

Gall Bladder Cancer Research: A Scientometric Study of Indian Publications during 2006-15

Ritu Gupta¹, K.K. Mueen Ahmed², B.M. Gupta³ and Ashok K. Garg^{4*}

ABSTRACT

The paper examines 492 Indian publications on gallbladder cancer research, as covered in Scopus database during 2006-15, experiencing an annual average growth rate of 2.46% and citation impact of 7.10. The world gallbladder cancer output (6289 publications during 2005-14) came from several countries, of which the largest global publication share (21.07%) came from USA, followed by Japan (15.58% share), China, (11.32%), India (7.82% share), South Korea (5.76% share), U.K., Germany and Italy (from 4.09% to 4.82%), France and Canada (from 2.02 to 2.67%) during 2006-15. India's global publication share was 7.82% and hold 4th rank in global output during 2006-15. India's international collaborative publications share in gallbladder cancer was 9.96% during 2006-15, which increased from 9.80% to 10.07% from 2006-10 to 2011-15. Medicine, among subjects, contributed the largest publication share (92.68%), followed by biochemistry, genetics and molecular biology (3.789%), pharmacology, toxicology and pharmaceuticals (3.46%), immunology and microbiology (1.42% share) and agricultural and biological sciences (1.22% share) and during 2006-15. Diagnosis, surgery, pathology and prognosis, among treatment methods, together accounted for 89.84% share of the total publication output on gallbladder cancer in India during 2006-15. The four cities, namely, Delhi, Lucknow, Mumbai and Varanasi together accounted for 56.90% of the country output during 2006-15. The most productive 15 Indian organizations, authors and journals in gallbladder cancer research together contributed 67.89%, 53.66% and 37.80% share respectively in the cumulative publications output of India in gallbladder cancer research during 2006-15.

Key words: Gallbladder cancer, Publications, India, Scientometrics, Bibliometrics.

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INTRODUCTION

Gall bladder is a small pear shaped organ on the right side of abdomen, behind the right lower ribs, just below the liver. It usually measures about an inch in width and 3-4 inches long. The function of gall bladder is to concentrate and store digestive fluid called bile that is formed in the liver. During the process of digestion, when food enters the first part of the small intestine, the gall bladder contracts and releases bile into small intestine through a which helps in digesting the fats.^[1] The gall bladder's wall is made up of three main layers of tissue:(i) the mucosa, which is the innermost layer and covers the wall of the gall bladder, (ii) the muscularis, the middle layer of smooth muscle and (iii) the serosa, the outer layer. Primary gall bladder cancer begins in the inner layer and spreads into the outer layers as it grows.^[2] Gall bladder is helpful organ but not an essential organ, one can live without it. Many people who have got their gall bladder removed lead normal life after surgery. Gall bladder cancer (GBC) forms in the tissues of gall bladder.^[1]

Gall bladder cancer is a relatively uncommon cancer. It has peculiar geographical distribution being common in central and South America, Central and

Eastern Europe, Japan and Northern India; it is also common in certain ethnic groups e.g. Native American Indians and Hispanics.^[3] If it is diagnosed early enough, it can be cured by removing the gall bladder, part of the liver and associated lymph nodes. Most often it is found after symptoms such as abdominal pain, jaundice and vomiting occur, and it has spread to other organs such as the liver. It is a rare cancer that is thought to be related to gallstones building up, which also can lead to calcification of the gall bladder, a condition known as porcelain gall bladder. Porcelain gall bladder is also rare. Some studies indicate that people with porcelain gallbladder have a high risk of developing gall bladder cancer, but other studies question this. The outlook is poor for recovery if the cancer is found after symptoms have started to occur, with a 5-year survival rate close to 3%.^[3] Globally about 1, 78, 101 gall bladder cancer cases (GBC) are estimated to occur in the year 2015. Unique features of GBC such as strong gender, ethnic and geographical propensity suggest influence of genetic and environmental factors. Twice the numbers of women than men suffer from this cancer. GBC is one of the most common gastrointestinal cancers, especially in women in areas of high prevalence. Globocan 2012 age adjusted rates (AAR) data

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show that the disease is uncommon in African region (0.7/1,00,000) and highest in Eastern Asia (3.3/1,00,000). Developed countries show low incidence rate of these cancers. Chile has the highest incidence rate in both the sexes (12.8/ 1,00,000 in women; 6.3/1,00,000 in men). In India, GBC is more prevalent in north and north-eastern regions of the country while Southern India has low incidence rate in both the sex. It is the commonest digestive cancer in North Indian women. Incidence of GBC in women in northern India is as high as 9 per 1,00,000 per year as compared to 1 per 1,00,000 per year in southern India. Comparison of all population based cancer registries (PBCR) shows that Kamrup district in Assam has the highest AARs in both sexes (14/1,00,000 women; 7.4/1,00,000 men) and Aurangabad in Maharashtra has the least incidence (0.1/1,00, 000 women; 0.3/1,00,000 among men).^[1]

Literature Review

No study has been undertaken so far on the bibliometric analysis of gallbladder cancer research output both at international and national level. However, few bibliometric studies have been carried out, by one of the author in collaboration with his professional colleagues, on the quantitative analysis of cancer research output in India in the areas of cervical cancer,^[4] oral cancer,^[5] prostate cancer,^[6] colorectal cancer,^[7] breast cancer^[8] and stomach cancer.^[9] On similar lines, the present study makes an assessment of India's research output on gall bladder cancer during 2006-15.

OBJECTIVES

The main objectives of this study are to study the performance of Indian research in gall bladder cancer during 2006-15, based on publications covered in Scopus database. In particular, the study focuses on the following objectives: (i) To study the growth of world and Indian research output and the citation impact of the Indian research output; (ii) To study the global publication share of top 10 most productive countries and the place of India in global output; (iii) To study the international collaboration share of Indian publications and the contribution of leading foreign countries in India's collaborative output; (iv) To study the distribution of Indian research output by broad subject areas and study their growth and decline; (v) To study the Indian gall bladder cancer output by treatment methods and their distribution by geographical areas; (vi) To study the publication productivity and citation impact of 15 most productive organizations and authors; and (vii) To study the medium of communication

METHODOLOGY

The study retrieved and downloaded the publication data of the world and of 10 most productive countries in gall bladder cancer from the Scopus database (<http://www.scopus.com>) for 10 years during 2006-15. A number of keywords, such as "gall bladder" and "cancer or neoplasm or carcinoma" were used in "title, abstract and keyword" tag and restricting it to the period 2006-15 in "date range tag" was used for searching the global publication data and this become the main search string. When the main search string with restricted to 10 most productive countries in "country tag", as shown below, the publication data on 10 productive countries were obtained. When the main search string is further restricted to "subject area tag", "country tag", "source title tag", "journal title name" and "affiliation tag", we got information on distribution of publications by subject, collaborating countries and organization-wise, etc. For citation data, citations to publications were also collected from date of publication till the end of April 2016.

(TITLE-ABS-KEY (gall bladder) AND TITLE-ABS-KEY (cancer or carcinoma or neoplasm)) AND PUBYEAR > 2005 AND PUBYEAR < 2016

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ANALYSIS

The world and India has published 6289 and 492 publications on gallbladder cancer during 2006-15, which increased from 519 and 50 publications in 2006 to 609 and 46 publications in 2015, registering an annual average growth rates of 2.46% and 2.58%. The cumulative growth of world and Indian publications in gall bladder cancer increased from 2757 and 204 during 2006-10 to 3532 and 288 publications during 2011-15, witnessing a growth rate of 28.11% and 41.18%. India's global publications share in gall bladder cancer was 7.82% during 2006-15, which increased from 7.40% during 2006-10 to 8.15% during 2011-15. The average citation per publication registered by Indian publications in gallbladder cancer was 7.10 during 2006-10, which decreased from 10.70 during 2006-10 to 4.54 during 2011-15 (Table 1).

Global Publication Share and Citation Impact of Top 10 Most Productive Countries

The global research output in gall bladder cancer originated in more than 100 countries during 2006-15. Table 2 lists the output of top 10 most productive countries in gall bladder cancer during 2006-15. The publication share of 10 most productive countries in gall bladder cancer was 79.44% of the world output during 2006-15, which increased from 77.47% during 2006-10 to 80.98% during 2011-15. Individually, the global publication share of these 10 countries varied from 2.02% to 21.07% during 2006-15, with highest publication share (21.07%) coming from USA, followed by Japan (15.58% share), China, (11.32%), India (7.82% share), South Korea (5.76% share), U.K., Germany and Italy (from 4.09% to 4.82%), France and Canada (from 2.02 to 2.67%) during 2006-15. The global publication share has increased by 6.08% in China, South Korea (1.66%), India (0.75%), Italy (0.44%), Canada (0.23%), France (0.11%) and U.K (0.05%), as against decrease by 4.09% in Japan, Germany (1.65%) and USA (0.07%) from 2006-10 to 2011-15 (Table 2). Six out of 10 countries have scored relative citation index more than 1: U.K. (2.96), France (2.62), Canada (2.34), Italy (2.18), Germany (2.0) and USA (1.64) during 2006-15.

International Collaboration

The share of international collaborative publications in India's in gallbladder cancer research output was 9.96% during 2006-15, which increased from 9.80% during 2006-10 to 10.07% during 2011-15. India has collaborated with several countries in gall bladder cancer research during 2006-15. Among the collaborating countries, the largest share (51.02%) was contributed by United States, followed by Japan and U.K. (16.33% each), Australia (10.20%), Chile, France and Netherlands (6.12% each) and Brazil, Canada, Egypt and Germany (4.08% each) during 2006-15. The international collaborative publications share of foreign countries in India's publications output increased by 27.07% in USA, followed by Japan (10.69%), Chile, France and Netherlands (10.34% each), Germany (6.90%) and U.K. (2.24%), as against decrease by 25.0% in Australia, Canada (10.0%) and Egypt (1.55%) from 2006-10 to 2011-15 (Table 3).

Subject-Wise Distribution of Research Output

India's gall bladder cancer research output during 2005-14 has been published in the context of five sub-fields (as reflected in Scopus database classification), with highest publications share (92.68%) coming from medicine, followed by biochemistry, genetics and molecular biology (3.789%), pharmacology, toxicology and pharmaceuticals (3.46%), immunology and microbiology (1.42% share) and agricultural and biological

Table 1: World and Indian Literature in Gallbladder Cancer: Growth, Citation Impact and International Collaboration, 2006-15

Publication Year	World			India			Global Share
	TP	TC	ACPP	TP	TC	ICP	
2006	519	10057	19.38	50	691	13.82	9.63
2007	502	12335	24.57	29	218	7.52	5.78
2008	538	11939	22.19	35	436	12.46	6.51
2009	588	8456	14.38	44	328	7.45	7.48
2010	610	8782	14.40	46	510	11.09	7.54
2011	622	5931	9.54	47	434	9.23	7.56
2012	732	7095	9.69	70	243	3.47	9.56
2013	759	5252	6.92	62	157	2.53	8.17
2014	810	2346	2.90	63	67	1.06	7.78
2015	609	740	1.22	46	407	8.85	7.55
2006-10	2757	51569	18.70	204	2183	10.70	7.40
2011-15	3532	21364	6.05	288	1308	4.54	8.15
2006-15	6289	72933	11.60	492	3491	7.10	7.82

TP=Total Papers, TC=Total Citations; CPP=Citations Per Paper; ICP=International Collaborative Papers

Table 2: Publication Output and Global Publication Share of Top 10 Most Productive Countries in Gallbladder Cancer, 2006-15

SNo	Country Name	TP			%TP			TC	CPP	ICP	%ICP	%TC	RCI
		06-10	11-15	06-15	06-10	11-15	06-15						
1	USA	582	743	1325	21.11	21.04	21.07	25224	19.04	356	26.87	34.59	1.64
2	Japan	493	487	980	17.88	13.79	15.58	10031	10.24	70	7.14	13.75	0.88
3	China	218	494	712	7.91	13.99	11.32	4386	6.16	89	12.50	6.01	0.53
4	India	204	288	492	7.405	8.15	7.82	3491	7.10	49	9.96	4.79	0.61
5	South Korea	133	229	362	4.82	6.48	5.76	4039	11.16	32	8.84	5.54	0.96
6	U.K.	132	171	303	4.79	4.84	4.82	10411	34.36	124	40.92	14.27	2.96
7	Germany	144	126	270	5.22	3.57	4.29	6247	23.14	96	35.56	8.57	2.00
8	Italy	106	151	257	3.84	4.28	4.09	6491	25.26	85	33.07	8.90	2.18
9	France	72	96	168	2.61	2.72	2.67	5105	30.39	67	39.88	7.00	2.62
10	Canada	52	75	127	1.89	2.12	2.02	3440	27.09	57	44.88	4.72	2.34
	World	2757	3532	6289				72933	11.60				

TP=Total Papers, TC=Total Citations; CPP=Citations Per Paper; ICP=International Collaborative Papers; RCI=Relative Citation Index

Table 3: Share of Leading Countries in India's International Collaborative Output in Indian Gallbladder Cancer during 2006-15

Country Name	Number of Papers			Share of Papers		
	06-10	11-15	06-15	06-10	11-15	06-15
USA	7	18	25	35.00	62.07	51.02
Japan	2	6	8	10.00	20.69	16.33
U.K.	3	5	8	15.00	17.24	16.33
Australia	5	0	5	25.00	0.00	10.20
Chile	0	3	3	0.00	10.34	6.12
France	0	3	3	0.00	10.34	6.12
Netherlands	0	3	3	0.00	10.34	6.12
Brazil	0	2	2	0.00	6.90	4.08
Canada	2	0	2	10.00	0.00	4.08
Egypt	1	1	2	5.00	3.45	4.08
Germany	0	2	2	0.00	6.90	4.08
Total of the Country	20	29	49			

sciences (1.22% share) and during 2006-15. The research activity, as reflected in activity index, has witnessed increase in medicine (from 99.43 to 100.40) and biochemistry, genetics and molecular biology (from 88.64 to 108.05), as against decrease in pharmacology, toxicology and pharmaceuticals (from 127.68 to 80.39), agricultural and biological sciences (from 120.59 to 85.42) and immunology and microbiology (from 137.82 to 73.21) from 2006-10 to 2011-15. Among these five subjects, the largest citation impact per publication (12.57 and 11.27) were registered by immunology and microbiology and biochemistry, genetics and molecular biology, followed by agricultural and biological sciences (9.67), pharma-

cology, toxicology and pharmaceuticals (8.76) and medicine (7.00) during 2006-15 (Table 4).

Distribution of Publications by Treatment Methods

In terms of treatment methods used in gall bladder cancer research in India during 2005-14, the largest publication share (29.07%) was registered by diagnosis, followed by surgery (22.97%), pathology and prognosis (18.90% each), chemotherapy (11.99%), radiotherapy (5.89%), genetics (5.69%), screening (3.66%), palliative care (3.46%) and quality of life (1.63%) during 2006-15. The top 4 treatment methods together account

for 89.84% share of the total publication output on gall bladder cancer during 2005-14. The publication share has increased by 9.46% in diagnosis, pathology and prognosis (6.33%), surgery (5.74%), radiotherapy (1.70%), and chemotherapy and screening (0.39% each), as against decrease by 0.80% in palliative care, 0.57% in quality of life and 0.33% in genetics from 2006-10 to 2011-15. (Table 5).

Distribution of Research Output by Geographical Areas

Among India cities contributing to gall bladder cancer research during 2005-14, the largest publication share (22.36%) came from Delhi and Lucknow, followed by Mumbai (11.18%), Varanasi (10.77%), Chandigarh (3.86%), etc during 2006-15. The 12 cited listed in Table 7 account for 81.10% of the total output of India during 2005-14, which marginally increased from 80.88% to 81.55% from 2006-10 to 2011-15. (Table 6). Uttar Pradesh as a state accounted for the largest output of 37.20% of the country output in gall bladder during 2006-15.

Profile of Top 15 Most Productive Organizations

In Indian gall bladder cancer research, 161 Indian organizations participated, of which 140 organizations published 1-5 papers, 12 organizations 6-10 papers, 4 organizations 11 to 16 papers, and the rest 6 organizations 30 to 84 papers during 2006-15. The productivity of 15 most productive Indian organizations in gall bladder cancer varied from 7 to 84 publications and together contributed 67.89% (334) publication share and 80.09% (492) citation share in the cumulative publications output of India in gall bladder cancer research during 2006-15. The scientometric profile of these 15 Indian organizations is presented in Table 7. Five organizations have registered higher publications output than the group average of 22.27: Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (84 publications), Banaras Hindu University Institute of Medical Sciences (50 publications), Chhatrapati Shahuji Maharaj

Medical University, Lucknow (35 publications), Tata Memorial Hospital, Bombay (33 publications) and All India Institute of Medical Sciences, New Delhi (30 publications during 2006-15. Five organizations have registered more than the average citation per publication (8.37) among the 15 organizations during 2004-15: Tata Memorial Hospital, Bombay (20.79), All India Institute of Medical Sciences, New Delhi (9.73), Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (9.42), G.B. Pant Hospital, Delhi (9.15) and Postgraduate Institute of Medical Education and Research, Chandigarh (8.56) during 2006-15. Six organizations have registered more than the average h-index (6.00) of all 15 organizations: Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (17), Banaras Hindu University Institute of Medical Sciences (12), Tata Memorial Hospital, Bombay (10), All India Institute of Medical Sciences, New Delhi(8), G.B. Pant Hospital, Delhi and Chhatrapati Shahuji Maharaj Medical University, Lucknow (7 each) during 2006-15. Ten organizations have achieved more than the average share of international collaborative publications (8.08%) of all organizations: Tata Memorial Hospital, Bombay (90.0%), Jawaharlal Medical College, Aligarh (66.67%), Postgraduate Institute of Medical Education and Research, Chandigarh (60.0%), Sher-I-Kashmir Institute of Medical Sciences, Srinagar (50.0%), Institute of Rotary Cancer Hospital, Delhi and Rajiv Gandhi Cancer Research Institute and Research Center, Delhi (33.33%), Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (29.41%), G.B. Pant Hospital, Delhi (28.57%), All India Institute of Medical Sciences, New Delhi (12.50%) and Banaras Hindu University Institute of Medical Sciences (8.33%) during 2006-15.

Profile of Top 15 Most Productive Authors

In Indian gall bladder cancer research, 288 Indian authors participated, of which 237 authors published 1-5 papers, 23 authors 6-10 papers, 23 authors 11 to 19 papers, and the rest 5 authors 22 to 41 papers dur-

Table 4: Subject-Wise Break-up of India's Publications in Gallbladder Cancer, 2006-15

Subject	Number of Papers			Activity Index		TC	CPP	%TP
	2006-10	2011-15	2006-15	2006-10	2011-15			
Medicine	188	268	456	99.43	100.40	3194	7.00	92.68
Biochemistry, Genetics and Molecular Biology	43	74	117	88.64	108.05	1319	11.27	23.78
Pharmacology, Toxicology and Pharmaceutics	9	8	17	127.68	80.39	149	8.76	3.46
Immunology and Microbiology	4	3	7	137.82	73.21	88	12.57	1.42
Agricultural and Biological Sciences	3	3	6	120.59	85.42	58	9.67	1.22
Total of the country	204	288	492					

TC=Total Citations; CPP=Citations Per Paper

Table 5: Distribution of India's Gallbladder Cancer Publications by Treatment Methods, 2006-15

Treatment Methods	Number of Publications			Share of Publications		
	06-10	11-15	06-15	06-10	11-15	06-15
Diagnosis	48	95	143	23.53	32.99	29.07
Surgery	40	73	113	19.61	25.35	22.97
Pathology	31	62	93	15.20	21.53	18.90
Prognosis	31	62	93	15.20	21.53	18.90
Chemotherapy	24	35	59	11.76	12.15	11.99
Radiotherapy	10	19	29	4.90	6.60	5.89
Genetics	12	16	28	5.88	5.56	5.69
Screening	7	11	18	3.43	3.82	3.66
Palliative Care	8	9	17	3.92	3.13	3.46
Quality of Life	4	4	8	1.96	1.39	1.63
Total of India	204	288	492			

Table 6: Geographical Distribution of Gallbladder Cancer Research Publications in India, 2006-15

Name of Geographical Area	Number of Publications			Share of Publications		
	06-10	11-15	06-15	06-10	11-15	06-15
Delhi	36	74	110	17.65	25.69	22.36
Lucknow	47	63	110	23.04	21.88	22.36
Mumbai	26	29	55	12.75	10.07	11.18
Varanasi	28	25	53	13.73	8.68	10.77
Chandigarh	12	7	19	5.88	2.43	3.86
Bangalore	3	8	11	1.47	2.78	2.24
Aligarh	9	2	11	4.41	0.69	2.24
Chennai	2	8	10	0.98	2.78	2.03
Gurgaon	0	7	7	0.00	2.43	1.42
Noida	1	3	4	0.49	1.04	0.81
Hyderabad	1	3	4	0.49	1.04	0.81
Kanpur	0	3	3	0.00	1.04	0.61
Agra	0	2	2	0.00	0.69	0.41
Total of India	204	288	492	80.88	81.25	81.10

ing 2006-15. The productivity of 15 most productive Indian authors in Gall bladder cancer varied from 12 to 41 publications and together contributed 53.66% (264) publication share and 77.63% (2710) citation share in the cumulative publications output of India in gall bladder cancer research during 2006-15. The scientometric profile of these 15 Indian authors is presented in Table 8. Seven authors have registered higher publications output than the group average of 17.60: B.Mittal (41 publications), A.Kumar (24 publications), M.Tewari (23 publications), V.K.Kapoor and H.S.Shukla (21 publications), A.Srivastava (19 publications) and S.Misra (18 publications) during 2006-15. Four authors have registered more than the average citation per publication (10.27) among all 15 authors: A.Srivastava (18.26), S.N.Pandey (17.27), G.Choudhuri (13.92) and B.Mittal(13.20) during 2006-15. Nine authors have registered more than the average h-index (7.93) of all 15 authors: B.Mittal (14), A.Srivastava (12), S.N.Pandey (11), A.Kumar and H.S.Shukla (9 each), G.Choudhuri, V.K.Kapoor, P.J.Shukla and M.Tewari (8 each) during 2006-15. Seven authors have achieved more than the average share of national collaborative publications (4.55%) of all authors: P.J.Shukla (23.08%), S.V.Srikhande (13.33%), A.Srivastava (10.53%), K.L.Sharma (7.69%), A.K. Agarwal (6.25%), B.Mittal (4.88%) and V.K.Kapoor (4.76%) during 2006-15.

Medium of Communication

In India, gall bladder cancer research was published in 116 journals, of which 145 journals published 1-5 papers, 10 journals 6-10 papers, 6 journals 11 to 18 papers, and the rest 2 journals 20 to 24 papers during 2006-15. The 15 most productive journals contributed from 7 to 24 papers and together contributed 37.80% share (186 papers) to the total India's publication output in gall bladder cancer during 2006-15. The publication share of these top 15 most productive journals increased from 32.84% to 41.32% from 2006-10 to 2010-15. The most productive journal (with 24 papers) was Journal of Gastrointestinal Cancer, followed by Indian Journal of Gastroenterology (20 papers), Asia Pacific Journal of Cancer (18 papers), Journal of Clinical and Diagnostic Research, Journal of Cancer Research and Therapeutics and HPB (13 papers each), etc. during 2006-15 (Table 9).

SUMMARY AND CONCLUSION

In gall bladder cancer research, the world and India have published 6289 and 492 publications during 2006-15, which increased from 519 and 50 publications in 2006 to 609 and 46 publications in 2015, registering annual average growth rates of 2.46% and 2.58. India's global publications share in gall bladder cancer was 7.82% during 2005-14, which increased

from 7.40% during 2006-10 to 8.15% during 2011-15. The average citation per publication registered by Indian publications in gall bladder cancer was 7.10 during 2006-15, which decreased from 10.70 during 2006-10 to 4.54 during 2011-15. The global research output in gall bladder cancer came from more than 100 countries during 2006-15, of which the top 10 most productive countries contributed 79.44% of global output, which increased from 77.47% during 2006-10 to 80.98% during 2011-15. USA contributed the largest global publication share of 21.07%, followed by Japan (15.58% share), China, (11.32%), India (7.82% share), South Korea (5.76% share), U.K., Germany and Italy (from 4.09% to 4.82%), France and Canada (from 2.02 to 2.67%) during 2006-15. The global publication share has increased by in China, South Korea, India, Italy, Canada, France and U.K), as against decrease in Japan, Germany and USA from 2006-10 to 2011-15. Six out of 10 countries have scored relative citation index more than 1: U.K. (2.96), France (2.62), Canada (2.34), Italy (2.18), Germany (2.0) and USA (1.64) during 2006-15. India's share of international collaborative papers in its total output on gall-bladder cancer was 9.96% during 2006-15, which increased from 9.80% to 10.07% from 2006-10 to 2011-15.

Medicine, among subjects, contributed the largest publication share (92.68%), followed by biochemistry, genetics and molecular biology (3.789%), pharmacology, toxicology and pharmaceuticals (3.46%), immunology and microbiology (1.42% share) and agricultural and biological sciences (1.22% share) and during 2006-15. The research activity, as reflected in activity index, has witnessed in medicine and biochemistry, genetics and molecular biology, as against decrease in pharmacology, toxicology and pharmaceuticals, agricultural and biological sciences and immunology and microbiology from 2006-10 to 2011-15. Immunology and microbiology and biochemistry, genetics and molecular biology, registered the largest citation impact per publication (12.57 and 11.27), followed by agricultural and biological sciences (9.67), pharmacology, toxicology and pharmaceuticals (8.76) and medicine (7.00) during 2006-5. The top four treatment methods, namely diagnosis, surgery, pathology and prognosis together accounted for 89.84% share of the total publication output on gall bladder cancer during 2006-15. The 12 cited listed in Table 7 account for 81.10% of the total output of India during 2005-14, which marginally increased from 80.88% to 81.55% from 2006-10 to 2011-15. Delhi, Lucknow, Mumbai and Varanasi together accounted for 56.90% of the country output during 2006-15. The combined productivity of most productive 15 Indian organizations, 15 authors and 15 journals in gall bladder cancer accounted for 67.89%, 53.66% and 37.80% share in the cumulative publications output of India in gallbladder cancer research during 2006-15.

Table 7: Scientometric Profile of Top 15 Most Productive Indian Organizations in Gallbladder Cancer, 2006-15

S.No	Name of the Organization	TP	TC	ACPP	HI	ICP	%ICP
1	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	84	791	9.42	17	5	29.41
2	Banaras Hindu University Institute of Medical Sciences	50	328	6.56	12	1	8.33
3	Chhatrapati Shahuji Maharaj Medical University, Lucknow	35	172	4.91	7	0	0.00
4	Tata Memorial Hospital, Bombay	33	686	20.79	10	9	90.00
5	All India Institute of Medical Sciences, New Delhi	30	292	9.73	8	1	12.50
6	Postgraduate Institute of Medical Education and Research, Chandigarh	16	137	8.56	5	3	60.00
7	G.B. Pant Hospital, Delhi	13	119	9.15	7	2	28.57
8	Banaras Hindu University	11	50	4.55	4	0	0.00
9	University of Delhi	11	32	2.91	3	0	0.00
10	Institute of Rotary Cancer Hospital, Delhi	10	41	4.10	3	1	33.33
11	Rajiv Gandhi Cancer Research Institute and Research Center, Delhi	10	39	3.90	3	1	33.33
12	Sher-I-Kashmir Institute of Medical Sciences, Srinagar	8	63	7.88	4	2	50.00
13	Jawaharlal Medical College, Aligarh	8	22	2.75	3	2	66.67
14	Indian Institute of Toxiological Research, Lucknow	8	16	2.00	3	0	0.00
15	University College of Medical Sciences, Delhi	7	8	1.14	1	0	0.00
	Total of 15 Organizations	334	2796	8.37	6	27	8.08
	Total of India	492	3491	7.10			
	Share of 15 organizations in India's total	67.89	80.09				

TP=Total Papers, TC=Total Citations; ACPP=Average Citations Per Paper; ICP=International Collaborative Papers; HI=h-index

Table 8: Scientometric Profile of Top 15 Most Productive Indian Authors in Gallbladder Cancer, 2006-15

S.No	Name of Author	Affiliation of the Author	TP	TC	ACPP	HI	ICP	%ICP
1	B.Mittal	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	41	541	13.20	14	2	4.88
2	A.Kumar	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	24	238	9.92	9	0	0.00
3	M.Tewari	Institute of Medical Sciences, Banaras Hindu University, Varanasi	23	171	7.43	8	0	0.00
4	V.K.Kapoor	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	21	201	9.57	8	1	4.76
5	H.S.Shukla	Institute of Medical Sciences, Banaras Hindu University, Varanasi	21	169	8.05	9	0	0.00
6	A.Srivastava	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	19	347	18.26	12	2	10.53
7	S.Misra	King George Medical University, Lucknow	18	92	5.11	5	0	0.00
8	A.KAgarwal	G.B.Pant Hospital, Delhi	16	109	6.81	7	1	6.25
9	S.N.Pandey	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	15	259	17.27	11		0.00
10	S.V.Srikhande	Tata Memorial Hospital, Mumbai	15	130	8.67	7	2	13.33
11	G.Choudhuri	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	13	181	13.92	8	0	0.00
12	K.L.Sharma	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	13	103	7.92	5	1	7.69
13	P.J.Shukla	Tata Memorial Hospital, Mumbai	13	123	9.46	8	3	23.08
14	A.Behari	Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow	12	46	3.83	4	0	0.00
15	V.K.Shukla	Institute of Medical Sciences, Banaras Hindu University, Varanasi	12	74	6.17	4	0	0.00
	Total of 15 authors		264	2710	10.27	115	12	4.55
	Total of India		492	3491	7.1	7.93		
	Share of 15 authors in India's output		53.66	77.63				

TP=Total Papers, TC=Total Citations; ACPP=Average Citations Per Paper; ICP=International Collaborative Papers; HI=h-index

Table 9: List of Most Productive Journals in Indian in Gallbladder Cancer during 2006-15

S.No	Name of the Journal	Number of Papers		
		06-10	11-15	06-15
1	Journal of Gastrointestinal Cancer	2	22	24
2	Indian Journal of Gastroenterology	12	8	20
3	Asia Pacific Journal of Cancer Prevention	5	13	18
4	Journal of Clinical and Diagnostic Research	0	13	13
5	Journal of Cancer Research and Therapeutics	4	9	13
6	HPB	6	7	13
7	Indian Journal of Pathology and Microbiology	5	7	12
8	Journal of Surgical Oncology	11	0	11
9	Hepatobiliary and Pancreatic Disease	8	2	10
10	Indian Journal of Surgery	4	6	10
11	Indian Journal of Cancer	3	7	10
12	Indian Journal of Surgical Oncology	0	9	9
13	Tumor Biology	0	8	8
14	Journal of Indian Medical Association	3	5	8
15	Journal of Gastroenterology and Hepatology Australia	4	3	7
	Total of 15 journals	67	119	186
	Total of India	204	288	492
	Share of 15 journals in India's output	32.84	41.32	37.80

Conclude that cancer research and management practices become one of the crucial tasks of importance for effective management and clinical care for patient in any country. Hence, the need to develop a nationwide consensus for clinical management and treatment for various cancers was felt. The consensus document should be based on review of available evidence about effective management and treatment of cancers in Indian setting by an expert multidisciplinary team of oncologists. This will lead towards development of guidelines for various other cancer specific sites in future ahead. Development of these guidelines will ensure significant contribution in successful management and treatment of cancer and best care made available to patients. In this context, it is essential to analyze the evidence pertaining to GBC from India and the rest of the world with an aim to formulate reliable, evidence-based guidelines that could be applicable to Indian patients bearing in mind the socio-cultural diversity, the distribution of resources and the availability and accessibility to health-care.

CONFLICT OF INTEREST

The authors declare none.

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