Epilepsy Research in Iran: a Scientometric Analysis of Publications Output During 2000-2014

Masoud Rasolabadi[1], Seyedeh Moloud Rasouli-Ghahfarkhi[2], Marlin Ardalan[3], Marya Maryam Kalhor[3], Jamal Seidi[3], Alireza Gharib[1]

[1]Kurdistan University of Medical Sciences, Sanandaj, Iran
[2]Department of Nursing and Midwifery, Islamic Azad University, Masjed-Soleiman Branch, Masjed-Soleiman, Iran
[3]School of Nursing & Midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran

Corresponding author: Jamal Seidi, PhD of Nursing, School of Nursing & Midwifery, Kurdistan University of Medical Sciences, Sanandaj, Iran. Tel./Fax.: +98-8731827286. Email: jamal.seidi@muk.ac.ir

doi: 10.5455/aim.2015.23.374-378
ACTA INFORM MED. 2015 DEC; 23(6): 374-378
Received: 11 September 2015 • Accepted: 05 November 2015

ABSTRACT

Aim: The aim of this study is to analyze the epilepsy research output of Iran in national and global contexts, as reflected in its publication output indexed in Scopus citation database during 2000-2014. **Methods**: This study was based on the publications of epilepsy research from Iranian authors retrieved Feb. 2015 from Scopus Citation database [http://www.scopus.com]. The string used to retrieve the data was developed using "epilepsy OR epilepsies" keywords in title, abstract and keywords and Iran in affiliation field was our main string. **Results:** Cumulative publication output of Iran in epilepsy research consisted of 702 papers from 2000 to 2014, with an average number of 46.53 papers per year. The total publication output of Iran in epilepsy research increased from 2 papers in 2000 to 88 papers in 2014. Hence, with 702 paper, Iran ranked 25th among the top 25 countries with a global share of 0.82 %. Iranian publication average citation per paper increased from 0 in 2000 to 7.88 in 2014. Overall, the received citations were 3184 citations during those years. **Conclusion:** Iran is collaborating with 36 countries with no more than 244 of its papers (35% of its total papers). It is necessary to prepare conditions for epilepsy researchers to collaborate more with international scientific societies in order to produce more and high quality papers.

Key words: Bibliometrics, Epilepsy, bibliographic database, Scopus, Iran.

1. INTRODUCTION

Epilepsy is a chronic non communicable disorder of the brain that affects people of all ages in every country of the world. It is characterized by recurrent seizures. Seizures are brief episodes of involuntary shaking which may involve a part of the body (partial) or the entire body (generalized). Seizures can vary from the briefest lapses of attention or muscle jerks, to severe and prolonged convulsions; they can also vary in frequency, from less than one per year to several per day. Around 50 million people worldwide have epilepsy. Nearly 80% of the people with epilepsy are found in developing regions. Epilepsy responds to treatment about 70% of the time, yet about three fourths of affected people in developing countries do not get the treatment they need. People with epilepsy and their families can suffer from stigma and discrimination in many parts of the world (1).

Epilepsy is one of the most common neurological disorders and is a worldwide common chronic neurological disorder. Symptoms of epilepsy depend on the type of it and the localization of the epileptogenic focus in the brain. An epileptic event can includes motor, psychiatric, sensory auras and loss of consciousness (2, 3).

The incidence and prevalence of epilepsy may vary widely because of their different causes. Parasitic, viral and bacterial infections have been suggested as important factors in the cause of epilepsy in developing countries, also infections, brain damage occurring at birth or in accidents, or other brain trauma. Some of these factors may be reduced in developing countries by improved prevention and treatment. In the affluent countries, reduction of strokes and brain tumors may lessen the incidence of epilepsy. Although it has a minor role, genetic counseling can also help to prevent certain types of epilepsy (4).

Epilepsy is especially common in childhood and in elderly people. Epilepsy affects not only the individual, but also has consequences for the family

and the rest of society. A minimum of 250 million people will experience at least one seizure in their lifetime and at least 2.4 million new cases of epilepsy occur each year. The incidence of epilepsy is generally taken to be between 40 and 70 per 100, 000 people per year in industrialized countries, with estimates of 100 – 190 per 100, 000 people per year in developing countries. The prevalence is between 5 and 40 per 1000 persons (4). Quality of life for people with epilepsy is considered worse than the conditions clinical and medical prognosis would predict. Quantity and quality of social interaction considerably determine quality of life. Research shows that a significant proportion of patients with epilepsy experience difficulties with social functioning that is thought to be related to impaired quality of life (5).

Mohammadi et al in a study showed that the prevalence of epilepsy in Iran was 1.8%, also epilepsy was more common in females, unemployed and higher educational level. There was not significantly associated between epilepsy and age group, marital status and residential areas. The most common psychiatric disorders in persons with epilepsy were major depressive disorder and obsessive compulsive disorder and the rate of lifetime suicide attempt was 8.1% (6).

A recent study in Iran on attitudes towards epilepsy among five major ethnic groups - Persian, Azeri, Kurd, Lur and Arab - found that while the level of awareness and understanding of epilepsy among respondents was generally good, and their attitude towards the employment, childbearing and social integration of people with epilepsy was positive, the response to the prospect of their children marrying someone with epilepsy was highly negative, as it is in other parts of the world (7).

Zamani et al in their study which conducted to assess the quality of life of a group of adolescents with epilepsy in Iran revealed an unsatisfactory state of the QOL of adolescents with epilepsy in Iran in comparison with other studies. They indicated the need for greater concern about the psychological status and risk factors for the QOL of adolescents with epilepsy in Iran (8).

The aim of this study is to analyze the epilepsy research output of Iran in national and global contexts, as reflected in its publications output indexed in Scopus citation database during 2000-2014. The study focuses on; Iranian research output, its growth, rank and global publications share and citation impact, the patterns of international collaboration and identification of major collaborators, the publications productivity and impact of leading universities and authors of Iran and also to study the characteristics of highly cited papers. Citation data can be used to identify the structure of different research disciplines, fields and even sciences as a whole (9).

2. METHODS

This study was based on the publications of epilepsy research from Iranian authors retrieved Feb. 2015 from Scopus Citation database [http://www.scopus.com]. The string used to retrieve the data was developed using "epilepsy OR epilepsies" keywords in title, abstract and keywords and Iran in affiliation field was our main string. We searched above mentioned terms in document search tab of Scopus. The date range was set for 2000-2014. We used searching and analyzing features of Scopus, this way, first data were searched using searching system of Scopus, then results were analyzed using analyzing result system of Scopus. To retrieve the data of world research in epilepsy, also the key word 'epilepsy OR epilepsies' was searched in title, keyword and abstract filed in document search tab of Scopus. The date range also was set for 2000-2014.

3. RESULTS

Total number of papers for epilepsy research indexed in Scopus was 84372 papers until the end of 2014. Top 25 countries with 82948 papers had the most number of papers and a global share of 98.31 %. From top 25 countries with the most number of papers in diabetes research, 20 countries were in the category of developed country including: United States, United Kingdom, Germany, Italy, France, Japan, Canada, Australia, Spain, Sweden, Netherlands, Denmark, South Korea, Switzerland, Poland, Belgium, Finland, Israel, Austria, Taiwan and 5 are developing countries including: China, India, Brazil, Turkey and Iran (Table 1).

Six developed countries including: US, UK, Germany, Italy, France and Japan have produced 60.47 % of epilepsy research papers. From top 25 developing countries; China and India ranked 8th and 9th, respectively. Altogether, share of 5 developing countries in the world epilepsy research was 12.85% (Table 1).

Considering the share of papers published by these productive countries the highest is registered by US with 26.15 followed by UK (8.97), Germany (7.66), Italy (7.38), France (5.48), Japan (4.83), Canada (4.45), China (3.75), India (3.35), Spain (3.02), Netherlands (2.93), Brazil (2.74), Australia (2.58), Turkey (2.19), Switzerland (1.97), Belgium (1.55), Sweden (1.24), South Korea (1.23), Poland (1.09), Austria (1.09), Finland (0.99), Israel (0.99), Taiwan (0.90), Denmark (0.87) and Iran (0.82) (Table 1).

Country	No. of Papers	Share of papers	Rank
United States	22068	26.15	1
United Kingdom	7576	8.97	2
Germany	6470	7.66	3
Italy	6234	7.38	4
France	4631	5.48	5
Japan	4080	4.83	6
Canada	3759	4.45	7
China	3172	3.75	8
India	2784	3.35	9
Spain	2549	3.02	10
Netherlands	2477	2.93	11
Brazil	2319	2.74	12
Australia	2183	2.58	13
Turkey	1848	2.19	14
Switzerland	1667	1.97	15
Belgium	1311	1.55	16
Sweden	1051	1.24	17
South Korea	1034	1.23	18
Poland	923	1.09	19
Austria	921	1.09	20
Finland	843	0.99	21
Israel	840	0.99	22
Taiwan	765	0.90	23
Denmark	741	0.87	24
Iran	702	0.82	25
Total	82948	100	-

Table 1. World publication output, share and rank of top 25 most productive countries in epilepsy research from 2000 to 2014

Year	Papers	Citations	Average citations per paper
2014	88	694	7.88
2013	122	651	5.33
2012	101	541	5.35
2011	93	434	4.66
2010	89	298	3.34
2009	55	186	3.38
2008	46	137	2.97
2007	28	89	3.17
2006	18	59	2.10
2005	27	63	2.33
2004	11	17	1.7
2003	13	7	0.58
2002	5	3	0.75
2001	4	5	1.66
2000	2	0	0
Total	702	3184	4.56

Table 2. Iranian research papers in epilepsy research according to number of papers, citations and average citations per paper by year

Cumulative publication output of Iran in epilepsy research consisted of 702 papers from 2000 to 2014, with an average number of 46.80 papers per year. The total publications output of Iran in epilepsy research increased from 2 papers in 2000 to 88 papers in 2014 (Table 2). Hence, with 702 paper, Iran ranked 25th among the top 25 countries with a global share of 0.82 %. Also H-index of Iran in epilepsy research was 26 it means that of the 702 documents considered for the h-index, 26 have been cited at least 26 times.

Based on Epilepsy publication output of Iran, highly cited papers were also evaluated. In this regard, 93 papers were cited up to 10 times and identified as the papers with the highest citations.

From the list, the highest cited paper received 109 citations and ranked 1st.

Concerning research quality, as measured by field-weighted citation impact, Iran's publication output as measured by average citation per paper was 4.56 on the whole. So, in epilepsy research, Iranian publication average citation per paper increased from 0 in 2000 to 7.88 in 2014. Overall, the received citations were 3184 citations during those years (Table 2).

In epilepsy research, Iran is collaborated with 36 countries with no more than 244 of its papers (35% of its total papers). Among top 5 Iranian international collaborative partners United States ranked highest in the list by contributing 101 papers, followed by Germany (26 papers), United kingdom (13 papers), Australia (12 papers) and Italy (11 papers).

Regarding the type of Iranian publication being indexed, the most publication type in the field of diabetes research was articles (78.25%), the second and third most published document were allocated to review articles (5.15%), and letters (4.58%) and the lowest publication documents in the field of epilepsy research were notes and short surveys (0.14%).

	AFFILIATION	No. of papers
1	Henry Ford Health System	30
2	Thomas Jefferson University	27
3	Westfalische Wilhelms-Universitat Munster	16
4	Wayne State University	18
5	Henry Ford Hospital	15
	Total	106

Table 3. Five non domestic universities and institutes contributed with Iran in Epilepsy research

	AFFILIATION	No. of papers
1	Tehran University of Medical Sciences	153
2	Shiraz University of Medical Sciences	82
3	Shahid Beheshti University of Medical Sciences	75
4	University of Tehran	72
5	Daneshgahe Azad Eslami	56
6	Tarbiat Modares University	44
7	Mashhad University of Medical Sciences	37
8	Isfahan University of Medical Sciences	36
9	Tabriz University of Medical Sciences	30
10	Shahed University	27
11	Pasteur Institute of Iran	23
12	Iran University of Medical Sciences	19
13	Kerman University of Medical Sciences	18
14	Qazvin University of Medical Sciences	16
15	Kermanshah University of Medical Sciences	14
	Total	702

Table 4. Top 15 domestic most productive institutes and universities of Iran in Epilepsy research

Altogether, 160 institutes and universities contributed with Iran to produce 702 papers in epilepsy research. Among top 20 institutes and universities contributed with Iran in Epilepsy research 5 are non domestic including; "Henry Ford Health System" (30 Papers), "Thomas Jefferson University" (27 papers)." Wayne State University" (18 papers), " Westfalische Wilhelms-Universitat Munster" (16 papers) and "Henry Ford Hospital" (12 papers) (Table 3).

Ten Authors have been identified as productive authors who have published 13 or more in Epilepsy research. These 10 authors have published 221 papers with an average of 22.1 papers per author. Almost more than 30 percent of Iranian publications in epilepsy research have been contributed by these 10 productive authors.

There were 2 authors with more than 40 papers in Epilepsy research in Iran namely Hamid Soltanian Zadeh from University of Tehran with 43 papers and Ali Akbar Asadi-Pooya from Shiraz University of Medical Sciences with 41 papers . Their two universities ranked first and second among most reproductive Iranian institutes in Epilepsy research. (Table 4).

Five Iranian Medical Universities have registered higher publications in Epilepsy research including Tehran University of Medical Sciences with 157 papers followed by Shiraz University of Medical Sciences (82), Shahid Beheshti University of Medical Sciences (75), University of Tehran (72) and Daneshgahe Azad Eslami (56) (Table 4).

There are 5 journals that publishing 140 (20%) Iranian papers in Epilepsy research among them there is just one Iranian journal which ranked the first (Table 5).

Rank	Name of Journal	No. of papers
1	Iranian Journal of Child Neurology	47
2	Epilepsy and Behavior	33
3	Seizure	31
4	Basic and Clinical Neuroscience	16
5	Epilepsy Research	13

Table 5. The List of Most Productive Journals Publishing Iranian Papers in Epilepsy research

4. DISCUSSION

The results of the present study showed that total number of papers for epilepsy research indexed in Scopus was 84372 papers until the end of 2014 in which the share of developed countries was more than 60%. The incidence of epilepsy in developed countries is usually between 40 and 70 per 100, 000 persons per year. The incidence in developing countries is usually much higher than in developed countries, often above 120 per 100, 000 per year (10). More than 80% of people with epilepsy live in developing countries (11, 12). Developed countries despite lower rate of incidence of epilepsy have greatest share in publications. Their global share in epilepsy research is 60.47% while 20% of their people are suffering from epilepsy.

The results also showed that total publication output of Iran in epilepsy research consisted of 702 papers from 2000 to 2014, with an average number of 46.80 papers per year. Although Iran ranked 25 and is among most productive countries in epilepsy research, but it seems that more efforts are needed. The prevalence of epilepsy in Iran is 1.8% (6) and its epilepsy publication share is 0.82.

Considering this fact that Iran is among developing countries consistent findings from epidemiologic studies of epilepsy in developing countries indicate that both the prevalence and, unfortunately, the treatment gap, defined as the number of individuals with epilepsy who remain untreated with antiepileptic drugs, for epilepsy is typically higher in rural than urban areas of the same country (12).

The results showed that most productive institutes and universities of Iran in Epilepsy research are located in big cities such as Thehran, Shiraz, Mashhad, Isfahan and Tabriz. Small cities are deprived from research centers in epilepsy and consequently their publications in epilepsy are not remarkable. It also indicates that the facilities to diagnosing and treatment of epilepsy are not contributed equally in country. Almost universally, developing countries have marked inequalities in the distribution of health care resources (13).

Iranian Ministry of Health should establish new epilepsy research centers in small and medium universities across the country to cover all parts of country and also facilities should be contributed equally.

The total number of Iranian papers involving international collaboration during 2000-2014 is 244, accounting for 35% share in the cumulative publications output of Iran in epilepsy research. Among the major international collaborators (36 countries) 5 have published collaborative papers with Iran during 2010-2014. United States was the major collaborating partner of Iran during 2010-2014 with 101 collaborative publications, followed by Germany (26 papers), United kingdom (13 papers), Australia (12 papers) and Italy (11 papers). Gupta also in his study showed that 15 countries have published 4 or more collaborative papers with India during 2002-2011. United States was the major collaborating partner of India during 2002-2011 accounting for 41.88% of collaborative publications, followed by United Kingdom (with 24.61% share), Japan, Australia, Canada, Germany, Switzerland, Italy and Belgium (varying its publication share from 4.19% to 7.85%), Malaysia, Brazil, Spain, Singapore, France and Austria (varying its publication share from 2.09% to 3.66%) during 2002-2011 (14).

Five journals have published 140 (20%) Iranian papers in Epilepsy research among them there is just one Iranian journal which ranked the first with 47 papers followed by other 4 foreign journals with 93 papers. It seems that there are no adequate international and highly indexed Iranian journals to publish Iranian papers in Epilepsy research. Gupta in his study revealed that 15 most productive Indian and foreign journals publishing Indian research papers together contributed 217 papers in epilepsy research, which accounts for 35.74% of the total output of India during 2002-2011. Among these 15 journals 7 were published in India and 8 were foreign journals (14). It is recommended that scientific associations in epilepsy research in Iran and also Iranian medical universities try to establish epilepsy scientific journals in order to publish Iranian papers in Epilepsy research.

5. CONCLUSION

Iran is collaborating with 36 countries with no more than 244 of its papers (35% of its total papers). It is necessary to prepare conditions for epilepsy researchers to collaborate more with international scientific societies in order to produce more and high quality papers. It is recommended that scientific associations in epilepsy research in Iran and also Iranian medical universities try to establish epilepsy scientific journals in order to publish Iranian papers in Epilepsy research. Iranian Ministry of Health should establish new epilepsy research centers across the country and also facilities should be contributed equally.

Acknowledgments

The authors are thankful to Vice Chancellor for Research, Kurdistan University of Medical Sciences to provide access to Scopus database.

Authors' contributions

Study concept and design: Masoud Rasolabadi, Seyedeh Moloud Rasouli-Ghahfarkhi, Marlin Ardalan, Jamal Seidi. Acquisition of data: Masoud Rasolabadi, Susan Penjvini, Alireza Gharib. Analysis and interpretation of data: Masoud Rasolabadi, Alireza Gharib, Marya Maryam Kalhor. Drafting of the manuscript: Masoud Rasolabadi, Seyedeh Moloud Rasouli-Ghahfarkhi, Marlin Ardalan, Marya Maryam Kalhor, Jamal Seidi. Critical revision of the manuscript for important intellectual content: Masoud Rasolabadi, Jamal Seidi, Alireza Gharib, Susan Penjvini. Study supervision: Masoud Rasolabadi, Seyedeh Moloud Rasouli-Ghahfarkhi, Marlin Ardalan, Alireza Gharib, Jamal Seidi.

CONFLICT OF INTEREST: NONE DECLARED.

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