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Original Research Article

Evaluation of publications trend and contributions amongst the clinical and paraclinical departments of a tertiary care hospital in metropolitan city

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Abstract

Background: Health research and publications are important for the global health, and it helps in making appropriate clinical decision. It has been found that highest number of publications is from developed countries. Studying publication trends in India helps to identify problems regarding publication and help to make improvements. It can enhance research visibility, address challenges, and help in making policy decisions. This analysis also supports institutional growth and promotes a stronger research culture. Hence, this study was planned at a tertiary care hospital.

Objectives: To evaluate the publication trend, number of awards received, amount of grant received, department wise research output, publication in indexed journals and area of research in pharmacology department.

Materials and Methods: After getting approval from Institutional Ethics Committee (IEC(II)/OUT/587/2024), a retrospective cross-sectional web-based study was conducted using data from annual reports available at the KEM hospital website from 2010 to 2023. Publications from pre-clinical, para-clinical, Medical and surgical branches were evaluated. Data regarding awards, grants, indexed articles were collected. Data was analyzed by using descriptive statistics. A Spearman' rank correlation was performed to analyse the association between number of publication and awards received.

Results: The total number of articles found were 5,236 with an increasing trend from 2010 onwards followed by a dip during the COVID era, with increase again in the post-COVID phase. Medical and surgical department's contribution were the highest amongst all the branches for publication. A significant positive correlation was observed between the number of publications and the awards received. 75% of the published articles were in indexed journals. In pharmacology, research in neurology was done followed by research ethics, medical education, and drug use.

Conclusion: There is an increasing trend seen in publication and receiving grants across departments.

Keywords: Bibliometric analysis, Research productivity, Publication trends, Hospital research output

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1. Introduction

Medical research not only forms the backbone of healthcare system in developing countries, provides opportunities for innovation, and helps in guiding effective clinical practice but also addresses challenges ultimately improving patient outcomes.[1] Developed countries dominate the research output, compared to the developing countries.[2] India is the third in publications of scientific papers in 2022, still it faces challenges, like low citation rates and poor presentation in high impact journals.[3]

In Medical colleges and tertiary care hospitals, there is an increase in research activities, mainly due to the newer regulatory requirements, and linking of academic promotions with publications.[4] However, inconsistency persist amongst the institutions in India, where centrally acclaimed institutes like All India Institute of Medical Sciences, Delhi (AIIMS) and Jawaharlal Institute of Postgraduate Medical Education & Research (JIPMER) lead in research output, while other recognized institutions are catching up in research work.

One of the top 10 institutes in India is Seth GS Medical College and KEM Hospital in Mumbai, which is a known institution for medical education and healthcare facilities. Seth GS Medical college and KEM hospital serves as a major tertiary care centre. Despite being

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a renowned hospital, an evaluation of its institutional research output has not yet been conducted. Such institutional analyses are not only important for the institute to improve the healthcare services but also for global academic visibility. The availability of institutional annual reports provided a reliable data source, which made it feasible to conduct this study.

Understanding the trend of this institute can help to identify the gaps and strategize to strengthen research, and not only improve the global position but also enhance healthcare outcomes.

This study aims to assess research trends by focusing on publications, awards, and grants with a particular emphasis on the Department of Pharmacology over a span of thirteen years (2010-2023). The Department of Pharmacology and Therapeutics plays a vital role in research as it bridges the gap between the science and clinical practice. The authors are from pharmacology and therapeutics department and they are one of the departments that initiated the research culture pharmacology by being part of Ethics committee, editorial board of Journal of Postgraduate Medicine (JPGM), so a focused evaluation of the research contributions and research areas of the pharmacology department was undertaken to understand its role in institutional research productivity and to identify areas for further improvement.

By compiling and analysing data across all departments, this study aims to provide valuable insights for improving the institutional research productivity. No such study has been done so far.

The objective of this study is to evaluate the publication trends which include the types of publications, grants, awards, indexed journal articles across all clinical, pre-clinical and para clinical departments and area of research of pharmacology in a tertiary care hospital.

2. Materials and Methods

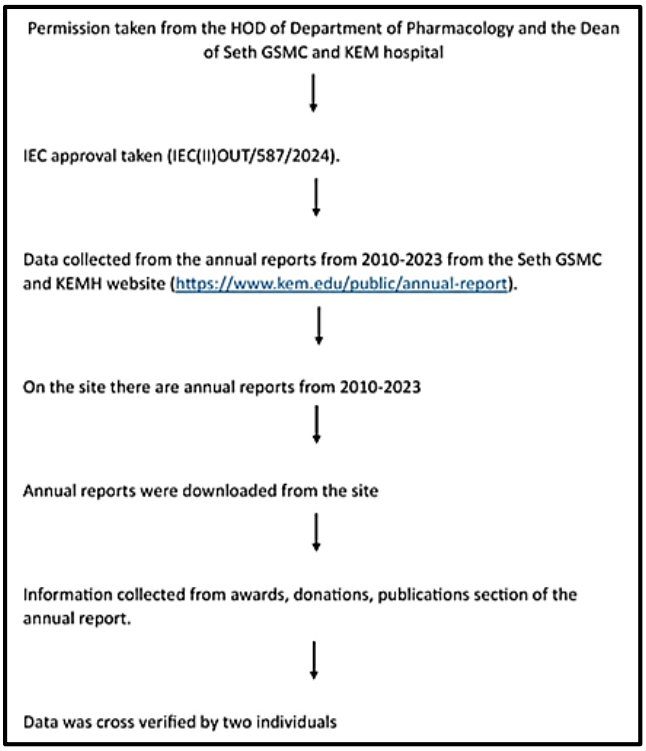
It was a retrospective cross-sectional, web-based study of conducted over a period of 12 months for data collection and data analysis. The study evaluated the research articles published from 2010-2023. Following is the methodology flow chart of the study-

2.1. Inclusion criteria

1. All publications reported in the institutional annual reports between 2010 and 2023
2. Publications originating from pre-clinical, para-clinical, medical and surgical departments.
3. Publications including original research articles, case reports, case series, letters to the editor, review articles, systematic reviews, meta-analyses, book chapters, and books

2.2. Exclusion criteria

1. Publications not listed in the institutional annual reports
2. Incomplete records
3. Publications not affiliated with the institution



Data source: Information available at(https://www.kem.edu/public/annual-report).

2.3. Grants and Awards definition

Research includes extramural funding. Extramural fundings are the fundings received by the investigator from external agencies like government bodies, private organisations. Awards included paper, poster presentation prizes won by the faculties, resident and medical students for their research work.

Area of research in Pharmacology and Therapeutics was categorized as follows-

1. System wise- Cardiovascular system, Respiratory System, Gastrointestinal System, Central Nervous system, Reproductive System, Haematology.
2. Infectious diseases- Includes Parasitology, Virology, Fungal, Bacterial Infection
3. Allied medicine- Includes Homeopathy and Ayurvedic drug study
4. Rationale use of drugs studies
5. Systematic review- includes articles on statistics, informed consent, studies on guidelines, healthcare practices, Ethics.
6. Pharmacovigilance- ADRs
7. Medical Education

Outcomes measured were:

1. Number of studies published
2. Number of awards received annually.
3. Number of grants received annually.
4. Type of publication and department wise publication distribution categorized in pre-clinical, Para clinical, Medical and Surgery Departments.
5. Number of publications in Indexed journals
6. Focus research area within the department of pharmacology.

2.3. Statistical analysis

The data was entered in Microsoft Excel and all the variables analysed by descriptive statistics by using a GraphPad Prism Version 3.0 Free version.

Descriptive statistics were used to summarize the data, including median, interquartile range (IQR), minimum, and maximum values as the data had variability across years. Trends in annual publications, awards, and funding were evaluated across the study period.

A Spearman's rank correlation analysis was performed to assess the association between the annual number of publications and the number of awards received.

A p-value <0.05 was considered as statistically significant.

3. Results

A total of 14 years of institutional data was analysed from the year 2010 to 2023. The total number of publications from the year 2010 to 2023 were 5,236. Maximum publications were in 2016 (559) and lowest were reported in 2011 (230) A linear trendline was noted from the year 2010 to 2023(**Figure 1**).

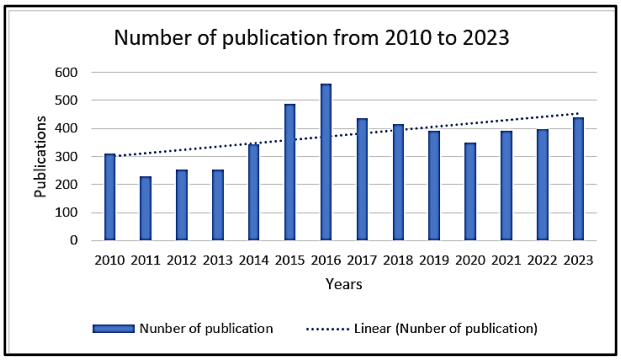


Figure 1: Number of publication and trend at Seth G.S. Medical College and KEM Hospital from 2010 to 2023.

The linear line shows the trend over years regarding the number of publications.

The highest number of awards received were in the year of 2016. Followed by that there is an increasing trend with a dip in the year of 2020 (**Figure 2**). Similar trend was seen in the amount of grant (extramural funding) received by the institute (**Figure 3**). Over the study period from 2010 to 2023, the data does not follow the normality curve due to variability, hence median was calculated for the number of publications, awards and grant received. The median annual number of publications was 391, the median number of awards received per year was 43 and for annual extramural research funding was ₹11,021,845. (**Table 1**)

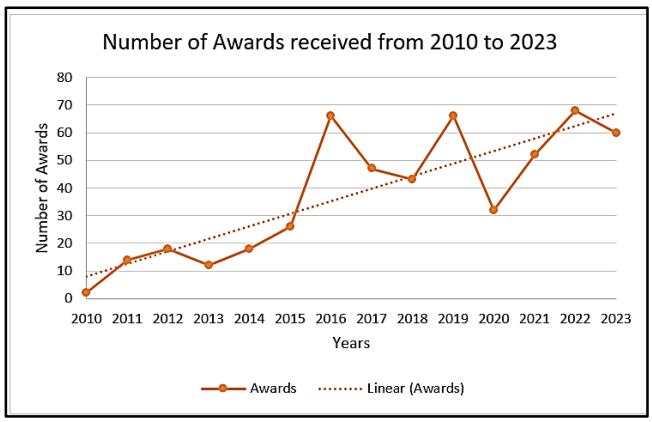


Figure 2: Number of Awards received and trend at Seth G.S. Medical College and KEM Hospital from 2010 to 2023.

The linear line shows the trend over years regarding awards received.

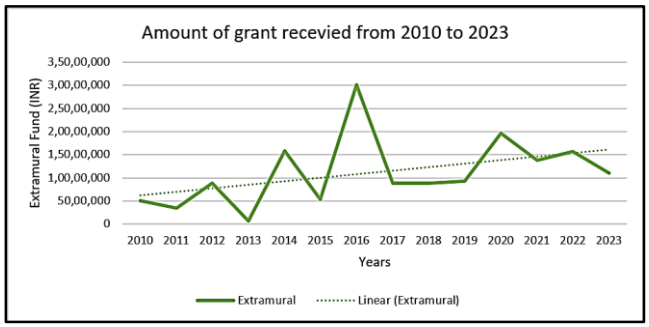


Figure 3: Amount of grant received and trend at Seth G.S. Medical College and KEM Hospital from 2010 to 2023.

The linear line shows the trend over years regarding extramural fund

Table 1: Descriptive statistics of annual publication, awards and extramural fund (2010-2023)

Variables	Median (IQR)	Minimum–Maximum
Annual publications (n)	391 (310–489)	230–559
Annual awards (n)	43 (18–66)	2–68
Annual extramural funding [In Crore (Rupees)]	1.10 (0.54–1.97)	0.07–3.01
Data represented as median (interquartile range) n (sample size)= 14		

The type of articles identified in the review were original articles, case series, case reports, letter to editor, book chapter, systematic review which were segregated in pre-clinical, para-clinical, medicine and surgery speciality. It was found that medicine and surgery speciality ranked highest across all categories. Amongst the Preclinical branches – Anatomy, in the Paraclinical branches - Pharmacology, in the Medicine branches- Paediatrics, and in Surgical branches- Neurosurgery had the highest original article publication respectively. Surgical branches also had a higher publication in case reports and letter to editor. Medicine branches had higher publications as original articles, book chapter and systematic review (**Figure 4**).

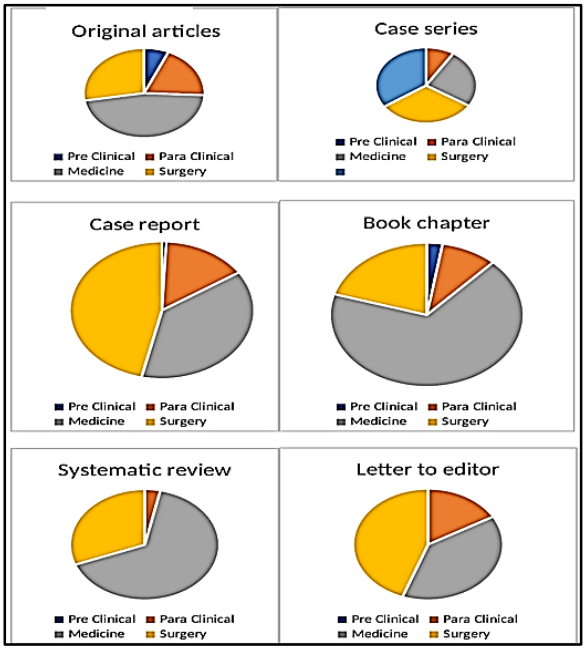


Figure 4: Distribution of different types of publications across departmental categories

Spearman's rank correlation analysis was conducted to understand the association between publication number and awards. It revealed a significant positive relationship between yearly publication count and awards received ($r = 0.706$, $p < 0.05$*, 95% CI: 0.2765 to 0.8988) (**Figure 5**).

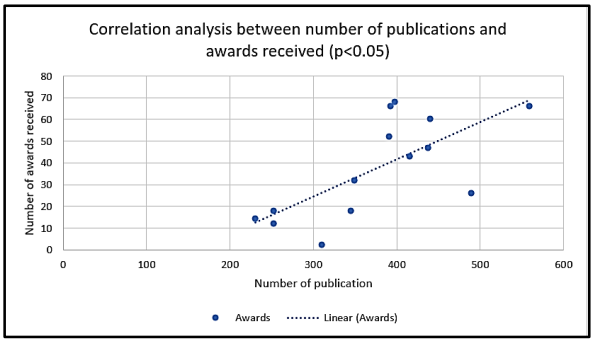


Figure 5: Spearman's rank correlation analysis between number of publications and awards received

Out of the total articles, 75% (3,967) articles were published in Indexed journals and 25% (1,269) were published in non-indexed journals. Amongst the Indexed publications, 150 articles (2.9%) from Preclinical, 650 (12.4%) from Paraclinical, 1,782 (34%) from Medicine, and 1,385 (26.5%) from Surgical branches.

In Pharmacology, research was primarily concentrated on the central nervous system, followed by research in ethics, medical education, and drug use and drug utilisation studies. Other areas such as the cardiovascular system, gastrointestinal system, respiratory system, ayurvedic drugs, haematology, autoimmune diseases, pharmacovigilance, and pharmacokinetic/pharmacodynamic studies remain relatively less explored. (**Figure 6**). The most frequently studied topics in Central nervous system included neurobehavioral animal models as well clinical studies in depression, anxiety, PTSD (Post Traumatic stress disorder), alcohol use disorder, analgesics. Various articles on ethics like research ethics, ethics committee functioning, Informed consent practices were published. Further, newer teaching learning methods, pharmacotherapy training articles, scientific writing and training publications were done as well. Being a pharmacology department, various drug utilisation studies, prescription pattern analysis, antibiotic utilization studies, drug cost and affordability studies were also conducted. Along with allopathic drugs, herbal formulations were also evaluated in different animal models for diseases like osteoarthritis, Alcohol use disorder, PTSD (Post Traumatic stress disorder). Further, fewer studies in Gastrointestinal were conducted in hepatitis, ulcerative colitis and adverse drug reaction studies were done as well.

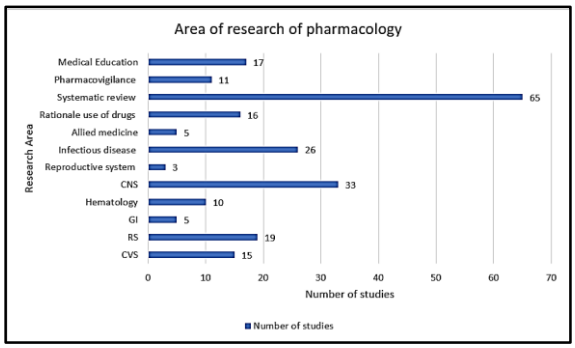


Figure 6: Research areas within the department of pharmacology and therapeutics at Seth GSMC and KEM hospital

4. Discussion

Studies which have been undertaken in the field of research evaluation, are commonly known as bibliometric studies[5]. These studies help in understanding the growth in research. A study was conducted to review recent publication trends from top publishing countries which concluded that USA led in all publication citations and specific publication types, except for meta-analysis where China published more. Collaborative publishing among international collaborators was also increasing[2]

In this study, the total number of articles per year were approximately 300-500. It is seen that in JIPMER Pondicherry the average annual publications range from 800-1000 [6]. AIIMS New Delhi has approximately 1000-1200 publications in a year in 2015.[7] These are highly acclaimed medical institutions and hospitals in India, recognized for its excellence in medical education, advanced research, and top-tier faculty. AIIMS Delhi has been consistently ranked at the top, establishing its position as a premier medical institution in the country, because of its contributions and innovations. Compared to these institutes, Seth G.S. Medical College and KEM hospital has lesser publications.

The number of original article publications has increased over the years due to the National Medical Commission (NMC) criteria for faculty promotion and academic advancement. The National Medical Commission (NMC) in India has set stringent criteria for faculty promotions and recognition, strongly emphasizing original research articles, meta-analyses, systematic reviews, and case series published in reputable, indexed journals. This shift has fostered genuine research innovation, enabling the integration of new knowledge into clinical practice. Original research is acknowledged as evidence of investigative ability and institutional research capabilities, thus increasing the institutes credibility.[8,9]

Publication matters as better research publications improves the institute ranking across globe, they directly contribute to domestic (NIRF- National Institutional Ranking Framework) and global (QS-Quacquarelli Symonds, THE-Times Higher Education, ARWU-Academic Ranking of World Universities) rankings. High publication counts, especially in indexed and cited journals, help institutions gain international visibility, attract grants, and boost their academic reputation. A prolific publication record also enhances the probability of faculty members being chosen as national and international experts, grant reviewers, or guideline panellists—further raising both individual and institutional stature. This virtuous cycle strengthens research culture, attracts talent, and facilitates academic collaborations. [10]

During COVID19, there was a dip in publications (2020), followed by that a rise is being seen in publications as well the grants as many companies, government agencies encouraged research in the field of COVID19. Time for acceptance for manuscripts shortened; regulatory authorities and ethics committees streamlined processes, most notably easier and clear consenting procedures, facilitated urgent research and easy recruitment. This led to both a volume increase and rapid dissemination of research [11]

In India, the NDCTR-2019, or New Drugs and Clinical Trials Rules, 2019, provided a comprehensive regulatory framework for new drugs and clinical trials in India, introducing mandatory compensation for trial-related injuries, stipulating ethical committee structure and registration, accelerating approval processes for certain drugs, and requiring registration for Clinical Research Organizations (CROs). These rules aim to enhance safety, transparency, and efficiency in clinical research. These guidelines have helped to initiate clinical research faster.[12]

The increasing trend in the awards won shows eagerness amongst young doctors as well faculties to showcase their study to the world. The institute has received grants from government and private companies which suggests that many Principal Investigators are good clinical researchers who have the aptitude to write standard protocol relevant to science.

In between preclinical, paraclinical, medicine and surgery, medicine branches have shown highest publication because clinical branches have a greater number of faculties and residents and as KEM is a tertiary care hospital they have patients being referred from all over Maharashtra giving them an edge over pre-clinical and paraclinical branches. This trend also talks about their central role in patient care, access to diverse diseases and morbidities. A similar study was done spanning from 1999-2008 which found that medicine had highest amount of research in all the institutes of India [13] A lower research output is seen from preclinical and paraclinical departments compared to clinical, this can be due to limited infrastructure, lesser residents and patients are not registered under them. These challenges exacerbate the decline in publication rates and diminish their impact. However, the number of original articles were more than other type of publication in pre and paraclinical departments which suggests that even if the number of publications is less, more primary and empirical studies, trials are being conducted.

The most common area of pharmacology research is neurology, followed by infectious diseases. Neurology ranks highest largely because, according to the WHO, more than one in three individuals worldwide are affected by neurological conditions such as stroke, epilepsy, depression PTSD. [14]

Alongside neurology and infections, ethics committees represent another well-researched domain. Because Pharmacology has a dedicated neuropharmacology laboratory with all the facilities and post graduates undertake research in areas pertaining to neurology because many of these areas still does not have definitive treatment. At KEM, pharmacologists have contributed extensively to the institute's research ecosystem, from serving as member secretaries on the research ethics committee to training faculty in research practices, and in the process, have carried out substantial research in their respective domains.

Out of all the publications, 75% of publications are in Indexed journals. This is an important indicator of research quality and impact.

5. Conclusion

It is pertinent to say that there is an increasing trend seen in publications. With the help of better infrastructure and grants, robust research can be carried out in future.

5.1. Strength

By identifying key gaps such as insufficient funding and poor infrastructure, this study not only strengthens the institutional research culture but also encourages faculty and residents to publish in high-impact journals. Institutional studies of this kind foster self-reflection, and by overcoming challenges at the local level, they pave the way for broader contributions to global research.

6. Limitations

Incomplete data from some years and departments can impact the uniformity in trend. Intramural funding was not consistently reported by each department so the data was not used for analysis.

7. Author Contribution

1. **Pooja R Ugale:** Data curation, Formal analysis, Investigation, Writing – original draft, Writing – review editing
2. **Shirish Joshi:** Conceptualization, Methodology, Project administration, Supervision, Validation, Visualization, Writing – review editing
3. **Yashashri Shetty:** Conceptualization, Methodology, Project administration, Supervision, Validation, Visualization, Writing – review editing,
4. **Aayush Gupta:** Data curation, Formal analysis, Investigation, Writing – original draft.

8. Conflict of Interest

None.

9. Source of Funding

None

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