ORTHOPEDIC AND TRAUMA SERVICES IN THE HEALTHCARE SYSTEM OF SERBIA

Zoran VUKAŠINOVIĆ¹, Zorica ŽIVKOVIĆ², Duško SPASOVSKI¹

¹Institute for Orthopaedic Surgery and Traumatology "Banjica", Belgrade;
²Clinical Hospital Centre "Dr. Dragiša Mišović", Belgrade

ABSTRACT

Our aim has been to present the functioning of orthopaedic and trauma services in the healthcare system of Serbia. In the introduction, we present geographic, demographic, political and economic elements, which define more closely the position of Serbia in the Southeastern Europe. Further, the healthcare system of Serbia, organized in four levels, is presented: self-care, primary healthcare, secondary healthcare and tertiary healthcare, as well as the schedule of 20,157 physicians engaged in healthcare. In addition, we point out numerous problems, which the system is faced with. Special attention is paid to orthopaedic and trauma services active within the system, its development, current condition and personnel education. We have concluded that, despite this being a middle-income country, the healthcare system is well developed. With 524 orthopaedic surgeons, working in 56 specialized departments, musculoskeletal diseases and trauma management are covered at all three healthcare levels. Nevertheless, the authors also underline weaknesses that are mostly of technical nature. Measures for their elimination and improvement of the entire service are also suggested.

Key words: Serbia; healthcare; musculoskeletal diseases; trauma; surgery; training

INTRODUCTION

The Republic of Serbia is a landlocked country in the Central Southeastern Europe, covering the Southern part of the Pannonian Plain and the central part of the Balkan Peninsula. It borders with Hungary on the North, Romania and Bulgaria on the East, Albania and Macedonia on the South, and Montenegro, Croatia and Bosnia and Herzegovina on the West. Its capital is Belgrade [1-4].

Serbia is divided into 5 regions, 29 districts (in Central Serbia, Vojvodina and Kosovo) plus districts and the city of Belgrade. The districts and the city of Belgrade are divided into 200 (183+17) municipalities. Serbia has two autonomous provinces: Vojvodina in the North (7 districts, 46 municipalities), and Kosovo and Metohija in the South (5 districts, 30 municipalities). The local authorities of Kosovo unilaterally declared independence in 2008 [5, 6].

Serbia spreads over 88,361 km² with a population of 7,365,507 inhabitants (as recorded on 1st January, 2008) (excluding Kosovo and Metohija) [7]. Population density equals 115 inhabitants per square kilometre [8-12]. Serbia had a large refugee population of 97,427 per 9,396,000 inhabitants at the end of October 2007 [13, 14]. The median age is 40.4 years (males 39.1 years, females 41.7 years) [2, 7, 11, 15, 16]. Life expectancy at birth in the total population is 74 years (males 71 years, females 76 years) [2, 11, 15, 16]. Birth rate is 1.8 children born per woman [2, 11, 15, 16]. Infant mortality rate is 12 per 1,000 live male births and 8.6 per 1,000 live female births, with 1 to 4 year mortality rate of 0.4 in both genders [12]. The literacy rate (defined as age 15 and over of persons who can read and write) in the total population is 96% (males 99%, females 94%) [2, 11, 15, 16]. A computer is present in 34% homes, and 26.3% have Internet connection [7].

The Republic of Serbia is considered to have an upper-middle income economy according to the World Bank [17]. Serbia has economy mostly based on services, industry and agriculture. The main economic problems include high unemployment rate (overall unemployment rate is 13.3%, rising to 14.0% in age group of 15-64) and insufficient number of economic reforms [7]. Serbia suffers from a high export/import trade deficit and a considerable national debt [9, 13, 14, 17-22]. The average gross monthly salary in July 2008 was US$ 870 with a net salary of US$ 624 (in the industrial sector it was US$ 821 gross and US$ 590 net amount). The average monthly consumption of households in the first quarter of 2008 was US$ 668 [7, 23].

HEALTHCARE SYSTEM

The healthcare system in Serbia has transitioned through four major reorganizations since the World War II. It is practically a Bismarck model, based on mandatory health insurance with almost total population coverage (almost 96%), and a dominant government control over medical facilities and equipment. It is primarily financed by contributions of employees and others (91%), followed by government budget donations (7%), fund reimbursement (1%), and miscellaneous income (1%) [10, 24-26].

The healthcare system is organized into several levels: 1) self-care (individual and family level); 2) primary healthcare (local community level for the intended population range of 2,000-50,000 inhabitants); 3) secondary healthcare (district level, for the intended population range of 100,000-500,000 inhabitants; specialist hospital-type care); and 4) tertiary healthcare (country level for
intended population range of 500,000–5,000,000 inhabitants with subspecialistic hospital-type care including scientific research). Tertiary medical institutions are affiliated to university centres. Highly specialized services are available for the population of several districts at these centres and secondary healthcare level service is provided for the local population [10, 24-26].

In the Republic of Serbia the number, structure, capacity and spatial distribution of health institutions is defined by the Plan for Healthcare Institutions Network [8, 17, 27, 28]. It specifies 37,500 hospital beds (excluding daily hospital and neonatal capacity, and including beds for accompanying persons), or five hospital beds per 1,000 inhabitants. Thirty thousand beds are reserved for a short-term hospitalization of patients with acute diseases and injuries: 24,000 at the secondary level (3.2 per 1,000 inhabitants) and 6,000 at tertiary level institutions (0.8 beds per 1,000 inhabitants). Another 7,500 beds are reserved for prolonged hospitalization, of which 3,500 beds (0.47 beds per 1,000 inhabitants) are for psychiatric patients, 1,000 (0.13 beds per 1,000 inhabitants) for chronic diseases, and 3,000 (0.4 beds per 1,000 inhabitants) for hospital rehabilitation and physical therapy. The specified number of beds represents a substantial reduction compared to the previous year's total of 45,115 beds, which increased the number of inhabitants per hospital bed from the 172 calculated in 2006.

Secondary level hospital capacity for acute diseases and injury treatment is defined by beds number per 1,000 inhabitants for the corresponding district in each medical category, with overall average hospitalization of 8.5 days. In the Belgrade district an average orthopaedic and trauma capacity is 0.16 beds per 1,000 inhabitants (range 0.10-0.20 beds), which is divided among several hospitals that provide secondary level healthcare according to the size of the gravitating population, as well as infrastructural hospital capacities (size, number of beds, medical staff structure).

The capacity of tertiary level institutions (clinical hospital centres, clinics, institutes and clinical centres with total of 6,000 beds, or 0.8 beds per 1,000 inhabitants) is determined by the same criteria – the estimation of the gravitating population needs for complex medical care as reflected by infrastructural capabilities.

In 2006, there were 20,157 physicians (15,317 specialists) involved in the healthcare system in Serbia (1,368 inhabitants) [28]. In hospital facilities there were 7,381 physicians, mostly specialists (6,372). In addition, there were 2,542 general dental practitioners, 1,888 graduated pharmacists, 57,949 medical workers with secondary and higher education, and 531 medical workers with lower education [8, 28-31].

The healthcare system of Serbia is faced with numerous problems:

- Undeveloped informatics system and healthcare informatics system without timely and exact information serving as a support to decision-making, expenditure control and usage of resources in healthcare, which lowers the transparency of the whole healthcare system;
- Undeveloped mechanisms of competition and unequal treatment of private practice;
- “Passive approach” to the process of privatization;
- Development of healthcare capacities above the limits of economic possibilities of the society;
- Outdated equipment and deterioration of healthcare buildings;
- Masses orientated and poor-quality education of healthcare personnel, their narrow specialistic orientation and excessive coverage of the population with healthcare personnel;
- Low salaries of healthcare personnel;
- Dehumanized relationship between healthcare personnel and patients;
- Emphasis on curative medicine prioritizing the development of secondary (hospital) and tertiary (highly specialized) healthcare, despite the formal backup of primary healthcare;
- Non-existence of policy for providing equipment of high technological value;
- Non-existence of criteria for hospitalization and usage of expensive equipment, as well as non-existence of indicators to evaluate the quality of healthcare efficiency;
- Irrational prescription of medicaments;
- Unreal goals of prevention with formal and ineffective measures and activities in the promotion of health, despite frequent risk behaviour and wide-spread risks in the environment;
- Limited freedom of choice for users, disrespect of the rights of patients in healthcare system and non-existence of mechanisms for the protection of these rights [26, 27, 32-35].

ORTHOPEDIC AND TRAUMA SERVICE

Development

The development of the orthopaedic and trauma service in Serbia is linked with the name of Dr. Nikola Krsić, who was the first to make an x-ray image of King Petar I Karadjordjević’s hand in 1905. In addition, at the time, the term orthopaedics was mentioned for the first time. The first polyclinics for the treatment of bone diseases was opened in 1918, and the first department of orthopaedic surgery, as a part of General State Hospital of Belgrade, in 1919; it incorporated orthopaedic surgery with trauma of bone-joint system, which had an impact on today's orientation and profile of orthopaedic surgery in Serbia, particularly in Belgrade. In other countries of the region that were under German influence, the entire pathology of bone-joint system has remained disunited even until
today, so that orthopaedics and trauma function as separate units. To follow, in 1920 Orthopaedic Institute was established, which produced appliances and prostheses for invalids. Sanatorium for Bone-Joint Tuberculosis was opened in 1932 in Sremska Kamenica and the next one in Banja Koviljača in 1939 [35-39].

Specialization in orthopaedics with mechanotherapy and electrotherapy was introduced in the former Kingdom of Serbs, Croats and Slovenians in 1919 [37-39]. Curriculum in Orthopaedics was initiated in 1923, four years after the foundation of the Medical School of Belgrade [37-39]. The first textbook „Orthopaedics“ was written by a Private Associate Professor Borivoje Gradojević in 1934 [37-39]. During 1933, there were four orthopaedists in Belgrade, while in 1955 there were already fifteen [37-39].

Over the next years, and before and after the World War II, new personnel was educated, new hospitals were built and specialized departments were established. In 1947, the first orthopaedic department of the General State Hospital developed into the Clinical Hospital for Orthopaedic Surgery and Traumatology of the Belgrade School of Medicine (today’s Institute of Orthopaedic Surgery and Traumatology of the Clinical Centre of Serbia). In 1961, Special Hospital for Child Paralysis and Bone-Joint Tuberculosis started to function (today’s Institute for Orthopaedic Surgery and Traumatology “Banjica”, Belgrade). Schools of medicine were also founded in Novi Sad, Niš, Priština and Kragujevac, with affiliated orthopaedic hospitals; orthopaedic departments were also formed in most regional hospitals [33-39].

Current conditions

Musculoskeletal diseases and trauma management is covered at all three healthcare levels, according to present capacities. At the primary level, the response is the responsibility of general practitioners or intensive care specialists. In trauma management, they act as the first responders and are trained in wound dressing, provisional immobilization, antitetanus prophylaxis, administration of antibiotics, and circulatory volume correction. At the secondary level, most patients with musculoskeletal diseases and trauma are treated by orthopaedic and trauma surgeons, and only in rare situations by general surgeons or paediatric surgeons. Appropriate laboratory, ultrasound, and radiographic diagnostic tests are fully provided at this level. At the tertiary healthcare level orthopaedic diseases and trauma are exclusively managed by orthopaedic and traumatology specialists. In patients with polytrauma, other specialists are available if required.

The network among orthopaedic departments is quite good, with territorial organization and a rather balanced distribution. The leading orthopaedic institutions are located in regional centres: Belgrade (five clinical hospitals with orthopaedic traumatology departments), Novi Sad, Kragujevac, Niš, and Priština (now located in the Northern part of Kosovska Mitrovica). There are additional orthopaedic departments in 40 other hospitals across the country, as well as in three military hospitals (Belgrade, Novi Sad, and Niš).

In Serbia, there are 524 specialists of orthopaedic surgery and traumatology (137 in Belgrade) [40]. Given the relatively small area, a well-defined health institution network and a relatively good road infrastructure, the availability of orthopaedic trauma service is considered as very good. The time interval for the injured to reach the nearest orthopaedic trauma surgeon is variable, but never exceeds three hours.

Education

Basic medical education for physicians is available at five public medical universities (Belgrade, Novi Sad, Kragujevac, Niš, and Priština). First private medical university opened in 2005 in Belgrade. Orthopedics and traumatology is a part of surgical course, with 60 hours of instructions. All higher educational institutions are in the course of accreditation process.

Physician licensing is being introduced into our practice as obligatory, with licenses issued on January 1, 2008. The criteria for license renewal and the role of continual medical education involve precisely defined procedures. Orthopaedic and traumatology specialty training lasts for five years and includes 100 hours of orthopaedics and 100 hours of traumatology. It also involves practical skills training based on the “watch-assist-do” principle with mentor supervision and department rotations in orthopaedics and traumatology (48 months), as well as other disciplines: paediatric surgery, general surgery, neurology and neurosurgery, resuscitation and intensive care, plastic and reconstructive surgery, vascular surgery, urology, radiological diagnostics, physical therapy, rehabilitation, and prosthetics (total 12 months) [41].

For the official final exam, there are two textbooks: General Orthopaedics [42] and Special Orthopaedics [43], along with numerous monographs and manuals in Serbian, and relevant international literature (mostly in English).

Candidate evaluation consists of ten mandatory tests throughout the specialization, covering various fields: 1) musculoskeletal examination and surgical approaches; 2) paediatric orthopaedics; 3) neuroorthopaedics; 4) musculoskeletal oncology; 5) diseases and injuries of the spine; 6) diseases and injuries of upper limbs (including hand and reconstructive microsurgery); 7) diseases and injuries of the pelvis, hip and thigh; 8) diseases and injuries of the knee; 9) diseases and injuries of the calf, foot and ankle; and 10) pseudarthroses, bone defects, transplantation, and bone bank.

The final specialist examination consists of several parts: 1) multiple choice test (100 questions, with an equal number of questions concerning both orthopaedics
and traumatology); 2) practical patient examination and diagnostics; 3) surgical treatment; and 4) an oral exam (administered by a panel of five professors, five questions in the orthopaedic field of knowledge and five questions concerning traumatology).

Some musculoskeletal diseases and trauma training is provided for specialty residents in general surgery, pediatric surgery, plastic and reconstructive surgery, sports medicine and physical therapy and rehabilitation (mostly within 1-3 months of supervised “watch-assist” involvement at an orthopaedic institution).

Although continual medical education has been systematically introduced over the past few years, it remains incompatible with the international CME framework, but fortunately, it is obligatory for medical license renewal. Physicians mostly participate, according to their personal interest, at various national and international scientific meetings and in scientific literature correspondence (paper and electronic).

CONCLUSION

Despite being a middle-income country, Serbia has a very well developed healthcare system, especially if compared with other low and middle-income countries [33, 34, 44-58]. Musculoskeletal diseases and trauma management is covered at all three healthcare levels, according to actual possibilities. Only physicians provide diagnostic and therapeutic healthcare services.

There are 524 specialists of orthopaedic surgery and traumatology in Serbia (56 specialized departments). Given the relatively small area, well-defined health institution network, and relatively good road infrastructure, the availability of orthopaedic and trauma service is considered as very good. The time interval for the injured to access the nearest orthopaedic trauma surgeon is variable, but never exceeds three hours.

The training process is satisfyingly developed. Nevertheless, there are elements that need to be addressed in order to strengthen the delivery of musculoskeletal diseases and trauma services and the healthcare system. It is important to establish appropriate trauma centres throughout the country, which would provide the needed staff and staff development resources; appropriate space, services, equipment, and supplies; good prehospital care and transport; improved preventive strategies, and stronger communication between healthcare providers and government organizations [33, 34, 44-49].

Orthopaedic surgeons must be specially educated. Supporting staff in operating theaters, wards, and hospitals must be also specially educated. Special medical care is required for anaesthesia/pain management, trauma surgery, neurosurgery, critical care, plastic surgery, nutrition, rehabilitation, neurology, infectious diseases, internal medicine, paediatrics, etc. Involvement of these individuals with less training in trauma (e.g., general and paediatric surgeons) should be limited to first responder activities.

Continual medical education for orthopaedic and trauma specialists should be improved and organized on regular basis. Unfortunately, over the last several years, the national orthopaedic society has not been very active; it has just been reestablished. The First Congress of Serbian Orthopaedics and Traumatology Association was held from 25th to 26th September, 2008 [34, 35]. Orthopaedic surgeons rarely participate at EPOS (only one member), EFORT (the National Society is only an observer now), and SICOT (15 members) activities.

An accessible operating theater, 24 hours a day, 7 days a week, with anaesthesia, nurses, and technologists familiar with orthopaedic diseases and trauma care procedures, must be provided [33, 34, 44-49]. In addition, a well-equipped and staffed emergency department and a cast room in inpatient wards should be established. Classic radiology, CT, MRI and ultrasound should be provided 24 hours a day, 7 days a week in all orthopaedic and trauma services.

Modern orthopaedic beds with frames for mobility aids, support/suspension and traction, and modern instrumentation devices should be provided in all orthopaedic and traumatology services. Medical equipment should be standardized at all healthcare levels, and diagnostic and therapeutic protocols should be optimized for usefulness and applicability.

Fracture fixation implants, joint replacement prostheses, disposable equipment, bone cement, and bone graft substitutes should be also available in all orthopaedic and traumatology services [33, 34, 44-48].

Providing the appropriate level of care while transporting the injured should be improved. Interinstitutional transfer at an appropriate time after initial stabilization of the patient for definitive care of certain types of tertiary orthopaedic trauma care (limb replantation, spine injuries) should be also provided [33, 34, 44-49].

Preventive strategies for traffic, industrial and agricultural injuries should be improved.

Special attention should be paid to communication between healthcare providers and the government, as well as different nongovernmental organizations.

REFERENCES

ОРАТОПЕДСКО-ТРАУМАТОЛОШКА СЛУЖБА У СИСТЕМУ ЗДРАВСТВЕНЕ ЗАШТИТЕ СРБИЈЕ

Зоран ВУКАШИНОВИЋ1, Зорица ЖИВКОВИЋ2, Душко СПАСОВСКИ1
1Институт за ортопедско-хируршке болести „Бањица“, Београд;
2Клиничко-болнички центар „Др Драгиша Миховић“, Београд

КРАТАК САДРЖАЈ
Циљ рада је био да се прикаже функционисање ортопедско-трауматолошке службе у систему здравствене заштите Србије. У уводу су приказане географски, демографски, политички и економски елементи који прецизно дефинишу место Србије у југоисточној Европи. Затим је приказан систем здравствене заштите Србије, који је организован на четири нивоа (самопомоћ, примарна, секундарна и терцијарна здравствене заштите), као и распоред 20.157 лекара ангажованих у том систему. Такође су наглашени и бројни проблеми са којима се систем сушта. Посебна пажња обраћена је на ортопедско-трауматолошку службу у систему здравствене заштите Србије, њен развој, тренутно стање и образовање кадрова. Иако наша земља припада средишње развијеним, за- кључено је да је систем здравствене заштите Србије добро развијен. Са 524 ортопедска хирурга, који раде у 56 специјализованих одељења, омогућено је да се болести и повреде локомоторног система збрињавају на сва три нивоа здравствене заштите. Ипак, наглашени су слабости, које су углавном технологске природе, и предложене мере за њихово превазилажење и побољшање рада службе.

Кључне речи: Србија; здравствена заштита; мускулоскелетне болести; травма; хирургија; едукација

Zoran VUKAŠINOVIĆ
Kneginje Zorke 14, 11000 Belgrade, Serbia
Phone: +381 63 8523091
Fax: +381 11 3672129
E-mail: zvukasin@beotel.net

* Рукопис је достављен Уредништву 22. 9. 2008. године.