STANDARDIZATION AND IMPLEMENTATION OF A SCALE FOR ASSESSMENT OF PROFESSIONALISM AMONG DENTAL STUDENTS

SYNOPSIS

Submitted to

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INTRODUCTION

Professionalism

Professionalism is a multi-faceted and dynamic concept that changes with time and according to various cultural backgrounds. It is also considered second-order competence. The concept of professionalism has become a recurring topic, but educators are putting in significant effort without achieving widespread agreement on uniform standards related to professionalism. Today, any health care worker must act according to professional standards more than ever, yet assessing professionalism remains a gap in the formal curricula.

Professionalism is grounded in three key principles: prioritizing patient welfare, respecting autonomy, and promoting social justice. Tools designed to evaluate medical professionalism can be categorized into three groups: those that view professionalism as a component of competence, those that see it as an all-encompassing concept, and those that focus on distinct aspects of professionalism, like empathy and humanism. Overall, professionalism encompasses the traits, behaviors, commitments, values, and objectives that define a profession. In contrast, ethics involves the examination of morality, which includes a detailed and systematic assessment of moral choices and actions, along with the implementation of those choices. Therefore, professionalism is a habitual framework that embodies vital beliefs and virtues aimed at fostering public trust in healthcare professionals.

Professionalism plays a vital role in dental education, influencing students to become competent and ethical practitioners. Developing professionalism is a continuous process that begins in dental school and extends throughout a dental professional's career. Professionalism is essential in dental education because it helps dental students learn how to provide compassionate and empathetic care to patients. It also teaches them the importance of ethical practice and the need to comply with professional standards and regulations.

Assessing dental students' professionalism is critical to ensuring they possess the skills and values required to provide exceptional patient care and contribute positively to the dental profession. It helps dental schools identify areas for improvement in their education and training programs and develop targeted interventions to enhance professionalism among their students. Furthermore, assessing professionalism in dental education is critical for maintaining public trust and confidence in the dental profession and ensuring that all patients obtain the highest quality of care.

Students in India learn professionalism indirectly also, from their tutors as their role models. They keenly observe the behavior of their teachers, including patience, professional integrity, interpersonal relations, teamwork approach, and direct and indirect actions. The students have their attitudes towards professionalism gained from their own experiences with family physicians and dentists and are also influenced by interactions with peers or senior students. The cultural background, gender, and age of the students also play a role in affecting their professional attitudes. The hidden curriculum of college also plays a substantial role in molding the students to develop a sense of professionalism. Good communication skills, healthier interaction with seniors, and cheerful role model staff can strengthen the sense of professionalism in students.

There is a clear transition from the conventional relationship between patients and doctors, as well as how dental care is delivered. With advancements in science and technology, along with the growing needs of patients, their families, and the community, there is an increasing focus on the overall health of the community. This change emphasizes a greater responsibility towards society. Like other health professionals, dental specialists encounter numerous ethical dilemmas. Therefore, everyone involved in healthcare needs to equip themselves to address these challenges. To achieve this and foster human values, all trainees need to participate in ethical training through lectures, discussions on moral issues, and debates on cases with significant ethical considerations.

Definition of professionalism:

Hilton and Slotnick (2005) described professionalism as something that is developed over time, rather than being an inherent quality. They outlined six areas associated with professionalism. One category includes personal (intrinsic) characteristics, which encompass ethical behavior, self-reflection and awareness, and taking responsibility/accountability for one's actions, as well as a dedication to excellence, lifelong learning, and critical thinking. The other category focuses on collaborative traits such as respect for patients, teamwork, and social responsibility. They summarized this with a statement about a reflective physician who conducts themselves ethically.

In 2009, Wilkinson and colleagues identified five critical themes related to ethical practice in healthcare. These themes include adhering to moral principles, establishing effective communication with patients and their loved ones, cultivating effective relationships with healthcare colleagues, prioritizing reliability, and showing commitment to maintaining and improving competence in oneself, others, and healthcare systems. Various organizations and authors have given different definitions depending on their contexts and societal needs. Professionalism forms the foundation of the medical profession's agreement with society. Some key tenets of professionalism encompass prioritizing patient welfare, honoring patient autonomy, dedicating oneself to social justice, ensuring professional competence, being truthful with patients, upholding patient confidentiality, fostering appropriate relationships with patients, enhancing the quality of care, improving access to healthcare, ensuring an equitable distribution of limited resources, possessing scientific knowledge, maintaining trust by addressing conflicts of interest and fulfilling professional obligations.

Taking into account all the definitions mentioned above, it is clear that professionalism is a multifaceted notion that is dynamic and varies across various cultural contexts. One consensus on this construct is sometimes challenging to draw. Few authors also suggest that as it is a dynamic construct beauty lies in, not to define professionalism in the strict sense.

Research Context:

The curriculum aims to teach professionalism to both undergraduate and postgraduate students. Doctoral students are particularly well-suited to demonstrate professionalism due to their advanced skills and knowledge. On the other hand, postgraduates are typically between 24 and 30 years old, an age where many different personal and social obligations can impact their behavior and attitudes. Some may even be married or have family responsibilities while pursuing professional learning. These students already possess essential undergraduate competencies and are at a stage where they need to balance their personal and professional lives. They can become researchers, academicians, private practitioners, or entrepreneurs dealing with dentistry-related materials and equipment. This is why the researcher chose postgraduate students to assess their professionalism-related ideas.

No research has been conducted on the level of professionalism among Indian postgraduate dental students. The researcher has developed a tool or scale for this purpose, drawing on various concepts from literature and conducting multiple interviews with stakeholders such as private practitioners, faculty members, students, and patients. This study purposes to identify the fundamental constructs of professionalism values expected from a postgraduate dental student to establish a baseline for the Indian context. This research could lead to curriculum reforms aimed at enhancing teaching and learning methods and promoting professionalism in the dental field.

Research Questions:

- What basic constructs of professionalism are essential for postgraduate dental students?
- What fundamental values are essential as constructs of the scale of professionalism according to faculties, dental students, dental practitioners, and patients?
- Why is an assessment of professionalism needed for existing postgraduate dental students in India?

- How will the assessment of professionalism help the existing teaching-learning practices of the dental curriculum?

The rationale of the study:

The assessment of professional behavior is crucial for evaluating the success of teaching strategies in any institute. Without proper assessment, it's difficult to determine the effectiveness of educational approaches. The need for developing new assessment tools arises from the growing interest in teaching and evaluating professionalism. It's important to create culturally relevant assessment tools, especially in the context of dental education in India. Existing literature suggests that assessing professionalism in dentistry is time-consuming but essential. Therefore, there's a need to develop a professional assessment scale tailored to the Indian cultural and professional framework. This scale should integrate input from patients, dental experts, faculty, and students to confirm its reliability and validity. With this in mind, a study is proposed to create and validate a professional assessment scale for postgraduate dental students.

Dental education should place significant importance on the advancement of soft skills alongside the acquisition of theoretical knowledge. Professionalism stands out as a vital attribute that aspiring dental surgeons must diligently cultivate. A dentist who possesses robust professional skills is not only better prepared to navigate the complexities of clinical practice but also effectively manage their personal and professional life, fostering a holistic approach to their career.

Recognizing the need for professionalism is merely the first step; its active development is equally crucial. To elevate the standards of professionalism, it becomes essential to pinpoint the various factors that contribute to it. A key question in this exploration is how these elements can be assessed accurately. Research with in the realm of dental education is focused on exploring these complexities. It is evident that before we can implement strategies to enhance professionalism among dental students, we must first evaluate its current state.

The initial step in assessing professionalism involves identifying the potential components that constitute this multifaceted concept. Following this identification, it is important to develop a specialized assessment instrument grounded in these components, capable of measuring professionalism effectively. At present, there is no established scale in India tailored specifically for postgraduate dental students. Nonetheless, the investigator tried creating such an assessment tool aimed at measuring professionalism. Although some international scales exist in the literature, they often lack applicability to Indian students due to cultural and contextual differences.

The longstanding maxim that “assessment drives learning” holds particular significance in this context. The assessment framework employed by any educational institution mirrors the effectiveness of the teaching strategies implemented within it. Without a methodical assessment of professional behavior, educators cannot ascertain whether their pedagogical efforts have been fruitful. Professionalism encompasses a wide array of domains that are often challenging to evaluate. As Arnold famously noted, "Without dependable assessment tools, inquiries regarding the efficacy of methods for teaching learners about professional behavior will remain unanswered effectively.".

Therefore, a pressing need was felt to develop innovative assessment tools in response to the increasing interest in teaching and evaluating professionalism. Crafting assessment tools that resonate with the cultural nuances of dental education in India is particularly important. Existing literature indicates that while assessing professionalism in dentistry may be a time-intensive process, it is nonetheless indispensable. This scale should incorporate feedback from a diverse range of stakeholders, including patients, dental practitioners, faculty, and students, to confirm its successful application. In light of this need, a study is proposed to develop and validate a professional assessment scale tailored for postgraduate dental students, ultimately aiming to increase the quality of dental education and practice in India.

Statement of the problem

Standardization of Scale to measure professionalism in postgraduate dental students.

In India, the landscape of dental education is evolving, yet a significant gap persists concerning the assessment and development of professionalism in postgraduate dental students. Professionalism is a multifaceted construct that encompasses not only clinical competence but also adherence to ethical standards, communication skills, and an understanding of societal values. Despite the critical role professionalism plays in ensuring high-quality patient care and fostering trust within the healthcare system, there is currently no standardized framework that articulates the essential competencies expected of dental professionals in the Indian context.

Existing international frameworks for measuring professionalism often do not account for the unique societal and cultural nuances of India. They may overlook important dimensions such as the interplay between personal and professional identity, the ethical obligations towards diverse populations, and the expectations of various stakeholders including patients, educators, and the community at large. This lack of context-specific guidance leads to inconsistencies in how professionalism is understood and taught in dental programs, ultimately impacting the preparedness of graduates to meet the psychological needs of society.

Furthermore, the absence of a comprehensive assessment tool means that important components of professionalism may be neglected in contemporary dental education, leading to potential deficits in important skills such as empathetic communication, ethical decision-making, and teamwork. As a result, postgraduate dental students may graduate without a fully developed professional identity or the competence required to navigate complex ethical dilemmas in their practice.

In light of these challenges, this study strives to address the urgent need for a tailored framework to measure professionalism among postgraduate dental students in India. By identifying the foundational values and competencies essential for professionalism within the Indian context, this research aims to not

only facilitate better assessment but also to inform the development of targeted educational strategies that foster these ideals within dental programs. Ultimately, this effort will contribute to enhancing the quality of dental education and practice in India, ensuring that graduating professionals are well-equipped to serve the needs of their communities.

Objectives of the Study

1. To analyze and identify the constructs and domains of professionalism for Indian postgraduate dental students.
2. To prepare and standardize the scale of professionalism for Indian postgraduate dental students.
3. To implement the scale of professionalism in the context of Indian postgraduate dental students to develop norms.
4. To study the relationship of the professionalism scale with various demographic factors.

In this study, the concept of professionalism was operationalized as

Professionalism is described as the integration of various essential skills of an individual to act ethically in both their personal and professional lives, while also advocating for and contributing to societal benefits

Hypotheses

Ho1: There will be no significant difference in the mean professionalism score of male and female students

Ho2: There will be no significant difference in the mean professionalism score of married and unmarried students

Ho3: There will be no significant difference in the mean professionalism scores of students of parents with health care or no healthcare backgrounds.

Ho4: There will be no significant difference in the mean professionalism score between students who opted by interest or by compulsion

Ho5: There will be no significant difference in the mean professionalism score between students having siblings or no siblings

Ho6: There will be no significant difference in the mean professionalism scores of students of urban and rural environments.

Ho7: There will be no significant differences in the mean professionalism scores of students according to I, II, and II years of postgraduation

Ho8: There will be no significant difference in the mean professionalism scores of students according to various Family incomes

Ho9: There will be no significant difference in the mean professionalism scores of students according to whether they attended any formal training /courses on professionalism and ethics or not

Methodology:

Source of Data: Dental Colleges in India offering postgraduate courses were included as sources of data. All three years of postgraduate students with nine branches of specialization willing to participate in the study comprised for the source of data.

Population**:**

The population consisted of all postgraduate dental students in India who were enrolled in various dental colleges offering postgraduate courses. There are approximately 200 colleges in India that provide doctoral programs, but the number of available seats is subject to change every year based on annual inspections and the availability of faculty. Additionally, not all seats are filled in either private or government dental colleges.

Sample:

In this study, we aimed to develop and standardize a tool to measure the professionalism of postgraduate students. This was the first phase of the research, which required two separate sample groups for standardization and subsequent implementation of the tool.

Phase-1 sample

Pilot study with 100 postgraduate students

Data was collected between December 2020 and August 2023. Due to the significant restrictions during the COVID-19 pandemic, the standardization phase of the scale began under challenging conditions. The researcher was only able to conduct a pilot study through direct physical interaction at two dental colleges with postgraduate programs in Vadodara.

In the first phase of constructing the tool, 100 postgraduate students participated in a pilot study. For the pilot study, all post-graduates from two dental colleges in Vadodara were selected**.**

College Name	Students number
K M Shah Dental College	64
Manubhai Dental College	36
Total	100

A total of 25 experts contributed their insights and expertise in the finalization of various constructs and items for the scale. Initially, 15 specialists were involved in the development phase before the pilot test, helping to refine a comprehensive 35-item questionnaire.

Following this,10 additional experts participated in the validation process, meticulously evaluating and confirming the relevance and efficacy of an updated 20-item questionnaire.

Phase 2 sample

Implementation of scale with 410 postgraduate students

30 students participated separately in the test and retest reliability of the scale

The formula used for sample size determination is as per Slovin's formula, and the available data obtained from the DCI site for dental postgraduates in India.

P 6693, d =0.05, p as per data available on DCI Year 2021-22

N = P/ (p x d2) + 1

= 6696/ (6696 x 0.05 x 0.05) + 1

= 6696/ (6696 x 0.0025) + 1

= 6696/17.74

= 377.45

Therefore, the minimum sample size required was 378 postgraduate students for the implementation of the scale. Out of 415 students who participated in the online mode with consent, the data from five students who didn't complete the questionnaire properly was excluded, leaving a total of 410 students for data evaluation.

Final sample -100 postgraduate students for a pilot study

410 for the implementation of scale

30 students for test-retest reliability

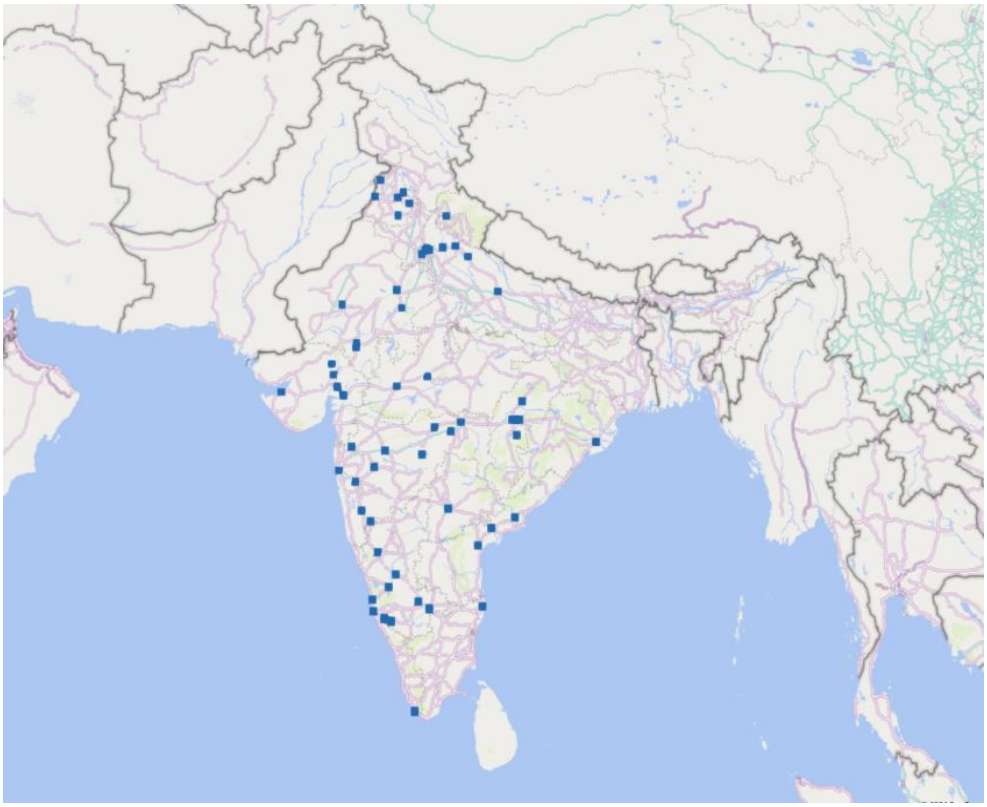
Sampling method

The random sampling method was utilized for the selection of colleges offering postgraduate courses in India, and the purposive sampling method was used for the selection of postgraduate students.

Setting and Participants

After conducting a pilot study and finalizing a 20-question questionnaire, data were collected using an online survey created with Google Forms. Students were informed about the study's purpose and scope, and the link to the online survey was shared in various postgraduate WhatsApp groups available across India.

The questionnaire also included information about the purpose of the study, and participants were asked to give consent to the statement, "I consent to participate in the study." This permitted online consent from all the participants.



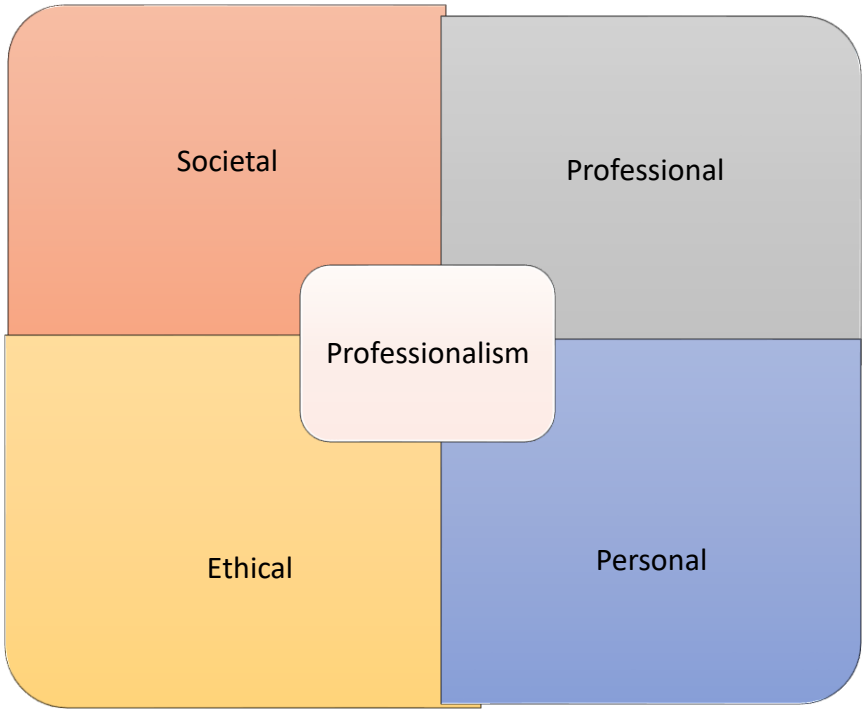


Figure 2: Domains of Professionalism

Table :1 VARIOUS CONSTRUCTS OF THE SCALE OF PROFESSIONALISM

Societal	Teamwork and Collaboration. Prevention, promotion, and maintenance of public health Supporting people of all communities (solidarity) Sustainable living Ethical usage of social media
Professional	Good listener and effective communicator Compassionate toward patients Professional integrity Lifelong learning Accountability
Ethical	Autonomy of patients Equitable justice Beneficence Nonmaleficence Confidentiality
Personal	Resiliency/adaptability Work-life balance Personal integrity Self-discipline Self-reflection

Tool for data collection: Scale of Professionalism

A total of 50 items were initially created after a thorough literature review. Following discussions and analysis, a researcher with expertise in dentistry and professionalism collaborated with two senior experts from the Departments of Education and Psychology to narrow the items down to 35. Professionalism lacks a consensus definition, leading to efforts to clarify its meaning. Key components like sustainability, personal upliftment, lifelong learning, and work-life balance are often overlooked in existing scales, and no scale has successfully integrated the four domains: Ethical, Personal, Professional, and Societal. To fill this gap, the researcher established a 35-item scale with an equitable focus on each domain—5 statements for Ethical and 10 each for Personal, Professional, and Societal dimensions. Participants rated each item on a five-point scale from "strongly disagree" (1) to "strongly agree" (5), including both positive and negative statements.

A total of 25 experts contributed to finalizing various constructs for the scale, with 15 specialists involved in developing a 35-item questionnaire during the initial phase. The validation process included 25 dental practitioners and faculty from colleges across India, with participants averaging 45 years old. Feedback from experts regarding components of professionalism indicated their appropriateness, though many recommended consolidating similar components for clarity.

After a pilot study, 15 statements were removed, leaving 20 for evaluation. A panel of 10 experts emphasized simplicity and suggested removing negative statements to maintain a positive framework. Consequently, all statements were rephrased positively, transforming the scale into a five-point rating system rather than a traditional Likert scale. Following these revisions, 10 additional experts validated the updated 20-item questionnaire.

The scale includes four major domains: Societal, Personal, Professional, and Ethical. Various constructs like teamwork and collaboration, prevention, promotion, and maintenance of public health, solidarity, sustainable lifestyle, ethical use of social media; resilience and adaptability; work-life balance; honesty and personal integrity; self-discipline; and reflection were incorporated in the scale.

CONCEPTUAL AND OPERATIONAL DEFINITIONS OF VARIOUS CONSTRUCTS OF PROFESSIONALISM

Societal:

Teamwork and Collaboration: A team is a unified group working towards a common objective, leveraging individual strengths to achieve collective success. Effective teamwork involves seamless communication, mutual respect, and shared accountability, fostering an environment of trust and collaboration. The capacity of team members to work together and communicate well, foresee each other's requirements, and establish trust is referred to as teamwork. Collaboration, on the other hand, is a formal process where individuals with different areas of expertise come together to solve problems or create something new. This process promotes innovation, efficiency, success, better communication, and problem-solving, ultimately improving teamwork. Sippli et al (2017)

Prevention, promotion, and maintenance of public health encompass strategies to empower individuals and communities to make informed health choices, reduce the burden of chronic diseases, and enhance overall well-being. These efforts involve education, advocacy, and community engagement to promote healthy behaviors and improve access to healthcare services. It aims to reduce chronic diseases and improve well-being by empowering individuals and communities with the knowledge and skills to adopt healthy behaviors and practices. These strategies include education, awareness campaigns, and community engagement to promote healthy choices and improve access to healthcare. Chiu et al (2020)

Supporting people from all communities through solidarity fosters a sense of unity and mutual support among individuals with shared values and goals. Solidarity promotes empathy, cooperation, and collective action, creating a cohesive and inclusive community that stands together in pursuit of common interests. Psychological unity arises when people come together to pursue a common cause or overcome a shared challenge. Solidarity can be seen as a form of social glue that binds people together and fosters a sense of belonging, unity, and collective identity. It has been a driving force behind many successful social movements, from civil rights to labor rights to environmental justice. Hargreves and Connor (2018)

Sustainable living practices focus on conscientious daily choices to preserve natural resources and protect the environment for future generations. By adopting sustainable living habits, individuals reduce their ecological footprint, minimize waste generation, and contribute to a healthier planet for all. It aims to minimize our ecological footprint and reduce negative impacts on the ecosystem while maintaining a healthy balance between human activities and nature. Sustainable practices ensure that our needs are met without harming the environment for future generations. Kuhlman and Farrington (2010)

Ethical use of social media demands a profound commitment to upholding individuals' dignity, privacy, and confidentiality in online interactions. Respecting ethical principles involves safeguarding personal information, promoting respectful communication, and fostering a safe and inclusive digital environment for all users. It involves being mindful of how you interact with others online, respecting their opinions, and not engaging in any activity that might harm or offend them. It also means knowing the potential risks of sharing personal information online and safeguarding your and others' privacy. For instance, refrain from sharing sensitive or confidential information, use strong passwords, and be vigilant about who you connect with on social media. By adopting these ethical principles, we can create a safer, more respectful online environment for everyone. Chretien and Kind (2013) Gurayaet al (2021)

Professional:

Good listener and effective communicator: Proficiency in communication is a fundamental skill to augment our relationships in personal and professional domains. It encompasses the act of speaking and the practice of active listening and empathetic understanding. Engaging in active listening means concentrating on both the message being communicated and the deeper intentions behind it while maintaining an open mindset to understand the speaker's viewpoint. Empathetic understanding refers to perceiving and acknowledging the speaker's feelings and emotions. Mastery of these skills is imperative for developing and nurturing long-lasting and productive relationships. Khalifah and Celenza (2019)

Compassion is a complex and nuanced emotion that emerges when one is confronted with the distress of another. It is a profound sense of empathy that translates into a deep desire to alleviate the pain that is being experienced. It is a selfless act of kindness

driven by a genuine concern for the well-being of others. This emotion is often described as a force that compels individuals to take action and do everything they can to ease the physical, mental, or emotional suffering of those in need. Demonstrating compassion can bring about a feeling of satisfaction and meaning, as it enables individuals to positively impact the lives of those around them. Sinclair et al (2021)

Professional Integrity: Demonstrate and promote conduct consistent with professional standards. Professional integrity is a crucial aspect that refers to the unwavering adherence to ethical standards and principles in the workplace. It involves being truthful and transparent in all your dealings, treating everyone with respect, and taking responsibility for your actions, no matter the outcome. A person with professional, solid integrity places the needs of the organization and its stakeholders above personal gain or interests. It is an essential quality that inspires trust, promotes teamwork, and fosters a workplace culture of honesty and accountability. Coverdale et al (2016)

Lifelong learning is a continuous and self-directed quest for knowledge that individuals undertake for personal or professional growth. It involves a voluntary commitment to learning that expands beyond traditional formal education. Pursuing knowledge can lead to personal development, social inclusion, and active citizenship. Furthermore, it can enhance competitiveness and employability in an ever-changing job market. Dunlap and Grabinger (2003)

Accountability revolves around owning one's actions and conduct concerning a task or responsibility. It encompasses the impact of one's actions on others and entails a sense of obligation to act truthfully and ethically toward others. On the other hand, responsibility is more focused on fulfilling the duties and expectations of a given role or task. Accountability involves acknowledging and accepting responsibility for one's actions and the consequences for others and always striving to act ethically and truthfully. Peetet et al (2023)

Ethical:

Autonomy: The right for individuals to make decisions based on their values, beliefs, and desires is an essential aspect of personal independence and freedom. It implies that people have the right to live according to their preferences and principles without excessive outside influence or coercion. This right is fundamental in healthcare, education, and religion, where personal choices should be respected and upheld. Campbell (2017)

Equitable justice: A just society is built on the principle of meeting the needs of every individual, regardless of status or background. This means that equity is the cornerstone of such a society, where everyone can succeed and excel equally. By striving for equity, we can create a fairer world where individuals are not discriminated against based on their race, gender, orientation, or any other factor. In such a society, everyone has access to the same opportunities, and external factors beyond their control do not limit their success. Therefore, we must work together to create a just society that benefits everyone, not just the majority. Peter (2001)

Beneficence Healthcare professionals must ensure positive outcomes, such as maintaining good health and preventing or alleviating detrimental conditions in their patients. This principle emphasizes the importance of actively promoting health, preventing illness, and addressing any existing health issues promptly and effectively. This principle allows healthcare providers to help patients achieve optimal health and well-being. Bester (2020)

Nonmaleficence: The principle of non-maleficence is a widely recognized ethical standard in healthcare that demands healthcare professionals abstain from causing injury to their patients, whether deliberately or unintentionally. This belief requires healthcare providers to exercise due caution, avoid negligence, and prevent any other potential sources of harm that may arise from their actions. Ultimately, the goal is to ensure that patients receive the best care without experiencing harm or adverse effects. Girdler (2019)

Confidentiality: This principle guarantees that any information the client shares will always be kept strictly confidential. The primary objective is to establish a secure and

trustworthy environment where you can freely express yourself without fear of being judged. Your privacy will always be respected and safeguarded. Petronio et al (2004)

Personal:

Resilience is a psychological attribute that empowers individuals to navigate challenges and setbacks with fortitude and optimism. It involves cultivating mental strength, perseverance, and adaptive coping strategies to overcome obstacles and thrive in the face of adversity. It entails staying concentrated, driven, and hopeful during difficult times. Conversely, adaptability refers to the capability to modify one's approach in response to evolving situations and maximize outcomes. Individuals need to be flexible and receptive to tackle new challenges and think creatively to resolve issues. Both resilience and adaptability are crucial traits that enable individuals to navigate difficulties and achieve success in different aspects of life. Stoffel and Cain (2018)

Work-life balance entails optimizing time and energy allocation between professional responsibilities and personal pursuits. Striking a harmonious balance fosters improved well-being, heightened productivity, and enhanced satisfaction in both the professional and personal domains, leading to a fulfilling and sustainable lifestyle. Balancing both factors leads to a harmonious equilibrium, enhanced productivity, and greater overall satisfaction. This approach enables individuals to prioritize and accomplish their work tasks while having ample time for personal pursuits and well-being. It is essential to maintain physical and mental health, enhancing productivity, and achieving overall life satisfaction. By striving for a healthy work-life balance, individuals can meet their professional commitments while devoting time to their interests, hobbies, and relationships. Chittenden and Ritchie (2011)

Honesty and personal integrity are rooted in ethical principles of transparency, fairness, and sincerity in interpersonal relationships. Upholding these values involves demonstrating integrity, authenticity, and accountability in all actions and fostering trust, respect, and ethical conduct in personal and professional interactions. It involves being open and candid about your thoughts, feelings, and actions and avoiding any form of deception or manipulation. On the other hand, personal integrity refers to the ethical standards that guide your behavior toward yourself and others. It involves respecting your values and principles and treating everyone with dignity and fairness. Personal integrity also entails taking responsibility for your actions and being accountable for

the consequences of your decisions. A fundamental aspect of character shapes your reputation, relationships, and success in life. Weziak et al (2021)

Self-discipline: Self-discipline is a quality that enables people to persevere through difficulties and challenges, no matter their current physical or mental condition. It demands that individuals regularly inspire themselves and act towards their objectives, even in the face of hardships. Those who possess self-discipline can focus on the overall vision without allowing momentary obstacles or diversions to distract them. It is an essential ability for anyone looking to fulfill their dreams and realize their full potential. Simsir and Dilmac (2020)

Self-Reflection: "Reflection" is a process where learners analyze their past experiences to evaluate their learning outcomes and explore the connections between the knowledge they acquired and their pre-existing ideas. This helps them better understand the subject, develop metacognitive skills, and promote lifelong learning.

The conceptual definition and model of dental professionalism is a comprehensive framework that outlines the key attributes and competencies necessary for dental professionals to possess. This model can effectively enhance dental teaching, learning, and assessment systems. By incorporating this model into the curriculum, dental students can better comprehend professionalism. Additionally, this model can provide a clear roadmap for faculty to design enthralling learning experiences and evaluate students' performance more accurately and fairly.

Data collection and analysis:

The data collected underwent qualitative and quantitative analysis. Statistical analysis was conducted using IBM SPSS 20.0 Version (IBM, Chicago). Factor analysis was carried out using Varimax's principal component and rotation methods. Content validation involved 25 experts from various colleges in India. A five-point rating scale was created for its simplicity and time efficiency. This method provides a high-reliability coefficient even with fewer items. Ultimately, twenty items belonging to four domains were finalized. The scale used a 5-point rating ranging from strongly disagree

(1) to strongly agree (5). Each scale item was scored between 1 and 5 points, with no reverse-scored items. The scale measured four dimensions: 1) Societal, 2) Professional, 3) Ethical, and 4) Personal. The total score ranged from 0 to 100, with maximal scores indicating more positive attitudes toward professionalism.

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Table 2: Quantitative Interpretation of the Content Validity

Question/Item	Content Validation Ratio (CVR)	Result
Q1	1	Accepted
Q2	1	Accepted
Q3	1	Accepted
Q4	1	Accepted
Q5	1	Accepted
Q6	1	Accepted
Q7	1	Accepted
Q8	1	Accepted
Q9	1	Accepted
Q10	1	Accepted
Q11	1	Accepted
Q12	1	Accepted
Q13	1	Accepted
Q14	1	Accepted
Q15	1	Accepted
Q16	1	Accepted
Q17	1	Accepted
Q18	1	Accepted
Q19	1	Accepted
Q20	1	Accepted

Quantitative Interpretation of the Content Validity: The content validity of the final questionnaire is “Acceptable” for all 20 items/questions included because the CVR value is> 0.42 (critical value based on validation among 25 subject experts). The entire test's Content validity index (CVI) is 1.0, which is also greater than 0.42 (critical value), so all questions are accepted.

Table 3 Test-Retest reliability of the scale of professionalism, N=30 students

Subscale	Test-retest (ICC) (n =30)	95 % CI	Cronbach's alpha	P value
Total score	0.75	0.476 - 0.881	0.75	0.001
Societal	0.68	0.326 - 0.849	0.68	0.002
Professional / Occupational	0.64	0.234 - 0.827	0.63	0.004
Ethical	0.82	0.633 - 0.916	0.82	0.001
Personal	0.84	0.180 - 0.706	0.85	0.001

If the ICC score is <0.5, poor, 0.5 to 0.75, moderate, 0.75 to 0.9, Good, and above 0.9, excellent

Cronbach's alpha < 0.4 poor, 0.4 to 0.6 moderate, 0.6 to 0.8 good, and above 0.8 excellent

and P value < 0.05

Table 4 -KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.938
Bartlett's Test of Sphericity	Approx. Chi-Square	5.138E3
	df	190
	Sig.	.000

Initially, the Kaiser-Meyer-Olkin (KMO) sample adequacy value was found to be 0.938, showing that the sample size was sufficient for the scale of Professionalism for Dental Students. This value is considered enough when it is above 0.50 by Field (2009: 647) and classified in the "excellent" category between 0.80-0.90. The KMO values calculated for each item were also found to be the lowest, 0.930, confirming that the sample was sufficient. In addition, as a result of Bartlett's Test x2(190) = 5138;

P<0.001. This finding showed that the correlations between the items were significant enough for the scale of Professionalism for Dental students.

Table 5: Exploratory Factor Analysis

Total Variance Explained							
		Initial Eigenvalues		Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	9.624	48.121	48.121	9.624	48.121	48.121	8.78
2	1.78	8.9	57.021	1.78	8.9	57.021	4.636
3	1.117	5.583	62.604	1.117	5.583	**62.604**	6.683
4	0.88	4.399	67.003				
5	0.736	3.682	70.685				
6	0.722	3.608	74.293				
7	0.631	3.154	77.447				
8	0.567	2.837	80.284				
9	0.526	2.632	82.916				
10	0.475	2.376	85.293				
11	0.412	2.06	87.353				
12	0.389	1.944	89.297				
13	0.353	1.765	91.062				
14	0.314	1.572	92.634				
15	0.295	1.474	94.108				
16	0.29	1.449	95.557				
17	0.271	1.353	96.91				
18	0.248	1.238	98.147				
19	0.203	1.014	99.161				
20	0.168	0.839	100				

Extraction Method: Principal Component Analysis.

a. When components are correlated, the sums of squared loadings cannot be added to obtain a total variance.

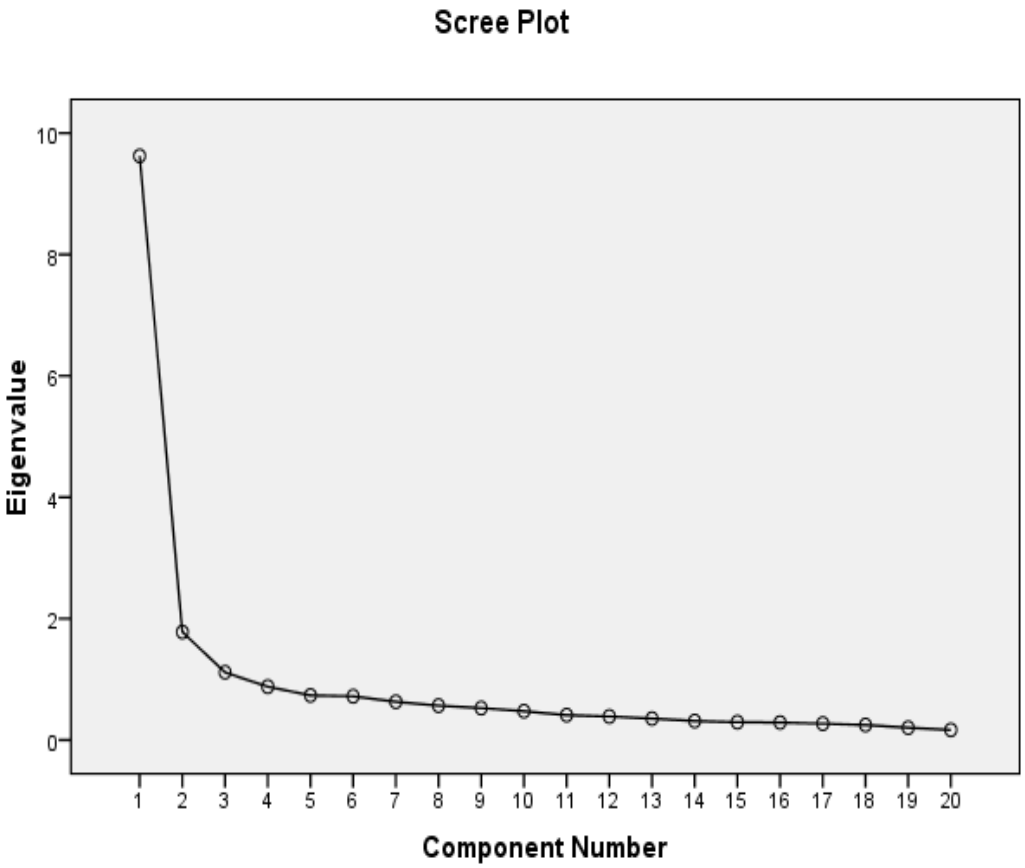
Exploratory Factor Analysis (EFA) was conducted to determine the construct validity of Professionalism for Dental students and to reveal the factor structure. For this, principal components and direct oblimin rotation methods were used. The reason for this is that the main components method is the most frequently and quickly used method in practice, and the direct, oblique rotation method is used when it is considered that there is a relationship between the factors.

Table 6: Factor analysis results for the scale of Professionalism for Dental students

Items	Mean	Std. Deviation	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted	Factor loadings
Societal					
Q1	4.41	0.75	0.514	0.935	0.645
Q2	4.45	0.65	0.66	0.932	0.852
Q3	4.46	0.67	0.643	0.932	0.796
Q4	4.32	0.69	0.591	0.933	0.831
Q5	4.21	0.77	0.483	0.935	0.678
Professional					
Q6	4.37	0.64	0.624	0.932	0.455
Q7	4.42	0.61	0.72	0.931	0.645
Q8	4.35	0.62	0.752	0.930	0.575
Q9	4.56	0.61	0.608	0.933	0.692
Q10	4.48	0.59	0.759	0.930	0.828
Ethical					
Q11	4.45	0.62	0.761	0.930	0.785
Q12	4.47	0.60	0.752	0.930	0.863
Q13	4.42	0.72	0.628	0.932	0.814
Q14	4.62	0.59	0.694	0.931	0.810
Q15	4.56	0.60	0.703	0.931	0.673
Personal					
Q16	4.32	0.65	0.722	0.931	0.464
Q17	3.82	0.96	0.366	0.94	0.869
Q18	4.38	0.65	0.712	0.931	0.537
Q19	4.18	0.74	0.55	0.934	0.812
Q20	4.18	0.68	0.624	0.932	0.685

As a result of the EFA, it was determined that the Professionalism for Dental Students scale consisted of 20 items. All items had factor loadings above 0.455(>0.4 were considered significant). Factor analysis extracted five factors that accounted for 62.60 % (> 50% was deemed necessary) of the variance. Cronbach's alpha was more than 0.7, indicating good reliability.

Figure -3 Principal component analysis



Cronbach's alpha is the most common measure of internal consistency ("reliability"). It is most commonly used when you have multiple Likert questions in a survey/questionnaire that form a scale and wish to determine whether the scale is reliable.

Table:7 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.935	.941	20

We can see that Cronbach's alpha is **0.935**, indicating a high internal consistency level for our scale with this specific sample.

Table:8 Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
Q1	82.9951	74.753	0.514	0.935
Q2	82.9561	74.208	0.66	0.932
Q3	82.9415	74.124	0.643	0.932
Q4	83.0805	74.5	0.591	0.933
Q5	83.1951	74.91	0.483	0.935
Q6	83.0366	74.73	0.624	0.932
Q7	82.9805	74.068	0.72	0.931
Q8	83.0561	73.613	0.752	0.93
Q9	82.8439	75.208	0.608	0.933
Q10	82.9268	73.941	0.759	0.93
Q11	82.9561	73.514	0.761	0.93
Q12	82.9317	73.907	0.752	0.93
Q13	82.9854	73.682	0.628	0.932
Q14	82.7854	74.614	0.694	0.931
Q15	82.8415	74.417	0.703	0.931
Q16	83.0805	73.551	0.722	0.931
Q17	83.5805	74.953	0.366	0.94
Q18	83.022	73.635	0.712	0.931
Q19	83.2244	74.39	0.55	0.934
Q20	83.2268	74.259	0.624	0.932

Characteristics		Number	%
Gender	**Male**	139	*33.9*
	Female	271	*66.1*
Marital status	**Married**	66	*16.1*
	Unmarried	344	*83.9*
Post-Graduation Year	**1 Year**	153	*37.3*
	2 Year	178	*43.4*
	3 Year	79	*19.3*
Opted for a profession	**By Interest**	381	*92.9*
	By Compulsion	29	*7.1*
Sibling status	**Yes**	349	*85.1*
	No	61	*14.9*
Environment	**Rural**	89	*21.7*
	Urban	321	*78.3*
Family Income	**Less than 8 Lakhs**	136	*33.2*
	8 Lakhs to 30 Lakhs	230	*56.1*
	More than 30 Lakhs	44	*10.7*
Parents healthcare workers	**Yes**	70	*17.1*
	No	340	*82.9*
Attended any formal courses on dental professionalism and ethics	**Yes**	158	*38.5*
	No	252	*61.5*

***** Mean age of participants 26.42 years with SD 2.44 (26.42 ± 2.44) with a range of 22 to 44 years

* Mean age of female participants 26.11 years with SD1.99 (26.11 ± 1.99) with a range of 23 to 44 years

***** Mean age of male participants 27.01 years with SD 3.04 (27.01 ± 3.04) with a range of 22 to 41 years

Table 9 Demographic Characteristics of Participants (n = 410)

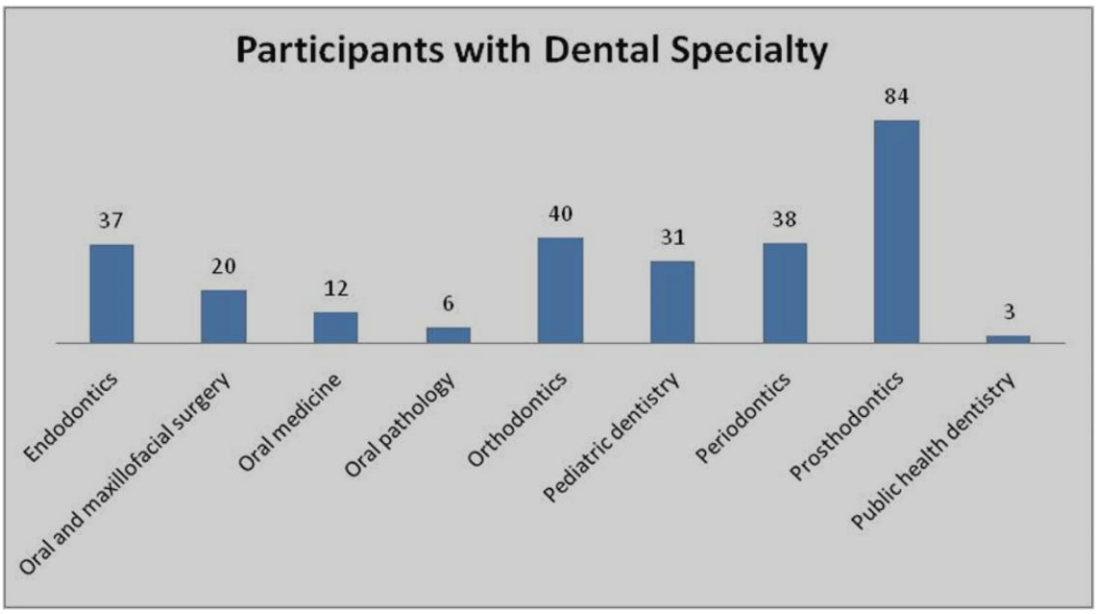


Figure 3: Dental specialties distribution of Participants

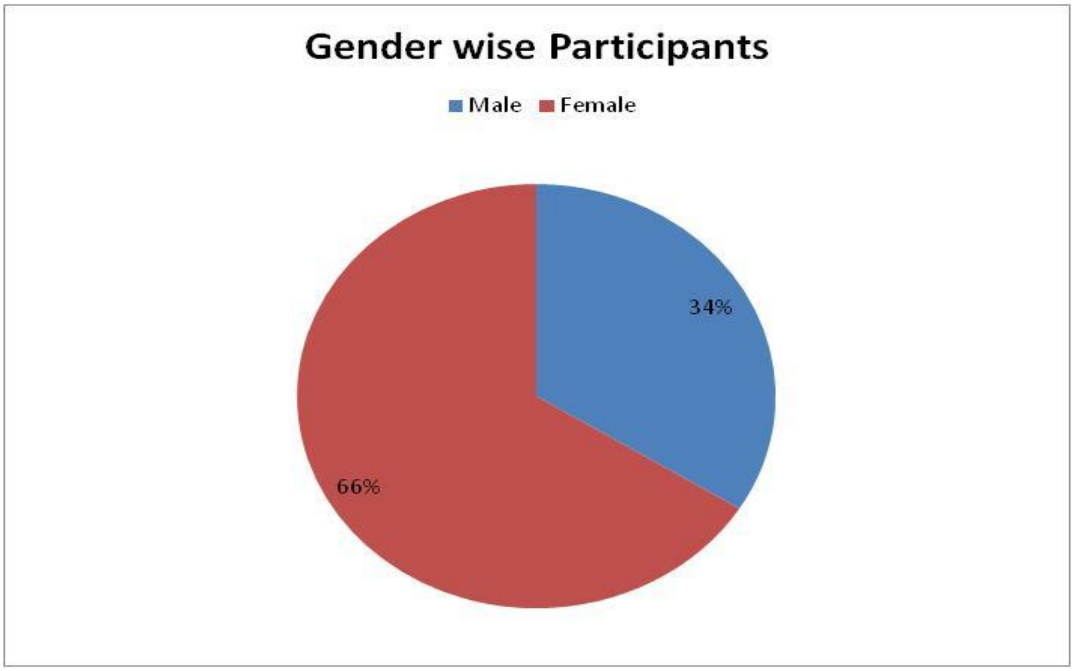


Figure 4: Gender Distribution of Participants

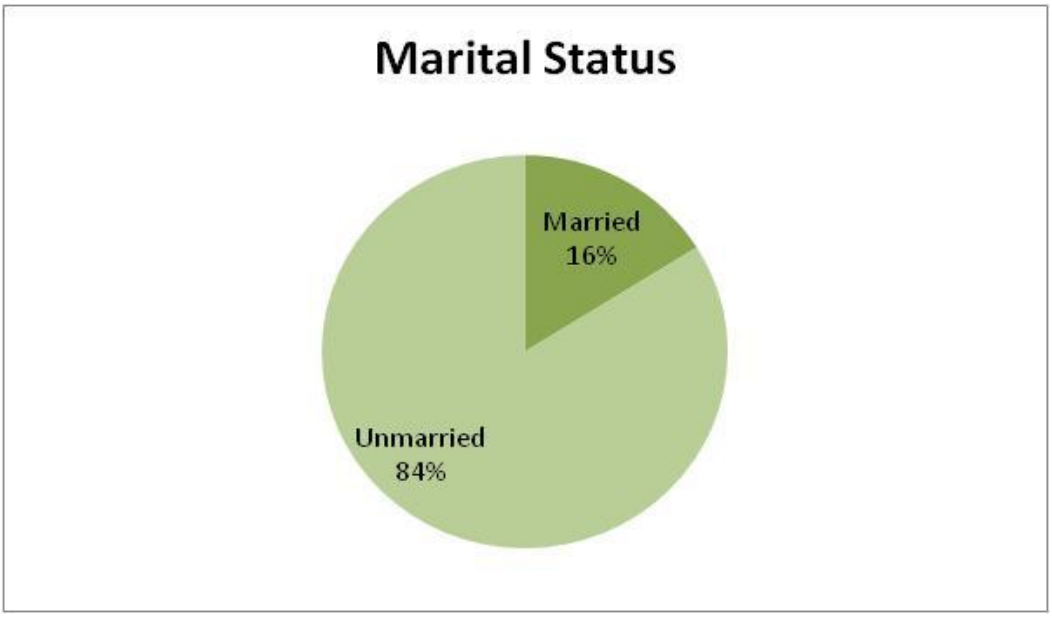


Figure 5 Marital status distribution of participants

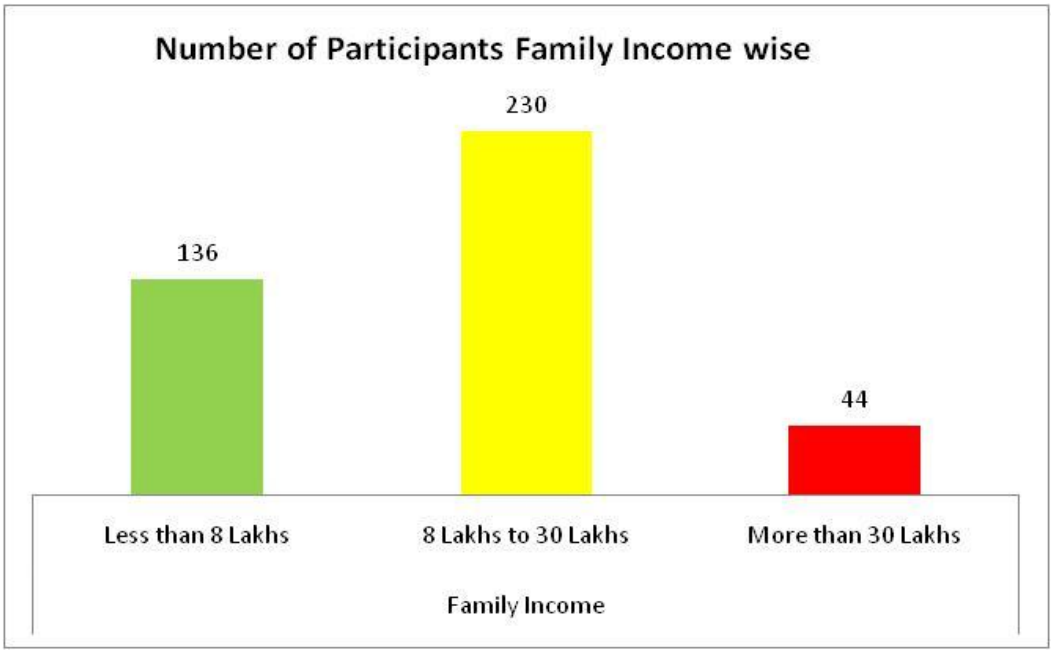


Figure 6: Family income Distribution of participants

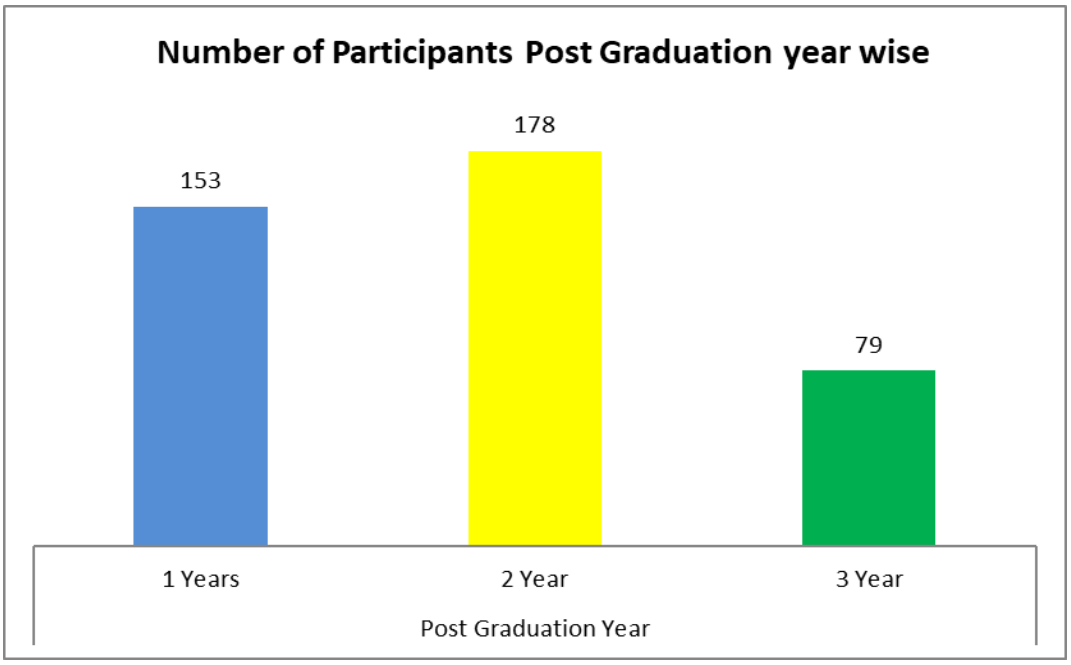


Figure 7 Academic Year-wise enrolment of postgraduate students

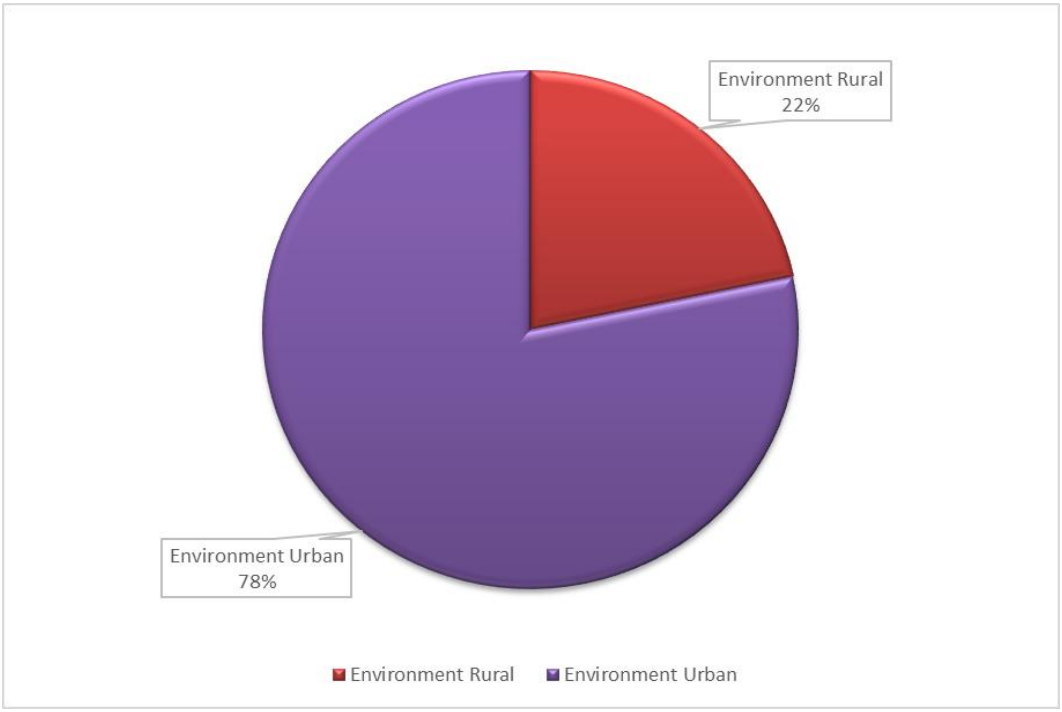


Figure 8 Urban and Rural environment Status distribution of participants

Table 10 Mean score of the Professionalism scale

S. No.	Questions/items (Response out of 410 Participants)	Strongly Disagree		Disagree		Neutral		Agree		Strongly Agree	
		N	%	N	%	N	%	N	%	N	%
1	Question 1	7	*1.7*	2	*0.5*	18	*4.4*	173	*42.2*	210	*51.2*
2	Question 2	3	*0.7*	3	*0.7*	8	*2.0*	190	*46.3*	206	*50.2*
3	Question 3	3	*0.7*	3	*0.7*	14	*3.4*	172	*42.0*	218	*53.2*
4	Question 4	5	*1.2*	2	*0.5*	16	*3.9*	220	*53.7*	167	*40.7*
5	Question 5	5	*1.2*	4	*1.0*	47	*11.5*	199	*48.5*	155	*37.8*
6	Question 6	2	*0.5*	3	*0.7*	14	*3.4*	215	*52.4*	176	*42.9*
7	Question 7	2	*0.5*	0	*0.0*	14	*3.4*	201	*49.0*	193	*47.1*
8	Question 8	2	*0.5*	0	*0.0*	20	*4.9*	220	*53.7*	168	*41.0*
9	Question 9	2	*0.5*	2	*0.5*	7	*1.7*	153	*37.3*	246	*60.0*
10	Question 10	2	*0.5*	1	*0.2*	5	*1.2*	194	*47.3*	208	*50.7*
11	Question 11	2	*0.5*	1	*0.2*	13	*3.2*	190	*46.3*	204	*49.8*
12	Question 12	2	*0.5*	0	*0.0*	10	*2.4*	189	*46.1*	209	*51.0*
13	Question 13	3	*0.7*	10	*2.4*	9	*2.2*	179	*43.7*	209	*51.0*
14	Question 14	3	*0.7*	0	*0.0*	4	*1.0*	137	*33.4*	266	*64.9*
15	Question 15	2	*0.5*	2	*0.5*	4	*1.0*	158	*38.5*	244	*59.5*
16	Question 16	2	*0.5*	1	*0.2*	26	*6.3*	215	*52.4*	166	*40.5*
17	Question 17	12	*2.9*	19	*4.6*	104	*25.4*	170	*41.5*	105	*25.6*
18	Question 18	2	*0.5*	3	*0.7*	17	*4.1*	203	*49.5*	185	*45.1*
19	Question 19	2	*0.5*	7	*1.7*	50	*12.2*	208	*50.7*	143	*34.9*
20	Question 20	1	*0.2*	3	*0.7*	49	*12.0*	227	*55.4*	130	*31.7*

Table 11: Hypothesis Testing

Ho1: There will be no significant difference in the mean professionalism score of male and female students.

$H_1$1: There will be a significant difference in the mean professionalism score of male and female students

Table 11.1 Professionalism attitude of Male and Female students' comparison

Professionalism Scores	Mean	SD	T value	P value
Male	88.15	8.39	1.24	0.21
Female	87.02	9.36		

P value 0.21, which is greater than 0.05, so there is no significant difference in the mean professionalism score of male and female students.

Accepted (Null Hypothesis) Ho1 and rejected (Alternative Hypothesis) $H_1$1

Ho2: There will be no significant difference in the mean professionalism score of married and unmarried students

$H_1$2: There will be a significant difference in the mean professionalism score of married and unmarried students

Table 11.2 Professionalism attitude of Married and Unmarried students' comparison

Professionalism Scores	Mean	SD	T value	P value
Married	88.12	7.2	0.84	0.4
Un-Married	87.26	9.37		

P value 0.4, which is greater than 0.05, so there is no significant difference in the mean professionalism score of married and unmarried students.

Accepted (Null Hypothesis) Ho2 and rejected (Alternative Hypothesis) $H_1$2

Ho3: There will be no significant difference in the mean professionalism scores of students' parents with healthcare and no healthcare backgrounds.

$H_1$3: There will be a significant difference in the mean professionalism scores of student's parents with healthcare and no healthcare backgrounds.

Table 11.3: Professionalism attitude of parents with a healthcare background, students, and No Healthcare background student's comparison.

Professionalism Scores	Mean	SD	T value	P value
Healthcare backgrounds	87.17	8.75	0.24	0.81
No -Healthcare background	87.45	9.13		

P value 0.81 which is greater than 0.05 so there is no significant difference in the mean professionalism scores of student's parents with health care and no healthcare backgrounds.

Accepted (Null Hypothesis) Ho3 and rejected (Alternative Hypothesis) $H_1$3

Ho4: There will be no significant difference in the mean professionalism score between students who opted by interest or by compulsion.

$H_1$4: There will be a significant difference in the mean professionalism score between students who opted by interest or by compulsion.

Table 11.4: Comparison of the mean professionalism score between students who opted by interest or by compulsion.

Professionalism Scores	Mean	SD	T value	P value
Compulsion	83.76	7.99	2.52	0.01
Interest	87.67	9.08		

P value 0.01, which is less than 0.05 so there is a significant difference in the mean professionalism score between students who opted by interest or by compulsion.

Accepted (Alternative Hypothesis) $H_1$4 and rejected (Null Hypothesis) Ho4

Ho5: There will be no significant difference in the mean professionalism score between students having siblings or no siblings

$H_1$5: There will be a significant difference in the mean professionalism score between students having siblings or no siblings.

Table 11.5: Comparison of the mean professionalism score between students having siblings or no siblings

Professionalism Scores	Mean	SD	T value	P value
Siblings	87.48	9.11	0.46	0.64
No Siblings	86.91	8.75		

P value 0.64, which is greater than 0.05, so there is no significant difference in the mean professionalism score between students having siblings or no siblings.

Accepted (Null Hypothesis) Ho5 and rejected (Alternative Hypothesis) $H_1$5

Ho6: There will be no significant difference in the mean professionalism scores of students of urban and rural environments.

$H_1$6: There will be a significant difference in the mean professionalism scores of students of urban and rural environments.

Table 11.6: Comparison of the mean professionalism score between students having urban and rural environments.

Professionalism Scores	Mean	SD	T value	P value
Urban	87.34	9.36	0.29	0.76
Rural	87.63	7.9		

P value 0.76 which is greater than 0.05 so there is no significant difference in the mean professionalism scores of students of urban and rural environments.

Accepted (Null Hypothesis) Ho6 and rejected (Alternative Hypothesis) $H_1$6

Ho7: There will be no significant differences in the mean professionalism scores of students according to I, II, and II years of postgraduation

$H_1$7: There will be significant differences in the mean professionalism scores of students according to I, II, and II years of postgraduation.

Table 11.7: Comparison of the mean professionalism score among students' years of post-graduation

Professionalism Scores	Mean	SD	F value	P value
1st Year	87.12	9.66	0.343	0.709
2nd Year	87.32	9.13		
3rd Year	88.14	7.63		

P value 0.709 which is greater than 0.05 so there is no significant difference in the mean professionalism scores of student's Years of post-graduation.

Accepted (Null Hypothesis) Ho7 and rejected (Alternative Hypothesis) $H_1$7

Ho8: There will be no significant difference in the mean professionalism scores of students according to various Family incomes.

$H_1$8: There will be a significant difference in the mean professionalism scores of students according to various Family incomes.

Table 11.8: Comparison of the mean professionalism score among students' Family income.

Professionalism Scores	Mean	SD	F value	P value
Less than 8 Lakes per annum	87.50	9.82	0.145	0.865
8 to 30 Lakes per annum	87.23	7.78		
More than 30 Lakes per annum	88.00	12.44		

P value 0.865 which is greater than 0.05 so there is no significant difference in the mean professionalism scores of student's Family income.

Accepted (Null Hypothesis) Ho8 and rejected (Alternative Hypothesis) $H_1$8

Ho9: There will be no significant difference in the mean professionalism scores of students according to whether they attended any formal training /courses on professionalism and ethics or not

$H_1$9: There will be significant differences in the mean professionalism scores of students according to whether they attended any formal training /courses on professionalism and ethics or not

Table 11.9: Comparison of the mean professionalism score between students who attended/did not attend any formal courses on dental professionalism and ethics.

Professionalism Scores	Mean	SD	T value	P value
Students attended formal courses on dental professionalism and ethics	87.36	9.59	0.07	0.94
Students did not attend formal courses on dental professionalism and ethics	87.43	8.72		

P value 0.94, which is greater than 0.05, so there is no significant difference in the mean professionalism scores of students who attended any formal courses on dental professionalism and ethics.

Accepted (Null Hypothesis) Ho9 and rejected (Alternative Hypothesis) H

To derive the Percentile Norms in this study, we calculated the Mean, Standard Deviation, Median, Percentiles, Skewness, and Kurtosis for the full sample (N= 410).

Table 12: Percentile Norms of Professionalism Scale

Descriptive Statistics of Samples	
Mean	87.40
Std. Deviation (SD)	9.06
Median	88
P10	78
P20	80
P30	81
P40	84
P50	88
P60	91
P70	93
P80	96
P90	99
Skewness	-1.73
Kurtosis	10.75

Major findings:

The demographic values of the participants in the study are diverse and provide a comprehensive representation of the target population. Out of the 410 participants, 66.1% were female, and 33.9% were male. The mean age of participants was 26.42 years with SD 2.44 (26.42 ± 2.44) with a range of 22 to 44 years Mean age of female participants was 26.11 years with SD 1.99 (26.11 ± 1.99) with a range of 23 to 44 years. The mean age of male participants was 27.01 years with SD 3.04 (27.01 ± 3.04) with a range of 22 to 41 years. The majority of the participants were unmarried (83.9%) and had opted for the profession by interest (92.9%). In terms of post-graduation year, 43.4% were in their second year, followed by 37.3% in their first year and 19.3% in their third year. The study also encompassed participants from both rural (21.7%) and urban (78.3%) environments. Additionally, the distribution of family income among the participants varied, with 56.1% having a family income between 8 lakhs to 30 lakhs. The sample demographics accurately represented postgraduate dental students in India. The analysis of these factors helped in understanding the characteristics of the sample and ensured that the study's results were not biased based on any particular demographic factor.

The investigation into the professionalism scores of various demographic groups among students has yielded significant insights into how factors such as gender, marital status, parental background, motivations for choosing their field of study, environmental background, years of post-graduation, and family income impacted the perceived professionalism in their academic environment. Each hypothesis explored a different dimension of this relationship, and the results shed light on the complexities of professionalism development among postgraduate students. Each hypothesis was tested using relevant statistical analyses, and the findings provide insights into the factors influencing professionalism among students. The summary of the hypotheses is given as follows.

Gender Differences in Professionalism Scores The analysis showed no significant difference in professionalism scores between male and female students ($p = 0.21$), suggesting that both genders exhibit similar levels of professionalism in the academic context.

Marital Status Impact on Professionalism Scores: There was no significant difference in professionalism scores between married and unmarried students ($p = 0.40$). This indicates that marital status does not affect students' perceptions of professionalism, reflecting a mature academic environment.

Parental Background in Healthcare: The investigation found no significant difference in professionalism scores between students from healthcare-related backgrounds and those from other backgrounds ($p = 0.81$). This suggests that educational experiences may play a more crucial role in developing professionalism than familial professional backgrounds.

Interest versus Compulsion in Choosing Field of Study: A significant difference was found in professionalism scores, with students motivated by interest scoring higher (mean = 87.67) than those who chose their field out of compulsion (mean = 83.76, $p = 0.01$). This highlights the importance of intrinsic motivation in cultivating professionalism.

Influence of Having Siblings on Professionalism Scores: The analysis showed no significant difference in professionalism scores between students with siblings (mean = 87.48) and those without (mean = 86.91). This suggests that having siblings may not significantly impact professionalism, implying that other factors are more influential.

Urban vs. Rural Environments: The results indicated no significant difference in professionalism scores between students from urban and rural backgrounds ($p = 0.76$). This challenges the stereotype that urban students have more exposure and suggests comparable skills and values in professionalism from both environments.

Different Years of Post-Graduation: The analysis found no significant differences in professionalism scores across students at various years of post-graduation ($p = 0.709$), suggesting that progression through postgraduate education does not significantly impact professionalism ratings.

family income's impact on professionalism: It revealed no significant differences, with a p-value of 0.865. This outcome suggests that higher family income may not necessarily correlate with better professionalism scores and highlights the importance of other factors like personal motivation and institutional support in shaping

professional attitudes.

The influence of formal courses on dental Professionalism and Ethics: The study found no significant differences in professionalism scores between students who attended such courses (87.36) and those who did not (87.43), with a t-value of 0.07 and a p-value of 0.94. These results indicate that formal courses may not have a substantial effect on professionalism development, possibly due to the courses not effectively translating into practical skills, students already having inherent professionalism, or variations in course quality and engagement.

After implementing the scale on 410 students, the minimal score on the Professional Scale was 20, while the maximum score was 100. It was found that 200 students (48.78%) exhibited low professional commitment, meaning their scores were less than or equal to 87. Additionally, the professional scores of 13 students (3.17%) were categorized as average, with their professional commitment scoring 88. Finally, the professional commitment of 197 students (48.05%) was deemed high, as their scores were equal to or greater than 89.

The scale demonstrated strong content validity, with a content validity index (CVI) of 1.0, indicating that all 20 items were acceptable according to expert validation. The internal consistency, evaluated through Cronbach's alpha, ranged from .64 to .84, with a specific value of .75 for a sample of 30 students, suggesting a reliable measure of professionalism. Additionally, the calculated Cronbach's alpha of 0.935 in the larger sample reflects a high level of internal consistency. The Kaiser-Meyer-Olkin (KMO) value of 0.938, considered excellent, confirmed the adequacy of the sample size for the scale. Finally, significant correlations among the items were supported by Bartlett's Test ($p < 0.001$), and exploratory factor analysis (EFA) was utilized to explore the factor structure, further establishing the construct validity of the scale. Overall, the findings affirm the scale's reliability and validity in measuring professionalism among dental students.

Conclusions:

Standardizing a professionalism scale for dental students involves rigorous procedures to ensure reliability and validity. This scale provides insights into existing baseline post-graduate dental students' professionalism and tries to identify areas for improvement.

The study highlights intrinsic motivation as a key factor in professional development, finding that demographic factors like gender, marital status, and parental background have less impact than expected. The results show that socioeconomic factors and educational progression do not significantly affect students' professionalism scores. Instead, the study emphasizes the need to focus on the quality of educational experiences and the importance of fostering genuine interest in students' fields to enhance professionalism.

The percentile norms from this study provide insights into the professional commitment levels of the population examined. By placing these scores in a broader context, institutions can create strategies to boost commitment, leading to increased engagement and success. Future research should explore the factors influencing these scores and identify interventions to raise commitment among those at the lower end. Ultimately, this validated scale is essential for promoting ethical behavior in dental education and improving the overall quality of dental care. Nevertheless, there remains potential for refinement in the execution of future research endeavors.

Strengths of the study:

This scale was developed to evaluate professionalism among postgraduate dental students in India. This framework can serve as a valuable resource for faculty members in guiding students through 20 essential subdomains, thus raising awareness and fostering an environment where assessment leads the teaching and learning process.

The strengths of this study also lie in its rigorous methodology and comprehensive approach to assessing professionalism among postgraduate dental students in India. Additionally, the scale demonstrated good internal consistency and reliability, as evidenced by high values from the Cronbach alpha coefficient and test-retest reliability analysis. The study also utilized a sufficient sample size and employed robust statistical

methods, such as exploratory factor analysis, to validate the measurement tool and identify the factor structure. Overall, these strengths contribute to the study's credibility and make its findings reliable and applicable to the field of dental education and practice.

Limitations of the study:

In this cross-sectional study, we focused on constructs for dental postgraduate students. While online surveys are convenient and enable the inclusion of a large sample, they do present the limitation of lower response rates compared to in-person interviews and focus groups. It is important to conduct further research on a larger sample to widely understand the scale's reliability and validity. Additionally, considering students' diverse socioeconomic and cultural backgrounds, it is crucial to acknowledge that different perceptions of professionalism may exist, potentially impacting the scale results. Despite keeping the scale short to encourage higher student response rates, it is essential to recognize that respondents' burdens and attitudes toward participating in online surveys may influence the results.

Future studies:

This scale can be used to assess students' initial professionalism score. If the scores are low, additional steps can be taken to address the issue. Research can also be undertaken to identify the reasons behind students' low professionalism scores and attitudes. Further study is necessary to determine the efficacy of this scale for undergraduate students, especially after educating them about important areas and subcategories. Since professionalism is a dynamic concept that can change over time, there is always room for refining and revising the items in this scale, allowing for future research opportunities.

In light of the study's findings and limitations, probable avenues for future research in professionalism assessment among dental students include conducting longitudinal studies, comparative studies, intervention studies, multimethod approaches, and cross-disciplinary research. Future research should aim to address the identified limitations

and contribute to evidence-based strategies for fostering professional development in dental education. Additionally, exploring the relationship between professionalism and academic capabilities among dental students and assessing the effect of professional training on students' clinical performance and patient outcomes are recommended.

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