

Assessing Knowledge, Attitudes, Practices and Perceived Barriers towards Research among Dental Interns, Chhattisgarh, India: A Cross-sectional Study

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ABSTRACT

Introduction: Research is fundamental to advancing dental science and evidence-based clinical practice. The rationale for the study is to address the lack of comparative evidence on research preparedness among interns in government and private dental colleges in Chhattisgarh.

Aim: To assess knowledge, attitudes, practices, and perceived barriers towards research among dental interns in government and private dental Colleges in Chhattisgarh, India.

Materials and Methods: A cross-sectional study was conducted under the Department of Public Health Dentistry, from March 2024 to April 2024 among dental interns from the Government Dental College, Raipur, Chhattisgarh, India, It also included three Private dental colleges-Rungta College of Dental Sciences and Research, Triveni Institute of Dental Sciences, Hospital and Research Centre, and Chhattisgarh Dental College and Research Institute (CDCRI), Raipur, Chhattisgarh, India, where the study was planned and executed. All interns posted during the study period were approached, and those who provided informed consent were included, resulting in a total sample of 113 participants. Data were collected using a

validated 24-item self-administered questionnaire (Cronbach's alpha=0.98) distributed electronically through Google Forms. Responses were analysed using Chi-square and Fisher's-Exact tests in Statistical Package for Social Science (SPSS) version 20.0, with a p-value <0.05 considered significant.

Results: Among 113 interns, a good level of self-rated understanding of research concepts was reported by 50 (58.1%) government interns and 15 (55.6%) private interns (p=0.980). Research being mandatory was supported by 78 (90.7%) government interns and 26 (96.3%) private interns. Challenges in conducting research were reported by 53 (61.6%) government interns and 13 (48.1%) private interns. Confidence in appraising research articles was noted by 53 (61.7%) government interns and 22 (81.5%) private interns, while 15 (55.6%) private interns and 28 (32.6%) government interns used online sources to stay updated (p=0.032).

Conclusion: Interns from both Institutions strongly supported integrating research into dental education; however, challenges such as limited confidence and resource gaps highlight the need for structured research training and mentorship to strengthen research competency.

Keywords: Clinical competence, Curriculum, Self-efficacy, Undergraduate

INTRODUCTION

The basis for increasing scientific understanding and knowledge is research. The French word "recherche," which means "to seek," is where the word "research" first appeared [1]. The rate of international research has rapidly increased throughout the last century. Every day in the 21st century, fresh discoveries are produced. Large volumes of information have become widely available to individuals since the internet's launch at the beginning of the new century, which has sparked a "paradigm shift" toward research-oriented and self-directed learning [2,3].

Research is the backbone of innovation and improvement in the medical and dental professions. It serves as the foundation for evidence-based practices that bridge the gap between theoretical knowledge and clinical application, ensuring that patient care is both effective and up-to-date. As emphasised by Colwell AR et al., medical education should integrate research with teaching and clinical practice, as new knowledge must be generated through inquiry before it can be taught and applied in patient care. This statement underscores the necessity of integrating research training into medical and dental education, fostering a culture of inquiry and continuous learning among healthcare professionals [4].

Globally, the integration of research into undergraduate dental education is increasingly recognised as vital. Dental schools worldwide have incorporated research methods courses into

their curricula to equip students with essential research skills and to nurture a research-oriented mindset. The aim is not only to produce competent clinicians but also to develop innovators and researchers who contribute to the expanding body of evidence in the dental field [5].

The approach to dentistry known as "evidence-based dentistry" combines clinical knowledge, patient preferences, and the best available scientific data to make treatment decisions. It has received more attention in recent years, prompting a call for the capacity to evaluate scientific material and conduct research critically. Therefore, a solid basis in research methodology should be provided during undergraduate dentistry education [6], inspiring students to conduct their research, present their findings at conferences, and publish their work [7].

Around the world, undergraduate research projects have become a mandatory part of the dental curriculum. For instance, Oklahoma University's College of Dentistry has been organising a scientific day for students since 1982 [5]. Similarly, the Students' Research Club at Istanbul University has completed nearly 200 research projects since its inception in 1992 [8]. In South Africa, the culture of research participation dates back to 1961, when a dentistry student published his first academic paper [9].

In India, the landscape of dental education has evolved to include a stronger emphasis on research. The Indian Council of Medical

Research (ICMR) introduced the Short-Term Studentship (STS) programme in 1979, aimed at promoting research interest among medical and dental undergraduates [10].

In India, research activities in dental colleges are gaining traction, with Institutions like Maulana Azad Institute of Dental Sciences in New Delhi setting a precedent for research excellence. However, variability in academic and research performance is evident across dental Institutions in India, including both government and private colleges, although differences in implementation remain insufficiently explored [11]. This disparity raises concerns about the uniformity of research culture across different types of Institutions, particularly in regions like Chhattisgarh, where both government and private dental colleges play a crucial role in shaping future dental professionals [12].

Many studies carried out in different nations have sought to evaluate health professionals and medical students' attitudes and understanding toward scientific research [12-16]. These studies have brought to light the obstacles between the theoretical comprehension of scientific research and its application in real-world settings. Major obstacles include a lack of mentorship opportunities, poor facilities and infrastructure, a lack of training in skills, and time and motivation limits [13]. Research on medical professionals' knowledge, attitudes, and barriers regarding evidence-based medicine and medical research, including physicians, specialists, pharmacists, nurses, and physiotherapists, has been carried out in Malaysia [14]. However, undergraduate medical and dentistry students are little informed about this subject.

Few studies in India have addressed the challenges and barriers dental students face in engaging with research. For instance, a study conducted in Karnataka highlighted the lack of research opportunities and inadequate mentorship as significant barriers for dental students [15]. Another study in Maharashtra revealed that while students recognised the importance of research, they felt unprepared to conduct it due to insufficient training. These findings reflect a broader issue within the Indian dental education system—a lack of standardised research training across institutions [16].

Chhattisgarh, a central Indian state, is home to a mix of government and private dental colleges. These Institutions are pivotal in training the region's future dental professionals, yet there is little published literature comparing the research efforts between these two types of colleges [17]. This gap in the literature is concerning, as understanding the differences in research culture and output between government and private colleges is crucial for developing strategies to enhance research training across the board [18,19].

The need for a study focusing on Chhattisgarh is further justified by the unique socio-economic and educational landscape of the state. With a diverse mix of government and private Institutions, understanding the differences in research efforts can provide insights into how to standardise and improve research training across the state. Moreover, such a study could serve as a model for other regions in India, where similar disparities may exist. In Chhattisgarh, the lack of published literature on this subject highlights the need for a comparative study between government and private dental colleges. Such research would not only fill a critical gap in the literature but also provide valuable insights for enhancing the research culture in dental education across India. Addressing these disparities will help ensure that dental graduates are well-equipped to contribute to advancing dental science and improving patient care outcomes [11,20-22]. Hence, the present study aimed to evaluate the knowledge, attitudes, practices, and perceived barriers towards research among dental interns in government and private dental colleges of Chhattisgarh. The specific objectives were to assess interns' attitudes toward incorporating research findings into clinical practice, evaluate their understanding of research concepts and principles, including research methodology and ethical considerations, compare research-related knowledge, attitudes,

and practices between government and private dental college interns, identify barriers encountered during research activities, and propose recommendations to strengthen research training and support in dental education based on the study findings.

The present study suggests the need for ongoing efforts to strengthen research education in dental colleges, including the development of a comprehensive research curriculum and the provision of mentorship and support for interns. Additionally, fostering collaborations between dental colleges and research Institutions could enhance access to resources and facilitate hands-on research experiences for interns.

MATERIALS AND METHODS

This was a cross-sectional questionnaire-based survey conducted under the Department of Public Health Dentistry, among dental interns from The Government Dental College, Raipur, Chhattisgarh, India, from March 2024 to April 2024. It also included three randomly selected private dental colleges three private dental colleges-Rungta College of Dental Sciences and Research, Triveni Institute of Dental Sciences, Hospital and Research Centre, and Chhattisgarh Dental College and Research Institute (CDCRI) in Raipur, Chhattisgarh, India. Ethical approval was obtained from the Institutional Ethical Committee of Government Dental College, Raipur, Chhattisgarh (Ref: S.No./1838/GDC/Scientific Committee/2024). The first page of the Google Form contained an informed consent statement, and only participants who selected "Agree and Continue" were able to proceed with the questionnaire. Participation was voluntary, anonymous, and without incentives.

Sample size calculation: There are six dental colleges in Chhattisgarh; one government and five private Institutions. The Government Dental College, Raipur, was included purposively due to its singular status in the state, while three Private dental colleges-Rungta College of Dental Sciences and Research, Triveni Institute of Dental Sciences, Hospital and Research Centre, and Chhattisgarh Dental College and Research Institute (CDCRI)- were selected using a lottery-based random sampling method to minimise selection bias; however, the low response rate among private college interns may limit the representativeness of the private dental colleges in the state.

The sample size comprised all interns who responded during the data collection period, totalling 113 participants (86 Government, 27 Private). This was a time-bound study, and no statistical formula was used for sample size calculation due to the complete enumeration of available willing participants.

Inclusion criteria: Dental interns who were currently undergoing compulsory rotatory internship in the selected colleges and who were willing to participate after completing the informed consent process were included in the study.

Exclusion criteria: Interns who declined participation or submitted incomplete or partially filled questionnaires were excluded from the study.

Study Procedure

Questionnaire: The questionnaire consisted of validated items adapted from previously published studies [5,23,24], with minor modifications made following a pilot test. The questionnaire was developed in English by Public Health Dentistry faculty with more than five years of academic and research experience. The preliminary version consisted of 30 items and underwent expert review for content relevance. A pilot test was conducted among 10 interns (excluded from final analysis), and modifications were made based on feedback, resulting in a final 24-item questionnaire. The internal consistency reliability was found to be high with a Cronbach's alpha value of 0.98, and the content validity index was calculated as 0.92. The questionnaire included three knowledge items, six attitude items, and eleven practice items, of which seven additionally

explored perceived barriers to research. Those seven items were assessed primarily using the first question of the practice section of the validated questionnaire, which directly enquired whether interns had faced challenges while conducting research in dentistry. In addition, related practice-based questions addressing formal research training, access to research literature, participation in data collection, collaboration with faculty or peers, and independent conduct of research were used to further contextualise the nature of these barriers. Overall, seven practice-related questions contributed to the assessment of barriers associated with training limitations, resource availability, mentorship, and research exposure. [Annexure 1] illustrates the questionnaire used in the study.

Self-rated understanding of research concepts was assessed using a single item in the attitude section of the questionnaire, wherein participants were asked to rate their overall understanding of research concepts. Responses were recorded on a four-point ordinal scale as Excellent, Good, Fair, or Poor. The scoring criteria were based on participants' subjective self-perception, with Excellent indicating a high level of confidence in understanding research concepts, Good indicating adequate understanding, Fair indicating limited understanding, and Poor indicating minimal understanding. No numerical or composite scoring system was applied, and responses were analysed as categorical variables.

STATISTICAL ANALYSIS

The statistical analysis was done using SPSS version 20.0. The collected data were tabulated, compiled, and further subjected to statistical analysis by using Pearson's Chi-square test, continuity correction test (Computed only for a 2 x 2 table), and Fisher's Exact test. The data were entered in a Microsoft Excel spreadsheet and were presented using frequencies and percentages without applying a composite scoring system, mean, and standard deviation as appropriate. A p<0.05 was considered statistically significant.

For selected questionnaire items assessing the frequency of research-related activities, response options were grouped into meaningful categories to facilitate analysis and comparison. The term "meaningful categories" refers to the logical grouping of response options that reflect similar levels of engagement or behaviour, rather than analysing each option separately. For example, for questions on frequency of research-related activities, responses such as "daily" and "weekly" were combined under the category "regular engagement," while "monthly," "rarely," and "never" were grouped as "infrequent engagement." This approach was applied consistently across similar questions to simplify analysis and improve the interpretability of results. The variable "staying updated with research" was analysed as a multi-category variable using the Chi-square test, and a single omnibus p-value was reported.

The structure of the questionnaire used in the study are represented in [Table/Fig-1].

Section	Purpose	Number of items	Examples of variables assessed
Demographic information	To collect background characteristics of interns	4	Age, gender, college type, area of residence
Knowledge	To assess awareness of research concepts and processes	3	Research methodology, ethical approval, sources of research updates
Attitude	To evaluate perceptions and views regarding research in dental education and practice	6	Importance of research, confidence in critical appraisal, integration of research into curriculum

Research practice and perceived barriers	To assess involvement and experience in research-related activities	4	Literature review, data collection, research presentations, publications
	To identify challenges and obstacles faced while conducting research	7	Lack of formal research training, difficulty in conducting research, limited access to research literature, inadequate mentorship/collaboration, time constraints, difficulty in independent research conduct, limited engagement with peer-reviewed journals

[Table/Fig-1]: Structure of the questionnaire used in the study.

RESULTS

A total of 113 dental interns from government and private dental colleges in Chhattisgarh participated in the study. The response rate varied considerably between Institutions. The government college recorded a response rate of 95.5% (86 responses from 90 interns), whereas the three private colleges collectively recorded a response rate of 9% (27 responses from 300 interns, with each college having 100 interns). The demographic distribution of respondents is summarised in [Table/Fig-2].

Variables	Category	Government n (%)	Private n (%)	Total n (%)
Gender	Male	22 (25.6)	10 (37.0)	32 (28.3)
	Female	64 (74.4)	17 (63.0)	81 (71.7)
Age (in years)	20-25	61 (70.9)	16 (59.3)	77 (68.1)
	>25	25 (29.1)	11 (40.7)	36 (31.9)
Area of residence	Rural	9 (10.5)	2 (7.4)	11 (9.7)
	Semi-urban	13 (15.1)	9 (33.3)	22 (19.5)
	Urban	64 (74.4)	16 (59.3)	80 (70.8)

[Table/Fig-2]: Demographic characteristics among dental students (N=113).

The self-rated understanding of research concepts among the participants are shown in [Table/Fig-3]. Comparison between government and private dental college interns was performed using the Chi-square test. The majority reported a good level of understanding, with 50 (58.1%) from government and 15 (55.6%) from private colleges. An excellent level was reported by 15 (17.4%) government and 5 (18.5%) private interns, while 15 (17.4%) and 5 (18.5%) rated their understanding as fair. A smaller proportion reported a poor understanding, with 6 (7.0%) government and 2 (7.4%) private interns. No statistically significant difference was found between the groups (p=0.980).

Level of understanding	Government n (%)	Private n (%)	Total n (%)	p-value
Excellent	15 (17.4)	5 (18.5)	20 (17.7)	0.980
Good	50 (58.1)	15 (55.6)	65 (57.5)	
Fair	15 (17.4)	5 (18.5)	20 (17.7)	
Poor	6 (7.0)	2 (7.4)	8 (7.1)	

[Table/Fig-3]: Distribution of self-rated understanding of research concepts among government and private dental interns. Chi-square test applied: $\chi^2=0.056$

The detailed responses regarding knowledge, attitudes, practices, and perceived barriers toward research, with barriers assessed through practice-related questions addressing difficulties faced during research activities, are presented in [Table/Fig-4]. A significantly high proportion of interns expressed a positive attitude toward integrating research in dental education, with 78 (90.7%) interns from government colleges and 26 (96.3%) interns from private colleges agreeing that research should be a mandatory component. Regarding research exposure, 39 (45.3%) government interns and 12 (44.4%) private interns had conducted a literature review, while 33 (38.4%) government interns reported independently

Domain	Question	Response category	Government n (%)	Private n (%)	p-value	χ ² /Fisher-value
Knowledge	Staying updated with research	Conferences/Seminars	18 (20.9)	3 (11.1)	0.187	4.80
		Reading journals	24 (27.9)	5 (18.5)		
		Online forums/websites	28 (32.6)	15 (55.6)		
		Other (Peers/Faculty etc.,)	16 (18.6)	4 (14.8)		
	Aware of research methodologies	Yes	66 (76.7)	21 (77.8)	0.912	0.012
		No	20 (23.3)	6 (22.2)		
Familiar with ethical approval	Yes	61 (70.9)	20 (74.1)	0.764	0.100	
	No	25 (29.1)	7 (25.9)			
Attitude	Understanding of research	Excellent	15 (17.4)	5 (18.5)	0.980	0.056
		Good	50 (58.1)	15 (55.6)		
		Fair	15 (17.4)	5 (18.5)		
		Poor	6 (7.0)	2 (7.4)		
	Research important	Yes	85 (98.8)	25 (92.6)	0.078	Fisher=0.078
		No	1 (1.2)	2 (7.4)		
	Research mandatory	Yes	78 (90.7)	26 (96.3)	0.350	0.873
		No	8 (9.3)	1 (3.7)		
	Incorporating research improves outcomes	Yes	75 (87.2)	24 (88.9)	0.845	0.038
	Confidence appraising articles	Very confident	12 (14.0)	5 (18.5)	0.573	2.111
		Somewhat confident	41 (47.7)	17 (63.0)		
		Not very confident	23 (26.7)	3 (11.1)		
		Not at all confident	10 (11.6)	2 (7.4)		
	Research improves dental practice	Strongly agree	35 (40.7)	14 (51.9)	0.532	2.203
		Agree	44 (51.2)	10 (37.0)		
		Neutral	6 (7.0)	3 (11.1)		
Disagree		1 (1.2)	0 (0.0)			
Research practice and perceived barriers	Faced challenges in research	Yes	53 (61.6)	13 (48.1)	0.060	3.515
		No	33 (38.4)	14 (51.9)		
	Conducted literature review	Yes	39 (45.3)	12 (44.4)	0.934	0.007
		No	47 (54.7)	15 (55.6)		
	Access research literature	Daily	6 (7.0)	2 (7.4)	0.741	2.060
		Weekly	20 (23.3)	3 (11.1)		
		Monthly	22 (25.6)	5 (18.5)		
		Rarely	28 (32.6)	12 (44.4)		
		Never	10 (11.6)	5 (18.5)		
	Received methodology training	Yes	33 (38.4)	12 (44.4)	0.574	0.315
		No	53 (61.6)	15 (55.6)		
	Participated in data collection	Yes	44 (51.2)	16 (59.3)	0.462	0.542
		No	42 (48.8)	11 (40.7)		
	Read peer-reviewed journals	Daily	5 (5.8)	2 (7.4)	0.642	2.483
		Weekly	17 (19.8)	6 (22.2)		
		Monthly	22 (25.6)	8 (29.6)		
		Rarely	32 (37.2)	8 (29.6)		
		Never	10 (11.6)	3 (11.1)		
	Presented research	Yes	39 (45.3)	7 (25.9)	0.073	3.215
		No	47 (54.7)	20 (74.1)		
	Research collaboration	Frequently	16 (18.6)	4 (14.8)	0.654	0.383
		Occasionally	27 (31.4)	8 (29.6)		
		Rarely	30 (34.9)	11 (40.7)		
		Never	13 (15.1)	4 (14.8)		
	Publication experience	Yes	10 (11.6)	3 (11.1)	0.955	Fisher=1.000
		No	76 (88.4)	24 (88.9)		
	Conducted research independently	Yes	33 (38.4)	3 (11.1)	0.008	7.034
		No	53 (61.6)	24 (88.9)		
Likelihood to pursue research	Very likely	35 (40.7)	12 (44.4)	0.168	1.306	
	Likely	42 (48.8)	14 (51.9)			
	Unlikely	7 (8.1)	1 (3.7)			
	Very unlikely	2 (2.3)	0 (0.0)			

[Table/Fig-4]: Knowledge, attitudes, practice and perceived barriers toward research and previous research experience among dental students. p-values are based on Chi-square test;/Fisher's-Exact Test , p<0.05 considered statistically significant.

conducting a research project compared to only 3 (11.1%) private interns, showing a significant difference ($p=0.008$). Challenges during research were reported by 53 (61.6%) government interns and 13 (48.1%) private interns, indicating variation in perceived research-related challenges between the groups.

The selected practice-related research activities among dental interns, focusing on the frequency of accessing research literature, reading peer-reviewed journals, collaboration with peers or faculty members, and willingness to pursue future research activities are summarised in [Table/Fig-5]. These practice indicators were highlighted to provide a focused understanding of interns' engagement and inclination toward research. For practice-related questions with multiple response options, responses were dichotomised for analysis. Participants selecting "Daily," "Weekly," or "Monthly" were categorised as having regular engagement, while those selecting "Rarely" or "Never" were categorised as having infrequent engagement. The values presented for government and private interns represent the number and percentage of participants reporting regular engagement in the respective practice activities. The values presented represent the number and percentage of interns reporting regular engagement in the respective practices. No statistically significant differences were observed between government and private dental college interns across the assessed practice variables ($p>0.05$).

Practice question	Government n (%)	Private n (%)	p-value	χ^2 /Fisher-value
How often do you access research literature?	26 (30.2)	5 (18.5)	0.182	2.060
How frequently do you read peer-reviewed journals?	22 (25.6)	8 (29.6)	0.532	0.393
How often do you collaborate with other students or faculty members?	43 (50.0)	12 (44.4)	0.655	0.200
How likely are you to pursue further research activities in the future?	77 (89.5)	26 (96.3)	0.168	1.915

[Table/Fig-5]: Participants' opinions regarding practice of research. p-values are based on Chi-square test/Fisher's-Exact Test. $p<0.05$ considered statistically significant

Interns' opinions regarding the contribution of research to the improvement of dental practice are presented in [Table/Fig-6]. This table highlights participants' perceptions of the role of research in enhancing clinical practice and supports the assessment of attitudes toward evidence-based dentistry. A majority either agreed or strongly agreed, with 79 (91.9%) government interns and 24 (88.9%) private interns acknowledging that research advances clinical practice standards.

Response category	Government n (%)	Private n (%)	Total n (%)
Strongly agree	35 (40.7%)	14 (51.9%)	49 (43.4%)
Agree	44 (51.2%)	10 (37.0%)	54 (47.8%)
Neutral	6 (7.0%)	3 (11.1%)	9 (8.0%)
Disagree	1 (1.2%)	0	1 (0.8%)
Strongly disagree	0	0	0

[Table/Fig-6]: Participants' opinions regarding the contribution of research in the improvement of dental practice. Chi-square test applied ($\chi^2=2.203$, $p=0.532$).

Participants' knowledge regarding research methodologies and ethical approval processes are depicted in [Table/Fig-7]. These variables were presented to assess interns' awareness of essential research requirements and their preparedness to undertake ethical and methodologically sound research. Awareness of research methods was reported by 66 (76.7%) government interns and

Knowledge questions	Response	Government n (%)	Private n (%)
Familiar with the process of ethical approval	Yes	61 (70.9)	20 (74.1)
	No	25 (29.1)	7 (25.9)
Awareness of various research methodologies	Yes	66 (76.7)	21 (77.8)
	No	20 (23.3)	6 (22.2)

[Table/Fig-7]: Participants' knowledge regarding research methods. Chi-square test applied (Ethical approval: $\chi^2=0.100$, $p=0.764$; Research methodologies: $\chi^2=0.012$, $p=0.912$)

21 (77.8%) private interns, while familiarity with ethical approval procedures was acknowledged by 61 (70.9%) government interns and 20 (74.1%) private interns, demonstrating relatively similar knowledge levels across both settings.

DISCUSSION

The present cross-sectional study assessed the knowledge, attitude, and research-related practices among dental interns in Chhattisgarh and compared these findings with previously published literature. The study found that although more than half of the participants from both government (61.6%) and private colleges (55.6%) reported not receiving formal research methodology training, the difference was not statistically significant. This finding aligns with the observations of Pallamparthi S and Basavareddy A who also emphasised that inadequate exposure to structured research training continues to remain a concern among undergraduate health professional students [7]. The absence of structured learning may impact interns' capability to plan and execute research independently, which was reflected in the present study, where only 38.4% of government interns and 11.1% of private interns reported independently conducting research.

A notable finding of the present study was that 61.6% of government interns and 48.1% of private interns reported facing challenges during research activities, which is lower than the 74% reported by Pawar DB et al., among resident doctors [21] and the 68-75% barrier prevalence reported in studies by Pallamparthi S and Basavareddy A and Al-Shalawy FA and Haleem A among undergraduate medical students [7,25]. This comparatively lower prevalence may reflect differences in study settings, participants' characteristics, or Institutional research exposure and access to digital resources. However, the continued presence of barriers such as lack of structured mentorship, limited time, difficulties in data analysis, and procedural challenges related to ethical approval mirrors findings from Kumar J et al., Memarpour M et al., and Siemens DR et al., indicating that these constraints remain common across health professional education settings [26-28].

Support for the inclusion of research in the undergraduate curriculum was markedly high in the present study, with 92.0% of interns favouring research as a mandatory curricular component. This proportion exceeds the 76% reported by Pawar DB et al., [21] and 60% strong agreement reported by Pallamparthi S and Basavareddy A [7]. Similar positive attitudes have been documented internationally, including among South African dental students by Grossman ES and Naidoo S [9], Iranian dental students by Memarpour M et al., [27], and Malaysian medical students by Al-Kubaisi NJ et al., all of whom emphasised the role of research training in strengthening analytical thinking and clinical reasoning [29]. These comparisons indicate a growing global consensus on the importance of early research exposure in dental and medical education.

Interest in future research engagement was also assessed, and a higher proportion of interns in the present study reported willingness to pursue research activities compared with observations in previous studies. Studies by Khan SQ et al., Siemens DR et al., and AlGhamdi KM et al. have reported generally positive attitudes toward research and notable involvement in research activities among medical and dental students in their respective contexts,

underscoring approaches to improving research engagement in health professional education [5,28,30]. This upward trend may be attributed to increased awareness of research as a pathway for academic progression, specialisation, and evidence-based clinical practice. Studies conducted in Saudi Arabia and the United Kingdom similarly reported that early exposure to research during undergraduate training positively influenced students' long-term academic aspirations [29].

With respect to research knowledge, the present study demonstrated an overall awareness of research methodologies of 77% among interns, which is higher than the 70% knowledge score reported by Pallamparthy S and Basavareddy A [7] and comparable to findings by Khan SQ et al., and Al-Kubaisi NJ et al., who reported moderate-to-good research knowledge among senior students [5,29]. Awareness of ethical approval procedures was also relatively high and comparable between government (70.9%) and private (74.1%) interns, consistent with observations by Memarpour M et al., and Siemens DR et al., suggesting improved emphasis on research ethics in recent curricula [27,28]. Furthermore, the significantly higher reliance on online research forums and websites among private college interns (55.6%) aligns with studies by Khan SQ et al., and Alghamdi KM et al., reflecting the increasing role of digital platforms in academic learning, particularly in the post-Coronavirus Disease 2019 (COVID-19) period [5,30].

Overall, the comparative analysis indicates a positive shift toward enhanced research awareness, favourable attitudes, and increased research engagement among dental interns in Chhattisgarh when compared with earlier national and international studies. Despite these improvements, persistent practical barriers highlight the need for structured research methodology training, strengthened mentorship frameworks, protected research time, and Institutional research support systems. Addressing these gaps may facilitate the development of research-oriented dental professionals capable of delivering evidence-based care and contributing meaningfully to clinical research and public health advancement.

The findings highlight the growing inclination of dental interns toward evidence-based dentistry, which directly influences clinical decision-making, patient outcomes, and diagnostic accuracy. Strengthening research training can improve critical appraisal skills, enabling clinicians to update their treatment decisions based on emerging evidence rather than traditional experience alone. Enhanced research literacy also supports participation in public health initiatives and policy-based dental interventions.

To further strengthen the positive trend observed in the present study, dental Institutions should integrate structured modules on research methodology and biostatistics early in the undergraduate curriculum and enhance mentorship support to assist students in research execution, scientific writing, and publication. Establishing collaborations with national research bodies would enable access to research training, funding opportunities, and internships, while the incorporation of simulation-based digital platforms could improve understanding of research design and data analysis. Additionally, the development of a unified state-level research support cell for dental colleges in Chhattisgarh may help streamline ethical approval processes, minimise administrative barriers, and promote multi-institutional collaborative research. Longitudinal studies are recommended to assess the long-term impact of early research exposure on career choices, academic engagement, and evidence-based clinical practice among dental graduates.

Limitation(s)

Despite the valuable insights gained from this study, several limitations should be acknowledged. Firstly, the assessment of participants' understanding of research concepts was based solely on self-

rated, subjective responses rather than an objective or standardised measurement tool. As no validated scale or numerical scoring system was used, the findings may reflect personal perception rather than actual competence in research methodology. Secondly, the study relied on self-reported data, which may be subject to recall bias or social desirability bias, potentially influencing participants' responses. Thirdly, the sample was restricted to dental interns from colleges in Chhattisgarh, which may limit the generalisability of the findings to other regions or Institutional settings. A key limitation of the present study is the markedly low response rate from private colleges (9%) compared to government Institutions, resulting in an imbalanced sample (86 government vs 27 private participants). This disparity raises the possibility of non response bias, as the private college respondents may not be representative of the broader private sector. Consequently, comparisons between government and private Institutions should be interpreted with caution, and the generalisability of findings, particularly for private colleges, may be limited. Additionally, the use of an online survey may have excluded interns with limited or no internet access, thereby, introducing potential selection bias.

CONCLUSION(S)

The present study underscores the importance of integrating research training into dental education, with a high level of agreement among interns and strong support for its inclusion in the curriculum. These findings highlight the potential for enhancing research culture and preparing future dental professionals to contribute effectively to the advancement of the field. Future studies should consider using validated assessment tools, incorporating objective measures of research knowledge, and including a broader, multi-state sample to strengthen the reliability and applicability of the findings.

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