Scientometric Dimensions of Blood Cancer Research

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Abstract - *This paper attempts to highlight quantitatively the growth and development of world literature on blood cancer particularly in the South Asian region in terms of publication output as per PubMed database (2004-2013). During 2004-2013 a total of 1936 papers were published by experts in medical science in the field 'Blood Cancer'. A total of 1936 papers were published from the 8 South Asian countries in the field of Blood Cancer. The highest papers (1731) were published by India in 10 years period. Pakistan is the second highest producing country with 127 publications. The average number of publications produced per year was 173. The highest number of publications (286) from India was produced in 2012.*

Keywords: Scientometrics, Blood Cancer, Bibliometrics PubMed Database

Introduction

Cancer is a dangerous disease in which certain cells in our body grow in an uncontrolled way. It is one of the world's most serious illnesses. Together with heart attacks it kills more people than any other disease in the world.

The human body has billions of cells. They are tiny elements of living material. Cells always reproduce themselves. Normally our body controls this process. It tells cells to divide themselves when we need it and to stop when we don't. Sometimes, however, cell growth gets out of control and the production of cells doesn't stop.

These cells that produce new tissue are called tumours. They can be benign or good tumours or malignant or bad tumours. A benign tumour usually stays in the same area in which it starts growing. It is often harmless. A malignant tumour however is dangerous. It can grow and spread to healthy cells and destroy them. Cells from malignant tumours can also spread to other parts of the body and produce more tumours. These malignant tumours are the ones that cause cancer and may even lead to death. Sometimes they enter the blood and lymphatic system.

Blood cancer represents a large group of different malignancies. This group includes cancers of the bone marrow, blood, and lymphatic system, which includes lymph nodes, lymphatic vessels,

tonsils, thymus, spleen, and digestive tract lymphoid tissue. Leukemia and myeloma, which start in the bone marrow, and lymphoma, which starts in the lymphatic system, are the most common types of blood cancer. What causes these cancers is not known.

PubMed Database

PubMed is a free search engine accessing primarily the MEDLINE database of references and abstracts on life sciences and biomedical topics. The United States National Library of Medicine (NLM) at the National Institutes of Health maintains the database as part of the Entrez system of information retrieval.

From 1971 to 1997, MEDLINE online access to the MEDLARS Online computerized database had been primarily through institutional facilities, such as university libraries. PubMed, first released in January 1996, ushered in the era of private, free, home- and office-based MEDLINE searching. The PubMed system was offered free to the public in June 1997, when MEDLINE searches via the Web were demonstrated, in a ceremony, by Vice President Al Gore.

Need For the Study

Cancer is a public health problem in both industrialized and developing countries and remains a leading cause of morbidity and mortality worldwide. India consists of largest pool of patients with different types of cancer. In a country like India, prevention of oncology and early detection of it is much more important than any drug discovery. This research would become a valuable resource to assist the scientific community, funding agencies and governmental efforts to concentrate resources on strengthening the local cancer research capacity and on developing public health initiatives and cancer control strategies.

Importance and Relevance of the Study

Now a day's Cancer has become a common household word, with each of us closely associated with at least one near and dear one diagnosed with the cancer. In India there is also a perception that cancer incidences is on the increase; and a hope that perhaps with the advances in technology.

IACR has published updated estimations in Globocan 2012 report that, global cancer burden estimates were 14.1 million and 8.2 million cancer deaths and five year prevalence of 32.6 million cancers in individuals above the age of 15 years. Globocan 2012 estimates indicate a substantive increase to 19.3 million new cancer cases by 2025.
In India 1.1 million new cases were estimated, indicating India as a single country contributing to 7.8% of global cancer cases.

Only few studies have been carried in the past on the evaluation of Indian cancer literature. Among such studies, Patra and Bhattacharya analyzed World and Indian oncology research output (6484 papers) during 1987-2003, using PubMed database. When we hear that someone

has been diagnosed with cancer, the question that comes to mind is "what are they going to do for treatment?". The decision of cancer treatment travels many highways and byways of research. Usually cancer patients can tell you what drugs, were given that took them to "deaths door and back," caused them to be "really tired" beyond any concept of what "tired" meant, but they can't usually tell you why their doctor chose the specific treatment. The patients don't learn the history of their drug. In most cases, they don't care, nor should they, but the path it took from concept to the IV drip is one that also is responsible for saving their life! Other than, "That's what they say they are supposed to do for my type of cancer," usually patients don't think twice about how their drug got to be the one of choice. If we think about the cancer treatments available today, we must be strongly reminded that those drugs didn't just "appear" out of nowhere. They are a result of many years of study, trials, promise and money. Thus this study helps the researchers, medical professionals and laymen to understand the present publication growth of blood cancer literature and recent developments in the subject area.

Objectives

The main objectives of the study is to present the growth of literature and make the quantitative assessment of status of blood cancer research in south Asia by way of analyzing the following features of research output:

- To find country wise distribution of research output of South Asia.
- To find the year wise growth of publication of India.
- To compare the growth of publication of world and India.

Research Methodology

The Data Source for the study was PubMed database, published by NLM. It is an abstract database, Comprises of more than 24 million citations for biomedical literature from MEDLINE, life science journals, and online books. Citations may include links to full text content from PubMed Central and Publisher website.

By using suitable search strategy, records pertaining to South Asian countries were downloaded for the years 2004 to 2013 on December 2014. All the details were transferred to spreadsheet and the data was analyzed as per the objectives of the study.

Results and Discussions

Table 1: Country wise Distribution of Research Output in Blood Cancer of South Asia:

Country Name	No. of Publications	Percentage (%)
India	1731	89.41
Pakistan	127	6.56
Bangladesh	38	1.96
Nepal	29	1.5
Sri Lanka	5	0.26

Bhutan	3	0.15
Maldives	2	0.1
Afghanistan	1	0.05
Total	**1936**	**100**

Table: 1 provides the county wise distribution of number of publications of 8 South Asian countries on Blood Cancer in 10 years (2004 to 2013). A total of 1936 papers were published by scientists from medical field from the 8 South Asian countries in the field of Blood Cancer. The highest papers (1731) were published by India in 10 years period. Pakistan is the second highest producing country with 127 publications, followed by Bangladesh with 38, Nepal with 29, Sri Lanka with 5, Bhutan with 3, Maldives with 2 and Afghanistan with only 1 publication.

Table 2: Year wise Distribution of Research Output in Blood Cancer of South Asian Counties:

Year	India	Pakistan	Bangladesh	Nepal	Sri Lanka	Bhutan	Maldives	Afghanistan
2004	68	9		1				
2005	95	4		1				
2006	122	3	4	1				
2007	131	9	6	1				
2008	155	10	2					1
2009	173	12	5	1	1		1	
2010	215	15	3	2				
2011	231	17		4				
2012	286	21	9	8				
2013	255	27	9	10	4	3		
Total	**1731**	**127**	**38**	**29**	**5**	**3**	**2**	**1**

Table: 2 provide the Year wise distribution of number of publications of 8 South Asian countries on Blood Cancer in 10 years (2004 to 2013). A total of 1731 papers were published by scientists from medical field from India in the field of Blood Cancer. Compared to other South Asian Countries like Afghanistan, Maldives, Bhutan, SriLanka, etc. India has more publications in the field and Indian Scientists started working on it from (2004-2013) continuously.

Table 3: Year wise growth of publication of India

Year	No. of Publication	Percentage (%)
2004	68	14.73137
2005	95	16.52224
2006	122	13.34489

2007	131	12.42057
2008	155	9.994223
2009	173	8.954362
2010	215	7.56788
2011	231	7.047949
2012	286	5.488157
2013	255	3.928365
Total	**1731**	**100**

During 2004-2013, a total of 1731 publications were published on blood cancer by India. The average number of publications produced per year was 173. The highest number of publications 286 were produced in 2012. Table: 3 gives year wise growth on Blood Cancer in India.

It can be clearly visualized from the figure that growth of the literature was exponential which indicates that research on Blood Cancer received major impetus during this period.

Table 4: Relative Growth Rate and Doubling Time for Contributions

Year	No. of Publication	Cumulative No of Publications	W1	W2	R (a) W2-W1	Mean R (a) (1-2)	Doubling Time Dt(a)	Mean Dt(a) (1-2)
2004	68	68	4.22	4.22	0		0	
2005	95	163	4.55	5.09	0.54		1.283333333	
2006	122	285	4.8	5.65	0.85		0.815294118	
2007	131	416	4.87	6.03	1.16		0.597413793	
2008	155	571	5.04	6.34	1.3	0.77	0.533076923	0.644
2009	173	744	5.15	6.61	1.46		0.474657534	
2010	215	959	5.37	6.86	1.49		0.465100671	
2011	231	1190	5.44	7.08	1.64		0.422560976	
2012	286	1476	5.65	7.29	1.64		0.422560976	
2013	255	1731	5.54	7.45	1.91	1.628	0.362827225	0.428
Total	**1731**	**3462**	**7.45**	**8.14**	**0.69**		**1.004347826**	

The data on Blood Cancer total output of India over a period of 10 years (2004-2013) is shown in Table-4 for the purpose of analyzing the relative growth rate and doubling time has been collected from PubMed database.

Table 5: Comparison of growth of publication of India and World

Year	No. of Publication of India (TP)	No. of Publication of World (TP)	% of TP Shares
2013	255	12380	2.06
2012	286	12081	2.37
2011	231	10778	2.14
2010	215	10047	2.14
2009	173	9380	1.84
2008	155	9135	1.7
2007	131	8547	1.53
2006	122	7976	1.53
2005	95	7838	1.21
2004	68	7243	0.94
Total	**1731**	**95405**	**17.46**

TP= Total Publications

The global research output in Blood Cancer has increased from 7243 in 2004 to 12380 in 2013. The trend shows a steady and significant increase in the publications (Table 5).

In the same manner, the Indian research output in Blood Cancer too has increased from 68 in 2004 to 255 by 2013. The trend shows a higher steepness, indicating a faster increase in research output vis-à-vis global research output.

Conclusion

The Scientific Study on Blood Cancer based on PubMed database shows that India is the major producer of scientific output with 1731 publications to its credits in this field in South Asia. Growth of Publication peaked in 2012 indicates that sudden impetus has been received for the research during this period. Only four countries in South Asia (India, Pakistan, Bangladesh and Nepal) have contributed more than fifty percent of the total publications.

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