

## Research Article

# Evaluation of Perceived Competency of Dental Graduates of Saudi Arabia

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**Background.** Dental professional's competency comprises a comprehensive management of the oral health care of their patients, and an evaluation of competence level is an important step towards assessing the quality of the graduating dentists. This study assessed the level of self-rated competencies of dental graduates from Saudi dental colleges. **Methods.** A cross-sectional study was conducted online through a structured questionnaire that consisted of three domains of "Knowledge, Skills, and Values." The study population was dental graduates who have studied the same curriculum and were working in Saudi dental settings. Dental graduates included interns, general practitioners, and specialists/consultants, both male and female, grouped into age groups (20-24, 25-29, and  $\geq 30$  years), Saudi/non-Saudi, with qualifications (Bachelor, Master, and Fellowship/Board), working in any region inside Saudi Arabia. **Results.** Complete responses received from 197 graduates were analyzed.  $\geq 75\%$  of the respondents felt that they were well prepared for 40% and half of the respondents felt that they were not well prepared in 50% competencies in the domain of "Knowledge."  $\geq 75\%$  of the respondents felt that they were well prepared for 36% and 50% were not well prepared in 36% competencies in the domain of "Skills."  $\geq 75\%$  of the respondents felt that they were well prepared for 67% competencies in the domain of "Values." Statistically, mean values were significant ( $p \leq 0.001$ ) for female genders and nonsignificant for qualification and rank categories. The overall mean scores for self-perceived competencies for the domains of "Knowledge," "Skills," and "Values" were  $8.9 \pm 3.1$ ,  $12.8 \pm 3.3$ , and  $5.5 \pm 2.1$ , respectively. Participants showed the highest level of "Knowledge" in medical problem diagnosis and least level in basic life support. The highest level of "Skills" was noted in the differential diagnosis and lowest in the dental emergency management. Most participants had shown a value for service to humanity. **Conclusions.** Dental graduates of this study sample perceived themselves well prepared for many aspects of dental practice and have highlighted areas that need improvement in their training at the undergraduate level.

## 1. Introduction

A competent workforce with the necessary knowledge and skills is vital for the future growth and development of health promotion, and a general dentist must have a broad biomedical knowledge and clinical training to be able to demonstrate professional and ethical behavior as well as effective communication and interpersonal skills [1]. The goal of the dental professional's competency is to manage the oral health care of the patient and to take all actions

designed to improve the patient's oral and general health, and an evaluation of competence level is an important step towards assessing the quality of graduating dentist [2]. Competency is a complex behavior or ability essential for the general dentist to begin an independent, unsupervised dental practice; it assumes that all behaviors and skills are performed with a degree of quality consistent with patient well-being [3]. Studies have investigated how qualified dentists feel that their undergraduate training has prepared them as high-quality dentists that are able to address the

needs of the community [4–6]. An assessment of graduates' performance is essential to identify the strengths and weaknesses in dental education, and the performance of dental graduates in practice provides an early indicator of quality of the undergraduate curriculum and educational process [7]. Self-assessment skills enable professionals to progress rapidly with accuracy toward a goal [8]. The Saudi Commission for Health Specialties (SCFHS) has specifically targeted on the competency of health professionals in its vision and mission statements [9]. Data about competencies of dental graduates from Saudi dental colleges is rarely available. There is a need to investigate dentists' competencies who have graduated and trained from Saudi dental colleges, feeling that their undergraduate teaching and training facilities were sufficient to prepare them as an independent dental practitioner. Therefore, this study was conducted to assess the level of self-rated competencies by dental graduates from Saudi dental colleges and to investigate differences between gender, qualifications, and rank.

## 2. Materials and Methods

**2.1. Study Design, Setting, and Population.** This was a cross-sectional observational study that was conducted on dental graduates during September 2021. Dental graduates from all Saudi dental colleges were approached through social media. An online anonymous questionnaire was shared, and a response was requested as used in recent study [10]. This study population covered the dental graduates who have studied the same curriculum and were working in Saudi dental settings. Dental graduates including interns, general practitioners, and specialists/consultants, both male and female, grouped into age groups (20–24, 25–29, and  $\geq 30$  years), Saudi/non-Saudi, with qualifications (Bachelor, Master, and Fellowship/Board), working in any region inside Saudi Arabia were included in the study. Instructions were given at the beginning of the questionnaire to guide the participants on how to complete the questionnaire.

**2.2. Data Collection Tool.** The study questionnaire was extracted and designed from competency statements prepared and used by various colleges/institutions [11–13]. The questionnaire included 30 competencies, those were divided (classified) into 3 domains: The domain "Knowledge" included 10 questions covering comprehensive knowledge of medical and dental conditions; the domain "Skills" included 14 competencies comprising of questions about diagnosis, communication, patient and staff management, dealing emergencies, referral, and information technology; and the domain "Values" comprised of 6 questions related to ethics, personal development, and professional responsibilities. In the questionnaire, the participants were asked to rate their competencies at one of three levels of performance for each of the selected competencies ranging from "fully agree," "partially agree," and to "disagree." The "fully agree" responses were reflecting "well prepared" participants, the "partially agree" responses reflected "partially prepared," while the "disagree" responses reflected the "poorly prepared" graduates. The "questionnaire validation" was an on-step process that was carried out among internees and

general practitioners of the College of Dentistry, King Faisal University, and the Kappa value was noted as 0.89. The questionnaire was validated for the reason to make it easy, simple, understandable, and judgmental for general dental practitioners.

**2.3. Data Collection and Analysis.** Data was collected directly from participants through an online response to the questionnaire. Filled questionnaires were checked for completeness and incomplete questionnaires were excluded. Participants were analyzed as a percentage of each competency for comparison between groups (gender, qualification, and rank). Responses in each domain were analyzed as means and standard deviation. To calculate the mean score, responses were dichotomized into 1 and 0, where 1 stands for full preparedness and 0 stand for partially/poorly preparedness. Higher mean values were taken as a positive indication. The *t*-test was used to compare the means between two groups and Chi-square test for nominal data. Data was analyzed using Statistical Software for Social Sciences (SPSS) version 26 (IBM SPSS., Chicago, IL, USA).

## 3. Results

**3.1. General Profile of Study Participants.** One hundred and ninety-seven ( $n = 197$ ) complete questionnaires were analyzed, and this data included 148 Saudi and 49 non-Saudi; 103 males and 94 females; and 70 internees, 89 general practitioners, and 38 specialists/consultants. 161 were with Bachelor degree, 22 with Master degree, and 14 with Fellowship/Board qualifications. 69 graduates were aged 20–24 years, 80 were 25–29 years, and 48 were 30 and above years old. 72 participants belonged to the Eastern region, 28 to the Riyadh region, 28 to the Medina region, 24 to the Qasim region, 13 to the Aljouf region, and 32 from the other regions (Figure 1).

**3.2. Self-Perceived Competencies.** The overall mean scores for self-perceived competencies for the domains of "Knowledge," "Skills," and "Values" were  $8.9 \pm 3.1$ ,  $12.8 \pm 3.3$ , and  $5.5 \pm 2.1$ , respectively. Under the "Knowledge" domain, the Q.4 (Have knowledge of and recognize common medical problems in the dental office) was perceived by the highest number of respondents (157, 80%) as well prepared; and Q.5 (Know and execute "basic life support") was perceived by the least number of respondents (57, 29%) as well prepared.  $\geq 75\%$  of the respondents felt that they were well prepared for 4 (40%) of the competencies under the domain of "Knowledge," and half of the respondents felt that they were not well prepared for 5 (50%) of the competencies under the same domain. In the domain of "Skills," Q.20 (Able to do differential diagnosis and prepare planned treatment) was perceived by the highest number of respondents (169, 86%) as well prepared, and Q.15 (Possessing good information technology skills) was perceived by the least number of respondents (31, 16%) as well prepared.  $\geq 75\%$  of the respondents felt that they were well prepared for 5 (36%) of the competencies under the domain of "Skills,"

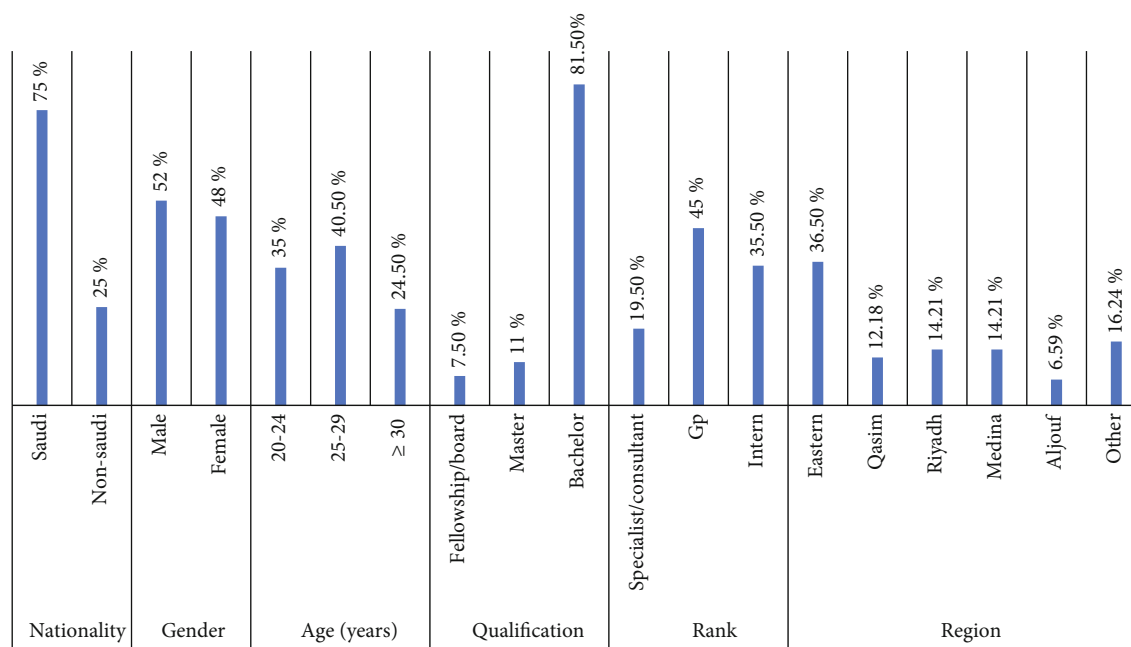


FIGURE 1: Demographic characteristics.

and 50% felt that they were not well prepared for 5 (36%) of the competencies under the same domain. In the domain of “Values,” Q.30 (Being realistic and aware of my limitations) was perceived by the highest number of respondents (173, 88%) as well prepared, while Q.26 (Understand the responsibility of a health-care professionals towards the community and profession) was perceived by the least number of respondents (114, 58%) as well prepared.  $\geq 75\%$  of the respondents felt that they were well prepared for 4 (67%) of the items under the domain of “Values” (Tables 1 and 2).

**3.3. Differences in Competency by Gender.** The proportion of male and female respondents (52% and 48%, respectively) may demonstrate an overall gender distribution in Saudi dental profession. Gender comparison by percentage for single competencies showed statistically insignificant differences ( $p \geq 0.089$ ). The mean scores of self-perceived competency among females and males in the domain of “Knowledge” were  $9.2 \pm 3.4$  and  $7.4 \pm 4.1$ , in the domain of “Skills” were  $12.4 \pm 2.3$  and  $10 \pm 3.8$ , and in the domain of “Values” were  $5.6 \pm 1.8$  and  $5.5 \pm 1.2$ , respectively. Using the One-way ANOVA analysis, female graduates significantly ( $p \leq 0.001$  and  $p = 0.024$ ) felt themselves more competent than the male graduates in the domain of “Knowledge” and “Skills,” respectively (Tables 1 and 2).

**3.4. Differences in Competency by Qualification.** The participants of this study were compared by their qualifications (Bachelor, Master, and Fellowship/Board) by their percentage in each competency; the nonsignificant statistical difference ( $p \geq 0.0064$ ) was observed only in 4 competencies (2, 15, 16, 17). The mean scores of self-perceived competency among Fellowship/Board holders, Master, and Bachelor for the domain “Knowledge” were  $9.6 \pm 3.2$ ,  $8.2 \pm 3.0$ , and  $7.8 \pm 2.6$ . In the domain “Skills,” the mean scores of self-

perceived competency were  $13.8 \pm 4.2$ ,  $13.4 \pm 3.8$ , and  $12.6 \pm 4.1$ , while in the domain “Values,” the mean scores were  $5.8 \pm 1.8$ ,  $5.4.9 \pm 2.0$ , and  $5.6 \pm 2.1$  respectively, and the statistical difference in the mean scores was in-significant ( $p \geq 0.265$ ) (Tables 1 and 2).

**3.5. Differences in Competency by Rank.** In this study, the participants categorized as internees, general practitioners, and specialists/consultants showed a nonsignificant ( $p \geq 0.055$ ) difference in percentage in 12 competencies (2, 4, 11, 12, 15, 18, 19, 20, 26, 28, 29, 30). Regarding the rank, the mean score of self-perceived competency among specialists or consultants, general practitioner, and interns showed mean values of  $9.8 \pm 2.2$ ,  $9.2 \pm 2.0$ , and  $7.2 \pm 3.1$  under the domain of “Knowledge.” While under the domain of “Skills,” the mean values were  $13.8 \pm 3.6$ ,  $12.9 \pm 3.4$ , and  $12.2 \pm 4.1$ , under the “Values” domain, the mean scores of self-perceived competency were  $5.7 \pm 1.7$ ,  $5.6 \pm 1.4$ , and  $5.1 \pm 2.3$ , respectively. One-way ANOVA analysis for mean (SD) of competencies in all domains also showed no statistical difference ( $p \geq 0.064$ ) among participants’ ranks (Tables 1 and 2).

## 4. Discussion

Surveying dental graduates is a commonly used method for assessing competencies to determine their perceived level of proficiency in specific areas of dental practice after graduation [6, 14]. Self-assessment methodology is a recommended procedure that has been shown to promote professional growth and enhance higher-order skills of interpersonal relations, critical reflection, and value-based decision and means to strengthen competent performance at the work place [5, 8, 15, 16]. The participants of this study were representative of dental graduates from both public and private dental colleges

TABLE 1: Participants' [n(%)] response to questions.

(a)

Questions	Well prepared	Partially prepared	Poorly prepared
<i>Domain: Knowledge</i>			
(1) Possess sound basic knowledge of dental diseases and associated medical problems	139 (70.5%)	56 (28.5%)	2 (1%)
(2) Have knowledge of and record comprehensive medical and dental history	153 (78%)	42 (21%)	2 (1%)
(3) Know and understand national demands and responsibilities to cope with dental diseases, communicable diseases and national disasters	150 (76.2%)	46 (23.3%)	1 (0.5%)
(4) Have knowledge of and recognize common medical problems in dental office	157 (79.6%)	39 (19.9%)	1 (0.5%)
(5) Know and execute "basic life support"	57 (29%)	90 (46%)	50 (25%)
(6) Know to draft a comprehensive treatment plan including prognosis, complications, and outcomes of the treatment	147 (74.6%)	49 (24.9%)	1 (0.5%)
(7) Know and understand the importance of post treatment follow-up	95 (48%)	100 (51%)	2 (1%)
(8) Know to correlate and transfer the theoretical knowledge to clinical procedure	87 (44%)	109 (55.5%)	1 (0.5%)
(9) Be aware of situations/conditions needing referral to appropriate consultant/specialist centers	90 (45.6%)	106 (53.9%)	1 (0.5%)
(10) Have knowledge of research	64 (32.5%)	123 (62.4%)	10 (5.1%)
<i>Domain: Skills</i>			
(11) Have appropriate communication skills towards patients, health-care professionals including breaking bad news to the patients	122 (62%)	74 (37.5%)	1 (0.5%)
(12) Use different diagnostic tools (radiographs and laboratory investigations)	147 (74.6%)	49 (24.9%)	1 (0.5%)
(13) Well trained for life-long learning, personal and professional growth and development	118 (60%)	77 (39%)	2 (1%)
(14) Able to manage patients of special-needs group	44 (22.4%)	113 (57.3%)	40 (20.3%)
(15) Possess good information technology (IT) skills	31 (15.7%)	159 (80.7%)	7 (3.6%)
(16) Able to train and handle dental auxiliaries	37 (18.8%)	132 (67%)	28 (14.2%)
(17) Have multidisciplinary approach (ability to discuss and report the clinical conditions of the patient to the specialist)	151 (76.6%)	43 (21.9%)	3 (1.5%)
(18) Able to perform general medical examination	168 (85.2%)	28 (14.3%)	1 (0.5%)
(19) Able to examine and diagnose all dental problems	165 (83.7%)	31 (15.8%)	1 (0.5%)
(20) Able to do differential diagnosis and prepare plan treatment	169 (85.7%)	27 (13.8%)	1 (0.5%)
(21) Able to diagnose dental problems and refer for specialist care	112 (56.8%)	84 (42.7%)	1 (0.5%)
(22) Able to deal with medical emergencies and if required, refer for "general medical care"	126 (63.9%)	68 (34.6%)	3 (1.5%)
(23) Able to manage dental emergencies	56 (28.5%)	128 (64.9%)	13 (6.6%)
(24) Able to perform common dental procedures, depending on the treatment plan	117 (59%)	78 (40%)	2 (1%)
<i>Domain: Values</i>			
(25) Be imbued with the spirit of "service to humanity" and enhancing the good image of the healing profession	169 (85.7%)	27 (13.8%)	1 (0.5%)
(26) Understand the responsibility of health-care professionals towards community and profession	114 (58%)	82 (42%)	1 (0.5%)
(27) Understand medical ethics and medical/dental jurisprudence	125 (63.5%)	71 (36%)	1 (0.5%)
(28) Understand the importance of informed consent, and patient confidentiality	158 (80.2%)	38 (19.3%)	1 (0.5%)
(29) Have high emotional quotient	152 (77%)	44 (22.5%)	1 (0.5%)
(30) Be realistic and aware of my limitations	173 (87.8%)	23 (11.7%)	1 (0.5%)

(b)

Dental graduates	Number of questions in each domain		
	Domain 1	Domain 2	Domain 3
≥75% well prepared	4 (40%)	5 (36%)	4 (67%)
51-74% well prepared	1 (10%)	4 (28%)	2 (33%)
≤50% well prepared	5 (50%)	5 (36%)	0 (0%)

TABLE 2: Comparison of mean score ( $\pm$  SD) of competency domains with participants' characteristics of gender, qualification, and rank.

	Domain 1 Knowledge	Domain 2 Skills	Domain 3 Values
Maximum score	10	14	6
Overall mean score	8.9 $\pm$ 3.1	12.8 $\pm$ 3.3	5.5 $\pm$ 2.1
Gender			
Female	9.2 $\pm$ 3.4	12.4 $\pm$ 2.3	5.6 $\pm$ 1.8
Male	7.4 $\pm$ 4.1	10 $\pm$ 3.8	5.5 $\pm$ 1.2
Chi-squared test	$p \leq 0.001$ *	$p = 0.024$ *	$p = 0.481$
Qualification			
Fellowship/Board	9.6 $\pm$ 3.2	13.8 $\pm$ 4.2	5.8 $\pm$ 1.8
Master	8.2 $\pm$ 3.0	13.4 $\pm$ 3.8	5.4.9 $\pm$ 2.0
Bachelor	7.8 $\pm$ 2.6	12.6 $\pm$ 4.1	5.6 $\pm$ 2.1
One-way ANOVA	$p = 0.265$	$p = 0.826$	$p = 0.682$
Rank			
Specialist/consultant	9.8 $\pm$ 2.2	13.8 $\pm$ 3.6	5.7 $\pm$ 1.7
General practitioner	9.2 $\pm$ 2	12.9 $\pm$ 3.4	5.6 $\pm$ 1.4
Intern	7.2 $\pm$ 3.1	12.2 $\pm$ 4.1	5.1 $\pm$ 2.3
One-way ANOVA	$p = 0.064$	$p = 0.422$	$p = 0.528$

of Saudi Arabia, and to the best of our knowledge, this may be the first study of its kind from Saudi Arabia. The American Dental Education Association (2011) has categorized competencies for the general dentist into six domains [10, 12], and the Association for Dental Education in Europe (ADEE) defined the necessary competencies in 7 domains described under 3 levels [13]. Using the same criteria of competencies for this study, we extracted and used the competencies in three domains of "Knowledge," "Skills," and "Values." The foundation knowledge, skills, and professional behavior are considered part of every competency [2], and the variability of competencies and assessment of necessary skills lead to the quality and scope of practice of the graduating dentist. It is important that a graduating dentist should meet a minimum global standard [17].

The findings of this study show that  $\geq 75\%$  participants are well prepared to practice dentistry in 40% competency of the domain "Knowledge," 36% competency of the domain "Skills," and 67% of the domain "Values" which are comparable with a study by Abadel et al. [7] that revealed that more than 87% of the graduates rated themselves as very good and good; this higher rating by graduates' self-assessment might be explained by the tendency of the graduates to overestimate their abilities and competency. A remarkable observation of this study is that  $\leq 50\%$  dental graduates reported themselves as poorly prepared in 5 (50%) competencies of the domain "Knowledge" and 5 (36%) competencies in the domain "Skills." In this study, graduates were confident and prepared about their level of dental knowledge and applying and understanding basic and clinical sciences to the care of patients. The analysis with respect to the relationship between the graduates' qualification level, professional rank, and gender with their self-assessed competencies showed that the mean values of competencies were higher for graduates with higher qualifica-

tion, specialist and female gender in all domains with statistical significance only for gender in the domain "Knowledge" ( $p \leq 0.001$ ) and the domain "Skills" ( $p = 0.024$ ). These findings are consistent with what has been reported in other studies [18, 19], and this might be explained by the fact that as the graduates acquire more experience, they become more critical and objective in the assessment of their professional performance.

Due to the solitary nature of dental practice, it is imperative that practitioners develop skills of self-reliance and confidence in their clinical judgment [8]; that is the reason why more than 50% of this study participants have declared themselves as well prepared in 9 (64%) competencies in the domain of "Skills." McGrath et al. [18] reported that 10% (0.5% of this study) of dental graduates of their study felt not well prepared to develop a treatment plan, the majority (65%) felt that they were not well prepared to manage special needs patients (compared to 22% of this study); half of the dentists (50%) felt well prepared in the "practice management" (59% in this study) and maintaining accurate confidential patient records (97%) (80% in this study); and 96% (70% of this study) could take and interpret medical, social, and dental history. Less than half of the graduates (45%) reported being well prepared in treating patients with medical or dental emergencies, in comparison to this study (64%).

The results of this study are consistent with those of Rafeek et al. [6] who reported that the graduates were perceived most competent in taking an adequate medical history, recognizing oral diseases, conducting oral examination, and need for referral and least competent in research, practice management issues, or medical emergencies. These findings are consistent with studies [12, 16] and also coherent with other studies, where females felt more competent in four items than males

[5, 20]. Yiu et al. [21] reported that their study samples were able to take and interpret a patient's medical, social, and dental history (98%); to discuss treatment plans and obtain informed consent (97%); to communicate effectively with patients (96%); to interpret patient history to make a diagnosis (96%); and to prepare treatment plan (91%); these figures are comparatively higher than those of this study where nearly two-thirds of graduates (65%) felt that they were well prepared to manage special-needs patients. Some did not feel well prepared to treat medically compromised patients (27%). 38% claimed that they were poorly prepared to manage patients with medical emergencies, and about one-fifth (21%) said that they were poorly prepared to deal with dental emergencies; the figures are closely comparable to the findings of this study; these findings are also consistent with other studies [22, 23].

Competencies of this study were analyzed from the highest to lowest scores, and it was noted that the highest scores were for medical/dental examination (80%), diagnostic skills (85%), treatment planning (86%), maintained patient confidentiality (80%), personal skills development (60%), medical emergencies (64%), and use diagnostic tools (75%), which were comparable with the competency percentages of diagnostic skills (75%), treatment planning (100%), management skills (100%), personal values (100%), medical emergencies (47%), maintain confidentiality (92%), and use diagnostic tools (0%), as observed in a study by Razak et al. [24] in Malaysian dental graduates. With respect to the mean values of competencies in each domain, the findings of this study are comparable with those of the study by Arena et al. [4] in which the graduates were most confident about their level of core dental knowledge and applying and understanding basic and clinical sciences to the care of patients. In another study [1], internees rated their competence significantly lower than the presumed level of their job and showed weakness in communication and management skills that is comparable with the results from internees of this study.

Based on the observed weaknesses of competencies in this study, we have prepared the following recommendations to be given due importance during undergraduate training:

- (i) Incorporate and enhance training in basic life support
- (ii) Elaborate more teaching in the management of special needs patients
- (iii) Improve training in information technology
- (iv) Incorporate training to handle dental auxiliary
- (v) Manage medical emergencies

*4.1. Strengths and Limitations of the Study.* The strengths and limitations of the study may be noted as follows:

- (1) The response to the survey may be considered reliable as all participants of the study were oral health professionals
- (2) Despite the homogeneity of the respondents, the probability of bias related to misconceptions, nonre-

sponses, and incorrect answers may exist in the study

- (3) The limitation of the study may be the self-reported nature of the data, which may not accurately reflect the accurate competence of the graduates

## 5. Conclusions

The findings of this study showed that most graduates perceived themselves to be prepared, competent to practice as dentists with weaknesses in a few areas. This study demonstrates that domain-wise distribution of competent dental graduates ranges from the highest to lowest percentages, respectively, in the domains of "Values" to "Knowledge" and "Skills." This study has opened avenues for further research to improve different aspects of the dental education system in Saudi Arabia.

## 6. Impact of the Study

The amount of information gathered through this study has created an opportunity to find ways for improving professional competency and provided reliable baseline data for the regulatory bodies and stakeholders of dental institutes to look into the current status of dental education and training system in the country. The information received from this study will enable heads of dental colleges to make the undergraduate courses and training more effective.

## Data Availability

Data is available upon request.

## Consent

Informed consent was obtained from all subjects involved in the study.

## Conflicts of Interest

The authors declare no conflict of interest.

## Authors' Contributions

Bokhari SAH was assigned in the conceptualization, formal analysis, data curation, and writing—review and editing. Rashed HT was assigned in the methodology, software, validation, investigation, resources, and writing—original draft preparation. Al-Farhan MF was assigned in the visualization, supervision, project administration, and funding acquisition. All authors have read and agreed to publish the version of the manuscript.

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