall scar endometriosis, after a cesarean section is more frequent than generally assumed, and it is challenging to be diagnosed and treated. It is caused by iatrogenic inoculation of endometrium into the surgical wound, so with rising Cesarean section rate it may become more common. Clinically it is often misdiagnosed because endometriosis may occur years after the cesarean section. The pain is often noncyclic and there is not always a palpable mass. The sonographic finding of a solid mass in the abdominal wall is not pathognomonic for endometriosis. Only good surgical techniques and clinical practice and proper care during primary surgery may help in preventing endometriosis.

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Zaključci moraju proisteći isključivo iz rezultata istraživanja rada; treba izbegavati uopštene i nepotrebne zaključke. Zaključci koji su navedeni u tekstu rada moraju biti u saglasnosti sa zaključcima iz Sažetka.

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Potrebno je da se literatura numeriše arapskim brojevima redosledom kojim je u tekstu navedena u parentezama; izbegavati nepotrebno velik broj navoda literature. Časopise bi trebalo navoditi u skraćenom obliku koji se koristi u *Index Medicus* (*http://www.nlm.nih.gov/tsd/serials/lji.html*). Pri citiranju literature koristiti Vankuverski sistem. Potrebno je da se navedu svi autori rada, osim ukoliko je broj autora veći od šest. U tom slučaju napisati imena prvih šest autora praćeno sa *et al*.

Primeri pravilnog navođenja literature nalaze se u nastavku.

Radovi u časopisima

∗ Standardni rad

Ginsberg JS, Bates SM. Management of venous thromboembolism during pregnancy. J Thromb Haemost 2003;1:1435-42.

∗ Organizacija kao autor

Diabetes Prevention Program Research Group. Hypertension, insulin, and proinsulin in participants with impaired glucose tolerance. Hypertension 2002;40(5):679-86.

∗ Bez autora

21st century heart solution may have a sting in the tail. BMJ. 2002;325(7357):184.

∗ Volumen sa suplementom

Magni F, Rossoni G, Berti F. BN-52021 protects guinea pig from heart anaphylaxix. Pharmacol Res Commun 1988;20 Suppl 5:75-8.

∗ Sveska sa suplementom

Gardos G, Cole JO, Haskell D, Marby D, Pame SS, Moore P. The natural history of tardive dyskinesia. J Clin Psychopharmacol 1988;8(4 Suppl):31S-37S.

∗ Sažetak u časopisu

Fuhrman SA, Joiner KA. Binding of the third component of complement C3 by Toxoplasma gondi [abstract]. Clin Res 1987;35:475A.

Knjige i druge monografije

∗ Jedan ili više autora

Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

∗ Urednik (urednici) kao autor (autori)

Danset J, Colombani J, eds. Histocompatibility testing 1972. Copenhagen: Munksgaard, 1973:12-8.

∗ Poglavlje u knjizi

Weinstein L, Shwartz MN. Pathologic properties of invading microorganisms. In: Soderman WA Jr, Soderman WA, eds. Pathologic physiology: mechanisms of disease. Philadelphia: Saunders; 1974. p. 457-72.

∗ Zbornik radova sa kongresa

Christensen S, Oppacher F. An analysis of Koza's computational effort statistic for genetic programming. In: Foster JA, Lutton E, Miller J, Ryan C, Tettamanzi AG, editors. Genetic programming. EuroGP 2002: Proceedings of the 5th European Conference on Genetic Programming; 2002 Apr 3-5; Kinsdale, Ireland. Berlin: Springer; 2002. p. 182-91.

∗ Disertacija

Borkowski MM. Infant sleep and feeding: a telephone survey of Hispanic Americans [dissertation]. Mount Pleasant (MI): Central Michigan University; 2002.

Elektronski materijal

∗ Članak iz časopisa u elektronskom formatu

Abood S. Quality improvement initiative in nursing homes: the ANA acts in an advisory role. Am J Nurs [Internet]. 2002 Jun [cited 2002 Aug 12];102(6):[about 1 p.]. Available from: http://www.nursingworld.org/AJN/2002/june/Wawatch.htmArticle

∗ Monografija u elektronskom formatu

CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reevs JRT, Maibach H. CMEA Multimedia Group, producers. 2nd ed. Version 2.0. San Diego:CMEA;1995.

∗ Kompjuterska datoteka

Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

5. Prilozi (tabele, grafikoni, sheme i slike)

BROJ PRILOGA NE SME BITI VEĆI OD ŠEST!

Tabele, grafikoni, sheme i slike se postavljaju kao posebni dokumenti.

– Tabele i grafikone bi trebalo pripremiti u formatu koji je kompatibilan programu u kojem je napisan tekst rada. Slike bi trebalo poslati u jednom od sledećih oblika: *JPG*, *GIF*, *TIFF*, *EPS*.

– Svaki prilog mora biti obeležen arapskim brojem prema redosledu po kojem se navodi u tekstu rada.

– Naslovi, tekst u tabelama, grafikonima, shemama i legende slika bi trebalo da budu napisani na srpskom i engleskom jeziku.

– Nestandardne priloge označiti u fusnoti uz korišćenje sledećih simbola: *, †, ‡, §, | |, ¶, **, † †, ‡ ‡ .

– U legendi slika trebalo bi napisati korišćeno uveličanje okulara i objektiva mikroskopa. Svaka fotografija treba da ima vidljivu skalu.

– Ako su tabele, grafikoni, sheme ili slike već objavljene, navesti originalni izvor i priložiti pisano odobrenje autora za njihovo korišćenje.

– Svi prilozi će biti štampani kao crno-bele slike. Ukoliko autori žele da se prilozi štampaju u boji, obavezno treba da plate dodatne troškove.

6. Dodatne obaveze

AUTORI I SVI KOAUTORI RADA OBAVEZNO TREBA DA PLATE GODIŠNJU PRETPLATU ZA ČASOPIS *MEDICINSKI PREGLED*. U PROTIVNOM, RAD NEĆE BITI ŠTAMPAN U ČASOPISU.

INFORMATION FOR AUTHORS

Medical Review publishes papers (previously neither published in nor submitted to any other journals) from various fields of biomedicine intended for broad circles of doctors.

Since January 1th, 2013 the Medical Review has been using the service e-Ur: Electronic Journal Editing. All users of the Registration system, i.e. authors, reviewers, and editors have to be registered users with only one e-mail address. Registration should be made on the web address:

http://aseestant.ceon.rs/index.php/medpreg/user/register.

Manuscript submission should be made on the web address:

http://aseestant.ceon.rs/index.php/medpreg/

A SUPPLEMENTARY FILE, WITH THE STATEMENT THAT THE PAPER HAS NOT BEEN SUBMITTED OR ACCEPTED FOR PUBLICATION ELSEWHERE AND A CONSENT SIGNED BY ALL AUTHORS, HAVE TO BE ENCLOSED WITH THE MANUSCRIPT.

Authors may not send the same manuscript to more than one journal concurrently. If this occurs, the Editor may return the paper without reviewing it, reject the paper, contact the Editor of the other journal(s) in question and/or contact the author's employers.

Papers should be written in English language, with an abstract and title page in English, as well as in Serbian language.

All papers submitted to ***Medical Review*** are seen by one or more members of the Editorial Board. Suitable articles are sent to at least two experts to be reviewed, thier reports are returned to the assigned member of the Editorial Board and the Editor. Revision of an article gives no guarantee of acceptance and in some cases revised articles are rejected if the improvements are not sufficient or new issues have arisen. Material submitted to *the Journal* remains confidential while being reviewed and peer-reviewers' identities are protected unless they elect to lose anonymity.

Medical Review publishes the following types of articles: editorials, original studies, preliminary reports, review articles, professional articles, case reports, articles from history of medicine and other types of publications.

1. Editorials – up to 5 pages – convey opinions or discussions on a subject relevant for the Journal. Editorials are commonly written by one author by invitation.

2. Original studies – up to 12 pages – present the authors' own investigations and their interpretations. They should contain data which could be the basis to check the obtained results and reproduce the investigative procedure.

3. Review articles – up to 10 pages – provide a condensed, comprehensive and critical review of a problem on the basis of the published material being analyzed and discussed, reflecting the current situation in one area of research. Papers of this type will be accepted for publication provided that the authors confirm their expertise in the relevant area by citing at least 5 self-citations.

4. Preliminary reports – up to 4 pages – contain scientific results of significant importance requiring urgent publishing; however, it need not provide detailed description for repeating the obtained results. It presents new scientific data without a detailed explanation of methods and results. It contains all parts of an original study in an abridged form.

5. Professional articles – up to 10 pages – examine or reproduce previous investigation and represent a valuable source of knowledge and adaption of original investigations for the needs of current science and practice.

6. Case reports – up to 6 pages – deal with rare casuistry from practice important for doctors in direct charge of patients and are similar to professional articles. They emphasize unusual characteristics and course of a disease, unexpected reactions to a therapy, application of new diagnostic procedures and describe a rare or new disease.

7. History of medicine – up to 10 pages – deals with history with the aim of providing continuity of medical and health care culture. They have the character of professional articles.

8. Other types of publications – The journal also publishes feuilletons, book reviews, extracts from foreign literature, reports from congresses and professional meetings, communications on activities of certain medical institutions, branches and sections, announcements of the Editorial Board, letters to the Editorial Board, novelties in medicine, questions and answers, professional and vocational news and In memoriam.

Preparation of the manuscript

The complete manuscript, including the text, all supplementary material and covering letter, is to be sent to the web address above.

The covering letter:

– It must contain the proof given by the author that the paper represents an original work that it has neither been previously published in other journals nor is under consideration to be published in other journals.

– It must confirm that all the authors meet criteria set for the authorship of the paper, that they agree completely with the text and that there is no conflict of interest.

– It must state the type of the paper submitted (an original study, a review article, a preliminary report, a professional article, a case report, history of medicine).

The manuscript:

General instructions.

Use Microsoft Word for Windows to type the text. The text must be typed in font *Times New Roman*, page format A4, space 1.5 (for tables as well), margins set to 2.5 cm and font size 12pt. All measurements should be reported in the metric system of the International System of Units – SI. Temperature should be expressed in Celsius degrees (°C) and pressure in mmHg.

The manuscript should contain the following elements:

1. The title page.

The title page should contain a concise and clear title of the paper, without abbreviations, then a short title (up to 40 characters), full names and surnames of the authors (not more than 6) indexed by numbers corresponding to those given in the heading along with the full name and place of the institutions they work for. Contact information including the academic degree(s), full address, e-mail and number of phone or fax of the corresponding author (the author responsible for correspondence) are to be given at the bottom of this page.

2. Summary.

The summary should contain up to 250 words, without abbreviations, with the precise review of problems, objectives, methods, important results and conclusions. It should be structured into the paragraphs as follows:

– Original and professional papers should have the introduction (with the objective of the paper), materials and methods, results and conclusion

– Case reports should have the introduction, case report and conclusion

– Review papers should have the introduction, subtitles corresponding to those in the paper and conclusion.

The authors should provide up to 10 keywords below the summary. These keywords will assist indexers in cross-indexing the article and will be published with the summary, but the authors' keywords could be changed in accordance with the list of Medical Subject Headings, MeSH of the American National Medical Library.

The summary should be written in both languages, English as well as Serbian. The summary in Serbian language should be the translation of the summary in English; therefore, it has to contain the same paragraphs.

3. The text of the paper.

The text of original studies must contain the following: introduction (with the clearly defined objective of the study), materials and methods, results, discussion, conclusion, list of abbreviations (if used in the text) and not necessarily, the acknowledgment mentioning those who have helped in the investigation and preparation of the paper.

The text of a case report should contain the following: introduction (with clearly defined objective of the study), case report, discussion and conclusion.

Introduction contains clearly defined problem dealt with in the study (its nature and importance), with the relevant references and clearly defined objective of the investigation and hypothesis.

Materials and methods should contain data on design of the study (prospective/retrospective, eligibility and exclusion criteria, duration, demographic data, follow-up period). Statistical methods applied should be clear and described in details.

Results give a detailed review of data obtained during the study. All tables, graphs, schemes and figures must be cited in the text and numbered consecutively in the order of their first citation in the text.

Discussion should be concise and clear, interpreting the basic findings of the study in comparison with the results of relevant studies published in international and national literature. It should be stated whether the hypothesis has been confirmed or denied. Merits and demerits of the study should be mentioned.

Conclusion must deny or confirm the attitude towards the 0based solely on the author's own results, corroborating them. Avoid generalized and unnecessary conclusions. Conclusions in the text must be in accordance with those given in the summary.

4. References are to be given in the text under Arabic numerals in parentheses consecutively in the order of their first citation. Avoid a large number of citations in the text. The title of journals should be abbreviated according to the style used in Index Medicus (http://www.nlm.nih.gov/tsd/serials/lji.html). Apply Vancouver Group's Criteria, which define the order of data and punctuation marks separating them. Examples of correct forms of references are given below. List all authors, but if the number exceeds six, give the names of six authors followed by 'et al'.

Articles in journals

∗ *A standard article*

Ginsberg JS, Bates SM. Management of venous thromboembolism during pregnancy. J Thromb Haemost 2003;1:1435-42.

∗ *An organization as the author*

Diabetes Prevention Program Research Group. Hypertension, insulin, and proinsulin in participants with impaired glucose tolerance. Hypertension 2002;40(5):679-86.

∗ *No author given*

21st century heart solution may have a sting in the tail. BMJ. 2002;325(7357):184.

∗ *A volume with supplement*

Magni F, Rossoni G, Berti F. BN-52021 protects guinea pig from heart anaphylaxix. Pharmacol Res Commun 1988;20 Suppl 5:75-8.

∗ *An issue with supplement*

Gardos G, Cole JO, Haskell D, Marby D, Pame SS, Moore P. The natural history of tardive dyskinesia. J Clin Psychopharmacol 1988;8(4 Suppl):31S-37S.

∗ *A summary in a journal*

Fuhrman SA, Joiner KA. Binding of the third component of complement C3 by Toxoplasma gondi [abstract]. Clin Res 1987;35:475A.

Books and other monographs

∗ *One or more authors*

Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

∗ *Editor(s) as author(s)*

Danset J, Colombani J, eds. Histocompatibility testing 1972. Copenhagen: Munksgaard, 1973:12-8.

∗ *A chapter in a book*

Weinstein L, Shwartz MN. Pathologic properties of invading microorganisms. In: Soderman WA Jr, Soderman WA, eds. Pathologic physiology: mechanisms of disease. Philadelphia: Saunders; 1974. p. 457-72.

∗ *A conference paper*

Christensen S, Oppacher F. An analysis of Koza's computational effort statistic for genetic programming. In: Foster JA, Lutton E, Miller J, Ryan C, Tettamanzi AG, editors. Genetic programming. EuroGP 2002: Proceedings of the 5th European Conference on Genetic Programming; 2002 Apr 3-5; Kinsdale, Ireland. Berlin: Springer; 2002. p. 182-91.

∗ *A dissertation and theses*

Borkowski MM. Infant sleep and feeding: a telephone survey of Hispanic Americans [dissertation]. Mount Pleasant (MI): Central Michigan University; 2002.

Electronic material

∗ *A journal article in electronic format*

Abood S. Quality improvement initiative in nursing homes: the ANA acts in an advisory role. Am J Nurs [Internet]. 2002 Jun [cited 2002 Aug 12];102(6):[about 1 p.]. Available from: http://www.nursingworld.org/AJN/2002/june/Wawatch.htmArticle

∗ *Monographs in electronic format*

CDI, clinical dermatology illustrated [monograph on CD-ROM]. Reevs JRT, Maibach H. CMEA Multimedia Group, producers. 2nd ed. Version 2.0. San Diego:CMEA;1995.

∗ *A computer file*

Hemodynamics III: the ups and downs of hemodynamics [computer program]. Version 2.2. Orlando (FL): Computerized Educational Systems; 1993.

5. Attachments (tables, graphs, schemes and photographs).

THE MAXIMUM NUMBER OF ATTACHMENTS ALLOWED IS SIX!

– Tables, graphs, schemes and photographs are to be submitted as separate documents, on separate pages.

– Tables and graphs are to be prepared in the format compatible with Microsoft Word for Windows programme. Photographs are to be prepared in JPG, GIF, TIFF, EPS or similar format.

– Each attachment must be numbered by Arabic numerals consecutively in the order of their appearance in the text

– The title, text in tables, graphs, schemes and legends must be given in both Serbian and English languages.

– Explain all non-standard abbreviations in footnotes using the following symbols *, †, ‡, §, | |, ¶, **, † †, ‡ ‡ .

– State the type of color used and microscope magnification in the legends of photomicrographs. Photomicrographs should have internal scale markers.

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– All attachments will be printed in black and white. If the authors wish to have the attachments in color, they will have to pay additional cost.

6. Additional requirements

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