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## Research Productivity and Visualization of the All India Institute of Medical Sciences (AIIMS) Bhubaneswar during 2012-2019: A Scientometric Approach

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# Research Productivity and Visualization of the All India Institute of Medical Sciences (AIIMS) Bhubaneswar during 2012-2019: A Scientometric Approach

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### **Abstract**

The purpose of the present study is to evaluate the productivity of research at the Indian Institute of Medical Sciences (AIIMS), Bhubaneswar, in the first eight years (2012-2019) of its establishment. In this study, the authors used a number of Scientometric indices to assess research productivity. The results of the study showed that in the selected period of 2019, most research publications appear with an average growth rate of 46.43%. Most of the comments were written by five or more authors. In addition, R.R. Das is recognized as the most prolific author, and the Journal of Clinical and Diagnostic Research is one of the most popular sources of publications, with the largest number of publications with the help of scientists from AIIMS. The UK and AIIMS New Delhi are the countries and institutions that work best together. In addition, the study also found that the Indian Medical Research Council is the leading research institution with AIIMS Bhubaneswar. The title of Maiti R "Metronomic Chemotherapy", published in the Journal of Pharmacology and Pharmacotherapeutics, received the most citations. This sentence is long and somewhat complicated. This study is useful for policymakers and stakeholders in medical institutions to improve their research prospects.

**Keywords:** Scientometric, Annual growth rate (AGR), Relative growth rate (RGR), Doubling Time (DC), Collaboration coefficient (CC), Research productivity, AIIMS Bhubaneswar

### **1. Introduction**

Research is a continuous process and regular activity in academic and research institutions. It is essential to promote a nation's prosperity and service to humankind. Nations' R&D institutions and governmental organizations spend vast amounts on activities associated with the research, development and the innovations towards the creation of a better knowledge society. In India, several funding agencies offer funds to researchers working in various

research institutions in various fields through different schemes and programs from time to time. As an assessment of research and research productivity, it is important to measure and evaluate the number of research articles published by a selected unit over time. The scientific method can be used to effectively evaluate the effectiveness of research carried out by individual authors and institutions, as well as by other authors, institutions and countries, etc. Their collaboration continued. Quantitative analysis using scientometric techniques reveals visibility, prestige and credibility within the wider scientific community, which results in high-quality research productivity. Scientometric analysis of research results allow us to understand the current state of individuals and institutions, to improve their performance. Therefore, an analysis of academic publications was carried out to assess and evaluate the research productivity and performance of the Indian Institute of Medicine (AIIMS), Bhubaneswar. The Government of India with the aim to work for the betterment medical education and services launched a scheme named Pradhan Mantri Swasthya SurakshaYojana (PMSSY) <sup>1</sup> which comes under the Ministry of Health and Family Welfare, Nirman Bhawan, New Delhi. Under the PMSSY, six AIIMS have been established during 2012-2013 at Bhopal, Patna, Jodhpur, Bhubaneswar, Raipur, and Rishikesh. It is supposed to provide better healthcare services in respective states and quality medical education to more NEET qualified aspirants.

AIIMS, Bhubaneswar, is one among them established as an autonomous institution and then conferred the status of institute of national importance (INI) with the objective to develop patterns of teaching in medical services especially in medical education for both undergraduates and postgraduates in all the medical branches. It demonstrates a high standard in the field of medical education and trains the aspirants in various health related activities throughout India ever since AIIMS Bhubaneswar is striving for providing quality medical education in super-specialty disciplines in these areas and also up-grading Medicare facilities in underserved areas of the country.

## **2. Literature review**

A review of the literature indicated that many studies were carried out by applying scientometrics techniques to analyse the institutional productivities and their collaborations using different quality measuring parameters. Some statistical analyses have been conducted at individual institutions or discipline levels. Some are under a group of institutions to know collaborative research in co-authorship, institutions, etc. Such scientometric studies are carried out at national as well as global level also. In particular, few reviews are found to be conducted among the AIIMS institutions. Prathap and Gupta<sup>2</sup> in their scientific study conducted to know the position of the medical faculty in India which is based on the publication of researches that are produced in the years 1999-2008. The results show that AIIMS, New Delhi, is the largest and number one publisher, followed by PGIMER, Chandigarh. The author also sees the thirty most prolific writers in the field of medicine, as well as in other medical fields. In the same year, another study by Gupta and Bala<sup>3</sup> analysed the research activities and performance of various types of Indian universities, colleges, research foundations, research institutes and hospitals as well as the characteristics of the literature published during the 'year. from 1999-2008 These results show that India ranks 12th among the most productive countries in medical research, consisting of 65,745 articles, with a total public publication output of 1.59%. The author suggests that there must be strategic planning, investment and support resources to produce high quality research in India. He stressed the urgent requirement of improving the existing medical education practices and systems followed in India.

Kaur and Preeti<sup>4</sup> conduct scientific research to analyse and compare the results of two treatises on medical institutions, AIIMS and PGIMER, the research publication from 1999 to 2008. It was clear from the study's findings that AIIMS produced a higher number of papers, 9838 with

a total citation count of 209995, whereas PGIMER contributed 5552 articles at a citation rate of 11439. Further, the authors also performed subject wise analysis, growth pattern of publications, authors collaborations, an h-index of both the institutions.

Wani et al.<sup>5</sup> carried a scientometric study to analyse the research productivity of AIIMS using various parameters for 53 years from 1959 to 2011. The result of the course indicated that the publications produced from the field of medicine received the highest rate of productivity of 14381 articles. Further, it was observed that the collaboration of AIIMS authors represented at 14.25%, 5.66%, and 80.09% at national, international, and Local levels, respectively.

Meera and Surendra Kumar Sahu<sup>6</sup> conducted a quantitative bibliographic analysis of scientific output at Delhi Medical College (UCMS) between 1975 and November 2013. The author found a total of 2557 articles. 25.6% of all publications. Furthermore, the amount of collaboration in a typical year is 0.92, making the United States the best country for researchers in terms of research collaboration.

Yazudani et al.<sup>7</sup> Conducted a cross-sectional study to assess the scientific results of research centers belonging to TUMS (Tehran Medical University). The authors have expressed that they have used scientometric indices and also collected data through questionnaires and evaluating annual reports. The results of the study indicated the increasing trend in the publication of research papers in TUMS research centers.

Jeysankar and Nishavathi<sup>8</sup> performed a survey-based scientometric analysis to identify the research productivity of AIIMS for ten years from 2007-2016 using a statistical approach and revealed that the quantitative and qualitative research publications produced by AIIMS influence India's disease burden. Another study by Kaur<sup>9</sup> analyzed the classification of two Indian medical institutions such as AIIMS, New Delhi and PGIMER, Chandigarh, and found that most authors have different classifications depending on the total productivity and quality indicators. However, some authors have nearly the same classifications as TC. TP, citation indexes such as G-Index, H-Index, and I-10 Index, which have been shown to be consistent in their research. The authors also suggest that organizations such as (NAAC), which rank various institutions, should consider quality as a key factor when doing the same.

Similarly, Nishavathi<sup>10</sup> examined the growth trajectory of the medical literature published by AIIMS over the period 2007-2016. The study results found an exponential growth with an annual growth rate (AGR) of 6.7%, compared to an average annual growth rate of 11.57% in the medical literature published in India. The authors also point out that the creation of six new AIIMS institutions in India, the emergence of new departments in this medical trend, and the approved budgets for AIIMS research cells are factors that are enhancing the growth of the literature.

Wang et al.<sup>11</sup> assessed knowledge structures, areas of knowledge and evolutionary trends in global health research between 1996 and 2019 based on the Web of Science (WoS) database. The author makes a visual analysis based on these documents. on the characteristics of scientific production, collaboration networks involved in scientific research, keywords and widely cited literature. The authors note that researchers are showing a growing interest in global health research around the world and have shown that "global health governance", "global health diplomacy", "medical education", "global health education" "and" antimicrobial resistance "is the main and critical trend of the research points.

### **3. Scope of the Study**

Currently, the scope of the research is limited to studies published by the All India Institute of Medical Science (AIIMS) Bhubaneswar, listed in the Scopus database. Well-organized scientists work for better research results. When the Indian Institute of Medical Sciences (AIIMS) was established in Bhubaneswar in 2012, the research area was limited to a total of 8

years in 2012-2019. The study also evaluated all publications in the Scopus database, regardless of type or category. that are displayed.

#### 4. Objectives

The main objective of the study is to evaluate the publication activities of AIIMS, Bhubaneswar, for a period of 2012-2019. In particular, the research study targets results on the following objectives:

- To find out the year-wise growth pattern of research productivity of the AIIMS, Bhubaneswar;
- To find out the Annual Growth Rate (AGR), Relative Growth Rate (RGR), and Doubling Times (Dt);
- To examine the authorship pattern, degree of collaboration (DC), and collaborative coefficient (CC);
- To find out the most prolific author, collaborative research with co-authorship, institutions, and countries;
- To identify the highly preferred source for publication in which authors wish to publish their work.

#### 5. Methodology

A descriptive research project was adopted to study the scientific results of the All Indian Institute of Medical Sciences (AIIMS) in Bhubaneswar from 2012 to 2019. The Scopus<sup>12</sup> database was searched for retrieving of data for the present study. It is used to collect data with different parameters. The name of the affiliated organization derives from "All Indian Institute of Medical Sciences (AIIMS) Bhubaneswar." The search string appeared was "(AF-ID("All India Institute of Medical Sciences Bhubaneswar" 60110821) AND ( LIMIT-TO ( PUBYEAR,2019) OR LIMIT-TO ( PUB YEAR,2018) OR LIMIT-TO ( PUBYEAR,2017) OR LIMIT-TO ( PUBYEAR,2016) OR LIMIT-TO ( PUBYEAR,2015) OR LIMIT-TO ( PUBYEAR,2014) OR LIMIT-TO ( PUBYEAR,2013) OR LIMIT-TO ( PUBYEAR,2012) ))". All the retrieved data were carefully analysed using Google<sup>TM</sup> sheets<sup>13</sup> to provide the details. Data visualization using Vosviewer software<sup>14</sup> is also used to achieve a better understanding.

### 6. DATA ANALYSIS

#### 6.1 Year-wise growth pattern of publications

From 2012 to 2019, a total of 734 publications were received. The frequency of publications over the last eight years shows an increasing trend. In 2012, the publication growth model was less efficient (0.27%), which may be due to the creation of an entry-level institution with few researchers and infrastructure. The results of the study showed that in 2019 the survey growth model was maximal (28.22%). For analysing the quality of publications, the average article reference is being used as a scientometric indicator. 2282 citations were received for all 734 publications. The average number of citations per article in the years 2012–2019 ranged between 10.5 and 0.59. Table 1 shows the annual growth model of publications based on the total number of publications issued, the percentage collected, number of citations received (TC) in total and the average citation data per publication (ACPP).

Table.1: Year-wise growth of publications

Year	TP.	%	Cumulative %	TC	ACPP
2012	2	0.27	0.27	21	10.5
2013	27	3.68	3.95	260	9.63
2014	57	7.77	11.71	374	6.56
2015	74	10.08	21.80	428	5.78

2016	110	14.99	36.78	462	4.2
2017	119	16.21	52.99	380	3.19
2018	140	19.07	72.07	236	1.69
2019	205	27.93	100.00	121	0.59
Total	734	100	200.00	2282	3.11

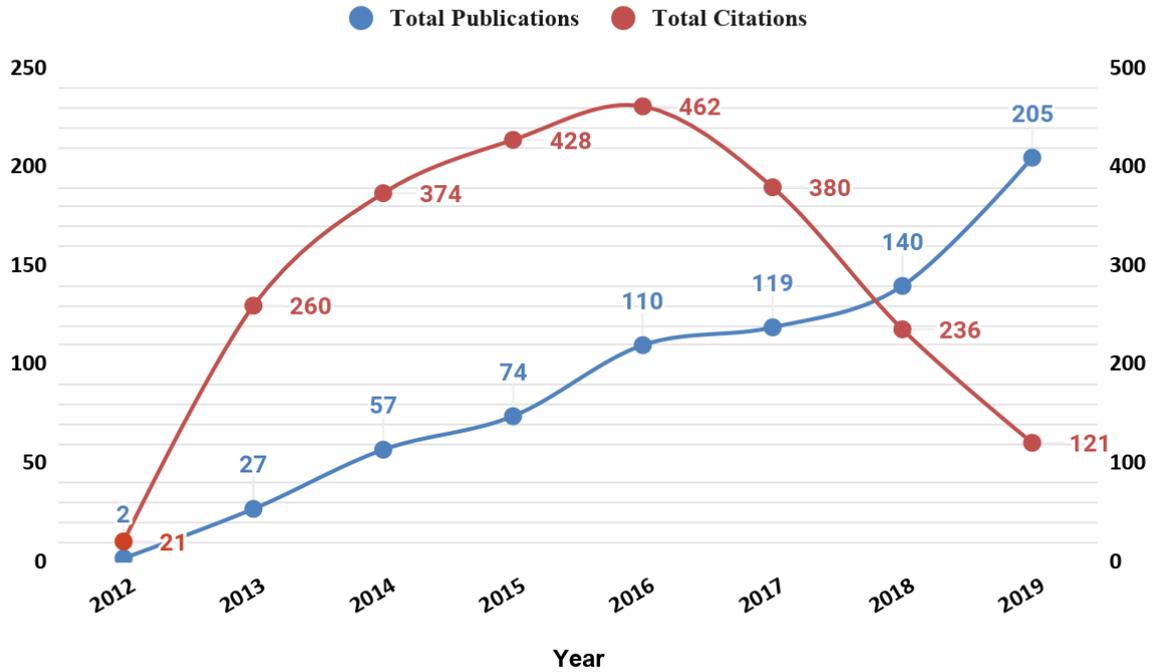


Fig.1: Year-wise growth pattern of publications with its total citations

### 6.2 Annual Growth Rate (AGR), Relative Growth Rate (RGR), and Doubling Time (DT) of research publications

The authors show in Table 2 the annual growth rate and the relative growth rate along with the doubling time. Scientometric studies typically use two measurements to assess the growth rate of the literature in any field- the annual growth rate (AGR) and the relative growth rate (RGR). The AGR is determined using the formula below. Table 2 below shows the number of AGR documents for the period 2012-2019. The annual growth rate of the total publication is calculated each year using the following formula:

$$AGR = \frac{\text{end value} - \text{first value}}{\text{first value}} \times 100$$

Table.2: Annual Growth Rate, Relative Growth Rate and Doubling Times

Year	TP	AGR	CT	W1	W2	RGR	Dt
2012	2	0	2	0	0.69	0	0
2013	27	1250	29	0.69	3.37	2.67	0.26
2014	57	111.11	86	3.37	4.45	1.09	0.64
2015	74	29.82	160	4.45	5.08	0.62	1.12

2016	110	48.65	270	5.08	5.60	0.52	1.32
2017	119	8.18	389	5.60	5.96	0.37	1.90
2018	140	17.65	529	5.96	6.27	0.31	2.25
2019	205	46.43	734	6.27	6.60	0.33	2.12

\*Note: AGR=Annual Growth Rate, CT=Cumulative Total, RGR=Relative Growth Rate  
Dt= Doubling times

The analysis clearly shows that the values obtained for the publication's annual growth rate were inconsistent during the study. Here, the AGR is determined according to the formula given above. Therefore, it can be said that the publication of AGR shows a downward trend from 1250 in 2013 to 8.18 in 2017. However, the AGR has again increased in the last period of the IP from 17.65 (2018) to 46, 43 (2019) and fluctuated. year to year since then, as shown in Table 2.

The relative growth rate (GRR) expresses growth as the rate of growth per unit of size (Baskaran)<sup>15</sup>. The following equation can be used to calculate the average relative growth rate (RGR) for a given interval period.

*Relative Growth Rate (RGR)*

$$RGR = (1 - 2^r) = \frac{\ln(w2) - \ln(w1)}{T2 - T1}$$

Where,

w1 = Total Number of Publications at Initial time.

w2 = Total Number of Publications at Final.

T2 –T1 = Difference between the initial year and the final year can be taken here as time.

*Doubling Time (DT)*

Doubling time is used to indicate “the period required for a quantity to double in size or value”. The formula used for calculating Doubling Time as follows:

$$Doubling\ Time = D(t) \frac{0.693}{RGR}$$

Table 2 shows the annual growth rate (TCR) by publication. According to the analysis, the RGR will increase from 0.26 in 2013 to 2.12 in 2019. However, the replication time (Dt) increases regularly from 0.20 to 2.12 over the years.

### 6.3 Authorship Pattern

The authorship pattern that emerged as a result of the Bhubaneswar AIIMS publications were counted and found that five or more authors contributed to many publications (267). 179 with four following authors, 138 with three authors, 106 with two authors, and the contribution of some individual authors was low for a total of 42 articles. Table 3 illustrates the annual representation of the authorship patterns. The given table indicates that the largest number of publications are appeared as collaborative authorship patterns. The trend of authorship pattern in AIIMS, Bhubaneswar, refers to collaborative research rather than individual research.

Table.3: Authorship Pattern

Year	One Author	Two Authors	Three Authors	Four Authors	Five and more Authors	Total Authors	DC	CC
2012	0	0	0	0	2	2	1	0.99
2013	1	6	7	4	10	28	0.96	0.84
2014	4	7	10	13	23	57	0.93	0.74
2015	4	15	18	7	27	71	0.94	0.78
2016	11	16	25	27	31	110	0.90	0.66
2017	4	13	17	37	48	119	0.97	0.75
2018	10	22	20	35	53	140	0.93	0.77
2019	8	27	41	56	73	205	0.96	0.91
Total	42	106	138	179	267	732	0.94	0.67

\*Note: DC=Degree of Collaboration, CC= Collaborative Coefficient

### *Degree of Collaboration (DC)*

DC is the “ratio of the number of collaborative researches works to the number of researches works in a scientific discipline in a certain period”. The formula proposed by Subramanyam (1983)<sup>16</sup> is considered for this study to analyse. This formula is expressed as follows:

$$DC = \frac{Nm}{Nm + Ns}$$

Where, “DC- is the degree of collaboration in a discipline”

“Nm - Is the number of multi-authored research papers in the discipline published during the year”.

“Ns - Is the number of single-authored papers in the discipline published during the same year”

### *Collaboration Coefficient (CC)*

To measure the strength of the cooperation, the following formula was applied to the cooperation coefficient, as suggested by Ajiferuke, Burell and Tague (1988)<sup>17</sup>. The cooperation coefficient is a numerical value between 0 and 1. The more significant it is, the greater than 0.5, the better the collaboration rate between authors. If it is close to 0, it means that the authors' collaboration rate is low.

$$CC = 1 - \frac{\sum_{j=1}^k \binom{l}{j} f_j}{N}$$

Where; “fj= Total number of authored research papers”

“N= Total number of research papers published in a year”

“k= The most significant number of authors per paper in a discipline”

The collaboration coefficient is a measure that takes into account multiple authors in more detail than a collaboration index and the Degree of collaboration. The given Table 3 shows the annual values of the collaboration coefficient (CC). This is calculated using formula (3), which silently describes the amount that several authors contributed to a single publication. These data show that collaborative publications are still very rare by 2019. In the years 2013 and 2019 a huge contribution of collaboration was made. collaboration in 2012 was minimal, with a CC value of 0.09. Since 2012, the CC trend has slowed to 0.66 in 2016. In general, some academics have published on their own, but now several publications contribute to scientific collaborations.

#### 6.4 Top Ten most Prolific Authors

Based on the analysis, it was confirmed that a total of 160 authors, including writers from other countries, are participating in the AIIMS Bhubaneswar publishing operation. In addition, it happened that Das, R. R., Department of Pediatrics, took first place with 61 questions in his credentials. He scored 291 points with an ACPP of 4.77 and scored 11 best scores. In addition, Mahapatra, a PR staff member in the Department of Pulmonary Medicine and Critical Care, received 36 second-place citations in 25 (3.39%) publications with 1.44 ACPP, h index 3, and Naik, S. followed by the Department of Radio diagnostics, third with 23 (3.12%) publications, eight citations, and 0.33 ACPP with h index. Similarly, it can be concluded from the study that there are other authors, as shown in the table, who also published their research papers and drew plenty of important scriptures and indexes.

Table.4: Top ten most Prolific Authors

Author	Department, Institute	TP.	TC	ACPP	h-index
Das, R.R.	Pediatrics, AIIMS	61	291	4.77	11
Mohapatra, P.R.	Pulmonary Medicine & Critical Care, AIIMS	25	36	1.44	3
Naik, S.	Radiodiagnosis, AIIMS	23	8	0.34	1
Maiti, R.	Pharmacology, AIIMS	21	104	4.95	4
Patra, S.	Psychiatry, AIIMS	21	70	3.33	5
Patra, S.	Pathology with Laboratory Medicine, AIIMS	20	24	1.2	3
Tripathy, SK.	Orthopedics, AIIMS	20	113	5.65	5
Panigrahi, M.K.	Pulmonary Medicine & Critical Care, AIIMS	19	16	0.84	2
Behera, B.	Microbiology, AIIMS	18	43	2.38	4
Tripathy, S.	Anaesthesiology, AIIMS	17	100	5.88	6

#### 6.5 Country-wise collaboration

AIIMS Bhubaneswar’s collaboration pattern is shown in Figure 2. It is estimated that around 78 of all media activities are carried out in cooperation with international cooperation. It was found that the majority of AIIMS 'international staff, Bhubaneswar, represented the UK, followed by 18 (2.22%) and 12 Australia (1.48) Canada, Italy, Singapore and France are other countries working together. A number of publications appear to have been published according to AIIMS Bhubaneswar international collaboration patterns.

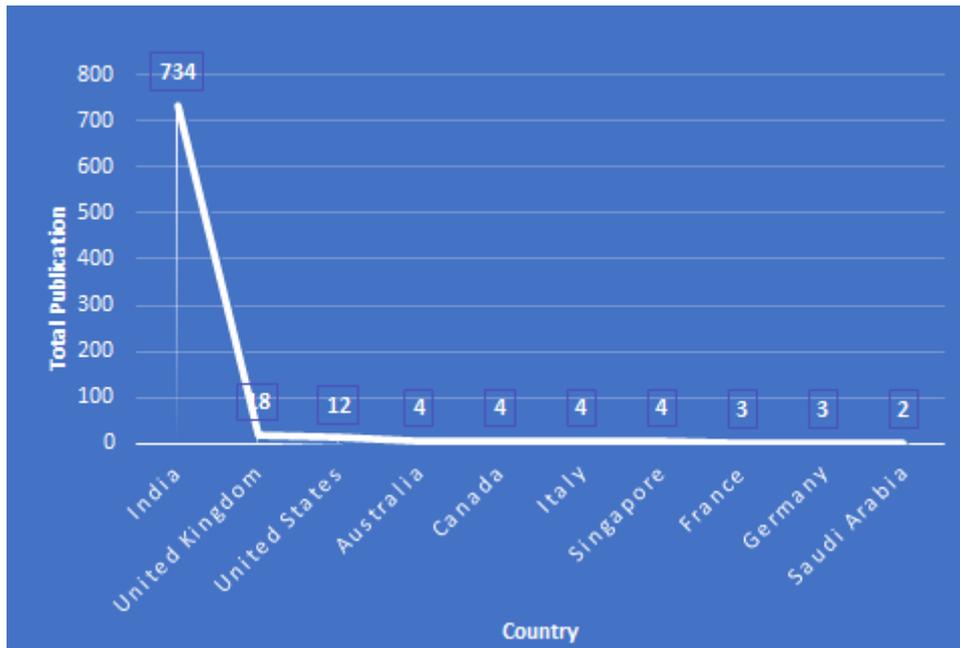


Fig. 2: Country-wise collaboration

### 6.6 Most Collaborative Institutions

Figure 3 shows the institutional collaborative patterns. This figure shows that 119 out of 734 publications collaborated with AIIMS, New Delhi, and 66 subsequent publications with Siksha O Anusandhan University, 52 publications with Chandigarh Graduate Institute of Education and Research. There are other collaborations with other important institutions in the country. Figure 3 shows the institutional collaborative patterns of the AIIMS, Bhubaneswar.

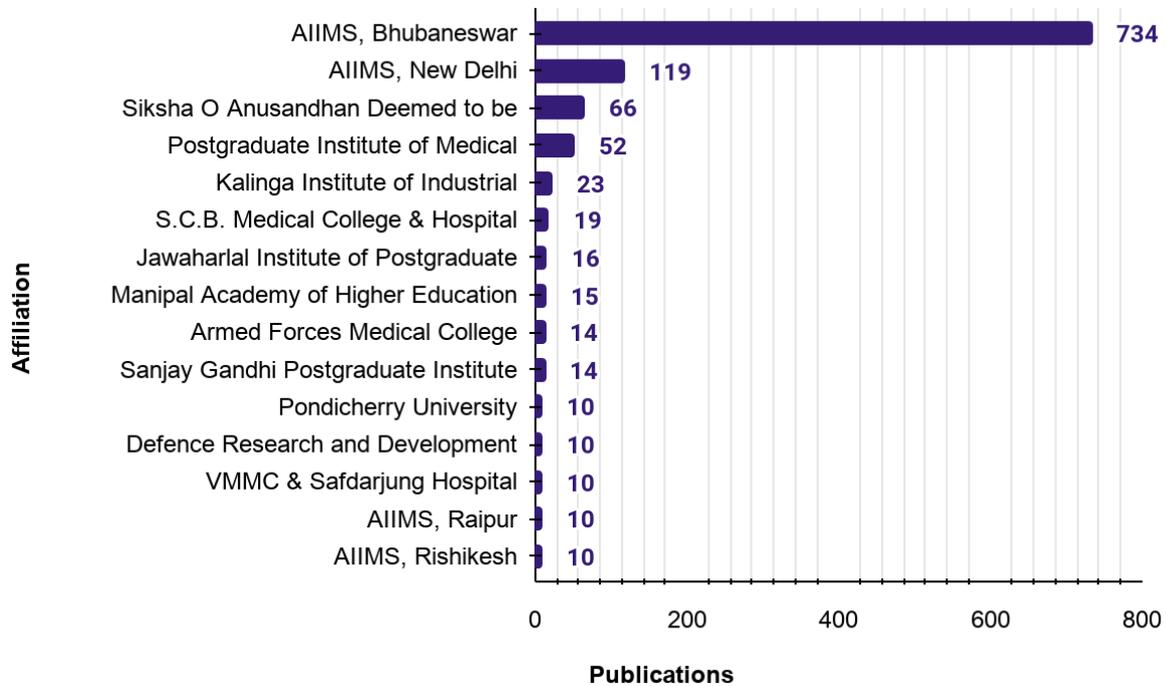


Fig.3: Most collaborative institutions

## 6.7 Top Funding Institutes

There are numerous international fundraising organizations for researchers who sometimes work in different research institutes, institutes and universities through various programs and programs. AIIMS Bhubaneswar researchers have carried out a large number of ever smaller research projects based on the benefits of institutional funding, as shown in figure 4. Overall, this means that the Indian Medical Research Council has approved 24 (3, 27) research projects and then 9 (1.23%) by the All-Indian Institute of Medicine. The remaining funding agencies are indicated in the below figure.

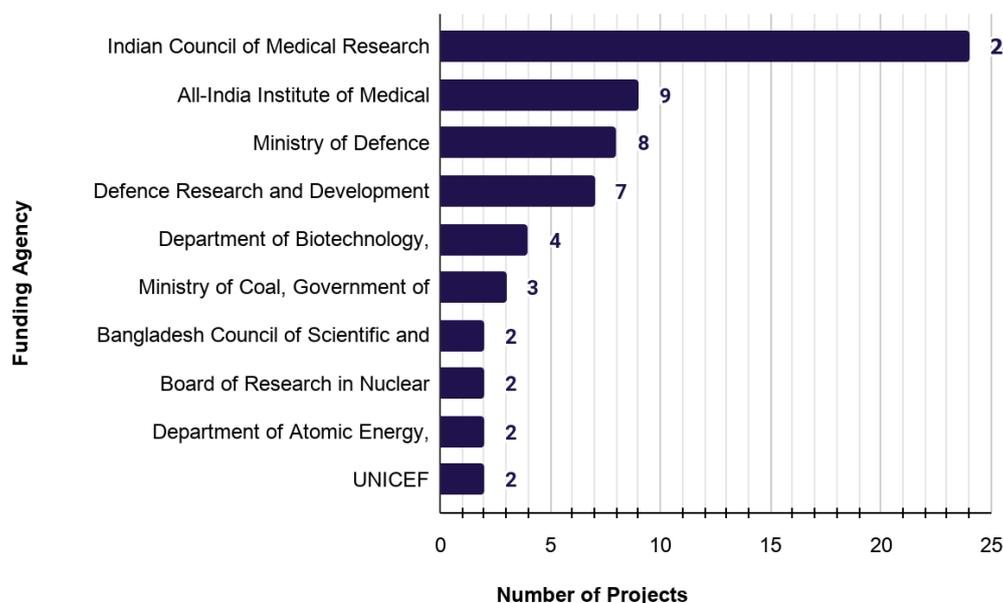


Fig. 4: Top funding institutes

## 6.8 Top Ten Highly Cited Publications

Table 5 lists the 10 most cited articles produced by the AIIMS Bhubaneswar. The list shows that it received a total of 345 citations, ranging from 29 to 47, including 34.5 ACP countries. As regards the reference, the first two articles that received a full reference, namely 'Metronomic Chemotherapy' by Maiti R, received 47 references, while Tripathy SK, Goyal T. and A Sen R K received 41 references, followed by Gargs et al. The authors received "35 quotes each" from "Children's Skull Aneurysms - A Review of Our Experience and Literature" and "Knowledge and Practice on Pesticide Use among Stable Farmers in Pondicherry, India". Other publications mention an average of 34 to 29.

Table.5: Top Ten Highly Cited Publications

Authors	Title	Year	Journal	TC.
Maiti R.	Metronomic chemotherapy	2014	Journal of Pharmacology and Pharmacotherapeutics	47
Tripathy S.K., Goyal T. and Sen R.K.	Management of femoral head osteonecrosis: Current concepts	2015	Indian Journal of Orthopaedics	41

Garg et al.	Pediatric intracranial aneurysms - Our experience and review of literature	2014	Child's Nervous System	35
Mohanty et al.	Knowledge attitude and practice of pesticide use among agricultural workers in Puducherry, South India	2013	Journal of Forensic and Legal Medicine	35
Maharana et al.	Recent advances in diagnosis and management of Mycotic Keratitis	2016	Indian Journal of Ophthalmology	34
Mishra et al.	Comparison of anticraving efficacy of right and left repetitive transcranial magnetic stimulation in alcohol dependence: a randomized, double-blind study	2015	Journal of Neuropsychiatry and Clinical Neurosciences	34
Bhatt G.C., Das R.R.	Early versus late initiation of renal replacement therapy in patients with acute kidney injury-a systematic review & meta-analysis of randomized controlled trials	2017	BMC Nephrology	30
Swain et al.	Estimation of post-mortem interval: A comparison between cerebrospinal fluid and vitreous humor chemistry	2015	Journal of Forensic and Legal Medicine	30
Pati et al.	Patient navigation pathway and barriers to treatment-seeking in cancer in India: A qualitative inquiry	2013	Cancer Epidemiology	30
Kar M.	Role of biomarkers in early detection of preeclampsia	2014	Journal of Clinical and Diagnostic Research	29

### 6.9 Highly Preferred Journals

Table 6 shows the popular journals that publish most of the articles contributed by AIIMS Bhubaneswar authors. The data observed in the table show that the Journal of Clinical and Diagnostic Research is among the best with 67 articles (9.13%). BMJ case studies are in second place with a total of 33 (4.50%). The Indian Journal of Medical Microbiology and Lung India each distributed 13 publications (1.77%) and finished third; Neurology India is the fourth most successful journal with 11 publications (1.50%). The Indian Journal of Critical Care Medicine and the Journal of Neurosciences in Rural Practice rank fifth with 10 (1.50%). Other journals are among the top ten most successful journals, with less than ten publications involved, as shown in the table below. It was also noted that the first ten publications were published in journals with an impact factor between 0.27 and 2.128. It is evident from the study that the researchers are preferred to declare their research publications in journals with high impact factors.

Table.6: Highly Preferred Journals

Journal title	Country	h-Index	SJR	SNIP	JIF	Cite Score	TP.	%	TC	ACP

			Value		*2019					
Journal of Clinical and Diagnostic Research	India	35	0.289	0.909	0.81	1.2	67	9.13	202	3.01
BMJ Case Reports	UK.	22	0.204	0.364	0.44	0.6	33	4.50	14	0.42
Indian Journal of Medical Microbiology	India	44	0.38	0.6	0.95	1.5	13	1.77	38	2.92
Lung India	India	22	0.28	0.672	0.58	1.6	13	1.77	55	4.23
Neurology India	India	45	0.353	0.784	2.128	2.0	11	1.50	26	2.36
Indian Journal of Critical Care Medicine	India	27	0.333	0.579	0.59	1.6	10	1.36	35	3.5
Journal of Neurosciences in Rural Practice	India	19	0.301	0.681	0.31	1.3	10	1.36	28	2.8
Indian Journal of Pathology and Microbiology	India	30	0.236	0.508	0.663	1.1	9	1.23	30	3.33
Indian Journal of Pediatrics	India	46	0.361	0.675	1.508	2.3	9	1.23	4	0.44
Journal of Pediatric Neurosciences	India	15	0.272	0.549	0.27	1.0	9	1.23	23	2.55

\* the JIF was taken as per 2019

### 6.10 Document-wise Distributions

Figure 5 shows the distribution of publications by its type, it shows that research productivity in the form of number of articles was 491(66.89%) followed by Letter with 137(18.66%) and Review 68(9.26%). Whereas, Note 19 (2.59%), Book Chapter 5 (0.68%), Editorial, Conference Paper and also Short survey with 4 (0.54%) each and Erratum with 2 (0.27%) respectively. The conclusion is that the percentage of survey results in the literature is highest in AIIMS, Bhubaneswar.

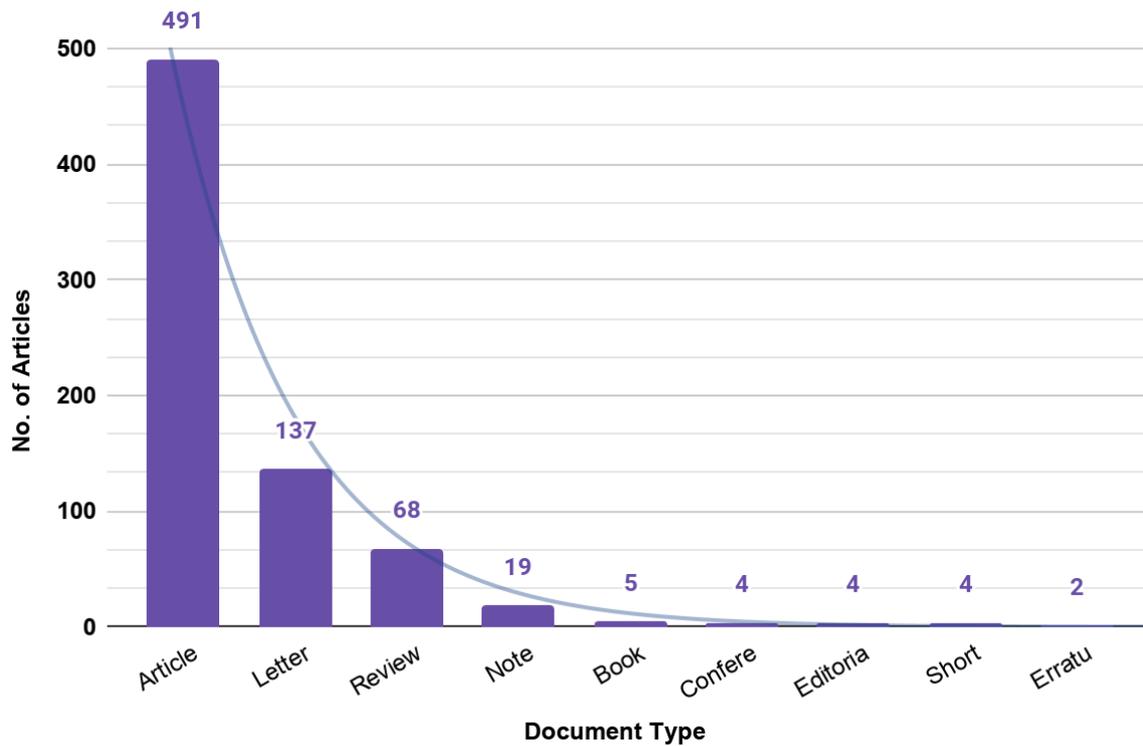


Fig.5: Publications types

### 6.11 Keyword co-occurrence based on network visualization

Figure 6 represents the keyword occurrence in the publication based on the network visualization techniques of VOSviewer. The purpose of the selection of keywords occurrence network was to identify the maximum number of its appearance in the full publications. It is found from the study that the minimum number of occurrences of keywords was 05 of the 8377 keywords and only 639 items meet the threshold. Seven clusters were in different colors. The cluster one (human: links 638 9820 link strength); followed by cluster two (microbiology: links 246 828 link strength); The cluster three (antibiotic agent; links 305 680 links strength); the cluster four (adult: links 626 5613 link strength);the cluster five (letter: links 436 1551 link strength); the cluster six (priority journal: links 591 3544 link strength); the cluster seven (drug efficacy: links 319 993 link strength).



## 8. Conclusion

The present study was performed to analyse the performance of research at the Indian Institute of Medical Sciences (AIIMS) Bhubaneswar from 2012 to 2019. A national health research plan must extend research productivity, improve quality, and conduct more targeted research. There is a requirement to make a cultural and research environment that supports health research. Additionally, human resources and, therefore, the development of infrastructure must be a priority. There is also a requirement to enhance the present health education system to market a search culture. People involved in research need a transparent career and productivity stimulus for researchers. Governments should strive to supply health professionals and scientists with the newest information and biotechnology tools that most scientists do not currently have. There is an urgent need to develop a series of researchers working during several areas that affect health.

Furthermore, the resources available for research (human, financial, and infrastructure) must be used carefully to satisfy national priorities. Adequate resources must be allocated to various areas, which must be monitored regularly. It is necessary to possess access to national and international literature and a knowledge domain of scientists and health professionals.

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