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# Scientometric study of Research literature output by Madras Medical College during 1989 -2018

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## Abstract

Madras Medical College is the one of well-known premier medical institution, situated in Chennai. The data was collected using PubMed database during 1989-2018, there are 646 Publications were found. Analyzed for year wise growth shows 53(8.20%) Publications found during 1989-1993 and Highest 283(43.81%) Publication found during 2014-2018 Authorship pattern shows single author have contributed 35(5.42%), multi author have contributed 611 articles, the mean relative growth rate is 0.0835 and mean doubling time is 14.65. Prolific contributed authors rank 1 occupied by Anand Chockalingam contributed 14(2.16%), 2<sup>nd</sup> by N, Deivanayagam contributed 13(2.01%), 3<sup>rd</sup> by Ottilingam Somasundaram contributed 12(1.86%). The mean degree of collaboration is 0.930. the prolific contributed journals by authors rank 1 occupied by The Journal of the Association of Physicians of India have published 46 research papers, rank2 occupied by Indian Journal of Dermatology, Venereology and Leprology have published 26 research papers, rank 3 occupied by Indian Journal of Psychiatry have published 20 research papers. The most contributions of research publications by affiliated department 1<sup>st</sup>. Department of Dermatology, Contributed 70(9.87%), 2<sup>nd</sup> Institute of Mental Health. Have contributed 41(5.78%) research publications, 3<sup>rd</sup> Institute of Nephrology. have contributed 40 (5.64%) research publications. The author preferred Language for publication is found to be English, now a days peoples are facing various health problems the postgraduates and faculties should publish their research papers in a Indexed Journals to share their knowledge to the fellow researchers and the funding agencies should encourage the researcher to do their research on current trend on health and diseases.

**Keywords:** Scientometric Study, Madras Medical College, Authorship pattern, Relative Growth Rate, Degree of collaboration, Rajiv Gandhi Govt Hospital.

## I. Introduction

Scientometric is the area of test which concerns itself with measuring and analyzing Scientific literature. Scientometric is a sub-location of bibliometrics.

## **II History of Madras Medical College (MMC)**

Madras were given its first Western style health center in 1664 because of the efforts of Sir Edward Winter the governor in a house in Fort St. George, the forerunner of the closing Indian fitness machine. From the records, it is decided that this health center was primarily based throughout 1664 and ultimately was Garrison Hospital in 1814. During 1835, the sanatorium become evolved in the route of the educational line and commenced the Medical School. In 1842, the precept building changed into constructed within the shape of capital letter "H". Simultaneously the Medical School grow to be upgraded into Madras Medical College and started out performing from 1850. Patients grew the health facility modified into extended and modernized to an extraordinary extent to amongst 1928 and 1938. Dr. A.L. Mudaliar who have become appointed as the primary Indian Principal of Madras Medical College.

Since 1935 numerous departments have been created and necessary buildings were built for accommodating the departments and the Public Works Department (PWD) taking care of the buildings. They encompass modern and current-day facilities, which can be on par with a number of the hi-tech multi-specialty organization hospitals in Tamilnadu and Neighboring States

The Tower blocks are built with interconnecting centers, spacious Corridor and high ceiling, spacious wards with contemporary facilities, spacious O.P. Devices, Modern operation theatres, vital laboratories, and so forth. The overall Plinth vicinity of Tower Block-I is 31559 square meter and Tower Block-II is 33304 square meters. Since Chennai comes under seismic zone III, the shape is designed thinking about the seismic forces. A framed form with pile basis is utilized in those superstructures. Modern and scientifically designed lighting fixtures is supplied for indoors and outdoors of the constructing. A 1000KVA generator with automated essential failure panel has been hooked up in building. A modern A.C. Plant is hooked up to provide aircon preparations to the needy additives of Tower Block I and II which encompass operation theatres, ICU's, IMCU's, blood economic enterprise, precise wards

## **III. Material and Methods**

The data is collected from the PubMed database using keyword within string” madras medical college” there are 646 records were found during 1989-2018. The retrieved data is analyzed for authorship pattern, year wise growth, relative growth rate, doubling time, degree of collaboration.

## **Review of Literature**

**Gupta, B. M., & Bala, A. (2011)**<sup>3</sup>. analyzed the research activities of India in medicine during 1999–2008 by retrieved data using Scopus database, India have contributed 65745 (1.59%) of global publication share on medical literature. High quality studies in India is grossly inadequate and requires strategic planning, funding and aid assist. There is also a want to enhance the existing medical education system, which must foster studies tradition.

**Janaarthanan, PI Mr.; Nithyanandam, K Dr; and Natarajan, Munusamy Dr (2019)**<sup>4</sup> analyzed the data collected from PubMed database on osteoporosis in children articles published during 1950 to 2018. There are (4837) articles were published on osteoporosis in children during the year 1950-2018. There are 22544 authors contributed 4837 articles during 1950 – 2018. The multi authors have contributed maximum number of articles 2616(54.1%, rank 1), single author contributed 866(17.904%, rank 2), double author contributed 741(15.319%, rank 3. There are 141 (2.90%) research papers contributed by the journal Osteoporosis International, Bone Miner Research contributed 118(2.43%, Rank 2) and 95(1.95%) research papers contributed by Bone Journal. There are 3945 research articles published in English shows predominant contribution, seconded by German (238) and third by French (182). Country United Nation contributed 1817 article (Rank 1), England 847 (Rank 2) and Germany 443(Rank 3), etc. The result indicates that in Osteoporosis research developed countries contribution is remarkable. The developing countries like India must give attention on osteoporosis in children to save the future generation free from osteoporosis.

**Natarajan, R. (2018)**<sup>5</sup> analyzed the research contribution on nephrology by retrieved data using Web of Science database during 2010 – 2015. He analyzed the kidney diseases prone to Children’s and adults. Analyzed the authorship pattern year wise growth of literature on kidney disease, relative growth rate, country wise prolific contributed country, he has done his work by using software HistCite and VOS viewer. The author preferred to publish their contributions in English language, United states have contributed in Leading research articles on Nephrology.

**Sachithanantham, S., & Raja, S. (2015)<sup>6</sup>** analyzed the Indian research output on rabies by collecting data using PubMed database during 1950-2014. It is found that there are 495 records. The *Journal of the Association of Physicians of India (JAPI)* has published 46 (9.29 %) research papers. Author '*Madhusudhana SN*' is the most prolific author have contributed 57 (11.51 %) articles. '*National Institute of Mental Health and Neurosciences (NIMHANS), Bangalore*' have contributed more research papers in the rabies research. The Bradford law of scattering is not fit to rabies research in India. It is advice that the agencies on doing research on zoonotic disease give priority to rabies research. Government should take steps to protect our people by eradicate rabies and reduce the mortality rate.

**Subramanyam, K. (1983)<sup>7</sup>** describes that Scientific studies is becoming an increasingly collaborative trend, it varies department to department. Earlier research have proven a high diploma of correlation between collaboration and research productiveness, and among collaboration and economic help for research. The volume of collaboration cannot be without problems determined by using traditional methods of survey and observation. Bibliometric strategies provide a convenient and non-reactive tool for reading collaboration in studies. There are several forms of collaboration had been identified, and in advance research on collaboration has been reviewed. Further research is wanted to refine the techniques of defining and assessing collaboration and its effect on the organization of studies and communication in technology.

#### **IV. Objective**

To find the growth of literature by Madras Medical College

To find the authorship pattern

To find the relative growth rate and doubling time

To find the ranking of author

To find the degree of collaboration

To find the productive Journal

To find the prolific department contribution

To find the preferred language of author

## V. Analysis

### V.1. Table 1

Year wise growth of literature during 1989-2018

S. No	Year	No. of Contributions	Cumulative	Percentage
1	1989-1993	53	53	8.20
2	1994-1998	53	106	8.20
3	1999-2003	59	165	9.13
4	2004-2008	75	240	11.61
5	2009-2013	123	363	19.05
6	2014-2018	283	646	43.81
		646		100

Table 1 shows the year wise growth of literature increased year by year, in the year 1989-1993 contributed 53 (8.20%)papers,1994-1998 contributed 53(8.20%) papers, 1999-2003 contributed 59(9.13%) papers, 2004-2008 contributed 75 (11.61%)papers, in 2009-2013 have contributed 123 (19.05%)papers, in 2014-2018 have contributed 283(43.81%) papers. It is found that in the year 2017 there are 82 contributions, in the year 2016 have 79 contributions and in the year 2018 there are 60 contributions.

### V.2. Table 2

Authorship pattern of the contributed research articles

Year	Single	Double	Triple	Four	Five	Above 5	Total
1989-1993	4	12	5	12	8	12	53
1994-1998	6	6	13	7	15	6	53
1999-2003	6	3	6	22	10	12	59
2004-2008	2	5	19	12	19	18	75
2009-2013	8	15	40	27	16	17	123
2014-2018	9	34	52	62	34	92	283
Total	35	75	135	142	102	157	646
Percentage	5.42	11.61	20.9	21.98	15.79	24.30	100

Table 2 shows the authorship pattern single author has contributed 35(5.42%), Double author 75(11.61%), Triple author 135(20.9%), Four author 142(20.98%), five author 102(15.79%) and above five authors have contributed 157(24.30%)

### V.3. Table 3

Relative Growth Rate and Doubling time

S. No	Year	No. of Contributions	Cumulative	$W_1$	$W_2$	RGR	Dt	mean
1	1989-1993	53	53		3.970			
2	1994-1998	53	106	3.970	3.970	0		
3	1999-2003	59	165	3.970	4.077	0.021	33	14.65
4	2004-2008	75	240	4.077	4.317	0.048	14.43	
5	2009-2013	123	363	4.317	4.812	0.099	7	
6	2014-2018	283	646	4.812	5.645	0.166	4.17	
						0.0835		

Table 3 shows the relative growth rate and doubling time, the rate of growth is gradually increased year by year. The mean relative growth rate is 0.0835 and mean doubling time is 14.65.

### v.4. Table 4

Ranking the top 10 productive author

S.no	Name of the author	Number of contributions	Percentage	Rank
1	Anand Chockalingam	14	2.16	1
2	N, Deivanayagam	13	2.01	2
3	Ottilingam Somasundaram	12	1.86	3

4	N. Raja Maheswari	11	1.70	4
5	R. Ponnudurai	10	1.55	5
6	N. Durairajan	9	1.39	6
7	Mayilvahanan Natarajan, N. Gopalakrishnan, N. Uday Kumar, Ramachandran Meenakshisundaram	7	1.08	7
8	Dhalapathy Sadacharan, Natarajan Gopalakrishnan, Varun Arunagiri,	6	0.928	8
9	Alexander Porter, Bijo Mathew, Indumathy Santhanan, M. Jayaraman, M.V. Natarajan, V. Ramachandran, Vengalathur Ganesan Ramesh	5	0.774	9
10	Biggs Saravanan Ramachandran, D. Vijayaraghavan, G. Sentamilselvi, J. Dhanapriya, JMV	4	0.619	10



	Amarjothi, M.A. Muthusethupathi, PV Venugoopal, R. Deepa, S. Rajkumar, V. Somasundaram			
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Table 4 shows the top 10 prolific contributed authors, rank 1 occupied by Anand Chockalingam contributed 14(2.16%), 2<sup>nd</sup> N, Deivanayagam contributed 13(2.01%), 3<sup>rd</sup> by Ottilingam Somasundaram contributed 12(1.86%)

#### V.5. Table 5

##### Degree of Collaboration

The degree of collaboration by using K. Subramaniam Formula

$$DC = Nm / (Nm + Ns)$$

Nm = Number of Multi Author

Ns = Number of Single Author

Year	Single (Ns)	Multi Author (Nm)	Nm+Ns	DC
1989-1993	4	49	53	0.924
1994-1998	6	47	53	0.886
1999-2003	6	53	59	0.898
2004-2008	2	73	75	0.973
2009-2013	8	115	123	0.934
2014-2018	9	274	283	0.968
Total	35	611	646	0.930
Percentage	5.41	94.58		

Table 5 reveals the degree of collaboration there are 35(5.41%) research publications were contributed by Single author. Multi author contributed 611(94.58%) research publications. The mean degree of collaboration was 0.930.

#### V.6. Table 6

The top 10 Productive journals for publication

S. No	Name of the Journal	Number of Contributions	Rank
1	The Journal of the Association of Physicians of India	46	1
2	Indian Journal of Dermatology, Venereology and Leprology	26	2
3	Indian Journal of Psychiatry	20	3
4	Journal of Clinical and diagnostic research (JCDR)	19	4
5	Indian Heart Journal, Indian Journal of Dermatology, Indian Pediatrics.	14	5
6	Indian Journal of Nephrology	12	6
7	Annals of Indian Academy of Neurology, BMJ Case Report, International Journal of Orthopedics	10	7
8	International Journal of Dermatology, Indian Journal of Pathology and Microbiology, Indian Journal of Pediatrics, Journal of Indian Medical Association, The Indian Journal of Surgery	9	8
9	Indian Journal of Endocrinology and Metabolism, International Surgery, Neurology India, Saudi journal of kidney diseases and transplantation: an official publication of the Saudi Center for Organ Transplantation, Saudi Arabia	8	9
10	Annals of the New York Academy of Sciences, Indian Journal of Medical Microbiology, Indian Journal of Sexually transmitted Disease and AIDS, Indian journal of urology: IJU: journal of the Urological Society of India, International urogynecology journal	7	10

Table 6 shows the name of the prolific contributed journals by authors rank 1 occupied by The Journal of the Association of Physicians of India have published 46 research papers, rank2 occupied by Indian Journal of Dermatology, Venereology and Leprology have published 26 research papers, rank 3 occupied by Indian Journal of Psychiatry have published 20 research papers. 4<sup>th</sup> Journal of Clinical and Diagnostic Research (JCDR) have contributed 19 research

papers, 5<sup>th</sup> Indian Heart Journal, Indian Journal of Dermatology, Indian Pediatrics have contributed 14 research articles.

#### V.7. Table 7

The various top 20 departments contributions of research publications

S. No	Name of the Department	Number of Contributions	Percentage
1	Department of Dermatology, Madras Medical College, Chennai, Tamil Nadu, India.	70	10.84
2	Institute of Mental Health, Madras Medical College, Chennai-10.	41	6.35
3	Institute of Nephrology, Madras Medical College, Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu, India.	40	6.19
4	Post Graduate Institute of Internal Medicine, Madras Medical College and Government General Hospital, Chennai, Tamil Nadu.	32	4.95
5	Institute of Neurology, Madras Medical College, India.	27	4.18
6	Department of Cardiology, Madras Medical College, Chennai, India.	26	4.02
7	Institute of Internal Medicine and Department of Endocrinology, Madras Medical College, Chennai, India.	23	3.56
8	Department of Rheumatology, Madras Medical College.	22	3.40

9	Department of Orthopedics, Madras Medical College, India.	17	2.63
10	Institute of Pathology, Madras Medical College, Chennai - 600 003, Tamil Nadu, India.	16	2.48
11	Pediatric Emergency Department, Institute of Child Health and Hospital for Children, Madras Medical College, Chennai, Tamil Nadu, India.	14	2.17
12	Institute of Neurosurgery, Madras Medical College & Rajiv Gandhi Government General Hospital (RGGGH), Chennai, Tamil Nadu, India.	13	2.01
13	Department of Pharmacology, Madras Medical College.	11	1.70
14	Department of Urogynecology, Institute of Social Obstetrics & Govt Kasthurbha Gandhi Hospital, Madras Medical College, Triplicaine, Chennai, Tamil Nadu, India 600005	11	1.70
15	Department Plastic Surgery, Madras Medical College, India.	11	1.70
16	Department of Radiation Oncology, Barnard Institute, Madras Medical College, Chennai, India. mmcradiationoncology@rediffmail.com	10	1.55
17	Institute of Child Health and Clinical Epidemiology Unit, Madras Medical College.	9	1.39
18	SC Bronson, Institute of Diabetology, Madras Medical College and Rajiv Gandhi Government	9	1.39

	General Hospital, Chennai 600003, Tamil Nadu, India. Email dr.s.charlesb@gmail.com.		
19	Department of Radiation Oncology, Barnard Institute, Madras Medical College, Chennai, India. mmcradiationoncology@rediffmail.com	8	1.24
20	Department of Urology, Madras Medical College, Chennai, Tamil Nadu, India.	7	1.08

Table 7 shows the most contributions of research publications by affiliated department 1<sup>st</sup>. Department of Dermatology, Madras Medical College, Chennai, Tamilnadu, India Contributed 70(9.87%), 2<sup>nd</sup> Institute of Mental Health, Madras Medical College, Chennai-10. Have contributed 41(5.78%) research publications, 3<sup>rd</sup> Institute of Nephrology, Madras Medical College, Rajiv Gandhi Government General Hospital, Chennai, Tamil Nadu, India .have contributed 40 (5.64%)research publications, 4<sup>th</sup> Post Graduate Institute of Internal Medicine, Madras Medical College and Government General Hospital, Chennai, Tamil Nadu.have contributed 32(4.51%), 5<sup>th</sup> Institute of Neurology, Madras Medical College, India.27(3.80%)

#### **V.8. Table 8**

Preferred Language of author for publication

Language	Number of Contribution	Percentage
English	646	100

The author preferred Language for publication is found to be English, All the research publications are published in English language only.

#### **Conclusion**

Madras Medical College have contributed 646 Research papers for the period of 30 years during 1989-2018. The year wise growth shows during 1989-1993 there are 53 (8.20%) papers,1994-1998 contributed 53(8.20%) papers, 1999-2003 contributed 59(9.13%) papers, 2004-

2008 contributed 75 (11.61%) papers, in 2009-2013 have contributed 123 (19.05%) papers, in 2014-2018 have contributed 283(43.81%) papers. The highest number of publications found in year 2017 there are 82 contributions, Authorship pattern shows single author have contributed 35(5.42%) papers, Double authors contributed 75(11.61%) papers, Triple authors contributed 135(20.9%) papers, four authors contributed 142(20.98%) papers, five authors contributed 102(15.79%) papers and above five authors have contributed 157(24.30%) papers. The relative growth rate and doubling time, the rate of growth is gradually increased year by year. The mean relative growth rate is 0.0835 and mean doubling time is 14.65. Prolific contributed authors, rank 1 occupied by Anand Chockalingam contributed 14(2.16%) research papers, 2<sup>nd</sup> N. Deivanayagam contributed 13(2.01%) research papers, 3<sup>rd</sup> by Ottilingam Somasundaram contributed 12(1.86%) research papers. The degree of collaboration shows Single author contributed 35(5.41%) research publications. Multi authors have contributed 611(94.58%) research publications. The mean degree of collaboration was 0.930. the prolific contributed journals by authors rank 1 occupied by The Journal of the Association of Physicians of India have published 46 research papers, rank2 occupied by Indian Journal of Dermatology, Venereology and Leprology have published 26 research papers, rank 3 occupied by Indian Journal of Psychiatry have published 20 research papers. the most contributions of research publications by affiliated department 1<sup>st</sup>. Department of Dermatology, Contributed 70(9.87%) research papers, 2<sup>nd</sup> Institute of Mental Health Have contributed 41(5.78%) research papers, 3<sup>rd</sup> Institute of Nephrology have contributed 40 (5.64%)research papers, 4<sup>th</sup> Post Graduate Institute of Internal Medicine have contributed 32(4.51%) research papers, 5<sup>th</sup> Institute of Neurology have contributed .27(3.80%) research papers. The author preferred Language for publication is found to be English, All the research publications were published in English language only. Madras Medical College is the Premier Institute there are so many renowned departments with world class facility, now a days peoples are facing various health problems the postgraduates and faculties should publish their research papers in a Indexed Journals to share their knowledge to the fellow researchers and the funding agencies should encourage the research to do their research on current trend on health and diseases.

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