

## Knowledge and Attitude of Dental Undergraduate students of Deemed University, Navi Mumbai towards Research: A cross-sectional study

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### KEYWORDS

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### ABSTRACT

**Introduction:** Research plays a critical role in advancing healthcare systems and improving clinical outcomes. While undergraduate dental education focuses primarily on clinical and academic skills, there is limited emphasis on research training. The present study aims to evaluate the knowledge and attitude of dental undergraduate students at a Deemed University in Navi Mumbai towards research.

**Materials and Methods:** A cross-sectional study was conducted at a dental college in Navi Mumbai using a validated, self-administered questionnaire consisting of 14 closed-ended questions related to knowledge and attitude towards research. The questionnaire was distributed to 456 students, of whom 363 completed it (response rate: 78.4%). Statistical analysis was performed using the Chi-square test to assess year-wise and gender-wise differences.

**Results:** A statistically significant difference in knowledge was observed across academic years, with interns demonstrating the highest awareness. Knowledge of research protocols, ethics, and clinical trial registries improved progressively with academic advancement. Gender-wise comparison showed no significant differences in knowledge but revealed significant differences in attitude regarding the role of research in knowledge construction, subject understanding, and research publication. Most participants (65.6%) preferred to start research projects during their undergraduate years.

**Conclusion:** While the knowledge of students related to research improves with academic progression, gaps in early-year exposure remain. Structured research training, mentorship, and integration of research into the curriculum can foster a research-oriented mindset and enhance student participation.

### Introduction:

The undergraduate course in dentistry aims to achieve academic, clinical, and interpersonal skills within a timeframe of five years through a pre-determined didactic curriculum. In the Indian undergraduate dentistry course (BDS), the four academic years are followed by one year of internship before the students obtain their bachelor's degree [1]. The measurement of academic success is not only restricted to the scores obtained in the examinations but extends to excelling in scientific research and accolades [2]. The field of dentistry benefits vastly through continuous research that aims to develop new devices or techniques seeking to improve treatment outcomes, patient satisfaction, and the convenience of dental professionals. To this effect, recent emphasis in the Indian dental education system has been laid on promoting innovations and novel scientific research [3].

Undergraduate research refers to any teaching-learning or scientific activity wherein students seek solutions to existing problems or improvements in the existing methods/armamentarium in their respective discipline [4]. It has been observed that students in research-promoting institutes develop more interest in scientific research which broadens their mental capabilities and career avenues [4,5]. The goal is to not only increasing the number of research projects and publications but also provide them with an updated knowledge of the scientific principles essential for conducting different types of research. Students in the medical field should be especially mindful of the correctness of the scientific methods in the present-day scenario where research projects are booming in numbers. The findings of their research will dictate changes in the diagnosis, treatment, and prognosis of the ailments which has a direct impact on the health of the population and also the healthcare policies [5-7].

It is, thus, of importance to gauge the levels of understanding of the students belonging to various disciplines of medicine. This would guide institutions to develop optimal plans to work on the identified gaps in knowledge and identify the factors that motivate the students toward performing research. It is equally important to identify barriers that deter undergraduate research such as lack of resources or finding a mentor [8,9].

In this context, the present study was conducted to evaluate quantitatively the knowledge and attitude of undergraduate students in a dental institution of Navi Mumbai toward scientific research.

### **Materials and Method:**

The present cross-sectional study was conducted in a dental college of Deemed University in Navi Mumbai in accordance with the modified declaration of Helsinki. Permission to conduct the present study was obtained from the concerned institutional authority after explaining the aim and objectives. The study was conducted over a period of one month in July 2024. The participants for the study were recruited from the students enrolled in the undergraduate course of dentistry by convenience sampling.

A self-constructed structured questionnaire with 15 closed-ended questions pertaining to knowledge (6 questions) and attitude (9 questions) about research was prepared. The internal reliability of the questionnaire was validated by providing a print to five experts across various disciplines of dentistry. The questionnaire was modified according to the received suggestions regarding the order of questions, phrasing, redundancy, irrelevance, and repetition. The modified questionnaire was then pilot-tested on a homogenous population of 35 students for external validation. The pilot yielded a Cronbach's alpha value of 0.82 indicative of a good validity of the questionnaire. The students involved in the pilot process were excluded from the final study.

The target population comprised 456 students enrolled in the dental undergraduate program at the institution. The participants were ensured that their identity would remain confidential and informed consent was obtained from each participant before enrolling them in the study. The questionnaire was directly provided to the students during their respective lectures. The list of students absent on the day of data collection was prepared and the students were contacted by telephone about when they would be attending the institution next. They were then provided with the questionnaire on that day. Participants with incomplete responses were excluded from the study. Out of the 456 students, n=363 responded thereby marking a 78.4% response rate of the survey.

The collected data was tabulated into an MS Excel datasheet and subjected to statistical analysis using Statistical Package for Social Sciences v22. The frequency of responses was obtained as numbers and percentages. Normality means Inter-group comparisons between students of different academic years and genders respectively were performed using the Chi-square test.

### Results:

The final study population of n=363 participants comprised first-year (n=58), second-year (n=87), third-year (n=77), fourth-year (n=84), and interns (n=57). The age of the study population was ranged from 18 to 27 years (mean: 20.92±1.61) comprising n=76 males (mean age: 20.87±1.82) and n=287 females (mean age: 20.96±1.54).

A statistically significant difference was observed across the responses received for questions pertaining to knowledge about research between students studying in different years of the course wherein interns In the present study, it was seen that, in all questions, knowledge-wise, there was a statistically significant difference between all participants on comparing study year-wise. [Table 1] Regarding attitude-related questions, there a was statistically significant difference was seen when asking whether there would be an extra burden if research was added to the curriculum, if they attended any research methodology workshop, and also if they have done any research and published it. [Table 2]

Table 1: Year-wise (Study) comparison between participants (Knowledge)

Questions							
	Studying In	I Year	II Year	III Year	IV Year	Internship	P value
1	Do you know how to conduct research?						
	Yes	9	17	25	26	45	0.000*
	No	49	70	52	58	12	
	Chi-square value	27.59	32.29	9.47	12.19	19.11	
	p-value	0.000**	0.000**	0.0021*	0.000**	0.000**	
2	Do you know how to make a research protocol?						
	Yes	3	13	11	29	37	0.00*
	No	55	74	66	55	20	
	Chi-square value	46.62	42.77	39.29	8.05	5.07	
	p-value	0.000**	0.000**	0.000**	0.004*	0.024*	
3	Have you ever heard about research ethics & plagiarism?						
	Yes	31	40	47	58	50	0.00*
	No	27	47	30	26	7	
	Chi-square value	0.28	0.56	3.75	12.19	32.44	
	p-value	0.599	0.453	0.0527	0.0005**	0.000**	
4	Do you have an idea about CTRI- Clinical Trial Registry of India						
	Yes	02	16	11	21	35	0.00*
	No	56	71	64	63	22	
	Chi-square value	50.28	34.77	37.45	21.00	2.96	
	p-value	0.000**	0.000**	0.000**	0.000**	0.085	
5	Do you have an idea about research bias?						
	Yes	20	17	12	29	35	0.00*
	No	38	70	65	55	22	
	Chi-square value	5.59	32.29	36.48	8.05	2.96	
	p-value	0.0018*	0.000**	0.000**	0.0045*	0.085	
6	Have you ever heard about ICMR- Indian Council Of Medical Research?						
	Yes	34	51	53	61	45	0.04*
	No	24	36	24	23	12	
	Chi-square value	1.72	2.59	10.92	17.19	19.11	
	p-value	0.18	0.10	0.000**	0.000**	0.000**	

Table 2: Year-wise (Study) comparison between participants (Attitude)

Questions							
	Studying In	I Year	II Year	III Year	IV Year	Internship	P value
1	Do you think research is important?						
	Yes	54	79	65	72	50	0.48
	No	4	8	12	12	7	
	Chi-square value	43.1	57.94	36.48	42.86	32.44	
	p-value	0.000**	0.000**	0.000**	0.000**	0.000**	
2	Do you think at least one research project & scientific paper writing and publishing to be added mandatorily in BDS curriculum?						
	Agree	36	59	49	56	37	0.07
	Disagree	5	8	12	17	13	
	Neither Agree Nor Disagree	17	20	16	11	7	
	Chi-square value	25.28	49.03	32.13	42.64	26.53	
	p-value	0.000**	0.000**	0.000**	0.000**	0.000**	
3	Do you agree that research is knowledge construction process						
	Agree	51	71	66	76	43	0.07
	Disagree	1	3	7	3	6	
	Neither Agree Nor Disagree	6	13	4	5	8	
	Chi-square value	78.45	92.97	95.25	123.50	45.58	
	p-value	0.000**	0.000**	0.000**	0.000**	0.000**	
4	Do you think research will help in better understanding of subject						
	Agree	51	71	65	63	43	0.10
	Disagree	1	2	7	9	4	
	Neither Agree Nor Disagree	6	14	5	12	10	
	Chi-square value	78.45	93.72	90.49	65.79	46.42	
	p-value	0.000**	0.000**	0.000**	0.000**	0.000**	
5	Do you think research will be an extra burden to existing curriculum if added?						
	Agree	15	18	30	36	38	0.00*
	Disagree	20	29	31	24	10	
	Neither Agree Nor Disagree	23	40	16	24	9	
	Chi-square value	1.69	8.34	5.48	3.43	28.53	
	p-value	0.429	0.015*	0.006*	0.18	0.000**	
6	Do you think separate mentor/guide should be assigned per year to motivate students for research						
	Agree	38	65	58	67	45	0.08
	Disagree	3	4	10	5	5	
	Neither Agree Nor Disagree	17	18	9	12	7	
	Chi-square value	32.10	70.41	61.12	82.36	53.47	
	p-value	0.000**	0.000**	0.000**	0.000**	0.000**	
7	Have you done any research and published it?						
	Yes	01	10	15	18	34	0.00*
	No	57	77	62	66	23	
	Chi-square value	54.07	51.6	28.69	27.43	2.12	

	p-value	0.000**	0.000**	0.000**	0.000**	0.145	
8	Have you ever attended any research methodology workshop?						
	Yes	08	33	23	20	37	0.00*
	No	50	54	54	64	20	
	Chi-square value	30.41	5.07	12.48	23.05	5.07	
	p-value	0.000**	0.024	0.0004	0.000**	0.0243	

In majority of questions related to knowledge and attitude about research, the "Yes" responses were significantly higher among interns, indicating that knowledge about conducting research improves with academic progression. The "Yes" responses were lowest among first-year students, suggesting a lack of early exposure to research training. The trend in "No" responses follows the inverse pattern, with first-year students showing the highest percentage of "No" responses, and interns showing the lowest, reinforcing the idea that knowledge about research improves as students advance academically.

The gender-wise comparison showed statistically no significant difference for all questions of knowledge. [Table 3] The gender-wise comparison showed statistically significant differences for attitude questions like, and research is the knowledge construction process, research will help in better understanding of the subject, also if they have done any research and published it. [Table 4] Table 5 shows the willingness of the participants to start with their research projects. About 65.6% of participants exhibited a positive willingness to conduct a research project during their undergraduate course.

Table 3: Gender-wise comparison between participants (Knowledge)

Questions		Males	Females	P value
1	Do you know how to conduct a Research?			
	Yes	25	97	0.49
	No	51	190	
2	Do you know how to make a research protocol?			
	Yes	20	73	0.49
	No	56	214	
3	Have you ever heard about research ethics & plagiarism?			
	Yes	41	185	0.06
	No	35	102	
4	Do you have an idea about CTRI- Clinical Trial Registry-India			
	Yes	21	64	0.20
	No	55	223	
5	Do you have an idea about research bias?			
	Yes	24	89	0.51
	No	52	198	
6	Have you ever heard about ICMR- Indian Council Of Medical Research?			
	Yes	45	199	0.06
	No	31	88	

Table 4: Gender-wise comparison between participants (Attitude)

Questions		Males	Females	P value
1	Do you think research is important?			
	Yes	63	257	0.08
	No	13	30	

2	Do you think at least one research project & scientific paper writing and publishing to be added mandatorily in BDS curriculum			
	Agree	46	191	0.57
	Disagree	14	41	
	Neither Agree Nor Disagree	16	55	
3	Do you agree that research is knowledge construction process			
	Agree	54	253	0.00*
	Disagree	8	12	
	Neither Agree Nor Disagree	14	22	
4	Do you think research will help in better understanding of subject			
	Agree	59	243	0.00*
	Disagree	9	14	
	Neither Agree Nor Disagree	17	30	
5	Do you think research will be an extra burden to existing curriculum if added?			
	Agree	29	108	0.97
	Disagree	23	91	
	Neither Agree Nor Disagree	24	88	
6	Do you think separate mentor/guide should be assigned per year to motivate students for research			
	Agree	54	219	0.62
	Disagree	7	20	
	Neither Agree Nor Disagree	15	48	
7	Have you done any research and published it?			
	Yes	22	56	0.05*
	No	54	231	
8	Have you ever attended any research methodology workshop?			
	Yes	29	92	0.19
	No	47	195	

Table 5: Participants response as to ‘When do you want to start your research project?’

Options given	Response in % (n)
During UG Academics	65.6 (238)
During PG Academics	17.4 (63)
After internship	14.0 (51)
Never	3.0 (11)

### Discussion:

The objective of the present study was to gauge the orientation of dental undergraduate students toward research. The findings of the present study reveal significant insights into the knowledge and attitudes of dental undergraduate students in Navi Mumbai towards research. A year-wise comparison demonstrated a progressive increase in knowledge as students advanced through their academic years, with interns exhibiting the highest levels of awareness regarding various aspects of research, such as conducting research, formulating protocols, understanding research ethics, and awareness of research registries like CTRI. This upward trend aligns with studies such as those conducted by Hasan MJ et al. (2025) [10] and Hegde A et al. (2017) [11], which reported improved knowledge and attitudes among senior students due to increased exposure to research opportunities and academic encouragement from faculty. The higher awareness among interns suggests that practical exposure during clinical training enhances their understanding. However, this also highlights that there is a need for earlier

clinical exposure and training earlier in the curriculum. In this way, the students will have more time to conduct quality research and the quality will further increase with their experience until they complete their course.

While most knowledge-related parameters showed statistically significant improvement with academic progression, the results also highlighted gaps in early-year students' understanding of key research concepts. For instance, first-year students demonstrated the least awareness of research bias, plagiarism, and ICMR. This indicates the necessity for structured integration of basic research principles into the initial years of the BDS curriculum. Comparatively, studies like those conducted by Habib SR et al. (2018), and Goli S et al. (2020) emphasized that insufficient training and lack of exposure are critical barriers to student involvement in research, which can be addressed through dedicated research methodology workshops and early mentorship [12,13].

Interestingly, gender-wise comparisons revealed no statistically significant differences in knowledge-related responses, suggesting that barriers to research participation may be universal across genders. However, attitude-related questions showed significant differences, particularly regarding the perception of research as a process for knowledge construction, its role in better understanding subjects, and the likelihood of having published research. These findings resonate with those of Naz M (2024) [14], who reported that while dental students generally acknowledge the importance of research, active participation and publishing remain limited. The majority of the study population being females in the present study is representative of the higher proportion of females in dental colleges in India. A similar proportion was reported across medical students of Bangladesh by Hasan et al. (2025) [10]. Addressing gender-specific motivational factors and barriers could help improve research engagement among all students.

One of the notable findings was the statistically significant response to questions about research being an additional burden if integrated into the curriculum. A significant number of students viewed research as a potential extra workload, particularly during the already demanding academic schedule of BDS. This aligns with observations by Olievera CC et al. [15], who emphasized the importance of creating a positive learning environment and intrinsic motivation to balance academic progress with research engagement. Encouraging teamwork and creating small-group research projects could help alleviate this perception, as suggested by a study conducted in Sudan [16], where collaborative research activities were preferred and resulted in better engagement.

The 'ideal' academic environment can be defined as one that effectively prepares students for their future careers while fostering their personal development, psychosocial health, and overall well-being. Various factors significantly impact how students perceive and experience their education. These range from 'class size', 'leisure time,' and 'assessment procedures' to 'relations with peers and faculty', 'ethical climate', and 'extra-curricular opportunities' [17]. Research becomes more motivating when conducted in small groups, as it allows participants to share their thoughts and ideas and explore different perspectives together. A study done in Sudan had similar findings and suggested that research is preferred in teams [16].

The attitude-related differences across academic years further highlight the role of faculty mentorship and institutional support. Students who had attended research methodology workshops or participated in research projects reported a more positive attitude towards research. This finding underscores the importance of hands-on experiences and guided learning opportunities. Faculty-led research initiatives, where students are involved as co-investigators, can serve as a stepping stone to inculcate interest in research among students. The faculty can readily clear their doubts throughout the research project which significantly improves the confidence of the students. research interest and building confidence, as suggested by Habib SR et al. (2018) [12].

The present study also highlighted a concerning trend that while students acknowledged the importance of research, only a small percentage had actively conducted or published research. This finding is consistent with prior research, which has noted that institutional barriers, such as lack of funding, time constraints, and mentorship, hinder active student participation in research activities. To bridge this gap, institutions need to create a research-friendly environment, allocate specific time slots for research in the curriculum, and provide financial and logistical support to students.

Another critical finding was the preference of most students (65.6%) to start their research projects during their undergraduate years. This is a promising indicator that students are willing to engage in research activities if provided with the right opportunities and support. The inclusion of mandatory research projects, as suggested by Naz M (2024) [14], and creating a structured undergraduate research program could further capitalize on this willingness. Additionally, programs that reward research achievements through academic credits or recognitions could serve as significant motivators.

The present cross-sectional study has certain methodological strengths and limitations. The high response rate of the survey can be attributed to the physical method of collecting data by questionnaires in a regular setting of the students. In a cross-sectional study, data collection was carried out at one-time point, and there was no follow-up. So, further studies on a larger sample size are recommended. Additionally, the research was conducted in a single institution. Assessing the knowledge and attitude of students exposed to different institutional environments and geographical regions would provide a more comprehensive information.

Overall, while the findings of this study indicate a gradual improvement in knowledge and attitude towards research with academic progression, they also highlight significant gaps in the early years of dental education. The reluctance to engage in research, primarily due to perceived workload and lack of training, underscores the need for institutional changes. Introducing structured research training, providing mentorship, and fostering a collaborative research environment can help overcome these challenges. Future studies should explore longitudinal interventions and their impact on students' research outcomes to develop a more research-oriented undergraduate curriculum.

### **Conclusion:**

The present study highlights the progressive improvement in knowledge and attitude towards research among dental undergraduate students, with notable differences observed across academic years. While interns demonstrated the highest levels of research awareness and engagement, the findings emphasize the need for structured integration of research-related training earlier in the BDS curriculum. Despite the generally positive attitude of students towards research, barriers such as perceived workload, lack of training, and insufficient opportunities for mentorship hinder their active participation and publishing. Addressing these challenges requires a multifaceted approach, including mandatory research projects, faculty-led mentorship programs, and workshops on research methodology. Overall, promoting research culture within undergraduate dental education will not only enhance students' academic and professional development but also contribute to the advancement of evidence-based dentistry.

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