

Quantitative Analysis of Publication Trends in the *Journal of Indian Prosthodontic Society* between 2011 and 2020

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ABSTRACT

Aim: To analyze quantitatively the trends in publication and compare the scientific content published during 2011–2015 and 2016–2020.

Materials and methods: An online search for all the different manuscripts published from 2011 to 2020 was performed electronically on the website of the *Journal of Indian Prosthodontic Society (JIPS)*. The manuscripts were grouped into the following broader categories: Author, article grouping, original article subtype, prosthetic division, and statistical analysis.

Results: The authors from private institutions showed higher publication trends than the authors from government institutions. The period 2016–2020 showed a higher number of publications with four or more authors. There was more original research published, followed by case reports. There was an increasing trend in a systematic review during 2016–2020 as compared to the period 2011–2015. There were a greater number of *in vitro* experimental studies published with a comparison of the means in the statistical analysis. There was more publication on materials and technology, followed by implants in the prosthetic division of articles.

Conclusion: The analysis shows the overall progress of the journal explains the characteristics of the authors involved in the research, highlights the types of research done, statistical methods used, and important areas of research and trends in research in prosthodontics at a national level.

Clinical significance: The publication trends will focus on the research thrust areas and the type of research done in the specialty, pointing out the gaps in the research and identifying the future course of action for authors and journals. It also helps for comparison with international publication trends in prosthodontics and provides information to prospective authors to focus research on the priority areas of the concerned journal for better acceptance.

Keywords: Bibliometrics, *Journal of Indian Prosthodontic Society*, Publication analysis, Trends in publication.

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INTRODUCTION

The journal metrics, indicators, and scientific literature are studied by bibliometrics, a tool in the library and information science. This kind of analysis will provide deeper insights into the journal and help researchers to investigate the publication trends. The journal informatics has shifted to quantitative methods in recent times with evolving research and statistical methods. Many specialty journals regularly publish their bibliometrics for a better understanding of the kinds of publication trends and to set future goals for better performance. This analysis will aid in the recognition of numerous inputs as well as the identification of inadequacies regarding the kind of research published, author profiles, collaborations, funded trials, number of systematic reviews, meta-analysis, and statistical methods used. The study can be used by the editorial team and authors of the journal to better understand the trends in publications and improve the quality. The potential writers will identify the research thrust areas and prioritize their studies to address the gaps.^{1–3}

The *Journal of Indian Prosthodontic Society* is a peer-reviewed, quarterly, open-access official publication of the Indian Prosthodontic Society. The journal was established in the late 1970s and has published 21 volumes to date. The journal is a valuable resource for publishing and discovering prosthodontic research, with a global audience reach. It covers a wide range of topics related to the field of prosthodontics, crown bridge, and implantology. The journal has published 1085 full-text articles, which include editorials, original research papers, systematic and narrative reviews, case series, case reports, *in vitro* investigations, methodologies, inventions, and clinical and laboratory procedures,

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with a journal impact factor of 0.81 for the year 2020. There has not been a single study examining the journal's publication trends or patterns in recent times.^{4–6}

As a result, the current study examined the *JIPS* journal in depth from 2011 to 2020 to highlight evolving patterns, dominating study designs, and the most significant breakthroughs made over time in dentistry research. The investigation's goal was to find out about a lot of different things, such as how many papers were published, who wrote them, and where they came from.

The study objectives were formulated with the above-mentioned background as follows:

- To investigate trends in publication patterns in the *Journal of the Indian Prosthodontic Society* between 2011 and 2020.
- To compare the trends of the first half of the decade (2011–2015) with the latter half (2016–2020), to compare the trends and observe the pattern changes.

MATERIALS AND METHODS

The *JIPS* was searched for the period of 2011–2020 to study the details of a decade of publications. An online search for all the different manuscripts published between 2011 and 2020 was performed electronically on the website.

Study Variables

The manuscripts were grouped into the following broader categories into the following five domains: Author, article grouping, original article subtype, prosthetic division, and statistical analysis (Flowchart 1). The affiliation of the author was studied under academic, practitioner, and other criteria. The authors were further grouped into the government and private sectors. The number of contributing authors for a manuscript was observed. The contribution of international authors was also marked. The genders of the contributing authors were observed.

The articles were further grouped into editorials, case reports, reviews, systematic reviews, original articles, and miscellaneous articles. The original articles were further divided into descriptive, analytical, and experimental studies. Original articles were further subdivided into experimental *in vivo*, experimental *in vitro*, descriptive, and analytical.

The prosthetic division of the concerned manuscripts was classified into the following categories: complete denture (CD), removable partial denture (RPD), fixed partial denture (FPD), implantology, maxillofacial material and technology, and miscellaneous.

Each statistical technique employed by the authors was included in one of the six main categories.^{7,8} Descriptive statistics, such as means and frequencies, comparison of groups (independent measures), such as Chi-squared test, *t*-test, and analysis of variance (ANOVA); measures of association, such as Spearman or Pearson correlations; multivariate analysis of variance (MANOVA), regression analysis, and discriminant analysis are examples of multivariate (dependent) analysis. Multivariate (interdependent) analysis, such as factor analysis and cluster analysis, other (any technique not belonging to any of the above).

Miscellaneous grouping was considered in article grouping, prosthetic division, and other categories in statistical analysis that were used to fit in data that did not fall under the defined groups.

Data Extraction

The *JIPS* website was searched during the period 2011–2020 for all volumes and issues. The articles were downloaded in portable document format (PDF) and were screened according to the study variables mentioned. The data collected was entered in Microsoft Excel format. For better understanding, the articles were split into two time frames from 2011–2015 and 2016–2020. The articles were grouped into the designated categories by three independent investigators after an understanding of the concepts was gained by reviewing the journal.

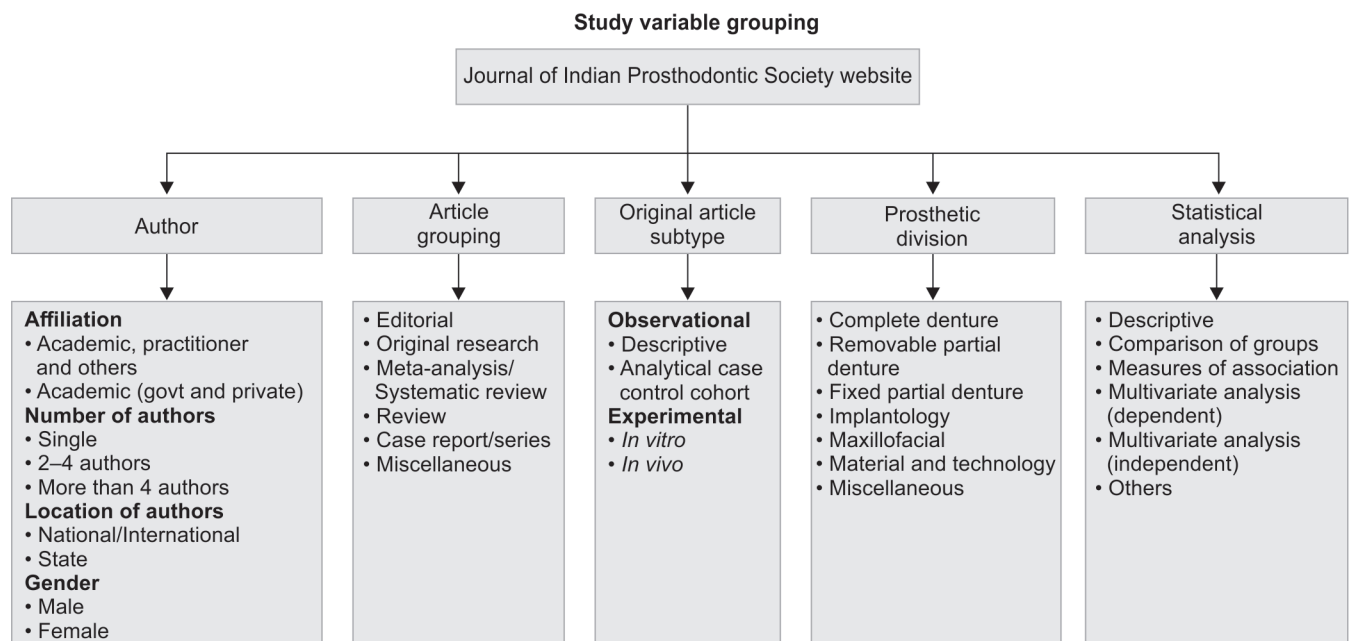
Study Mapping

The affiliations of all authors were considered for state location, and all data were entered to map the study state by state.

Study Analysis

Each article was looked at and put into groups based on the study design, disclosure of author affiliations, and study results. If there was any question or doubt about how to categorize things, the whole group was asked, and a consensus was reached. Before the researcher looked at the articles, he or she came up with the definitions for these parameters. There were three separate

Flowchart 1: Flowchart representing the study variables



reviewers who chose and looked at all the original articles. Before the study began, the team looked over the definitions for each type of study and agreed on them.

RESULTS

A total of 733 articles were retrieved from JIPS, published between 2011 and 2020. The total articles were divided into two time periods, published during 2011–2015 (404 articles) and 2016–2020 (329 articles) for a better understanding of the change in trend.

Domain 1 studied about the author’s affiliation with the type of institution details during these time frames (Table 1). In a total of 722 manuscript affiliations during 2011–2020, results show a higher number of authors affiliated with private dental colleges (570) than government dental colleges (120) in both selected time frames.

The total authorship of 2366 analyzed revealed that 82 (11.4%) were single authors, 439 (61.3%) were two to four authors, and 197 (27.5%) were four authors or above. The results show a greater number of publications with two to four authors in both time frames. However, a change in the trend with more than four authors publishing in the 2016–2020 time frame as compared to the time frame 2011–2015 was seen (Fig. 1).

The results showed more male authors publishing than female authors during 2011–2015; 848 (67.35%) male authors and 411 (32.65%) female authors; and in 2016–2020, 688 (62.15%) male authors and 419 (37.85%) female authors among the total authorship of 2,366 from 2011 to 2020 (Table 2).

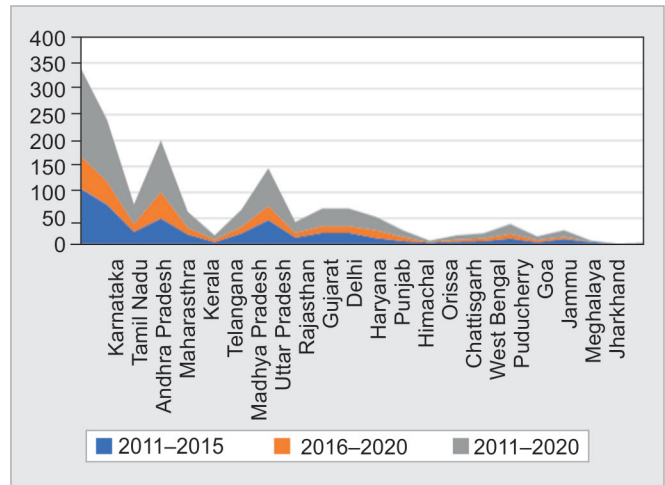


Fig. 2: The state wise publication trend during the different time frame

The state-wise publications were assessed based on the affiliation and location of the study conducted. The results showed the highest publications in Karnataka, Tamil Nadu, Maharashtra, Uttar Pradesh, and other states (Fig. 2).

Domain 2 studied a total of 733 articles that were analyzed during 2011–2020 for the type of article in which 410 (55.9%) were original research, followed by 187 (25.5%) case reports and others. In

Table 1: Author affiliation in government, private colleges, practitioners, and others

Time frame	Government N (%)	Private N (%)	Practitioner N (%)	Miscellaneous N (%)	Total
2011–2015	75 (18.4%)	322 (78.9%)	8 (1.96%)	3 (0.74%)	408
2016–2020	45 (14.3%)	248 (79%)	16 (5.1%)	5 (1.6%)	314

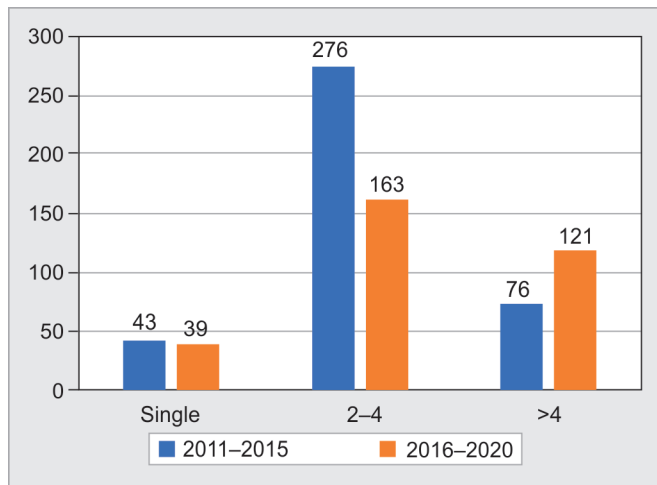


Fig. 1: The number of authors publishing: Single author, two to four authors and more than four authors

Table 2: Gender distribution of the authors during different time frames

Gender	2011–2015	2016–2020
Male	848 (67.35%)	688 (62.15%)
Female	411 (32.65%)	419 (37.85%)

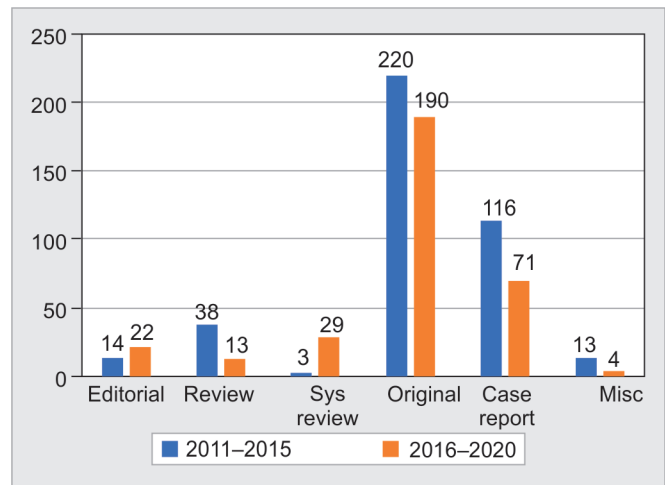


Fig. 3: The distribution of different types of articles published during the two time frames

both time intervals, original research articles were more prevalent, followed by case reports. The 2016–2020 period showed a sharp increase in the systematic reviews and a decrease in the narrative reviews published (Fig. 3).

Domain 3 showed that in the total of 394 studies analyzed, 224 (56.8%) were *in vitro* studies, 60 (15.2%) were *in vivo* studies

Table 3: The number of publications with experimental *in vivo*, *in vitro*, descriptive and analytical under original article subtype

Time frame	Experimental <i>in vivo</i> N (%)	Experimental <i>in vitro</i> N (%)	Descriptive N (%)	Analytical N (%)	Total
2011–2015	19 (9.5%)	122 (61%)	59 (29.5%)	0 (0%)	200
2016–2020	41 (21.1%)	102 (52.6%)	51 (26.3%)	0 (0%)	194

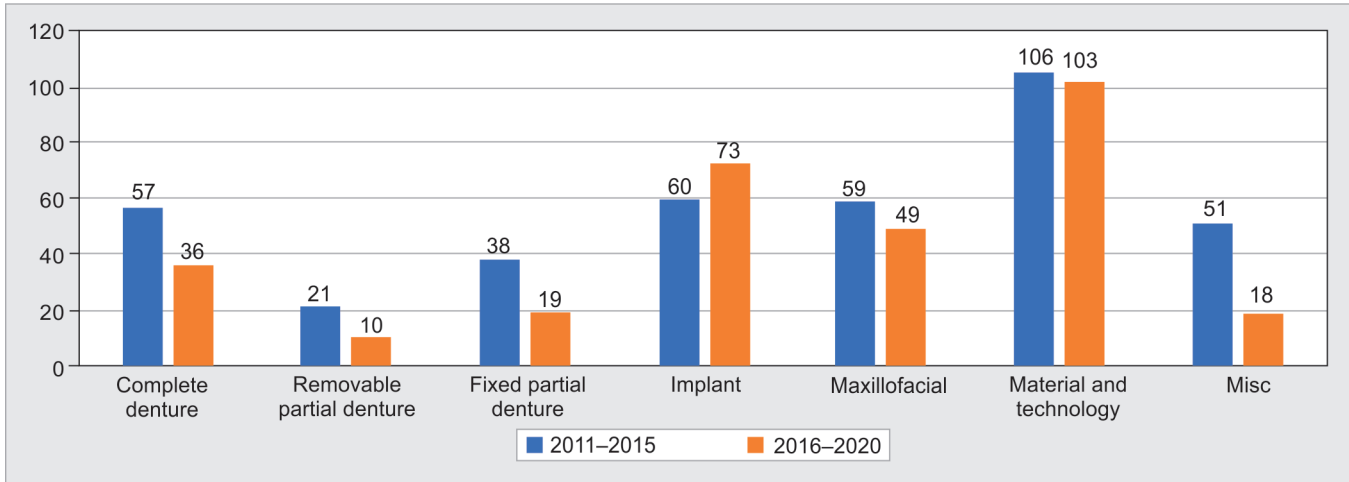


Fig. 4: The articles published in different prosthetic division in two different time frames

Table 4: Statistical analysis employed in different original studies published in different time frame

Time frame	Descriptive N (%)	Comparison between groups N (%)	Measures of association N (%)	Multivariate analysis (dependent) N (%)	Multivariate analysis (inter-dependent) N (%)	Others N (%)	Total
2011–2015	51 (24.9%)	90 (43.9%)	52 (25.4%)	12 (5.8%)	0 (0%)	0 (0%)	205
2016–2020	46 (18.8%)	139 (57%)	47 (19.3%)	12 (4.9%)	0 (0%)	0 (0%)	244

and 110 (27.9%) were descriptive studies. The study types showed 61 and 52.6% of experimental *in vitro* studies in 2011–2015 and 2016–2020, respectively, followed by descriptive studies and *in vivo* experimental studies (Table 3).

Domain 4 studied the total number of articles, excluding the editorials and meeting the inclusion criteria were considered to analyze the prosthetic division between 2011 and 2020, which was equal to 700, among which 209 (29.8%) were on material and technology articles, followed by 133 (19%) were on implants, followed by others. The trend during 2011–2015 and 2016–2020 in the prosthetic division showed a greater number of articles were published under the material and technology headings followed by implants, maxillofacial, CD, miscellaneous, FPD, and RPD (Fig. 4).

Domain five studied a total of 410 original research, among which 449 statistical results were analyzed in original research articles between 2011 and 2020 with some articles having more than one analysis. The results show a greater number of studies used the comparison of mean followed by measures of association, descriptive statistics, and multivariate analysis. The trend between different time frames (2011–2015 and 2016–2020) showed a similar finding (Table 4).

The results showed a changing trend of the increased number of *in vivo* studies and systematic reviews in the time frame 2016–2020 in comparison to 2011–2015. Similarly, the trend showed more manuscripts with four or more authors in the time frame 2016–2020.

Implant studies were slightly higher in 2016–2020 in comparison to 2011–2015. The overall number of publications showed a better trend in 2016–2020 than 2011–2015 in all states of India. The rest of the variables did not show any significant change.

DISCUSSION

In this analysis of the published articles in *JIPS* from 2011 to 2020, the articles were screened and grouped into the selected headings and domains. The author's related analysis showed the private sector contributed more than the government sector, as there is a clear distinction between the two there are a greater number of private dental colleges than government dental colleges in India.⁹ There is no mandate for promotion in terms of the number of publications for private practitioners and others, so authors with academic institution affiliations were more numerous than those without.¹⁰

There has been a recent change in the workforce in dentistry with a greater number of women dentists taking the lead, but in the early 70s, there were more male dentists as compared to female dentists.¹¹ Female dentists' engagement in prosthodontics literature writing has not increased much in the United States during the last 13 years, according to a study. Furthermore, in the United States, female leadership in prosthodontics has been limited in the recent decade¹² Indian prosthodontics scenario also has a marked similarity to the United States manuscript writing and leadership in the specialty.

The southern Indian states such as Karnataka and Tamil Nādu followed by Maharashtra and Uttar Pradesh stand out as the maximum contributing states in the publications which being linked to the number of dental colleges in the state and their establishment year.⁹

Original research followed by case reports showed a greater number in total publications of article grouping as governing bodies and accreditation bodies assign a higher score for publications with original research.^{13,14} From 1998 to 2008, the number of authors per publication in the prosthodontic literature has continuously increased. In the prosthodontic literature, the tendency of globalization of authorship was noticeable.¹⁵

Each year, the *JIPS* is successful in attracting approximately 20% of article submissions from other nations. This development is gratifying in many ways because it signifies the utility and importance of obtaining viewpoints from other lands in ways that enhance the understanding of Indian prosthodontist educators and clinicians about common issues and challenges involving the preparation of a highly competent health workforce.⁴

The research is increasingly becoming internationally collaborative with scientific papers doubled in international collaborations in the last 20 years. These publications are more highly cited than single-authored publications. Foreign contributions to the *JIPS* help in understanding the direction of research globally. It is important to understand which topics attract the most interest of the scientific community and guide research into the existing gap areas. This emphasizes the increasing trend of collaborative national authorship and four or more authors to a study in the 2016–2020 time frame than the single author in the earlier time in this study.¹⁴

The analysis in this study revealed a greater number of *in vitro* experimental studies published. However, in the current scenario, a majority of the *in vitro* studies are taken for a chance and have a lesser impact on research advancement. This necessitates the review of standardization of *in vitro* study guidelines.¹⁶ Reasons for *in vitro* studies to sometimes serve as the better method are that *in vitro* studies (a) cut expenses; (b) monitor product performance more directly; and (c) provide ethical benefits. There is a strong need for the future development of pertinent *in vitro* assays because of the surprising lack of connection between *in vitro* and *in vivo* evaluations of biomaterials. The results obtained *in vitro* and *in vivo* did not significantly correlate with one another. The average *in vitro* scores showed a 58 percent correlation trend with the *in vivo* results. The shortcomings of the existing *in vitro* evaluations that are described here highlight the requirement for the creation of fresh methods for *in vitro* biomaterial testing and validated pre-clinical pipelines.¹⁷

An increasing number of articles on implants is in norm with the worldwide trend seen as this is the preferred form of treatment of tooth replacement and is undergoing development on regular basis. The declining trend in CD, RPD, and FPD is observed which is again with the normal trend seen in many other similar journals. Material and technology are almost similar in comparison as constant development is needed for the advancement of science. Improvement in material and technology will ultimately advance patient care services.^{18,19}

The majority of articles used the comparison between mean as a preferred statistical method in line with the higher number of *in vitro* experimental study designs in original research. Higher statistical methods such as multivariate analysis need to be utilized in research for robust statistics when needed.²⁰

The analysis shows a positive change in the trend with a greater number of systematic reviews than narrative reviews in the later 2016–2020-time frame. The trend of globalization of authorship was evident in the prosthodontic literature. However, there can be improvements in the statistical methods employed in the studies and the inclusion of diverse study designs in the original articles. There are limited studies showing registered clinical trials and funded trials. The limitation of this study is that it is purely a descriptive process and does not help in the identification of the underlying motives for the observed pattern.

Recommendations

The journal can focus on creating the highest level of evidence for researchers and clinicians by mainly promoting meta-analysis, systematic reviews, randomized control trials, and registered clinical trials; creating a balance between *in vivo* and *in vitro* studies; and encouraging the publication of intra- and extra-mural funded projects. Private practitioners can be encouraged to publish rare cases and unique treatment plans. Collaborations between authors through multicentric studies both nationally and internationally can influence the impact factor of the journal. The use of advanced methods of statistics in line with the objective of the study can improve the results and generalizability of studies.

CONCLUSION

This journal is the reflection of the national research in the field of prosthodontics and has a wide reach to the global audience. The analysis shows the overall progress of the journal, explains the characteristics of the authors involved in the research and highlights the types of research done, statistical methods used, and important areas of research and trends in research in prosthodontics at a national level. This insight will immensely benefit the prosthodontists to set the future direction of the journal, attract more citations and increase the impact factor of the journal.

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