

# Bridging the Soft Skills Gap in Indian Dental Education: A Cross-Sectional Study of Student Competencies

Zeba Jafri<sup>1</sup>, Anuradha Sharma<sup>2</sup>, Ashu Bhardwaj<sup>3</sup>, Nishat Sultan<sup>4</sup>, Madhuri Sawai<sup>5</sup>,  
Kirti Chawla<sup>6</sup>

<sup>1,3,4,5,6</sup>MDS Periodontics, Professor Faculty of Dentistry, Jamia Millia Islamia University, New Delhi

<sup>2</sup>MD Microbiology, Professor Faculty of Dentistry, Jamia Millia Islamia University, New Delhi

**Corresponding Author:** Dr Zeba Jafri, Address of Correspondence: Room No. 403, Department of Periodontics, Faculty of Dentistry, Jamia Millia Islamia University, Maulana Mohammad Ali Jauhar Marg, Jamia Nagar, New Delhi- 110025  
Email- zjafri@jmi.ac.in

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## ABSTRACT

**Background:** The Indian dental curriculum prioritizes theoretical knowledge and clinical skills for undergraduates but lacks formal guidelines for soft skills, vital for professional success. This study evaluates knowledge, attitudes, and perceptions of soft skills among Indian dental undergraduates.

**Materials and Method:** A descriptive survey was conducted at a central government dental institution in New Delhi. After obtaining scientific and ethical approval, a questionnaire was distributed online via Google Forms, WhatsApp, and email. Participation was voluntary, confidential, and required informed consent. Over four months, 789 responses were collected. Data were analyzed using SPSS (Version 16.0, Chicago, SPSS Inc.). Frequencies summarized demographic variables and responses, with mean and standard deviation calculated for individual item and domain scores on a Likert scale. Chi-square tests compared responses by gender and year, with significance set at 0.05.

**Results:** Among 789 participants, 80% showed knowledge of soft skills (p-value = 0.282), a non-significant result. Many were unfamiliar with soft skill categories (p-value = 0.044) and unaware these skills can be learned. Most respondents believed they possessed soft skills. Mean scores were 2.41 for identifying nonverbal communication, 2.34 for financial skills, and 2.49 for entrepreneurial skills.

**Conclusion:** The study concluded that although most respondents were familiar with soft skills, there was a lack of strong agreement in possessing these skills, particularly in nonverbal communication and financial and entrepreneurial areas. The authors suggest developing and incorporating scientifically designed modules into the curriculum to address this gap.

**Keywords:** *Soft skills, entrepreneurial skill, dental undergraduates, perception, communication.*

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## BACKGROUND

The goal of India's dental undergraduate program is to produce graduates who excel in fundamental, pre-clinical, para-clinical, and clinical sciences. These graduates should be capable of delivering high-quality dental care while understanding the social and psychological aspects of patient treatment. The curriculum heavily emphasizes three learning domains: cognitive, psychomotor, and attitudinal, throughout the course. This approach enables students to acquire theoretical knowledge and clinical expertise. However, it has become evident that soft skills are equally crucial for professional success, as they are essential in addressing patients' psychological, physical, and social needs, as well as their overall well-being[1,2].

Hard skills refer to the technical abilities objectively required for a specific occupation, while soft skills are a sociological concept related to an individual's Emotional Intelligence Quotient (EQ). Soft skills encompass personality traits, social graces, communication abilities, language proficiency, personal habits, friendliness, and optimism that characterize relationships with patients[3]. Perreault [4] described soft skills as the personal qualities, attributes, interpersonal skills, or level of commitment that distinguishes an individual from others with similar skills and experience. Dental health care, a crucial component of overall well-being, encompasses not only the treatment of oral diseases and enhancement of oral health but also addresses patients' emotional requirements and desires. The latter is largely influenced by the personal attributes of healthcare providers. It is essential for dental students to attentively hear patients, comprehend their worries, and view them as individuals with thoughts and feelings, underscoring the importance of soft skills. These interpersonal abilities should be seen as complementary to, rather than a substitute for, technical expertise. Students who excel in interpersonal communication can effectively listen to and inquire about their patients' concerns empathetically, enabling patients to grasp their oral health status and needs. Dalaya et al [5] noted that students with better soft skills training are more likely to thrive in challenging situations. Multiple studies have associated high levels of emotional intelligence and soft skills with improved academic performance, superior clinical outcomes [6,7], and effective team management among students, peers, and staff [8].

Research indicates that professionals possessing soft skills are more employable and collaborative, with patients reporting higher satisfaction regarding their clinical care [5, 9]. Conversely, patients express less contentment with treatment provided by dentists lacking interpersonal skills [10]. Acquiring and mastering soft skills enables students to better comprehend patient needs, fulfill patient expectations, and enhance their academic progress. While soft skills are linked to personality traits, they can be developed through education and practice [11]. Some nations have incorporated soft skills into dental education curricula. In 2009, the Association of Dental Education in Europe's General Assembly mandated that all European Dental Schools adhere to professional conduct and ethics (Domain I), interpersonal and social skills (Domain II), and knowledge and information literacy (Domain III) [12]. These domains encompassed additional soft skills such as teamwork, critical thinking, problem-solving, leadership, and practice management. Similarly, in 2011, the American Dental Education Association recognized these soft skills as competencies for their 'New General Dentist' [8]. Malaysia introduced a soft skills module for dental students in 2006, with the Ministry of Higher Education identifying key areas including communication, leadership, critical thinking, professionalism, entrepreneurship, lifelong learning, and teamwork [13].

Currently, to our knowledge, dental colleges in India lag behind in teaching soft skills to students, as there are no formal guidelines in the current dental undergraduate curriculum [14]. The Dental Council of India has recently proposed a revised Competency-based curriculum for dental undergraduates, which is yet to be implemented, emphasizing the integration of an Attitude, Ethics and Communication (AETCOM) module [15]. A similar module was incorporated for medical graduates by the Medical Council of India in 2018 [16, 17].

This study aimed to assess Indian Dental Graduates' knowledge and understanding of soft skills, their awareness and perception of these skills, and to explore the need for incorporating soft skills training into the Indian dental undergraduate curriculum.

## MATERIALS AND METHOD

This descriptive study utilized an online questionnaire to gather information on knowledge, attitudes, and perceptions regarding soft skills from Indian Dental undergraduates. The study was conducted over four months, from May to August 2022. Prior to commencement, scientific approval was obtained from the Internal Research Review Committee, and ethical approval was granted by the Institutional Ethics Committee.

**Aim:** To assess the soft skills knowledge, attitude, and perception of dental students in India.

### Objective:

Primary Objective: To identify soft skill competency gaps among dental undergraduates in the current curriculum.

Secondary Objective: To consider and devise strategies to address these gaps

### Study Participants:

**Included:** Final year BDS students and BDS interns

**Excluded:** First, second, and third-year BDS students

**Research Instrument:** A literature-based, self-administered questionnaire was created using Google Forms. The survey, conducted in English, gathered information on demographics, soft skills knowledge, awareness, and perceptions. The link was distributed via email and WhatsApp to Indian dental undergraduates. Participation was voluntary, anonymous, and consent-based. Demographic data collected included age, gender, and year of study. The questionnaire assessed soft skills knowledge, awareness, and perceptions using a five-point Likert scale: Strongly disagree (0), Disagree (1), Neutral (2), Agree (3), Strongly agree (4). Content validity was established by expert evaluation using the content validity index (CVI). A pilot study involving 30 final year and intern respondents was conducted to ensure question clarity before the main study.

**Sample Size Determination:**

nMaster software (version 2, CMC, Vellore) was used to calculate the sample size for estimating a single proportion. Assuming a 50% prevalence of soft skills among Indian dental undergraduates, 5% absolute precision, 95% confidence interval, and a design effect of 2 (to account for cluster sampling), a sample size of 768 was determined to be adequate. Sample size calculation formula:

$$n = \frac{Z^2_{1-\alpha/2} p(1-p)}{d^2}$$

Where,

p: Expected prevalence = 0.5

d: Absolute precision required on either side of the prevalence = 0.05 or 5%

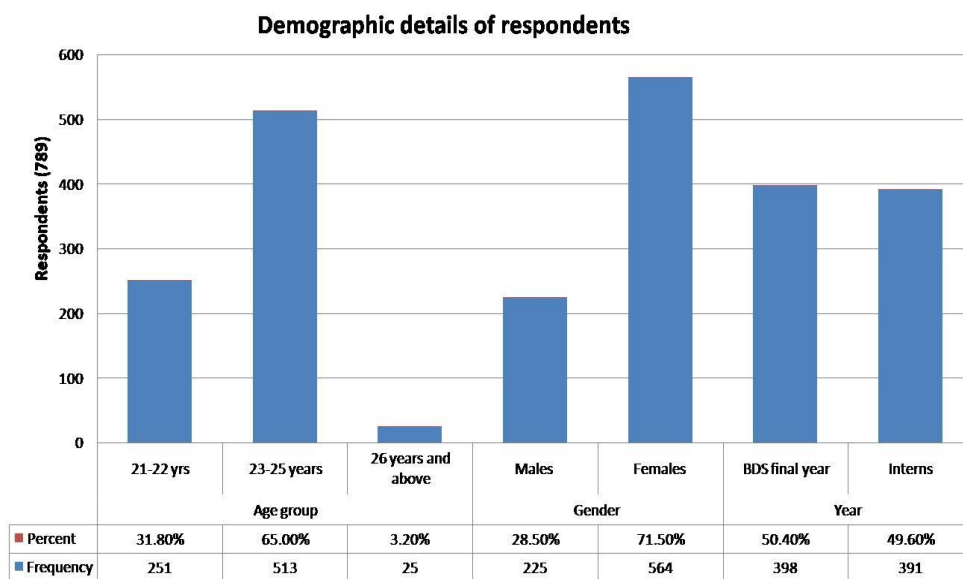
Z: 1.96

**Statistical Analysis:**

SPSS (Version 16.0. Chicago, SPSS Inc.) was utilized for data analysis. Initially, the data was input into a Microsoft Excel spreadsheet before being transferred to SPSS for further examination. Frequencies were used to summarize and present demographic variables and questionnaire item responses. Given that the survey instrument employed a Likert scale, individual item scores and domain scores were represented as means and standard deviations. Chi-square tests were employed to compare item responses across gender and year. The threshold for statistical significance was established at 0.05.

**RESULTS**

The questionnaire was completed by 789 dental students from various institutions across India. Participants were 21 years of age or older, with 65% falling between 23-25 years old. The gender distribution showed 72% female and 28% male respondents. The study sample was evenly split between final year students and interns, each comprising 50% of the participants. Figure 1 illustrates the demographic breakdown of the respondents, presenting the frequency and percentage of their characteristics



**Fig 1- Demographic details of respondents i.e. Age, Gender and Year of study**

The survey results indicated that 80% of participants were familiar with soft skills (with a non-significant p-value of 0.282). However, many respondents lacked awareness of the various soft skill categories (with pvalue = 0.282 showing non-significant result). A significant number of individuals were unaware that soft skills encompassed various categories and could be acquired through education and practice (significant p value=0.044) as shown in Fig-2

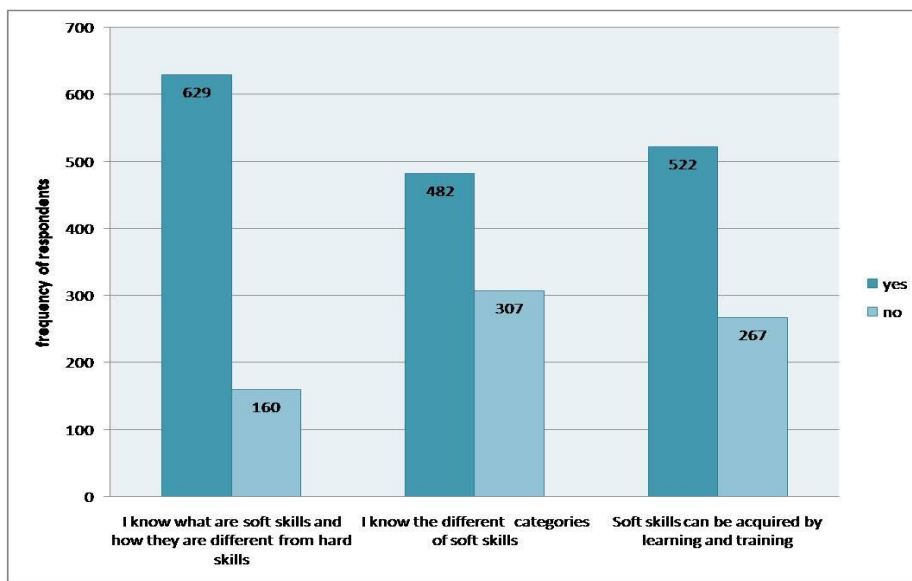


Fig 2- Knowledge about Soft skills

Concerning the self-assessment of various soft skill categories, the majority of participants indicated that they "agree" rather than "strongly agree" to possessing these skills (Fig 3). This suggests a moderate level of confidence in their soft skill abilities among the respondents.

**Self Perceived Level of Soft skills**

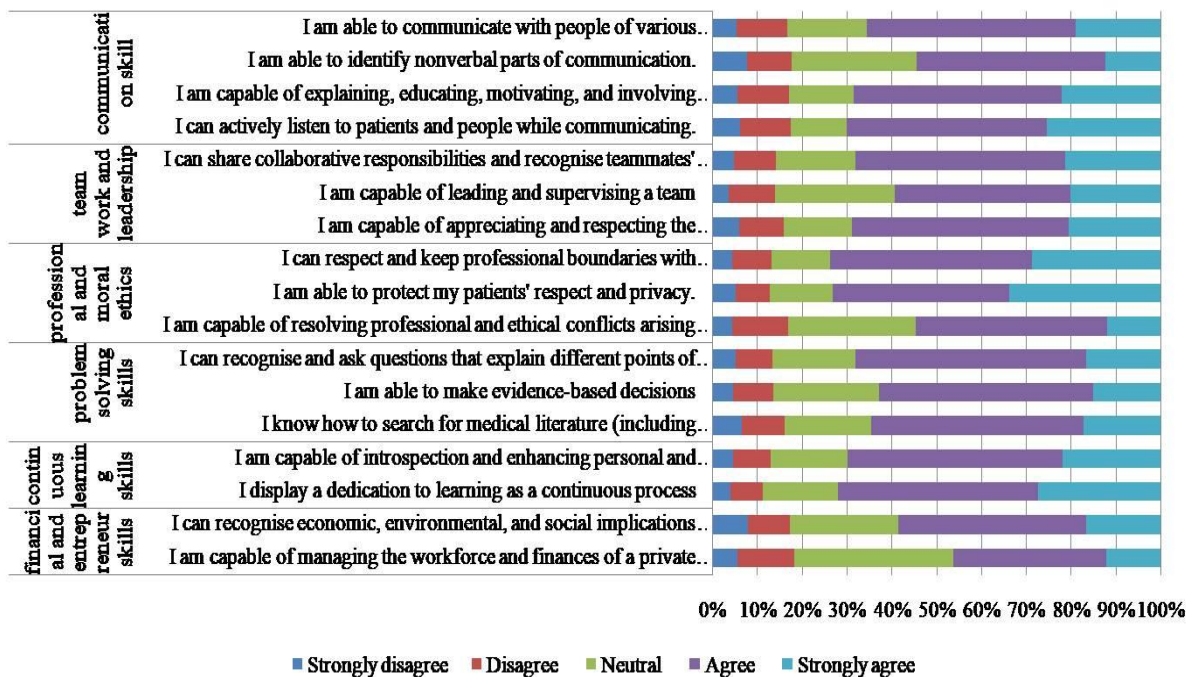


Fig 3- Self perceived level of soft skills

The mean of Likert scale for each category is shown in Table 1. This shows that participants agree to have these competencies in them but they do not strongly believe to possess them.

**Table 1- Table showing mean scores of perceived level of soft skills and p value across gender and year of study**

Domains of Soft skills	Components of Questionnaire	Mean (of likart scale)	SD	P Value (by Year of Study) S/NS	P Value (by Gender) S/NS
<i>communication skill</i>	I can actively listen to patients and people while communicating.	2.7161	1.14462	0.017 S	0.026 S
	I am capable of explaining, educating, motivating, and involving patients in their treatment plan.	2.6781	1.10733	0.033 S	0.051 NS
	I am able to identify nonverbal parts of communication. (understanding body language and gestures)	2.4106	1.07401	0.796 NS	0.007 S
	I am able to communicate with people of various ages, genders, cultures, and socioeconomic backgrounds.	2.621	1.08151	0.355 NS	0.002 S
<i>team work and leadership</i>	I am capable of appreciating and respecting the attitude, behaviour, and beliefs of team members.	2.6755	1.08809	0.178 NS	0.022 S
	I am capable of leading and supervising a team	2.6147	1.03546	0.427 NS	0.247 NS
	I can share collaborative responsibilities and recognize teammates' contributions	2.7009	1.05521	0.177 NS	0.053 NS
<i>professional and moral ethics</i>	I am capable of resolving professional and ethical conflicts arising from a mishandled case as a result of my negligence.	2.4512	1.00214	0.468 NS	0.021 S
	I am able to protect my patients' respect and privacy.	2.8872	1.1146	0.151 NS	0.017 S
	I can respect and keep professional boundaries with patients, coworkers, and the public.	2.8454	1.07175	0.088 NS	0.016 S
<i>Critical thinking and problem solving skills</i>	I know how to search for medical literature (including online), evaluate it critically, and use the available scientific information to treat the patient	2.5868	1.08596	0.754 NS	0.038 S
	I am able to make evidence-based decisions	2.5944	1.00014	0.18 NS	0.019 S
	I can recognize and ask questions that explain different points of view and lead me to a better treatment option	2.6578	1.01861	0.358 NS	<0.001 S
<i>continuous learning skills</i>	I display a dedication to learning as a lifelong process	2.839	1.03404	0.073 NS	0.016 S
	I am capable of introspection and enhancing personal and professional development via continual learning.	2.7427	1.0354	0.432 NS	<0.001 S
<i>financial and entrepreneur skills</i>	I am capable of managing the workforce and finances of a private dental set up.	2.3447	1.02768	0.445 NS	0.001 S
	I can recognize economic, environmental, and social implications in professional practice	2.4981	1.1159	0.221 NS	0.024 S

Among the various skills assessed, financial and entrepreneurial abilities scored the lowest, with mean values of 2.34 and 2.49 respectively. These scores were notably lower than those of other skills evaluated. Additionally, a significant gender disparity was observed in managing the workforce and finances of a private dental practice ( $p = 0.001$ ), as well as in recognizing economic, environmental, and social implications in professional practice ( $p = 0.024$ ), as shown in Table 1.

Communication skills exhibited a notable difference between final year students and interns, with  $p$  values of 0.033 and 0.017. Interns perceived themselves as more proficient communicators compared to final year students. Gender-wise analysis revealed significant differences in most soft skills, with male participants expressing stronger agreement about possessing these skills than their female counterparts. However, teamwork and leadership skills showed no significant gender-based differences, with  $p$  values of 0.247 and 0.053 respectively. Nonetheless, male participants demonstrated a significantly higher capability in appreciating and respecting the attitudes, behaviors, and beliefs of team members compared to females ( $p = 0.022$ ).

## DISCUSSION

An individual should possess various soft skills, including communication, leadership, time management, problem-solving, adaptability, and receptiveness to new information and experiences. Effective communication occurs when information and understanding are exchanged between two people through any efficient means, whether verbal, non-verbal, or written. The impact levels of body language, tone of voice, and words are 55%, 38%, and 7%, respectively. Essential components of effective communication include active listening and history taking. Non-verbal communication, such as facial expressions, contact, gestures, proximity, and eye contact, also contribute to effectiveness, although within cultural contexts. These abilities, while not inherent, can be developed through experiential deep learning processes and aid in rapid career advancement [18].

In our research, 789 students from across India responded to an online questionnaire, with 80% demonstrating remembrance of soft skills according to Bloom's revised taxonomy [19]. This knowledge needs to evolve into understanding and application in patient care and interpersonal interactions. Such development will not only strengthen patients' trust in their dentists but also improve patient compliance. Holt and McHugh [20] observed that a dentist's interpersonal qualities were the primary reason for patients switching dentists. Effective communication fosters a stronger group, assisting the team leader in organizing activities and, consequently, reducing stressful situations [21]. The dental profession requires proficiency in six distinct categories of soft skills: communication, teamwork and leadership, professional and moral ethics, critical thinking and problem-solving, continuous learning, and entrepreneurial abilities. These competencies have been integrated into dental undergraduate curricula in various countries. Notably, our study revealed that 39% of participants were unaware of these classifications.

Effective communication is vital for medical practitioners. Our research demonstrated a significant difference in communication skills between final-year students and interns, with P values of 0.033 and 0.017, indicating interns' self-perceived superiority. This disparity may be attributed to interns' extended clinical exposure. Cowpe et al [12] emphasized several soft skill competencies for European dental graduates, including communication, problem-solving, team building, leadership, professionalism, and social interaction. A BMJ Open study [22,23] showed that employing appropriate communication techniques, such as expressing empathy and offering reassurance, can alleviate patient anxiety. Manogue et al [24] stressed the importance of developing strong communication, professional, and behavioral competencies during undergraduate education.

The doctor-patient relationship is established and sustained through open communication, which extends beyond mere fact-sharing. This interaction is crucial for diagnosis, treatment planning, reaching agreements, and ensuring patient adherence. Involving patients in treatment planning fosters shared responsibility and enhances compliance likelihood. Non-verbal communication aspects, such as the doctor's proximity to the patient, forward lean, and body alignment, have been associated with increased patient satisfaction and compliance. Our study revealed a mean score of 2.41 for non-verbal communication skills, indicating room for improvement in this area. Dental school curricula should incorporate instruction in both verbal and non-verbal effective communication techniques. Dental students should be trained to attentively consider patient feedback, address concerns, and treat each individual as unique [25].

Effective communication faces several challenges, including time limitations, [26] insufficient experience/practice, lack of cultural competency skills among practitioners, and reluctance to form relationships with patients from diverse backgrounds.

Among various skills, financial and entrepreneurial abilities scored the lowest, with mean scores of 2.34 and 2.49 respectively. Financial management is crucial, whether practiced independently or in collaboration with hospitals or educational institutions [27]. After completing their education and residencies, some dentists opt for employment in hospitals and healthcare facilities, while others choose to establish private practices. Dentists who open their own practices must possess strong business acumen to run their enterprises successfully. They should be able to create business structures and work independently. Their responsibilities include hiring and training staff, ensuring legal compliance, marketing, and managing daily operations. Financial and entrepreneurial skills contribute significantly to establishing a thriving dental practice.

The dental profession requires frequent collaboration and teamwork among specialists. Our study revealed that both genders showed equal inclination towards teamwork and leadership. However, male participants demonstrated a greater ability to appreciate and respect team members' attitudes, behaviors, and beliefs compared to their female counterparts. Students should develop relationship and teamwork skills early in their education, as these are essential for patient interactions. While some dentists enjoy positive relationships with colleagues, Jupp discovered that many face staff-related

issues leading to a negative work environment [28]. She attributed this to insufficient emphasis on developing soft skills like teamwork and leadership. Abbas et al's research indicates that medical schools do not allocate enough time for leadership and management training [29]. Nevertheless, students recognize the importance of acquiring these skills. A study of Canadian dental students showed positive results for team competency [30]. The ADEA survey on professional competencies also supported this finding [31]. At the University of Manchester, students exhibited teamwork skills, but underlying relationship conflicts were inevitable, as noted by Qualtrough [32]. She emphasized that effective teamwork is a learned skill and an integral part of dental education. Brodsky et al [33] also stress the importance of formal training to develop collaborative abilities. Their study concluded that formal teamwork training and team-based practices in neonatal intensive care significantly enhanced teamwork, communication skills, mutual support and respect, information sharing, and situational awareness. Educational programs should incorporate planning and treatment of shared patients, as shared responsibility would foster positive interactions among team members and improve overall team performance.

Moral quandaries emerge when individuals face multiple ethical choices. Our research revealed notable gender disparities in professional and ethical competencies, such as the ability to address professional and ethical conflicts arising from negligent case management. Participants demonstrated proficiency in safeguarding patient dignity and privacy, as well as maintaining appropriate professional boundaries with patients, colleagues, and the public. When necessary, referring cases to more qualified dentists is an ethical course of action.

Students must recognize that clinical training extends beyond enhancing technical knowledge and skills; it also aims to instill professional and ethical standards crucial for delivering high-quality patient care. A key objective of dental education is fostering professionalism and adherence to ethical and moral principles within the dental field and society at large. Respecting patient confidentiality is a testament to honoring their privacy rights. Building patient rapport and trust necessitates respecting their individuality and privacy [35,36].

To navigate conflicting interests, students require instruction in ethical decision-making and critical thinking. In fact, nurturing critical thinking is a fundamental educational goal [37]. Critical thinking and decision-making encompass reasoning, creativity, responsible problem-solving, drawing conclusions, and effectively acquiring, evaluating, and applying information [38].

Dentists have both ethical and legal obligations to stay current in their field, enabling them to offer patients the most advanced treatment options [39,40]. The implementation of self-directed continuing professional development programs aims to motivate individual dentists to continuously enhance their knowledge and skills.

Dental schools should lay the groundwork for lifelong learning, emphasizing its importance to prepare students for future dental practice. Various pedagogical approaches have been employed to teach soft skills, including lectures, seminars, case-based studies, problem-based learning (PBL), project-oriented PBL (POPBL), and simulation laboratory activities [41, 42]. The development of a soft skills competency model should follow a scientific approach, such as Kern's six-step method [43]. This process should allocate sufficient time for assessing general and specific needs, defining goals and specific learning objectives, selecting teaching-learning methods and assessment tools, organizing and implementing the program, and finally, evaluating it through internal or external bodies like the Internal Quality Assurance Committee of the respective Institute and the National Accreditation Board, India's statutory external evaluating agency.

While soft skills can be taught through didactic methods, student-centered and experiential learning approaches, such as role-playing, can be more effective. In the Indian context, "nukkadnatak" [44], also known as "path natya" in Marathi, is a street drama technique used to raise awareness about social and behavioral issues.

## **CONCLUSION**

In conclusion, this study provides valuable insights into the soft skills awareness and self-perceived competencies of dental students in India. While a majority of participants were familiar with soft skills, there is a clear need for increased awareness and education regarding the various categories of these skills. The moderate levels of confidence reported across different soft skill categories suggest room for improvement in dental education curricula. Notably, financial and entrepreneurial abilities emerged as areas requiring particular attention. Gender disparities in certain skills and the differences observed between final year students and interns highlight the importance of tailored educational approaches. To address these gaps, dental schools should consider implementing comprehensive soft skills training programs that incorporate diverse teaching methods, including experiential learning and role-playing. By focusing on developing these crucial competencies, dental education can better prepare students for the multifaceted challenges of professional practice, ultimately leading to improved patient care and career success.

### Recommendations:

1. Incorporate soft skills training in dental curricula.
2. Focus on non-verbal communication, financial, and entrepreneurial skills.
3. Implement experiential learning approaches.
4. Develop a soft skills competency model.
5. Allocate time for needs assessment, objective setting, and program evaluation.
6. Utilize internal and external quality assurance measures.

Conflict of Interest: Nil

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