

Student self-assessment of essential skills in dental surgery

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Objective: To assess whether student self-assessments of essential skills in dental surgery are reliable indicators of the strengths and weaknesses of the clinical aspects of the dental school curriculum. This was done as part of an ongoing evaluation of the curriculum of the Faculty of Dental Sciences of the University of Peradeniya in Sri Lanka.

Design: Cross-sectional surveys of 5 different classes of students using a pre-tested questionnaire.

Setting: The Faculty of Dental Sciences of the University of Peradeniya, Sri Lanka, which is the only dental school in the island.

Materials & Methods: A questionnaire was developed specifically for the purpose of eliciting student self-confidence in 46 essential skills on a three point scale. It was administered to 5 different classes of students, immediately or soon after their respective Final BDS examinations. The 5 classes had followed similar curricular formats. The surveys were conducted on a voluntary and anonymous basis.

Results: Results show a remarkable consistency in the self-ratings done by the five different classes of students who followed the same curriculum during five different time periods. Students were least confident in the skills related to the management of medical emergencies and of oral manifestations of systemic diseases while they were most confident in skills related to the care of Periodontal disease and Caries.

Conclusion: Student self-assessments of skills is a useful tool for evaluating the clinical training provided in the dental school curriculum. Students were most confident in managing problems that they most frequently encountered in the dental school. The areas in which they were least confident require curricular reform.

INTRODUCTION

A large portion of the dental school curriculum is aimed at assisting students acquire technical skills in dentistry. Buck *et al*¹ found that trainers of dental students consider good technical skills as the most important component of a 'good' dentist. Hence the achievement of self-confidence and competence in clinical and technical skills should be one of the main aims of the dental school curriculum.

Student self-assessments of their own knowledge and skills have been used for several educational purposes. The data from such assessments have been used for the evaluation of dental school curricula^{2, 3} and for assessing effectiveness of specific courses within the dental school curriculum⁴. Teaching strategies have been tested out to determine whether they improve students' perception of their own clinical competencies⁵. In medical school settings, student confidence in clinical skills has been assessed

using an Objective Structured Clinical Examination (OSCE)⁶ and student self-assessments of personal efficacy have been carried out to test their ability to predict performance in the OSCE⁷.

OBJECTIVE

The objective of this survey was to obtain dental students' self-perceptions of competence at the time of graduation or soon afterwards in each of the essential skills required to practice dental surgery in Sri Lanka and to see whether there would be a consistent pattern in the self-assessments made by different classes of students who followed the same curriculum in different time periods. If a reasonable degree of consistency was apparent in their self-assessments, the data would be used to bring about relevant curricular reform. This survey was done as part of a wider evaluation of the undergraduate curriculum in the Faculty of Dental Sciences of the

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MATERIALS AND METHODS

A preliminary list of essential skills for a practicing dental surgeon was developed from the ideas expressed in the documented statement of the Institutional Objectives of the Dental School. This list of skills was circulated amongst all the senior teaching staff of the Faculty of Dental Sciences asking for their comments. Using the feedback obtained from these teachers, a final list of 46 essential skills for the newly qualified graduate was drawn up. A questionnaire was formulated, in which the respondent was requested to make a self-assessment with respect to each of the 46 skills on a three point scale of 'very good', 'satisfactory' and 'poor'

The questionnaire, after testing in a pilot study, was administered, on a voluntary and anonymous basis to five different classes of students, each class answering the questionnaire immediately after or a short time after sitting their respective final BDS examinations. The students who sat the final BDS examinations held in 2000 and in 2002 were given the option of answering the questionnaire on the last day of their respective final exams and were asked to hand in the completed questionnaire before leaving the dental school on that day. The students who sat the final BDS examinations held in 1996, 1997 and 2001 were given the option at academic meetings held outside the dental school shortly after their respective examinations. These were asked to hand in the completed questionnaire at the meeting or return it by post. In total, responses were obtained from samples of the five different classes of students all of whom had undergone similar four year curricula leading to the BDS degree.

The completed questionnaires were scored using an arbitrary scale of 1 to 3. "very good" carried 3, "satisfactory" 2 and "poor" 1. A mean score was calculated for each skill and the skills were then ranked from 1 to 46 in each class; rank 1 denoting least confident and rank 46 the most confident.

RESULTS

In 1996, of the 72 students who had sat the final BDS examination, 29 (40%) attended the meeting and answered the questionnaire. Similarly in 1997, of the 75 who sat the final exam, 23 (31%) attended the meeting and answered the questionnaire. In 2000 all 80 (100%) students who sat the final exam answered the questionnaire in the dental school. In 2001, of the 78 who sat the final exam, 25 (32%) attended the meeting and answered the questionnaire. In 2002 of the 62 who sat the final exam 55 (89%) answered the questionnaire in the dental school. The meetings, at which the questionnaire was given, were all held outside the dental school. In the five classes all the questionnaires that were given out were returned fully completed. There was no non-response bias in any of the classes.

Because the scores for the skills were in ordinal scales and since the samples from 3 of the 5 classes were relatively small, non parametric statistics was

used to test the consistency in the pattern of responses among the five classes. Non-parametric statistics are applicable in situations where sample sizes are small and where no assumptions are made as to the distribution of the data⁸.

Table 1 gives the rank orders (1 to 46) of the skills for each of the five classes; rank order 1 being least confident and 46 most confident. The statistical correlation of the ranking of the 46 skills among the five different classes was tested using the non-parametric Kendall's 'tau' rank order correlation test⁹. The results are given in Table 2. It shows a very high degree of correlation ($p < .0001$) between the rank orders of the skills in the five different classes. This suggests a high degree of consistency in the self-ratings of confidence in the different skills amongst the five different classes.

Table 1 also reveals that all five classes ranked the skills of doing an external cardiac massage; maintaining a clear airway and ventilating a patient; treating common systemic diseases as the three least confident skills. The skills that were ranked among the three most confident skills by the five classes were extracting fully erupted teeth using forceps & elevator; restoring teeth using tooth coloured restorative materials; restoring teeth using amalgam; educating patients on oral diseases and their prevention; carrying out a thorough examination of the mouth; performing scaling and root planning of teeth; diagnosing Caries; carrying out pulp therapy in primary dentition and removing broken teeth.

The 46 skills were grouped into 12 categories (see Table 1). The three categories in which they were least confident were cardiac arrest; oral manifestations of systemic disease and medical emergencies. The three categories in which they were most confident were caries; periodontal disease and paedodontics.

DISCUSSION

The remarkable consistency in the rank ordering of the skills by the five 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. This evidence also suggests that student self-assessment of clinical skills is a reliable instrument for gaining insights into the efficacy of the practical sections of the curriculum.

The relatively high confidence expressed by the students in the management of caries and periodontal disease, which was also reported by Holmes, Diaz-Arnold & Williams² in their survey done in the University of Colorado, may be related to the fact that these are the two commonest problems being managed in the Peradeniya dental school and in which they have the most practice. This is in keeping with Chase & Simon's¹⁰ observation that practice is the major independent variable in gaining confidence and in the acquisition of skills. The low confidence in the management of medical emergencies and common systemic diseases is a reflection of the deficiency of practical experience in these aspects of the curriculum. The curricula that the five classes followed did not include a clerkship in clinical and emergency

RANK ORDERING (1 TO 46) OF THE SKILLS BY EACH BATCH
1=Least Confident , 46=Most Confident

#	SKILLS	1996 n=29	1997 n=23	2000 n=80	2001 n=25	2002 n=55
GENERAL CLINICAL SKILLS						
1	Obtain a medical, social & dental history document and interpret it	29	42	26	35	32
2	Carry out a thorough examination of the mouth and related structures	36	45	27	36	40
3	Educate patients on oral diseases and their prevention	34	41	39	45	45
4	Recognize general health problems in dental patients	19	22	8	11	14
5	Use common laboratory investigations for diagnosis	4	16	4	7	5
6	Take relevant dental x-rays and interpret them	16	30	19	14	18
7	Draw up comprehensive treatment plans including timing	17	37	12	18	12
8	Refer patients for appropriate specialist treatment	25	27	28	32	35
9	Prescribe drugs safely and effectively	39	39	22	30	23
10	Manage dental problems in patients with systemic diseases	11	15	6	10	6
11	Maintain an aseptic environment to prevent cross infections	40	33	24	15	29
12	Understand the ethical principles involved in clinical practice	21	34	29	25	38
13	Work effectively in a team with other personnel	23	32	20	29	30
14	Keep abreast of advances in dentistry	7	9	14	12	25
PERIODONTAL DISEASE						
15	Obtain all relevant data and diagnose the disease	27	31	25	28	26
16	Perform scaling and root planing of teeth	28	40	42	41	46
17	Carry out specific oral health education to prevent the disease	35	38	37	40	42
CARIES						
18	Diagnose the disease	41	44	43	38	31
19	Restore teeth using amalgam	45	43	45	42	36
20	Restore teeth using tooth coloured restorative materials	42	46	46	43	44
21	Carry out uncomplicated endodontic procedures on anterior teeth	38	36	40	31	41
ORAL MALIGNANCY & PRE-MALIGNANT LESIONS						
22	Recognize pre-cancerous conditions in the mouth	13	23	33	21	22
23	Manage oral mucosal lesions	12	13	15	4	7
24	Diagnose oro-facial pain of dental origin	20	25	11	6	15
MALOCCLUSION						
25	Obtain all records necessary for the management of a malocclusion	15	11	31	17	28
26	Diagnose and classify malocclusions	18	12	32	22	24
27	Treat a simple malocclusion using removable appliances	14	6	13	9	9
CLEFT PALATE						
28	Diagnose and classify cleft palate	6	17	41	34	17
29	Describe treatment procedures relating to cleft palate to parent ¹⁰	4	34	23	20	
ORAL MANIFESTATIONS OF SYSTEMIC DISEASE						
30	Recognize the common oral manifestations of systemic diseases	22	18	18	5	11
31	Treat common systemic diseases	1	1	1	3	1
CARDIAC ARREST						
32	Do an external cardiac massage	2	3	2	2	2
33	Maintain a clear airway and ventilate the patient	3	2	3	1	3
OTHER MEDICAL EMERGENCIES						
34	Recognize common medical emergencies and give emergency treatment	5	8	7	8	4
35	Recognize and refer medical emergencies to the relevant specialist	9	14	17	19	19
PROSTHETICS						
36	Rehabilitate partial edentulousness with removable partial dentures	31	26	35	37	34
37	Rehabilitate edentulousness with full dentures	32	35	38	33	39
38	Repair and relining of existing dentures	33	19	21	24	21
39	Carry out and assess the lab procedures involved in the construction of partial and complete dentures	8	7	5	13	8
PEDODONTICS						
40	Manage a child during dental treatment procedures	43	21	30	27	33
41	Carry out pulp therapy in primary dentition	24	10	36	44	37
ORAL SURGERY						
42	Extract fully erupted teeth using forceps & elevator	46	29	44	46	43
43	Remove broken teeth	44	28	23	39	27
44	Perform minor surgical procedures involving the raising of a flap and removal of bone	26	5	10	20	16
45	Recognize and manage post-operative complications	37	20	16	26	10
46	Recognize and manage infections in the oral-facial region	30	24	9	16	13

Table 1: List of skills and the relevant rank ordering of the mean scores done by each batch of students. (1=least confident; 46=most confident)

'Further research is required to determine whether confidence in skills at the time of graduation has a positive correlation with the actual performance of these skills in dental practice.'

YEAR	1996	1997	2000	2001	2002
1996	1.00000	0.54 p<.0001	0.47 p<.0001	0.55 p<.0001	0.53 p<.0001
1997	0.54 p<.0001	1.00000	0.46 p<.0001	0.51 p<.0001	0.54 p<.0001
2000	0.47 p<.0001	0.46 p<.0001	1.00000	0.66 p<.0001	0.70p p<.0001
2001	0.55 p<.0001	0.51 p<.0001	0.66 p<.0001	1.00000	0.69 p<.0001
2002	0.53 p<.0001	0.54 p<.0001	0.70 p<.0001	0.69 p<.0001	1.00000

Table 2-Kendall Tau b Correlation Coefficients between the rank orders of skills for the five classes (N=46)

medicine. The results of this survey will engender relevant changes in this aspect of their clinical training.

There are three deficiencies in this study. First, the administration of the questionnaire was not done uniformly for the five classes. Second, three of the five classes had relatively low sample sizes. Third, the study did not correlate the students' self-assessments with the actual scores obtained by the students in the clinical sections of the Final BDS examination. This could not be done because the questionnaire was answered anonymously. Hence the question remains whether self-assessments of clinical skills are predictors of clinical competence as judged in examinations and subsequently of actual clinical performance as a practicing dental surgeon. Stacey MA *et al*⁵ found that students obtained significantly lower scores for clinical competency from their teachers as compared to the students' own assessments. Mavis B⁷ found that high self-rated students tended to score above the mean in OSCEs as compared with low self-rated students but there was no significant correlation between self-efficacy ratings and OSCE scores. Further research is required to determine whether confidence in skills at the time of graduation has a positive correlation with the actual performance of these skills in dental practice.

Lists of the essential skills in dental surgery are useful tools not only for assessing student self-confidence in these skills but also for assessing student competence at examinations. Such lists have also been used for the certification of practicing dentists.^{11,12} 🍷

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