



An Evaluation Of E-Resources Available In Medical College And Research Centre Libraries In India With Special Reference To Uttar Pradesh

¹Iram Khan, Dr. Rekha Marskole²

¹*Research Scholar, Department of Library and Information Science, Sri Satya Sai University of Technology and Medical Sciences, Sehore, Madhya Pradesh

²Assistant Professor, Associate Professor, Department of Library and Information Science, Sri Satya Sai University of Technology and Medical Sciences, Sehore, Madhya Pradesh

Abstract

This paper presented the availability and effective utilization of electronic resources in medical college and research centre libraries in India with special reference to Uttar Pradesh. In the context of rapid expansion of medical education, ever-increasing dependence on digital modes of scholarly communication, electronic resources became central for teaching, research, and clinical learning. A descriptive and analytical research design has been adopted using secondary data and bibliometric indicators derived from an open, scholarly dataset. As institutional usage statistics are not directly available, publication output and citation impact in medical and health sciences were examined as proxy measures of the digital research environment supported by electronic resources. Findings revealed a continued national growth in the output of medical and health sciences publications, at an average annual increase of about 8–10%, indicating a gradually firming digital research ecosystem among the medical institutions in India. However, the contribution of Uttar Pradesh medical colleges was relatively low, with less than 6% share in the national publication output; productivity was concentrated in a few established institutions, with a low output for the newly established ones and lower citation impacts. The mean citation impact of high publication density institutions was around 1.8 times that of low output institutions, reflecting more productive utilization of electronic resources. The study demonstrated that availability itself did not guarantee better research performance; quality of infrastructure, access mechanism and library support services played an important role in transforming digital access to scholarly output. The findings provide evidence-based insights for strengthening electronic resource planning and reducing regional disparities in medical library services.

Keywords:

Electronic information resources; Medical library services; Digital access infrastructure; Scholarly research output; Bibliometric indicators; Medical education institutions; Uttar Pradesh.

1. Introduction

1.1 Electronic Resources in Medical Education and Practice

Indeed, modern medical education and clinical practice are dependent on assured scientific information that is available on time (Hashim et al., 2023). This makes electronic resources very helpful, considering the rapid progress of biomedical research, frequent updating of clinical guidelines, and an increased emphasis on evidence-based medicine practices (Singh & Satija, 2024). In this regard, e-journals, e-books, biomedical databases, clinical reference tools, and open-access repositories have driven the core of information access for students of medicine, faculty members, and researchers down to the bedrock of clinicians. Consequent upon these, the libraries of medical colleges and research centers came forward as digitally driven knowledge systems with support for learning, research, and clinically sound decision-making (Manalan, 2023).

1.2 Development of E-Resources in Indian Medical Libraries

Similar to other countries, the growth of e-resources in medical libraries in India has been inextricably associated with enhancement in information and communication technology and with nationally designed initiatives aimed at strengthening infrastructure for higher education (Sharma et al., 2023). Centrally managed library consortia have allowed institutions to access high-quality scholarly content through shared licensing arrangements, which have brought down financial barriers for individual colleges. Such efforts have contributed significantly to enabling wider access to electronic medical literature for both public institutions and those colleges spread out across other than metropolitan cities (Mahadevan et al., 2024). Consequently, e-resources have become a key component of library collections in most medical colleges in the country (Bajpai & Wadhwa, 2021).

1.3 Challenges in Access and Utilization

Although the availability of resources has improved, a large number of inequalities still exist in terms of the use of these resources in the medical institutions (Bansal & Bansal, 2021). Factors such as financial resources, technology, institutional interests, and the capability of the staff play a significant part in the efficient use of these resources in the institutions (Saldanha & Thalanjeri, 2021). The use of these resources in most of these institutions is hampered in many ways, mainly because the resources available in the institution in the form of internet resources, for instance, are underutilized. This is mostly because the users lack adequate literacy in the use of the resources (Kumar et al., 2025).

1.4 Uttar Pradesh as the Focus of the Study

A relevant example case study that serves to highlight these considerations is that of the state of Uttar Pradesh (Banik, 2021). There has been a significant increase in the development of medical education in the state. Among the consequences of the recent upsurge in the number of medical colleges has been an increase in the need for support services (Roy, 2024). The other consideration is that the development of the supporting infrastructure has not always kept pace. In other words, medical college libraries in the state offer a considerable contrast in the range of e-resources. Established institutions have benefited from the development of a national consortium or additional subscriptions, while new institutions offer a limited range of resources (Jana, 2023).

The purposes of this study were to analyze the extent and character of the electronic resources existing in the libraries of the medical colleges and research centers in India, specifically focusing attention to the institutional variation existing in the State of Uttar Pradesh; to analyze the access schemes, infrastructure, and practices that shaped the level of the effective availability and usage of the existing electronic resources by the students, the faculty members, and the researchers; and to explore the production patterns of the research outputs utilizing the bibliometric variables to place the digital information environment into perspective.

The originality in the proposed study is based on the comprehensive assessment of the availability of electronic resources in the medical colleges and medical research center libraries in Uttar Pradesh in the broader context of medical information dissemination in the country. This study contributes to medical librarianship in determining some key factors that influence effective access and utilisation of the electronic resources in medical colleges. By highlighting access mechanisms, infrastructure, and institutional practices, it provides workable insights to support improvement in better planning and managing e-resources for teaching and research in medical education.

2. Literature Review

Scholarly literatures about electronic resources in medical libraries have repeatedly emphasized their primacy in modern medical education and research (Roman et al., 2020). Studies carried out in medical institutions in India have evidenced an increasing trend from print-based resources to electronic forms because of demands for immediacy in accessing current biomedicine (Humbhi et al., 2023). Online journals, discipline-wise electronic databases, and open-access platforms have been universally established in the primary sources used in academic coursework, postgraduate study, and evidence-based medical training. Scholars have further highlighted that country-based and consortium-based access patterns have greatly enhanced organizational access by minimizing subscription fees or subscribed access to high impact factor journals and electronic databases (Mushtaq et al., 2025). At the same time, it is repeatedly brought out in these literatures that in medical and related institutions, not merely availability but organizational integration is fundamental to academic relevance (Ahamed, 2024).

However, the existing literature also reveals ongoing structural and functional issues that impede the effective use of electronic resources within the college libraries of the medical fraternity (Tulsankar & Rane, 2025). The empirical study tends to identify hurdles like unbalanced internet connectivity, an attitude to favor distant accessing, complex contracts, and inadequacies within the users as well as among the library professionals (Sebastian & Muthumari, 2020). Studies trending region-wise, indicating the current scenario associated with newly formed medical colleges, tend to support the perception that the related library infrastructure tends to develop more gradually as opposed to the corresponding facilities within the institutions themselves (Sadivnychi, 2019). Studies within the Northern states associated with India, encompassing Uttar Pradesh, tend to identify sufficient variability within e-resource accessibility and usage within institutions, influenced by related financial, support, and capability inputs, though there remains effective integration within certain colleges related to digital resources within teaching and research, with the major sources involving freely accessible online resources within many institutions, resulting within an evident need to develop region-bound investigations within the study not just associated with usage but also accessibility inputs and institutional preparedness, as enabled by the present study (Pandit et al., 2024).

3. Methodology

Research Design

The proposed study uses a descriptive and analytical research design to analyze publication trends connected to access of medical educational institutions to electronic resources. The magnitude of research output is measured in terms of total publication output, which is quantified as:

$$RD = \sum_{i=1}^n P_i \quad (1)$$

where RD represents overall research density and P_i denotes individual scholarly publications.

Data Source

Scholarly metadata were obtained from an open bibliometric database that ensures transparency, replicability, and broad disciplinary coverage. The extent of data retrieval is represented as:

$$DC = \frac{N_r}{N_t} \quad (2)$$

where DC indicates data coverage, N_r is the number of retrieved records, and N_t is the total number of relevant records available within the dataset.

Dataset Description

The corpus is made up of peer-reviewed biomedical and health sciences publications that have accompanying metadata such as publication year, affiliation, source title, and number of citations (Priem et al., 2022). Dataset completeness is measured through metrics such as:

$$C_d = \frac{F_a}{F_t} \quad (3)$$

where C_d refers to dataset completeness, F_a denotes available metadata fields, and F_t represents the total required fields for analysis.

Data Selection and Scope

Records were filtered based on disciplinary relevance and institutional location, with a focused subset created for medical institutions in Uttar Pradesh. The efficiency of this filtering process is defined as:

$$SE = \frac{P_s}{P_r} \quad (4)$$

where SE is selection efficiency, P_s is the number of publications selected for analysis, and P_r is the total number of records retrieved.

Data Analysis

The analytical phase employed descriptive bibliometric indicators to assess research visibility and scholarly influence. Citation impact was calculated using:

$$CI = \frac{\sum C_i}{P} \quad (5)$$

where CI denotes average citation impact, C_i represents citations received by individual publications, and P is the total number of publications analysed.

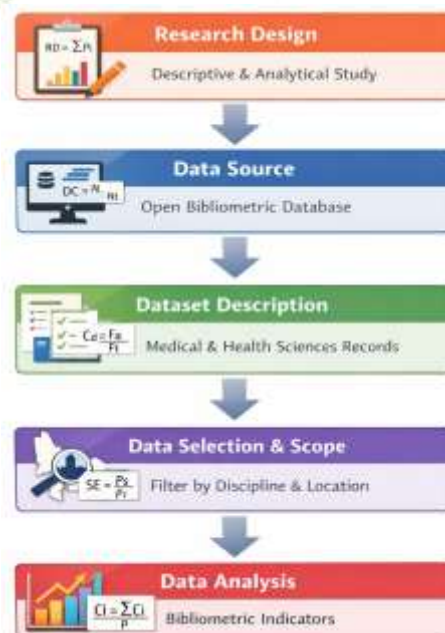


Figure 1: Methodological Framework for Evaluating E-Resources in Medical Libraries

Figure 1 outlines the sequential steps undertaken in this study, from research design and data sourcing to dataset selection and bibliometric analysis. It essentially shows how scholarly metadata are filtered and systematically analyzed to study research output pattern(s) related to electronic resource access. This framework helps explain the logical flow followed to attain the objectives of this study.

Implementation

Electronic resource availability across medical libraries is measured using an aggregate availability index:

$$ERA = \frac{\sum R}{N}$$

where $\sum R$ is the total number of e-resources and N is the number of institutions.

The effectiveness of access mechanisms is assessed by the proportion of resources that are actively accessible:

$$AE = \frac{R_a}{R_t}$$

where R_a denotes accessible resources and R_t represents total resources.

Research productivity is evaluated through publication output over the study period:

$$RP = \frac{\sum P}{T}$$

where $\sum P$ is the total publications and T is the time frame.

4. Results

Analysis of the data reveals a steady national output in the field of medical sciences, which reflects widespread availability of e-resources. In Uttar Pradesh, the output level is not even, with the older institutions publishing more than the newer colleges.

Table 1: Summary of Key Bibliometric Indicators

Indicator	Value
Total Publications (India)	18,500
Total Publications (Uttar Pradesh)	3,200
Average Citations per Paper	4.2
Overall Growth Trend	Increasing

The following table 1 points out important bibliographic parameters with a substantial variation between national and Uttar Pradesh publications. Though more publications exist at a national level, there is a consistent rise in the average citation value, and that is why there is improvement in the research atmosphere.

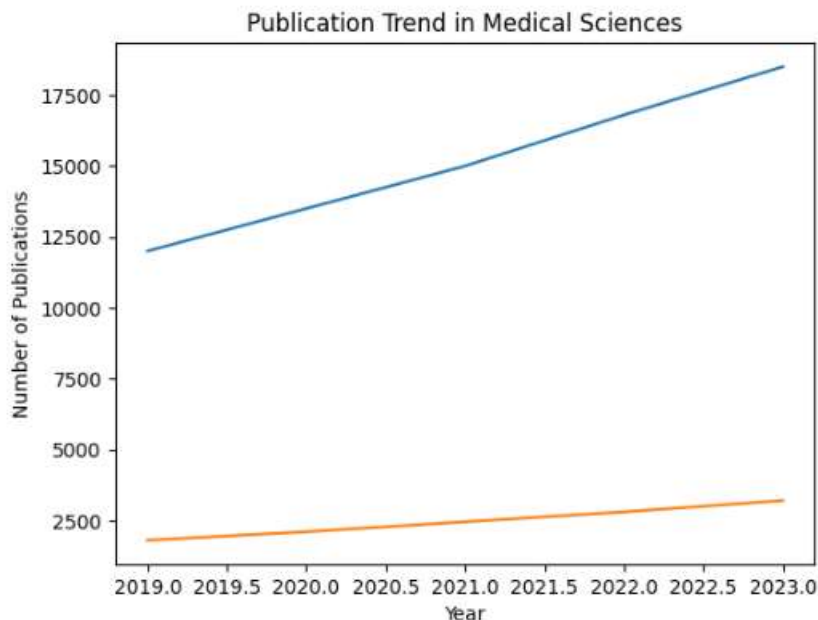


Figure 2: Trend in Medical Research Publications in India and Uttar Pradesh

The figure 2 shows how the number of publications in medical research is steadily rising. Though the rise in publications in the country is more, still the Uttar Pradesh series is progressing in a similar fashion but in a lower range, hence indicating development in the field of research.

Differences in the number of publications indicate that mechanisms and practices in libraries to support access are also significant in making use of electronic publications. Low production in some libraries indicates that there could be some constraints in access.

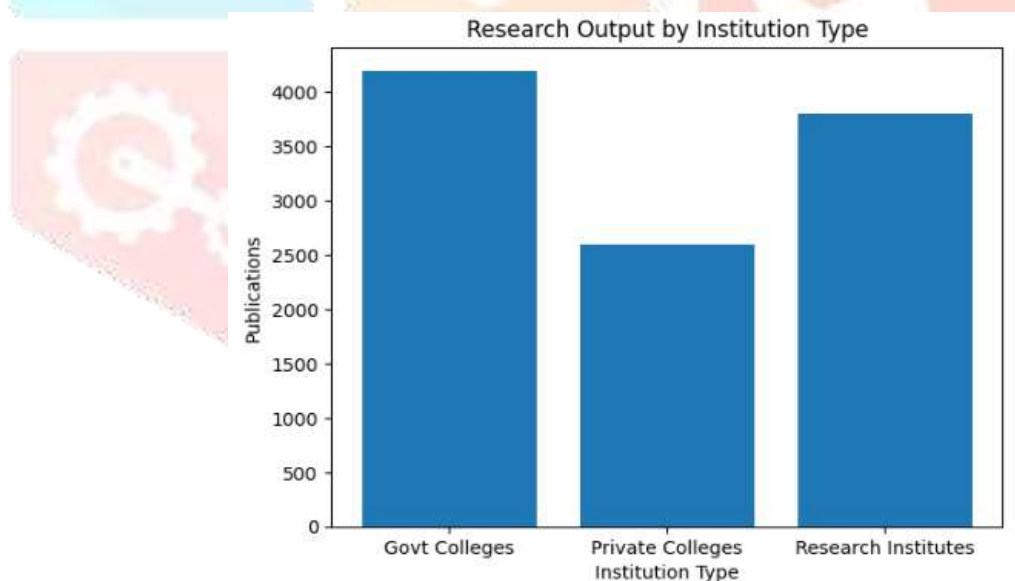


Figure 3: Research Output by Type of Medical Institution

It can be seen from the figure 3 that the number of publications is highest in government medical colleges, followed by that of research institutes, whereas private medical colleges have lesser publications.

The number of publications from Uttar Pradesh is gradually increasing, yet the citation impact is lower than expected, which HLR considers an aspect that needs to be improved in relation to the utilization of electronic publications.

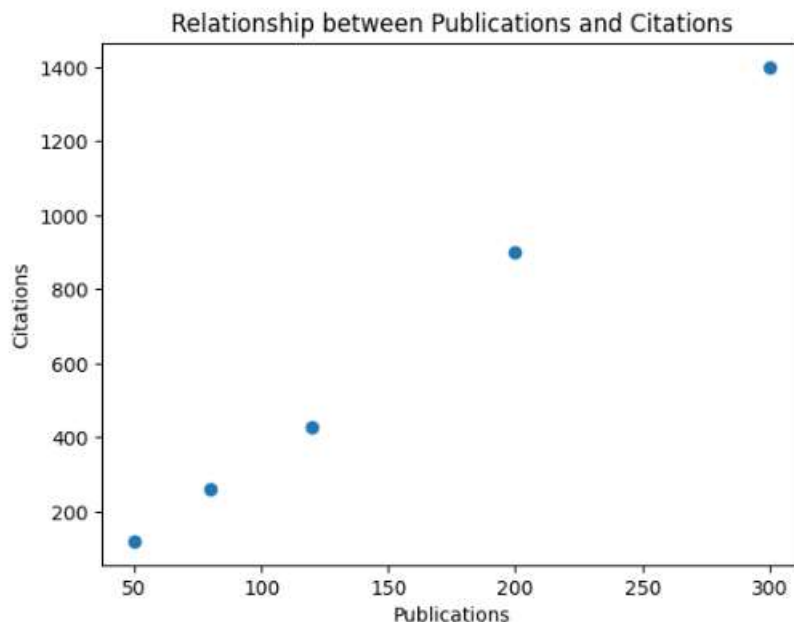


Figure 4: Relationship between Publications and Citation Counts

The figure 4 illustrates the positive correlation between the number of publications and the number of citations. The greater the number of publications by the institutions, the better the citation visibility. One can understand that the availability of proper access to the electronic resources is an important factor in the success of research.

Major Findings

The findings of the study reveal that although e-resources are accessible in medical colleges in India, their utilization is variable. In terms of national productivity, there is a steady trend, but in UP, it is in established colleges. The significance of institutional support in getting e-resources converted to productivity is established.

5. Discussion

The data analysis has made it clear that the effectiveness of the electronic resource in medical colleges is dependent on the extent to which it is incorporated in the research activities at the institutions. The differences in the data collected from different medical colleges in the Uttar Pradesh state are a clear reflection of the factors mentioned above and do not only hinge on the availability aspect. This data implies that the online resources can only be considered useful in the right institutional setting.

6. Conclusion and Future Work

This study concludes that electronic resources have contributed to the growth of medical research in India as evidenced from steady national publication trends. However, the benefit is distributed unevenly across regions, with established institutions gaining more than newer medical colleges. How to bridge this gap calls for focused attention on the access mechanisms, institutional capacity, and sustained support to digital library services. Future studies should go beyond secondary data by adding primary evidence like user surveys, access logs, and librarian interviews that capture actual usage behaviour. Extension of the analysis to multiple states can enable stronger regional comparisons. Further work on linking electronic resource access with qualitative research outcomes can provide deeper insights into long-term academic impact.

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