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

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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.

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.
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). Mohnamadi 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 was developed using “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          | 9.17            | 2    |
| Germany          | 6670          | 8.22            | 3    |
| Italy            | 6234          | 7.38            | 4    |
| France           | 4631          | 5.68            | 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          | 761           | 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.

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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 doc-

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

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

| AFFILIATION                      | No. of papers |
|----------------------------------|--------------|
| 1 Henry Ford Health System       | 30           |
| 2 Thomas Jefferson University    | 27           |
| 3 Westfalisiche Wilhelms-Universitats Munster | 16            |
| 4 Wayne State University         | 18           |
| 5 Henry Ford Hospital            | 15           |
| Total                            | 108          |

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 Daneshgah 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        |

Table 4. Top 15 domestic most productive institutes and universities of Iran 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), “Westfalisiche Wilhelms-Universitat Munster” (16 papers) and “Henry Ford Hospital” (12 papers). 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.

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 Daneshgah Azad Eslami (56).

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).
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 Tehran, 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 papers until the end of 2014 in which the share of 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.

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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.

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Authors’ contributions

Study concept and design: Masoud Rasolabadi, Seyedeh Moloud Rasooli–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 Rasooli–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 Rasooli–Ghahfarkhi, Marlin Ardalan, Alireza Gharib, Jamal Seidi.

CONFLICT OF INTEREST: NONE DECLARED.

REFERENCES

1. Epilepsy Fact sheet N°999. October 2012. Available at: http://www.who.int/mediacentre/factsheets/fs999/en. Accessed on 2/16/2015.
2. Goodridge DMG, Shorvon SD. Epileptic seizures in a population of 6000. I. Demography, diagnosis and classification. Br Med J. 1983; 287: 641-644.
3. Shi-Chuo L, Schoenberg BS, Wang CC, Cheng XM, et al. Epidemiology of epilepsy in urban area of the People’s Republic of China. Epilepsia. 1985; 26: 391-394.
4. Global Campaign against Epilepsy out of the shadows. Avail-
5. Szemere E, Jokel H. Quality of life is social - Towards an improvement of social abilities in patients with epilepsy. Seizure. 2015; 26: 12-21.

6. Mohammadi MR, Ghanizadeh A, Davidian H, Mohammadi M, Norouzian M. Prevalence of epilepsy and comorbidity of psychiatric disorders in Iran. Seizure. 2006; 15(7): 476-482.

7. Masoudnia E. Awareness. Understanding and attitudes towards epilepsy among Iranian ethnic groups. Seizure. 2009; 18(5): 369-373.

8. Zamani GR, Shadi S, Mohammadi M, Mahmodi Garaie J, Rezaei N. A survey of quality of life in adolescents with epilepsy in Iran. Epilepsy and Behaviour. 2014; 33: 69-72.

9. Garfield E, Welljams-Dorof A. Citation data: Their use as quantitative indicators for science and technology evaluation and policy-making. Science & Public Policy. 1992; 19(5): 321-327.

10. Henney C, MacDonald BK, Everitt A, et al. Socioeconomic variation in incidence of epilepsy: prospective community based study in south east England. Br Med J. 2002: 1013-1016.

11. de Boer HM, Mula M, Sander JW. The global burden and stigma of epilepsy. Epilepsy Behav. 2008; 12(4): 540-546.

12. Gretchen L Birbeck. Epilepsy Care in Developing Countries: Part I of II. Epilepsy Curr. 2010; 10(4): 75-79.

13. Begley CE, Baker GA, Beghi E, Butler J, Chisholm D, Langfitt JT, et al. Cross-country measures for monitoring epilepsy care. Epilepsia. 2007; 48: 990-1001.

14. Gupta BM, Adarsh B. Epilepsy Research in India: A Scientometric Analysis of Publications Output during 2002-11. Annals of Neurosciences. 2013; 20(2): 71-78.