

Challenges, obstacles and strategies in dental scientific production in Guerrero, Mexico: an exploratory qualitative analysis

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ABSTRACT

Objective: To explore the experiences of researchers and dental professionals in the State of Guerrero, Mexico, with the aim of identifying the main challenges, barriers, and strategies in scientific production. **Materials and methods:** An exploratory qualitative study was conducted using thematic coding of narratives collected through an online form. Using purposive sampling, 14 dental professionals—with and without research experience—were recruited from educational and healthcare institutions in Guerrero, Mexico. The initial coding was performed using Atlas.ti V23.2.1®. **Results:** The main barriers identified were lack of financial resources, limited institutional support, and difficulties in publishing, while the proposed measures included greater access to funding, research training, and the consolidation of academic networks. In addition, the experiences highlighted persistence, mentorship, and collaboration as key elements in research development. **Conclusions:** The analysis highlights the need to strengthen support for dental research through institutional and governmental policies that promote scientific production and its integration into the academic community.

Keywords: dentistry; qualitative research; dental research; research funding sources; interinstitutional relations.

Received: June 04, 2025

Accepted: August 25, 2025

Online: September 30, 2025



Open access article

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Cite as:

Juárez-Medel CA, Reyna-Álvarez MA, González-Rojas JM, Arriaga S, Chávez-Almazán LA. Challenges, obstacles and strategies in dental scientific production in Guerrero, Mexico: an exploratory qualitative analysis. *Rev Estomatol Herediana*. 2025; 35(3): 187-195. DOI: 10.20453/reh.v35i3.6572

INTRODUCTION

Dental research is an essential component in improving oral health and the quality of life of populations. Through the generation of scientific knowledge, it is possible to develop more effective interventions for the prevention and treatment of oral diseases, reduce health disparities, and strengthen primary care systems (1-3). Therefore, scientific productivity represents not only an indicator of academic development but also a strategic tool to address the social and epidemiological challenges that affect communities (4-6).

In Mexico, particularly in states with high levels of marginalization such as Guerrero, scientific production in the field of dentistry faces significant structural barriers, including insufficient funding, lack of research infrastructure, absence of institutional incentives, and limited integration into international academic networks (7). Despite these challenges, various universities, research centers, and independent professionals generate knowledge applied to local contexts to respond to specific problems with their environment (8).

From a qualitative perspective, it is possible to understand the experiences and perceptions of the actors involved in research. This approach allows for the visibility of social meanings, institutional practices, and power relations that influence scientific production, especially in the field of health. By focusing on the testimonies of those who participate in or are interested in the research process, a deeper understanding of the context and structural factors that condition scientific productivity is offered (9).

This is particularly relevant in contexts such as the states in southern Mexico, where structural limitations affect both the production and the conception and valuation of research (10). For this reason, identifying barriers, challenges, and opportunities from the experience of professionals helps guide strategic actions to strengthen local research capacity. In this regard, the objective of this analysis was to identify the main challenges, obstacles, and strategies in scientific production, based on the experiences of researchers and dental professionals in the state of Guerrero, Mexico.

MATERIALS AND METHODS

It was an exploratory qualitative study through thematic coding aimed at identifying perceptions about experiences in dental scientific production in the state of Guerrero, Mexico. Data collection was conducted in February 2025. The research team was composed of professionals trained in dentistry, medicine, nursing, and anthropology, all with experience in public health. None of the team members had prior relationships with

the participants, ensuring impartiality in the collection and interpretation of data.

A purposive sampling approach was employed, targeting dental professionals—with or without research experience—from public and private educational institutions or the health sector in the state of Guerrero. Inclusion criteria included: residing and/or practicing in the state, holding a degree in dentistry, and providing informed consent to participate. The sample consisted of 14 participants, corresponding to the completed forms received. There were no exclusions, as the digital design of the instrument required answering all questions to continue. The collected responses revealed sufficient thematic recurrences for the exploratory aims of the study (11).

The data collection instrument consisted of a digital form using Microsoft Forms®, developed by the research team. Its content was defined based on the team's professional experience and a literature review of scientific research in health and dentistry, without relying on a specific theoretical framework. The form was structured into three sections. The first section corresponded to informed consent, which was mandatory for continuation. The second section gathered sociodemographic and professional information: sex, age, academic background, years of professional practice, institutional affiliation, membership in the State Registry of Researchers of the Council of Science, Technology, and Innovation of the State of Guerrero (COCYTIEG, by its acronym in Spanish) and the National System of Researchers (SNII, by its acronym in Spanish), participation as a peer reviewer, and recent scientific publications. Finally, the third section comprised five open-ended questions designed to explore the main challenges, obstacles, and strategies derived from professional experience to strengthen research in dentistry.

The participants' characteristics were presented solely to contextualize the sociodemographic and professional profile of the sample, without being part of the central analysis. The qualitative analysis of responses was conducted through thematic coding, following the phases proposed by Braun & Clarke (12): complete reading of the material, code generation, theme grouping, review, and definition of categories.

Initial coding was performed using Atlas Ti V.23.2.1® (free version), which facilitated the organization and coding of responses. Additionally, the analysis was complemented by the exploratory use of ChatGPT as a technical support tool. Its use was limited to identifying repetitive patterns and organizing key ideas, without influencing the final analytical interpretation. The validation of the categories was performed independently by two team members with previous experience in qualitative methodology, who participated in the review and triangulation of the results. This process ensured

internal coherence and the reliability of the thematic analysis based on qualitative methodological standards.

The analysis was conducted in collaboration with the Health Department of the State Health Services of Guerrero under file number CISSG012/2025, to initiate the application of the form and follow up with participants. The privacy notice, along with the study objectives, was included in the form instructions to ensure voluntary and informed participation of subjects (13). Data collection was carried out by the Clinical and Epidemiological Innovation Unit of the State of Guerrero, in accordance with the General Health Law on Research (14).

RESULTS

Of the 14 participants, 9 were women and 5 were men. Ages ranged from 25 to 68, with an average age of 45. Regarding academic level, 5 held doctoral degrees, 1 held a master's degree, 3 had a specialization, and the remaining 5 held a professional degree in dentistry. In terms of professional experience, 6 participants had

been practicing dentistry for one to ten years, while 8 had been practicing for eleven years or more. In terms of institutional affiliation, 4 worked in healthcare institutions, 4 in public educational institutions, 2 in private educational institutions, and the remaining 4 in private practice.

Regarding research participation, 2 were members of the COCYTIEG Registry, and none were affiliated with the SNII. Similarly, 2 had been invited to serve as peer reviewers for scientific journals. In terms of academic production, 7 participants had published at least one scientific article in the past three years, while the other 7 had no scientific publications. Detailed information is presented in Table 1, which summarizes the participants' sociodemographic and professional characteristics.

Figure 1 presents a diagram illustrating a thematic network constructed from the main elements associated with dental research, based on the experiences of the participants involved. It is organized into four central nodes that function as key categories for understanding the research experience:

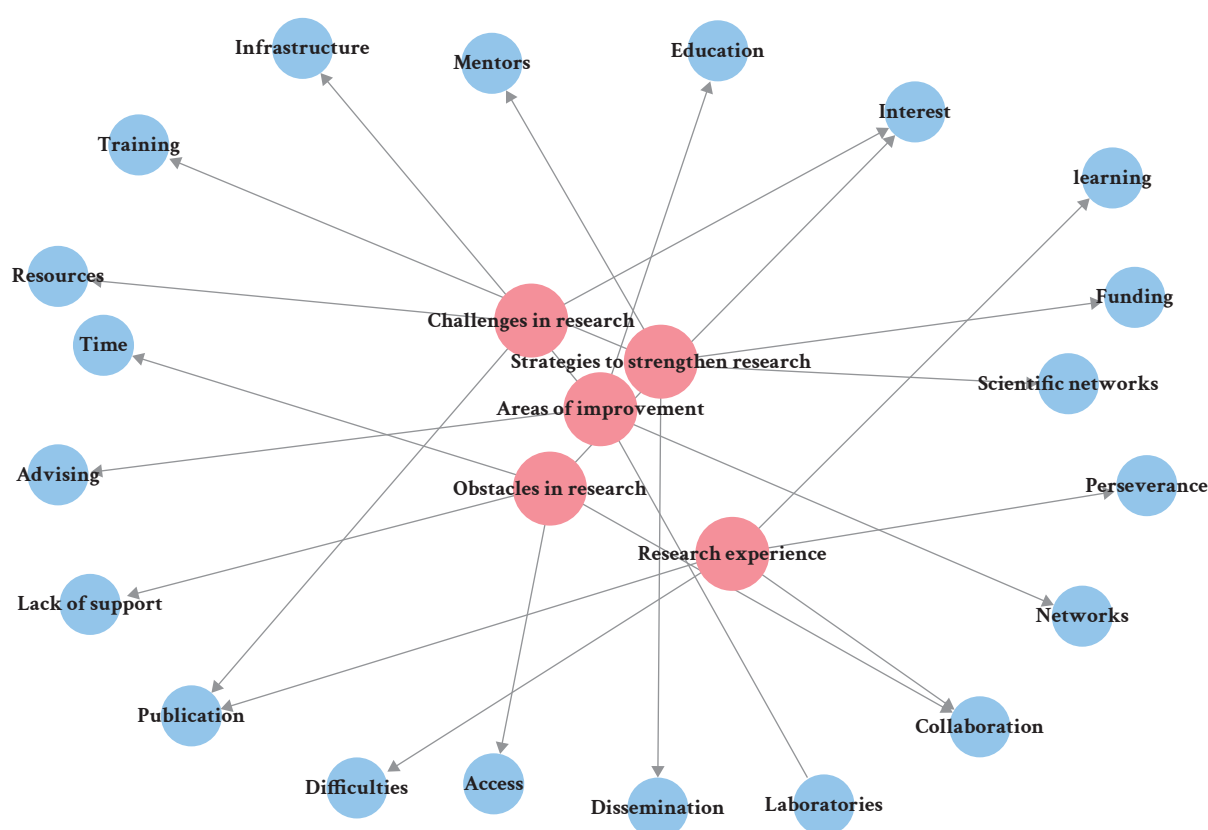


Figure 1. Thematic network of challenges, obstacles, and strategies in dental research in Guerrero, Mexico.

* The central red nodes represent the main categories that emerged from the qualitative analysis. The blue nodes correspond to specific categories derived from participants' testimonies, allowing the visualization of connections among the various elements that shape scientific production in the local dental research context.

Table 1. Sociodemographic and professional characteristics of each participant.

Participant	Sex	Age	Highest academic degree	Years in the dental practice	Affiliated institution	Member of the COCYTIEG State Registry of Researchers	Served as a peer reviewer in the last year	Number of scientific publications as author and/or co-author in the last three years
P1	Male	63	PhD in Social Sciences	36-40 years	School of Dentistry of the Universidad Autónoma de Guerrero	No	Yes	4
P2	Female	68	PhD in Education	41 years or more	School of Dentistry of the Universidad Autónoma de Guerrero	Yes	No	5 or more
P3	Male	58	PhD in Education	36-40 years	School of Dentistry of the Universidad Autónoma de Guerrero	No	No	5 or more
P4	Female	52	PhD in Biomedical Sciences	31-35 years	School of Dentistry of the Universidad Autónoma de Guerrero	No	No	5 or more
P5	Male	35	PhD in Public Health	6-10 years	IMSS-Bienestar Public Health Services in Guerrero	Yes	Yes	5 or more
P6	Female	62	Specialty in Orthodontics	31-35 years	IMSS-Bienestar Public Health Services in Guerrero	No	No	0
P7	Female	39	Specialty in Orthodontics	16-20 years	IMSS-Bienestar Public Health Services in Guerrero	No	No	0
P8	Male	33	Professional Degree in Dental Surgery	6-10 years	IMSS-Bienestar Public Health Services in Guerrero	No	No	0
P9	Female	37	Master's Degree in Epidemiological Sciences	6-10 years	Universidad Hipócrates	No	No	1
P10	Female	47	Specialty in Orthodontics	21-25 years	Universidad Hipócrates	No	No	0
P11	Male	30	Professional Degree in Dental Surgery	1-5 years	Self-employed private sector	No	No	0
P12	Female	25	Professional Degree in Dental Surgery	1-5 years	Self-employed private sector	No	No	0
P13	Female	41	Professional Degree in Dental Surgery	6-10 years	Self-employed private sector	No	No	0
P14	Female	47	Professional Degree in Dental Surgery	21-25 years	Self-employed private sector	No	No	5 or more

COCYTIEG: Council of Science, Technology, and Innovation of the State of Guerrero; IMSS: Mexican Social Security Institute.

Challenges: These are related to material limitations such as financial resources, infrastructure, and time, as well as difficulties in achieving the publication of research findings.

Obstacles: These reflect structural and institutional barriers, such as a lack of support, restricted access to dissemination channels, limited motivation or interest, and the absence of favorable conditions for conducting research.

Strengthening strategies: This category encompasses proactive elements such as continuous education, academic mentoring, guidance from senior researchers, strengthening of scientific networks, and technical training as means to move forward. Areas for improvement are considered a component within this node.

Experiences: This category includes both subjective and practical aspects, such as learning, collaboration, use of laboratory facilities, participation in academic networks, and perseverance as key facilitators in the research process. They constitute the transversal axis from which challenges, obstacles, and strategies emerge.

Each central node is linked to specific categories, illustrating the complexity of factors influencing the development of dental research in contexts such as Guerrero, Mexico. The diagram highlights a constant tension between structural limitations (challenges and obstacles) and the responses that arise from individual and collective actions (strategies and experiences). This visualization synthesizes the main findings of the qualitative analysis and illustrates the coexistence of persistent barriers and transformative aspirations among those engaged in dental research.

The qualitative analysis identified three main categories regarding dental research in Guerrero: (i) barriers-challenges, (ii) strategies-proposals for improvement, and (iii) research experiences in dentistry. Based on participants' testimonies, subcategories and descriptors were developed to further explore the limitations, proposals, and lessons reported by participants.

Barriers-challenges in dental research

The main challenges for conducting dental research include the lack of funding—considered the greatest obstacle to carrying out high-quality studies—as well as the absence of specific financial support for this field:

P5: *The lack of research funding, inadequate infrastructure, and limited institutional support are the main barriers to developing high-quality studies.*

Added to this is the lack of institutional support and the disinterest of some universities in promoting scientific production:

P9: *There is a lack of interest among universities in promoting research in dentistry.*

Most professionals prioritize clinical practice, particularly in the private sector, which limits their involvement in research projects:

P1: *In dentistry, clinical practice is prioritized, especially in the private sector, which restricts research interest. Moreover, there are few educators properly trained to teach it.*

Participants also reported difficulties publishing their findings due to complex editorial processes and the absence of institutional guidance:

P3: *Publishing an article in an indexed journal was a long and complex process, but I learned the importance of patience and persistence.*

Finally, inadequate infrastructure in many institutions represents a significant barrier to conducting rigorous research:

P1: *In the educational sector, the lack of budget for clinical or laboratory areas limits data collection, as resources are often directed toward priorities unrelated to research.*

Strategies and proposals for improvement

To strengthen dental research, participants emphasized the need for increased funding and better integration of research into clinical and educational practice. It is essential to facilitate access to funds, particularly for professionals holding a professional degree, to encourage their participation in scientific projects:

P12: *It is very difficult to access research funding with only a professional degree, which discourages many dentists from engaging in scientific projects.*

Similarly, there is a clear need to incorporate research training at an early stage, with the inclusion of courses and mentoring during graduate and specialization programs that teach students to develop and publish studies:

P6: *Research training should be integrated into specialty programs, with mandatory courses that teach dentists to design and publish scientific studies.*

Participants also suggested promoting collaboration with scientific networks and universities to strengthen academic production:

P11: *Dentists should join scientific networks and collaborate with universities to strengthen scientific production.*

Finally, being part of institutions that actively promote research and provide adequate financial and logistical support was considered a key facilitating factor:

P5: *Researchers in public educational institutions have greater opportunities to join the National System of Researchers and access funding.*

Experiences in dental research

Participants' experiences revealed several challenges, particularly among those who combine private clinical practice with research, due to the lack of institutional incentives and support:

P13: *It has been difficult to balance my private practice with research, as there are no incentives or support for dentists working in the private sector to develop scientific projects.*

One of the main challenges involves limited access to resources, laboratories, and funding, which forces many researchers to seek external collaborations or manage their projects using personal funds.

P1: *The greatest challenge has been the lack of access to resources and specialized laboratories within the university, which forced me to seek external collaborations to conduct my studies.*

Finally, research is perceived as a costly activity that requires perseverance, self-management, and strong personal motivation, particularly in private institutions where institutional support is limited. Despite these difficulties, the importance of having mentors, joining research groups, and establishing collaborative networks with other specialists is recognized as a key strategy to sustain and enrich scientific work:

P2: *Researchers must seek financial support and collaborate with other specialists to ensure the feasibility of their studies.*

DISCUSSION

The results of the qualitative analysis reveal that dental research in the state of Guerrero, Mexico, faces multiple challenges. Participants primarily identified the persistent lack of funding, limited institutional interest, and difficulties in scientific publishing as major obstacles. These findings are consistent with systematic reviews that highlight insufficient financial support and inadequate training in scientific methodology as key limitations to evidence-based dentistry (15, 16).

In terms of the proposed strategies, participants emphasized the need for financial incentives, research training, and interinstitutional collaboration. Literature supports these strategies, as collaborative networks and access to mentorship can significantly enhance scientific production and the integration of emerging researchers into academic communities (17, 18). Moreover, the implementation of programs focused on scientific writing and project management has proven to be an effective strategy to increase research productivity (19).

The shared experiences underscore the importance of persistence, interdisciplinary collaboration, and association groups in health as key elements of scientific productivity. Previous studies have demonstrated that institutional support and academic recognition are key factors in motivating researchers to continue the process of scientific publication. Similarly, the perception of autonomy and the availability of incentives may influence dentists' scientific production (20).

In this way, the study highlights academic needs that combine the local specificity of research in Guerrero with the influence of international trends in dental education (21). Although the identified barriers align with challenges reported in other contexts, it is evident that the development of dental research requires contextualized strategies that strengthen scientific production while remaining aligned with broader global dynamics (22).

Although no directly comparable qualitative studies on dental research in Mexico are available, the findings of this analysis are consistent with existing evidence on the barriers affecting scientific production in this field. In contrast to quantitative methodological approaches, the study by García et al. (7), through a bibliometric analysis, documented that only 2.23% of Mexican scientific production corresponded to the dental field. This figure reflects the historical lag of dentistry within the national research context and highlights the need to design and implement targeted strategies to strengthen scientific development in this area of knowledge.

In this context, the exploratory qualitative analysis provides a situated perspective on the conditions faced by dental professionals in Guerrero, identifying formative, structural, and academic linkage needs. Although some of these barriers coincide with those reported elsewhere, the results show that the development of dental research requires differentiated strategies adapted to the regional context but that also promote articulation with global knowledge-generation dynamics.

Given this scenario, educational and health institutions in Guerrero must implement strategies for financial support, methodological guidance, and dissemination of dental research. The creation of regional scien-

tific journals, the establishment of inter-institutional research networks, and the incorporation of research training modules, courses, or workshops at the undergraduate level could help reduce the obstacles identified in this analysis (23).

The results of this analysis present certain limitations that should be considered in interpretation. The small sample size, purposive sampling, and exclusive use of digital means for data collection limit the representativeness of the findings. Although the questionnaire design ensured response integrity by requiring full completion, these conditions may have excluded professionals who, due to work, technical, or geographical reasons, were unable to participate. Furthermore, the exploratory nature of this analysis prevents the establishment of generalizations or conclusive inferences. Nevertheless, the findings represent a valuable preliminary approach that can guide the design of broader, comparative, and more representative future studies.

Based on the findings, it is suggested that future research expand the sample size and consider incorporating a mixed methodological design. At the same time, the use of hybrid data collection modalities combining digital and in-person tools is recommended, along with the de-

velopment of comparative studies in different regions. The oral health literature supports both mixed methodologies and hybrid strategies, as they promote data integration and the strengthening of research competencies, especially when virtual and in-person environments are combined (24, 25).

CONCLUSIONS

The exploratory qualitative analysis conducted in the state of Guerrero reveals that scientific production in dentistry faces multiple structural barriers, primarily the scarcity of funding, lack of institutional support, and difficulties in publishing. However, significant opportunities were also identified through proposals focused on research training, the strengthening of academic networks, and access to financial resources.

Testimonies highlight that personal factors such as persistence, mentorship, and collaboration are key to advancing dental research in Guerrero. Findings highlight the urgent need to implement public and institutional policies that not only support knowledge generation but also become actively integrated into professional and academic practice.

Conflict of interest:

The authors declare no conflict of interest.

Funding:

Self-funded.

Ethics approval:

This study was approved by the Health Directorate of the State Health Services of Guerrero under file number CISSG012/2025.

Authorship contribution:

CAJM, CSOC: conceptualization, writing of the original draft, writing – review & editing.

JMGR: formal analysis, methodology, validation, writing – review & editing.

MARA: formal analysis, project administration, software, visualization.

SAR: research, resources, writing of the original draft.

LASA: research, writing – review & editing.

Acknowledgments:

Special thanks are extended to Dr. Alondra García Carbajal, Secretary of Health of the State of Guerrero, for her support given to the Clinical and Epidemiological Innovation Unit in disseminating the form through institutional social media platforms. Our gratitude to Dr. Nancy Karina Martínez Osorio, Director of Health Services, and Dr. Jaime Feliciano Barragán, Deputy Director of Medical Education and Health Research of the State Health Services, for their valuable assistance throughout this process. Finally, our appreciation is extended to Dr. Martha Herlinda Teliz Sánchez, Head of the Department of Education and Health Research at the IMSS-Bienestar State Coordination in Guerrero, for facilitating collaborative work and referring research-experienced personnel from her coordination.

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