

Assessment of Science Production in the field of pediatric surgery in Iran, Turkey, India and Pakistan

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Abstract

Keywords

- Science production
- Pediatric Surgery

Introduction: Scientific progress is one of the main parts of development in any country. One of the means of assessing it is the number of scientific papers which are published in internationally approved journals. In this article we will compare scientific production in the field of pediatric surgery between Iran and three other Asian countries: Turkey, India and Pakistan during 25 years.

Material and methods: Using scientometric methods we analyzed scientific productions in the field of pediatric surgery indexed in bibliographic databases such as PubMed and Scopus during 25 years from 1990-2015 by 4 Asian countries: Iran, Turkey, India and Pakistan.

Results: Turkey had the most articles indexed in ISI web of Science with 843 articles, India had 545 articles, Iran had 127 articles and Pakistan had 29 articles in 25 years.

Conclusion: Our main intention was to assess the research activity of pediatric surgeons in Iran. And what we found showed that despite similarity in the population and budget among neighboring countries our scientific production is lower.

Introduction

Since the beginning of the last century scientific power and progress has been considered an important means of development among many countries. After the introduction of internet comparing this scientific

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progress has become very simple especially after the construction of bibliographic databases. Comparing scientific progress between countries has become popular and serves to enlighten the position of that specific field for those involved and encourage future improved activity or continuation of the current

outstanding activity depending on the results. In this article we will compare scientific production in the field of pediatric surgery between Iran and three other Asian countries: Turkey, India and Pakistan during 25 years.

India: has a population of 1,300,000,000 (2015) and a Gross national income per capita (PPP international \$, 2013) = 5 (<http://www.who.int/countries/ind/en/>).

Pediatric surgery in India as a subspecialty was implemented about 4 decades ago.¹ In 1966 the first M. Ch (Master of Chirurgiae) course was founded in Chennai by Dr. M. S. Ramkrishnan. The first person to secure M. Ch (Pediatric Surgery) under him was Dr. T. K. Subramanian. During the years to come the number of teaching departments increased and has reached to almost 50 teaching departments across India at present and now they have more than 1,300 pediatric surgeons.⁴

Two pediatric Surgeons are required for a total population of 1 million. The child population in India is 40% which means there are 400 million children under 12 years of age.²

The mean (range) annual neonatal admissions in neonatal surgical units are 137 (42–263). The mean newborn admissions requiring surgical intervention

per surgeon per year are 36 (17–80).³

Pakistan: has a population of 188,925,000 (2015) and a Gross national income per capita (PPP international \$, 2013) = 4 (<http://www.who.int/countries/ind/en/>).

According to the statistics provided by UNICEF (<http://www.unicef.org/infobycountry/pakistan>) in the year 2012 the total population was 179160100 of which 73844900 were under 18.

Turkey: has a population of 78,666,000 (2015) and a Gross national income per capita (PPP international \$, 2013) = 18 (<http://www.who.int/countries/ind/en/>). According to the statistics provided by UNICEF (http://www.unicef.org/infobycountry/Turkey_statistics.html) in the year 2012 the total population was 73997100 of which 23098200 were under 18.

Iran: Is the 18th largest country in the world which is divided into 31 provinces. It has a population of 79,109,000 (2015) and a Gross national income per capita (PPP international \$, 2013) = 15 (<http://www.who.int/countries/ind/en/>). Nearly 25% of the Iranian population consists of children between 0-14 years old which is about 20 million children. There are 25 centers that provide pediatric surgery care scattered in 20 of the 31 provinces of the country.

Table 1: General governmental expenditure on education (%GDP) in 2006 in four countries

	Iran	India	Turkey	Pakistan
General governmental expenditure on education (%GDP) in 2012	4.42	3.09	2.86	2.63
GDP, current prices, billion \$US in 2015	387.6	2,090.7	733.6	270

Educational Budget

General governmental expenditure on education is expressed as a percentage of GDP (Gross domestic product) and is shown in table 1 for the four countries assessed in this paper. (<http://data.uis.unesco.org>)

Materials and Methods

Using scientometric methods we analyzed scientific productions in the field of pediatric surgery indexed in bibliographic databases such as PubMed and Scopus during 25 years from 1990-2015 by 4 Asian countries: Iran, Turkey, India and Pakistan.

Also articles in the field of pediatric surgery which had at least one affiliation to these four countries, indexed in the Web of Science (ISI) were gathered.

Web of Science:

A search was carried out for each country using the word pediatric surgery in the field of “Topic” and the name of the country as the term searched in the field of address. The year of our search was limited to 1990 up to 2015. This search included all fields of surgery in children eg: pediatric neurosurgery, pediatric orthopedic surgery and

Scopus:

A search was carried out for each country using the

word pediatric surgery in the field of “affiliation” and the name of the country as the term searched in the field of affiliation-country. The year of our search was limited to 1990 up to 2015.

PubMed:

A search was carried out for each country using the word pediatric surgery in the field of “affiliation” and the name of the country also as the term searched in the field of affiliation. The year of our search was limited to 1990 up to 2015.

We analyzed the data gathered, using SPSS version 18.

Results

Sub specialty journals:

The Indian Association of Pediatric Surgeons (IAPS) publishes a pediatric surgery journal since 1995 which is indexed PubMed Central and SCOPUS.

Turkey had the most articles indexed in ISI web of Science with 843 articles in 25 years, at the same time USA had 10131 articles, Canada had 1683 articles, England had 1157 articles and Germany had 1391 articles.

number of articles indexed in ISI web of Science, PubMed Central and SCOPUS in the 4 countries studied during 25 years is summarized in **Table 2**.

Also articles indexed in each of these databases per

Table 2: Articles indexed in different data bases between 1990 and 2015

	ISI web of science	Scopus	PubMed
Iran	127	295	142
India	545	2113	1370
Turkey	843	3264	1959
Pakistan	29	143	111

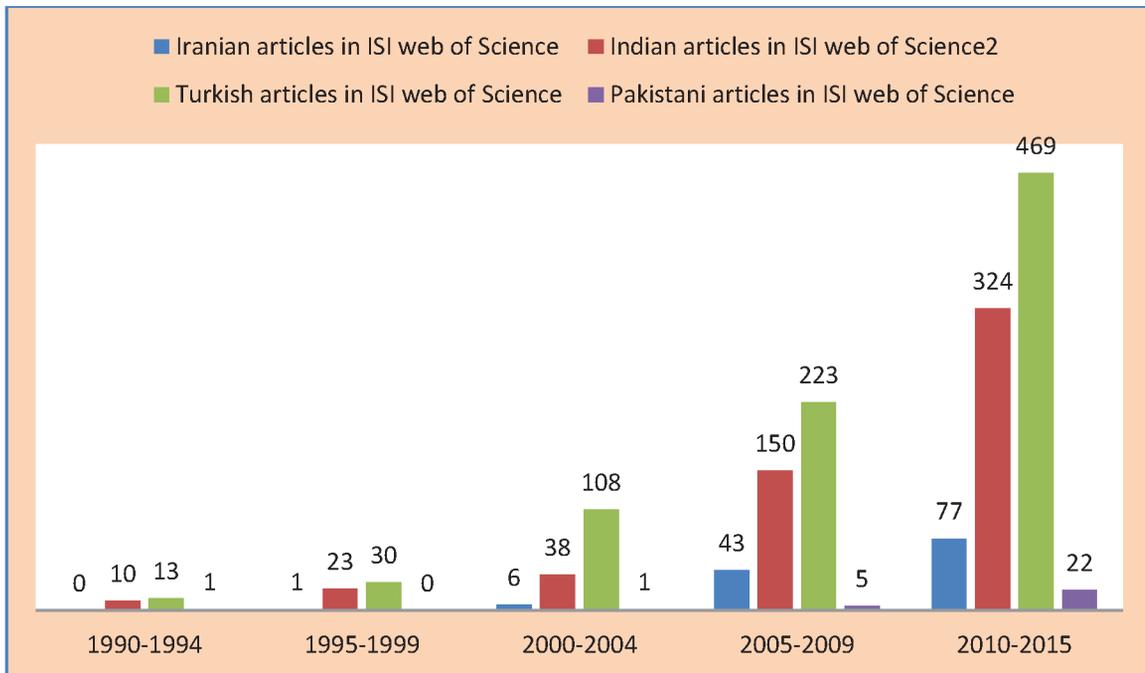


Figure 1: Articles indexed in ISI web of science per 5 years

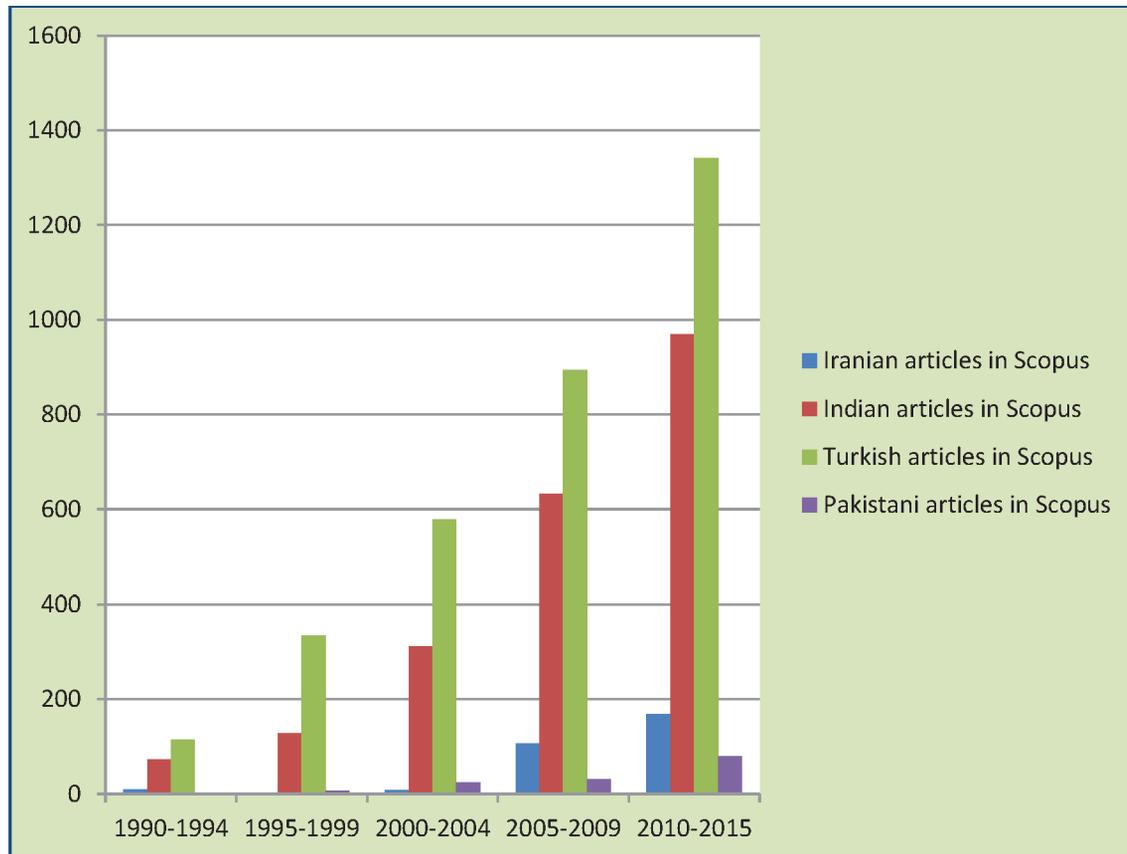


Figure 2: Articles indexed in scopus per 5 years

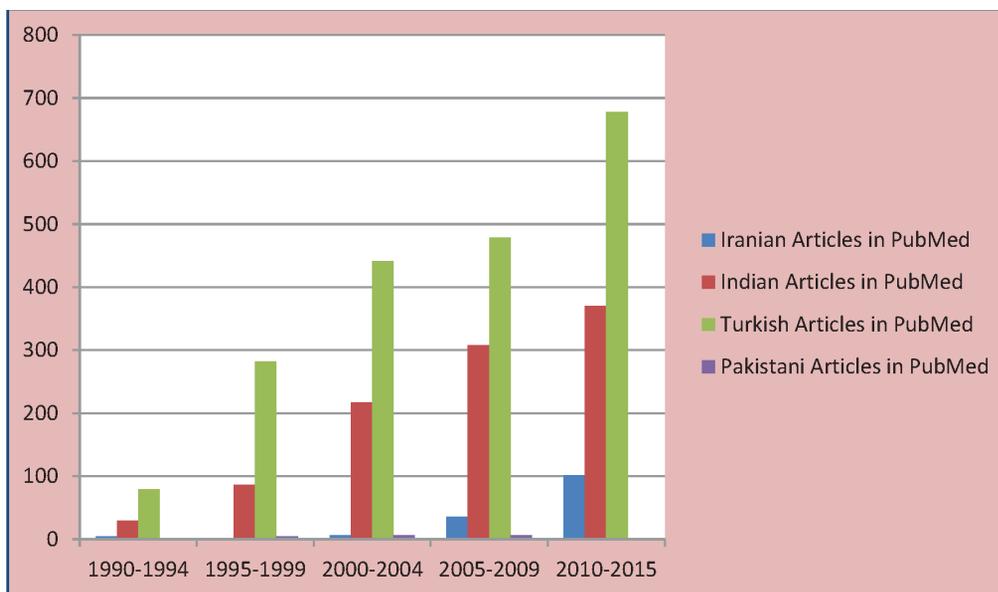


Figure 3: Articles indexed in PubMed per 5 years

5 year are shown in **Figures 1-3**.

In reference to the quality of the papers published we used the citation reports in the ISI Web of Science.

The 127 Iranian articles were cited 685 times which excluding self citations would be 677 times. Average citation per item is 5.39. It should be mentioned that citation of Iranian articles has increased in recent years **Figure 4** which is indicative of the increase in their qualities.

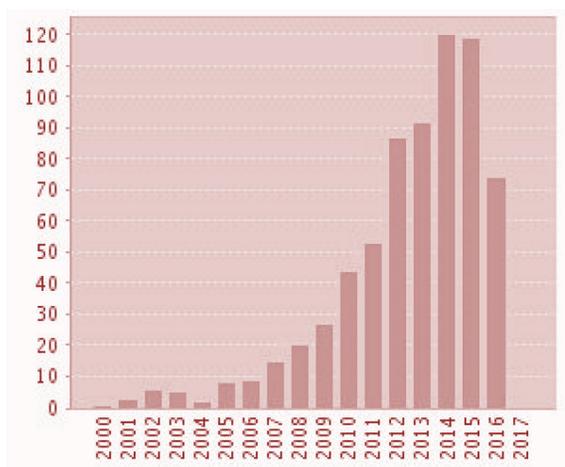


Figure 4: citations of the Iranian articles in ISI Web of Science from 2000 to 2016

The 545 Indian articles indexed in ISI Web of Science were cited 3813 times which excluding self citations would be 3600 times. Average citation per item is 7. It should be mentioned that citation of Indian articles has increased in recent years **Figure 5** which is indicative of the increase in their qualities.

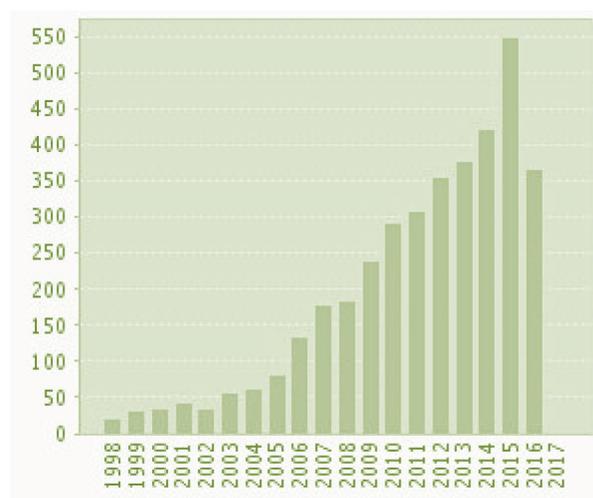


Figure 5: Citations of the Indian articles in ISI Web of Science from 2000 to 2016

The 844 Turkish articles indexed in ISI Web of Science were cited 6043 times which excluding self citations would be 5798 times. Average citation per item is 7.16. It should also be mentioned that citation of Turkish articles has increased in recent years **Figure 6** which is indicative of the increase in their qualities.

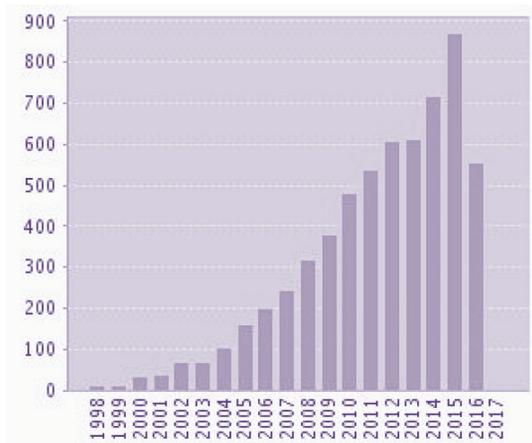


Figure 6: Citations of the Turkish articles in ISI Web of Science from 2000 to 2016

The 29 Pakistani articles indexed in ISI Web of Science were cited 133 times and no self citations were reported. Average citation per item is 5. It Citation of Pakistani articles has increased in recent years **Figure 7** which is indicative of the rise in their qualities.

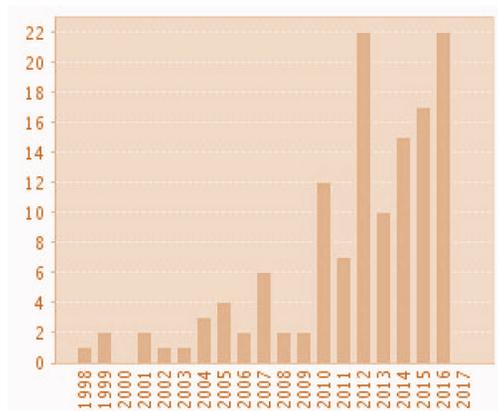


Figure 7: Citations of the Pakistani articles in ISI Web of Science from 2000 to 2016

Discussion

Assessing scientific progress and function in a particular field is a common practice in order to inform those working in that domain of the current situation and its limitations and shortcomings. Comparing these findings with those of other groups or countries can shed light on the etiology of the current situation. This is the reason that articles in scientology have become popular in the recent decade. To our knowledge comparing science production in the field of pediatric surgery in Asian countries hasn't been done before and this is the first step in evaluating the current situation and its improvement.

During these 25 years (from 1990-2015) pediatric surgery articles indexed in the ISI-web of Science by pediatric surgeons in America was 10131 followed by Canada with 1683 articles and Germany with 1391 articles. This included all fields of surgery in the pediatric population. The same search showed 127 articles for Iran, 843 articles for Turkey, 545 articles for India and 29 articles for Pakistan. (<http://apps.webofknowledge.com/Search.do>) which is significantly lower than those of the developed countries.

Among the four countries assessed turkey was the number one in production of scientific articles in the field of pediatric surgery followed by India. One of the assumptions might be that having a higher population may result in higher numbers of pediatric surgeons resulting in a higher production of scientific articles but this is not the case since turkey has the least population amongst the four but has the highest production of science thus one might assume the opposite that the lower the

population the better the use of resources and the higher the situation of science production, but that is also not true since India has the highest population amongst the four country and in fact it has the second highest population in Asia but is number two in science production among our four countries.

Also one might think that if the budget spent by a country on education is higher it may result in better outcome in science production, this may partly be true since according to **Table 1** the two countries which have the most production of science also have the highest budget for education but not entirely true since India's education budget is higher than Turkey but its science production is lower.

Regarding the quality of the papers which can be partly calculated by the increase in citations of the articles in consequent years it is obvious that all four countries have had similar rise in the quality of their work as shown in **Figures 4-7**.

It should be mentioned that we intended to assess science production in the field of pediatric surgery but due to the limitations in search mechanisms

in bibliographic databases many of our results also include articles in pediatric ophthalmology, pediatric otolaryngology and etc, but since this situation existed for all the countries; it shouldn't cause a problem.

In all we mainly had the intention of assessing the science production of Iranian pediatric surgeons; and what we found shows that we are far behind from our fellow Asian countries like Turkey which have similar population and educational budget.

It should be said that although Iranian pediatric surgeons have nothing less in their education and quality of care which they provide for their country –as shown by them being approved by UEMS section of pediatric surgery- they have a long way to go regarding research and science production in their specialty.

Ethics Approval

This study was approved by Ethics Committee of Shahid Beheshti University of Medical Sciences with ethical code IR.SBMU.REC.1392.379.

Conflict of Interest

There is no conflict of interest.

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