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Country Rank, Journal Rank and H-Index in the Field of Medicine in the Republic of Macedonia (1996-2008) Using Data from *SCImago*

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Key words: scientific papers; citation metrics; country rank; journal rank; H-index; SCImago indicator; Republic of Macedonia.

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Abstract

Aim. The aim of this study was to present the country rank, journal rank and H-index in the field of medicine in the Republic of Macedonia (1996-2008) using data from *SCImago Journal & Country Rank (SCImago)*.

Material and Methods. *SCImago* database was used for analysis of country rank, journal rank and H-index in the Republic of Macedonia and other former Yugoslav countries (Slovenia, Croatia, Serbia, Bosnia and Herzegovina, and Montenegro) for the period of 1996-2008, as they are presented in the Scopus database.

Results. Of a total number of 222 countries for the period of 1996-2008, the Republic of Macedonia with H-index of 20 is placed on the 118th position of the country rank, the percentage of citable documents in the field of medicine is 88.92%, and the percentage of relative production of documents in the world is below 0.01. In 2008, Macedonian biomedical journal Prilozi is ranked on the 2484th place with 0.048 SJR of citable documents in the last three years. The biggest H-index of 10, for the period between 2007and 2008, in the Republic of Macedonia had nephrology subject category, followed by medicine (miscellaneous) with H-index of 7, haematology and endocrinology, diabetes and metabolism with H-index of 6, transplantation, oncology and pathology and forensic medicine with H-index of 5.

Conclusion. There is only one Macedonian biomedical journal (Prilozi, Macedonian Academy of Sciences and Arts, Section of Biological and Medical Sciences) included in the Scopus database for the period between 1996 and 2008, probably by mistake in the list of journals from Serbia, instead from the Republic of Macedonia. The priority task of the Editorial Boards of other Macedonian medical journals is to include their journals in the Scopus database.

Introduction

Documents (papers) in medical sciences are deposited in several secondary scientific databases with an aim to increase the availability of the scientific information to end users (scientists, scientific institutions, pharmaceutical companies and similar). The most known and the oldest scientific database of medical information is Medline (PubMed) [1], but several other databases have also been created - Web of Sciences, Scopus, Google Scholar [2-5], EMBASE [6], EBSCO [7], CAB abstracts [8], Index Copernicus [9], and others.

Medical journals, presenting primary scientific information, intend to be included in all medical scientific databases as well as to be cited as much as possible in order to increase the quality and quantity of the published scientific papers. Only three Macedonian medical journals

have been indexed in Medline/PubMed (*Maked Med Pregl, God zb Med fak Skopje*, and *Prilozi*) and only one is currently indexed in Index Copernicus (*Maced J Med Sci*). Macedonian medical journals have very limited scientific influence and their Editorial Boards are obliged to improve the quality of their published manuscripts, and to adhere to international standards for scientific journals, which will result in their greater visibility and scientific influence [10].

Twelve institutes at the Faculty of Medicine in Skopje, Republic of Macedonia with 140 authors were analysed with *Harzing's Publish or Perish* software for their current scientific impact (August, 2009) [11]. One hundred thirty nine members of the academic staff employed at the institutes, Faculty of Medicine in Skopje, Republic of Macedonia were analysed with *Harzing's Publish or Perish* software for their current individual scientific impact (October, 2009) [12].

These and other papers [13,14] have so far provided a series of reviews on the state of the current Macedonian biomedical science, via extensive analysis of the research publications arising from the Faculty of Medicine, University of Ss Cyril and Methodius in Skopje. The information contained in these studies should not be considered as a criticism of the current state of the Macedonian biomedical science, but as an audit describing the current state, as well as providing some solutions how to overcome the latter [15].

Scopus is the largest abstract and citation database of peer-reviewed literature and quality web source with smart tools to track, analyze and visualize research. It's designed to find the information that scientists need. Quick, easy and comprehensive, Scopus provides superior support of the literature research process [2-4].

The *SCImago Journal & Country Rank (SCImago)* is a portal that includes the journals and country scientific indicators developed from the information contained in the Scopus® database (Elsevier B.V.). These indicators can be used to assess and analyze scientific domains. This platform got its name from the SCImago Journal Rank (SJR) indicator, developed by SCImago from the widely known algorithm Google PageRank™ [16]. This indicator shows the visibility of the journals contained in the Scopus® database since 1996.

The aim of this study was to present the country rank, journal rank and H-index in the field of medicine in the Republic of Macedonia (1996-2008) using data from *SCImago* [17].

Material and Methods

SCImago Journal & Country Rank

SCImago Journal & Country Rank database was used for analysis of country rank, journal rank and H-index in the Republic of Macedonia and other former Yugoslav countries (Slovenia, Croatia, Serbia, Bosnia and Herzegovina, and Montenegro) for the period between 1996 and 2008, as they are presented in the Scopus database [2-4,17].

The search was performed (April 4, 2010) in the official Web site provided by the SCImago journal and country rank Web site, and developed by the SCImago research group [17]. Country ranks were customized by ranking criterium of H-index. The Republic of Macedonia was analyzed separately. Ranking and filtering options include: Scopus® Subject Areas and Subject Categories - Journals are assigned to 27 major thematic categories as well as to 313 specific subject categories according to Scopus® Classification; Region - ten Major World Regions in which the world was splited to facilitate sectorial analyses; Year - Source year for obtained values; Order by - the result set can be ranked by Cites per document (2 years), H index, Documents, Citable Documents and Total Cites.

Journal sets listed in rankings from the former Yugoslav countries were filtered and ranked by SJR (SCImago Journal Rank) indicator.

The definition of the terms

Documents - Amount of documents published during the selected year. It is usually called the country's scientific output;

Citable Documents - Selected year citable documents. Exclusively scientific articles and reviews are considered;

Cites - Amount of citations of all data received by the documents published during the source year, —i.e. citations in years X, X+1, X+2, X+3... to documents published during year X. Thus, all published documents during the period 1996-2008, are taken into consideration;

Self Cites - Country self-citations. Amount of self-citations of all datq received by the documents published during the source year, —i.e. self-citations in years X, X+1, X+2, X+3... to documents published during year X. Thus, all published documents during the period 1996-2008, are taken into consideration;

Cites per Document - Average citations (of all times) per document published during the source year, —i.e. citations in years X, X+1, X+2, X+3... to documents published during year X. Thus, all published documents during the period 1996-2008, are taken into consideration;

H index - The h index is a country's number of articles (h) that have received at least h citations. It quantifies both country scientific productivity and scientific impact and it is also applicable to scientists, journals, etc. [18-20];

SJR (SCImago Journal Rank) indicator - It expresses the average number of weighted citations received in the selected year by the documents published in the selected journal in the three previous years, —i.e. weighted citations received in year X to documents published in the journal in years X-1, X-2 and X-3 [21]

Self Cites per Document - Average country's self-citations (of all times) per document published during the source year, —i.e. self-citations in years X, X+1, X+2, X+3... to documents published during year X;

Non-citable Documents (Available in the graphics) - Non-citable documents ratio for the period taken into consideration;

Cited Documents (Cited Doc.) - Amount of documents cited at least once;

Uncited Documents (Uncited Doc.) - Amount of uncited documents, i.e. documents that have never been cited;

% International Collaboration - Document ratio whose affiliation includes more than one country address;

% Region - Country relative contribution to regional publication output;

% World - Country relative contribution to world publication output.

Results

Country Rank

Country rankings in the field of medicine (April 4, 2010) in SCImago journal and country rank database ordered by H-index, for the analyzed period (1996-2008) are shown in Table 1.

Of a total number of 222 countries, the Republic of Macedonia with H-index of 20 is placed on the 118th position. For the period between 1996 and 2008, 406 documents are deposited in Scopus database, of which 361 documents are citable. Of the 2,000 citations, 116 are self-citations with 5.77 citations per document (Table 1).

From the former Yugoslav countries, Slovenia is on the 48th position with H-index of 60 and Croatia on the 52nd position with H-index of 53. The rest of the former Yugoslav countries are ranked below the Republic of Macedonia: Bosnia and Herzegovina on the 135th position with H-index of 16; Serbia on the 153rd position with H-index of 13; and Montenegro on the 209th position with H-index of 2 (Table 1). The ranking of the former Yugoslav countries according the other parameters is little different and should be taken into account.

Table 1: Country rankings in subject field of medicine between 1996 and 2008 in SCImago journal and country rank database, ordered by H-index (April 4, 2010).

	Country	H index	Documents	Citable documents	Citations	Self-Citations	Citations per Document
1	United States	686	1,249,462	1,091,307	21,545,323	10,429,616	18.33
2	United Kingdom	436	375,099	302,540	5,341,629	1,284,907	15.13
3	Canada	375	154,212	135,678	2,582,152	441,563	18.89
4	Germany	364	303,493	266,911	3,594,608	906,989	12.31
5	France	356	208,165	179,015	2,438,178	486,629	12.01
6	Italy	333	187,390	166,756	2,246,743	446,968	12.77
7	Netherlands	325	111,103	99,432	1,925,982	332,131	19.01
8	Sweden	278	70,457	65,177	1,267,870	200,233	18.8
9	Japan	275	278,570	264,161	2,711,586	741,030	9.69
10	Switzerland	273	68,922	60,933	1,060,037	126,494	16.55
11	Australia	267	113,589	96,734	1,472,922	274,851	14.69
12	Belgium	253	55,136	49,208	843,656	104,613	16.28
13	Spain	244	127,422	108,542	1,075,971	230,548	9.23
14	Denmark	229	37,660	33,959	667,990	91,637	18.79
15	Finland	226	31,884	30,129	653,376	87,839	21.22
16	Israel	193	43,000	38,931	529,605	65,644	13.15
17	Austria	184	42,247	37,369	530,896	66,569	13.2
18	Norway	181	26,784	24,304	406,564	53,707	16.48
19	New Zealand	153	19,686	16,750	247,559	30,286	14.57
20	Brazil	145	57,370	53,305	361,752	91,221	7.75
21	Ireland	140	15,850	13,559	196,450	15,834	14.71
22	Poland	138	39,764	37,957	212,578	36,576	6.18
23	Greece	136	33,217	29,673	271,456	41,735	9.72
24	Hong Kong	136	20,670	18,278	229,071	36,251	12.42
25	Taiwan	132	44,603	42,056	340,902	64,877	8.92
26	China	126	110,468	108,089	365,736	111,182	5.46
27	South Korea	119	41,275	39,424	313,516	47,983	10.1
28	South Africa	112	16,162	13,360	148,079	23,619	10.21
29	Portugal	110	10,817	9,849	99,112	11,662	10.57
30	Argentina	109	14,281	13,161	124,203	15,761	9.2
31	Czech Republic	107	20,727	19,403	108,813	17,863	5.44
32	Hungary	105	13,160	12,087	121,476	14,070	10.07
33	India	104	68,787	57,872	282,276	76,083	4.93
34	Singapore	101	13,137	11,796	121,801	14,338	10.54
35	Mexico	100	17,025	15,855	123,057	20,044	7.84
36	Turkey	96	72,156	64,892	302,290	61,179	5.14
37	Russian Federation	95	13,199	12,840	81,156	11,563	6.17
38	Thailand	90	12,725	12,168	90,295	15,139	8.13
39	Iceland	84	1,637	1,520	40,282	2,292	27.14
40	Chile	84	7,182	6,737	61,234	7,939	9.88
41	Saudi Arabia	68	9,892	8,928	52,408	6,514	5.45
42	Puerto Rico	68	1,226	1,146	24,095	1,059	23.56
43	Kenya	68	2,091	1,901	30,813	5,446	18.31
44	Colombia	65	3,863	3,594	26,963	2,947	9.7
45	Venezuela	64	3,163	2,947	25,224	3,021	9.57
46	Slovakia	63	5,337	4,893	28,435	3,596	5.44
47	Egypt	63	6,948	6,538	43,025	4,627	7.49
48	Slovenia	60	4,452	4,159	33,714	4,625	8.42
49	Uganda	60	1,462	1,289	20,850	3,255	19.47
50	Viet Nam	55	1,274	1,195	17,271	1,872	16.52
51	Tanzania	55	1,353	1,247	15,830	2,878	15.19
52	Croatia	53	8,616	8,096	34,669	7,182	4.58
53	Philippines	53	1,345	1,275	15,271	1,147	13.09
54	Estonia	51	1,474	1,410	18,401	1,775	13.89
55	Peru	51	1,347	1,244	15,078	1,625	14.52
56	Romania	51	3,033	2,815	17,247	936	5.96
57	Gambia	50	523	451	10,706	1,007	22.85
58	Uruguay	50	1,268	1,150	13,287	1,490	12.19
59	Iran	49	12,889	12,032	35,287	9,752	5.57
60	Malaysia	49	5,014	4,584	21,872	2,592	5.66
61	Cuba	48	6,346	5,993	16,560	4,639	3.06
62	Lebanon	48	3,244	2,798	18,517	1,736	7.25
63	Bulgaria	48	5,332	5,046	19,950	1,892	3.78
64	Costa Rica	48	732	694	12,341	1,131	19.28
65	Pakistan	48	7,442	6,618	23,856	5,621	3.8
66	Malawi	48	899	786	11,528	1,766	16.5
67	Nigeria	44	5,175	4,848	20,483	4,628	5.55
68	Indonesia	44	1,402	1,335	11,821	1,199	9.53
69	Bangladesh	44	1,993	1,834	13,799	2,437	7.53
70	Ukraine	42	1,417	1,377	9,514	1,130	6.98

Continue ...

Table 1: Continue from previous page

	Country	H index	Documents	Citable documents	Citations	Self-Citations Document	Citations per
71	Lithuania	42	1,170	1,111	11,664	696	14.15
72	Luxembourg	42	617	558	6,954	298	13.66
73	Senegal	41	1,135	999	8,471	1,140	7.85
74	Tunisia	41	5,190	4,798	15,576	2,112	3.79
75	Ghana	40	935	868	8,643	1,123	11.7
76	Côte d'Ivoire	39	919	850	7,792	1,010	9.01
77	Zimbabwe	39	1,131	1,052	9,520	1,011	8.6
78	Cameroon	38	894	829	8,065	1,266	10.53
79	Kuwait	38	2,441	2,315	13,651	1,663	6.02
80	Zambia	38	570	501	6,730	871	14.81
81	United Arab Emirates	37	2,124	1,883	11,149	1,082	5.92
82	Latvia	37	409	395	7,026	274	18.39
83	Nepal	37	1,641	1,397	7,693	1,028	6.45
84	Ethiopia	35	941	899	6,885	1,030	9.29
85	Jordan	35	2,104	2,007	9,214	850	5.1
86	Jamaica	35	1,078	963	8,236	1,097	9.67
87	Morocco	35	3,884	3,511	10,869	1,379	3.08
88	Ecuador	34	767	700	5,315	618	7.67
89	Panama	34	251	228	4,404	334	22.46
90	Belarus	32	669	652	4,978	739	7.93
91	Burkina Faso	32	691	634	5,144	845	7.99
92	Sri Lanka	31	996	830	5,917	743	7.87
93	Guatemala	29	391	358	3,746	211	10.8
94	Malta	28	392	347	4,408	192	13.41
95	Papua New Guinea	28	401	375	3,786	515	9.54
96	Georgia	28	450	421	3,482	136	8.96
97	Gabon	28	335	295	3,893	402	12.15
98	Dominican Republic	28	204	191	2,277	139	13.74
99	Trinidad and Tobago	27	656	568	4,076	437	7.49
100	Mali	27	369	351	3,144	284	10.33
101	Madagascar	27	347	320	2,583	399	8.71
102	Algeria	27	507	473	3,979	203	10.19
103	Botswana	26	225	209	2,630	132	12.25
104	Cyprus	26	556	507	3,889	370	8.78
105	Bolivia	26	311	296	2,741	297	10
106	Mozambique	25	257	237	2,809	283	13.8
107	Barbados	25	263	218	2,612	218	13
108	Benin	24	350	329	2,311	304	8.01
109	Paraguay	24	170	159	1,834	99	12.97
110	Oman	24	1,225	1,064	4,631	433	4.47
111	Cambodia	24	284	248	2,960	298	15.61
112	Sudan	24	556	519	3,581	557	8.83
113	Nicaragua	23	183	178	1,731	186	10.6
114	Guinea-Bissau	23	115	103	1,909	328	19.74
115	Haïti	22	141	122	1,972	162	17.9
116	Congo	22	510	456	2,277	249	5.35
117	Syrian Arab Republic	22	305	281	2,016	256	8.61
118	**Macedonia**	**20**	**406**	**361**	**2,000**	**116**	**5.77**
119	Monaco	20	194	151	1,262	57	6.84
120	Mongolia	20	125	120	1,538	123	19.53
121	Iraq	20	686	610	1,850	230	3.51
122	Netherlands Antilles	19	135	121	1,059	70	11.53
123	Honduras	19	140	135	1,345	93	11.16
124	Laos	19	178	165	1,330	218	8.5
125	French Guiana	19	154	138	1,552	127	12.15
126	Guadeloupe	19	169	158	1,276	100	8.1
127	Myanmar	19	145	138	1,674	50	12.34
128	Kazakhstan	18	181	177	1,058	180	7.29
129	Bahrain	18	844	736	2,024	309	3.12
130	Rwanda	18	134	116	1,000	76	12.29
131	Qatar	18	844	775	2,007	216	3.75
132	El Salvador	17	136	126	962	42	8.89
133	Niger	17	196	184	1,402	141	6.98
134	Central African Republic	17	102	91	881	56	8.51
135	Bosnia and Herzegovina	16	442	409	1,334	169	4.94
136	Faroe Islands	15	38	37	637	50	19.67
137	Libyan Arab Jamahiriya	15	244	227	931	36	4.02
138	Guinea	15	93	89	815	44	11.39
139	Armenia	14	205	186	879	82	4.75
140	Brunei Darussalam	14	152	113	599	40	5.65
141	Palestine	14	212	198	831	179	7.54
142	French Polynesia	14	80	68	641	41	11.78
143	Mauritius	14	90	83	873	34	9.83
144	Albania	14	146	133	839	43	6.38
145	Greenland	14	62	61	633	78	13.46
146	Yemen	14	261	242	826	108	3.65
147	Martinique	13	154	144	710	20	5.07
148	Sierra Leone	13	53	50	563	15	13.51
149	Burundi	13	52	51	626	27	14.25
150	Seychelles	13	39	35	694	67	21.57
151	Fiji	13	88	76	512	26	6.28
152	Guam	13	72	72	718	39	11.13
153	Serbia	13	921	839	1,136	117	8.37
154	Togo	13	326	279	918	118	3.09
155	Angola	12	56	50	489	33	13.2
156	Uzbekistan	12	155	145	547	51	3.87
157	Grenada	11	195	170	507	45	8.15
158	Kyrgyzstan	11	65	61	569	17	10.56
159	Chad	11	42	39	417	16	10.63
160	Democratic Republic Congo	11	55	50	313	10	5.51
161	New Caledonia	11	81	74	490	30	7.73
162	Azerbaijan	10	763	745	593	15	3.99
163	Eritrea	10	45	39	258	26	8.83
164	Afghanistan	10	78	64	443	53	6.63
165	Moldova	10	98	87	359	20	4.45
166	Swaziland	10	31	26	335	7	10.68
167	Reunion	10	61	55	280	9	6.99
168	Namibia	10	56	48	345	14	8.42
169	Suriname	9	39	36	207	18	6.15
170	Guyana	9	60	49	284	21	5.57
171	Bahamas	8	40	36	253	5	12.47
172	Mauritania	8	45	43	196	6	5.61
173	San Marino	8	24	23	717	0	26.69
174	Equatorial Guinea	7	16	16	160	11	7.34
175	Bermuda	7	20	15	158	9	9.23
176	Marshall Islands	7	10	10	73	14	9
177	Vanuatu	7	33	28	163	11	6.04
178	Dominica	7	26	25	124	1	5.57
179	Tonga	7	17	17	121	13	8.99
180	Saint Kitts and Nevis	7	14	13	142	3	16.92
181	Solomon Islands	7	32	24	148	7	6.89
182	Djibouti	6	32	25	107	2	3.9
183	Lesotho	6	25	20	132	2	7.83
184	Liechtenstein	6	23	19	118	5	7.18
185	Andorra	6	32	27	129	8	3.9
186	Somalia	6	14	14	71	1	6.27
187	Macao	5	48	43	95	5	2.23
188	Virgin Islands (U.S.)	5	15	15	72	4	4.92
189	Federated States of Micronesia	5	13	12	114	10	11
190	Turkmenistan	4	7	5	73	0	13.38
191	Cape Verde	4	6	6	46	3	8.8
192	United States Minor Outlying Islands	4	4	3	184	0	46
193	Antigua and Barbuda	4	25	24	39	14	3.33
194	Belize	4	10	9	73	10	10
195	Liberia	4	16	11	46	3	2.68
196	Palau	4	12	10	81	4	9.6
197	Sao Tome and Principe	4	8	8	51	11	6.5
198	Saint Vincent and The Grenadines	3	4	4	27	0	11.5
199	Timor-Leste	3	12	9	31	2	6
200	Samoa	3	12	10	38	1	5.92
201	Comoros	3	10	10	23	2	2.61
202	Maldives	3	14	11	26	1	2.88
203	Aruba	3	6	6	82	0	27.33
204	Northern Mariana Islands	2	5	5	6	3	1.5
205	Cook Islands	2	4	4	32	1	16
206	Mayotte	2	12	12	15	1	2.04
207	Gibraltar	2	5	5	14	0	2.5
208	Saint Lucia	2	4	4	17	0	5.75
209	Montenegro	2	23	23	22	1	1.48
210	American Samoa	2	6	6	41	2	9.88
211	North Korea	2	4	4	16	0	4.33
212	Bhutan	2	8	8	9	0	1.5
213	Virgin Islands (British)	2	8	6	18	0	4.13
214	Cayman Islands	2	11	11	52	0	17.33
215	Tajikistan	1	15	15	9	0	0.79
216	Norfolk Island	1	3	3	0	0	0
217	Tokelau	1	1	1	10	0	10
218	Tuvalu	1	2	2	3	0	1.5
219	Falkland Islands (Malvinas)	1	2	2	1	0	1
220	Anguilla	0	1	0	0	0	0
221	Kiribati	0	1	0	0	0	0
222	Wallis and Futuna	0	1	1	0	0	0

Citable documents in the field of medicine from the Republic of Macedonia, deposited in the Scopus database in the period between 1996 and 2008, is shown in Figure 1. The percentage of citable documents (citable documents include: articles, reviews and conference papers) is 88.92% with variations of the smallest in 1998 of 69% and the highest in 2002 of 100% (Figure 1).

International collaboration is presented by studies conducted by researchers from several countries. The chart shows the ratio of journal's documents signed by

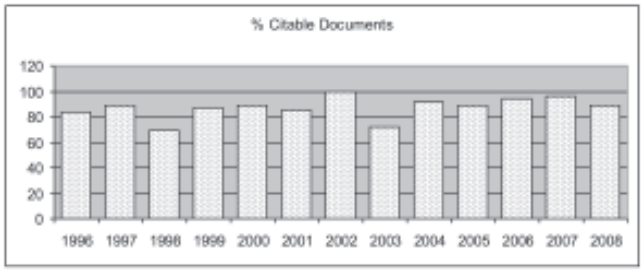

Figure 1: Citable documents in the field of medicine from the Republic of Macedonia, deposited in the Scopus database between 1996 and 2008.

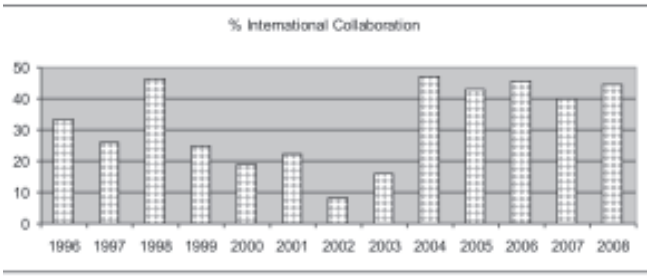

Figure 2: International collaboration of documents in the field of medicine from the Republic of Macedonia, deposited in Scopus database between 1996 and 2008.

researchers from more than one country. International collaboration in the field of medicine from the Republic of Macedonia, deposited in the Scopus database for the analyzed period, is shown in Figure 2. The least international collaboration was recorded in 2002 with 8.33% documents with more than one country included, and the best cooperation was recorded in 2004 with 47.06% documents with more than one country included (Figure 2).

Relative production of documents in the field of medicine from the Republic of Macedonia (as percent of a documents in Eastern Europe and in the world), deposited in the Scopus database for the period between 1996 and 2008, is shown in Figure 3. The percentage of relative production from the Republic of Macedonia in the region was the smallest in 1998 (0.195) and the biggest in 2008 (0.548). The percentage of relative production of documents from the Republic of Macedonia in the world was below 0.01 (Figure 3).

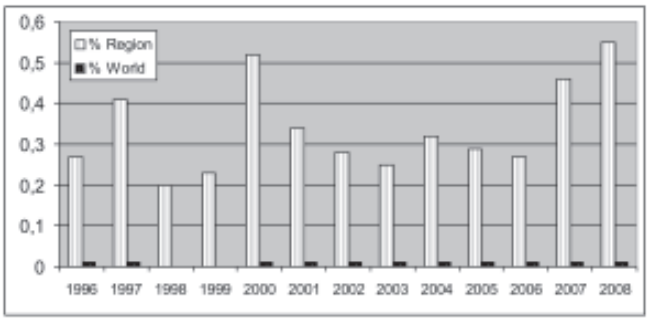

Figure 3: Relative production of documents in the field of medicine from the Republic of Macedonia (as percent of document in Eastern Europe and in the world), deposited in Scopus database between 1996 and 2008.

A citation versus self-citations in the field of medicine from the Republic of Macedonia, deposited in the Scopus database for the period between 1996 and 2008, is shown in Figure 4. Mean self-cites in the field of medicine from the Republic of Macedonia is 5.8% with variations of 0.06% in 2008 and 0.78% in 2001 (Figure 4).

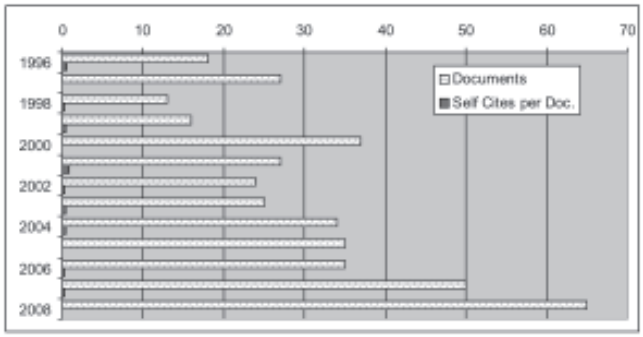

Figure 4: Citations versus self-citations in the fields of medicine from the Republic of Macedonia, deposited in Scopus database between 1996 and 2008.

Documents in the field of medicine from the Republic of Macedonia by subject category deposited in the Scopus database (1996-2008) is shown in Table 2. We can see a very heterogeneous distribution of medical

Table 2: Documents in the field of medicine from the Republic of Macedonia by subject category deposited in the Scopus database (1996-2008).

Subject categories	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	Total
Anatomy	-	-	-	-	-	-	-	-	-	-	-	1	1	**2**
Anesthesiology and Pain Medicine	-	1	-	-	-	-	-	-	-	1	-	1	2	**5**
Biochemistry (medical)	-	-	-	-	-	-	-	-	-	-	-	3	4	**7**
Cardiology and Cardiovascular Medicine	-	-	-	-	-	-	-	-	-	-	1	4	6	**11**
Critical Care and Intensive Care Medicine	-	-	-	-	-	-	-	-	-	-	-	-	1	**1**
Dermatology	-	-	-	-	1	1	1	-	1	3	-	1	1	**9**
Endocrinology, Diabetes and Metabolism	-	-	1	-	1	2	-	-	1	1	1	3	3	**13**
Epidemiology	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Gastroenterology	-	-	-	-	-	-	-	1	-	-	-	-	-	**1**
Genetics (clinical)	-	-	-	-	-	-	1	-	1	1	-	1	4	**8**
Geriatrics and Gerontology	-	-	-	-	-	-	-	-	-	-	-	1	2	**3**
Health Policy	-	-	-	-	-	-	-	-	1	-	-	-	-	**1**
Hematology	3	4	5	1	5	4	2	3	-	2	1	5	-	**35**
Immunology and Allergy	-	2	-	-	-	-	-	-	-	1	1	1	2	**7**
Infectious Diseases	-	-	-	-	-	-	-	-	1	1	-	-	-	**2**
Internal Medicine	-	-	-	-	-	-	-	-	-	-	1	-	-	**1**
Medicine (miscellaneous)	4	-	1	4	1	1	5	2	7	6	6	8	15	**60**
Microbiology (medical)	-	-	-	-	-	-	1	-	-	-	-	1	-	**2**
Nephrology	4	7	4	4	6	9	3	9	6	5	6	4	9	**76**
Neurology (clinical)	-	2	1	1	-	1	-	-	-	-	-	1	2	**8**
Obstetrics and Gynecology	1	-	-	-	3	1	-	-	2	2	6	2	-	**17**
Oncology	2	4	-	3	1	1	-	2	8	2	2	4	6	**35**
Ophthalmology	-	-	-	-	-	-	-	1	-	2	-	-	-	**3**
Orthopedics and Sports Medicine	-	-	-	-	-	-	-	-	-	-	1	1	-	**2**
Otorhinolaryngology	1	-	-	-	-	-	-	-	-	-	-	-	-	**1**
Pathology and Forensic Medicine	-	-	-	-	1	1	1	-	1	4	2	3	-	**13**
Pediatrics, Perinatology and Child Health	-	1	1	1	2	2	2	6	1	1	2	-	2	**21**
Pharmacology (medical)	-	-	-	-	-	-	-	-	-	-	-	1	1	**1**
Physiology (medical)	-	-	-	-	-	-	-	-	-	-	-	-	-	**0**
Psychiatry and Mental Health	-	2	-	1	-	-	1	-	1	4	-	2	-	**11**
Public Health, Environmental and Occupational Health	-	-	-	-	-	1	-	-	2	1	4	3	5	**16**
Pulmonary and Respiratory Medicine	3	-	-	-	-	-	-	-	-	-	-	1	2	**6**
Radiology, Nuclear Medicine and Imaging	-	1	-	-	8	1	-	-	-	1	1	1	2	**15**
Rehabilitation	-	-	-	-	-	-	-	-	-	-	1	-	-	**1**
Reproductive Medicine	-	-	-	-	-	1	-	-	-	-	-	-	1	**2**
Rheumatology	-	-	-	-	-	-	-	-	-	-	-	1	-	**1**
Surgery	-	2	-	1	-	2	2	-	-	2	-	3	2	**14**
Transplantation	1	4	-	-	-	2	6	1	2	3	-	3	3	**25**
Urology	-	2	-	-	8	-	-	-	-	-	1	1	1	**13**

documents in different fields from the Republic of Macedonia. Subjects of epidemiology and physiology (medical) are not reported in the Scopus database (1996-2008), which means that not one scientific paper has been published from the academic staff of these institutions in the Republic of Macedonia in the twelve years of analysis. The biggest number of documents in this period of time has been published from the field of nephrology (76 documents), followed by medicine (miscellaneous) (60 documents), haematology (35 documents), and oncology (35 documents). There is smaller number of documents published from the remaining fields of medicine (Table 2).

Journal Rank

Medical journal rankings in the former Yugoslav countries for 2008 in the SCImago journal and country rank database, ordered by SJR (April 4, 2010) is shown in Table 3.

There are no medical journals in *SCImago journal and country rank database* from the Republic of Macedonia and Montenegro. There are 24 medical journals from Croatia, 12 medical journals from Serbia, 2 scientific journals from Slovenia, and 2 medical journals from Bosnia and Herzegovina (a total number of 40 medical journals

Table 3: Medical journal rankings in the former Yugoslav countries for 2008 in the SCImago journal and country rank database, ordered by SJR (April 4, 2010).

	Title of the journal	ISSN	SJR	H-index	Total Documents (2008)	Total Documents (3 years)	Total References	Total cytes (3 years)	Citable Documents (3 years)	Cites/ Document	References /document
Slovenia (48th posistion)											
1	Acta Dermatovenerologica Alpina. Panonica et Adriatica	15812979	0.062	7	35	98	867	70	93	0.5	24.77
2	Radiology and Oncology	13182099	0.037	9	29	118	793	18	118	0.17	27.34
Croatia (52nd position)											
1	Croatian Medical Journal	13328166	0.103	22	121	397	2,136	409	322	1.01	17.65
2	Acta Dermatovenerologica Croatica	1330027X	0.050	9	54	140	919	64	116	0.46	17.02
3	Arhiv za Higijenu Rada i Toksikologiju	00041254	0.048	8	39	131	1,181	52	131	0.3	30.28
4	Psychiatria Danubina	03535053	0.042	6	86	123	1,835	76	105	0.77	21.34
5	Acta Clinica Croatica	13339451	0.036	7	39	133	674	32	131	0.22	17.28
6	Biochemia Medica	13300962	0.033	2	44	44	827	15	36	0.42	18.8
7	Acta medica Croatica	13300164	0.033	10	100	298	2,900	70	280	0.27	29
8	Lijecnicki vjesnik	00243477	0.031	7	69	340	1,745	65	299	0.26	25.29
9	Gynaecologia et Perinatologia. Supplement	13310151	0.030	3	19	80	544	9	80	0.13	28.63
10	Gynaecologia et Perinatologia	13300091	0.029	5	19	98	389	10	95	0.08	20.47
11	Medica Jadertina	03510093	0.028	1	15	43	300	2	41	0	20
12	Socijalna Psihijatrija	03037908	0.028	4	32	79	733	6	79	0.04	22.91
13	Medicina	00257729	0.028	2	13	131	427	6	122	0.07	32.85
14	Reumatizam	03741338	0.028	3	24	67	288	3	66	0.04	12
15	Alcoholism	0002502X	0.028	4	12	32	176	1	32	0	14.67
16	Medicus	1330013X	0.028	4	19	218	681	7	197	0.05	35.84
17	Infektoloski Glasnik	13312820	0.028	3	27	76	570	5	64	0.08	21.11
18	Paediatria Croatica. Supplement	1330724X	0.027	3	34	153	1,364	4	148	0.04	40.12
19	Paediatria Croatica	13301403	0.027	4	8	110	209	4	110	0.03	26.13
20	Hrvatska Revija Za Rehabilitacijska Istrazivanja	13313010	0.027	2	36	41	937	1	38	0	26.03
21	Neurologia Croatica	03538842	0.027	4	8	24	208	0	24	0	26
22	AMHA - Acta Medico-Historica Adriatica	13344366	0.027	1	9	36	188	1	35	0.03	20.89
23	Libri Oncologici	03008142	0.027	1	0	42	0	0	42	0	0
24	Acta Clinica Croatica. Supplement	03539474	0	3	0	0	0	0	0	0	0
Macedonia (118th position)											
0	Ranking parameters did not match any journal										
Bosnia and Herzegovina (135th position)											
1	Bosn J Basic Med Sci	15128601	0.032	3	70	198	56	25	197	0.09	0.8
2	Medicinski arhiv	0350199X	0.031	8	84	317	179	34	315	0.09	2.13
Serbia (153rd position)											
1	Prilozi/Macedonian Academy of Sciences and Arts. Section of Biological and Medical Sciences.	03513254	0.048	3	0	99	0	31	98	0.27	0
2	Archive of Oncology	14509520	0.038	6	19	120	483	13	104	0.13	25.42
3	Medicinski pregled	00258105	0.032	7	125	391	685	41	374	0.1	5.48
4	Journal of Medical Biochemistry	14528266	0.032	5	36	130	1,408	25	128	0.24	39.11
5	Vojnosanitetski pregled	00428450	0.031	7	171	449	3,845	66	414	0.18	22.49
6	Acta chirurgica Iugoslavica	0354950X	0.031	5	80	244	495	27	243	0.1	6.19
7	Srpski arhiv za celokupno lekarstvo	03708179	0.030	7	139	358	1,122	34	358	0.07	8.07
8	Archives of Gastroenterohepatology	03542440	0.028	2	0	9	0	0	8	0	0
9	Medicinski Glasnik	00258091	0.028	2	25	40	358	1	38	0.03	14.32
10	Glas. Srpska akademija nauka i umetnosti. Odeljenje medicinskih nauka	00813966	0.027	1	0	22	0	0	22	0	0
11	Acta Facultatis Medicae Naissensis	03516083	0	0	0	0	0	0	0	0	0
12	Serbian Journal of Experimental and Clinical Research	18208665	0	0	28	0	647	0	0	0	23.11
Montenegro (209th position)											
0	Ranking parameters did not match any journal										

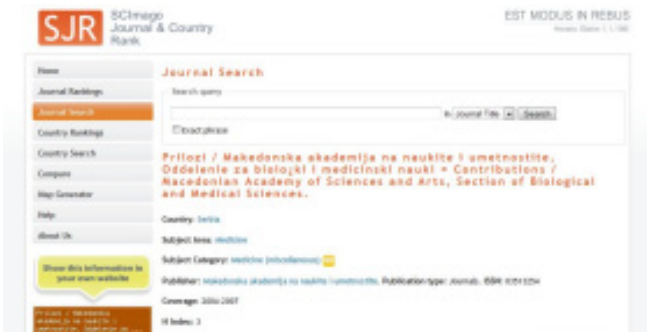

Figure 5: Screenshot of the web page SCImago journal and country rank database [17] showing a classification of Macedonian biomedical journal Prilozi (Macedonian Academy of Sciences and Arts, Section of Biological and Medical Sciences) in Serbia, instead of in the Republic of Macedonia.

from former Yugoslav countries) included in *SCImago journal and country rank database* (Table 3).

Macedonian biomedical journal Prilozi (Macedonian Academy of Sciences and Arts, Section of Biological and Medical Sciences), probably by mistake, is referred in the list of Serbian medical journals, instead in the list of Macedonian medical journals (Figure 5). In 2008, Prilozi was ranked on the 2484th place (out of 4922 medical journals) with 0.048 SJR for the citable documents in the last three years. From the former Yugoslav countries, Croatian Medical Journal from Croatia has the biggest SJR (0.103), followed by Acta Dermatovenerologica Alpina, Panonica and Adriatica from Slovenia (0.062), and Acta Dermatovenerologica Croatica from Croatia (0.050). All the rest of medical journals from the former Yugoslav countries have equal or smaller SJR in comparison with Prilozi. The ranking of medical journals from the former Yugoslav countries based on other parameters (H-index, total document, total references, total cites and their indexes) is very different, heterogeneous and out of the scope of interest of this paper (Table 3).

H-index

H-index for Top 30 subject categories (Agricultural and Biological Sciences; Arts and Humanities; Biochemistry, Genetics and Molecular Biology; Business, Management and Accounting; Chemical Engineering; Chemistry; Computer Science; Decision Sciences; Dentistry; Earth and Planetary Sciences; Economics, Econometrics and Finance; Energy; Engineering; Environmental Science; Health Professions; Immunology and Microbiology; Materials Science; Mathematics; Medicine; Multidisciplinary; Neuroscience; Nursing; Pharmacology, Toxicology and Pharmaceutics; Physics and Astronomy; Psychology; Social Sciences; and Veterinary) between 2007 and 2008 in the Republic of Macedonia is shown in Figure 6.

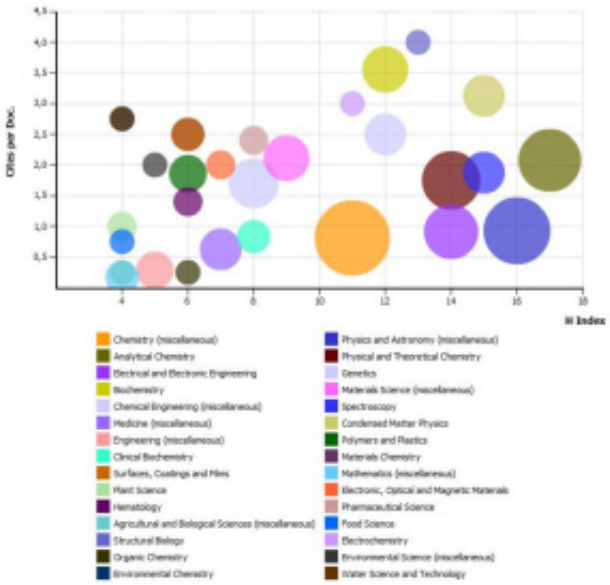

Figure 6: Correlation of H-index and cites per document for Top 30 subject categories (Agricultural and Biological Sciences; Arts and Humanities; Biochemistry, Genetics and Molecular Biology; Business, Management and Accounting; Chemical Engineering; Chemistry; Computer Science; Decision Sciences; Dentistry; Earth and Planetary Sciences; Economics, Econometrics and Finance; Energy; Engineering; Environmental Science; Health Professions; Immunology and Microbiology; Materials Science; Mathematics; Medicine; Multidisciplinary; Neuroscience; Nursing; Pharmacology, Toxicology and Pharmaceutics; Physics and Astronomy; Psychology; Social Sciences; and Veterinary) for the period of 2007-2008 in the Republic of Macedonia.

The biggest H-index (above 10) between 2007 and 2008 in the Republic of Macedonia had the chemistry group-related disciplines. Documents from medicine (miscellaneous) had H-index of 7, and the lowest H-index (1) had Pharmacology, Toxicology and Pharmaceutics (Figure 6).

H-index for the medical subject categories (Medicine (miscellaneous); Haematology; Cardiology and Cardiovascular Medicine; Nephrology; Oncology; Biochemistry (medical); Endocrinology, Diabetes and Metabolism; Pathology and Forensic Medicine; Public Health, Environmental and Occupational Health; Surgery; Transplantation; Obstetrics and Gynecology; Psychiatry and Mental Health; Anatomy; Anesthesiology and Pain Medicine; Dermatology; Genetics (clinical); Geriatrics and Gerontology; Immunology and Allergy; Microbiology (medical); Neurology (clinical); Orthopaedics and Sports Medicine; Pharmacology (medical); Pulmonary and

Respiratory Medicine; Radiology, Nuclear Medicine and Imaging; Rheumatology; Urology) between 2007 and 2008 in the Republic of Macedonia is shown in Figure 7.

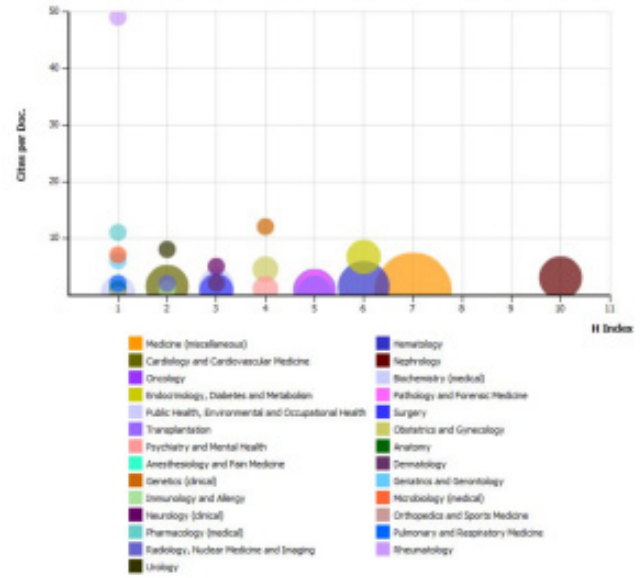

Figure 7: Correlation of H-index and cites per document for medical subject categories (Medicine (miscellaneous); Haematology; Cardiology and Cardiovascular Medicine; Nephrology; Oncology; Biochemistry (medical); Endocrinology, Diabetes and Metabolism; Pathology and Forensic Medicine; Public Health, Environmental and Occupational Health; Surgery; Transplantation; Obstetrics and Gynecology; Psychiatry and Mental Health; Anatomy; Anesthesiology and Pain Medicine; Dermatology; Genetics (clinical); Geriatrics and Gerontology; Immunology and Allergy; Microbiology (medical); Neurology (clinical); Orthopaedics and Sports Medicine; Pharmacology (medical); Pulmonary and Respiratory Medicine; Radiology, Nuclear Medicine and Imaging; Rheumatology; Urology) for the period of 2007-2008 in the Republic of Macedonia.

The biggest H-index of 10, between 2007 and 2008, in the Republic of Macedonia had the nephrology group, followed by medicine (miscellaneous) with H-index of 7, haematology and endocrinology, diabetes and metabolism with H-index of 6, transplantation, oncology and pathology and forensic medicine with H-index of 5. In the lower part of the scale the rest of medical subject categories are placed with the smallest H-index of 1 for biochemistry (medical), orthopaedics and sports medicine, pulmonary and respiratory medicine, anatomy, geriatrics and gerontology, microbiology (medical), pharmacology (medical), and rheumatology (Figure 7).

Discussion

In this paper I have presented the country rank, journal rank and H-index of different medical disciplines in the Republic of Macedonia and other former Yugoslav countries (Slovenia, Croatia, Serbia, Bosnia and Herzegovina, and Montenegro) as they are available in the SCImago Country & Journal database between 2007 and 2008. In the country rankings in the subject field of medicine (April 4, 2010, in *SCImago journal and country rank database* ordered by H-index, between 2007 and 2008) of a total number of 222 countries, the Republic of Macedonia with H-index of 20 is located on the 118th position.

The analysis of 406 documents in the field of medicine, written by authors affiliated in Macedonian institutions and deposited in Scopus between 2007 and 2008, has shown that the percentage of citable documents is 88.92%, citation per document is 4.93%, international collaboration is between 8.33% and 47.06%, percentage of relative production is 0.195-0.548, and mean self-cites is 5.8%. There is a very heterogeneous distribution of medical documents in different fields of medicine from the Republic of Macedonia. One of the reasons for these differences might be that the citation potential is shown to vary not only between journal subject categories – groupings of journals sharing a research field – or disciplines (e.g., journals in mathematics, engineering and social sciences tend to have lower values than journals in life sciences), but also between journals within the same subject category [22].

In 2008, Prilozi had 0.048 SJR for citable documents in the last three years. Croatian Medical Journal had the biggest SJR from the former Yugoslav countries (0.103), followed by Acta Dermatovenerologica Alpina, Panonica and Adriatica (0.062), and Acta Dermatovenerologica Croatica (0.050). Macedonian biomedical journal Prilozi, probably by mistake, is referred in the list of Serbian medical journals, instead in the list of Macedonian medical journals. Misclassification of Macedonian biomedical Journal Prilozi should be corrected either by the Editor-in-chief of Prilozi or by the Scopus and SCImago Journal & Country Rank.

One of the disadvantages of the Impact Factor (IF) is self-citation. The SCImago Journal Rank (SJR) indicator excludes self-citations and considers the quality, rather than absolute numbers of citations of a journal by other journals. Citation analysis shows that specialized orthopaedic journals have specific self-citation tendencies. The correlation between self-cited rate and IF in our sample was large but, due to small sample size, not significant. The SJR excludes self-citations in its calculation and therefore enhances the underestimation in ranking of specialized journals [23]. The newest bibliometric measure numbers - like the recent enhancements of Journal Citation

Report Web, Hirsch-index, Eigenfactor and SCImago Journal & Country Rank algorithms have unified and well-structured web pages behind the newly appeared indicators, and some of the new numbers are presented in the well-known databases (Web of Science, Scopus) as scientific measures. The ranking of the compared oncological journals based on the different indicators has shown more similarities than differences [24]. To investigate a possible relationship between editorial leadership and journal quality, research journals from two European countries, one Anglophone and one non-Anglophone, were studied and compared. Journals from Italy scored worse for quality and editorial leadership than did their UK counterparts. Editorial leadership predicted quality for the entire set of journals [25].

We have to mention that the SJR indicator is an open-access resource, while the journal IF requires paid subscription. The SJR indicator (based on Scopus data) lists considerably more journal titles published in a wider variety of countries and languages, than the journal IF (based on Web of Science data). Both indices divide citations to a journal by articles of the journal, during a specific time period. However, contrary to the journal IF, the SJR indicator attributes different weight to citations depending on the "prestige" of the citing journal without the influence of journal self-citations; prestige is estimated with the application of the PageRank algorithm in the network of journals. The novel SJR indicator poses as a serious alternative to the well-established journal IF, mainly due to its open-access nature, larger source database, and assessment of the quality of citations [26].

Documents in the field of medicine, written by authors affiliated in Macedonian Institutions and deposited in Scopus between 2007 and 2008, have shown that medicine (miscellaneous) have H-index of 7 in comparison with chemistry-related group with H-index of 10-18. The biggest H-index of 10, between 2007 and 2008, in the Republic of Macedonia had nephrology-related group, followed by medicine (miscellaneous) with H-index of 7, haematology and endocrinology, diabetes and metabolism with H-index of 6, transplantation, oncology and pathology and forensic medicine with H-index of 5.

In a conclusion, I can say that the country rank of the Republic of Macedonia, journal rank of the Macedonian biomedical journal Prilozi, and H-index of disciplines in the field of medicine are in the ranges of other former Yugoslav countries, but Editorial Boards of the other Macedonian medical journals should include their journals in the Scopus database as soon as possible.

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