Doi: 10.5152/TJAR.2019.06787

Original Article

Paediatric Anaesthesia

Article in Press

Turkish Journal of Anaesthesiology & Reanimation

Research Output from the Irish Paediatric Hospitals in the Field of Anaesthesia and Intensive Care Over 10 Years: A Bibliometric Analysis

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Cite this article as: Abdelaal Ahmed Mahmoud M Alkhatip A, Younis M, Holmes C, Sallam A. Research Output from the Irish Paediatric Hospitals in the Field of Anaesthesia and Intensive Care Over 10 Years: A Bibliometric Analysis. Turk J Anaesthesiol Reanim 2019; DOI: 10.5152/TJAR.2019.06787.

Abstract

Objective: To the best of our knowledge, no bibliometric studies have characterised the paediatric anaesthesia research in Ireland. In this study, we aim to analyse the research output from two anaesthetic departments in Irish paediatric hospitals.

Methods: A Scopus database search was conducted to identify the publications from 2007 to 2018 of the departments of anaesthesia and intensive care medicine in the Children's University Hospital, Temple Street (CUH), and Our Lady's Children's Hospital, Crumlin (OLCHC).

Results: The Irish publications in paediatric anaesthesia and intensive care included 108 publications. CUH and OLCHC published 37 (34.9%) and 73 (68.8%) documents, respectively, with 6 (5.6%) documents affiliated with both hospitals. The number of original research articles was 28 (75.7%) for CUH versus 46 (63%) for OLCHC. The number of published reviews was 5 (13.5%) for CUH versus 11 (15.1%) for OLCHC. Over the last 2 years (2016, 2017), the number of OLCHC publications was almost double (13 and 14 publications) that of CUH (4 and 6 publications). For CUH, only two publications were in specialised journals. For OLCHC, 18 publications were in specialised journals, in addition to four publications in high-ranked journals. The mean impact factor for CUH publications was 3.78 (standard deviation [SD], 7.19) versus 4.52 (SD, 10.56) for OLCHC. From OLCHC, 20 authors published with a median h-index of 2.00 (interquartile range, 0-4.25), versus 14 authors form CUH with a median h-index of 1.50 (1.00-4.50).

Conclusion: Anaesthetic publications from the two Irish paediatric hospitals are unexceptional and with limited cooperation between the two hospitals. Research plans should be implemented.

Keywords: Bibliometric analysis, Ireland, Irish paediatric hospitals, paediatric anaesthesia, paediatric intensive care

Introduction

Clinical research is vital for the development of any health care system (1, 2). Reflecting this importance, the Irish health care system places research as a basic part of its structure (3). However, there are no definitive data focusing on the quantitative and qualitative assessment of the research activities originating from the Irish anaesthesia departments.

Research productivity can be measured using quantitative indices from scientific citation databases (4). The most commonly used index is the 2-year journal impact factor (IF) from Clarivate Analytics, Philadelphia, PA. This index measures the average citations per article in a given journal (5). As a measure of an author's cumulative productivity, the Hirsch's h-index was developed (6). This index has gained popularity as a measure of personal research output

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Received: 25.05.2019 Accepted: 30.07.2019
Available Online Date: 22.10.2019

in the physical and medical sciences (7-11).

The objective of this study is to systemically analyse both the quantity and the quality of the research articles published internationally from two Irish paediatric hospitals over the last 11 years in the field of paediatric anaesthesia and paediatric intensive care. We also aim to identify factors that may influence the Irish paediatric anaesthesia research output.

Methods

The current research included a retrospective analysis of the published medical research in the field of paediatric anaesthesia and paediatric intensive care originating from the two Irish paediatric hospitals: Children's University Hospital Temple Street (CUH) and Our Lady's Children's Hospital, Crumlin (OLCHC).

We conducted a literature search in Scopus database from 2007 to 2018 in the fields of anaesthesia and intensive care using the search terms 'Children's University Hospital, Temple Street,' 'Temple Street Children's University Hospital,' and 'Our Lady's Children's Hospital, Crumlin.' We included only publications with at least one author affiliated with one of the studied paediatric anaesthesia departments. The search was conducted according to the best practice methodologies set in the Cochrane Handbook for Systematic Reviews (12).

The search for CUH on Scopus was applied in two ways as the initial search showed that Children's University Hospital, Temple Street (CUH) has two affiliation IDs; the first ID is for the name format 'Children's University Hospital, Dublin' (Affiliation ID: 60005073), and the second ID is for the name format 'Temple Street Children's University Hospital' (Affiliation ID: 60003135), while Our Lady's Children's Hospital, Crumlin (OLCHC) has a single Scopus affiliation ID (Affiliation ID: 60020035). The search results were checked for duplicates (publications that appear affiliated to both hospitals. The publications collected for analysis were classified according to their type as either articles, reviews or letters).

The Scopus author search tool was used to obtain the authors h-indexes using the authors names as search terms. The journal impact factors were obtained from the Journal Citation Reports. A comparative analysis between hospitals was done with the t-test for means. The article search results of Scopus were analysed using the Scopus data analysis tools.

Results

From the 1st of January 2007 to the 1st of September 2018, the Irish publications in the fields of paediatric anaesthesia and intensive care included 108 documents. CUH published 42 (38.8%) documents and OLCHC published 73 (67.6%), with an average of 3.57 and 6.21 publications per year, respectively. Seven (6.5%) documents had affiliations to both hospitals. Most publications from both hospitals were original research articles and reviews. The number of research articles was higher for OLCHC (46 articles) compared to CUH (28 articles) (Figure 1).

The yearly distribution of the published documents from the anaesthesia departments in the two Irish paediatric hospitals

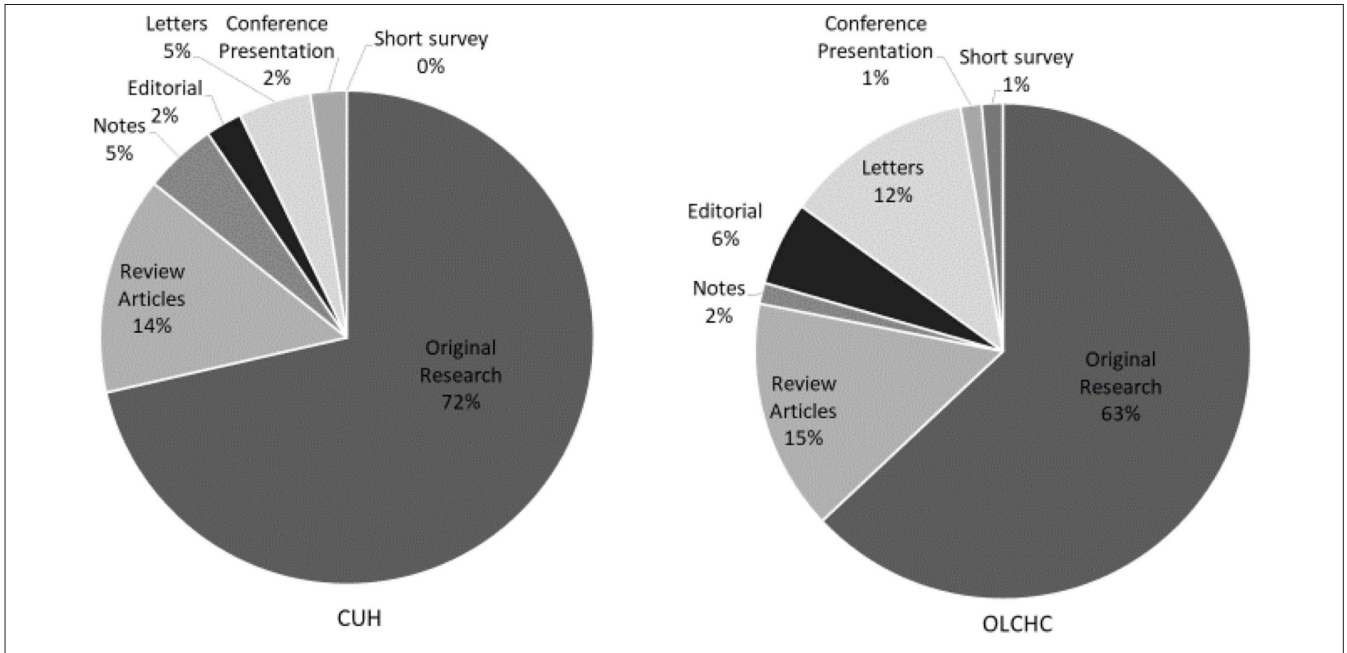

Figure 1. Type of Documents Published from the Department of Anaesthesia of the CUH and OLCHC
OLHCH: Our Lady's Children's Hospital at Crumlin; CUH: Children's University Hospital at Temple Street

is presented in Figure 2. Although CUH had less publications overall, in time it showed a more consistent growth in the number of publications per year. OLCHC showed a more erratic trend of publications with two peak years of high research output and three epochs of low output.

Out of the 42 publications from the Department of Anaesthesia in CUH, only five publications (11.9%) were in specialised journals, one publication in *Anesthesiology* journal, two publications in *Pediatric Critical Care Medicine* journal, one in *Pediatric Anesthesia Journal* and one publication in *International Journal of Obstetric Anesthesia*, while the other 37 publications (88%) were in non-specialised journals, that is, not anaesthesia or intensive care journals (Table 1).

Out of the 73 publications from the Department of Anaesthesia in OLCHC, only 18 publications (24.6%) are in specialised journals, as *Pediatric Anesthesia Journal* (9 publications), *Pediatric Critical Care Medicine* (6 publications), *Anesthesiology* (1 publication), *BMC Anesthesiology* (1 publication), *Intensive Care Medicine* (1 publication), in addition to four publications (5.5%) in high-ranked journals including *Cochrane Database*, *New England Journal of Medicine*, *JAMA* and *JAMA Pediatrics*, while the other 51 publications (69.8%) were in non-specialised journals, that is, not anaesthesia or intensive care journals.

Publications from CUH contained a total of 160 authors, with the range of publications number per author is 1-4. Publications from OLCHC contained also 160 authors, but with a higher range of publications number per author is 1-8 (Table 2).

The mean journal IF for the articles published by OLCHC was higher than the mean journal IF for the publications by CUH, with a value of 4.52 (standard deviation [SD], 10.56) and 3.78 (SD, 7.19), respectively. This difference was not statistically significant with a p=0.658 (Table 3).

While 20 publishing authors had affiliations with the OLHCH Department of Anaesthesia, only 14 authors had affiliations with the CUH Department of Anaesthesia. The h-index from OLHCH authors showed a tendency to be higher with a median of 2.00 and an interquartile range of 0-4.25. The h-indexes of CUH authors showed a median of 1.50 with an interquartile range of 1-4.50 (Table 4).

Discussion

The present bibliometric analysis shows the quantity, quality and the yearly distribution of publications from the Department of Anaesthesia in the two paediatric hospitals in Ireland. We found that OLCHC had a better publication output than CUH. One of the factors that may contribute to the higher number and quality of publications from OLCHC over CUH is the presence of a dedicated research fellow in the Department of Anaesthesia in OLCHC. This indicates the presence

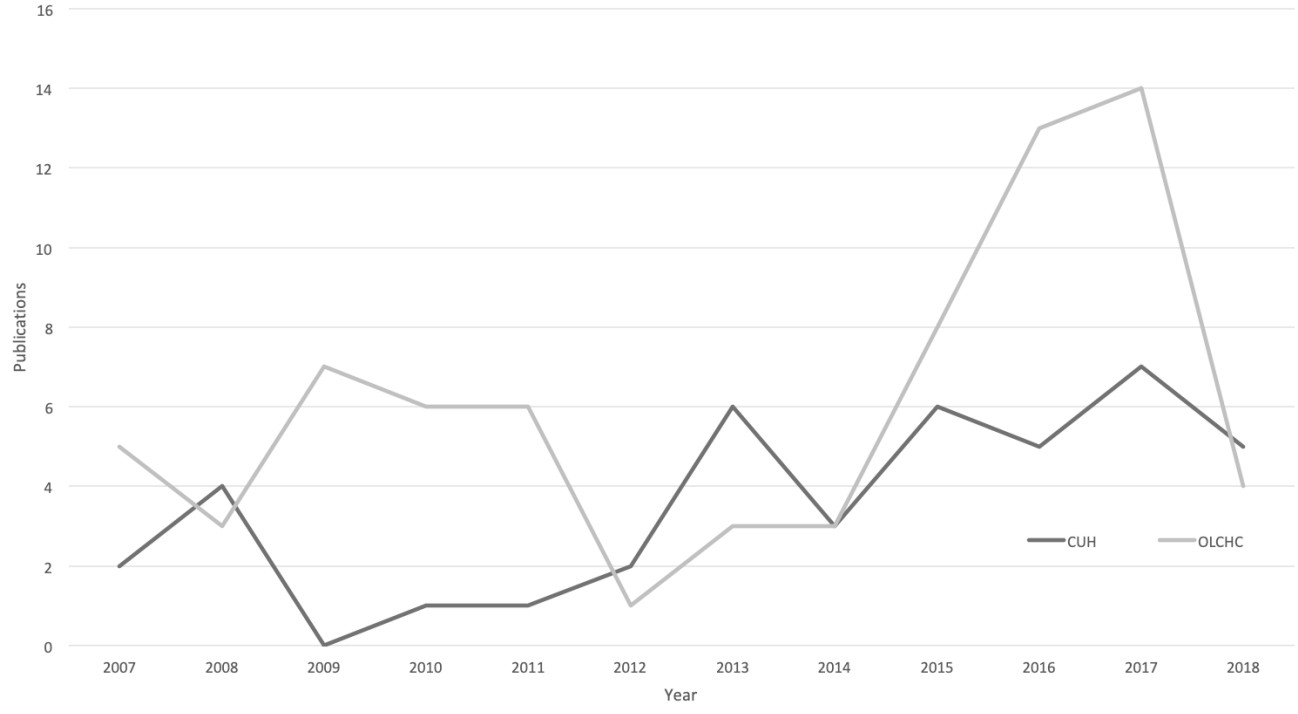

Figure 2. Yearly Distribution of the Published Documents from the Departments of Anaesthesia of the CUH and OLCHC

OLHCH: Our Lady's Children's Hospital at Crumlin; CUH: Children's University Hospital at Temple Street

of a research budget and a departmental and institutional concern about the process of carrying out research. It has been demonstrated that the accreditation of research funding correlates to a much higher productivity of publishable material, both in quantity and quality (9). The Department of

Table 1. Distribution of Publications from the Department of Anaesthesia of the CUH in Different Journals

Journal	Number of articles
Irish Medical Journal	6
Acta Paediatrica International Journal of Paediatrics	2
European Journal of Pediatrics	2
Journal of Hospital Infection	2
Pediatric Critical Care Medicine	2
Acta Ophthalmologica Scandinavica	1
Anesthesiology	1
Archives of Disease in Childhood	1
Archives of Disease in Childhood Fetal and Neonatal Edition	1
BMJ Open	1
Child S Nervous System	1
Clinical Microbiology and Infection	1
Developmental Medicine and Child Neurology	1
European Respiratory Journal	1
International Journal of Obstetric Anesthesia	1
International Journal of Oral and Maxillofacial Surgery	1
International Journal of Pediatric Otorhinolaryngology	1
Irish Journal of Medical Science	1
JAMA Journal of The American Medical Association	1
Journal of Clinical Endocrinology and Metabolism	1
Journal of Inherited Metabolic Disease	1
Journal of Neurosurgery Pediatrics	1
Journal of Orthopaedic Trauma	1
Journal of Pediatric Orthopaedics	1
Journal of Pediatrics	1
Journal of Perinatology	1
Journal of Plastic Reconstructive and Aesthetic Surgery	1
Paediatric Anaesthesia	1
Pediatric Infectious Disease Journal	1
Pediatric Pulmonology	1
Seizure	1
Spine Journal	1

CUH: Children's University Hospital at Temple Street

Table 2. Distribution of Publications from the Department of Anaesthesia of OLCHC in Different Journals

Journal	Number of publications
Paediatric Anaesthesia	9
Pediatric Critical Care Medicine	6
Irish Journal of Medical Science	5
Cochrane Database of Systematic Reviews	4
Irish Medical Journal	4
Journal of Pediatrics	4
Acta Paediatrica International Journal of Paediatrics	3
Archives of Disease in Childhood Fetal and Neonatal Edition	3
Cardiology in The Young	3
Anesthesiology	1
Archives of Disease in Childhood	1
BMC Anesthesiology	1
BMJ Case Reports	1
BMJ Open	1
British Journal of Haematology	1
Catheterization and Cardiovascular Interventions	1
Clinical Dysmorphology	1
Epidemiology and Infection	1
European Archives of Paediatric Dentistry Official Journal of The European Academy of Paediatric Dentistry	1
European Journal of Palliative Care	1
European Journal of Pediatrics	1
Haemophilia	1
Infant Mental Health Journal	1
Intensive Care Medicine	1
International Journal of Surgery	1
JAMA Journal of The American Medical Association	1
JAMA Pediatrics	1
Journal Of AAPOS	1
Journal of Cardiothoracic and Vascular Anesthesia	1
Journal of Cystic Fibrosis	1
Journal of Pediatric Orthopaedics Part B	1
Journal of Thrombosis and Haemostasis	1
Neonatology	1
New England Journal of Medicine	1
Pediatric Infectious Disease Journal	1
Pediatric Surgery International	1
Pediatrics	1
Resuscitation	1
Seizure	1
Thrombosis Research	1

OLCHC: Our Lady's Children's Hospital at Crumlin

Table 3. Summary of Impact Factors of Journals Publishing Articles with Affiliations to OLCHC and Articles with Affiliations to the CUH

Journals Impact Factors Summary			
	OLHCH	**CUH**	**p**
Mean	4.52	3.78	0.658
Standard error	1.24	1.11	
Median	2.33	2.33	
Mode	1.22	1.22	
Standard deviation	10.56	7.19	
Sample variance	111.52	51.70	
Kurtosis	38.98	35.99	
Skewness	6.04	5.85	
Range	78.88	46.62	
Minimum	0.38	1.04	
Maximum	79.26	47.66	
Sum	329.71	158.77	
Count	73.00	42.00	
Confidence level (95.0%)	2.46	2.24	

OLHCH: Our Lady's Children's Hospital at Crumlin; CUH: Children's University Hospital at Temple Street

Table 4. Summary of h-Indexes from Authors with Affiliations to OLCHC and Authors with Affiliations to the CUH

Consultants h-index Summary			
	OLHCH	**CUH**	**p**
Mean	2.95	4.21	0.576
Standard error	0.83	2.06	
Median	2.00	1.50	
Mode	0.00	1.00	
Standard deviation	3.69	7.70	
Sample variance	13.63	59.26	
Kurtosis	5.06	11.61	
Skewness	1.96	3.31	
Range	15.00	30.00	
Minimum	0.00	0.00	
Maximum	15.00	30.00	
Sum	59.00	59.00	
Count	20.00	14.00	
Confidence level (95.0%)	1.73	4.44	
Quartile 1	0	1	
Quartile 3	4.25	4.5	
Interquartile range	4.25	3.5	

OLHCH: Our Lady's Children's Hospital at Crumlin; CUH: Children's University Hospital at Temple Street

Paediatric Anaesthesia from OLCHC is also larger than that of the CUH. This also indicates a larger number of anaesthesiologists publishing their work.

The research productivity of these two paediatric anaesthesia departments was relatively high. OLCHC had a higher productivity than CUH with an average publication rate of 6.21 and 3.57 publications per year, respectively. To put this numbers in perspective, data from all Turkish anaesthesia departments show a mean productivity of 0.88 publications per year for university hospitals and 0.46 publications per year for teaching hospitals not affiliated with a university. The Turkish hospital with the highest research output published 4.40 documents per year (13). The United States has had the highest productivity in the anaesthesia literature (14). A study from 1996 to 2011 of selected anaesthesia departments in the United States showed a department with a productivity as high as 26.5 publications per year (15). There are no similar studies in the field of paediatric anaesthesia, to the best of our knowledge. Taking that in consideration, the research productivity of the Irish paediatric anaesthesia departments can be considered as average, and different measures can be taken to increase it considerably.

The journal IF from Clarivate Analytics was developed as a tool for the measurement of a journal output in terms of its citation frequency. It has also been used as a quantitative parameter of quality for published documents (5). We found that the mean IF for OLCHC and CUH were 4.52 and 3.78, respectively. This is a high mean IF, considering that a study of four important anaesthesia journals showed a mean IF for their paediatric anaesthesia publications of 1.16 in 2000 and 1.59 in 2005 (16).

The h-index has been used as a tool to evaluate the research output of anaesthesiology physicians. Although it has shown a cumulative effect over time and is not a good measure of the current work of an individual author, it has also shown great utility when comparing groups of researchers and clinicians in the field of anaesthesiology (7, 10). Our data show a median (interquartile range) h-index for the groups of OLCHC and CUH of 2.00 [0-4.25] and 1.50 [1-4.50], respectively. Similarly, a study from all university affiliated hospitals in Canada up to the year 2009 showed that the median h-index for all Canadian authors in the field of paediatric anaesthesia was 2 [1-5] (10). In contrast, a study of anaesthesia authors in the United Kingdom showed a median h-index of 6 [3-8] for the years 2004-2008 (11). It has to be considered that the last study also included adult anaesthesia literature, and the indexes were obtained from a different database.

Conclusion

During our search on Scopus, we discovered that CUH had double affiliation IDs and two main name formats in the Sco-

pus database. For OLCHC, it had multiple name formats, but under a single affiliation ID. The presence of multiple affiliation IDs for the same institution can be a source of confusion during the publication process, in addition to the possibility of underestimation of the publication rate of this institution. The research committee within a hospital or institution should be aware of this issue and ask the scientific databases as Scopus to unify the affiliation IDs for the multiple name formats of the institution. Also, the hospital should request researchers and authors to use a single-name format during submission of their work for publication.

Ethics Committee Approval: No ethics committee approval was required for this study as it did not include any patients or clinical data.

Informed Consent: No consent was required for this study as the study did not include any patients or any clinical data.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – A.A.A.M.M.A.; Design – A.A.A.M.M.A.; Data Collection and Analysis – A.A.A.M.M.A., C.H., A.S.; Writing the Primary Manuscript – A.A.A.M.M.A., M.Y.; Revision and Editing of the Final Manuscript - A.S.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

References

1. Nass SJ, Levit LA, Gostin LO. Beyond the HIPAA Privacy Rule: Enhancing Privacy, Improving Health Through Research. 2009. doi:10.1111/j.1467-8519.2007.00622.x. [CrossRef]
2. Dobrow MJ, Miller FA, Frank C, Brown AD. Understanding relevance of health research: Considerations in the context of research impact assessment. Heal Res Policy Syst 2017; 15: 31. [CrossRef]
3. Education, Training and Research. 2009. Available from: https://www.hse.ie/eng/services/publications/etr/education training research.pdf. Accessed January 22, 2019.
4. Wouters P, Leydesdorff L. Has Price's dream come true: Is scientometrics a hard science? Scientometrics 1994. doi:10.1007/BF02018560. [CrossRef]
5. Pendlebury DA. Whitepaper: Using Bibliometrics: A Guide to Evaluating Research Performance with Citation Data. 2008. doi:10.1097/NCN.0b013e31819ec9ac. [CrossRef]
6. Ball P. Achievement index climbs the ranks. Nature 2007; 448: 737. [CrossRef]
7. Pagel PS, Hudetz JA. H-index is a sensitive indicator of academic activity in highly productive anaesthesiologists: results of a bibliometric analysis. Acta Anaesthesiol Scand 2011; 55: 1085-9. [CrossRef]
8. Saunders TFC, Rymer BC, McNamara KJ. A global bibliometric analysis of otolaryngology: Head and neck surgery literature. Clin Otolaryngol 2017; 42: 1338-42. [CrossRef]
9. Pagel PS, Hudetz JA. Scholarly productivity and National Institutes of Health funding of Foundation for Anesthesia Education and Research grant recipients: Insights from a bibliometric analysis. Anesthesiology 2015; 123: 683-91. [CrossRef]
10. O'Leary JD, Crawford MW. Bibliographic characteristics of the research output of pediatric anesthesiologists in Canada. Can J Anesth 2010; 57: 573-7. [CrossRef]
11. Moppett IK, Hardman JG. Bibliometrics of anaesthesia researchers in the UK. Br J Anaesth 2011; 107: 351-6. [CrossRef]
12. Higgins JPT, Green S, (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [Updated March 2011]. 2011. doi:10.1088/0004-637X/699/2/L76. [CrossRef]
13. Yılmaz HO, Babazade R, Turan OA, Babazade B, Koyuncu O, Turan A. Scientific Publication Performance of Turkish Anaesthesia Clinics in High Impact Factor International Journals Between 2005 and 2014: A Bibliometric Analysis. Turkish J Anaesthesiol Reanim 2017; 45: 16-25. [CrossRef]
14. Swaminathan M, Phillips-Bute BG, Grichnik KP. A bibliometric analysis of global clinical research by anesthesia departments. Anesth Analg 2007; 105: 1741-6. [CrossRef]
15. Pagel PS, Hudetz JA. An analysis of scholarly productivity in United States academic anaesthesiologists by citation bibliometrics. Anaesthesia 2011; 66: 873-8. [CrossRef]
16. Ramsdell R, Lerman J, Pickhardt D, Feldman D, Foster J, Houle TT. Subspecialty Impact Factors: The Contribution of Pediatric Anesthesia and Pain Articles. Anesth Analg 2009; 108: 105-10. [CrossRef]