India's contribution on "Guillain-Barre syndrome": Mapping of 40 years research

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India's contribution on "Guillain-Barre syndrome": Mapping of 40 years research

Shri Ram

Learning Resource Center, Jaypee University of Information Technology, Waknaghat, Kandaghat, Solan 173 234, Himachal Pradesh, India

Abstract

Objective: Guillain-Barre Syndrome (GBS) is an acute inflammatory polyradiculoneuropathy causing limb weaknesses. The mortality is around 8%, with about 20% of patients remaining disabled. The purpose of this study is to examine the performance of Indian Medical Scientists in the area of GBS over a period of 40 years. India's contribution to GBS has been examined based on the global publication output and share, growth rate, citation impact, publication share in various field, highly cited papers and their impact, most productive authors and their citation impact and collaboration of research on GBS with the international community. **Materials and Methods:** The data for this study has been taken from Scopus, a multidisciplinary database using keywords GBS and Miller Fisher Syndrome. The contribution of India on GBS has been compared with different countries for its publication and citation count during a period of 40 years (1973-2012). **Results:** It is found that there were 10,633 publications available from global medical research covering the various aspects of GBS. India's share is 2.92% of global output and holds 10th rank in overall publication output on GBS, whereas United States topped the rank with the highest number of publications. Sanjay Gandhi Post-graduate Institute of Medical Research, Lucknow is the most productive institutions while Tally AB from the National Institute of Mental Health and Neurosciences, Bangalore is the most productive author who has contributed the highest number of papers on GBS. **Conclusion:** India is far behind in GBS research as compared to other countries like USA, as there might be a low case report of GBS in Indian population. Still the research focusing this disease is quite prominent and needs a careful medical attention through research capacity building in order to look for better treatment of the disease in Indian cases. This study shall be helpful in enhancing the awareness of the GBS by Indian scientists.

Key words: *Bibliometric analysis, Guillain-Barre syndrome, Indian research output, Miller Fisher syndrome, neural disorder, polyneuropathy*

Address for correspondence:
Mr. Shri Ram,
Learning Resource Center,
Jaypee University of Information Technology, Waknaghat, Kandaghat,
Solan - 173 234, Himachal Pradesh,
India.
E-mail: shriram2576@gmail.com

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Introduction

Guillain-Barre Syndrome (GBS) is an acute immune-mediated acute polyradiculoneuropathy disorder. The syndrome is named after the French physicians Georges Guillain and Jean Alexandre Barre, who described it in 1916. GBS can cause life-threatening complications if the respiratory muscles are affected or if autonomic nervous system is involved. The weakness reaches its nadir in 2-4 weeks. About 5% of the patients die and more patients are left with a disabling motor deficit and/or fatigue.[1] GBS is a heterogeneous disorder.[2] Epidemiology suggests annual incidence of 1.55/100,000 and incidence increases from 0.8/100,000 in patients younger than 35 to 4.67/100,000 in patients older

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than 75 years. Men are affected approximately 1.5 times more than women.[3] There are no incidence studies of GBS in Indian population, but some case based studies have been reported.[4,5] The major predisposing causes include infections: *Campylobacter jejuni*, cytomegalovirus, Epstein-Barr virus and *Mycoplasma pneumonia*.[6] Some cases of GBS have been reported following influenza virus infection.[7] The treatment of GBS is multidisciplinary and both plasma exchange and high dose intravenous immunoglobulin are effective in reducing both the severity of the disease and the residual deficits.[8]

There are different Bibliometric studies reported involving publication analysis on different diseases such as acquired immunodeficiency syndrome (AIDS),[9-13] neuroscience,[14] cancer,[15] malaria,[16-18] tuberculosis,[19] diabetes,[20] diarrhea[21] and antioxidant.[22] Some of the Bibliometric studies highlighting the contribution of India on Immunology[23] and contribution of Brazil on Immunology,[24] Indian Dental Science Research[25] and Cholera research in India.[26] The study on "Syndrome," other than AIDS, only one Bibliometric analysis on "Severe Acute Respiratory Syndrome"[27] has been reported. On the other hand, as far as GBS is concerned there is no incidence of literature analysis or Bibliometric analysis has been reported so far by any author from India or any other country. Hence, this study aimed to analyze the current status of research output on GBS by Indian scientists. This study shall help in understanding the current stand of India's contribution on GBS and hence help in highlighting the research potential and in-turn helping stakeholders in decision making.

This study is undertaken to analyze the patterns of Indian GBS research output with the emphasis on: (i) Indian research output growth, rank and global publications' share and impact; (ii) The India's international collaboration with collaborative partners; (iii) The productivity of Indian institutions and their impact; (iv) The most productive Indian authors and their citation impact; (v) Most popular and highly cited Indian papers and (v) The patterns of research communication in the most productive journals.

Materials and Methods

This study is undertaken on the publications on GBS by Indian research community. The data is collected from Scopus multidisciplinary bibliographic database available over http://www.scopus.com/home.url. Two phrases "GBS" and "Miller Fisher Syndrome" available in the article title, abstract and keywords, has been used to retrieve bibliographic data and "India" word is used for the country of affiliation of the author using following string.

(TITLE-ABS-KEY("GBS") OR TITLE-ABS-KEY("Miller Fisher Syndrome")) AND PUBYEAR > 1972 AND PUBYEAR < 2013 (TITLE-ABS-KEY("GBS") OR TITLE-ABS-KEY("Miller Fisher Syndrome") AND AFFIL (India)) AND PUBYEAR > 1972 AND PUBYEAR < 2013.

The citation count for the study has been taken as the number of citation received by the articles since it was published. For the international collaboration, each articles published from India is manually analyzed to see the collaboration by Indian authors with International authors. In combination with the above string, separate search strategies have been adopted to retrieve the data for individual, institutional and journal output. Thus, the data obtained using the different search strategies has been subjected to data analysis and interpretation of results.

Results

Global publication share and rank

The Scopus database yielded a total of 10,633 records from the world and 310 records by Indian scientists on GBS. Table 1 presents the distribution of 10 most productive countries on GBS. The global publication ranges from 2.92% to 22.48%, where United States holds top rank with the highest number of publications (2390 papers), which is 22.48% share of total publication. United Kingdom ranked second (9.15% share), Japan third (9.25%) share while Germany, France, Italy, The Netherlands, Spain and Canada have contributed handsomely and their share ranges between 3.15% and 7.84% of global share. India holds the 10th rank with 310 publications, which shares 2.92% publication of global output.

The overall publication output shown an increasing trends, but for few countries, decline in their publication share can be observed from 1973 to 2012. USA has shown a decline in publication share of 3.55% from 1983-1992 to 1993-2002. Japan, Germany, Netherland and Spain have shown a decline in publication share of 0.46% to from 1993-2002 to 2003-2012. France has shown continued decline in publication share from 1973-82 to 1993-02 and a marginal increase of 0.05% from 1993-2002 to 2003-2012. India's publication share increased progressively from 1973 to 2012 and highest progress has been a gain in the period 2003-2012 (4.34%) and the overall growth rate of 2.92%.

From Table 2, we can find that there are six countries, which have average citation per paper (ACPP) higher than world ACPP (12.74). The Netherlands hold the top position on ACPP (28.80) followed by United Kingdom (24.15) and Canada (22.03). The other three countries are USA (17.67), Japan (14.90)

Table 1: Publication output and shares of research output on GBS research by top 10 most productive countries

Rank	Country	Total papers					Share of papers				
		1973-1982	1983-1992	1993-2002	2003-2012	1973-2012	1973-1982	1983-1992	1993-2002	2003-2012	1973-2012
1	United States	216	374	629	1171	2390	22.78	23.55	20.00	23.65	22.48
2	United Kingdom	67	126	295	485	973	7.07	7.93	9.38	9.79	9.15
3	Japan	51	102	411	420	984	5.38	6.42	13.07	8.48	9.25
4	Germany	48	136	308	342	834	5.06	8.56	9.79	6.91	7.84
5	France	100	106	170	270	646	10.55	6.68	5.41	5.45	6.08
6	Italy	30	65	138	252	485	3.16	4.09	4.39	5.09	4.56
7	The Netherlands	7	53	141	194	395	0.74	3.34	4.48	3.92	3.71
8	Spain	16	43	125	174	358	1.69	2.71	3.97	3.51	3.37
9	Canada	17	36	92	190	335	1.79	2.27	2.93	3.84	3.15
10	India	16	22	57	215	310	1.69	1.39	1.81	4.34	2.92
	Others	380	525	779	1239	2923	40.08	33.06	24.77	25.02	27.49
	World	948	1588	3145	4952	10633	100.00	100.00	100.00	100.00	100.00

GBS - Guillain-Barre syndrome

and Germany (13.35). For four countries, the ACPP lower than world ACPP and these are Italy (12.15), France (10.67), Spain 6.57) and India (5.27).

India's contribution on GBS

India holds the 10th position in overall publication output on GBS with a cumulative total of 310 papers during 1973-2012. The overall Indian publication appears in six different document types, which consists of 206 articles (66.45% share), 42 letters (13.55% share), 25 reviews (8.06% share), 6 conference papers (1.94%), 5 editorial (1.61%), 4 note items (1.29%) and 3 short surveys (0.97%). The cumulative growth of the Indian output increased from 16 papers in 1973-82 to 215 in 2003-12, which is a 1243.75% growth. As for as the citation impact is concerned, the Indian papers receive 5.27 citations per paper. The ACPP is highest in the year ranging 1993-02 (11.28). Out of 310 papers of Indian origin, 200 (64.52%) papers have been cited by others [Table 3].

Subject coverage of GBS papers published from India

Indian contribution on GBS appeared in eight broad subject categories (Scopus classification of journal's subject). The highest publications are available in the subject category Medicine (281 publications, 90.65% share). The other subject categories are Neuroscience (76 publications, 24.52% share), Immunology and Microbiology (25 publications, 8.06% share) and Biochemistry, Genetics and Molecular

Table 2: Publication output and citation impact of top 10 countries on GBS

Country	Number of papers		
	TP	TC	ACPP
United States	2390	42242	17.67
United Kingdom	973	23499	24.15
Japan	984	14659	14.90
Germany	834	11133	13.35
France	646	6895	10.67
Italy	485	5894	12.15
The Netherlands	395	11376	28.80
Spain	358	2353	6.57
Canada	335	7380	22.03
India	310	1633	5.27
World	10633	135467	12.74

TP - Total publications, TC - Total citations, ACPP - Average citations per paper, GBS - Guillain-Barre syndrome

Table 3: Indian publications on GBS and citation quality during 1973-2012

Year	TP	Total cited papers	TC	ACPP
1973-1982	16	8	29	1.81
1983-1992	22	15	138	6.27
1993-2002	57	50	643	11.28
2003-2012	215	127	817	3.80
1973-2012	310	200	1633	5.27

TP - Total publications, TC - Total citations, ACPP - Average citations per paper, GBS - Guillain-Barre syndrome

Biology (17 publications, 5.48% share). The subject with less than 5% shares is Pharmacology, Toxicology and Pharmaceutics (9 publications, 2.90% share) and Psychology (6 publications, 1.94% share). Health professions and Veterinary science have shared two publications each with 0.65% share [Table 4].

Considering the citation quality impact of GBS on various subject categories, it is found that two subject category Immunology and Microbiology and Biochemistry; Genetics and Molecular Biology have highest citation impact (10.28 and 10.82 respectively). The other two subject, which have higher citation than average Indian ACPP (5.27) are Psychology (8.50 citation per paper) and Neuroscience (6.07 citation per paper). Though the Medical field has the highest number of publications and the highest number of citations, but the citation impact is only 5.10 citations per paper.

Table 4: Contribution and citation impact of Indian papers on different subject of GBS during 1973-2012

Broad subject area	TP	TC	ACPP
Medicine	281	1433	5.10
Neuroscience	76	461	6.07
Immunology and microbiology	25	257	10.28
Biochemistry, genetics and molecular biology	17	184	10.82
Pharmacology, toxicology and pharmaceutics	9	30	3.33
Psychology	6	51	8.50
Health professions	2	7	3.50
Veterinary science	2	2	1.00
Total of India	310	1633	5.27

GBS - Guillain-Barre syndrome, TP - Total publications, TC - Total citations, ACPP - Average citations per paper

Research contribution of Indian institutions on GBS

In this study, it is found that there are eleven Indian institutes, which have published five and more papers on GBS during 1973-2012. The publication performance of these 11 Indian institutions and their citation impact along with h-index value[28] is given in Table 5.

Unlike other Bibliometric measures, the h-index is another very important parameter to account the lifetime achievement of a scholar's work and h-index can give fairer measure of an academic's overall impact.[29,30] It is found that these 11 institutes have contributed 51.94% of total Indian publication on GBS. The contribution came as 14 papers per institutions and 7 institutes have more publication then average while 5 have less paper than average. "Sanjay Gandhi Post-graduate Institute of Medical Science (SGPGIMS), Lucknow" topped the rank with 31 (10%) publications. It has obtained 333 citations on an average citation rate of 10.74 citations per paper and h-index of 11. After Sanjay SGPGIMS, Post-graduate Institute of Medical Education and Research and All India Institute of Medical Science have contributed 20 publication (97 citations; 4.85 citation per paper; h-index value 5) followed by National Institute of Mental Health and Neuroscience (NIMHANS) have 19 publications (171 citations; 9 citations per paper; h-index value 8). The others have publication counts ranges between 5 and 15 and their citation count ranges between 6 and 75 and average citation per pages ranges from 0.35 to 9.20 citations per paper.

Table 5: Contribution and impact of Indian institutes with more than 5 publications on GBS during 1973-2012

Name of the India institutes	TP	TC	ACPP	h-index
Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	31	333	10.74	11
Post-graduate Institute of Medical Education and Research, Chandigarh	20	97	4.85	5
All India Institute of Medical Sciences, New Delhi	20	97	4.85	5
National Institute of Mental Health and Neurosciences, Bangalore	19	171	9.00	8
Chhatrapati Shahuji Maharaj Medical University, Lucknow	17	6	0.35	1
Christian Medical College, Vellore	15	75	5.00	4
Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala	14	67	4.79	5
Nizam's Institute of Medical Sciences, Hyderabad	10	38	3.80	3
G.B. Pant Hospital, New Delhi	5	46	9.20	2
Maulana Azad Medical College, New Delhi	5	13	2.60	3
Calicut Medical College	5	13	2.60	2
Others	149	694	3.04	14
India total	310	1633	5.27	

TP - Total publications, TC - Total citations, ACPP - Average citations per paper, GBS - Guillain-Barre syndrome

Most productive Indian authors on GBS and their impact

310 papers published by 159 Indian authors either singly or jointly. Table 6 presents the status of 21 most productive Indian authors and their citation impact who have published more than 5 papers during 1973-2012. It is found that these 21 authors belongs to 7 institutes of India and of which 7 authors are associated with SGPGIMS, Lucknow, 4 authors are associated with Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, 3 each from Chhatrapati Shahuji Maharaj Medical University, Lucknow and NIMHANS, Bangalore, 2 from Post-Graduate Institute of Medical Education and Research, Chandigarh and one each from Care Hospital, Hyderabad and Kasturba Medical College, Manipal.

These 21 authors have contributed 142 papers, which is 45.81% share of cumulative total Indian output. Eleven authors have published higher number of papers than the group average (6.76 papers), of which the most productive author is A.B. Tally from NIMHANS, Bangalore with the maximum number of publications (15 papers), followed by 12 papers by K. N. Prasad, 9

Table 6: Most productive Indian authors on GBS and their citation impact during 1973-2012

Author	Affiliating institutes	TP	TC	ACPP	h-Index
A. B. Tally	National Institute of Mental Health and Neuro Sciences India, Bangalore	15	64	4.92	5
K. N. Prasad	Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	12	89	7.42	6
S. Prabhakar	Post-graduate Institute of Medical Education and Research, Chandigarh	9	54	6.00	4
K. K. Nyati	Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	8	34	4.25	4
J. Kalita	Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	8	78	9.75	6
U. K. Misra	Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	7	53	7.57	4
V. K. Paliwal	Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	7	31	4.43	4
S. Pradhan	Sanjay Gandhi Post-graduate Institute of Medical Sciences, Lucknow	7	72	10.29	5
M. D. Nair	Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala	7	41	5.86	3
A. Verma	Sanjay Gandhi Post-graduate Institute of Medical Sciences Lucknow	6	29	4.83	4
S. Rao	Kasturba Medical College, Manipal	6	33	6.60	3
S. Rao	National Institute of Mental Health and Neuro Sciences India, Bangalore	5	14	2.80	2
R. K. Garg	Chhatrapati Shahuji Maharaj Medical University, Lucknow	5	4	0.80	1
V. Lal	Post-graduate Institute of Medical Education and Research, Chandigarh	5	8	1.60	2
V. V. Radhakrishnan	Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala	5	36	7.20	3
N. Jain	Chhatrapati Shahuji Maharaj Medical University, Lucknow	5	1	0.20	1
S. Reuben	Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala	5	33	6.60	3
A. Mathai	Sree Chitra Tirunal Institute for Medical Sciences and Technology, Kerala	5	33	6.60	3
D. Nagaraja	National Institute of Mental Health and Neuro Sciences India, Bangalore	5	43	8.60	4
J. M. K. Murthy	Care Hospital Hyderabad, Hyderabad	5	28	5.60	3
R. Verma	Chhatrapati Shahuji Maharaj Medical University, Lucknow	5	3	0.60	1
	Total	142	784	5.52	12
	Total of the Country	310			
	Share of 21 authors	44.84			

TP - Total publications, TC - Total citations, ACPP - Average citations per paper, GBS - Guillain-Barre syndrome

papers by S. Prabhkar and 8 papers each by K K. Nayati and J. Kalita. Seven papers each were published by each by four authors, 6 papers each by two authors and 5 papers each by 10 authors.

Seeing the quality of papers based on citation impact, it is found that 12 authors have more than Indian ACPP (5.52) while 9 authors have lower citation impact. The highest citation impact is received by S. Pradhan (10.29 citations per paper) of SGPGIMS, Lucknow, who have published 7 papers and obtained 72 citations during 1973-2012 followed by J. Kalita (8 papers, 78 citations and 9.75 citations per paper) and K.N. Prasad (12 papers, 89 citations and 7.42 citations per paper). Though A.B. Tally has published the maximum number of papers received only 84 citations (4.27 citations per paper).

Considering h-index as a factor of qualitative analysis, it is found that none of the authors have achieved the average h-index of all authors taken together. The highest h-index was achieved by two authors and these are K.N. Prasad and J. Kalita with h-index of 6 each. Two authors have h-index 5 each, six authors have h-index 4 each, six authors have h-index 3 each, two authors have h-index 2 each and three authors have h-index 1 each.

International collaboration

Out of 310 papers, forty six papers have international collaboration for research in GBS. The most of the international collaborative papers appeared in last 10 years. As far as the collaborative country is concerned, India has collaborated with 22 countries of the world and most number of papers appears in collaboration with United States (9). France (5) and United Kingdom (4) are other two countries with whom Indian authors have worked on GBS. Thirteen countries have at least one collaborative paper with Indian authors [Table 7].

Most productive journals publishing Indian GBS research

The Indian authored papers appeared in 125 national and international journals. Table 8 presents the status of top 14 journals, which have published 163 papers on GBS which is 53.97% of total Indian publications. As far as the Impact Factor (IF) is concerned, the Indian authors have published four papers in "Lancet" journal which has its IF 38.278 (JCR 2011). Six papers have been published in "Journal of Neurology, Neurosurgery and Psychiatry," which have IF of 4.764.

Highly cited Indian papers on GBS during 1973-2012

Out of 310 papers published from India, 200 (64.52%) papers received at least one citation during 1973-2012 with a cumulative total of 1633 citations. There are 17 papers, which have received 20 or more citations since their publication until 2012 and can be referred as highly cited publications. These all 17 papers appeared in different national and international journals. Of these 17 papers, four papers appeared as internationally collaborated and other 13 papers published as zero-international collaboration. Out of these 17 most cited Indian papers,

only one paper have the citation between 80 and 100, two papers have 60-80 citations, four papers have citations range between 40 and 60 and 10 papers have citations ranges between 20 and 40. These 17 papers collectively received 666 citations with an average citation of 39.18 citations per paper, which is about 40.78% of overall citations of Indian publications [Table 9].

Conclusion

The Bibliometric analysis of literatures on GBS available through Scopus database during 1973-2012, reveals that the research on GBS is being conducted throughout the world and the most number of literatures on GBS came from United States (22.48% of global share). As far as India is concerned, it is ranked 10th in overall publication. The Indian authors have contributed 310 papers on GBS, which is 10th ranked in global output with 2.92% share. The overall citation impact of the Indian publication is found to be 5.27 citations per paper during 1973-2012. Sanjay Gandhi Post-graduate Institute of Medical Research, Lucknow is found to be the most productive Indian institutes with 31 publications. The most of the papers have been collaborated with United States (19.57% share) and 21 other countries of the world. The 310 publications appeared from Indian institutes have been published in 125 national and international journals. "Neurology India" is the most productive journal (41 papers; IF – 0.956) and 4 papers in "Lancet" journal, which have highest IF of 37.278.

About 64.52% Indian papers have been cited by others and the top 17 articles are found to be most frequently cited papers with 20 or more citations. The most cited papers have average citation rate of 39.18 citations per paper. A.B. Tally of NIMHANS, Bangalore is most productive authors and published 15 papers on GBS with the cumulative total of 64 citations (4.92 citations per paper). The most cited Indian authors are S Pradhan and J. Kalita who have scored 10.29 and 9.75 citations per paper respectively.

The Bibliometric analysis of GBS, which is a rare disease and less frequent occurrence, help in understanding the nature of research being conducted throughout the globe specially with reference to India. The number of cases of GBS increased following vaccination with the A76NJ 1976 influenza vaccine.[31,32] This has created a need of

Table 7: International collaboration by Indian authors on GBS during 1973-2012

Country	1973-2003	2003-2012	1973-2012	% share
United States	1	8	9	19.57
France	0	5	5	10.87
United Kingdom	0	4	4	8.70
Switzerland	0	4	4	8.70
Canada	1	2	3	6.52
Japan	1	1	2	4.35
Italy	0	2	2	4.35
Germany	0	2	2	4.35
South Africa	0	2	2	4.35
Australia	0	1	1	2.17
Brazil	0	1	1	2.17
Finland	0	1	1	2.17
Ghana	0	1	1	2.17
Guatemala	0	1	1	2.17
Nepal	0	1	1	2.17
The Netherlands	0	1	1	2.17
Norway	0	1	1	2.17
Philippines	0	1	1	2.17
Poland	0	1	1	2.17
Saudi Arabia	0	1	1	2.17
South Korea	0	1	1	2.17
Sri Lanka	0	1	1	2.17
Total collaboration	3	43	46	100.00

GBS - Guillain-Barre syndrome

Table 8: Most productive journals publishing Indian GBS research during 1973-2012

Name of the Journal	1973-1982	1983-1992	1993-2002	2003-2012	1973-2012	IF (2011)
Neurology India	4	2	7	28	41	0.956
Journal of Association of Physicians of India	0	0	12	8	20	-
Indian Journal of Pediatrics	1	1	3	10	15	0.521
BMJ Case Reports	0	0	0	13	13	-
Annals of Indian Academy of Neurology	0	0	0	10	10	0.928
Journal of the Indian Medical Association	2	0	0	7	9	-
Indian Pediatrics	0	1	3	7	11	1.048
Acta Neurologica Scandinavica	1	3	3	2	9	2.469
Indian Journal of Medical Research	3	0	3	2	8	1.837
Journal of Neurology Neurosurgery and Psychiatry	1	0	2	3	6	4.764
Post-graduate Medical Journal	0	3	2	2	7	1.939
Indian Journal of Gastroenterology	0	0	0	5	5	-
Electromyography and Clinical Neurophysiology	0	0	4	1	5	-
Lancet	0	1	0	3	4	38.278
Total	12	11	39	101	163	
India total	16	22	57	207	302	
Share of top 14 journals in country output	75.00	50.00	68.42	48.79	53.97	

GBS - Guillain-Barre syndrome, IF - Impact factor

Table 9: Most frequently cited Indian papers on GBS during 1973-2012

Authors	Document title	Source title	Total citations
V. S. Negi *et al.*	Intravenous immunoglobulin: An update on the clinical use and mechanisms of action	Journal of Clinical Immunology 2007, 27 (3), 233-245	94
C. K. Pandey *et al.*	Gabapentin for the treatment of pain in GBS: A double-blinded, placebo-controlled, crossover study	Anesthesia and Analgesia 2002, 95 (6), 1719-1723	74
P. Satishchandra *et al.*	Profile of neurologic disorders associated with HIV/AIDS from Bangalore, south India (1989-96)	Indian Journal of Medical Research 2000, 111(Jan), 14-23	67
N. K. Singh *et al.*	Assessment of autonomic dysfunction in GBS and its prognostic implications	Acta Neurologica Scandinavica 1987, 75 (2), 101-105	45
R. Guleria *et al.*	Mycoplasma *pneumoniae* and central nervous system complications: A review	Journal of Laboratory and Clinical Medicine 2005, 146 (2), 55-63	43
D. Chowdhury and A. Arora	Axonal GBS: A critical review	Acta Neurologica Scandinavica 2001, 103 (5), 267-277	42
S. Sundar *et al.*	Comparison of short-course multidrug treatment with standard therapy for visceral leishmaniasis in India: An open-label, non-inferiority, randomised controlled trial	The Lancet 2011, 377 (9764), 477-486	40
J. N. Panicker *et al.*	Primary neuroleptospirosis	Post-graduate Medical Journal 2001, 77 (911), 589-590	36
D. R. Karnad and K. K. Guntupalli	Neurologic disorders in pregnancy	Critical Care Medicine 2005, 33 (10 Suppl.), S362-S371	35
P. I. Folb *et al.*	A global perspective on vaccine safety and public health: The Global Advisory Committee on Vaccine Safety	American Journal of Public Health 2004, 94 (11), 1926-1931	26
R. Bhatia, *et al.*	Tetanus	Neurology India 2002, 50 (4), 398-407	26
M. Tripathi and S. Kaushik	Carbamezapine for pain management in GBS patients in the intensive care unit	Critical Care Medicine 2000, 28 (3), 655-658	26
A. A. Ilyas *et al.*	Antibodies to GT1a ganglioside in patients with GBS	Journal of Neuro Immunology 1998, 82 (2), 160-167	25
C. K. Pandey *et al.*	The comparative evaluation of gabapentin and carbamazepine for pain management in GBS patients in the intensive care unit	Anesthesia and Analgesia 2005, 101 (1), 220-225	24
S. Jogai *et al.*	Immunohistochemical study of human rabies	Neuropathology 2000, 20 (3), 197-203	22
J. Kalita *et al.*	Neurophysiological criteria in the diagnosis of different clinical types of GBS	Journal of Neurology, Neurosurgery and Psychiatry 2008, 79 (3), 289-293	21
S. Venkataraman *et al.*	Postinfectious pandysautonomia with complete recovery after intravenous immunoglobulin therapy	Neurology 1998, 51 (6), 1764-1765	20

GBS - Guillain-Barre syndrome, HIV - Human immunodeficiency virus, AIDS - Acquired immunodeficiency syndrome

heightened awareness of GBS. In Indian scenario, this disease is spreading and occurring quite often, which can be understood by the literatures of Indian case studies published after 2003 onward. This study shall be able to enhance the awareness of the GBS, its nature of publications and growth of the literature world-wide and opens the door for further research.

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