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Research Paper

Internet Addiction Among College Students in India: A Comprehensive Bibliometric Analysis of Research Trends, Patterns, and Future Directions (2001-2025)

Nidhi Gupta[1]*, Nina Eduljee[2], Atasi Sinhababu[3], Rupak Chakravarty[4]

ABSTRACT

This comprehensive bibliometric study examines research on internet addiction among college students in India, by analyzing publication trends, thematic developments, and collaboration patterns to identify knowledge gaps and future directions. A systematic search of the Scopus database (2001 to May 2025) yielded 520 relevant documents. The bibliometric analysis employed multiple tools, including Excel for data organization, Biblioshiny for bibliometric indicators and thematic mapping, and VOSviewer for network visualization. The results revealed an annual publication growth rate of 14.54%, accelerating notably during the COVID-19 pandemic (2020-2021). Five thematic clusters emerged: (1) internet addiction in e-learning contexts among medical and dental students, (2) pandemic impacts on online learning and psychological well-being, (3) knowledge and attitudes during lockdown periods, (4) mental health and risk behaviors in the digital era, and (5) social media addiction and academic performance. The All India Institute of Medical Sciences (AIIMS) led with 87 publications, and international collaboration accounted for 13.85% of studies. As the first comprehensive study in this area, it highlights significant research growth alongside critical gaps in longitudinal, intervention, and cross-cultural studies. These findings offer valuable insights for developing evidence-based policies to address internet addiction in Indian higher education.

Keywords: *Internet addiction, college students, India, bibliometric analysis, COVID-19, digital behavior, COVID-19, online learning*

The digital revolution has fundamentally transformed higher education and student life worldwide, with India experiencing particularly rapid digitalization over the past two decades (Dash, 2024; Rani, 2019). As of 2025, India projects a user base of 900 million internet users, representing 55.3% internet penetration, alongside 491 million social media users constituting 33.7% of the total population (Kemp, 2025). This number is expected to surpass 1 billion users by 2027 (Parekh, 2024). This digital transformation

[1]Librarian S.C.D Government College Ludhiana, India
[2]Professor, Department of Psychology Saint Joseph's College of Maine 461 Alfond Hall Standish, ME, USA
[3]Librarian, Mehr Chand Mahajan DAV College for Women, Chandigarh, India
[4]Professor, Department of Library & Information Science, Panjab University Chandigarh, India
*Corresponding Author

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accelerated significantly during the COVID-19 pandemic, which necessitated unprecedented reliance on digital technologies for education, social interaction, and daily activities (Mhetre et al., 2024).

Under the *Digital India* initiative, internet connectivity has expanded rapidly across the country. As of March 2024, India reported 954.40 million internet subscribers, including 398.35 million were from rural areas and by April 2024, about 95.15% of villages (6,12,952 out of 6,44,131 villages) had access to 3G/4G mobile networks. This expansion has been accompanied by remarkable growth in internet adoption, with subscriptions increasing from 251.59 million in March 2014 to 954.40 million in March 2024, reflecting a Compound Annual Growth Rate (CAGR) of 14.26% (Ministry of Communications, 2024). This highlights India's growing digital inclusion and provides a foundation for examining patterns of internet use (Eduljee et al., 2026) and internet addiction among its young adult population.

While there is no universal definition of internet addiction (Tang et al., 2024), it is commonly described as excessive, uncontrolled, and compulsive use internet use that significantly impairs personal, social, academic, or professional functioning, and has emerged as a critical public health concern in the digital age (Shaw & Black, 2008; Chadha et al., 2024). The condition may manifest across various online activities, including social media engagement, digital gaming, video streaming, and compulsive web browsing, often presenting symptoms analogous to substance-related and behavioral addictions (Guo et al., 2018).

College students represent a particularly vulnerable population for internet addiction (Balaje et al., 2024) due to several converging factors including the developmental characteristics of emerging adulthood, increased autonomy coupled with reduced parental supervision, academic pressures, social adjustment challenges, and widespread availability of high-speed internet infrastructure in educational institutions (Joseph et al., 2021; Stanković et al., 2021). In the Indian context, additional considerations arise, such as rapid technological adoption, socioeconomic diversity, varying levels of digital literacy, and cultural factors that may influence internet usage patterns and susceptibility to addiction. Moreover, excessive internet use has increasingly been recognized as an emerging public health issue not only in India but also globally (Chung & Lee, 2023; Joseph et al., 2021; Nagarajappa et al., 2025).

Theoretical Framework

The theoretical understanding of internet addiction draws from multiple disciplinary perspectives, including cognitive-behavioral models, neurobiological frameworks, and social-ecological theories. Davis's (2001) cognitive-behavioral model distinguishes between generalized and specific internet addiction, emphasizing the roles of maladaptive cognitions and behavioral patterns. Recent neurobiological research has identified similarities between internet addiction and substance use disorders in terms of brain activation patterns, reward processing, and impulse control mechanisms (Geng et al., 2023).

The social-ecological model (Slimmen et al., 2024) provides a comprehensive framework for understanding internet addiction within the Indian college context, considering individual factors (such as personality traits, mental health status, academic performance), interpersonal relationships (including family dynamics, peer influences, social support), institutional factors (like university policies, infrastructure, academic demands), and broader

sociocultural contexts (such as cultural values, economic conditions, technological accessibility).

Significance of Internet Addiction Research in India

India's distinctive demographic and technological landscape positions it as a pivotal context for internet addiction research. With a vast population of students enrolled in higher education institutions and a rapidly expanding digital infrastructure, the nation constitutes one of the world's largest cohorts of digitally connected young adults (Vaidya, 2023).

Research has demonstrated significant associations between internet usage, internet addiction, and various negative outcomes including lowered academic performance, psychological distress, sleep quality and disturbances, mental health, well-being, anxiety, depression, and social isolation among Indian college students (Balaje et al., 2024; Gupta et al., 2018; Kumar et al., 2022; Patel, 2019; Raj, 2024; Rajasekhar et al., 2023; Razik et al., 2021; Srivastava et al., 2021).

The COVID-19 pandemic has further intensified concerns about internet addiction, as educational institutions transitioned to online learning modalities (Murphy et al., 2020; Nambiar, 2020) potentially exacerbating problematic internet use patterns (Scafuto et al., 2023). Understanding research trends, identifying knowledge gaps, and mapping the evolution of this field are essential for developing culturally appropriate interventions and evidence-based policies.

Research Gaps and Study Rationale

Despite growing recognition of internet addiction as a significant public health concern, comprehensive bibliometric analyses specifically focusing on college students in India remain limited. Existing reviews have primarily focused on global trends or specific aspects of internet addiction, lacking systematic analysis of research patterns, collaboration networks, and thematic evolution within the Indian context.

Recent bibliometric studies by Bhukya and Lakshmana (2025) and Muflih et al. (2024) have provided valuable insights into global internet addiction research trends, but these analyses lack the specificity needed to understand the unique characteristics and research needs within Indian higher education contexts. Furthermore, the rapid evolution of digital technologies and the transformative impact of the COVID-19 pandemic necessitate updated analysis of research trends and emerging themes.

Study Objectives

This bibliometric analysis aims to provide a comprehensive examination of internet addiction research among college students in India through the following specific objectives:

1. To analyze publication trends and growth patterns in internet addiction research among Indian college students from 2001 to 2025,
2. To identify and characterize major thematic clusters and research domains within the field,
3. To examine collaboration patterns among researchers, institutions, and countries,
4. To assess the impact and influence of key publications, authors, and journals,
5. To identify research gaps and emerging trends in the field,
6. To provide evidence-based recommendations for future research directions and policy development.

METHODS

Study Design and Approach

This study employed a comprehensive bibliometric analysis approach, integrating quantitative analysis of publication metrics with qualitative interpretation of research themes and patterns. The analysis followed established bibliometric methodologies and reporting guidelines to ensure reproducibility and validity of findings.

Data Source and Search Strategy

The Scopus database was selected as the primary data source due to its comprehensive coverage of peer-reviewed literature, superior indexing quality, and compatibility with bibliometric analysis tools. While Web of Science (WoS) was initially considered, preliminary searches yielded insufficient results for comprehensive analysis within the specific scope of this study.

The search strategy was developed through iterative refinement and expert consultation to ensure comprehensive coverage while maintaining specificity. The final search query implemented was:
TITLE-ABS-KEY (internet OR web-based OR digital OR web OR online OR "world wide web") AND TITLE-ABS-KEY (india* AND (college AND students OR graduate*)) AND TITLE-ABS-KEY ((attitude* OR view OR opinion OR perspective* OR position OR stance OR viewpoint OR approach OR belief* OR disposition OR mindset OR feeling OR thinking OR thought OR inclination OR learning OR behavio* OR usage OR use))).

Inclusion and Exclusion Criteria

Inclusion criteria included: (1) peer-reviewed articles, conference papers, and review articles; (2) publications focusing on internet-related behaviors, attitudes, or addiction among college students in India; (3) English-language publications; and (4) publications from 2001 to May 2025.

Exclusion criteria included: (1) non-peer-reviewed publications; (2) publications not specifically addressing college student populations; (3) studies conducted outside India or not specifically focused on Indian contexts; (4) and duplicate publications.

Data Extraction and Processing

The initial search yielded 716 records, which were subsequently filtered to remove duplicates and irrelevant publications, resulting in a final dataset of 520 unique publications. All retrieved records were exported in plain text format with complete bibliographic information including author details, affiliations, keywords, abstracts, and cited references.

Analytical Framework and Tools

The bibliometric analysis employed a multi-tool approach to ensure comprehensive coverage of different analytical dimensions:

1. Microsoft Excel: Used for data cleaning, preliminary organization, and descriptive statistical analysis.
2. Biblioshiny (R-package): Employed for generating bibliometric indicators, thematic mapping, and temporal trend analysis.
3. VOSviewer: Utilized for network visualization including co-authorship analysis, keyword co-occurrence mapping, and citation network construction.

Analytical Procedures Utilized

The analysis incorporated multiple bibliometric techniques:

- *Performance Analysis*: Calculation of annual publication trends, author productivity metrics, journal impact assessment, and institutional contribution analysis.
- *Science Mapping*: Implementation of four primary techniques: (1) Co-authorship analysis examining collaborative relationships between authors and institutions; (2) Co-occurrence analysis investigating keyword relationships and thematic structures; (3) Bibliographic coupling assessing shared reference patterns between publications; (4) Co-citation analysis evaluating joint citation patterns of authors and sources.
- *Thematic Analysis:* Development of thematic maps using centrality and density measures to identify motor themes, niche themes, basic themes, and emerging/declining themes within the research domain.

RESULTS

Document contents, citation patterns, publication trends and growth patterns

Table 1 indicates the time span and document types included in the analysis. A total of 520 publications, spanning from 2001 to May 2025, revealed a substantial growth in research activity, with an annual growth rate of 14.54%. These works were published across 387 journals, demonstrating the interdisciplinary nature of internet addiction research. The dataset comprised 1,745 authors, with only 45 single-authored publications, indicating strong collaboration in the field. Notably, international collaborations accounted for 13.85% of publications, reflecting the growing global engagement with Indian research contexts.

The mean number of authors per article was 3.77, reflecting collaborative research practices characteristic of contemporary academic publishing. A total of 1,507 author keywords were identified, highlighting rich thematic diversity in the field, while 16,987 references were cited across all publications, demonstrating substantial scholarly engagement with existing literature. On average, each document received 10.49 citations, indicating a moderate but meaningful level of academic impact.

The research landscape can be divided into three distinct phases: an emergence phase (2001-2010) characterized by sporadic publications; a steady growth phase (2011-2019) with consistent annual increases; and an acceleration phase (2020-2025) distinguished by substantial growth coinciding with the COVID-19 pandemic.

Table 1. Time span and document types

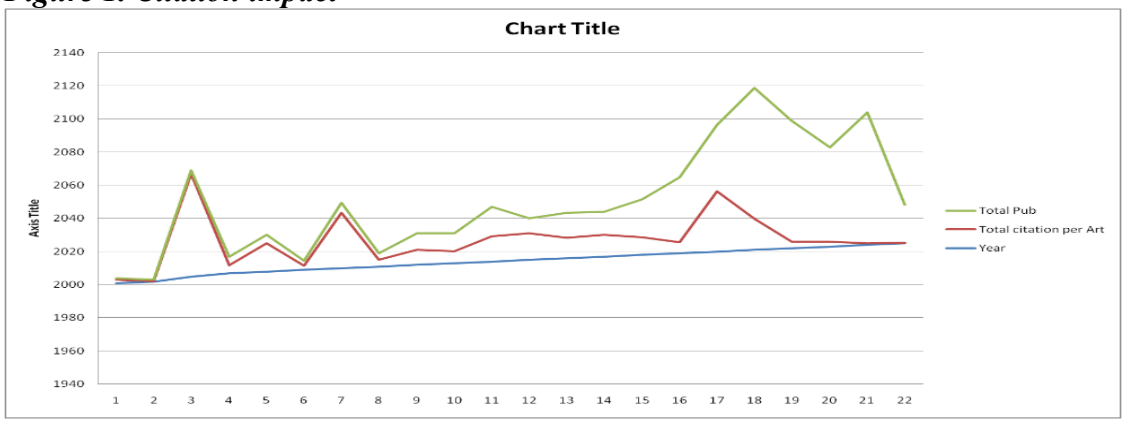
Timespan	2001-2025
Total number of documents	520
Sources (Journals, books, other sources)	387
References	16987
Document average age	4.96
Annual Growth rate	14.54%
Author keywords	1507
Number of authors per article	3.77
Author of single documents	45
Average citations per document	10.49
International co-authorship	13.85%

Citation Impact and Temporal Patterns

The Mean Total Citations per Year (Mean TC per Year) analysis revealed notable temporal variations in research impact. Between 2001 and 2019, publications consistently maintained Mean TC per Year values below 3, reflecting moderate impact during the field's developmental phase. In contrast, 2020 marked a pivotal shift, with Mean TC per Year rising to 6.12, underscoring the heightened interest and impact of COVID-19-related research on internet addiction (Figure 1).

The subsequent decline in Mean TC per Year to 0.60 by 2024 and 0.25 by 2025 can be attributed to the recency effect on citation accumulation, as newer publications require time to achieve measurable impact. Across the entire corpus, the average citation per article was 10-11 citations, with an estimated paper lifespan of 10.5 years from recognition to obsolescence.

Figure 1. Citation impact



Thematic Structure and Research Domains

The co-occurrence analysis of author keywords identified five distinct thematic clusters, each representing a major research domain within internet addiction studies among Indian college students (Figure 2).

Cluster 1 (Red): E-learning and Medical Education Context: This cluster highlights research on internet addiction within e-learning environments, particularly among medical and dental students. It incorporates keywords such as *e-learning*, *online learning*, *online teaching*, *education*, *medical students*, and *dental students*. This theme reflects the growing concern about internet addiction in professional healthcare education contexts.

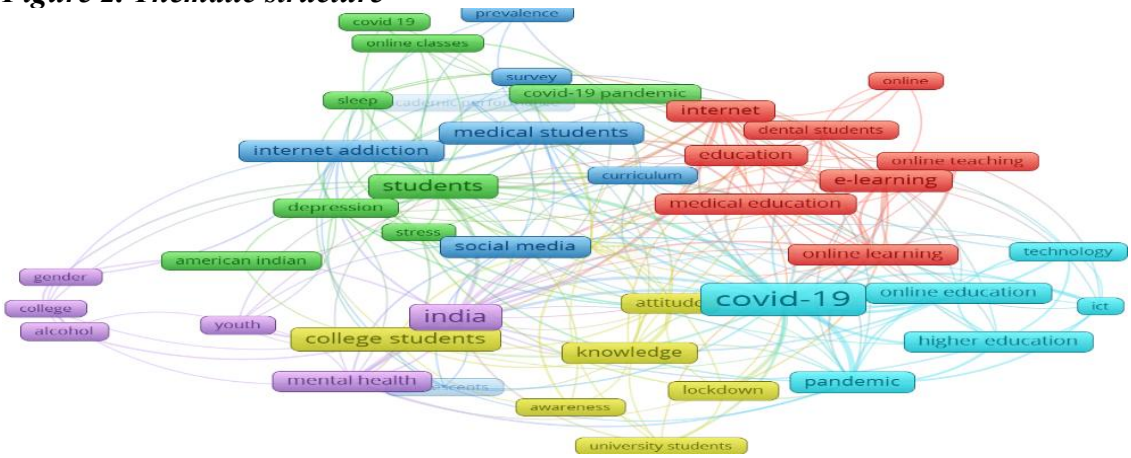
Cluster 2 (Green): COVID-19 Pandemic Impact: This cluster captures research examining the relationship between online classes, internet addiction, and psychological impacts during the COVID-19 pandemic. Core keywords include *COVID-19 pandemic*, *stress*, *sleep*, *depression*, *online classes*, and *students*. This theme represents the most rapidly growing research domain following the onset of the pandemic.

Cluster 3 (Yellow): Knowledge and Attitudes Assessment: This cluster emphasizes research on knowledge and attitudes toward internet addiction, particularly during COVID-19 lockdown periods. It is characterized by keywords such as *college students*, *knowl*edge, *attitudes*, *awareness*, and *lockdown*. This theme reflects efforts to examine the cognitive and attitudinal dimensions of internet addiction.

Cluster 4 (Purple): Mental Health and Risk Behaviors: This cluster addresses the intersection of mental health outcomes and risk behaviors in the digital era. Core keywords include mental health, *youth*, *alcohol*, *gender*, and *India*. This theme highlights the growing recognition of internet addiction as a complex behavioral health concern with multiple comorbidities.

Cluster 5 (Blue): Social Media and Academic Performance: This cluster examines the prevalence of internet and social media addiction among medical students and its impact on academic performance. Core keywords include *medical students*, *social media*, *curriculum*, *survey*, *prevalence*, and *academic performance*. The theme underscores the implications of excessive digital engagement on educational outcomes.

Figure 2. Thematic structure



Thematic Mapping and Research Evolution

The thematic map analysis classified research themes according to their centrality (interconnectedness with other themes) and density (internal development) measures (Figure 3).

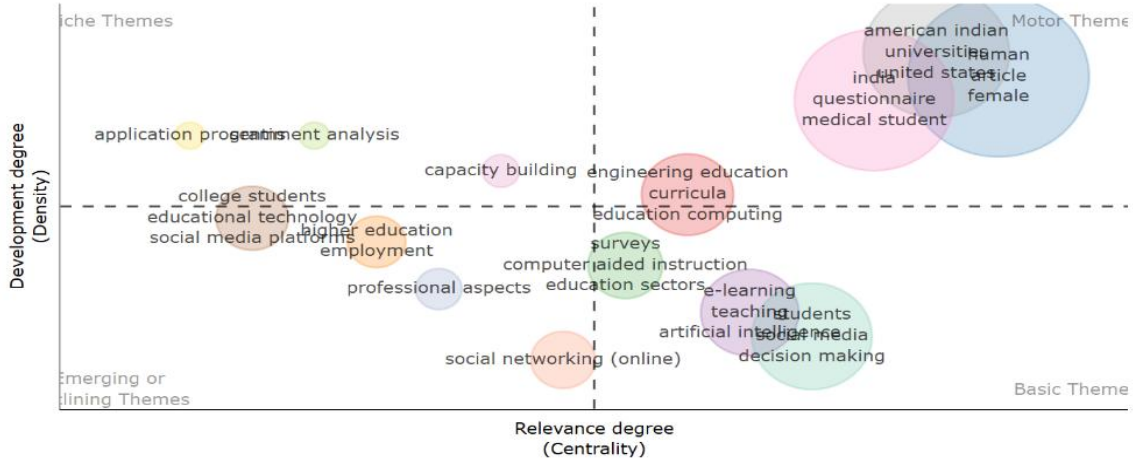
Motor Themes (High Centrality, High Density): These are well-developed and highly interconnected research themes, encompassing topics such as India, human subjects research, questionnaire methodologies, *medical students*, *engineering education*, *curricula*, and *universities*. These themes represent the core foundation of current research and reflect strong conceptual development within the field.

Niche Themes (Low Centrality, High Density): These represent specialized research areas characterized by strong internal development, but limited connections to broader themes. Examples include *application programs*, *capacity building*, and specific *student populations*. These themes indicate focused research tracks that could benefit from greater integration with mainstream studies.

Basic Themes (High Centrality, Low Density): These are foundational topics that maintain strong connections with other research areas but require further conceptual and methodological development. Key terms include *education computing*, *surveys*, *computer-aided instruction*, *e-learning*, *artificial intelligence*, *social media*, and *decision making*. These themes represent promising opportunities for expanded research investment.

Emerging or Declining Themes (Low Centrality, Low Density): These research areas in transition, encompassing topics such as *social media platforms*, *higher education employment*, *social networking*, and *educational technology*. These themes may represent either emerging research frontiers with potential growth areas or declining scholarly interest.

Figure 3. Thematic mapping



Author Productivity and Collaboration Networks

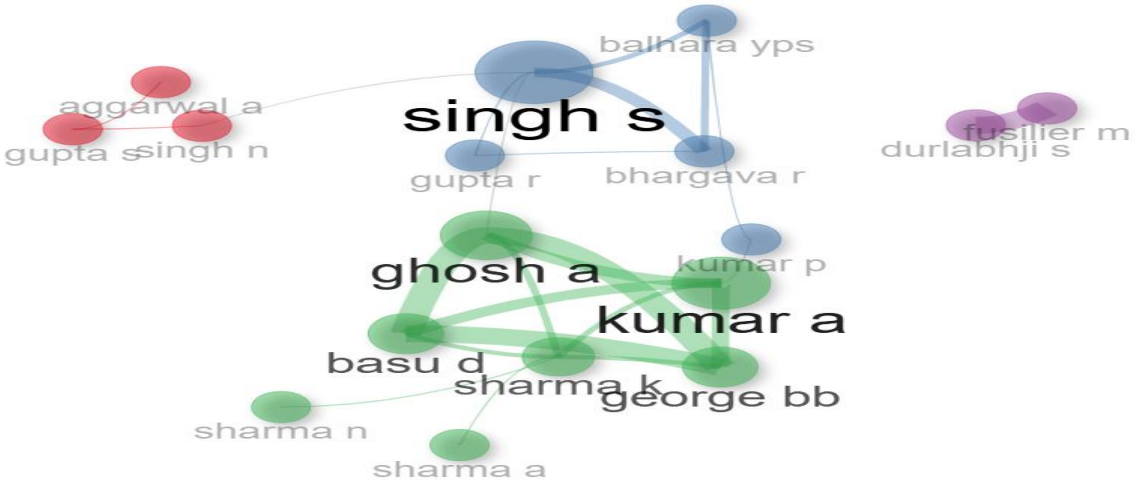
Analysis of author productivity identified the most prolific contributors are Balhara, Y.P.S., Ghosh, Singh, S., Basu, D., Bhargava, R., Durlabhji, S., Fusilier, M., George, B., and Kathirvel, S., each authoring 4-5 publications. Secondary contributors include Krishnan, N. and Kumar, A., with 3 publications each (Figure 4).

Citation-based analysis identified 14 authors who met the inclusion criteria of minimum three publications and at least 25 citations. Among them, Durlabhji, Subhash and Fusilier, Marcelline achieved the highest citation count, with 153 citations from four articles, followed by Singh, Swarndeep with 91 citations from five articles and Rahman, Afzalur with 58 citations from two articles.

Figure 4. Author Productivity

Figure 5 presents the collaboration network analysis that revealed two primary research clusters: The blue cluster includes researchers from All India Institute of Medical Sciences (AIIMS), focusing on COVID-19 pandemic impacts, screen time behaviors, and problematic internet use. The green cluster comprises researchers from Post Graduate Institute of Medical Education and Research (PGIMER) Chandigarh, emphasizing digital screening tools and substance use disorders.

Figure 5. Author collaboration

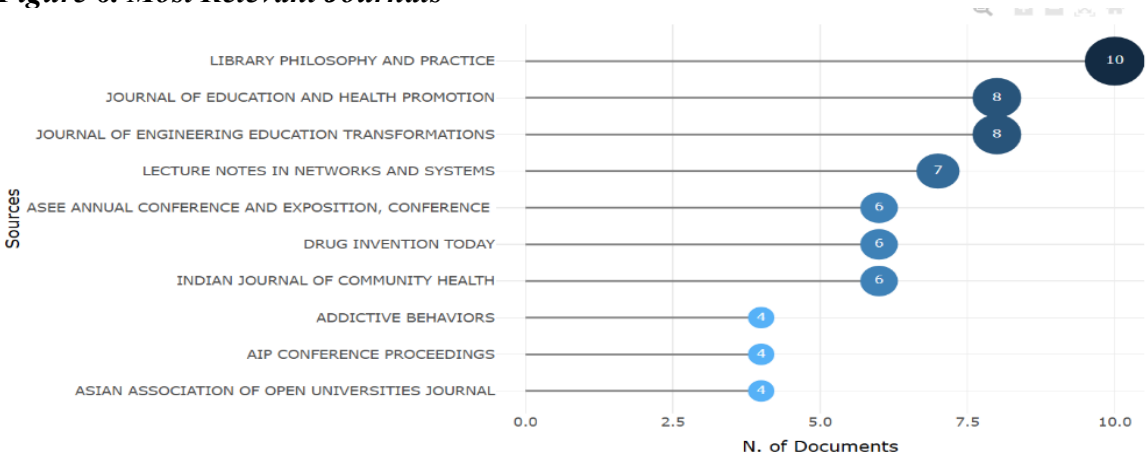


Journal and Source Analysis

The 520 articles were published across 389 journals, reflecting broad interdisciplinary interest. The most productive journals were *Library Philosophy and Practice* (10 publications), *Journal of Education and Health Promotion* (8 publications), and *Lecture Notes in Networks and Systems* (7 publications).

The citation impact analysis revealed a different pattern. *Addictive Behaviors* achieved the highest citation impact with 188 citations from only 4 publications, followed by *Asian Journal of Psychiatry* which garnered 152 citations from 4 publications. This discrepancy between publication frequency and citation impact highlights differences in journal influence and research quality within the field (Figure 6).

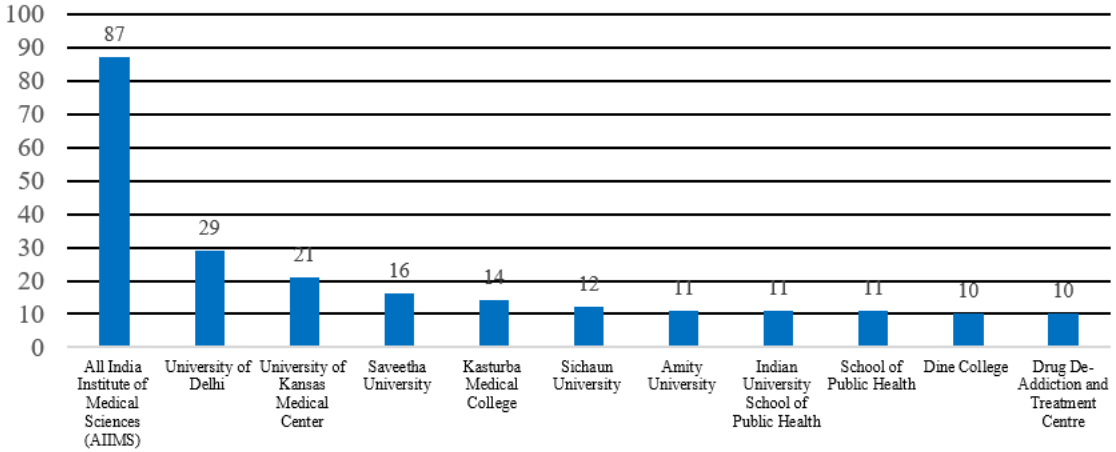
Figure 6. Most Relevant Journals



Institutional Contributions and Geographic Distribution

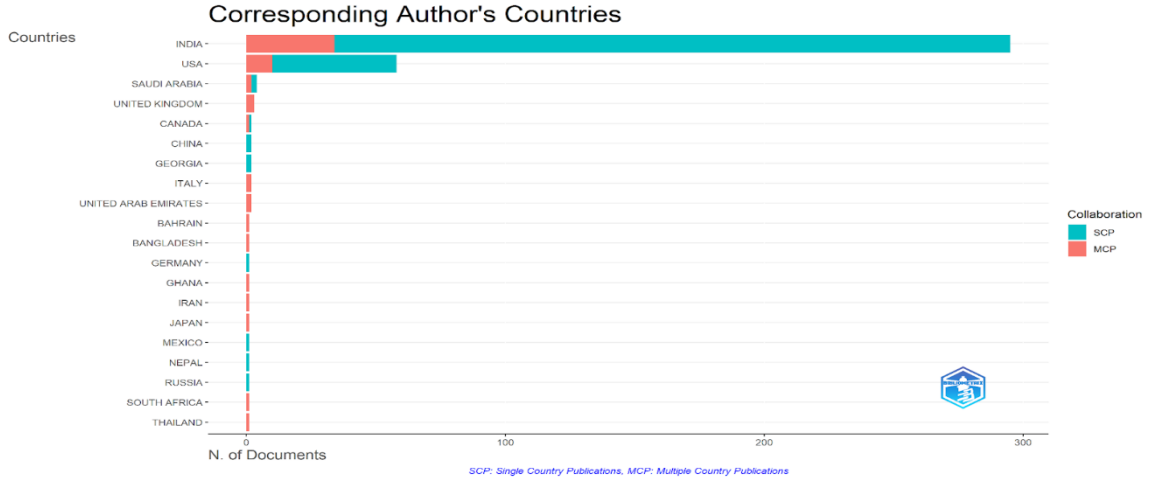
Institutional analysis identified the All India Institute of Medical Sciences (AIIMS) as the leading research institution, contributing 87 publications and significantly surpassing other contributors. The University of Delhi followed with 29 articles, while international collaboration was evident through the University of Kansas Medical Center, which contributed 21 publications. Other notable Indian institutions include Saveetha University (16 articles), Kasturba Medical College (14 articles), as well as various specialized medical and educational institutions (Figure 7).

Figure 7. Institutional contributions



The plot (Figure 8) highlights country-wise research output based on corresponding author affiliations, distinguishing between Single Country Publications (SCP) and Multiple Country Publications (MCP). India leads with 295 articles (11.5% MCP ratio), showing strong domestic research activity. The USA ranks second with 58 papers and higher international collaboration (17.2% MCP ratio). Smaller countries like Saudi Arabia, the UK, Canada, and others display high or full MCP ratios, reflecting reliance on global partnerships. In contrast, China, Germany, Mexico, Nepal, and Russia show only SCPs, suggesting domestic focus.

Figure 8. Corresponding author countries



DISCUSSION

This comprehensive bibliometric analysis constitutes the first systematic examination of internet addiction research among college students in India, providing key insights into the field's evolution, current state, and future directions. The substantial annual growth rate of 14.54% demonstrates increasing recognition of internet addiction as a significant public health concern within Indian higher education contexts, with research accelerating notably during the COVID-19 pandemic period.

The identification of five distinct thematic clusters offers valuable insights into the multifaceted nature of internet addiction research in India. The prominence of medical and dental education contexts highlights both the vulnerability of healthcare students to internet addiction and the robust research infrastructure within medical institutions. This finding aligns with international evidence showing higher rates of internet addiction among healthcare students, a trend often attributed to academic pressures, perfectionist tendencies, and high-stress educational environments (Aziz et al., 2024; Stanković et al., 2021).

The thematic analysis highlights significant theoretical contributions to understanding internet addiction within culturally specific contexts. The emergence of COVID-19-related research as a major theme provides empirical support for stress-vulnerability models of addiction, indicating that external stressors and environmental changes can significantly influence and shape patterns of internet addiction. These findings advance theoretical frameworks that emphasize the role of contextual factors in the development and maintenance of addictive behaviors (Şan et al., 2024; Scafuto et al., 2023).

The differentiation among types of internet addiction, such as social media, gaming, and general internet use, evident in the thematic clusters supports multi-dimensional conceptualizations rather than unitary models. This aligns with contemporary theoretical frameworks that propose distinct subtypes of internet addiction, each with distinct etiological pathways, symptom profiles, and treatment implications (Davis, 2001; Geng et al., 2023).

The prominence of knowledge and attitude research themes reflects the field's acknowledgement of cognitive-behavioral models, which emphasize the role of maladaptive cognitions and attitudes in development of internet addiction. However, the relative scarcity of intervention-focused studies highlights a notable gap between the theoretical understanding and practical application of cognitive-behavioral principles in treatment development.

Methodological Insights and Research Quality

This analysis highlights key methodological patterns with important implications for quality and validity of future research. The predominance of cross-sectional survey studies, while useful for estimating prevalence, restricts causal inference and limits understanding of the longitudinal trajectory of internet addiction. Furthermore, the average citation impact of 10–11 citations per article suggests only moderate influence compared to international benchmarks in addiction research, potentially reflecting limitations in study quality, dissemination, or global visibility.

The strong collaborative patterns, evidenced by an average of 3.77 authors per article and 13.85% international collaboration, reflect positive trends toward interdisciplinary

engagement. Nonetheless, the concentration of research within medical institutions may introduce disciplinary bias, potentially constraining theoretical diversity and methodological innovation. Broader collaboration with psychology, sociology, computer science, and education departments could enrich methodological rigor and expand the theoretical scope of the field

COVID-19 Pandemic Impact and Digital Transformation

The dramatic increase in research during 2020-2021, along with the emergence of COVID-19 as a major thematic cluster, reflects the pandemic's transformative impact on digital behavior and internet addiction research (De et al., 2020). The forced shift to online learning created a natural experiment in digital dependency, offering unprecedented opportunities to examine the development and progression of internet addiction (Besalti & Satici, 2022). Nevertheless, the pandemic context also poses unique challenges for generalizing these findings to post-pandemic settings.

The prominence of e-learning and online education themes indicates that the integration of educational technology has fundamentally reshaped the risk landscape for internet addiction among college students. The distinction between productive internet use (e.g., academic activities) and problematic use has become increasingly blurred, highlighting the need for more nuanced assessment methods and targeted intervention strategies (Haleem et al., 2022). The focus on psychological impacts during COVID-19 offers valuable insights into the interplay between environmental stressors, digital coping mechanisms, and the onset or escalation of internet addiction. Such research enhances understanding of how extraordinary circumstances can accelerate or modify addiction trajectories, with important implications for prevention and early intervention strategies.

Cultural and Contextual Considerations

The Indian context presents unique cultural and socioeconomic factors that shape both internet addiction patterns and research approaches. Rapid digital transformation in India, coupled with diverse socioeconomic conditions and uneven levels of digital literacy, creates complex interaction effects that current research methods may not fully capture (Tripathi, 2025; Kem, 2025).

Clinical and Practical Implications

The research findings carry important implications for clinical practice and intervention development. The prominence of mental health comorbidities, such as anxiety, depression, and sleep disorders, underscores the need for integrated treatment approaches that address both internet addiction and co-occurring conditions. This perspective aligns with clinical evidence supporting the effectiveness of treating internet addiction within broader mental health frameworks rather than as an isolated disorder (Jiang et al., 2025; Roberts et al., 2022).

The emphasis on academic performance offers important insights for educational institutions seeking to design effective policies and support services. The findings suggest that internet addiction among college students is not merely an individual concern but also carries significant consequences for educational outcomes and institutional effectiveness. These insights support the development of campus-based prevention and intervention programs that are integrated with academic support services (Şan et al., 2024; Singh & Srivastava, 2021).

The prominence of research focusing on medical students carries important implications for healthcare workforce development. The prominence of research focusing on medical students carries important implications for healthcare workforce development. Internet addiction among future healthcare providers has the potential to affect professional competency, empathy, and the quality of patient care. Medical education institutions should therefore consider integrating digital wellness and internet addiction awareness into their curricula and student support systems (Afrin et al., 2024; Umami et al., 2023).

Policy Implications and Recommendations

The research findings point to several important policy implications at institutional, state, and national levels. The rapid growth in internet addiction research, coinciding with the expansion of digital education, highlights the need for proactive policy initiatives that prioritize digital wellness within educational settings.

Institutional Policy Recommendations:

To address the growing challenges of internet addiction among college students, higher education institutions should consider developing comprehensive digital wellness policies that promote balanced technology use. In addition, screening and intervention services for problematic internet use can be integrated into existing student health and counseling infrastructures. A balanced approach to technology integration in education is essential to ensure that digital innovations support learning without exacerbating risks of overuse. Finally, digital literacy programs should be expanded to include components on responsible and healthy internet use, equipping students with the skills to navigate the digital world effectively (Han et al., 2023; Singhal et al., 2022).

Healthcare System Implications

To strengthen clinical responses to internet addiction, it is essential to train healthcare providers in both assessment and intervention techniques. Routine integration of internet addiction screening into mental health assessments can facilitate early identification and timely support. The development of culturally appropriate treatment protocols is particularly important in the Indian context, where sociocultural norms, family dynamics, and technology use patterns may differ from Western models. For individuals presenting with severe or treatment-resistant symptoms, specialized services should be established to ensure comprehensive care (Chadha et al., 2024; Throuvala, 2019).

Research Policy Recommendations

Increased funding is needed for longitudinal studies to clarify the developmental pathways and long-term outcomes of internet addiction. Equally important is the support of intervention research, particularly randomized controlled trials, to establish evidence-based prevention and treatment strategies. Given the complex and multifaceted nature of internet addiction, progress in this field also depends on interdisciplinary collaboration among medical, psychological, and educational disciplines. Finally, greater attention should be directed toward underrepresented populations and geographic regions to ensure that research findings are both culturally relevant and globally inclusive.

Global Context and International Collaboration

While this analysis focused on research within Indian contexts, the findings have implications for understanding internet addiction as a global phenomenon. The similarities between Indian research themes and international trends suggest common underlying

mechanisms and concerns across cultures, while differences may reflect unique cultural, technological, or educational factors.

The relatively modest level of international collaboration (13.85%) suggests opportunities for enhanced global research partnership. Collaborative research with investigators in other countries facing similar challenges could accelerate knowledge development, enhance methodological sophistication, and improve intervention effectiveness.

India's position as a major technology hub and large youth population makes Indian research potentially influential for global understanding of internet addiction. Enhanced international collaboration could amplify the impact and visibility of Indian research contributions while bringing international expertise to address local challenges.

Limitations of the Research and Methodological Considerations

Several important limitations should be acknowledged when interpreting these findings. Although Scopus provides comprehensive coverage, reliance on a single database may have excluded relevant publications indexed in local journals, regional databases, or other international sources. Similarly, the restriction to English-language publications may have overlooked research disseminated in regional Indian languages, introducing potential linguistic and cultural bias.

The search strategy, although carefully designed, focused on explicit internet-related terms and may have overlooked studies employing alternative terminology or indirect approaches to examining digital behaviors. The rapid evolution of digital technologies and associated language further complicates comprehensive literature identification, posing ongoing challenges for capturing the full scope of relevant research.

While the bibliometric approach offers valuable insights into research patterns and trends, it does not allow for direct assessment of research quality, methodological rigor, or the clinical significance of individual studies. Moreover, citation-based impact measures may be shaped by factors beyond research quality, such as publication accessibility, language of dissemination, and disciplinary citation practices.

The temporal coverage ending in May 2025 may have excluded the most recent developments and emerging trends, while the inclusion of projected future publications introduces some uncertainty. Furthermore, the analysis captures research conducted during a period of rapid technological and social change, which may constrain the stability and generalizability of the identified patterns.

Directions for Future Research

Based on the identified research gaps and emerging trends, several priority areas for future research can be recommended:

1. **Longitudinal and Developmental Research:** The predominance of cross-sectional studies represents a significant gap in the development, progression, and recovery over time. Longitudinal studies tracking students from enrollment through graduation and identifying risk factors could provide crucial insights into addiction trajectories, risk and protective factors, and natural recovery processes (Zhang et al., 2025).

2. **Intervention Research:** The limited number of intervention studies highlights a critical gap between problem identification and solution development. Priority should be given to designing and testing culturally appropriate interventions, including both prevention programs for at-risk students and treatment approaches for those with established internet addiction. Kumar et al. (2022) recommend monitoring internet addiction and internet usage with students through information sessions.
3. **Mechanistic and Neurobiological Research:** Increased focus on the neurobiological and psychological mechanisms underlying internet addiction in Indian populations could enhance both theoretical understanding and intervention development. This includes studies on genetic influences, neurocognitive profiles, and brain imaging.
4. **Technology-Enhanced Interventions:** Paradoxically, technology can also offer solutions to internet addiction through digital therapeutics, mobile applications, and online intervention platforms. Research focused on developing and evaluating these technology-based interventions represents a promising frontier.
5. **Prevention and Early Intervention:** Research on prevention strategies, early identification of at-risk students, and brief interventions could yield substantial public health benefits. This includes developing screening tools, risk assessment algorithms, and stepped-care intervention models.
6. **Cross-Cultural and Comparative Research:** Comparative studies examining internet addiction across diverse cultural, linguistic, and socioeconomic groups within India could deepen understanding of cultural influences and inform more targeted interventions.
7. **Implementation Science:** Research examining how to effectively implement internet addiction prevention and intervention programs within Indian higher education contexts is essential for translating research findings into practice.

CONCLUSION

This comprehensive bibliometric analysis provides the first systematic examination of internet addiction research among college students in India, highlighting a rapidly growing field with significant theoretical, clinical, and policy implications. The analysis of 520 publications spanning 2001-2025 demonstrates substantial research growth with particular acceleration during the COVID-19 pandemic, reflecting increasing recognition of internet addiction as a critical public health concern. As India's digital transformation accelerates and colleges increasingly adopt technology in education, research on internet addiction among college students will become increasingly critical. The foundation established by current studies provides a strong platform for addressing emerging challenges and developing innovative strategies to promote healthy digital behaviors in this population. This analysis provides a foundation for guiding future research, informing educational and clinical strategies, and promoting healthy digital behaviors among Indian college students.

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Conflict of Interest

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