ORIGINAL PAPER

Meta-analysis as Statistical and Analytical Method of Journal's Content Scientific Evaluation

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ABSTRACT

Introduction: A meta-analysis is a statistical and analytical method which combines and synthesizes different independent studies and integrates their results into one common result. **Goal:** Analysis of the journals "Medical Archives", "Materia Socio Medica" and "Acta Informatica Medica", which are located in the most eminent indexed databases of the biomedical milieu. **Material and methods:** The study has retrospective and descriptive character, and included the period of the calendar year 2014. Study included six editions of all three journals (total of 18 journals). **Results:** In this period was published a total of 291 articles (in the "Medical Archives" 110, "Materia Socio Medica" 97, and in "Acta Informatica Medica" 84). The largest number of articles was original articles. Small numbers have been published as professional, review articles and case reports. Clinical events were most common in the first two journals, while in the journal "Acta Informatica Medica" belonged to the field of medical informatics, as part of pre-clinical medical disciplines. Articles are usually required period of fifty to fifty nine days for review. Articles were received from four continents, mostly from Europe. The authors are most often from the territory of Bosnia and Herzegovina, then Iran, Kosovo and Macedonia. **Conclusion:** The number of articles published each year is increasing, with greater participation of authors from different continents and abroad. Clinical medical disciplines are the most common, with the broader spectrum of topics and with a growing number of original articles. Greater support of the wider scientific community is needed for further development of all three of the aforementioned journals.
Key words: meta-analysis, content scientific evaluation, indexed journals.

1. INTRODUCTION

The decision making process is a process that happens in the mind of every man when choosing one of several possible options. In order to make the right decision we should look at all the positive and negative aspects of that decision, and in addition we need to look at all alternatives available to us. Also, in order to make the right decision, we must be able to predict the results of each decision (1-7).

There are different types of decisions and the different levels at which these decisions are made. In this article I will try to show what the levels are and how they differ from each other. Furthermore, the article is divided into three parts: introduction, main body and a conclusion. Levels of decision-making are: strategic (decisions about our lives, what can we learn or what methods to use to reach the knowledge that can produce cheap or expensive products); tactical (if our strategic decision was to become a lawyer, then the tactical decision was the choice of the school to attend and which books we read; if our company decided to produce a cheap product, it would be a tactical decision to build a new factory where we could produce with the lower cost) and the last is operational (or technical) level (if our tactical decision was to read the law books then our operational decision will be where to buy the books).

Man every day make a number of decisions concerning its everyday problems and as a member of the organizational system decides on the resolution of problems affecting the wider or narrower circle of other members of the system. We make our decisions every day, both in private and business life. It is important to make the right decisions because the consequences of bad decisions can be wrong for us, and for the people who surround us. We often hear how some private business run out of business as a result of poor decisions made by owners. It is important that the decision is taken at the right time and with as little risk as possible. Also, sometimes we need to repeatedly go back and re-examine the decision and then change it if necessary or adjust it to current conditions.

Decision-making is an integral and inherent part of the medical profession. Doctors always, as a part of their profession, have to make different decisions. Maybe it's just the most important medical decision-making task, because these decisions are directly related to the lives of their patients. In the remainder of this article I will try to show what is actually the decision making process and how it takes place in medicine, as well as what role has the computer in today's medicine.

Medical informatics is a scientific discipline that by using different analytical tools develops procedures (algorithms) for management, process control, decision support and scientific analysis of data in the field of medicine. 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. Medical informatics is a scientific discipline that studies the theoretical and practical legality of the organization and use of information in order to support problem-solving and decision-making in medicine and health care, with a high degree of computer technology use.

According to the recommendations of the International Association for Medical Informatics–IMIA, among the reasons why medical informatics is especially important in the education of medical doctors is stated:

To successfully keep pace with the growth rate of medical knowledge, it is necessary to use a new methodology using the data/information and modern information and communication technologies;

Health professional that has good knowledge about methods of medical informatics will be able to use high-quality medical information, and competently and responsibly use modern information and communication technology.

Modern medicine cannot be imagined without diagnostic devices, ranging from ultrasound, various variants of X-ray machines to the scanner and MRI devices. Information technology, of course, found its application also in this sphere of human activity. The use of computers and digital technology in medicine in the world is still a relatively new area and its development is still in full swing.

Computers in medicine and medical institutions (except for the purposes of scientific development and personal development) can be used in many ways. One of them, and probably the simplest and most widespread is the use of computers in administrative and evidential purposes. By this is meant the classic and specific financial and material accounting, patient records, medication, word processing, statistics, etc. Another way is to use a computer for diagnostic purposes, when the computer (equipped with the appropriate hardware and software) is used in conjunction with diagnostic devices. The third method is to use computers to communicate, usually using the internet as a medium.

Medical informatics is formally defined as "an area that deals with cognitive processing of information and business communication in medical practice, education and research, including the Information Science and Technology to support these operations." In this definition is evident multidisciplinary nature of the research and practice in medical informatics. Medical Informatics includes computer science, artificial intelligence, decision theory, statistics, cognitive science, information management, health policy and, of course, medical science. This interdisciplinary approach also requires that the systems must have a clinical or administrative application, which is characteristic of computer science.

Medical practice is based on efficient making of timely and proper medical decisions. So it is not surprising that the great efforts of medical informatics are focused on the problem of making medical decisions in an automated medical practice. Science automated decision making in medicine requires not only the use of advanced computer science and technology, but also the understanding of how people (clinicians) using information and intelligence with the aim of making decisions. Data with which the user has chosen must be of high quality to make high-quality decisions, and hence arise the need for data standards. Contemporary specialists must also have access to modern medical knowledge, and there is a great help that information systems and the Internet provide information. Doctors also make decisions using appropriate methods, to enable them to solve problems and transform information in making medical decisions. Most research on decision-making in medicine using a computer is just concentrated on automation and modeling of these methods for solving their problems.

Computers can help in the treatment of patients by supporting clinical decision making, but also in the treatment of patients groups by support to decision making on the choice of strategy. Clinical Decision Support System–CDSS are computer systems designed with the aim to assist medical staff in the decision making process at the time of their adoption. Their assistance is reflected in the application of new information specific to each patient, obtained by analyzing clinical variables, and that the system brings a responsible medical staff. Support is implemented at several levels–providing access to scientific publications, supply of guides and protocols, pointing to missed information and systematically structured database. Many studies have shown that the use of CDSS support improved prevention of disease by 50%, while the improvement is also observed in the treatment of disease, especially in the field of drugs dosing.

Sullivan and Mitchell say that today almost 90% of general practitioners in the UK use computers, where many computers are used only to make it easier to work in repeated prescribing of medications. However, for 55% of all doctors they are a source of valid information during the consultations, because they allow access to important clinical information. A study conducted by Walton et al showed that 88% of physicians reported that the CDSS systems are easy to use in practice. There is increasing evidence that computer support helps doctors to decide to prescribe better and cheaper medicines. Studies in the UK have shown that the use of computers in repeated prescribing save over one minute per recipe. It was also found 30% savings on the price of the drug, and the recipes are prescribed much more complete and more accurate–recorded an improvement of 53%.

It is clear that computer support improves prescribing in many different ways, including routine checking of potential interactions. It should be stressed that the CDSS systems can never take into account every circumstance of the patients, because they are designed to assist physicians in decision-making–not to decide for them. This doctor remains fully responsible for the decision made.

Medical knowledge doubles its volume every five years (1). Traditional methods of education cannot keep up with this pace of science development (1). When finding the evidence, physicians should possess effective skills of finding literature, as well as easy access to bibliographic databases (1). There are two databases. One allows users to identify relevant citations in the clinical literature, using Medline and variations, and the other allows direct access to primary or secondary publications, relating to relevant clinical evidence (Cochrane Database of Systematic Reviews, ACP Journal Club, Scientific American Medicine on CD-ROM) (1).

Evidence based medicine is the integration of clinical expertise, best available evidence in the decision making process related to health care, population and patient needs. Evidence based medicine is the most popular in the UK, Canada, and some to a lesser extent in Australia and other countries (1). Evidence based medicine can be applied whenever there is a dilemma in the treatment, diagnosis and other clinical issues related to health care (1).

1.1. Cochrane Database of Systematic Reviews

The Cochrane Collaboration is a unique global non-profit organization whose goal is to help clinicians to make informed decisions for all forms of medical assistance by preparing, maintaining and promoting the accessibility of systematic reviews of the effects of healthcare interventions (2). As the primary task of this organization places the desire to avoid duplication and encourage authors to produce the original articles. It also offers support to authors of original articles, protecting their interests. It was founded in 1993 and named after the British epidemiologist, Archie Cochrane. The main product of the Cochrane Collaboration is the Cochrane Library (Wiley). To access the required subscription (personal or institutional). Access is free for the world's poorest countries (Bosnia and Herzegovina among them). The Cochrane Library is a collection of databases that contain high-quality evidence for informed decision-making in health care (2). Cochrane systematic review articles represent the highest level of evidence for decision-making in clinical treatment.

System review is the literature review focused on one issue, which is trying to identify, evaluate, select and synthesize all high quality scientific evidence relevant to the question. System review articles of randomized controlled experiments are crucial for evidence based medicine. Understanding systemic review articles and how that can be implemented in practice today is necessary for all professionals working in health care. System review articles may contain meta-analysis, a statistical method that combines the results of multiple studies, but also there are systematic reviews in which the meta-analysis is not suitable for a variety of reasons (3). As in all research, the value of the system review articles depends on what is done, what was found and on the clarity of the display. Like other publications, display quality in systematic inspections varies, which limits the ability of readers to assess their strengths and weaknesses. The Cochrane Library contains the following resources:

- Cochrane Database of Systematic Reviews;
- Database of Abstracts of Review of Effects;
- Cochrane Central Register of Controlled Trials;
- Cochrane Methodology Register;
- Health Technology Assessment Database and
- National Health Service Economic Evaluation Database.

Every year in the database Journal Citation Reports monitors and calculates the factor of influence (impact factor) for the Cochrane Database of Systematic Reviews. For the year 2013 it amounted to 5,939 (ranked among the top ten journals in the category of Medicine, General and Internal).

Nearest Cochrane branch to Bosnia and Herzegovina is the one in Croatia (HCO). The process of creating a "Croatian Cochrane Network" started with the aim of spreading the principles of evidence-based medicine on Croatian territory and region.

1.2. Meta-analysis

Tina Hesman Saey in her paper "Repeat Performance - To many studies, when replicated, fail to pass muster" described that to many discrepancies in research results is sparking self-reflection among scientists. She has written about 12 reasons research goes wrong (1): a) Pressure to publish; b) Impact factor mania; c) Tainted cultures; d) Bad math; e) Sins of omission; f) Biology is messy; g) Peer review doesn't work; h) Some scientists don't share; i) Research never reported; j) Poor training produces sloppy scientists; k) Mistaken happen; and l) Fraud. Tina concluded in this review: "Researchers who make up data or manipulate it produce results no one can replicate" (1).

An important way of a studies review was a meta-analysis (1). Meta-analysis is a statistical and analytical method which combines and synthesizes different independent studies and integrates their results into a common result. If well designed and properly implemented it can be a very powerful tool for proving a hypothesis. It is based on strictly determined mathematical and statistical principles of critical analysis of medical data. If the results of a survey obtained the proper meta-analysis supervised by experts, are considered to be valid and there is no need for additional testing (4).

Meta-analysis refers to the analysis of the analyses (5). Glass used it for statistical analysis of a large collection of analysis results from individual studies for the purpose of integrating the results (6). A meta-analytical approach, which is described by Glass in 1981 requires:

- Finding study;
- Labeling study because of its importance;
- To describe the results on a common scale and;
- Use of statistical methods for connecting the importance of study and results.

Some studies have reported more than one result for the given areas. Some of these multiple results have resulted in the use of more than one experimental or control groups in individual studies. Using slightly different sizes of effect to represent the results from one area in one study seems inappropriate (1, 4).

The procedure which was adopted is to calculate one effect size for each area of each study (5). Meta-analysis is a statistical method to connect, create summaries and testing of existing quantitative research articles (6). Using meta-analysis can be explored a wide range of issues, as long as there is an acceptable amount of research articles. Selected portions of the primary studies are entered into a database and these meta-data are analyzed in a similar manner as is done with other types of data–the first descriptive, and then deduced that to test certain hypotheses.

A meta-analysis provides a systematic review of quantitative research which is processed by a particular question. The specificity of the meta-analysis is that it actually connects all researches a particular topic in one big study with the many participants involved. But there is a danger that when connecting a large set of different research design definitions become imprecise and it becomes difficult to meaningfully interpret the results. Of course, like any other research method, meta-analysis has its advantages and its disadvantages.

The advantage stands out in its objectivity, but as with any research, its value depends on the creation of certain qualitative explanations as well as the understanding of objective data (6). Meta-analysis is, for example, used to gain insights into:

- Overall effectiveness of the intervention (in psychotherapy, education);
- The relative impact of the independent variables (the effects of different types of therapy);

- Strength of relationship between variables.

Meta-analysis has become essential in understanding the large collection of literature or raw data which is sometimes conflicting, inconsistent or unclear on a subject and understanding the true importance of the statistical results in a scientific question, such as, for example, efficiency. We should not only understand the motivation for a meta-analysis, but the techniques used to summarize the results of different studies giving them appropriate statistical analysis and interpretation of results.

Studies that are investigating the role of an intervention, such as, for example, reducing the concentration of cholesterol and its impact on cardiovascular health address a similar question and if the results of these studies do not match, the role of meta-analysis to compare all the results and reach a definitive conclusion about the positive, negative or inconclusive impact on lowering lipid levels and cardiovascular health.

Presentation of approach to meta-analysis is valuable since in most cases it provides understanding of the statistical approaches, their meaning, purpose and ultimate impact on the interpretation of the meta-analysis.

1.3. Analyzed journals

During the writing of this article were included three journals, by publishing company "Avicenna", Sarajevo, Bosnia and Herzegovina. These journals are (7-14):
- Medical Archives;
- Materia Socio-medica;
- Acta Informatica Medica.

"Medical Archives" was founded in 1947 as a professional journal of the "Doctor's Association of Bosnia and Herzegovina". Most reviewers are from Bosnia and Herzegovina, but the considerable number from abroad (8, 11, 12). "Materia Socio Medica" was founded in 1978 under the name "Materia Socio Medica Iugoslavica" (9). The first edition of the journal "Acta Informatica Medica" appeared during the war in Bosnia and Herzegovina in 1993. Since 2006 is published in English only (10). Journal is published every two months, so that during 2014 was issued 18 numbers.

"Medical Archives" is indexed in the following databases: PubMed/MedLine, PubMed Central, Excerpta Medica/EM-BASE, Scopus, Scirus, EBSCO, DOAJ, Index Copernicus, Ulrich's Periodicals Directory, Geneva Foundation for Medical Education and Research–GFMER, HINARI, ProQuest, NewJour, SCImago Journal & Country Rank, ISC Master List Journals, CrossRef, Google Scholar, Genamics JournalSeek, WorldCat, VINITI of RAS, Research Gate, Catalyst, ScopeMed, SafetyLit, BioinfoBank Library, PubGet, GetCited, CIRRIE, Kubon and Sagner OPAC .

"Materia Socio-Medica" is indexed in the following databases: PubMed, PubMed Central, EBSCO, DOAJ, Index Copernicus, Ulrich's Periodicals Directory, Geneva Foundation for Medical Education and Research – GFMER, HINARI, ProQuest, NewJour, ISC Master Journals List, CrossRef, Google Scholar, Genamics JournalSeek, WorldCat, NLM Catalog, VINITI of RAS, Catalyst, SafetyLit, EastView and ScopeMed.

The journal "Acta Informatica Medica" is indexed in the following databases: PubMed, PubMed Central, Scopus, EMBASE, EBSCO, DOAJ, Index Copernicus, Ulrich's Pe-

riodicals Directory, Geneva Foundation for Medical Education and Research-GFMER, CAB Abstracts, Global Health, HINARI, ProQuest, NewJour, ISC Master List Journals, Genamics JournalSeek, WorldCat, NLM Catalog, VINITI of RAS, CrossRef, Google Scholar, Catalyst, DynaPresse, ScopeMed, Kubon and Sagner OPAC.

H index of the "Medical Archives" is 10, which represents the largest citation index journals of one journal in the biomedical field on the territory of Bosnia and Herzegovina (8, 11), and since this year, with full-text articles at PubMed Central, the most prominent database of biomedical literature, which contains more than 4,5 million articles.

2. MATERIAL AND METHODS

The study presents a meta-analysis of three journals, or their issues, during the calendar year 2014. Research had retrospective and descriptive character.

3. RESULTS

During calendar year 2014 was published a total of 291 articles (in the "Medical Archives" 110 (37.8%), in the "Materia Socio Medica" 97 (33.3%), and in the "Acta Informatica Medica" 84 (28.8%)). The largest number of articles was original articles. Small number has been published as professional and review articles, and case reports. Each issue contained the texts such as: news, book reviews, in memoriam and guidelines (both professional and educational).

Article type	MEDICAL ARCHIVES		MATERIA SOCIO-MEDICA		ACTA IN-FORMATICA MEDICA	
Original articles	78	70.9%	73	75.3	58	69.0
Professional articles	5	4.5%	12	12.4	6	7.2
Review articles	10	9.1	8	8.2	16	19.0
Case report	17	15.5	4	4.1	4	4.8
Total	110	37.8	97	33.3	84	28.8

Table 1. *Type and number of articles published in all three journals during 2014*

Original articles are in all three journals were the most common but there is still statistically significant difference in type of published articles among journals ($\chi2$ = 15.745, p = 0.015).

Clinical medicine	MEDICAL ARCHIVES		MATERIA SOCIO-MEDICA		ACTA IN-FORMATICA MEDICA	
Internal medicine	23	27 %	12	25,5 %	8	23,5%
Surgery	24	28,2 %	7	14,8 %	9	26,4 %
Gynecology	9	10,5 %	12	25,5 %	4	11,7 %
Neuropsychiatry	5	5,8 %	3	6,3 %	1	2,9 %
ORL	1	1,17 %	0	0,0 %	0	0,0 %
Pediatrics	6	7,05 %	4	8,5 %	1	2,9 %
Family medicine	4	4,7 %	4	8,5 %	1	2,9 %
Infectious diseases	2	2,3 %	1	2,1 %	0	0,0 %
Nuclear medicine	0	0,0 %	0	0,0%	2	5,8 %
Ophthalmology	4	4,7 %	2	4,2 %	5	14,7 %
Physical therapy	3	3,5 %	1	2,1 %	3	8,8 %
Dermatovenerology	4	4,7 %	1	2,1 %	0	0,0 %
Total	85	100 %	47	100 %	34	100 %

Table 2. *Fields of clinical medicine covered in the articles during 2014*

The most common articles were published in the field of clinical medicine, and to a lesser extent in the field of pre-

clinical medicine and public health (Table 2). The articles in the field of public health represented articles in the field of epidemiology.

Field	MEDICAL ARCHIVES		MATERIA SOCIO-MEDICA		ACTA IN-FORMATICA MEDICA	
Clinical medicine	85	77.3	47	48.5	34	40.5
Preclinical medicine	18	16.4	26	26.8	50	59.5
Public health	7	6.3	24	24.7	0	0.0
Total	110	37.8	97	33.3	84	28.8

Table 2. *Total number of scientific articles (by field) during 2014*

In all three journals, articles in the field of clinical medical disciplines were the most common, but there are still significant differences between observed years ($\chi2$ = 8.0395; p = 0.0001).

The most frequently published articles, in clinical medical field, were from internal and surgical areas (Table 3) without significant difference between journals (χ^2=20.388; p=0.311). Table 4 shows the fields of preclinical medical disciplines, which were represented in the published articles, with statistically difference among journals (χ^2=17.000; p=0.009).

Preclinical medicine	MEDICAL ARCHIVES		MATERIA SOCIO-MEDICA		ACTA IN-FORMATICA MEDICA	
Microbiology	0	0,0 %	0	0,0 %	0	0,0 %
Pharmacology	5	27,7%	2	7,6%	1	2,0%
Biochemistry	4	22,2%	1	3,8%	2	4,0%
Medical Informatics	7	38,8%	21	80,7%	47	94%
Biology	2	11,1%	2	7,6%	0	0,0 %
Total	18	100%	26	100%	50	100%

Table 4. *Fields of preclinical medicine covered in the articles during 2014*

Table 5 shows the time that was needed for the review of the article, from the date when the article was accepted, up to the date when the article was published (usually 50-59 days) with statistically significant difference among journals (χ^2=32.661; p=0.018).

Time in days	MEDICAL ARCHIVES	MATERIA SOCIO- MEDICA	ACTA INFORMATICA MEDICA
10-19 days	11	1	5
20 -29 days	12	1	8
30-39 days	10	3	6
40 − 49 days	6	15	13
50 − 59 days	17	21	10
60 − 69 days	17	13	5
70 − 79 days	7	18	17
80 − 89 days	12	9	10
90 − 99 days	7	5	1
› 100 days	11	11	9

Table 5. *The time range from the moment of acceptance to the time when the article was published in 2014*

For the review of the articles a little bit more often it was necessary more than two months. Articles were submitted from 27 countries, mostly from the Bosnia and Herzegovina, then from Iran, Kosovo and Macedonia (Table 6). There were represented four continents (Europe, Asia, Africa and America).

In the journal "Medical Archives" number of articles published each year is approximately the same (Figure 1) but with statistically significant variations in article types (χ^2=15.332; p=0.018), while the number of articles published in the other

State	MEDICAL ARCHIVES	MATERIA SOCIO-MEDICA	ACTA IN-FORMATICA MEDICA
Bosnia & Herzegovina	62	34	28
Iran	12	22	22
Kosovo	12	11	4
Croatia	1	1	1
Turkey	6	3	3
USA	0	0	4
Egypt	2	1	0
Albania	6	8	1
Macedonia	3	7	3
Sudan	1	0	0
China	0	2	0
India	1	0	2
Greece	0	2	4
Germany	1	0	1
France	0	0	1
Japan	0	1	0
Slovenia	0	0	1
Brazil	0	0	1
Saudi Arabia	1	2	0
Sweden	0	1	1
Netherlands	0	1	2
Lebanon	1	0	0
Mexico	1	0	0
Jordan	0	0	1
Poland	0	0	1
United Kingdom	0	0	1
Romania	0	0	2
Total	110	98	84

Table 6. *State of articles origin published during 2014*

two journals, year after year tends to increase (Figure 2 and 3) without statistically significant difference in case of Materia Socio Medica (χ^2=6.341; p=0.386) and statistically significant
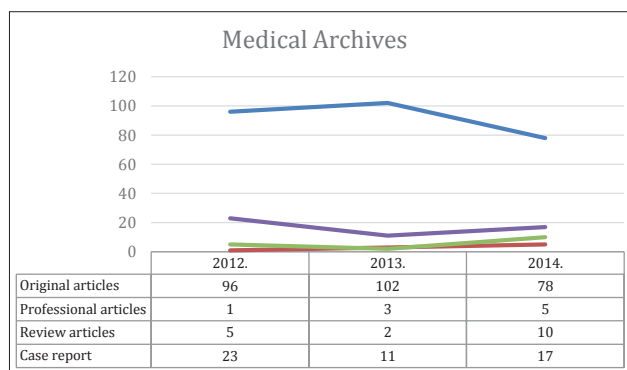

Medical Archives			
	2012.	2013.	2014.
Original articles	96	102	78
Professional articles	1	3	5
Review articles	5	2	10
Case report	23	11	17

Figure 1. *"Medical Archives" in the period 2012–2014*

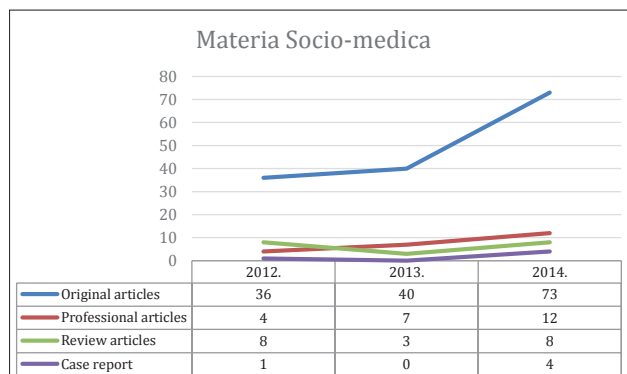| Materia Socio-medica			
	2012.	2013.	2014.
Original articles	36	40	73
Professional articles	4	7	12
Review articles	8	3	8
Case report	1	0	4

Figure 2. *"Materia Socio Medica" in the period 2012–2014*

difference in case of Acta Informatica Medica (χ^2=22,681; p=0,009). In all three journals, original articles, during the period from 2012 to 2014 are the most common.

In the journal "Medical Archives" during the last three years were most common articles in the field of clinical medi-
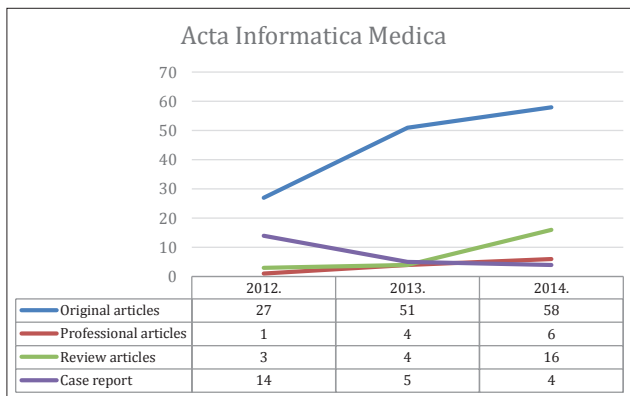
	2012.	2013.	2014.
Original articles	27	51	58
Professional articles	1	4	6
Review articles	3	4	16
Case report	14	5	4

Figure 3. *"Acta Informatica Medica" in the period 2012–2014*

cine. There has been an upward trend in the number of articles in the field of preclinical medicine (Figure 4) but without significant difference in the observed period (χ^2=7.761; p=0.185).

In the journal "Materia Socio Medica" during the last three years was usually published articles in the field of clinical

	2012.	2013.	2014.
Clinical medicine	111	90	85
Preclinical medicine	8	13	18
Public health	6	10	7
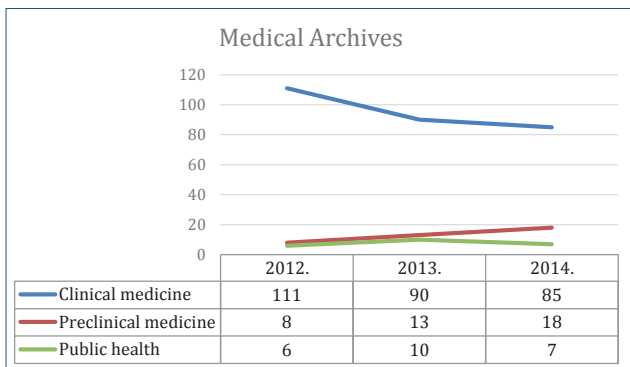
Figure 4. *Field in which are published articles in the journal "Medical Archives" in the period 2012–2014*

medicine. There has been an upward trend in the number of articles in the field of preclinical medicine and public health (Figure 5) also without significant difference (χ^2=6.84; p=0.145).

The journal "Acta Informatica Medica" during 2013 and 2014 mostly contained articles in the field of clinical medicine, while in 2014 were most often published articles in the

	2012.	2013.	2014.
Clinical medicine	28	17	47
Preclinical medicine	8	14	26
Public health	13	19	24
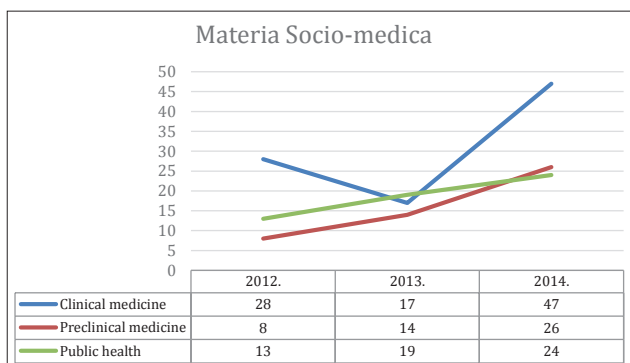
Figure 5. *Field in which are published articles in the journal "Materia Socio Medica" in the period 2012–2014*

field of clinical medicine, specifically in the field of medical informatics (Figure 6), with a particular increase in the number of articles in telemedicine, which represents the direction of development of modern medicine and with significant difference in the observed period (χ^2=47.961; p=0.0001).

From the clinical medical field over the past three years, in the journal "Medical Archives" were usually presented ar-

	2012.	2013.	2014.
Clinical medicine	33	31	34
Preclinical medicine	7	16	50
Public health	5	17	0
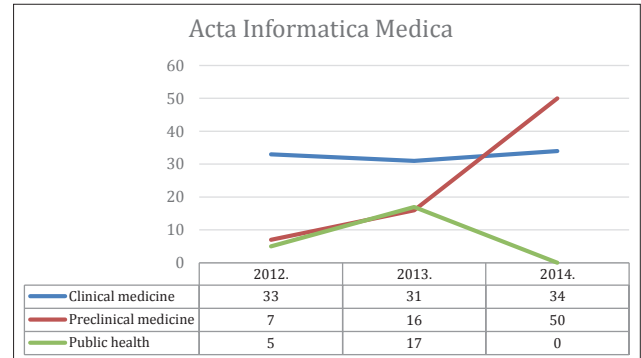
Figure 6. *Field in which are published articles in the journal "Acta Informatica Medica" in the period 2012–2014*

ticles of general internal and surgical disciplines (Figure 7). There has been an increase in the number Article in the field of family medicine and dermatovenerology, but without statistically significant difference (χ^2=27.847; p=0.064).

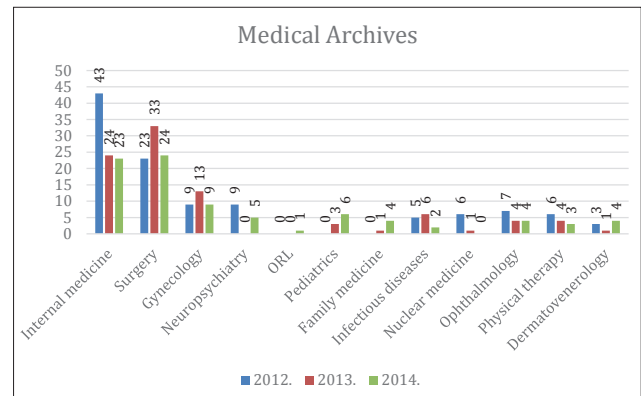From the domain of clinical medical field over the past three years, in the journal "Materia Socio Medica" usually

Figure 7. *Representation of clinical disciplines in the journal "Medical Archives" in the period 2012–2014*

was presented articles of general internal discipline (Figure 8).

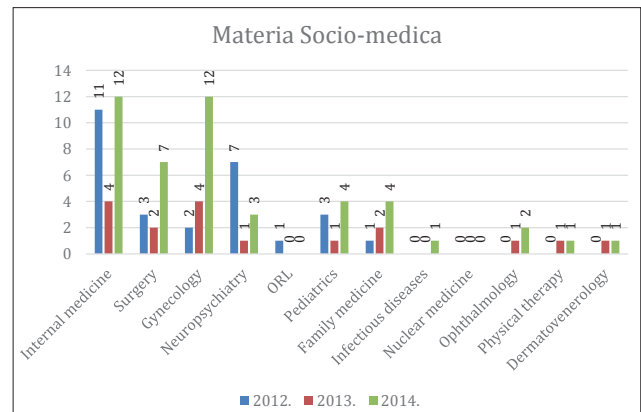Articles in gynecology is constantly growing, and the

Figure 8. *Representation of clinical disciplines in the journal "Materia Socio Medica" in the period 2012–2014*

number of Article on family medicine, but still does not represent a statistically significant increase χ²=7.664; p=0.906).

From the domain of clinical medical field over the past three years, in the journal "Acta Informatica Medica" usually was presented articles of general internal and surgical disciplines (Figure 9). There has been an increase in published articles in the field of ophthalmology which represents a statistically significant difference (χ^2=29.678; p=0.041).

Preclinical Medicine in the journal "Medical Archives" was most often represented by the articles in the field of pharma-
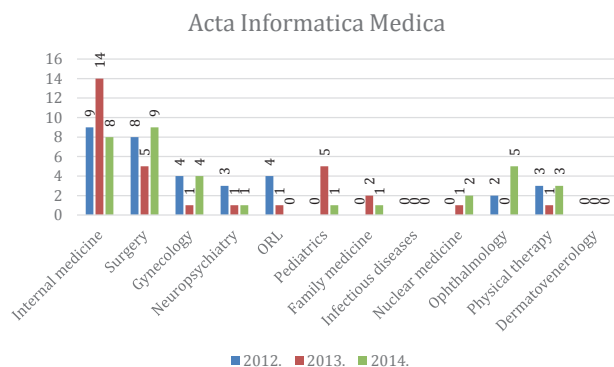
Figure 9. *Representation of clinical disciplines in the journal "Acta Informatica Medica" in the period 2012–2014*
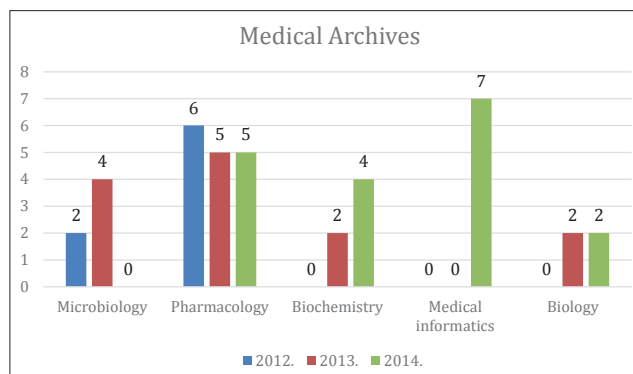
Figure 10. *Representation of preclinical disciplines in the journal "Medical Archives" in the period 2012–2014*

cology and biochemistry. In 2014, in the journal were present also articles in the field of medical informatics (Figure 10) but without significant differences between observed years (χ^2=11.35; p=0.182).

In the domain of preclinical medical field over the past three years in the journal "Materia Socio Medica" usually was
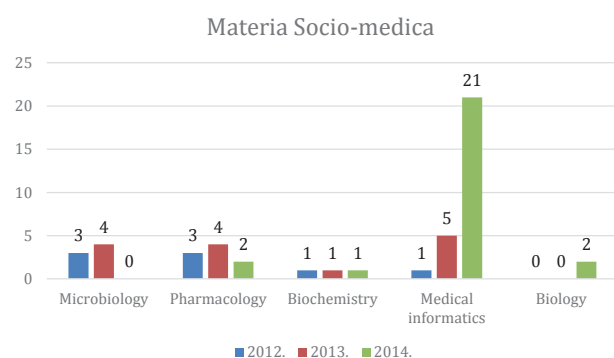
Figure 11. *Representation of preclinical disciplines in the journal "Materia Socio Medica" in the period 2012–2014*

presented articles in medical informatics (Figure 11). Pharmacology is the second most frequent field. Statistical analysis indicate that there is no significant difference in the observed period (χ^2=13.041; p=0.110)

Articles in the field of medical informatics in "Acta Informatica Medica" were most numerous in the past three years (Figure 12) with statistically significant increase during the observed period (χ^2=32.976; p=0.006).
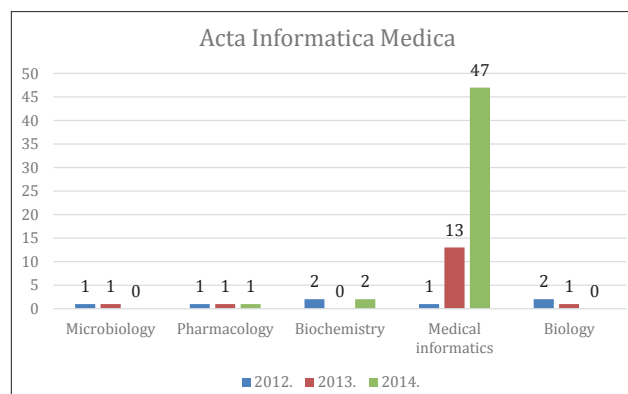
Figure 12. *Representation of preclinical disciplines in the journal "Acta Informatica Medica" in the period 2012–2014*

4. CONCLUSION

By exploring and analyzing the structure and scientific content of three medical journals in Bosnia and Herzegovina published during the years 2012 to 2014, the authors of this study came to the following conclusions:

- Meta-analysis is a powerful biostatistical tool in scientific research;
- The number of articles published each year is increasing, with a larger number of authors from many countries and four continents (usually Europe); Rejection rate was between 34 and 42 %;
- There is a trend to join forces in terms of regional cooperation when writing articles;
- The most common are the original articles;
- The areas of clinical medicine are still the most common in journals (number of articles in the field of radiology, gynecology and ophthalmology are increasing);
- Preclinical disciplines were most often represented within the articles in the field of medical informatics;
- All three journals have a strong scientific foundation and need the support of the wider scientific community for further development;
- Most reviewers of articles are from Bosnia and Herzegovina, but there is also a considerable number from abroad;
- The most common period which is necessary for the review was between fifty and fifty nine days;
- Most authors are from the territory of Bosnia and Herzegovina, Iran, Kosovo and Macedonia;
- During the year 2014 4 cases of plagiarism were discovered (in Medical Archives 3 and in Materia Socio-Medica 1 case (two from Egypt, one from Bosnia and Herzegovina and one from Turkey) (12, 13).

CONFLICT OF INTEREST: NONE DECLARED

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