

Twenty Years of Society of Medical Informatics of B&H and the Journal Acta Informatica Medica

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Editorial

SUMMARY

In 2012, Health/Medical informatics profession celebrates five jubilees in Bosnia and Herzegovina: a) Thirty five years from the introduction of the first automatic manipulation of data; b) Twenty five years from establishing Society for Medical Informatics BiH; c) Twenty years from establishing scien-

tific and professional journal of the Society for Medical Informatics of Bosnia and Herzegovina „Acta Informatica Medica“; d) Twenty years from establishing first Cathdra for Medical Informatics on biomedical faculties in Bosnia and Herzegovina and e) Ten years from the introduction of “Distance learning” in medical curriculum. All of the five mentioned activities in the area of Medi-

cal informatics had special importance and gave appropriate contribution in the development of Health/Medical informatics in Bosnia And Herzegovina.

Key words: Health/Medical informatics, Acta Inform Med, Jubilees, Bosnia and Herzegovina.

1. INTRODUCTION

In 2012, health informatics profession celebrates five jubilees in Bosnia and Herzegovina:

Thirtyfiveyearsfromintroduction of first automatic manipulation of data. In 1977, under the supervision of Fuad Secerbegovic, MD, chief of department for Health statistics, Republic institute for public health BiH, in Sarajevo, company “Energoinvest” Ltd. Was done first analysis of summary and periodic health data reports about network, capacities and performance of healthcare service in Bosnia and Herzegovina. Before that analysis was performed manually in above institute. In 1982, in the Regional health station “Visnjik” in Sarajevo was tested, for the first time in the health history of Bosnia and Herzegovina one Information System – Local health information system (LZIS). Creators of LZIS were Izet Masic and Arif Agovic. Health data on services provided to 6000 users of healthcare, were treated by four teams of physicians and analysed in software package „Archive“ in personal computer SINCLAIR QL.

Twenty five years from establishing Society for Medical

Informatics BiH. In October 1987, a group of enthusiasts and pioneers of health informatics in BiH (Izet Masic, Irfan Zulic, Arif Agovic, Marijan Dover, Mladen Novak, Zoran Kontic and others) established mentioned Society. Very next year, in April, presidents of the similar societies from Croatia (Gjuro Dezelic), Slovenia (Stefan Adamic) from Serbia (Rajko Vukasinovic) at the meeting held in School of public health “Andrija Stampar” in Zagreb, Croatia signed common memorandum of understanding and established Association of Societies for Medical Informatics of Yugoslavia. By end of 1988 Association of Societies was officially registered, and in 1990 organized First Congress of Medical Informatics in Yugoslavia held in Belgrade. After dissolution of Yugoslavia the Association of Societies stopped existing and BiH Society in 1992 was registered in Society for Medical Informatics of Bosnia and Herzegovina.

Twenty years from establishing scientific and professional journal of the Society for Medical Informatics of Bosnia and Herzegovina „Acta Informatica Medica“. First editorial board of this journal: Izet Masic

(editor-in-chief), Zoran Ridjanovic (assistant of editor-in-chief), Amra Redzepovic (secretary), Ljubomir Kravec (technical editor), Georgina Janjic (lector), Tatjana Prastalo (English translation). Editorial board members were: Kenan Arnautovic, Meho Basic, Mahmut Djapo, Zoran Hadziahmetovic, Dragan Huml, Mehmed Kantardzic, Mustafa Kulenovic, Nedzad Mehic, Miroslav Polomik, Nikola Rukavina, Borisa Telebak and Irfan Zulic. In 1993, in impossible war conditions was published first issue of the journal. So far, approximately 35 issues of „Acta Informatica Medica“ were published.

Twenty years from establishing first Cathdra for Medical Informatics on biomedical faculties in Bosnia and Herzegovina. During the war year, in 1992, by decision of board of cathedra-chiefs in Medical faculty, University of Sarajevo, signed by dean Professor Borisa Starovic, in October 1992 was established first Cathdra for Medical Informatics. Cathedra staff was the following: Asst. Professor Izet Masic, chief of Cathedra and teaching assistants–Zoran Ridjanovic, MD and engineer Safet Jakupovic, and associates Amra

Redzepovic and Ljubomir Kravec). Later were established cathedras for medical informatics at medical faculties in Tuzla (1994), Banja Luka (1994), Foca and Mostar (1997). In past years curriculum were modified and harmonized, but the basic one was program of Sarajevo cathedra for medical informatics.

Ten years from introducing method of "Distance learning" in medical curriculum. In December 2002, at the Cathedra for Medical Informatics, Medical Faculty, University of Sarajevo was organized symposium under title "Tele-education in biomedicine" organized because of celebration of ten-year anniversary of establishing the above cathedra. Participants were health informatics experts from Bosnia and Herzegovina and Croatia. During the symposium for the first time in the history of University was tested intra-university network, prepared by University Tele-information Centre – UTIC. Leader of this activity was electro-engineer Safet Jakupovic, UTIC manager. By this occasion it was held tele-lecturing in duration of 90 minutes. It was start of the project "Learning from distance in biomedicine". Izet Masic is leader of this project at Medical faculty in Sarajevo, and the project is financed by funds of the cantonal Ministry of Science and Education and the Federal Ministry of Science and Education. Experiences from this project were presented at number of world and European scientific events.

All of five mentioned activities in the area of health informatics had special importance and gave appropriate contribution in development of health informatics in Bosnia And Herzegovina. The fact that Society for Medical Informatics of Bosnia and Herzegovina gathered the most eminent experts, mostly medical doctors and various specialties, what is curiosity (we belong among countries, members of European Federation of Medical Informatics – EFMI, which involved the largest number of health professionals). BiH Society became member of European Federation



Figure 1. Izet Masic, founder of BHSMI and AIM

of Medical Informatics – EFMI during the war in 1994 and the same year of the International Medical Informatics Association – IMIA. Especially should be pointed out that professionals and expert of health informatics in Bosnia and Herzegovina have given important contribution to the promotion of this medical discipline through several studies and projects, from building and realization of information systems at certain levels of healthcare, to introducing modern education models in biomedicine using contemporary information technologies.

In this article has marked importance of mentioned jubilees in development of Health informatics in Bosnia and Herzegovina and very shortly presented the most significant events and persons with essential role in the past period.

2. BEGINNINGS OF DEVELOPMENT OF HEALTH INFORMATICS IN B&H

Health (medical) informatics as separate scientific discipline began to be effective in academic institutions in the end of seventies by presentation of actual accomplishments in this area in under and postgraduate education at biomedical faculties. As specialized discipline, health informatics has its rudiments in Bosnia

and Herzegovina (B&H) in the beginning of the past century (20th), when experts, mostly graduates from Vienna Medical Faculty who started their professionals' carriers in our country. Those who were more involved in the area of health statistics began to intensively be interested for application of health technologies in health science (1, 2, 3, 4).

Dezelic pioneer of health informatics in former Yugoslavia, and latter first teacher of medical informatics on postgraduate studies at Medical Faculty University of Sarajevo, stated that in the year 1926 distance learning was used for medical education as specific way of learning from the distance what can be considered as rudiment of tele-education in Bosnia and Herzegovina (1). But, officially health informatics has been used in B&H after the Second World War in Public health institutes on regional level, and especially should be emphasizes contribution of Evgenije Serstnev (Rostow, 1897 – Sarajevo, 1971) and Fuad Secerbegovic (1932-). They intensively involved this discipline in the Institute for Hygiene, later Republic public health institute, being manager of the department for health statistics. For some time, Serstnev was in charge for health statistics in the Republic Committee for health and social politics B&H (from 1945 to 1952 he was chief of department for health statistics when he has gone to the Central Institute for Hygiene where he took over the same department and leads it by his retirement by 1971) From 1977 automatically analysis of health data in above institutions was introduced gradually thanks to the engagement of Fuad Secerbegovic who heritage Serstnev on the same position. From 1977 Institute for Hygiene has publishing annual reviews and summary health statistics reports in B&H and utilization of health capacities under the title "Network, capacities and services of health institutions in B&H". First health data collected and processed by computers in Company „Energovinvest“ Ltd in

Sarajevo in this year (3,4).

By end of seventies of the previous century on University of Sarajevo being taught Health informatics under the subject Social medicine and organization of health care as well as on postgraduate studies of the same faculty. In the first year of war 1992 on Medical Faculty, University of Sarajevo was established Cathedra for Medical Informatics, and later on other medical faculties in Bosnia and Herzegovina with certain number of hours of theoretical and practical education. Currently, curricula are being adapted with principles of Bologna process and declaration (3,4,5).

3. HEALTH INFORMATICS IN PRACTICE IN BOSNIA AND HERZEGOVINA

Initiation, development and implementation of some informatics activities as automatically manipulation of health data and intensive use of information technologies for the need of diagnostics, therapy and patient rehabilitation on the all levels of care in BiH health system become to be solved systematically in the end of seventies and in beginning of eighties. Crucial decision with state character was in 1981, when B&H government brought decision to start with work on the project "Development of B&H health information system". Before the project, it was completed study/analysis "Social-economical position of the health system in B&H". Based on that B&H parliament approved preparation of appropriate project this should have made modernization of the information system of health care. Basically, this project should modernized and made automatically, well developed and functional health statistics system in Bosnia and Herzegovina which was part of also well organized (centralized) Yugoslav health statistics system lead by the State Public Health Institute Belgrade. Project "Development of information system of health care B&H in circumstances of electronic data manipulation" was approved

by Executive Board of Association of healthcare communities B&H. Project started on 8 December 1983, in the year 1985 revised and adopted and in 1985 began its implementation after financial funds were ensured. Unfortunately realization of the project, started in 1986, was broken by war in Bosnia and Herzegovina in the year 1991 (6, 7, 8, 9, 10).

In 1985 was established Electronic calculation centre of health and retirement insurance Sarajevo (ERC ZIPO). The act itself, which has proceeded to the establishing of centre, was "Elaborate about social-economic finding of establishing working unit for manipulation of electronic data for health and retirement insurance fund". For number of years the centre was lead by engineer Mirza Ceric. Unfortunately, this very well designed project, content of activities, as well as part of completed tasks in regard to the procurement of hardware and production of software applications has never been finished and realized in practice. Concept of centralization of data manipulation in the architecture proposed in ZIS B&H project (central host and analysis in Sarajevo, regional analysis in eight centres in B&H and local in 109 municipalities) has never been finalized and fail down. It was utopia which has no chance to be realized in practice. The true is that some of designed activities were started on institutional level, but never reached end as Clinical information system of the University clinical centre in Sarajevo, which was one of the biggest project in area of development and construction of medical information systems. Among 23 companies on the tender IRIS (eminent Company for hardware and software and part of Energoinvest Company, fourth biggest company in formal Yugoslavia) was chosen and has spent almost ten years working on the Study, Initiative design and Main project of Clinical information system of the University clinical centre in Sarajevo (11, 12, 13, 14, 15)..

Neither this project was finished

because of war actions. Already procured hardware and designed software for some of applications from the project (Medical subsystem, Diagnostics-polyclinic subsystem, Administrative-technical subsystem and Financial-economical subsystem) were destroyed or in meantime lost their usefulness. The biggest progress was made in the development of information system for pharmaceutical sector (only in Sarajevo the system connected 43 pharmacies in centralized system of receipt collection and analysis). Besides University clinical centre in Sarajevo certain health institutions in Bosnia and Herzegovina started with development of local and unique health information systems. First Local Health Information System created and used in Sarajevo in the year 1982 when Izet Masic and Arif Agovic tested special designed Health data bases for supervision of approximately 6.000 citizens – users of health care services at Community health centre „Visnjik“ in Sarajevo. Health data were processed in special designed software package ARCHIVE on Personal computer SINCLAIR QL. After 3 years of testing that data bases Izet Masic graduated first master thesis within Health informatics – it was first defended master theses in that field in one of Balkan countries. Period during the war (1992-1995), and after the war, lack of appropriate financial funds, and many other factors influenced on the interruption of the planned activities. Especially, having in mind how those activities were recommended in project plans regarding system development and perception (16, 17, 18, 19, 20).

Ministry of Health and Social Welfare of Socialistic Republic B&H set up Commission for health information system. Commission was in charge to assess above projects, concept, content of data necessary to collect, methods and methodology, information flow, functionality, rationality and efficiency. Chair person of the Commission was Izet Masic and members were: Irfan Zulic, Zoran Ridjanovic, Gojko Babic, Nedžad

Mehic, Stevica Krsmanovic, Mirza Ceric, Mustafa Hasovic and Naim Grebo. In spite of the fact that this Commission was very successful in last three structure of the ministry of health there is no such a body.

4. HEALTH INFORMATICS IN MEDICAL EDUCATION AND RESEARCH

Needs for additional education of health professionals were seen after first application of electronic data manipulation. Physicians in primary health care and clinicians in order to perform their duties in high quality manner must have been up to date with latest accomplishment in medicine and health. Since sixties development of information technologies was quantitative and qualitative growth especially in diagnostics and therapy, and health workers had to follow that. International Federation for Information Processing (IFIP) in early sixties organized expert teams which task was to develop strategy, concepts and content of under and postgraduate medical education. Later one from IFIP will be separated and formed IMIA – International Medical Informatics Association and EFMI – European Federation for Medical Informatics. Working groups for Education of Medical informatics consisted by experts of Medical informatics within those scientific and expert associations established recommendations and defined strategy and contents of education for medical informatics at medical universities in countries in Europe and World.

There are five medical faculties in Bosnia and Herzegovina (Sarajevo, established in 1946; Tuzla, established in 1976; Banja Luka, established in 1986; Foca, established in 1994; Mostar, established in 1997). At all faculties since 1992 and later were established cathedras for medical informatics, and/or introduced as independent subjects: medical informatics or health informatics, bioinformatics, etc. In principle, 60-70% of curriculum are the same, or very similar. The only difference is that chiefs of some cathedras are medical doctors and

Medical faculty (established)	Subject Medical Informatics	Curriculum	Cathedra website	Distance learning
Sarajevo (1946)	II and XI semester	30 + 45	Yes	Introduced in school year 2003
Tuzla (1976)	II semester		n/a	n/a
Banja Luka (1986)	II semester		n/a	n/a
Foca (1994)	II semester		n/a	n/a
Mostar (1994)	II semester		n/a	n/a

Table 1. Curricula of Subject of Medical informatics at Medical faculties in Bosnia and Herzegovina

on some professors are engineers, mathematicians or economists with title of MSc or PhD in this area. Most of those cathedras have web site where students can check number of hours and with content to be taught.

Openly speaking in undergraduate education until 1992 when medical informatics was introduced as independent subject at Medical Faculty, University of Sarajevo just some lectures were

Prof Gjuro Dezelic, MD PhD using concept, content and methodology of Medical Faculty, University of Zagreb. In school year 1970-1971 Medical Faculty, University of Zagreb introduced “Basic Informatics” (named Use of electronic computers in health care) as obligatory subject for 6th semester students in duration of 15 school hours. Very similar programme was at postgraduate studies at the same faculty under the subject

Figure 2. Web site – Cathedra for Medical Informatics, Medical faculty, University of Sarajevo

taught. Those were methodological units in that time very important for health practice (medical documentary with two teaching hours and health information systems also two teaching hours) under subject Social medicine and organization of health care and Professor Izet Masic. But, from 1979 on Postgraduate education at Medical Faculty, University of Sarajevo there were subject Health informatics lead by pioneer of health informatics at ex-Yugoslavia

“Introduction in scientific work”. In 1973 was established separate cathedra for “Basics of Informatics” since that it was obvious distinct those two areas. Both, under and postgraduate students had chance to facultative attend “Techniques of programming electronic computers” in duration of 20 school hours. Since 1973 it was introduced subject at postgraduate studies “Analysis of health data by methods of informatics and statistics” in duration of 20 hours.

Since 1985, Professor Izet Masic took over leader position and in help of Professor Gjuro Dezelic and Professor Arif Smajkic launched separate course "Informatics and Economics in Health" in total duration of 30 hours. Numbers of postgraduate students become MSc and PhD in this subject, and some of them are professors and assistant in B&H universities and abroad. Since 1992 at Medical Faculty, University of Sarajevo there are Cathedra for Medical Informatics. Content of education is 30 hours of theoretical and 45 hours of practical education for students of Medical Faculty. The subject is split into two parts: Basics of medical informatics with fund of 15+15 hours in second semester of studies and Applicative medical informatics with fund of 15+45 hours in eleventh semester. Final exam is due after 11th semester. Curriculum, teaching materials, application for exam, exam itself and check of results are possible over web site (www.unsamedinfo.org). Also, since 2002 at Cathedra for Medical informatics it is in progress project "Distance learning in biomedicine" which allow student to use electronic way learning and to pass exam from this subject. This method of education is in pilot phase and waiting for official approval from appropriate institutions in charge for high education. In total, education from Medical informatics gained 2500 students. At postgraduate students of Medical Faculty, University of Sarajevo there is subject Medical Informatics with fund of 15+15 hours and this type of education got over 800 medical doctors all medical specialization. In progress is adaptation of curriculum of neighbouring countries in Medical informatics and content of methodological units with Bologna process.

5. BOSNIA AND HERZEGOVINA HEALTH INFORMATICS AT INTERNATIONAL LEVEL

All above mentioned activities could not been realized in practice without strategies and concepts de-

veloped by professionals and experts in the area of medical informatics. In early eighties, first in Sarajevo, then in other towns in Bosnia and Herzegovina, mostly engineers of electro-technique start intensively be interested for some segments of health informatics. Some of them managed certain projects, beside other they be involved in preparation of design of software applications for mentioned project ZIS B&H. They have been followed by ambitious physicians who could see in new information technologies future and practical help in performing their everyday jobs. Pioneers in this area were: Izet Masic, Zoran Ridjanovic, Benjamin Djulbegovic, Sead Beganovic and others who started to attend the professional meetings and workshops with appropriate topics from medical informatics. They were been supported by Professor Abdulah Konjicija who in 1984 started to introduce mathematical models in diagnostics and therapy of certain diseases, and

decided to set up independent society for medical informatics which was with similar associations from Croatia, Slovenia and Serbia established in April 1988 at Andrija Stampar School in Zagreb Association of societies for medical informatics of Yugoslavia.

President of the Association board was Gjuro Dezelic, and members were Stefan Adamic, Rajko Vukasinovic and Izet Masic. In 1990 this association become member of European Federation for Medical Informatics and officially was accepted on EFMI Council in Glasgow. EFMI Council in Glasgow was attended by Gjuro Dezelic and Izet Masic and same year organized First Congress of Medical Informatics in Sava centre in Belgrade opened by in that time EFMI president Stellan Bengtsson. First Congress of Medical Informatics attended over 500 delegates.

In 1991 this association fail apart and each member established society



Figure 4. Professors Gjuro Dezelic and Izet Masic, representatives of Yugoslav Medical Informatics Association at MIE 90 Conference in Glasgow, Scotland in 1990

alter with mentioned experts algorithms for curing phases of a disease.

Later, those experts began to more closely work on some parts of medical informatics for which they had affinity. Some of them have prepared papers and presentations for specially organized symposiums "B&H days of informatics" held annually on mountain Jahorina near Sarajevo from the year 1976. In the year 1987 group of experts

at the level of new recognized states. BiH society was in war 1992 year become independent professional organization and first of kind in independent state Bosnia and Herzegovina. Same year a group of society members (Izet Masic, Zoran Ridjanovic, Irfan Zulic, Aziz Hodzic, Zelimir Nastic, Ljubomir Kravec, Marijan Dover, etc.) kicked off initiative for acceptance of Society for Medical Informatics B&H in European Federation for



Figure 5. Reception of BHSMI in EFMI in Lisbon, Portugal, during EFMI Council on March 22nd 1994

Medical Informatics. In 1994 Society for Medical Informatics B&H become member of EFMI (EFMI Council decision in Lisbon) and IMIA (Decision of General Assembly in Dresden). It should be pointed out that big gratitude for those acceptances had President Stellan Bengtsson and Gjuro Dezelic, who in unbelievable war conditions most of pre-activities done over radio link with establisher and first president of SMI B&H, Izet Masic. It was the only possible link from Sarajevo in that time. In incredible war conditions official delegation (Izet Masic and Zoran Ridjanovic) attended EFMI Council and were present at official ceremony in this distinguished scientific association.

War period (1992-1995) in Bosnia and Herzegovina Society for Medical Informatics spent working very hard and in almost impossible conditions organized eight scientific and professional events. On that events over 500 papers were presented which were published in proceedings what was real miracle having in mind that Sarajevo was under siege and without electricity and water supply, gas and food. It was last for about 1245 days without break. Those materials found the way to go across the Europe and they were recognized as one of Sarajevo miracles.

Serious activities of the Society follow on local and international level. Society has organized number of professional symposiums (eight

in total so far) on actual themes:

- Classification systems in Health care system, December 1992;
- History of Health and Social culture in B&H, march 1993;
- Health information systems, December 1993;
- War medicine and medicine in a



Figure 6. Reception of BHSMI in IMIA in Dresden (Germany), on 23 September 1994

- war, November 1993;
- War medicine and medicine in a war, November 1994;
- Medical documentation and evidence, November 1996;
- Tele-education in biomedicine, December 2002;
- eHealth and eEducation, December 2005.
- MIE 2009 Conference, August 2009.

Society also organized First

congress of Medical Informatics of Bosnia and Herzegovina with international participation, held in Sarajevo in November 1999, attended 70 participants (from B&H, Croatia, Slovenia, Serbia and Montenegro, Macedonia, Norway, etc.) opened by Professor Atila Naszldy.

Figure 12. Participants of Second Congress of Medical informatics of B&H, held in Sarajevo, April 18th 2004

Second congress of Medical Informatics with international participation, organized in Sarajevo in May 2004 opened by Professor Assa Reichert, president of EFMI where took place over 90 delegates from BiH, Croatia, Slovenia, Canada, Israel, Switzerland, Holland, United Kingdom, Germany, Norway, etc. During the congress EFMI held a meeting of EFMI Board where were: Assa Reichert, president; Robert Boaud, vice president; Jacob Hofdijk, secretary; Rolf

Engelbrecht, vice president IMIA; Johan Bryden, executive officer; Patrick Weber, treasurer. Members of the Board had official visited Sarajevo regarding SMI BiH and Sarajevo town for the organization of MIE2009. On next meeting of the EFMI Council held in Munich in June 2004, Board brought positive decision on the application and recommended to SMI BiH preparation of the BID book for the



Figure 7. Participants of First Congress of Medical Informatics of B&H, held in Sarajevo, on November 5th 1999

times a year and since 2005 is has been published quarterly. Journal is published in English language and it is currently abstracted and indexed in global biomedical data bases: EBSCO, Index Copernicus, Ulrich's Periodicals Directory, Geneva Foundation for Medical Education and Research–GFMER, CAB abstracts, Global Health, NewJour, ISC Master Journals List, Genamics JournalSeek, WorldCat, NLM Catalog, VINITI of RAS, Catalyst, ScopeMed.. So far, it was published over 1,000 scientific papers, professional articles, editorials, case studies, and various actualities. First Editorial Board in 1993 were:: Izet Masic (editor-in-chief), Zoran Ridjanovic (assistant

following EFMI Council. Finally, on the EFMI Council meeting in Athens held on 18 March 2005, official decision was that Sarajevo will be the host of 22nd European Congress of Medical Informatics – MIE2009 to be held in Sarajevo by end of August 2009. Completed activities, very well synchronized by Local organization body, with Professor Masic on the top, gave impression to the members of EFMI Executive Committee that this event was successfully organized and prepared Medical Informatics in Europe (MIE) Conference, which resulted as “The best ever MIE Conference” in the history of EFMI.

President and SMI BiH members were obliged to report to the each next EFMI Council meeting about progress made in regard to preparations and activities for MIE2009. In Geneva, Switzerland on 27 August 2005 were present Izet Masic, Ahmed Novo and Selim Toromanovic, in Timisoara, Romania on 7 April 2006 (Izet Masic) and Maastricht, the Netherlands (Izet Masic, Almir Džananović and Selim Toromanović). Information on above activities are described and published on www.mie2009.org.

Also, SMI BiH organized Special Topic Conference named “eHealth and eEducation” in the premises of the rector of Sarajevo University on 20 December 2005. During the conference Professor Rolf



Figure 12. Participants of Second Congress of Medical informatics of B&H, held in Sarajevo, April 18th 2004

Engelbrecht, as key speaker, held tele-conference from Munich, Germany on “Tele-medicine in Germany”. It was very first tele-lecture from biomedicine organized by our society. The event was organized with support of ERICSSON and World Association for tele-medicine and eHealth having in mind that SMI BiH becomes official member of ISfTeH and Izet Masic member of ISfTeH Governing Council.

SMI BiH after establishing in 1992 lunched professional and scientific journal Acta Informatica Medica (Acta Inform Med) and it has been publishing continuously 20 years. In first time Acta Inform Med was published twice of year, then three

of editor-in-chief), Amra Redzepovic (secretary), Ljubomir Kravec (technical editor), Georgina Janjic (lector), Tatjana Prastalo (English translation). Editorial board members were: Kenan Arnautovic, Meho Basic, Mahmut Djapo, Zoran Hadziahmetovic, Dragan Huml, Mehmed Kantardzic, Mustafa Kulenovic, Nedžad Mehic, Miroslav Polomik, Nikola Rukavina, Borisa Telebak, Irfan Zulic. Last issue in December 2011 was edited by Editorial board: Andrew Balas (USA), Robert Baud (Switzerland), John Bryden (United Kingdom), Rolf Engelbrecht (Germany), Francis Roger France (Belgium), K. Hakan Gulkesen (Turkey), Arie

Hasman (The Netherlands), Jacob Hofdijk (The Netherlands), Josipa Kern (Croatia), Simon de Lousignan (United Kingdom), John Mantas (Greece), Oleg Mayorov (Ukraine), Dragica Milinkich (Australia), George Mihalas (Romania), Haris Pandza (B&H), Besim Prnjavorac (B&H), Assa Reichert (Israel), Zekerijah Sabanovic (B&H), Francesco Sicurello (Italy), Michael Shifrin (Russia), Gaj Vidmar (Slovenia), Patrick Weber (Switzerland), Jana Zvarova (Czech Republic).

Teachers and associates involved in education of student on post and undergraduate studies on biomedical faculties in Bosnia and Herzegovina during past 15 years published number of books, monographs, and other publications, which are some translated into English language. Also, BiH expert for medical informatics are enthusiastically participated on European and world congresses of medical informatics with oral presentations or poster presentations. This is opportunity to mention just some of more important publications: Medical informatics: Book I – Basic of Medical Informatics and Book 2 – Applicative Medical Informatics, by Izet Masic, Zoran Ridjanovic, First edi-



Figure 8. MIE 2009 Conference in Sarajevo (Bosnia and Herzegovina), 30.08.-02.09.2009.

of the book is: Chapter 1. Review of Medical Informatics History; Chapter 2. Data information and knowledge; Chapter 3. System and communication; Chapter 4. Methods of data manipulation; Chapter 5. Medical Documentation; Chapter 6. Nomenclature and the Classification Systems; Chapter 7. Structure and Organization of Data; Chapter 8. Hardware and software; Chapter 9. Models, Modelling and Simulation by a Computer; Chapter 10, Medical Decision Making; Chapter 11, Computer Support to Medical Decisions Making; Chapter 12,

Medicine and Healthcare; Chapter 17, How to use Rationally Information Diagnostic Technologies; Chapter 18, Healthcare Information Systems. Another books are: Practicum for medical informatics edited by Izet Masic and Haris Pandza in 2000, Health ethics and data protection edited by Izet Masic and Zoran Ridjanovic in 2001 (Chapter 1. The basic notions and definitions; Chapter 2. The origin of the ethic dilemmas: physician help; Chapter 3. Taxonomy of the ethic problems in the medicine; Chapter 4. The ethic approach to the clinic patient; Chap-



Figure 9. Cover pages of scientific journal „Acta Informatica Medica“

tion in 1994, reprinted in 1996 and 2001. English version of the book Medical informatics, published in the year 2010 by AVICENA Publishing house in Sarajevo was edited by Izet Masic, Zoran Ridjanovic, Haris Pandza and Zlatan Masic. Contents

Biomedical System of Scientific and Research Information, Chapter 13, Computers in Education and Research; Chapter 14, Telematics, Telemedicine, Tele-education; Chapter 15, Evidence Based Medicine; Chapter 16, Information Technologies in

ter 5. Irrational decisions of the patients; Chapter 6. The assessment of patient abilities of decision making; Chapter 7. The patient right in providing of health care; Chapter 8. Data protection and confidentiality according to health ethics)



Figure 9. Cover pages of the books: Medical informatics and Proceedings of MIE 2009 Conference held in Sarajevo in 2009

Izet Masic and Ahmed Novo are also co-authors in a book “Advances in International Tele-medicine and eHealth around the world” edited by Wojciech Glinkowski (2006).

6. PERSPECTIVES FOR DEVELOPMENT OF MEDICAL INFORMATICS IN BOSNIA AND HERZEGOVINA

One of the main institutions in Bosnia and Herzegovina when development of medical informatics is in question is Cathedra for medical informatics, University of Sarajevo. Teaching staff performed number of surveys analysing current level among medical students and health professionals. Key activity of the B&H SMI will be in further period to enhance efforts on reconstructing high education system in the country in accordance with Bologna process. There are two areas which focus of activities needs to be directed: under and postgraduate education and continuous medical education (CME) for health workers, medical doctors as well as nurses.

It is obvious that Bosnia and Herzegovina is far away from the European Higher Education Area which provides Europe with a broad, high quality and advances knowledge base. With current education system it not possible to move from one university within Bosnia and Herzegovina, not to mention movement to the member states of European Union for the purpose of further study and employment. Also,

countries.

Now we have “teacher centred university” in contrary of “student centred university” how is proposed Bologna Process. Purpose of our studies for students is to pass exam, instead acquiring knowledge and to gain skills. Bologna process has a positive effect on the role of higher education in the lifelong learning framework. Lifelong learning must not mean that people’s knowledge is automatically considered outdated or expired after a certain time period and everyone is obliged to update their skills. Also, when we talk about medical doctors and having in mind that 50% of medical information is outdated after period of 3-4 years than continuous medical education (CME) is of essential interest.

Developing perspectives of health informatics must be oriented for further improvement of educational concepts and contents at biomedical faculties in Bosnia and Herzegovina and significantly larger involvement of health informatics experts in the development of health information systems, from the bottom to the top (state level), what is one of the basic objectives and goals of the deep reform and reconstruction health system in Bosnia and Herzegovina in general. Improvement of existing and building computer based Integral health information system which is inseparable part of the program for the reform and reconstruction health system in Federation of Bosnia and

we not in position to attract so many people from non-European countries to come and study in Bosnia and Herzegovina as it was before 1992 when we have had large number of foreign students especially from developing and third world

Herzegovina, Republika Srpska and Brcko District, three separately and organized health systems in BiH. But, each of them, in the future, must be based with emphasis on its adaptation to the goals of European regional strategy: “Health for all by 2015”. Must be pointed out that reform and reconstruction of health system in Bosnia and Herzegovina cannot be realized without medical informatics which is important vector in forthcoming changes. It is not possible to follow development of information technologies and information systems in neighbouring countries and wider in Europe without adopting existing health statistics system and make it comparable with mentioned systems. So, health informatics in wider and medical informatics in shorter meaning must be object of strategy reconstruction of existing health system in BiH and in accordance with strategy recommended by WHO. The truth if that actual problems in BiH health system are numerous (mostly methodological nature, informatics infrastructure is insufficient, it is obvious that medical staff has no appropriate training, lack of finance resources, etc.), general ones: problems in data collection and reporting, problems in data analysis, presentation of data and communication, problem in the use of health information, etc. To solve mentioned problems engagement of decision makers at all levels of healthcare and especially ones which were educated in the area of health informatics must be much larger. All above activities with joint and interfering resolving could justify current state investments in health sector and to improve population health and allowed fairness in the use of health resources, since BiH health system can give quality outputs/outcomes only based on reliable and quality information from health information system from local to state level. In this regard more important role must have cantonal and entity ministries of health.

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