

Research

Acute Pancreatitis Research in India: A Scientometric Assessment of Publications during 2007-16B.M.Gupta^{1*}, Ritu Gupta², Ashok Kumar³¹Formely with CSIR- NISTADS, New Delhi²Shri Venkateswara University, Tirupati³M.M.University, Mullan-Ambala

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Abstract

The present study examined 581 Indian acute pancreatitis research publications, as indexed in Scopus database during 2007-16, with a view to understand their growth rate, global share, citation impact, international collaborative papers share, distribution of publications by broad subjects, productivity and citation profile of top organizations and authors, preferred media of communication and characteristics of high cited papers. The Indian publications registered an annual average growth rate of 14.09%, global share of 4.28%, international collaborative publications share of 11.88% and its citation impact averaged to 9.21 citations per paper. Among broad subjects, medicine contributed the largest publications share of 92.94% in India's acute pancreatitis research output, followed by biochemistry, genetics & molecular biology (19.45%), pharmacology, toxicology & pharmaceuticals (8.61%) and immunology & microbiology (3.61%) during 2007-16. Among various organizations and authors contributing to India's acute pancreatitis research, the top 15 organizations and authors together contributed 48.02% and 59.38% respectively as their share of India publication output and 44.26% and 58.13% respectively as their share of India citation output during 2007-16. Among 574 journal papers in Indian acute pancreatitis research, the top 14 journals registered 35.71% share during 2007-16, which showed increase from 26.70% to 40.21% from 2007-11 and 2012-16. Indian Journal of Gastroenterology and Journal of the Pancreas, contributed the largest number of papers (27 papers each), followed Pancreatology (21 papers), Journal of Gastroenterology & Hepatology Australia (20 papers), etc. during 2007-16. There were only top 7 highly cited publications, which registered citations from 105 to 611 during 2007-16 and they together received 1343 citations, which averaged to 191.86 citations per paper.

Key words: Acute Pancreatitis; Pancreas; Indian publications; Scientometrics; Bibliometrics.

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Introduction

The pancreas is a large gland behind the stomach and next to the small intestine. The pancreas does two main things: (i) It releases powerful digestive enzymes into the small intestine to aid the digestion of food and (ii) It releases the hormones insulin and glucagon into the bloodstream. These hormones help the body control how it uses food for energy. Pancreatitis is a disease in which the pancreas becomes inflamed. Pancreatic damage happens when the digestive enzymes are activated before they are released into the small intestine and begin attacking the pancreas. There are two forms of pancreatitis: acute and chronic [1].

The etiology and pathogenesis of acute pancreatitis have been intensively investigated for centuries worldwide. Many causes of acute pancreatitis have been discovered, but the pathogenetic theories are at present controversial. The most common cause of acute pancreatitis is gallstone impacting the distal common bile-pancreatic duct. The majority of investigators accept that the main factors for acute biliary pancreatitis are pancreatic hyperstimulation and bile-pancreatic duct obstruction which increase pancreatic duct pressure and active trypsin reflux. Acute pancreatitis occurs when intracellular protective mechanisms to prevent trypsinogen activation or reduce trypsin activity are overwhelmed [2].

The revised Atlanta classification of acute pancreatitis identified two phases of the disease: early and late. Severity is classified as mild, moderate or severe. Mild acute pancreatitis, the most common form, has no organ failure, local or systemic complications and usually resolves in the first week. Moderately severe acute pancreatitis is defined by the presence of transient organ failure, local complications or exacerbation of co-morbid

disease. Severe acute pancreatitis is defined by persistent organ failure, that is, organ failure >48 h [3].

Treatment of mild disease is supportive, but severe episodes need management by a multidisciplinary team including gastroenterologists, interventional radiologists, intensivists, and surgeons. Improved understanding of pathophysiology and better assessments of disease severity should ameliorate the management and outcome of this complex disease [4].

Literature Review

No bibliometric study had been published so far focusing on pancreas research. However, few bibliometric studies have been carried in the area of gastro related research. Among such studies, Loomes [5] carried a comprehensive bibliometric analysis of clinical articles in digestive disease. The country, authorship of the top 100 most frequently cited articles published in the field of digestive disease. It also undertook an effort to identify and examine characteristics, such as citation ranking, year of publication; publishing journal, study design. Chou [6] analyzed the MEDLINE-indexed publications in gastroenterology specialty journals from 2001 to 2007. Special attention was paid to specific types of articles (randomized controlled trials). According to MEDLINE, 81 561 articles were published in 91 gastroenterology journals from 2001 to 2007. Only 12 journals had more than 2000 articles indexed in MEDLINE. The “World Journal of Gastroenterology” had the largest number of publications (5684 articles), followed by “Hepato-Gastroenterology” (3036) and “Gastrointestinal Endoscopy”. Among 141 741 author names appearing in the articles of gastroenterology journals, 92 429 had published only in one journal, 22 585 in two journals, 9996 in three journals, and 16 731 in more than three journals. Lewison [7] examined the

volume and potential impact of gastroenterology research outputs from 1985 to 1998 from 14 developed countries; the overlap with research in cancer, infectious diseases, and genetics; and the funding sources for this research. It also determined if countries' research outputs correlated with their burden of corresponding diseases and inputs to their research.

Objectives

The present manuscript aims to study the various dimensions of India's acute pancreatitis research in terms of various bibliometric indicators based on publications and citation data, derived from Scopus database during 2007-16. In particular, the study analyzed overall annual and cumulative growth of Indian publications, its global share among top 10 most productive countries, its citation impact, its international collaborative papers share, publication output distribution by broad sub-fields, productivity and citation impact of most productive organizations and authors, leading media of communications and characteristics of top highly cited papers.

Methodology

For the present study, the publication data was retrieved and downloaded from the Scopus database (<http://www.scopus.com>) on India's acute pancreatitis research during 2007-16. A main search strategy for global output was formulated, where the keyword such as "acute pancreatitis" is searched in the "keyword tag" or "Article Title Tag" or "Source Title tag" and further limited the search output to period '2007-16' within "date range tag". This search strategy generated 13568 global publications on acute pancreatitis from the Scopus database. This main search strategy was later refined by "Country Name Tag" to get acute pancreatitis research output of individual top 10 most productive countries, including India one by one. Detailed analysis was carried

out on 581 Indian publications data using the analytical provisions or tags existing in Scopus database such as "subject area tag", "country tag", "source title tag", "journal title name" and "affiliation tag", to get data distribution by subject, collaborating countries, author-wise, organization-wise and journal-wise, etc. For citation data, citations to publications were also collected from date of publication till 13 October 2017. A series of raw (such as number of papers and international collaborative papers, number of citations, citations per paper) and relative (activity index, relative citation index) bibliometric indicators were used by authors to understand the dynamics of India's acute pancreatitis research from different perspective (KEY(acute pancreatitis* or pancreatitis, acute) OR TITLE(acute pancreatitis* or pancreatitis, acute) OR SRCTITLE("acute pancreatitis*")) AND PUBYEAR > 2006 AND PUBYEAR < 2017 AND (LIMIT-TO(AFFILCOUNTRY,"India")

Analysis

The global and Indian research output in acute pancreatitis research cumulated to 13568 and 581 publications in 10 years during 2007-16 and they increased from 1186 and 33 in the year 2007 to 1407 and 80 publications in the year 2016, registering 2.02% and 14.09% growth per annum. Their five-year cumulative output increased from 6310 and 193 to 7258 and 388 publications from 2007-11 to 2012-16, registering 15.02% and 49.74% growth respectively. The share of Indian publications in global output was 4.28% during 2007-16, which increased from 3.06% to 5.35% from 2007-11 to 2012-16. Amongst Indian publications on acute pancreatitis, 70.74% (411) was published as articles, 11.19% (65) as reviews, 10.33% (60) as letters, 4.13% (24) as notes, 1.38% (8) as editorials, 1.20% (7) as book chapters, 0.86% (5) conference papers and 0.17% (1) as short surveys. The research impact as

measured by citations per paper registered by Indian publications in acute pancreatitis averaged to 9.21 citations per publication (CPP) during 2007-16; five-

yearly impact averaged to 18.39 CPP for the period 2007-11 which declined to 4.65 CPP in the succeeding five-year 2012-16 (Table 1).

Publication Period	World			India					
	TP	TC	CPP	TP	TC	CPP	ICP	%ICP	%TP
2007	1186	24237	20.44	33	1504	45.58	4	12.12	2.78
2008	1212	20690	17.07	27	357	13.22	0	0.00	2.23
2009	1312	24081	18.35	34	343	10.09	0	0.00	2.59
2010	1307	22301	17.06	34	523	15.38	4	11.76	2.60
2011	1293	21388	16.54	65	822	12.65	13	20.00	5.03
2012	1367	19600	14.34	63	468	7.43	7	11.11	4.61
2013	1453	18160	12.50	88	630	7.16	8	9.09	6.06
2014	1544	10011	6.48	82	333	4.06	8	9.76	5.31
2015	1487	8582	5.77	75	252	3.36	14	18.67	5.04
2016	1407	4719	3.35	80	120	1.50	11	13.75	5.69
2007-11	6310	112697	17.86	193	3549	18.39	21	10.88	3.06
2012-16	7258	62072	8.55	388	1803	4.65	48	12.37	5.35
2007-16	13568	174769	12.88	581	5352	9.21	69	11.88	4.28
TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper; ICP=International Collaborative Papers									

Table 1: World and India’s Output in Acute Pancreatic Research, 2007-16

Publication Profile of Top 10 Most Productive Countries

As many as 50 countries in the world participated in global research in acute pancreatitis during 2007-16. Between 396 and 3089 publications were contributed by top 10 most productive countries in acute pancreatitis research and they together accounted for 74.08% of global publication share and more than 100% of global citation share during 2007-16. Their five-year publications output increased from 71.13% to 76.65% from 2007-11 to 2016. Each of top 10 countries had global publication share between 2.92% and 22.77%

during 2007-16. USA accounted for the highest publication share (22.77%), followed by China (14.03% share), U.K. (6.64%), Japan and Germany (5.70% and 5.65%), Italy and India (4.79% and 4.28%), Spain and France (3.93% and 3.36%) and Turkey (3.43%) during 2007-16. Their five-year global publication share have increased by 5.35% in China, followed by India (2.29%), Turkey(1.10%) and USA (0.82%), as against decline by 2.07% in Germany, 1.01% in U.K., 0.61% in Japan and 0.03% in France from 2007-11 to 2012-16. France tops the list with 6.55% share in high cited papers, followed by Italy (5.69%), Germany (5.61%), U.K. (4.77%), USA (4.69%), etc. In terms of relative citation index (RCI), six

of top 10 countries scored above the world average i.e. more than 1.0: France (2.15), U.K. (2.11), Italy (2.07), Germany (2.01), USA (1.91) and Spain (1.46) during 2007-16 (Table 2).

S.No	Country Name	TP			%TP			TC	CPP	ICP	%ICP	HCP	%HCP	RCI
		2007-11	2012-16	2007-16	2007-11	2012-16	2007-16							
1	USA	1409	1680	3089	22.33	23.15	22.77	76028	24.61	697	22.56	145	4.69	1.91
2	China	705	1199	1904	11.17	16.52	14.03	12903	6.78	178	9.35	5	0.26	0.53
3	U.K.	453	448	901	7.18	6.17	6.64	24446	27.13	312	34.63	43	4.77	2.11
4	Japan	380	393	773	6.02	5.41	5.70	9070	11.73	84	10.87	12	1.55	0.91
5	Germany	426	340	766	6.75	4.68	5.65	19851	25.92	272	35.51	43	5.61	2.01
6	Italy	313	337	650	4.96	4.64	4.79	17371	26.72	185	28.46	37	5.69	2.07
7	India	193	388	581	3.06	5.35	4.28	5352	9.21	69	11.88	7	1.20	0.72
8	Spain	248	285	533	3.93	3.93	3.93	10017	18.79	111	20.83	17	3.19	1.46
9	France	214	244	458	3.39	3.36	3.38	12703	27.74	125	27.29	30	6.55	2.15
10	Turkey	147	249	396	2.33	3.43	2.92	2492	6.29	20	5.05	3	0.76	0.49
	Total	4488	5563	10051	100.00	100.00	100.00	190233	12.88	2053				1.00
	World	6310	7258	13568				174769						
	Share of Top 10 in World Output	71.13	76.65	74.08										

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

Table 2: Global Publication, Citation and International Collaboration Output of Top 10 Countries during 2007-16.

India’s International Collaboration

The share of India’s international collaborative publications (ICP) in its national output in acute pancreatitis research was 11.88% during 2007-16, which increased from 10.88% during 2007-11 to 12.37% during 2012-16. About 67 foreign countries collaborated with India in 69 acute pancreatitis research papers during 2007-16. These 69 papers together registered 1515 citations, with 22.61 citations per paper. USA, among

foreign countries, contributed the largest share (50.72%) to India’s international collaborative papers in acute pancreatitis research, followed by Japan (13.04%), Australia, Germany and U.K. (11.59% each), Canada (10.14%), South Korea and Spain (8.70% each), Netherlands, Spain and Sweden (7.25%) during 2007-16. The share of ICP increased by 14.58% in Canada, followed by Netherlands, Spain and Sweden (10.42% each), U.K. (9.82%), South Korea and Taiwan (5.65% each), USA (4.46%) and Germany (2.98%), as against

decrease by 10.71% in Australia and 8.63% in Japan from 2007-11 to 2012-16 (Table 3).

S.No.	Collaborative Country	Number of International Collaborative Papers			Share of International Collaborative Papers		
		2007-11	2012-16	2007-16	2007-11	2012-16	2007-16
1	USA	10	25	35	47.62	52.08	50.72
2	Japan	4	5	9	19.05	10.42	13.04
3	Australia	4	4	8	19.05	8.33	11.59
4	Germany	2	6	8	9.52	12.50	11.59
5	U.K.	1	7	8	4.76	14.58	11.59
6	Canada	0	7	7	0.00	14.58	10.14
7	South Korea	1	5	6	4.76	10.42	8.70
8	Taiwan	1	5	6	4.76	10.42	8.70
9	Netherlands	0	5	5	0.00	10.42	7.25
10	Spain	0	5	5	0.00	10.42	7.25
11	Sweden	0	5	5	0.00	10.42	7.25
	Total	21	48	69	100.00	100.00	100.00

Table 3. The Share of Top 11 Foreign Countries in India's International Collaborative Papers in India's Acute Pancreatitis research during 2007-16

Subject-Wise Distribution of Indian Research Output

As per the Scopus database classification, India's acute pancreatitis research output is distributed across four sub-fields during 2007-16. Among sub-fields, medicine registered the highest publications share (92.94%), followed by biochemistry, genetics & molecular biology (19.45%), pharmacology, toxicology & pharmaceuticals (8.61%) and immunology & microbiology (3.61%) during 2007-16. The publication activity, as seen through activity index from 2007-11 to 2012-16, witnessed

increase in medicine (from 99.79 to 100.11), biochemistry, genetics & molecular biology (from 87.91 to 106.01), as against decrease in pharmacology, toxicology & pharmaceuticals (from 114.39 to 92.84) and immunology & microbiology (from 157.69 to 71.31) from 2007-11 to 2012-16. In terms of citation impact per paper, Immunology & microbiology, among sub-fields, registered the highest CPP of 52.38, followed pharmacology, toxicology & pharmaceuticals (10.50), biochemistry, genetics & molecular biology (10.42), and medicine (7.48) during 2007-16 (Table 4).

S.No	Subject*	Number of Papers (TP)			Activity Index		TC	CPP	%TP
		2007-11	2012-16	2007-16	2007-11	2012-16	2007-16	2007-16	2007-16
1	Medicine	179	361	540	99.79	100.11	4040	7.48	92.94

2	Biochemistry, Genetics & Molecular Biology	33	80	113	87.91	106.01	1178	10.42	19.45
3	Pharmacology, Toxicology & Pharmaceutics	19	31	50	114.39	92.84	525	10.50	8.61
4	Immunology & Microbiology	11	10	21	157.69	71.31	1100	52.38	3.61
	World Output	193	388	581	100.00	100.00			
<ul style="list-style-type: none"> There is overlapping of literature covered under various subjects 									
TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper									

Table 4: Subject-Wise Breakup of Indian Publications in Acute Pancreatitis Research during 2007-16
Profile of Top 15 Most Productive Indian Organizations

Profile of Top 15 Most Productive Indian Organizations

240 organizations participated in Indian acute pancreatic research, of which 237 organizations contributed 1-10 papers each, 4 organizations each 13-28 papers, 2 organizations each 37 to 94 papers. The top 15 Indian organizations contribution to acute pancreatitis research varied from 7 to 94 publications and they together accounted for 48.02% (279) publication share and 44.26% (2369) citation share to its cumulative publications output during 2007-16. Table 5 presents a scientometric profile of these 15 India organizations.

- Four organizations registered higher productivity than the group average of 18.6: Postgraduate Institute of Medical Education & Research, Chandigarh (94 papers), All India Institute of Medical Sciences, New Delhi (37 papers), Asian Institute of Gastroenterology, Hyderabad (29 papers) and Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (25 papers) during 2007-16.
- Four organizations registered higher citation impact than group average of 8.49 citations per

publication: G.B. Pant Hospital, Delhi (22.57), Asian Institute of Gastroenterology, Hyderabad (13.55), All India Institute of Medical Sciences, New Delhi (13.35) and SMS College, Jaipur (11.0) during 2007-16.

- Three organizations registered higher h-index than group average of 5.47: Postgraduate Institute of Medical Education & Research, Chandigarh (17), All India Institute of Medical Sciences, New Delhi (12) and Asian Institute of Gastroenterology, Hyderabad (9) during 2007-16.
- Six organizations achieved higher international collaborative publications share than group average of 10.75%: Asian Institute of Gastroenterology, Hyderabad (44.83%), Manipal University (20.0%), Institute of Post Graduate Medical Education & Research, Kolkata (14.29%), Stanley Medical College, Chennai (14.29%), Institute of Liver & Biliary Sciences, New Delhi (14.29%) and Jawaharlal Institute of Postgraduate Medical Education & Research, Pondicherry (14.29%) during 2007-16.
- Four organizations registered higher relative citation index than group average (0.92): G.B. Pant

Hospital, Delhi (2.45), Asian Institute of Gastroenterology, Hyderabad (1.47), All India Institute of Medical Sciences (AIIMS), New Delhi (1.45) and SMS College, Jaipur (1.19) during 2007-16.

S.No	Name of the Organization	TP	TC	CPP	HI	ICP	%ICP	RCI
1	Postgraduate Institute of Medical Education & Research (PGIMER), Chandigarh	94	743	7.90	17	6	6.38	0.86
2	All India Institute of Medical Sciences (AIIMS), New Delhi	37	494	13.35	12	3	8.11	1.45
3	Asian Institute of Gastroenterology, Hyderabad	29	393	13.55	9	13	44.83	1.47
4	Sanjay Gandhi Postgraduate Institute of Medical Sciences (SGPGIMS), Lucknow	25	157	6.28	5	0	0.00	0.68
5	Christian Medical College (CMC), Vellore	14	66	4.71	5	1	7.14	0.51
6	Kasturba Medical College (KMC), Manipal	13	58	4.46	4	1	7.69	0.48
7	Manipal University	10	49	4.90	4	2	20.00	0.53
8	SMS College, Jaipur	8	88	11.00	4	0	0.00	1.19
9	Government Medical College & Hospital (GMCH), Chandigarh	7	24	3.43	3	0	0.00	0.37
10	G.B. Pant Hospital, Delhi	7	158	22.57	3	0	0.00	2.45
11	Medical College & Hospital, Kolkata	7	15	2.14	3	0	0.00	0.23
12	Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER), Pondicherry	7	18	2.57	2	1	14.29	0.28
13	Stanley Medical College, Chennai	7	25	3.57	4	1	14.29	0.39
14	Institute of Post Graduate Medical Education & Research (IPGMER), Kolkata	7	48	6.86	5	1	14.29	0.74
15	Institute of Liver & Biliary Sciences, New Delhi	7	33	4.71	2	1	14.29	0.51
	Total of 15 organizations	279	2369	8.49	5.47	30	10.75	0.92
	Total of India	581	5352	9.21				
	Share of top 15 organizations in Indian total output	48.02	44.26					

TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper; HI=h-index; ICP=International Collaborative Papers; RCI=Relative Citation Index

Table 5: Scientometric Profile of Top 15 Most Productive Indian Organizations in Acute Pancreatitis Research during 2007-16

Profile of Top 20 Most Productive Authors

265 authors participated in Indian acute pancreatic research, of which 254 authors contributed 1-10 papers each, 9 authors each 11-28 papers, 2 authors each 45 papers. The top 20 Indian author’s contribution to acute pancreatitis research varied from 8 to 45 publications and they together accounted for 59.38% (345) publication share and 58.13% (3111) citation share to its cumulative publications output during 2007-16. Table 6 presents a scientometric profile of these 20 India authors.

- Six authors registered higher publications productivity than group average of 17.25: D.K. Bhasin and S.S. Rana (45 papers each), R. Gupta (28 papers), V. Sharma (27 papers), K. Singh (23 papers) and R. Kochhar (19 papers) during 2007-16.
- Ten authors registered higher citation impact than the group average of 10.02 citations per publication: M. Kang (16.5), T.D. Yadav (16.3), J.D. Wig (14.8), P.K. Garg (13.8), R. Kochhar (12.74), R. Gupta

(12.5), U. Datta (12.44), S.K. Sinha (11.3), K. Singh (10.91) and B. Negi (10.78) during 2007-16.

- Eleven authors registered higher h-index than group average of 6.7: R. Gupta and S.S. Rana (11 each), J.D. Wig, R. Kochhar, K. Singh and D.K. Bhasin (10 each), M. Kang (9), T.D. Yadav, P.K. Garg, S.K. Sinha and R. Talukdar (7 each) during 2007-16.
- Seven authors achieved higher international collaborative publications share than the group average of 6.09% of all authors: R. Talukdar (41.18%), M. Kang (16.67%), P.K. Garg (15.0%), B. Negi (11.11%), S.K. Sinha (10.0%), S.S. Rana and D.K. Bhasin (6.67% each) during 2007-16.
- Ten authors registered higher relative citation index than the group average of 0.98: M. Kang (1.79), T.D. Yadav (1.77), J.D. Wig (1.61), P.K. Garg (1.5), R. Kochhar (1.38), R. Gupta (1.36), U. Datta (1.35), S.K. Sinha (1.23), K. Singh (1.18) and B. Negi (1.17) during 2007-16.

S.No	Name of the Author	Affiliation of the Author	TP	TC	CPP	HI	ICP	%ICP	RCI
1	D.K.Bhasin	PGIMER-Chandigarh	45	307	6.82	10	3	6.67	0.74
2	S.S. Rana	PGIMER-Chandigarh	45	319	7.09	11	3	6.67	0.77
3	R. Gupta	PGIMER-Chandigarh	28	350	12.50	11	0	0.00	1.36
4	V. Sharma	PGIMER-Chandigarh	27	51	1.89	4	0	0.00	0.21
5	K. Singh	PGIMER-Chandigarh	23	251	10.91	10	1	4.35	1.18
6	R. Kochhar	PGIMER-Chandigarh	19	242	12.74	10	0	0.00	1.38
7	R. Talukdar	NEMCARE Hospital, Guwahati	17	152	8.94	7	7	41.18	0.97

S.No	Name of the Author	Affiliation of the Author	TP	TC	CPP	HI	ICP	%ICP	RCI
8	P.K. Garg	AIIMS-New Delhi	20	276	13.80	7	3	15.00	1.50
9	J.D. Wig	PGIMER-Chandigarh	15	222	14.80	10	0	0.00	1.61
10	R. Sharma	PGIMER-Chandigarh	13	40	3.08	3	0	0.00	0.33
11	M. Kang	PGIMER-Chandigarh	12	198	16.50	9	2	16.67	1.79
12	C. Rao	PGIMER-Chandigarh	10	87	8.70	6	0	0.00	0.94
13	S.K. Sinha	PGIMER-Chandigarh	10	113	11.30	7	1	10.00	1.23
14	T.D. Yadav	PGIMER-Chandigarh	10	163	16.30	7	0	0.00	1.77
15	A.K. Baronia	SGPGIMS, Lucknow	9	32	3.56	3	0	0.00	0.39
16	U. Datta	PGIMER-Chandigarh	9	112	12.44	6	0	0.00	1.35
17	B. Negi	PGIMER-Chandigarh	9	97	10.78	6	1	11.11	1.17
18	S. Appasani	PGIMER-Chandigarh	8	54	6.75	3	0	0.00	0.73
19	P. Chhabra	PGIMER-Chandigarh	8	16	2.00	2	0	0.00	0.22
20	M. Gurjar	SGPGIMS, Lucknow	8	29	3.63	2	0	0.00	0.39
		Total of 20 authors	345	3111	9.02	6.7	21	6.09	0.98
		Total of India	581	5352	9.21				
		Share of top 20 authors in Indian total output	59.38	58.13	6.82	10	3	6.67	0.74
TP=Total Papers; TC=Total Citations; CPP=Citations Per Paper; HI=h-index; ICP=International Collaborative Papers; RCI=Relative Citation Index									

Table 6: Scientometric Profile of Top 20 Most Productive Authors in Acute Pancreatitis Research during 2007-16

Medium of Communication

164 Journals contributed to Indian acute pancreatic research, of which 157 journals contributed 1-10 papers

each and 7 journals 12-27 papers each. Among India's acute pancreatitis 574 papers in journals (constituting 98.79% of total Indian output), the top 14 most productive journals accounted for 9 to 27 papers. These

14 journals together accounted for 35.71% share (205 papers) of total Indian journal publication output during 2007-16, increasing from 26.70% during 2007-11 to 40.21% during 2012-16. *Indian Journal of Gastroenterology* and *Journal of the Pancreas* were the

most productive journals each with 27 papers each, followed by *Pancreatology* (21 papers), *Journal of Gastroenterology & Hepatology Australia* (20 papers), etc. during 2007-16 (Table 6).

S.No	Name of the Journal	Number of Papers		
		2007-11	2012-16	2007-16
1	Indian Journal of Gastroenterology	6	21	27
2	Journal of the Pancreas	13	14	27
3	Pancreatology	3	18	21
4	Journal of Gastroenterology & Hepatology Australia	7	13	20
5	Journal of Clinical & Diagnostic Research	2	14	16
6	Journal of Association of Physicians of India	6	7	13
7	Gastrointestinal Endoscopy	1	11	12
8	Annals of Gastroenterology	0	10	10
9	BMJ Case Reports	1	9	10
10	Endoscopic Ultrasound	0	10	10
11	Endoscopy	3	7	10
12	Indian Journal of Critical Care Medicine	0	10	10
13	Pancreas	3	7	10
14	World Journal of Gastroenterology	6	3	9
	Total of 14 journals	51	154	205
	Total global journal output	191	383	574
	Share of top 14 journals in Indian journal output	26.70	40.21	35.71

Table 7: Productivity of Top 14 Most Productive Journals in Indian Acute Pancreatitis Research during 2007-16

Characteristics of Highly Cited Papers

Seven papers receiving 100 or more citations were identified and are assumed as high cited papers. These 7 papers received citations from 105 to 611 during 2007-16 and together registered 1343 citations, which averaged to 191.86 citations per paper. Amongst 7 high

cited papers, 6 were reviews and 1 article. All the high cited papers involve collaboration (2 national collaborative and 5 international collaborative) and involve the participation of 57 authors and 42 organizations (5 Indian). The 5 Indian organizations include 3 papers from Institute of Medical Sciences,

BHU, Varanasi and 1 paper each in Asian Institute of Gastroenterology, Hyderabad, G.B. Pant Hospital, Delhi, Himachal Pradesh University, Shimla, Indian Institute of Technology, New Delhi and Punjabi University, Patiala. The 7 highly cited papers were published in 6 journals, with 2 papers in Nature Reviews Microbiology, and one paper each in Critical Reviews in Biotechnology, Critical Reviews in Oncology/Hematology, Hepatology, International Journal of Environmental Research & Public Health and Pancreas,

Summary & Conclusion

581 Indian publications in acute pancreatitis research, as indexed in Scopus database, were published during 2007-16 and they increased from 33 to 80 in the year 2007 to the year 2016, registering 14.09% growth per annum. Their cumulative Indian output increased from 193 to 388, witnessing 49.74% growth from 2007-11 to 2012-16. India's global publication share in acute pancreatitis research was only 4.28% during 2007-16, witnessing increase from 3.06% to 5.35% from 2007-11 to 2012-16. The citation impact per paper of Indian publications on acute pancreatitis research was averaged to 9.21 citations per paper, however, decreasing from 18.39 during 2006-11 to 4.65 during 2012-16. The share of India's international collaborative publications in acute pancreatitis research was 11.88% during 2007-16, showing increase from 10.88% during 2007-11 to 12.37% during 2012-16. USA in India's international collaborative papers, contributed the largest publications share of 50.72%, followed by Japan (13.04%), Australia, Germany and U.K. (11.59% each), Canada (10.14%), South Korea and Spain (8.70% each), Netherlands, Spain and Sweden (7.25%) during 2007-16.

Medicine, among sub-fields contributed the highest publications share (92.94%), followed by biochemistry, genetics & molecular biology (19.45%), pharmacology, toxicology & pharmaceuticals (8.61%) and immunology &

microbiology (3.61%) during 2007-16. The research activities, as reflected in activity index, showed increase in medicine and biochemistry, genetics & molecular biology, as against decrease in pharmacology, toxicology & pharmaceuticals and immunology & microbiology from 2007-11 to 2012-16. -16.

Among leading organizations and authors participating in India's acute pancreatitis research, the 15 most productive Indian organizations and 20 authors together contributed 48.02% and 59.38% respectively as their share of Indian publication output and 44.26% and 58.13% respectively as their share of Indian citation output during 2007-16. The leading organizations in research productivity were: Postgraduate Institute of Medical Education & Research, Chandigarh (94 papers), All India Institute of Medical Sciences, New Delhi (37 papers), Asian Institute of Gastroenterology, Hyderabad (29 papers), Sanjay Gandhi Postgraduate Institute of Medical Sciences, Lucknow (25 papers), etc during 2007-16.. The leading organizations registering comparatively higher citation impact were: G.B. Pant Hospital, Delhi (22.57), Asian Institute of Gastroenterology, Hyderabad (13.55), All India Institute of Medical Sciences, New Delhi (13.35) and SMS College, Jaipur (11.0) during 2007-16.

The leading authors in publication productivity were: D.K. Bhasin and S.S. Rana (45 papers each), R. Gupta (28 papers), V. Sharma (27 papers), K. Singh (23 papers) and R. Kochhar (19 papers) during 2007-16. The leading authors in terms of research impact were: M. Kang (16.5), T.D. Yadav (16.3), J.D. Wig (14.8), P.K. Garg (13.8), R. Kochhar (12.74), R. Gupta (12.5), U. Datta (12.44), S.K. Sinha (11.3), K. Singh(10.91) and B. Negi (10.78) during 2007-16.

Among the total journal output of 574 papers; the top 14 most productive journals contributed 35.71% share of total journal publication output during 2007-16, which

increased from 26.70% to 40.21% from 2007-11 and 2012-16. Indian Journal of Gastroenterology and Journal of the Pancreas contributed the largest number of papers (27 each), followed by Pancreatology (21 papers), Journal of Gastroenterology & Hepatology Australia (20 papers), etc. during 2007-16.

The 7 highly cited publications individually received citations varying from 105 to 611 in acute pancreatitis research and together these papers received 1343 citations, with 191.86 citations per paper. Around 57 authors and 42 organizations (5 Indian) participated in these 7 high cited papers and were published in 6 journals, with 2 papers in Nature Reviews Microbiology, and one paper each in Critical Reviews in Biotechnology, Critical Reviews in Oncology/Hematology, Hepatology, International Journal of Environmental Research & Public Health and Pancreas,

Concludes that pancreas disorders research have been a neglected subspecialty in India, both in teaching and research. A staggering patient load, a severely inadequate number of trained pancreas specialists and limited advocacy are some of the critical challenges that confront pancreas care research. To address the many problems with pancreas care in India, curricular reforms, capacity building, patient education and political support and funding support from Indian government are badly needed.

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