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Original Research

Self perception of key skills required by undergraduates in an Indian dental school

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ABSTRACT

To assess the dental undergraduate student's self- perception of key skills required. The study was undertaken as part of a curriculum evaluation of the Bachelor of Dental Surgery program at VishwanathKatti Institute of Dental Sciences, KLE University, Belgaum, Karnataka, India. A cross-sectional survey of the first 3 classes of students (third year, final year and Intern) who followed similar curricular formats were the participants. The survey was conducted on a voluntary and anonymous basis. A questionnaire was developed specifically for the purpose of eliciting student perception of 50 essential dental practice skills on a five point Likert scale. The self-ratings done by three different classes of students showed a remarkable consistency in identifying the key skills required. Student perception among the three classes was consistent in more than 60% of skills required in dental practice. The skills identified as top ten (most required) were those where training was emphasized by most of disciplines of dentistry and lowest ten (least required) were those that required greater expertise and time. These latter skills have been identified as areas that require curricular reforms. Dental schools can use these items as standard tools for reformatting curricula. Students' self-perception of required skills is a useful tool for evaluating the clinical training programs provided in a dental school curriculum as the students are also key stake holders.

INTRODUCTION

The Dental Council of India (DCI) is the highest body providing regulatory guidelines for the dental undergraduate's curriculum for all the dental schools in India [1]. It is mandatory for all the 258 dental colleges spread over India to follow the given guidelines. Currently KLE Society's VishwanathKatti (KLEVK) Institute of Dental sciences has come under a new independent autonomous University, KLE University. This new organization provided KLEVK with an opportunity to examine and reinvent the curriculum and methods of teaching that would lead to improved dental training and ultimately, patient care. Since the inception of the new University three classes of students have entered clinical training.

According to Kern [2], the assessment of curriculum can be undertaken by internal or external bodies. It can be carried out by stakeholders namely faculty, dean, board of studies or administrative body as a part of curricular evaluation, it was felt that this was an ideal time to determine student perceptions of the key skills required for dental practice.

Most Indian dental school's curriculum planning is based on the DCI guidelines and regulations, teacher perceptions and/or guidelines prescribed by the affiliated university. Attention to learner outcomes is related to these guidelines. Dental students are expected to develop competencies with respect to certain knowledge, attitudes and skills [KAS]. Traditionally technical skills based on accurate knowledge competency are highly important [3].However, an

undergraduate curriculum also focuses on the development of specific knowledge in the supportive basic sciences and human body knowledge (e.g., head and neck anatomy). The development of attitudes related to the quality of interpersonal relationships and the psychodynamics of patient care are also increasingly seen as important.

This dynamic of required content is complicated by the breadth of cultures represented by the KLEVK Institute of Dental students. Although KLE University is located in the state of Karnataka, KLEVK Institute's students hail from various parts of India. India is a country of diverse culture with varying habits of eating, diet and various personal habits that can lead to wide range of oral problems (for example chewing betel nut or tobacco leads to poor oral hygiene), it is essential that dental students obtain a broad and wide perspective with respect to eating and oral habits practiced by various cultures other than their own. Such oral habits call for a wide range of training so that students may learn about the underlying manifestations, analyze the results, and be able to diagnose and provide the oral care for a wide variety of patient needs. As dental students are major stake holders in the curriculum a needs assessment of targeted learners[2]was undertaken. It was anticipated that the outcome of this study would help KLEVK Institute of Dental Sciences to use student perceptions of key skills as a reference tool toward planning a structured and comprehensive approach to train specific areas of knowledge, attitudes and skills, in addition to those areas of KAS already prescribed by the DCI or the university.

Student and alumni self-assessments of their own knowledge and skills have been used for several educational purposes including the evaluation of dental school curricula[4,5] and assessing effectiveness of specific courses within a dental school curriculum[6]as well as self-perception of skills. With this supporting literature, it was decided to undertake a survey among students. It was anticipated that their participation would help in strengthening the curriculum and would also serve to increase their intrinsic motivation as learners.

OBJECTIVES OF THE STUDY

The objective of this survey was to obtain dental students' self-perceptions of key skills required at the time of graduation to practice dentistry effectively. The study was also intended to determine the pattern of self-perceptions among three existing cohorts of dental students currently in clinical training who followed the same pattern of training and assessment. If a significant degree of consistency was to be seen in these self-assessments, the data would be used to bring about relevant curricular reforms.

METHODOLOGY

A comprehensive, list of essential key skills for a dental undergraduate was developed from the guidelines given in the documented statement of the Dental Council of India regulation 2007 for Bachelor of Dental surgery and KLE University 2006 [7]. Using a modified Delphi process [8], this list of skills was circulated amongst all the senior teaching staff of each specialty at KLEVK Institute of Dental Sciences. Teaching staff perspectives were sought with respect to the importance of the listed skills, based on their experience in the dental care services required among the patients seen at KLEVK Institute of Dental Sciences. Predicated on several passes through the faculty, a final list of 50 essential skills for the qualifying graduates was constructed. This final version in the form of a questionnaire was piloted with 30 postgraduate students to assure clarity and meaning of language and to gain an additional learner cohort of opinions with respect to the list of skills. Based on their suggestions the final questionnaire was prepared.

The needs assessment process was presented to the IRB of KLE University. After the IRB approval the questionnaire was administered to all existing third year (85) and final year (83) students, and to the full cohort of Interns (73). As per IRB agreement, student and Intern participation was allowed only after an orientation on the need for the study and how being a participant would assist in curricular reform. Students and interns voluntarily participated in this activity. No names or other personal information was obtained during completion of the questionnaire.

Participants were instructed to mark a response to the best of their knowledge, on the five point Likert Scale Strongly Agree (SA), Agree (A), No comment (N), Disagree (D) and Strongly Disagree (SDA). Students were given questionnaire after a lecture and were requested to submit the completed form to investigator's office the next day. Questionnaires were completed by 85.06% participants and were submitted. These were scored using a scale of 5 to 1; with 5 for Strongly Agree, 4 for Agree, 3 for No Comment, and 2 for Disagree and 1 for Strongly Disagree for each skill.

RESULTS

Total responses received were 205(85.06%) among which 70 (82%) were third year, 78 (93.97%) were final year students, and 57 (78%) interns. The mean score for each skill was calculated and the key skills required were ranked from 1 to 50 in each batch (Table 1). Rank 1 denoted the least essential skill and a rank of 50 denoted most essential skill. It is not known if gender affected perception, since gender could not be assessed as participation was anonymous. However there is a majority of female students (approximately 60%) in the Bachelor of Dental Surgery program at KLEVK Institute of Dental sciences.

Table 1. List of skills and the relevant rank ordering of the mean scores done by each batch of students. (1- least required skill; 50- most required skill)

Sr. No.	Skill	III Year Rank score	IV Year Rank score	Interns Rank score
1	Obtain a medical, social & dental history document and interpret it	37.5	43	45.5
2	Carry out a thorough examination of the oral and paraoral structures	49	47	50
3	Educate patients on oral diseases and their prevention	46	45	44
4	Recognize general health problems in dental patients	26	27	13.5
5	Use common laboratory investigations for diagnosis	2	6	8
6	Take relevant dental radiographs and interpret them	47	47	48.5
7	Draw up orderly comprehensive treatment plans including timing	30	32.5	8
8	Present to a patient the estimated fees, the payment arrangements and patients responsibilities for the treatment	28	35	19.5
9	Refer patients for appropriate specialist treatment	23.5	17	19.5
10	Prescribe drugs safely and effectively	48	47	47
11	Manage dental problems in patients with systemic diseases	26	39	37
12	Maintain an aseptic environment to prevent cross infections	50	49	48.5
13	Understand the ethical principles involved in clinical practice	33	20	17
14	Work effectively in a team with other personnel	13.5	9.5	11.5
15	Educate the patient to accept the treatment plan that is in the patient's best interest	13.5	22	30.5
16	Gain the patient's cooperation in various phases of treatment	43	35	37
17	Maintain accurate and complete records in a confidential manner	31	40	45.5
18	Keep abreast of advances in dentistry	40.5	35	33
19	Obtain all relevant data and diagnose the periodontal diseases	21.5	21	15
20	Perform scaling and root planning of teeth	20	15	30.5
21	Carry out specific oral health education to prevent the periodontal diseases	15	9.5	19.5
22	Diagnose the type of caries	37.5	19	22.5
23	Restore teeth using amalgam	1	1	1
24	Restore teeth using tooth colored restorative materials	18	31	19.5
25	Carry out uncomplicated endodontic procedures on anterior teeth	37.5	30	27
26	Manage pre-cancerous lesions and conditions in the mouth	37.5	41	37
27	Recognize and manage oral mucosal lesions	35	23.5	34.5
28	Diagnose oro-facial pain of dental origin	23.5	27	25
29	Diagnose oro-facial pain of non-dental origin	5	8	3
30	Obtain all records necessary for the management of a malocclusion	11.5	5	11.5

Table 1. Resume

Sr. No.	Skill	III Year Rank score	IV Year Rank score	Interns Rank score
31	Diagnose and classify malocclusions	7	4	22.5
32	Treat a simple malocclusion using removable appliances	6	3	8
33	Treat a simple malocclusion using removable appliances	17	15	8
34	Diagnose and classify cleft palate	27.5	18	8
35	Describe treatment procedures relating to cleft palate to parent/guardian	16	32.5	43
36	Rehabilitate partial edentulousness with removable or fixed prosthesis	33	42	41.5
37	Rehabilitate edentulousness with complete dentures	19	27	30.5
38	Repair and relining of existing dentures	11.5	7	4
39	Manage a child during dental treatment procedures	40.5	44	41.5
40	Carry out pulp therapy in primary dentition	4	15	27
41	Extract fully erupted teeth using forceps & elevator	8	12	39
42	Remove broken teeth	3	2	5
43	Perform minor surgical procedures involving the raising of a flap and removal of bone	10	13	27
44	Recognize and manage post-operative complications	44.5	37.5	40
45	Recognize and manage infections in the oro-facial region	44.5	37.5	30.5
46	Recognize and manage trauma to the dento-facial complex	43	23.5	16
47	Perform soft tissue biopsy whenever needed	9	11	2
48	Recognize and manage the common oral manifestations of systemic diseases	29	27	13.5
49	Prevent, recognize and manage common medical emergencies related to dental treatment	42	50	24
50	Recognize and refer uncommon medical emergencies to the relevant specialist	26	27	34.5

Table 2. Top 10 Skills preferred by dental students

Sr. No.	Skill
1	Prevent, recognize and manage common medical emergencies related to dental treatment
2	Maintain an aseptic environment to prevent cross infections
3	Carry out a thorough examination of the oral and paraoral structures
4	Take relevant dental radiographs and interpret them
5	Prescribe drugs safely and effectively
6	Educate patients on oral diseases and their prevention
7	Obtain a medical, social & dental history document and interpret it
8	Manage a child during dental treatment procedures
9	Recognize and manage post-operative complications
19	Maintain accurate and complete records in a confidential manner

Differences among classes

The scores for the skills were in ordinal scales leading to the use of non-parametric statistics to test the consistency in the pattern of responses [9]. The statistical correlation of the ranking of the 50 skills among the three different classes was tested using Kendall's-tau rank order correlation test [10]. The results are given in (Table 4). There was a strong correlation between the rank orders of the skills in the three different classes (r=.694, r=.519, r=.604, p<.0001).This suggests a high degree of consistency in the self- ratings of perceived importance and the requirement of different skills amongst the three different classes. This is in accordance with Wanigasooriyas' findings [11] who found consistent scores among a cohort of students.

Table 3. Bottom 10 ranked skills

S. No.	Skills
	Restore teeth using amalgam
	Remove broken teeth
	Use common laboratory investigations for diagnosis
	Treat a simple malocclusion using removable appliances
	Diagnose oro-facial pain of non-dental origin
	Perform soft tissue biopsy whenever needed
	Repair and relining of existing dentures
	Diagnose and classify malocclusions
	Obtain all records necessary for the management of a malocclusion
	Carry out pulp therapy in primary dentition

Table 4. Kendall Tau b Correlation Coefficients between the rank orders of skills for the three classes.

Correlation between years	Correlation Coefficient	p value
third and final year	0.694	(p<.0001)
third year and Interns	0.519	(p<.0001)
final year and Interns	0.609	(p<.0001)

DISCUSSION

The top 10 skills with higher ranking and preference were:

- Prevent, recognize and manage common medical emergencies related to dental treatment (# 49)
- Maintain an aseptic environment to prevent cross infections (#12) ,
- Carry out a thorough examination of the oral and paraoral structures (#2),
- Take relevant dental radiographs and interpret them (#6),
- Prescribe drugs safely and effectively (#10) ,
- Educate patients on oral diseases and their prevention (#3),
- Obtain a medical, social & dental history document and interpret it (#1),
- Manage a child during dental treatment procedures (#39),
- Recognize and manage post-operative complications (#44),
- Maintain accurate and complete records in a confidential manner (#17),

These are all generic and widely practiced skills. Training in these skills is emphasized by all the disciplines of dentistry and thus logically students would rank them high.

In contrast, the bottom ten skills in the ranking were:

- Restore teeth using amalgam (#23)
- Remove broken teeth (#42)
- Use common laboratory investigations for diagnosis (#5)
- Treat a simple malocclusion using removable appliances (#32)
- Diagnose oro-facial pain of non-dental origin (#29)
- Perform soft tissue biopsy whenever needed (#47)
- Repair and relining of existing dentures (#38)
- Diagnose and classify malocclusions (#31)
- Obtain all records necessary for the management of a malocclusion (#30)
- Carry out pulp therapy in primary dentition (#40)

Currently restoration of teeth by amalgam has been replaced by tooth colored restoration and it is easier to perform, so students apparently have ranked this skill as least important. Diagnosis and treatment of malocclusion, oro-facial pain, repair and relining of existing denture and perform soft tissue biopsy has also been listed within the bottom ten skills. These skills demand specialist care and follow-up regularly and it is unlikely that undergraduate students or even interns

would have significant experience with them.

Table 4 shows that each of the three classes of student ranked the 50 skills consistently. This remarkable consistency in the ranking skills by the three different classes suggests that the existing trends in student's preference for clinical skills training are similar. The significant consistency in the rank ordering of the skills by the three different classes, irrespective of sample size, is an indicator that the questionnaire did yield reproducible results of truly existing trends in student perceptions of their own abilities. These findings also inform us of the reliability of the questionnaire. Thus using this instrument could be beneficial to other dental colleges who wish to gain insights into the efficacy of the practical training aspects of their curricula.

Differences between classes

We used Kendall's tau to establish the degree of concordance among the rankings between each of the three groups. The results of this test showed the strong correlation between third year and final year students and between final year and interns. There was also correlation between interns and third year but slightly less than the other two cohorts. This would be explained by the fact that there is difference in the experience of two years compared to the interns who have greater exposure to a variety of clinical cases.

Group difference was estimated, 7 items showed significant change by ANOVA, with effect size in relation to the groups

- Draw up orderly comprehensive treatment plans including timing(#7) effect size between third year and intern (0.39) and fourth year and intern(0.32)
- Maintain an aseptic environment to prevent cross infections(#12) effect size between third year and fourth year (0.33) third year and intern(0.44)
- Diagnose the type of caries(#22) effect size between third year and intern(0.39) and fourth year and third year (0.47)
- Diagnose and classify malocclusions(#31) effect size between third-year and intern(0.45) and fourth-year and intern(0.43)
- Carry out pulp therapy in primary dentition(#40) effect size between third year and intern (0.50)
- Recognize and manage infections in the oro-facial region(#45) effect size between third year and intern(0.46) and fourth year and third year (0.37)
- Prevent, recognize and manage common medical emergencies related to dental treatment(#49) effect size between third year and intern(0.42) and fourth year and intern(0.48)

Each of the 7 items reflected group difference between third-year students and interns as the former is a novice group and the other having completed the program. Items #7, #31, #45 and #49 reflect differences between fourth year and interns which is interesting and could be explained in terms of the need of expertise/ specialist support in patient management.

Further research is necessary to compare these data with practicing alumni to determine whether skills at the time of graduation have any relevance with the actual skills in future dental practice.

LIMITATIONS

There are certain limitations in this study. The study measures the importance of self-perceptions. We extrapolated that sense of importance related to capability, but this may not be so. Further, in measuring self-perceptions we did not conduct an objective method of assessment. Further, as these were the first three clinical training cohorts, the relevance of these skills to practicing dentists is not known nor measured. This specific limitation harkens toward another study which may be done. Lastly, the sample size is small and made up of students and interns from a single dental college, and therefore possibly not generalizable. It is doubtful whether self-assessments of clinical skills can predict, the actual skills required for a practicing dental surgeon. Thus, further research with larger samples and with multiple dental colleges is required to substantiate these findings.

CONCLUSIONS

The training of the dental practice skills emphasized in all the disciplines was ranked among the top ten skills. Most of these were generic skills and among the "must know" category of the syllabus. Many skills listed as least required needed a advanced training to manage them. Interestingly, each of the three classes of students ranked the skills consistently. This affirms that the questionnaire and self-assessment were reliable tools to gain insights into the efficacy of the skill based curriculum. Similar lists generated by regulatory bodies in western countries have been used for the certification of practicing dentists abroad [12,13]. Regular audits of the skills required at the time of undergraduate training in India, and possibly all dental colleges, can help strengthen the quality of training, enhance the support extended by the students in learning.

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