

# Barriers Experienced by Students in Conducting Research: A Web-based Cross-sectional Study among Indian Dental Population

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## Abstract

**Introduction:** Understanding research in health-care sciences can have a big impact on health care since it has a big impact on evidence-based diagnostic and therapy applications. There are multiple barriers which affect the investigator to take part in the study and also affect the outcome of the study.

**Aim:** The study was aimed to evaluate the obstacles faced by students on the subject of research conducted in dental colleges in India.

**Materials and Methods:** A web-based cross-sectional study was carried out from June 2021 to February 2022 covering Presence Across Nation India through zonal divisions. A closed-ended web-based questionnaire was formulated in English language. A template was provided by the Google Forms consisting of demographical data and nine questions through which participants were assessed.

**Results:** A total of 432 participants joined up for the study. The respondent rate showing maximum in western area (46%) accompanied by eastern region (16%) followed by central part (10%) and further followed as southern (10%), northern (9%), and north eastern (8%). Inadequate technical support (69.6%) is considerable as a major foundation problem whereas lack of time by adviser (59.1%) is considerable least among students. Among personal reasons cited, highly statistically significant difference was appreciated in terms of inadequate finance, lack of research course, and in terms of personal interest towards subject ( $P < 0.001$ ).

**Conclusion:** In this study, barriers of research were identified, and the ways to decrease the difficulties were suggested. The research would be further helpful for organizing training and continuing dental education program and modifications may be proposed in regard with research for the undergraduate curriculum.

**Key words:** Barriers, Dental, Education, Postgraduate, Research, Undergraduate students

## INTRODUCTION

Oral health-care investigation aims to keep the profession aware of scientific and technical breakthroughs, which have an immediate and long-term impact on the quality

of patient care and the further growth of dental practice, both of which are expected to have a considerable impact on dentistry.<sup>[1]</sup>

Understanding research in health care sciences can have a big impact on health care since it has a big impact on evidence-based diagnostic and therapy applications. Similarly, sufficient knowledge of sociological principles is required in academics to successfully perform a study and appropriately interpret data produced from clinical studies. For literature evaluation and evidence-based practice in dentistry, as well as for researchers seeking to have their publications accepted by international journals,

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understanding biostatistics and research design principles are critical.<sup>[2]</sup>

The search for facts in the pursuit of knowledge is what investigations are all about. It entails gathering and analyzing data to improve human description of the phenomenon under investigation. It comprises a systematic approach to data gathering, evaluation, observation, and assessment to find answers to a problem. According to the Organization for Economic Cooperation and Development, “research is methodical creative labor carried out with the goal of expanding knowledge and developing new applications.” It’s a common practice in academic and research organizations. In most situations, studies are done by researchers and postgraduate (PG) students, with the justification that education in institutions requires PG students to submit research projects, dissertation as part of their degree program.<sup>[3]</sup>

In the late 19<sup>th</sup> century, after the first academic revolution, research was done at universities in addition to learning. Since then, research has become one of the most important priorities in scientific societies. In the past few years, scientific research output has been evaluated and utilized to rate universities against one another. The publication of study results serves as proof of support for research investigations as well as a guarantee of future research funding to ensure the institute’s mandate and organizational goals are met.<sup>[4]</sup>

The trends in study are supported by knowledgeable members, whereas the lack of basic and essential research could be due to other variables influencing research. The three key factors that have been identified as having an impact on study give an insight into the literature are attitude, knowledge, and research barriers. Access skill barriers, attitudinal barriers, cultural barriers, infrastructural obstacles, and their sub-categories are examples of barrier elements that can be implemented. In universities, student research is extremely important, and university officials should be made aware of student research constraints. However, there are also some other obstacles faced by students which prevent them from conducting research which includes, lack of access to information sources, lack of English expertise, administratively tight regulations, limited research resources, and the inability to draught formal research proposals.<sup>[5]</sup>

Individual variations among students will be studied to improve the ability to plan curriculum, instruct, and advice learners. In part, we aim to learn more about whether students may encounter problems when conducting research, what those obstacles are, and how we might assist

individuals in their learning by better understanding and overcoming their specific challenges.<sup>[6]</sup>

Hence, the web-based study was commenced to evaluate the obstacles faced by students on research conducted in dental colleges in India.

## MATERIALS AND METHODS

This web-based cross-sectional study was carried out from June 2021 to February 2022 covering Presence Across Nation India through zonal divisions (northern, southern, eastern, western, central, and northeastern) after getting ethics approval from the Institutional Ethical Board (SVIEC/ON/DENT/SRP/21050).

### Calculation of Sample Size

$$\text{Formula: } n = \frac{N}{1 + N(e)^2}$$

Where,  $N$  is population size and  $e$  is the level of precision  
Where,  $N = 8000$  (considering participation of PG, undergraduate (UG), and interns students in various cities of India)

$e$  is 0.05 at 95% confidence interval  $n = 432$

Therefore, PG, UG, and interns’ participants are 432.

All the UG, interns, and PGs were included and those who were not willing were excluded from the study. A closed-ended web-based questionnaire was formulated by Sharma *et al.* in 2014 and was adapted for the present study.<sup>[6]</sup> The questionnaire was formulated in English language. Written consent was obtained from the author. A template was provided by the Google Forms (Google Inc., USA) consisting of demographical data and nine questions through which participants were assessed. Questionnaire was divided as demographic data, organizational (Question 1-5) and individual barriers (Question 6-9). Five-point (1–5) Likert scale was used in the study whose substitutes were as follows: (1) “Strongly agree,” (2) “agree,” (3) “neither agree nor disagree” (neutral), (4) “disagree,” and (5) “strongly disagree.”

Online generated link was forwarded through e-mail/WhatsApp groups. The surveyor could access the link to the online questionnaire through a laptop and smart phone. To ensure maximum participation from various zones, snowball sampling (the participating students will be asked to forward the questionnaire to their colleagues) way was used. Once questionnaire has been filled by all the participants, data were entered into the Excel sheet and were subjected for statistical investigation.

**Statistical Analysis**

The data were analyzed using IBM SPSS statistics 20.0 (IBM Corporation, Armonk, NY, USA) (Statistical Package for the Social Sciences, version 20.0, SPSS Inc., Chicago, IL, USA), and graphs, tables, and other graphics were created using Microsoft Word and Excel. The relevance of study parameters on a categorical scale was determined using Chi-square analysis. The significance of research parameters between the groups was determined using analysis of variance (intergroup analysis). The statistical significance level was set at  $P = 0.05$ , and any value less than or equal to that was considered statistically significant.

**RESULTS**

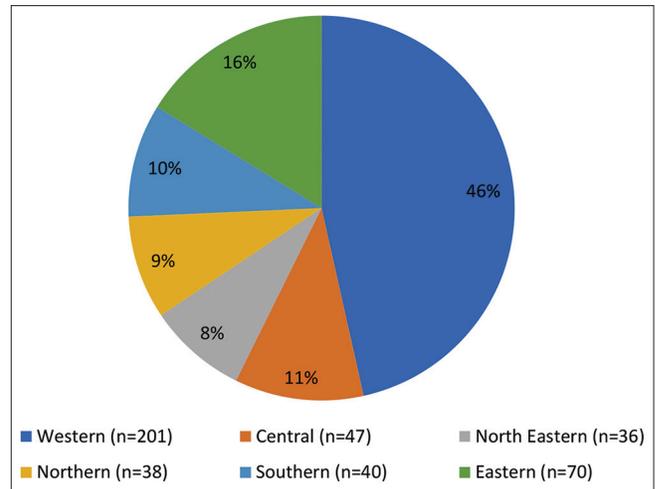
Out of 432 participants (317 females and 115 males), 182 UG, 72 interns, and 178 PGs were enrolled for this study. Age (years) of the respondents was stated as  $21.43 \pm 2.82$  for UG,  $23.4 \pm 1.3$  for interns, and  $26.05 \pm 1.36$  for PG. Distribution of participants from various zonal divisions is shown in [Figure 1]. Maximum respondents were from western zone (46%) and least response was from northeastern zone (8%). For ease of understanding the results, strongly agree and agree have been mentioned in the results.

Numerous institutional problems faced by all three groups of students while undergoing research activities are mentioned in [Figure 2]. Inadequate technical support (69.6%) is taken into consideration as a major foundation problem whereas lack of time (59.1%) by counselor is less considerable obstacle among organizational reasons perceived by students.

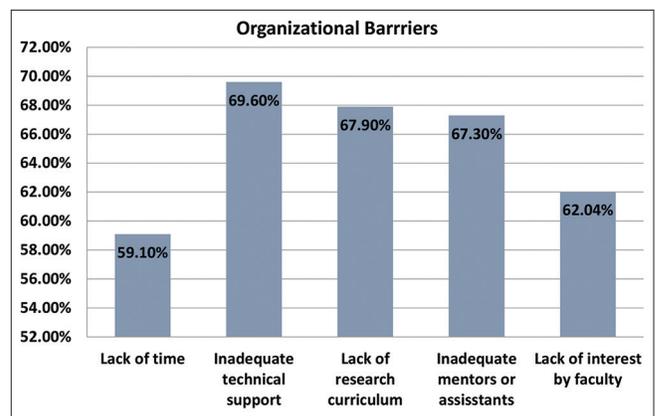
Individual reasons are stated in [Figure 3]. Overall students stated that approximately 69.7% faced inadequate financial resources as the major barrier and personal commitments like marriage and family problems as least experienced obstacle(50.5%).

Year-wise distribution of UG, interns, and PGs showed that significant values are revealed in [Table 1]. Among institutional reasons cited, highly statistically significant difference was appreciated in terms of inadequate technical support, lack of research course in UG syllabus, and in terms of inaccessibility of mentors in the institution ( $P < 0.001$ ). However, lack of interest by faculty does not show statistically significant difference ( $P > 0.56$ ).

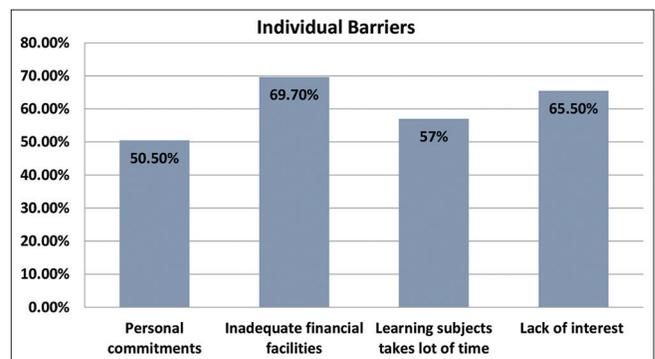
From the mentioned individual problems to research inadequate financial facilities, lack of interest and personal commitments such as family problem and marriage showed highly statistically significant difference ( $P < 0.001$ ) and significant difference was observed in learning regular subjects which took a lot of student's time ( $P = 0.01$ ).



**Figure 1: Distribution of participants from various zonal divisions**



**Figure 2: Distribution of overall students facing organizational obstacles**



**Figure 3: Distribution of overall students facing individual obstacles**

**DISCUSSION**

As research becoming a basic familiarity, not only PGs but also UG and interns should be motivated for taking part in research methods because it is important for dental students to have basic knowledge about research biostatistics.

**Table 1: Year-wise distribution of barriers**

| S. No.                  | Obstacles   | Undergraduates (%) | Interns (%) | Postgraduates (%) | P-value |
|-------------------------|---|--------------------|-------------|-------------------|---------|
| Organizational barriers |   |                    |             |                   |         |
| 1                       | Lack of interest by faculty                         | 61                 | 62.5        | 62.9              | 0.56    |
| 2                       | Inadequate mentors/assistants in institutions       | 62.1               | 63.9        | 74.2              | <0.001  |
| 3                       | Lack of research curriculum                         | 63.2               | 62.5        | 74.8              | <0.001  |
| 4                       | Inadequate technical support                        | 62.6               | 68.1        | 77.5              | <0.001  |
| 5                       | Lack of time  | 58.8               | 57          | 60.1              | 0.02    |
| Individual barriers     |   |                    |             |                   |         |
| 6                       | Lack of interest                                    | 61.5               | 58.4        | 72.5              | <0.001  |
| 7                       | Learning subject's takes up a lot of time           | 54.9               | 52.8        | 60.7              | 0.01    |
| 8                       | Inadequate financial facilities                     | 62.7               | 77.8        | 73.6              | <0.001  |
| 9                       | Personal commitments like family problems; marriage | 41.2               | 59.7        | 56.1              | <0.001  |

The present study was conducted on Indian dental students from all the regions (northern, southern, eastern, western, central, and northeastern) for maximum participation, hence to evaluate the obstacles faced by them while doing research.

The student population in this cross-sectional study included 432 students in the final sample and classified according to gender and year of study. The majority of the participants were females and similar demographic distribution was obtained by Sharma *et al.* in 2014.<sup>[6]</sup>

Although, its importance is well known and repeatedly stated in the field of medicine and dentistry, only a small proportion of research is done on obstacles faced by students.<sup>[7,8]</sup> There are many barriers that are responsible for this shortfall. In this study, we divided the questions into organizational and individual barriers. In organizational obstacles, we found inadequate technical support as the major one. However, in individual barriers, lack of finance is considered as a major obstacle. These results were consistent with the outcomes of another study conducted with Egyptian medical school in 2016.<sup>[9]</sup>

### Organizational Barriers

In this study, 62.1% of UG students, 63.9% of interns, and 74.2% of PG students considered that inadequate mentors in the institution are a hindrance from conducting research. Acquiring new skills such as conducting research is easy when one has an advisor that guides through the learning phase. Counselors not only facilitate in learning skills but also assess, progress, and advise corrective measures.<sup>[10]</sup> Similar results were shown in the study conducted on Egyptian medical students.<sup>[9]</sup> However, to overcome this difficulty, it is suggested by Heinicke *et al.* (2016) that unavailability of internal mentors can be overcome by approaching experts from other fields. The first step is conduction of literature search on topic in interest followed

by contacting corresponding authors in that field. The majority of researchers in our field will be eager to react and offer their advice and expertise.<sup>[11]</sup>

About 62% of dental UG students find difficulty in undergoing research activities due to lack of research curriculum in their course. These results were consistent with Sharma *et al.*<sup>[6]</sup> Research methods should be a compulsive activity due to growing era in fields of research. To get control over this obstruction, primarily research activities and modules should be made mandatory from the 1<sup>st</sup> year of graduation course by the statutory bodies. Secondly, one research/publication should be completed by the time students finish internship.

About 62% of UG, 68% of interns, and 77.5% of PG students considered that inadequate technical support from the foundation is considered a barrier. This finding is consistent with the study done by Farzaneh *et al.*<sup>[5]</sup> and Abushouk *et al.*,<sup>[9]</sup> Amin *et al.*,<sup>[12]</sup> Siemens *et al.*,<sup>[8]</sup> Majumder,<sup>[13]</sup> Sumathipala *et al.*,<sup>[14]</sup> and Majd *et al.*<sup>[15]</sup> It seems that the good training, research budget scarcity, lack of mentorship, and high publication cost of some specific journals are some of the underlying reasons for the current findings.<sup>[16,17]</sup> Unnikrishnan *et al.*<sup>[18]</sup> concluded that one of the barriers to conducting research and supporting students, as perceived by the faculty members, was limited sources, facilities, and limited access. Most of the colleges have a library resource center which has a computer laboratory where students have direct access to desktop and free WIFI. Other than this, the government has made designated areas for free WIFI accessibility.

Lack of interest on research by faculty members can be improved by giving them incentives toward their publication and presentation of their original research. Many universities have an incentive policy for their faculty members toward the research activities.

### Individual Barriers

In this study, 60% of respondents targeted lack of time and 69.7% considered lack of funding was considered as a chief barrier experienced by Indian dental students. Hegde *et al.* in 2017<sup>[15]</sup> reported that the most important barrier to conducting research was the lack of funding from the societies. However, similar findings were also stated in Alghamdi *et al.* in 2014 and Siemens *et al.* in 2010 considered lack of time as a significant barrier in conducting research due to busy academic schedule.<sup>[7,8]</sup>

Silvia (2017), his book about “finding time,” wrote that rather than “lack of time.” He mentioned about creating a schedule and stringently ensuring that it should not be canceled. He also stated to keep small goals while completing the task which would make the research more achievable.<sup>[19]</sup>

Various agencies that provide research funding can help overcome financial constraints or budget insufficiency. National organization such as the Science and Engineering Research Board, the Council of Scientific and Industrial Research, the Indian Council of Medical Research (ICMR), the Defence Research and Development Organization, and international organization such as the National Institute of Health and the World Health Organization assist in breaking down these barriers.

ICMR sponsors MD/MS/DM/MCh and MDS thesis and postdoctoral fellows in dental and medical research. Every year, it also grants 50 postdoctoral fellowships to work in ICMR institutes and centers with research and development resources. The ICMR funds the Short-Term Studentship Program for UG MBBS/BDS students to give them the opportunity to master research methods and methodologies.<sup>[20]</sup>

About 51% of respondents faced commitments such as marriages and domestic problems. This can be overcome by the college/institute making a schedule of one/two hours weekly in the time table; this will help in doing their research activity during college hours and it will not be a burden to students. Future perspectives on this topic of barriers in research are to increase the sample size of the population so as to generalize and validate the results of the study.

### CONCLUSION

Based on our current findings, the following suggestions will be implemented to improve the state of academic research, such as making it a mandatory component in

the dental curriculum. UG students must be encouraged to participate in workshops on study design to improve their skills. Externships to research laboratories or research institutes can be added advantages to the students and can be included by dental colleges. Providing more financial support for students’ research activities, holding theoretical and practical research methodology courses, forming a responsive and helpful research team assistant to support students and provide them with the necessary infrastructure, and carrying practical and theoretical methodology courses can all help to eliminate identified barriers to research. The takeaway message from this study is that students should be aware of and educated about research procedures, and that they should be given the time throughout their course to overcome these barriers.

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