

Scientometric Analysis of the Journals of the Academy of Medical Sciences in Bosnia and Herzegovina

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ABSTRACT

Introduction: Currently in Bosnia and Herzegovina there are 25 journals in the field of biomedicine, 6 of them are indexed in Medline/PubMed base (Medical Archives, *Materia Socio-Medica*, *Acta Informatica Medica*, *Acta Medica Academica*, *Bosnian Journal of Basic Medical Sciences (BJBMS)* and *Medical Glasnik*), and one (BJBMS) is indexed in Science Citation Index Expanded (SCIE)/Web of Science base.

Aim: The aim of this study was to show the scope of work of the journals that were published by Academy of Medical Sciences of Bosnia and Herzegovina - *Medical Archives*, *Materia Socio-Medica* and *Acta Informatica Medica*. **Material and Methods:** The research presents a meta-analysis of three journals, or their issues, during the calendar year 2015 (retrospective and descriptive character). **Results:** During 2015 calendar year a total of 286 articles were published (in *Medical Archives* 104 (36.3%), in *Materia Socio-Medica* 99 (34.6%), and in *Acta Informatica Medica* 83 (29%). Original articles are present in the highest number in all three journals (in *Medical Archives* 80.7%, in *Materia Socio Medica* 77.7%, and in *Acta Informatica Medica* 68.6%). In *Medical Archives*, 90.3% of the articles were related to the field of clinical medicine. In *Materia Socio-Medica*, the domain of clinical medicine and public health was the most represented. Preclinical areas are most frequent in *Acta Informatica Medica*. The period of 50-60 days for a decision on the admission of article is most common in all three journals, with trend of shortening of that period. Articles came from 19 countries, mostly from Bosnia and Herzegovina, then from Iran, Kosovo, Saudi Arabia and Greece. **Conclusion:** In *Medical Archives* original articles in the field of clinical medicine (usually internal and surgical disciplines) are most often present, and that is the case in last four years. The number of articles in *Materia Socio-Medica* and *Acta Informatica Medica* is growing from year to year. In *Materia Socio-Medica* there is a trend of growth of articles in the field of public health, while the most common articles in *Acta Informatica Medica* are about medical informatics.

Key words: biomedical publishing, meta-analysis.

1. INTRODUCTION

The Internet, which allows anyone with access to a computer to become a global publisher, is challenging traditional publishing patterns (1-3). In the biomedical domain, medical journals are providing more and more content online, both free and for a fee. Open Access approach to articles is an imperative of modern science, and indicates a free and limitless access to online library of scientific research articles. Open Access approach won the battle against traditional publishing, and in future it will cement its place (4).

The Open Access initiative derives from several premises: medical libraries can no longer afford journal subscriptions; society benefits from the open exchange of ideas; society has in large

part already paid for this research; the Internet provides an available venue (2). The traditional journal publishers model, however, has functioned well over many years with a robust peer review system and increasing Internet digital components permitting search and cross referencing, including elements of the Open Access model (4).

Biomedical publication in the former Yugoslavia has a long tradition. The oldest medical journal in Bosnia and Herzegovina (B&H) was "Jahrbuch des Bosnisch-Herzegowinischen Landesspitales in Sarajevo" (Annual of the Regional Hospital in Sarajevo) which was established in 1897 (published in German language) (3). *Medical News Journal (Medicinski vjesnik)* in Croatia (1877), *Health News (Zdravstveni*

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vjesnik) in Slovenia (1927), Medical Archives (Medicinski arhiv) in Bosnia and Herzegovina (1947) and Domestic physician (Domaci lekar) in Serbia (1877), represent a precursor of today's journal in the former Yugoslavia (5-8).

In 2015 in B&H about twenty-five journals are issued in the field of biomedical and life sciences in general. Systematization is made, 17 of the most relevant journals are selected, and their indexation in scientific databases is presented (Table 1) (6). Unfortunately, the rest of them are not in the table below (lot of them that are not included into account are review journals), due to inefficiency on their web sites, or due to absence of information of the index status on their website. Timeliness on their own web sites gives a great view of the seriousness of a journal in contemporary world.

Journals that are indexed in Medline/PubMed are Medical Archives, *Materia Socio-Medica*, *Acta Informatica Medica*, *Acta Medica Academica*, *Bosnian Journal of Basic Medical Sciences (BJBMS)* and *Medicinski Glasnik*. The first three mentioned represent editions of Academy of Medical Sciences of Bosnia and Herzegovina. *Acta Medica Academica* is edition of the Academy of Sciences and Arts of Bosnia and Herzegovina. *Medicinski Glasnik* is the official publication of the Medical Association of Zenica-Doboj Canton. *BJBMS* is edition of Association of Basic Medical Sciences of the Federation of Bosnia and Herzegovina and is the only one of the above mentioned journals, which is indexed in the Science Citation Index Expanded (SCIE)/Web of Science base (6).

Medical Archive is the oldest of the mentioned journals in B&H. In last ten years journal is published bi-monthly. Till now in Medical Archives over 5000 articles were published and most of them were original articles from all medical disciplines (4). Medical Archive is a journal, in which articles in the field of clinical medicine are usually present. Considering the number of articles, we can say that it is the most important journal in the field of clinical medicine, because majority of original articles in these areas are published there, compared with all other journals in B&H, which are contained in the Medline/PubMed database. Internal and surgical areas are dominating. Medical Archive (Table 1) is the most common in the scientific bases worldwide. H index (the index that attempts to measure the productivity and impact of published work of scientists) of Medical Archive for 2014 is 12, and is the highest among the journals in B&H.

Materia Socio-Medica represents a journal in which are equally represented articles in the field of clinical medicine and public health, and *Acta Informatica Medica*, is a journal where the field of Medical Informatics is mostly present. *BJBMS* is a journal where the content in basic, pre-clinical sciences (46.5% of all the articles in 2015) is usually published. Although the field of medical informatics is often neglected in comparison to the clinical disciplines, it is an extremely important source for the latest developments in clinical practice, because the modern clinical practice is in the conjunction with software development. Besides that, it represents the location where you kind find topics like information technologies and their use in medicine and the education. Information technologies can be used in the teaching process through several directions: interactive classroom, distance learning, interactive distance learning, web based learning and virtual classroom (they attempted that accumulated ma-

terial becomes closer in easier and approachable way to new, computerized generations) (5). Medical Informatics includes theoretical and practical aspects of communication and information processing, based on knowledge and experiences occurring in processes related to health care, it is developing methods and systems for collecting, processing and interpretation of patient data -with the help of knowledge acquired in scientific medical research (6), and the level of development of medicine of a country is mainly reflected in the level of modernization and computerization of the health care system.

The biggest problem which participants in the academic process encounter is plagiarism (1, 5, 9-14). In recent years, there is no doubt that the quality of scientific articles declines, a small percentage is something what is new and innovative, and this is not only in B&H, but also around the world. One can say freely that the quantity of scientific articles is in continual growth, while the quality very much decreases. For the development of science the key is that the fight against plagiarism continues. It is necessary to work on mechanisms for early detection of plagiarism, and relevant software should be used by all reputed journal, and on international level, a database of all cases of plagiarism should be launched with disclosure of all names of blacklisted plagiarist (9, 12, 13).

Bosnia and Herzegovina, although a small country geographically, has a great scientific potential, which is certainly illustrated by a large number of original articles, which are published in numerous journals. In the field of clinical medicine according to PubMed Medline base Enver Zerem (MD, PhD, University Clinical Center of Tuzla) and Husref Tahirovic (MD, PhD, ANU B&H) are most prolific authors. In the pre-clinical and public health fields most prolific authors are Izet Masic (MD, PhD, Faculty of Medicine in Sarajevo) and Mirsada Hukic (MD, PhD, ANU B&H). Apart from these, Dejan Milosevic (PhD, Professor of the Department of Physics, Faculty of Sciences, Sarajevo) must be mentioned, whose articles in the field of physics (biophysics is certainly important part of biomedicine) have highest number of quotations (according to researchgate.net 4097 times) among all the authors from Bosnia and Herzegovina. Highest number of cited articles in most important databases - PubMed, from authors in B&H: Izet Masic (302), Asim Kurjak (279) and Benjamin Djulbegovic (276) (retrieved on 20. 12. 2015).

The imperative has to be that future academic citizen is formed since college days, and that the awareness of the importance of scientific research is implanted, although it sometimes does not bring any economic benefit. In the end we shouldn't forget that the knowledge is the most powerful weapon in the world, and it has to be used is the path of prosperity and progress in community (15).

2. AIM

The aim of this study was to show the scope of work of the journals that were published by Academy of Medical Sciences of Bosnia and Herzegovina - *Medical Archives*, *Materia Socio-Medica*, *Acta Informatica Medica*

3. MATERIAL AND METHODS

The research presents a meta-analysis of three journals, or their issues, during the calendar year 2015 (retrospective and descriptive character).

	Medical Archives	Materia Socio Medica	Acta Informatica Medica	Acta Medica Academica	Medicinski Glasnik	BBNIS	Journal of Health Sciences	HealthMed	Acta Medica Saliniana	Pediatrics Today	Medical Journal	Pharmacia	Veterinaria	Sport Science
SCIE														
PubMed Central														
PubMed/MedLine														
Excerpta medica/EMBASE														
Scopus														
Scirus														
EBSCO														
DOAJ														
Index Copernicus														
Ulrich's Periodicals Directory														
GEMER														
HINARI														
ProQuest														
NewJour														
SCImago Journal and Country Rank														
ISC Master Journals List														
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WorldCat														
VINITI of RAS														
Research Gate														
Catalyst														
ScopusMed														
SafetyLit														
BioInfoBank Library														
PubGet														
GetCited														
CIRRIE														
Kubon and Sagner OPAC														
NLM Catalog														
EastView														
Cab Abstracts														
Global Health														
DynaPresse														
InfoBase Index														
Index Scholar														
Academic One File														
JCR														
BASE														
Elek Zetschriftenbibliothek														
ISI														
Open J Gate														
British Library Direct														
CASSI														

Table 1. Representation of the journals in Bosnia and Herzegovina in the field of medicine in the scientific bases (6)

4. RESULTS

During 2015 calendar year a total of 286 articles were published (in Medical Archives 104 (36.3%), in Materia-Socio Medica 99 (34.6%), and in Acta Informatica Medica 83 (29%)). Original articles are present in highest number in all three journals (in Medical Archives 80.7%, in Materia Socio Medica 77.7%, and in Acta Informatica Medica 68.6%) (Figure 1).

In Medical Archives, 90.3% of the articles were in the field of clinical medicine. In Materia Socio-Medica, the domain of clinical medicine and public health was the most represented. Preclinical areas are most frequent in Acta Informatica Medica (Figure 2).

Articles covering fields of Internal Medicine and Surgery, are most commonly found in Medical Archives and Acta Informatica Medica (Figure 3), while in Materia Socio Medica

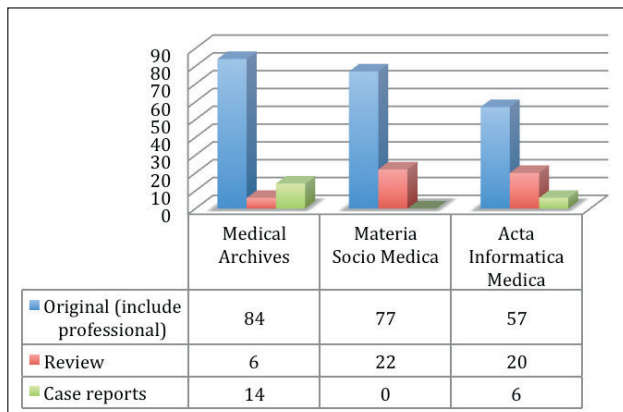


Figure 1. Distribution of articles by the type of article in 2015

besides internal medicine, gynecology is the second most common area. (Table 2). In the domain of preclinical medicine, biochemistry was most frequent in Medical Archives (Table 3), and medical informatics was most frequent in Materia Socio-Medica and Acta Informatica Medica (Figure 3).

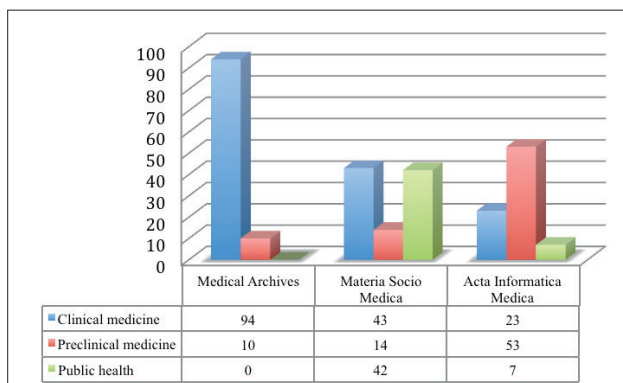


Figure 2. Representation of medical fields in year 2015

Most often the time required for decision on acceptance of article is between 50 to 60 days, but there is a trend in reducing the number of days required for a decision on acceptance or revision of article (Table 4). Articles came from 19 countries (Figure 4), mostly from Bosnia and Herzegovina, then from Iran, Kosovo, Saudi Arabia and Greece (Table 5). Countries from four continents were included (Europe, Asia, Africa and America). An increasing number of regional cooperation during writing articles has been noticed. Looking at the last 4 years, the category of original articles is the most common in Medical Archives (Figure 5). Original articles

	Medical Archives	Materia-Socio Medica	Acta Informatica Medica
Clinical medicine			
Internal Medicine	24 25,6%	25 58,1%	3 13%
Surgery	26 27,6%	2 4,7%	9 39,1%
Gynecology	7 7,4%	6 14%	2 8,7%
Neuropsychiatry	3 3,2%	1 2,3%	3 13%
ORL	4 4,2%	-	-
Pediatrics	7 7,4%	5 11,6%	2 8,7%
Ophthalmology	6 6,4%	-	1 4,4%
Physical therapy	5 5,3%	1 2,3%	1 4,4%
Dermatoven-erology	10 10,7%	1 2,3%	-
Radiology	1 1,1%	-	2 8,7%
Immunology	1 1,1%	-	-
Infectious dis-eases	-	2 4,7%	-
Total	94 100%	43 100%	23 100%

Table 2. Representation of clinical disciplines in three journals in year 2015

	Medical Archives	Materia-Socio Medica	Acta Informatica Medica
Preclinical medicine			
Microbiology	2 20%	3 21,4%	-
Pharmacology	-	3 21,4%	-
Medical Informatics	-	5 35,8%	46 86,8%
Biology	-	-	1 1,9%
Biochemistry	8 80%	3 21,4%	6 11,3%
Total	10 100%	14 100%	53 100%

Table 3. Representation of preclinical disciplines in three journals in year 2015

Time in days	Medical Archives	Materia-Socio Medica	Acta Informatica Medica
10-19	1		3
20-29	5	18	10
30-39	17	18	23
40-49	13	9	1
50-59	31	22	24
60-69	19	20	20
70-79	12	5	1
80-89	5	4	1
90-99	1	3	0
> 100	-	-	-

Table 4. Time needed for the decision on acceptance of article in year 2015

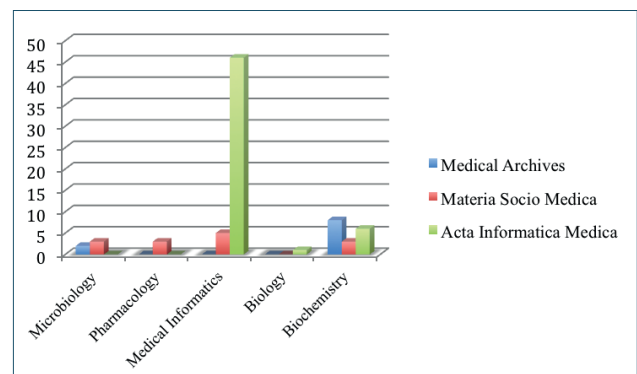


Figure 3. Representation of preclinical disciplines in three journals in year 2015 (Medical informatics is most frequent field)

	Medical Archives	Materia-Socio Medica	Acta Informatica Medica
BiH	49	38	25
Iran	16	36	31
Kosovo	19	7	4
Saudi Arabia	2	3	3
Albania	5	4	1
Turkey	4	-	3
R. Macedonia	3	1	3
Serbia	1	-	-
Jordan	2	-	1
Greece	2	5	1
Croatia	1	3	2
Sudan	-	1	-
China	-	1	-
India	-	-	2
Indonesia	-	-	3
USA	-	-	1
Slovenia	-	-	1
Belgium	-	-	1
Kuwait	-	-	1

Table 5. States from which the articles came from in 2015

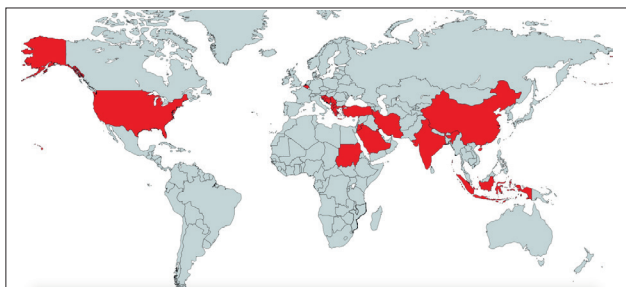


Figure 4. Map of countries from which the articles came from in year 2015 (19 countries, 4 continents)

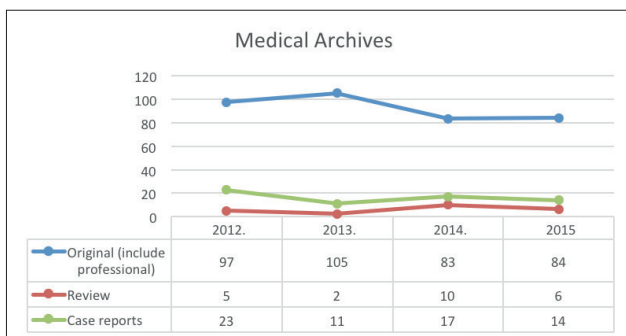


Figure 5. Distribution by type of article in Medical archives in the period 2012-2015

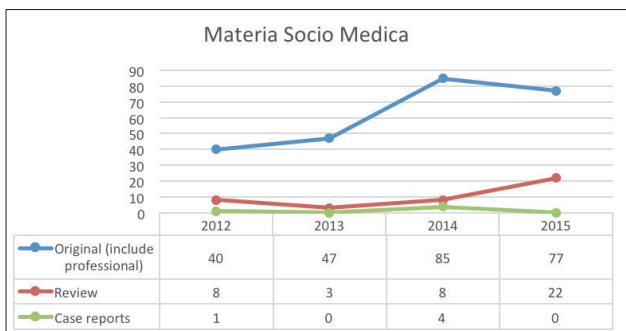


Figure 6. Distribution by type of article in Materia Socio-Medica in the period 2012-2015

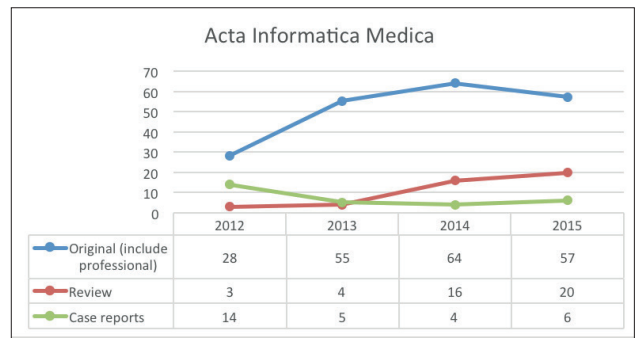


Figure 7. Distribution by type of article in the Acta Informatica Medica in the period 2012-2015

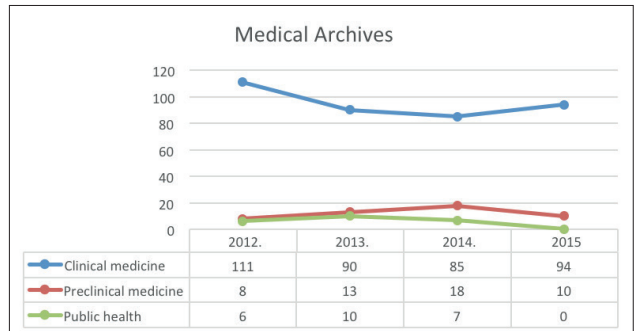


Figure 8. Representation of fields in Medical Archives during the period 2012-2015

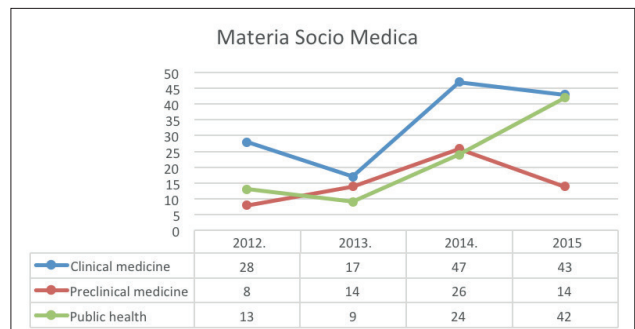


Figure 9. Representation of fields in the Materia Socio-Medica in the period 2012-2015

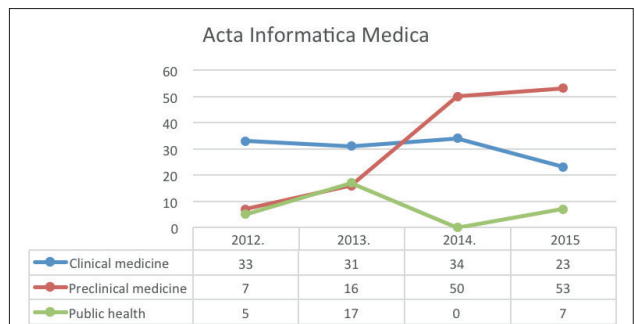


Figure 10. Representation of fields in the Acta Informatica Medica in the period 2012-2015

are well represented in other two journals through that period (Figure 6, Figure 7). Field of clinical medicine is most common in Medical archives (Figure 8). Clinical medicine is the most represented in the Materia Socio Medica, with year by year increase of total number of articles, and especially there is an increase in the number of articles in the field of public health (Figure 9). Preclinical fields, or basic medical sciences, are most common present in Acta Informatica Medica (Figure 10). Internal and surgical disciplines were

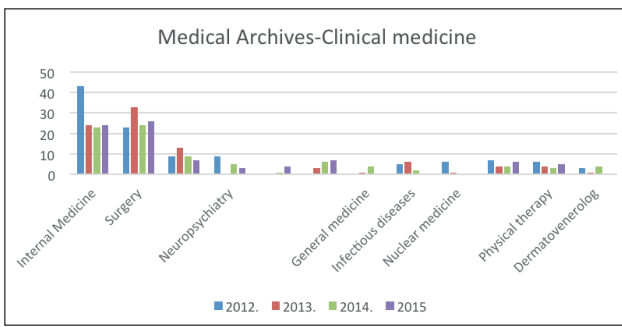


Figure 11. Clinical disciplines in Medical Archives in period 2012.-2015.

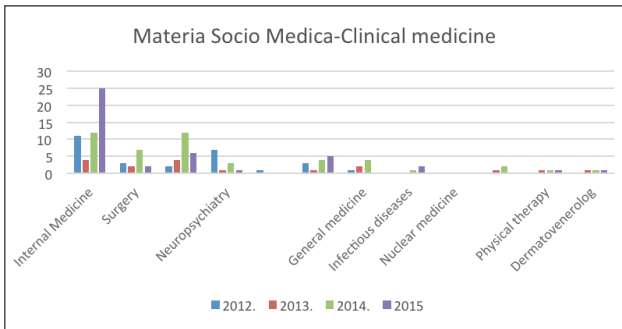


Figure 12. Clinical disciplines in Materia Socio-Medica in period 2012.-2015.

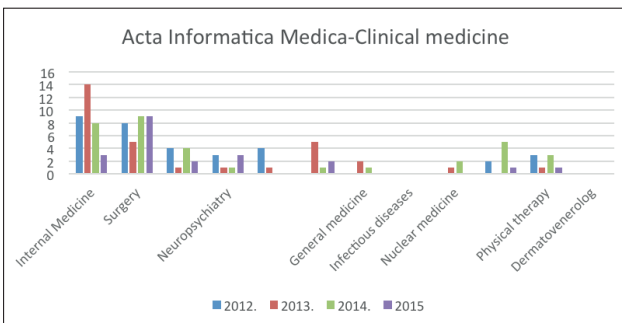


Figure 13. Clinical disciplines in Acta Informatica Medica in period 2012-2015

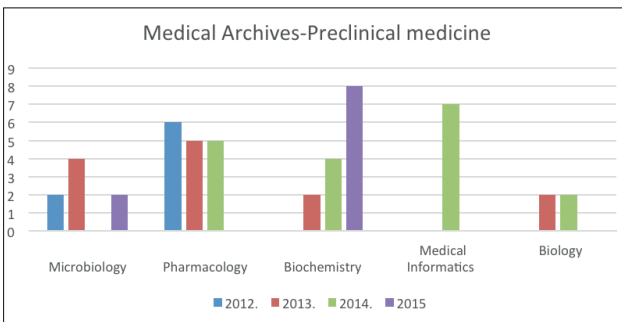


Figure 14. Preclinical disciplines in Medical Archives in period 2012-2015

the most represented in Medical Archive and Materia Socio Medica through all four years (Figure 11, Figure 12). Internal and surgical disciplines were most commonly present in the Acta Informatica Medica too (Figure 13). Area of biochemistry is mostly represented in Medical Archives in 2015, while the number of articles in the field of pharmacology is in decline (Figure 14). Through the years, Acta Informatica Medica is the biggest source of articles in the field of medical informatics (Figure 15). Medical informatics is also most common in Materia Socio-Medica, in last four years (Figure

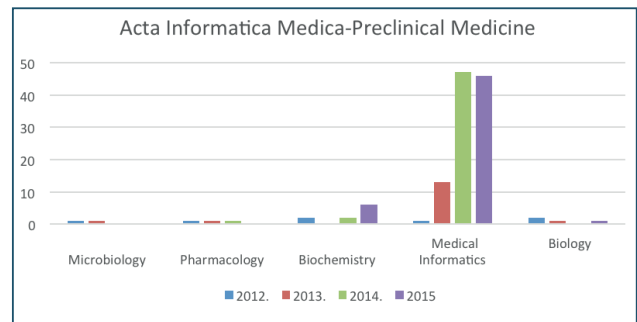


Figure 15. Preclinical disciplines in Acta Informatica Medica in period 2012-2015

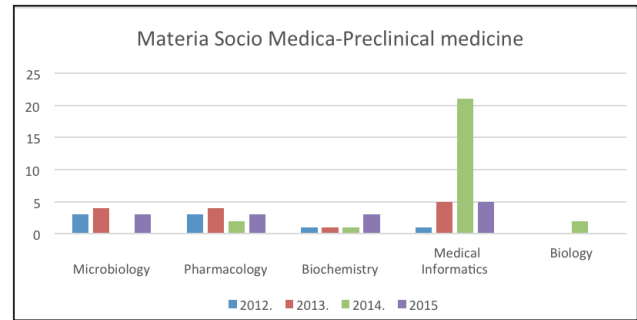


Figure 16. Preclinical disciplines in Materia Socio-Medica in period 2012-2015

	SCImago Journal Rank	H index	Cites / Doc. (2years)
Medical Archives	0,168	12	0,45
Acta Informatica Medica	0,166	6	0,70

Table 6. Comparison between Medical Archives and Acta Informatica Medica for 2014. (according to scimagojr.com)

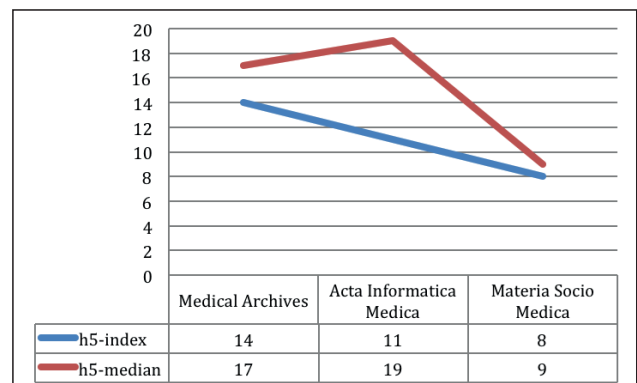


Figure 17. Google Scholar information about h5 index and h5 median for Medical Archives, Acta Informatica Medica and Materia Socio-Medica

16). According to scimagojr.com analysis for 2014, Medical Archives has higher SCImago Journal Rank (average number of weighted citations received in the selected year by the documents published in the selected journal in the three previous years) and H index then Acta Informatica Medica, while Acta Informatica Medica has higher Cites/Doc. (2years) parameter (average citations per document in a 2 year period-widely used as impact index) (Table 6). According to Google Scholar the highest h5 index (h-index for articles published in the last 5 complete years) has Medical Archives (14) (Figure 17), while the biggest h5 median (median number of citations for the articles that make up its h5-index) has Acta Informatica Medica (19) (Figure 17).

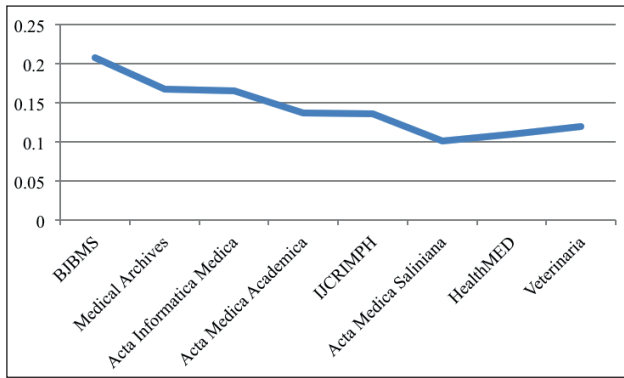


Figure 18. SCImago Journal Rank for B&H journals (according to scimagojr.com)

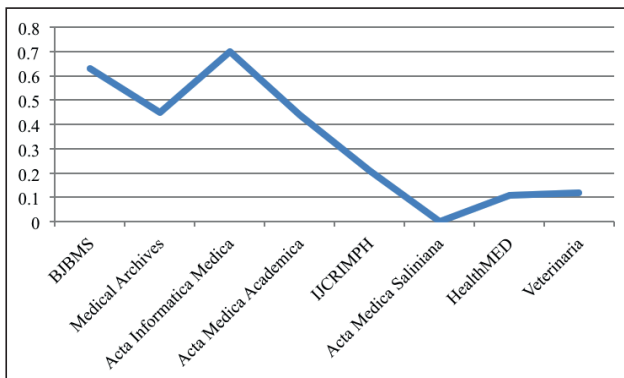


Figure 19. Cites / Doc. (2years) parameter for B&H journals (according to scimagojr.com)

5. CONCLUSION

Bosnia and Herzegovina is in Medline PubMed base represented with six journals, and only one of them is in the “Science Citation Index Expanded (SCIE)/Web of Science”.

In Medical Archives original articles in the field of clinical medicine (usually internal and surgical disciplines) are most often present, and that is the case in last four years. The number of articles in *Materia Socio Medica* and *Acta Informatica Medica* is growing from year to year. In *Materia Socio Medica* there is a trend of growth of articles in the field of public health, while the most common articles in *Acta Informatica Medica* are about medical informatics.

Articles came from 19 countries, four continents, and included a large number of interstate and regional cooperation.

The period of 50-60 days for a decision on the admission of article is the most common in all three journals, with trend of shortening of the period.

6. SCIENTOMETRIC ANALYSIS OF OTHER B&H MEDICAL JOURNALS

H index (the index that attempts to measure the productivity and impact of published work of scientists) of *Medical Archive* for 2014 is 12 (according to scimagojr.com), and is the highest among the journals in B&H (Figure 14) (1, 5, 8, 11). According to scimagojr.com for 2014, *BJBMS* has the biggest SCImago Journal Rank - average number of weighted citations received in the selected year by the documents published in the selected journal in the three previous years (0,208) (Figure 15), while the highest Cites/Doc. (2years) parameter (average citations per document in a 2 year period-widely used as impact index) has *Acta Informatica Medica* (0,70) (Figure 16). According to GoogleScholar the biggest h5 index (h-index for articles published in the last 5 complete years) has *BJBMS* and *Med-*

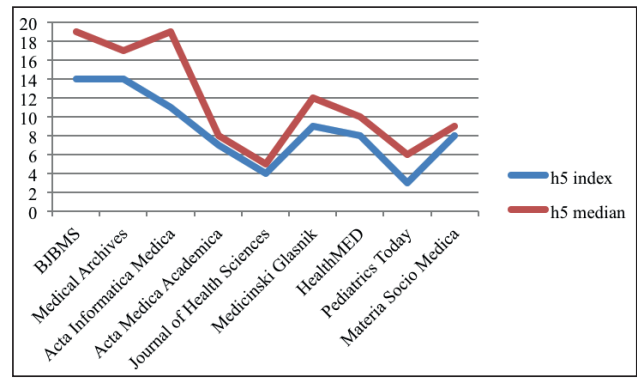


Figure 20. GoogleScholar information about h5 index and h5 median for B&H journals

Author	H-index	g-index
Azra Alajbegovic	9	12
Semir Beslija	6	19
Marko Buksa	4	7
Mirza Dilic	8	11
Vjekoslav Gerc	4	7
Mehmed Gribajcevic	2	2
Mirko Grujic	3	9
Zoran Hadziahmetovic	3	4
Almira Hadzovic Dzuvo	6	10
Kemal Dizdarevic	4	10
Muhidin Hamamdzic	2	2
Mirsada Hukic	9	19
Dzelaludin Junuzovic	4	7
Jasenko Karamehic	5	7
Abdulah Kucukalic	9	17
Mehmed Kulic	4	7
Lidija Lincender	4	5
Slobodan Loga	4	6
Farid Ljuca	8	14
Izet Masic	14	18
Bakir Mehic	3	4
Senka Mesihovic Dinarevic	3	6
Rusmir Mesihovic	6	9
Nedzad Mulabegovic	4	5
Snjezana Milicevic	3	5
Dragana Niksic	4	5
Ljerka Ostojic	12	16
Senija Rasic	3	4
Halima Resic	7	10
Nermin Salkic	6	10
Osman Sinanovic	11	19
Sekib Sokolovic	5	15
Emir Solakovic	3	5
Husref Tahirovic	9	15
Berislav Topic	5	8
Nenad Vanis	5	8
Semir Vranic	13	21
Enver Zerem	13	22

Table 9. Most prolific authors in B&H analyzed by Publish or Perish software (based on Google Scholar database)

ical Archives (14) (Figure 17), but the biggest h5 median (median number of citations for the articles that make up its h5-index) has *BJBMS* i *Acta Informatica Medica* (19) (Figure 17).

- Author's contribution: author and all co-authors of this paper have contributed in all phases if it's preparing. Final proof reading was made by first author.
- Conflict of interest: none declared.

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GENERAL INFORMATION

This year the MIE - Medical Informatics Europe conference is organized within a joint event of four scientific disciplines: Medical Informatics, Medical Biometry, Epidemiology and Health Data Management under the common title of HEC2016. HEC2016 represents the annual meetings of the European Epidemiological Federation of the International Epidemiological Association (IEA-EEF), of the German Society for Medical Informatics, Biometry and Epidemiology (GMDS), of the German Society for Epidemiology (DGEpi) and the principal annual conference of the European Federation for Medical Informatics (EFMI), the MIE. For the MIE2016 the conference language is English.

We invite you to make submissions for oral or poster contributions, workshops and panel discussions, to be presented at HEC2016. We invite submissions to all of the "classical" topics of Epidemiology, Biostatistics, Medical Informatics and Health Data Management. However, we also specifically welcome submissions on interdisciplinary approaches to managing complexity and big data in health, as well as on our three common core topics

- intersectoral health care (e.g. admission and discharge management, patient safety, smart housing),
- quality and performance indicators of health care (e.g. risk adjustment, pay for performance),
- populations in transition (e.g. demographic change, multimorbidity, migration).

For further information see the categories below or visit the HEC2016 main page: www.hec2016.eu

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