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"Knowledge, Attitude, Practice, And Barriers Of Undergraduate Dental Students Toward Scientific Research: A Web-Based Questionnaire Survey."

Dr. Raghavendra Metri[1], Dr. Ashutosh Agarwal[2], Dr Priyanka Talwade[3*], Dr. Ashwini Biradar[4], Dr. Gauri Ugale[5], Dr Vidya Vybase[6]

[1]Professor & Head, Dept. of Periodontology, Maharashtra Institute of Dental Sciences and Research (Dental College), Affiliated to MUHS Nashik, Maharashtra
[2]PG Student, Dept. of Periodontology, Maharashtra Institute of Dental Sciences and Research (Dental College) Affiliated to MUHS Nashik, Maharashtra
[3*]Assistant professor, Department of Pediatrics and Preventive Dentistry, JSS Dental College and Hospital Mysuru
[4]Associate Professor & Head, Dept. of Public Health Dentistry, Maharashtra Institute of Dental Sciences and Research (Dental College), Affiliated to MUHS Nashik, Maharashtra
[5]Professor, Dept. of Periodontology, Maharashtra Institute of Dental Sciences and Research (Dental College) Affiliated to MUHS Nashik, Maharashtra
[6]Assistant Professor, Department of prosthodontics and Implantology, Maharashtra Institute of Dental Sciences and Research (Dental College), Affiliated to MUHS Nashik, Maharashtra
***Corresponding Author:** Dr Priyanka Talwade
*Assistant professor, Department of Pediatrics and Preventive Dentistry, JSS Dental College and Hospital Mysuru, Email id:talwadepriyanka@jssuni.edu.in

Abstract

Introduction: *Scientific research is fundamental to advancing healthcare quality and dental practice. This study aimed to assess the knowledge, attitude, practices, and barriers related to scientific research among undergraduate dental students in the Marathwada region.*

Methods: *A cross-sectional, web-based questionnaire survey was conducted among third-year, final-year BDS students, and interns. The survey comprised sections on demographics, knowledge, general and personal attitudes, practices, and barriers toward research. Data were analysed using descriptive statistics.*

Results: *A total of 552 students participated, with 77.9% females. Correct knowledge of research objectives was low (16%), though awareness of null hypothesis (60.1%) and double-blind trials (58%) was better. Positive attitudes were predominant, with 65.2% supporting inclusion of research methodology in the curriculum and 70% interested in research workshops. However, research practice was limited; only 20.4% attended research courses, and 12.1% had publications. The primary barrier identified was lack of time (around 50%).*

Conclusion: *Undergraduate dental students in the Marathwada region possess a foundational understanding and positive attitude toward scientific research but engage less in active research practices. Incorporating research training into the dental curriculum and providing structured opportunities could enhance student participation and foster research competency.*

Keywords *– Knowledge, Attitude, Research, Cross sectional survey, Students, Dental, Dentistry.*

INTRODUCTION

In accordance with the Common Rule and the Privacy Rule of the Health Insurance Portability and Accountability Act (HIPAA), "research" is described as "a systematic investigation, including research development, testing, and evaluation, designed to develop or contribute to generalizable knowledge."[1] The scientific study known as "health care service research" is a multidisciplinary field that looks at how various factors

such as healthcare technologies, organizational structures and procedures, financing mechanisms, social structures, and individual behaviours affect healthcare quality and costs, accessibility to healthcare facilities, and ultimately an individual's and society's overall health and well-being.[2] Research in oral health care aims to ensure that the dental profession stays up to date with scientific and technological advancements. These advancements will have a short- and long-term impact on patient care quality and the continued development of dental practice, which will likely have a significant impact on dentistry practice.[3] A scientific foundation for these modalities is required in the current era of rapidly developing novel dental treatment approaches, and this can only be achieved through research projects, randomized trials, etc.

Studies addressing issues with diagnosis, prognosis, causation and harm, therapy and prevention are usually the source of evidence.[4] In order to bridge the gap between the discovery of new knowledge and its subsequent application in patients, it is imperative that students have some basic knowledge regarding research efforts. The most crucial factors are the student's understanding of and attitude toward scientific study, their interest in a particular topic, and their desire to find an answer to an open question. Students can develop their critical thinking and clinical reasoning abilities by being encouraged to actively engage in learning activities.[5] To fulfil international requirements, students could take required research courses, participate in research projects, and attend self-directed programs. Many universities throughout the world have established Medical Research Programs (MRPs) to include research into medical school curricula. These initiatives give medical students access to university-based research possibilities.[6] Undergraduate dental students are not subject to any such requirements, so they typically choose not to participate in research without considering the significant impact it could have on their future careers.

Hence the aim of this current study is to analyse the knowledge, attitude, practices, and barriers of undergraduates' dental students towards scientific research in the Marathwada region.

Material and Methods

The study included undergraduate dental students of the Marathwada region. Among the undergraduate students third, final year BDS students, and interns were included. The purpose of including these students was, that these are the years in the dental curriculum when the students get exposed to the clinics as well as get to learn research and various activities which takes place via university during these years. (Thirty randomly chosen participants were used in a pilot study to pre - test the questions meaning and intelligibility as well as the data collection techniques. The main study did not include the subjects from the pilot trial.) The students who gave informed consent were the ones included in this study. Faculty members, first and second BDS students and those who didn't give consent were excluded from the study.

ETHICS

The data collection was done by a cross-sectional self-designed web-based questionnaire survey which was approved by the Ethical Committee of the Maharashtra Institute Dental Science Research and Dental College, Latur (MIDSR/IEC/144/2023) and with the Helsinki Declaration of 1975, as revised in 2000. The study was carried out from May 2023 to July 2023.

STUDY DESIGN

The survey was divided into 6 sections consisting of demographics, knowledge, general attitude, personal attitude, practice, and barriers of dental students towards scientific research, for systematically arranging the questions in an orderly manner for the participants to answer in a precise and better way.

The first section included demographics and basic details of the participants. The second section aims for assessing the knowledge of the participants. The third section was based upon the general attitude of students which was assessed using the Likert's scale. Likert's scale consisted of strongly disagree, disagree, agree, and strongly agree as the variables. The fourth section was based on the personal attitude of the participants. The fifth section was framed for assessing the current practice that the students perform in their daily routine. The sixth and the last section was based on the barriers which restrict the students from taking part in research activities.

STATISTICS

The data which was collected was compiled in MS Excel sheet and later the statistical descriptive analysis was done using SPSS software v 21.

RESULTS

As it was a web-based questionnaire survey it was accessible to all the participants via their mobile phones and other electronic devices. A total of 552 students participated in the survey. Of this 430 (77.9 %) students were females and the remaining 122 (22.1%) students were males (**Table 1, Graph 1**). Out of the 552 undergraduate students 157 (28.4%) students were third year BDS students, 213 (38.6%) were final year students and 182 (33%) students were interns (**Table 1**). When evaluated on their knowledge of scientific research, only 16% could correctly identify the objective of research, while 46.4% recognized formulating a research question as the first step in the research process. An equal proportion (46.4%) identified simple random sampling as the better method. Awareness concerning null hypothesis was higher (60.1%), and 58% correctly understood the concept of double-blind trials. Familiarity with study designs was moderate, with 31.9% aware of randomized control trials, cohort studies, and cross-sectional studies; 52.9% considered randomized control trials to be the gold standard (**Table 2, Graph2**).

When asked about research activities that could be undertaken by students, only 12.3% could list activities such as reviewing articles, publishing, systematic reviews, and meta-analyses, indicating limited awareness (**Table 2**). Similarly, just 12.3% mentioned platforms for literature searches, including PubMed, Google Scholar, and Cochrane, while 47.8% acknowledged paper and poster as means for presenting scientific research (**Table 2**).

Attitudes towards scientific research were generally positive; 60.9% agreed and 16.6% strongly agreed that research is critical for improving oral health care through evidence-based processes. Likewise, 65.3% agreed and 26.1% strongly agreed that research is essential for improving patient care. A majority felt research methodology should be included in the undergraduate curriculum (65.2% agree, 18.8% strongly agree), and that research experience enhances prospects for postgraduate admissions (60.5% agree, 27.5% strongly agree) (**Table 3, Graph 3**).

Regarding personal attitudes, 45.2% expressed a desire to participate as first authors in scientific research, while 54.1% were open to co-authorship. Interest in attending hands-on research workshops was high (70%) (**Table 4, Graph 4**). Engagement in actual research practices, however, was limited; only 20.4% had attended a research-related course, 21.7% had presented a scientific paper or poster, and just 12.1% had published or submitted a scientific work. Participation in research events was mandatory for 38.9% of respondents (Table 5, **Graph 5**).

Time constraints emerged as the most frequently reported barrier, both academically (48.55%) and personally (51.4%) (**Table 6 Graph6**).

Table 1: Demographics

	Variable	Count	Percentage
Gender	Male	**122**	**22.1**
	Female	**430**	**77.9**
Year of BDS currently studying	Third	**157**	**28.4**
	Final	**213**	**38.6**
	Internship	**182**	**33**

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Table 2: Questions related to knowledge towards scientific research

Question	Correct answer	N (%)
What is the objective of research?	To study scientific theories or questions	88 (16)
What is the first step in conducting a research process?	Formulating a research question	256 (46.4)
Which among the following is a better sampling method?	Simple random sampling	256 (46.4)
Which of following can be considered as null hypothesis?	There is no significant difference in prevalence of chronic periodontitis among different genders	332 (60.1)
In which type of blinding trial, the participant as well as the investigator conducting does not know which the study group is and control group?	Double blind trials	320 (58)
Which experimental study design you are aware of?	Randomized control trials	176 (31.9)
From the above options which one do you think is considered as a gold standard in research field?	Randomized control trials	292 (52.9)
What are the different types of research activities you can do as a student in the field of research?	Review of article Publish an article	68 (12.3)
What are the various platforms on which we can search for research literature?	Pubmed Google Scholar Embase Medline	68 (12.3)
What are the different ways in which scientific research can be presented?	Paper Poster	264 (47.8)

Table 3: General attitude regarding scientific research (strongly disagree, disagree, strongly agree, agree)

Question	Strongly disagree N (%)	Disagree N (%)	Agree N (%)	Strongly agree N (%)
Research is critical for improving oral health care through evidence based processes.	35 (6.5)	87 (16)	338 (60.9)	92 (16.6)
Research is essential for improving patient care	24 (4.3)	24 (4.3)	360 (65.3)	144 (26.1)
Research methodology should be part of undergraduate curriculum	28 (5.1)	60 (10.9)	359 (65.2)	104 (18.8)
Conducting research improves one's chances of pursuing postgraduate studies.	12 (2.1)	52 (9.4)	336 (60.5)	152 (27.5)

Table 4: Participants' personal attitude regarding scientific research

Question	Yes N (%)	No N (%)
Do you want to participate in scientific study as a first author?	249 (45.2)	303 (54.8)
Do you want to participate in scientific study as a co- author?	302 (54.1)	250 (45.9)
Do you want to attend hands- on workshop on scientific research?	386 (70)	166 (29.9)

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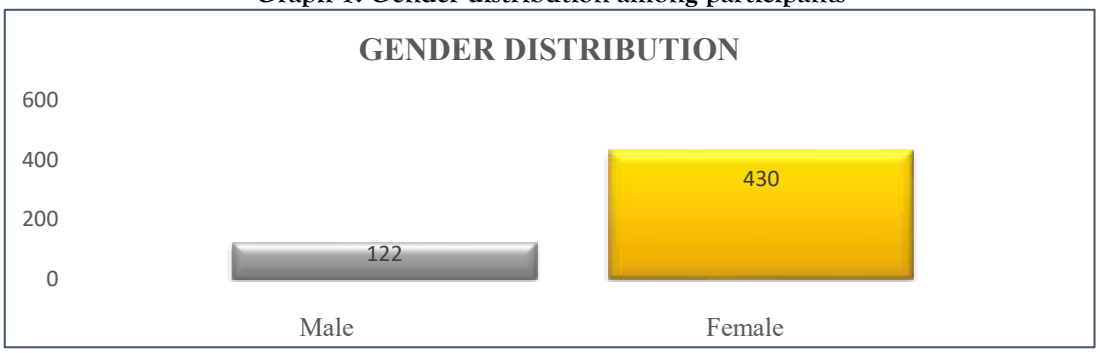
Table 5: Participants' scientific research practice.

Question	Yes N (%)	No N(%)
Have you attended any research related course?	112 (20.4)	440 (79.6)
Have you ever presented any scientific paper/ poster?	120 (21.7)	432 (78.3)
Do you have any scientific publications that have been published or submitted for publication?	66 (12.1)	486 (87.9)
Is/ was it mandatory in your curriculum to participate in research event?	215 (38.9)	337 (61.1)

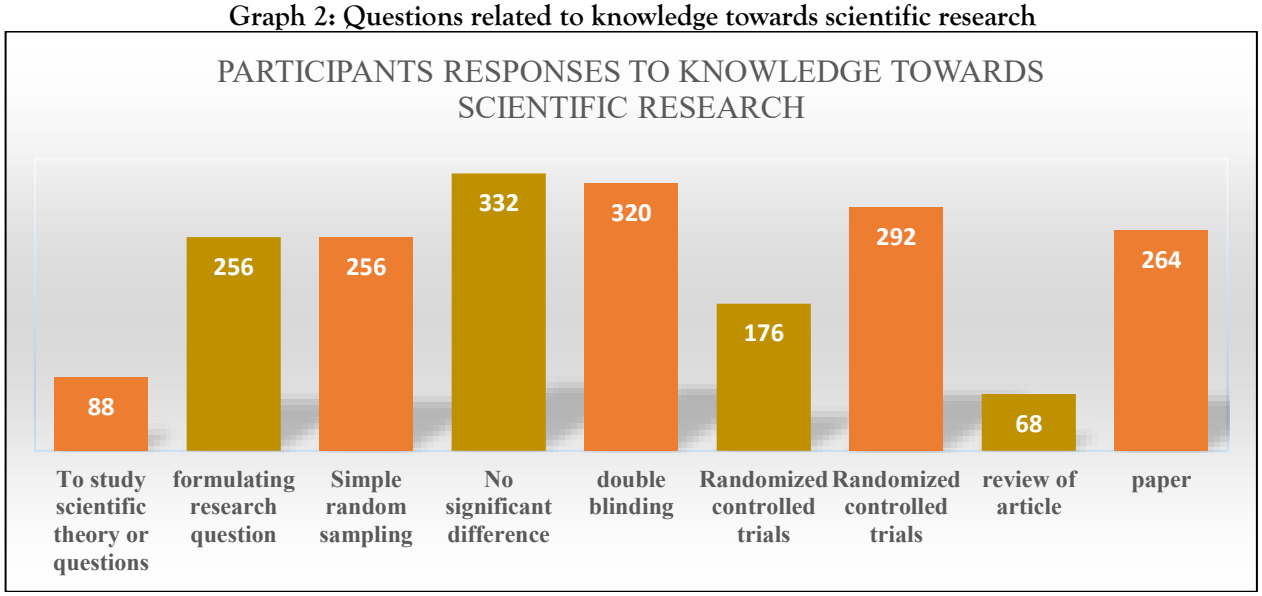
Table 6: Barriers to participate in scientific research

Question	Most answered option	N (%)
Academic barriers which restricts you from participation in scientific events	Time constraints as a result of curriculum	268 (48.1)
Personal barriers which restricts you from participation in scientific events.	Lack of time	284 (51.4)

Graph 1: Gender distribution among participants



Graph 2: Questions related to knowledge towards scientific research



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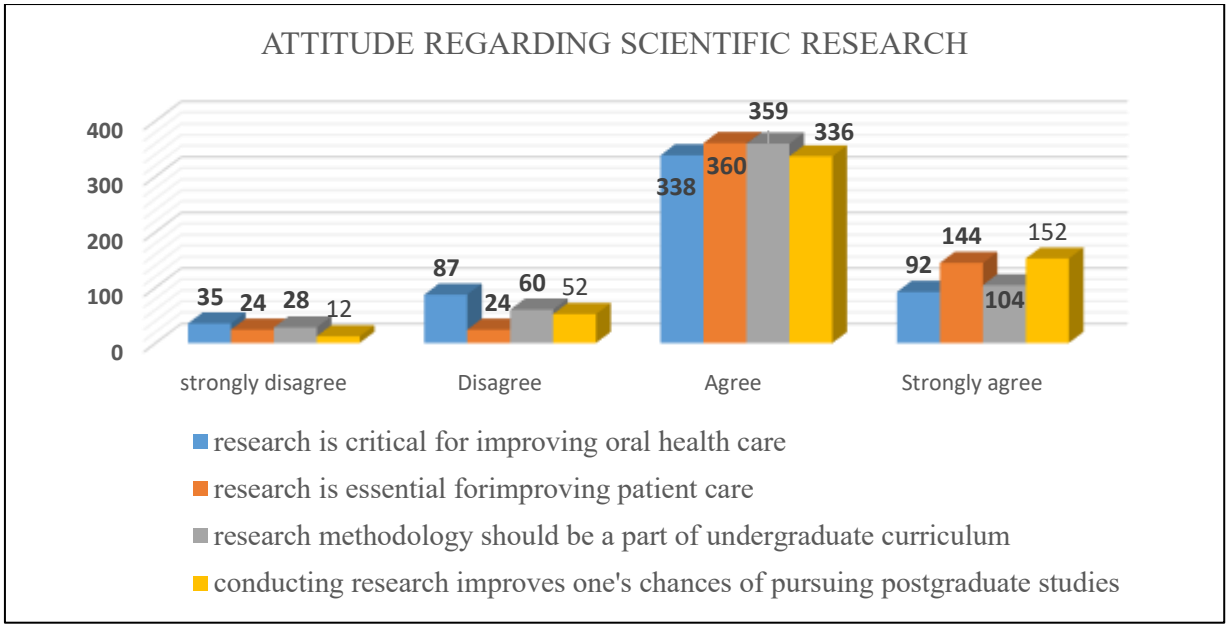
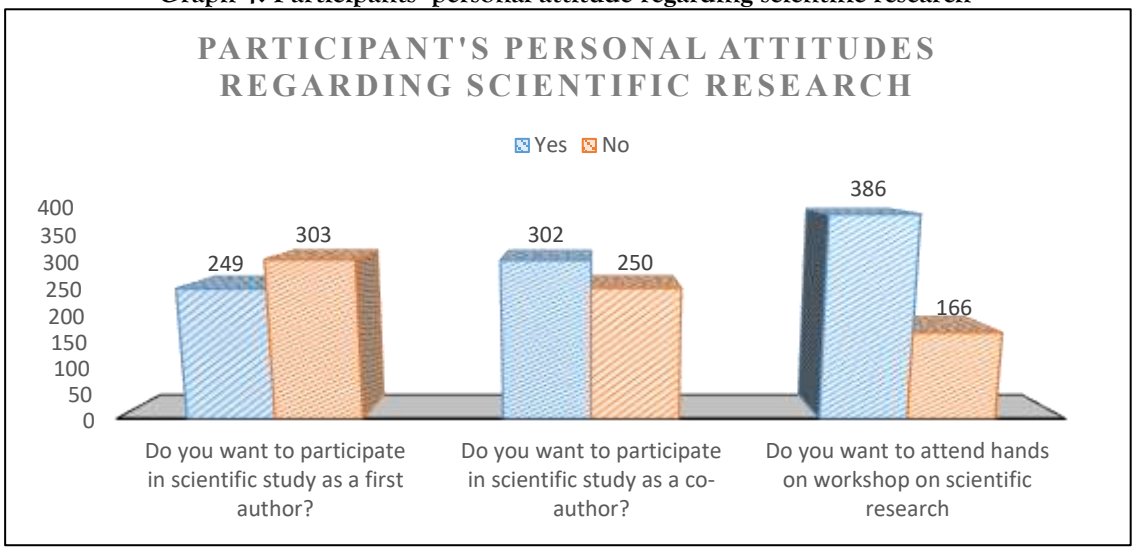
Graph 3: General attitude regarding scientific research



Graph 4: Participants' personal attitude regarding scientific research



Graph 5: Participants' scientific research practice

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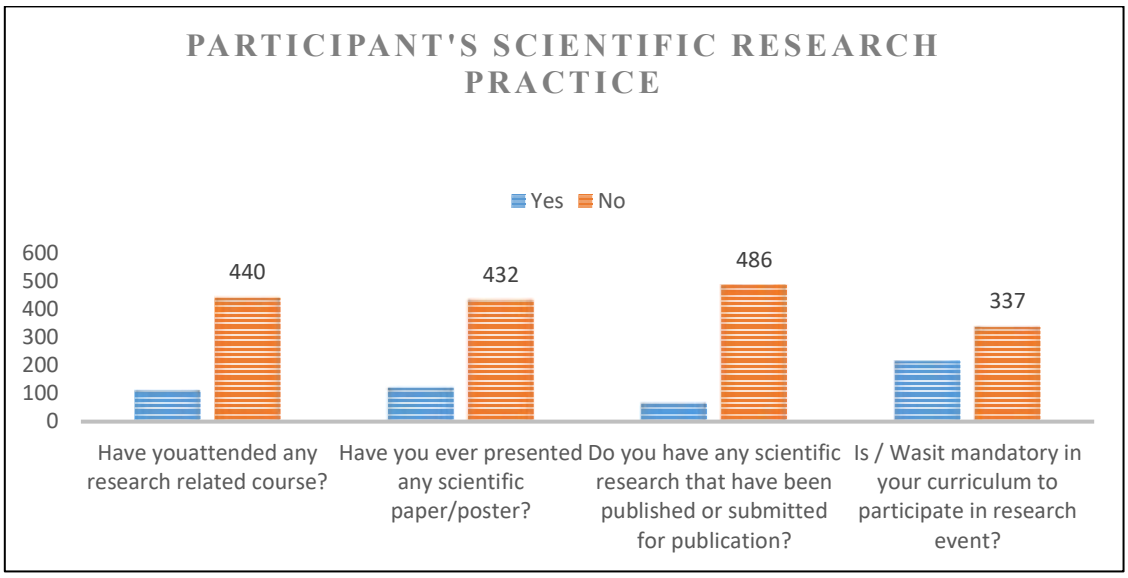
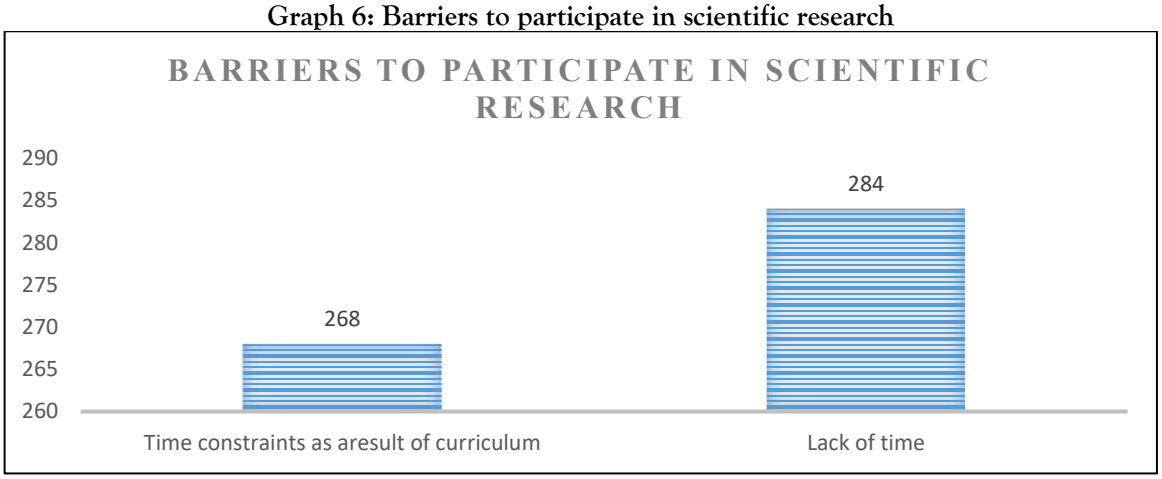


Graph 6: Barriers to participate in scientific research



DISCUSSION

For those working in medicine and dentistry, a fundamental understanding of research methodology is necessary.[7] Learning about research is best acquired in one's formative years, i.e., in undergraduate or graduate school. A fundamental understanding of research methodologies is necessary for practicing medicine and dentistry with competence. Based on data gathered via a specially created web-based questionnaire, the current study has assessed information regarding the knowledge, attitude, practice, and barriers of dentistry students towards scientific research. Research on the knowledge and attitudes of medical students regarding research has been extensively studied; however, there are few studies of a comparable nature including dental students in the Marathwada community.

Apparaju et al.[8] conducted a study that concluded that many practitioners still lack knowledge of the term evidence-based dentistry. In our study it was found that only 16% of students correctly knew the objective of the research. Participants in general have a positive general and personal attitude. The most common barrier was lack of time. Overall the average percentage of correct answers was found to be 33.9 %. Which is lesser when compared to Sharma et al.[9] and Pawar et al.[10] both of which were conducted in India. The findings are similar to Khan et al[11] and Oliveria C et al.[12] This shows the contribution of teaching research methodology, biostatistics, epidemiology, and public health dentistry during the third and final year of under graduation. According to Segal S et al.[13] if research has been made compulsory for the curriculum then the knowledge among students is higher when compared with the institutes in which research was not compulsory.

Although there are many barriers that directly or indirectly restrict a student and inhibit them from undertaking research activities. The primary barrier at the academic and personal level was found to be a lack of time.[14] In today's technology-driven and social media world, people get less time for educational purposes as they are more involved in mobiles, laptops, etc. and they complain about the lack of time.

CONCLUSION

From the current study we can conclude that the undergraduates have a basic understanding and moderate amount of knowledge about scientific research. Research component should be made an essential requirement in the undergraduate dental curriculum as well to form a strong foundation. Undergraduates must be encouraged to participate in workshops to provide a better perspective. Dental colleges have the option to include summer externships, which allow students to work as interns in prestigious research laboratories or institutes, improving the program's foundation for research-based practice.

LIMITATIONS

The possible limitation of this study included a low response rate as it was a web-based survey and it wasn't a part of the curriculum of the students many of the students did not participate in the study. Another reason for such a low response rate could be the lengthiness of the survey. Approximately 7- 10 minutes would have been required to fill the entire survey by an individual. Even though this study provides insight into the knowledge, attitude, practice, and barriers of undergraduate dental students towards scientific research, a study on a larger scale should be conducted. A comparative analysis among two different regions could be performed in the future as well.

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