

Kertas Asli/Original Articles

Graduates' and Employers' Perceptions on Competencies Obtained from An Undergraduate Dental Curriculum

Persepsi Graduan dan Majikan terhadap Kompetensi yang Diperolehi dari Kurikulum Program Pergigian Prasiswazah

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ABSTRACT

The effectiveness of a dental curriculum as reflected by the competencies of the graduates is paramount in ensuring its relevance in the rapidly evolving field of dentistry. This work aimed to assess the competencies of dental graduates of the Faculty of Dentistry, Universiti Kebangsaan Malaysia (UKM) as perceived by the graduates and their employers on the basis of the core competencies listed in the undergraduate dental curriculum. A self-administered questionnaire consisting of 43 questions based on eight competency domains were sent to all UKM dental graduates of years 2012 to 2015 and to senior dental officers who represented their employers. The eight domains assessed were as follows: 1) gathering information at chair-side, 2) diagnosis, 3) treatment planning, 4) treatment and prevention, 5) community-based, 6) management and administrative, 7) communication and 8) personal management and professional development. A total of 132 graduates (75%) and 18 employers (55%) responded. Only domain E on community-based skills was collectively rated 'satisfactory' while the rest of the seven domains had an 'excellent' rating by all respondents. With regard to individual skill, basic life support was rated very low for both groups (38.6% graduates and 23.5% employers). A strong association was found between the scores given by the graduates and their employers ($p=0.00$). Generally, no difference was found between the scores of graduates from different years. The findings allow an evaluation of the curriculum in a myriad of angles. Although the graduates reported a good level of competency in most domains, the employers were reserved on the community-based skills. Poor competency in the key skill of basic life support in medical emergencies was highlighted and must be addressed in the curriculum or during training at the workplace.

Keywords: competence; perception of graduates; perception of employers; dental education; Malaysia

Abstrak

Keberkesanan kurikulum pergigian seperti yang ditunjukkan melalui kompetensi graduan sangat penting dalam memastikan kesesuaiannya dalam bidang pergigian yang berkembang pesat. Kajian ini bertujuan untuk menilai kompetensi graduan lulusan Program Ijazah Doktor Pergigian, Fakulti Pergigian, Universiti Kebangsaan Malaysia (UKM) seperti yang dilihat oleh para graduan dan majikan mereka berdasarkan kompetensi teras yang disenaraikan dalam kurikulum program pergigian tersebut. Soal selidik sendiri telah dihantar kepada semua graduan pergigian UKM dari tahun 2012 hingga 2015 dan kepada pegawai pergigian kanan yang mewakili majikan mereka. Ianya terdiri daripada 43 soalan berdasarkan lapan domain kompetensi. Lapan domain yang dinilai adalah seperti berikut: 1) pengumpulan maklumat di 'chair side', 2) diagnosis, 3) perancangan rawatan, 4) rawatan dan pencegahan, 5) berdasarkan komuniti, 6) pengurusan dan pentadbiran, 7) komunikasi, 8) penilaian sendiri dan pembangunan profesional. Seramai 132 graduan (75%) dan 18 majikan (55%) telah memberikan maklumbalas. Hanya domain E iaitu kemahiran berdasarkan komuniti telah dinilai secara kolektif sebagai 'memuaskan' manakala tujuh domain yang lain mempunyai penilaian 'cemerlang' oleh semua responden. Kemahiran individu dan sokongan kehidupan asas dinilai 'sangat rendah' untuk kedua-dua kumpulan (38.6% graduan dan 23.5% majikan). Terdapat hubungan yang kuat antara skor yang diberikan oleh graduan dan majikan mereka ($p=0.00$). Secara amnya, tidak terdapat perbezaan skor oleh graduan mengikut tahun yang berbeza. Hasil penemuan ini membolehkan penilaian kurikulum dilaksanakan dalam pelbagai sudut. Walaupun para graduan melaporkan tahap kompetensi yang baik dalam kebanyakan domain, tetapi berbeza bagi domain kemahiran berdasarkan komuniti dinilai oleh majikan mereka. Kelemahan dalam kompetensi kemahiran utama sokongan kehidupan asas dalam kecemasan perubatan telah diketengahkan dan harus diperbaiki di dalam kurikulum atau semasa latihan di tempat kerja.

Kata kunci: kompetensi; persepsi graduan; persepsi majikan; pendidikan pergigian; Malaysia

INTRODUCTION

With the changing needs of the community and the dental profession, public and professional demand for an accountability in education has increased (Chambers 1988). One of the most widely used outcome-based measure to evaluate the dental curriculum is to measure the perception of the graduates on their competence on specific dental practices at the time of their graduation (Arena et al. 2007). Although the effectiveness of a curriculum cannot be measured with a method because no one tool can capture all the information needed (Dagenais et al. 2003), questionnaires are widely used as curriculum assessment tools because they promptly provide a large amount of information. However, these questionnaires are known to have an inherent limitation where the length of time between the end of training and data gathering makes separating the effects of the curriculum to those of experience difficult. To counter this effect, surveys have been limited to alumni who have graduated in the past ten years (Dagenais et al. 2003; Shugars, Bader & O'Neil 1992).

Questionnaire-based self-perceived evaluation of competence are used to assess the performance of graduates in a specific curriculum area (Bernabé, Ludeña & Beltrán-Neira 2006), to assess the dental curriculum, make revisions and improvements (Rafeek et al. 2004; Schönwetter et al. 2011), validate national competency standards (Gerrow, Murphy & Boyd 2006) and meet the accreditation standards of the governing body (General Dental Council 2015). It was found that although the competency of dental graduates has been widely studied, studies comparing the competence from the perspective of the graduates to the perspective of their employers are limited.

A questionnaire-based study by Bartlett et al. (2001) compared the levels of confidence in specific clinical skills by vocational dental practitioners with their vocational dental trainers' perception of their confidence. The authors identified that the reliance on assessment of confidence in clinical skills was a compromise but agreed that it is difficult to assess clinical ability in the absence of a gold standard. They found that there is a relatively low confidence by the trainers in the abilities of the vocational dental practitioners and they attributed it to the setting of high standards by the trainers in relation to their own confidence (Bartlett et al. 2001). Patel et al. (2006) compared the views of vocational dental practitioners' and their trainers' in England and found that there are differences in the perception of these two groups. This was credited to the lack of sufficient insight by the vocational dental practitioners. This finding was also supported by Razak et al. (2008) and Yusof et al.

(2010) who found that graduates have better perception of their competencies than their employers.

In Southeast Asia, common competencies for general dental practitioners have been discussed at the regional level (Chuenjitwongsa et al. 2017) but are yet to be implemented at the national level. In Malaysia, only the aforementioned studies by Razak et al. (2008) and Yusof et al. (2010) compared the perceived competency of dental graduates and their employers. These two studies assessed University Malaya's dental graduates. The domains in the questionnaire were based on the findings of a working group that analysed the competency statements of various dental education institutions and professional organizations worldwide (Yusof et al. 2010).

At the Faculty of Dentistry in Universiti Kebangsaan Malaysia (UKM), many tools have been utilized to evaluate the curriculum. One tool that is yet to be used is the alumni surveys assessing self-perceived graduate competency. Graduates are reported to be in a better position to reflect on the level of preparation provided by their education and curriculum (Berk, Close & Weyant 1998; McCann & Babler 1998). A survey of this group would be invaluable, both for continuous improvement at the faculty level as well as a reference by other dental education institutions in this region. Here, we aimed to assess the competencies of dental graduates of Faculty of Dentistry, UKM as perceived by the graduates and their employers on the basis of the core competencies listed in the undergraduate curriculum revised in 2008.

MATERIALS AND METHODS

Ethical approval from the Research Ethics Committee of the National University of Malaysia was obtained (UKM 1.5.3.5/244/DD/2105/027) before the study commencement.

QUESTIONNAIRE CONTENT

A questionnaire was developed based on the eight broad competency domains by Razak et al. (2008) designed to assess the competency of graduates from the perspective of the graduates themselves and their employers. Each domain contained a list of skills covered by the UKM dental curriculum as shown in Table 1. The list of skills was modified to contain 43 items compared with the 89 items in the original questionnaire.

A five-point Likert scale was used to assess each item representing a certain skill. The scale ranged from 1 (highly incompetent) to 5 (highly competent), and an odd numbered scale was chosen to allow the respondents

TABLE 1. Competency domains and the numbers of items assessed within each domain

Domain	Skills	No of items
A	Skills involved in gathering information at chair-side	2
B	Diagnostic skills	3
C	Skills in treatment planning	5
D	Skills in treatment and prevention	15
E	Community-based skills	4
F	Management and administrative skills	8
G	Communication skills	3
H	Personal management and professional development	3

to choose a neutral response at 3 (somewhat competent). After the modifications to the original questionnaire was carried out, it was face-validated by three lecturers to represent the employers and 10 final-year dental students to represent the graduates.

DATA COLLECTION

The graduates included in this study were from the total number of those graduating in the year of 2012 to 2015, and the employers were represented by senior dental officers that oversaw the graduates in their first year of practice in the Malaysian Ministry of Health. Graduates were excluded if they were working overseas or if they were not working with the Malaysian Ministry of Health.

The questionnaire was sent via email as well as through post to 177 dental graduates and 33 employers. Whenever a questionnaire was not returned, follow up was conducted via email, post or phone call to allow for an adequate response rate. Only 33 employers were surveyed because multiple graduates were employed by the same employers working at certified training clinics for first year dental officers in Malaysia.

DATA ANALYSIS

The ratings from the Likert scale were analysed and categorized into ‘incompetent’ (if the score was either 1, 2 or 3 on the Likert scale) and ‘competent’ (if the score was either 4 or 5 on the Likert scale). If more than 70% respondents scored competent for the item, then the skill was considered as having ‘excellent’ rating, ‘satisfactory’ if 60–69% and ‘poor’ if less than 60%. The categorization of data was identical to that of Razak et al. (2008) and Yusof et al. (2010). This categorization was chosen to allow for comparison with the results

from other Malaysian studies on dental graduates and their employers.

Statistical analysis of the variables was performed with IBM SPSS version 19.0 (IBM Co., Armonk, NY, USA). Demographic data were presented as frequencies (%) for all discrete variables and means \pm standard deviations (SD) for all continuous variables. It was hypothesized that graduates from different graduating years would have different levels of competencies. To test this hypothesis, Pearson chi-squared and analysis of variance (ANOVA) were carried out for categorical and continuous data, respectively. The Likert scores of the graduates and their employers were analysed by Spearman’s correlation test to determine the relationship between the responses of these two groups of subjects. All *p* values were two-sided, and *p* values less than 0.05 were considered statistically significant.

RESULTS

DEMOGRAPHIC DISTRIBUTION

Out of 177 questionnaires sent to the graduates, 132 questionnaires were completed while 18 out of 33 questionnaires were completed by the employers giving a response rate of 75% and 55% respectively. Of the 132 graduates surveyed, 106 (80.3%) were female and 26 (18.7%) were male. The graduates were predominantly of Chinese ethnicity (56.8%) followed by 37.9% of Malays and Indians at 5%. The mean age of the respondents was 26.8 ± 1.17 . The distribution of the respondents according to the year of graduation is shown in Table 2. No significant difference was found among the response rate, gender and ethnicity of the respondents from different years of graduation. Only the mean age was statistically different, reflecting the different years of graduation.

TABLE 2. Response rate and demographic data of respondents according to their year of graduation.

Year of Graduation	2012	2013	2014	2015	p
Questionnaire Response					
Returned; n (%)	41 (31.1)	30 (22.7)	27 (20.5)	34 (25.8)	
Not returned; n (%)	16 (35.6)	9 (20.0)	12 (26.7)	8 (17.8)	0.213
Mean age (SD)	25.5 (0.62)	26.1 (0.47)	27.1 (0.46)	28.2 (0.42)	0.000*
Gender					
Male; n (%)	4 (15.4)	9 (34.6)	6 (23.1)	7 (26.9)	
Female; n (%)	30 (28.3)	18 (17.0)	24 (22.6)	34 (32.1)	0.195
Ethnicity					
Malay; n (%)	15 (30.0)	7 (14.0)	8 (16.0)	20 (40.0)	
Chinese; n (%)	17 (22.7)	19 (25.3)	20 (26.7)	19 (25.3)	
Indian; n (%)	2 (40.0)	0 (0)	1 (20.0)	2 (40.0)	
Other; n (%)	0 (0)	1 (50.0)	1 (50.0)	0 (0)	0.326

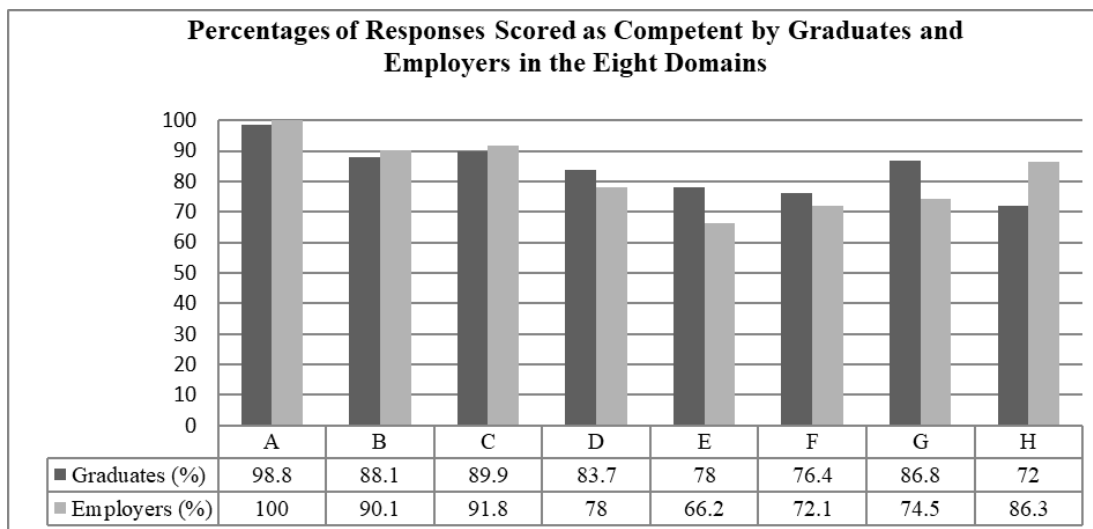


FIGURE 1: Percentages of responses scored as competent by graduates and employers in eight domains

RATINGS BY GRADUATES AND EMPLOYERS

Figure 1 shows the percentages of responses scored as competent by the graduates and their employers across the eight domains. The employers underrated the graduates in four domains i.e. D ‘Treatment and prevention’, E ‘Community-based’, F ‘Management and administrative’ and G ‘Communication’. Domain E: Community-based skills were the only one with a ‘satisfactory’ rating at 66.2% by the employers, while the rest of the other domains had an ‘excellent’ rating by both groups.

The relationship between scores by the graduates and their employers were further investigated using Spearman’s rho for non-parametric data. The mean score given by the graduates was compared with that from the employers across all 43 items. Mean rating by graduates showed a statistically significant, strong positive association ($r_s = 0.808, p = 0.00$, two-tailed, $N = 43$) with the mean rating by the employers.

SKILLS WITH ‘POOR’ RATINGS

Across the 43 skills investigated, seven skills achieved a ‘poor’ rating by either the graduates or the employers or both. This is where less than 60% of the respondents rated our graduates as ‘competent’ as shown in Table 3. Across these seven skills, the graduates constantly overrated themselves compared with the rating given by the employers.

Chi-squared test was used to determine whether the year of graduation had any association with the competency of our graduates in these seven skills, and the results are shown in Table 4. Significant difference in the skill of complex restorative procedures in primary and permanent dentition was found among the different years of graduation; $\chi^2 (3, N=132) = 9.854, p = 0.020$ ($p < 0.05$). The self-reported competency in performing this skill decreased over the elapsing of time since graduation. No difference in the other six poorest skills

TABLE 3. List of skills that had less than 60% competent score (poor rating)

Domain	Skill	Graduates (%) n= 132	Employers (%) n= 18
D	Complex Restorative Procedures in Primary and Permanent Dentition	59.9	23.5
D	Basic Life Support in the Management of Medical Emergencies in the Dental Practice	38.6	23.5
D	Simple orthodontic treatment including orthodontic Removable Appliances	50.9	29.4
E	Organize a community program to improve the oral health of the public	65.9	47.1
E	Collaborate with other health professionals in health promotion and disease prevention in the community	71.2	58.5
F	Leadership Skills	70.4	53
F	Management of general dental practice (GDP) in compliance with regulations, policies, protocols	63.6	58.8

TABLE 4. Comparison between the competency of graduates from different graduating years in skills with a 'poor' rating

Skill	2012	2013	2014	2015	p
Complex Restorative Procedures in Primary and Permanent Dentition					
Competent; n (%)	21 (51.2)	15 (50.0)	15 (55.6)	28 (82.4)	
Incompetent; n (%)	20 (48.8)	15 (50.0)	12 (44.4)	6 (17.6)	0.020*
Basic Life Support in the Management of Medical Emergencies in the Dental Practice					
Competent; n (%)	13 (31.7)	13 (43.3)	10 (37.0)	15 (44.1)	
Incompetent; n (%)	28 (68.3)	17 (56.7)	17 (63.0)	19 (55.9)	0.666
Simple orthodontic treatment including orthodontic Removable Appliances					
Competent; n (%)	17 (41.5)	13 (43.3)	13 (48.1)	24 (70.6)	
Incompetent; n (%)	24 (58.5)	17 (56.7)	14 (51.9)	10 (29.4)	0.058
Organize a community program to improve the oral health of the public					
Competent; n (%)	27 (65.9)	21 (70.0)	16 (59.3)	23 (67.6)	
Incompetent; n (%)	14 (34.1)	9 (30.0)	11 (40.7)	11 (32.4)	0.849
Collaborate with other health professionals in health promotion and disease prevention in the community					
Competent; n (%)	25 (61.0)	24 (80.0)	20 (74.1)	25 (73.5)	
Incompetent; n (%)	16 (39.0)	6 (20.0)	7 (25.9)	9 (26.5)	0.331
Leadership Skills					
Competent; n (%)	31 (75.6)	22 (73.3)	17 (63.0)	23 (67.6)	
Incompetent; n (%)	10 (24.4)	8 (26.7)	10 (37.0)	11 (32.4)	0.682
Management of GDP in compliance with regulations, policies, protocols					
Competent; n (%)	26 (63.4)	17 (56.7)	16 (59.3)	25 (73.5)	
Incompetent; n (%)	15 (36.6)	13 (43.3)	11 (40.7)	9 (26.5)	0.514

was observed between the graduates from different graduating years.

DISCUSSION

This study represents the perception of 132 graduates and 18 employers on the competencies of UKM graduates

obtained from the revised undergraduate dental curriculum in 2008. The three highest domains rated competent by both groups were gathering information, diagnostic skills and treatment planning. This finding corresponds with multiple other studies (Greenwood et al. 1999; Holmes, Diaz-Arnold & Williams 1997; Razak et al. 2008) as these skills are considered to be the basics in clinical practice. They are performed almost every day by the graduates in

the clinic and termed as the bread and butter of dentistry. Hence, a high percentage of graduates and their employers rating the graduates as 'competent' in these three domains was expected.

On the contrary, the three lowest domains rated competent by employers are community-based skills, management and administrative skills and communication skills. The perception of the graduates and their employers is similar to the findings of Razak et al. (2008) and Shugars et al. (1992), where the graduates were poor in performing a population need assessment and prevention program. The low ratings in these domains can be explained by the perceived low competency in the interpersonal skills set, reflecting the need to improve the curriculum content in this area.

For domain treatment and prevention, there were three skills categorized into a "poor" level of competency despite an overall high rating for that particular domain. These are basic life support, complex restorative procedures as well as simple orthodontic treatment. Yusof et al. (2010) also had similar findings where cardiopulmonary resuscitation skill was rated lowest by the graduates and their employers in University Malaya, Malaysia.

Competency in the management of medical emergencies is critical for healthcare professionals. The lack of training and inability to cope with medical emergencies can lead to tragic consequences and sometimes legal action (Peskin & Siegelman 1995). Other studies in New Zealand (Broadbent & Thomson 2001), United Kingdom (Graham & Scollon 1996), Brazil (Carvalho, Costa & Marcelo 2008) and Germany (Kaeppler et al. 1998) also reported similar findings regarding the need for enhanced teaching strategies for the Oral and Maxillofacial Surgery discipline in the undergraduate curriculum. Limited exposure in this area at the primary dental care setting may partly explain the reported poor competency in this area. However, since the questionnaire assessed competency of graduates in their first year of practice, exposure in the working environment per se would not be a sole contributor for the poor competency reported. Their training during the undergraduate years should still allow the graduates to be confident in this area. The finding that our graduates are not fully prepared for this is worrying and should be further explored and addressed.

Complex restorative procedures and orthodontic treatment may have been considered as treatment at a postgraduate level hence a poor rating by both the graduates and their employers in this skill set. Nevertheless, the dental curriculum and the nature of the working environment warrant the graduates to have a minimum competency in this area.

The graduates in this study feel competent in most skills in the eight domains, and these findings were similar

to the earlier studies on the Malaysian dental graduates (Razak et al. 2008, Yusof et al. 2010). However, only one out of the eight domains achieved a 'satisfactory' rating by the employers, and the rest were rated 'excellent'. This finding is an improvement compared with those reported by Razak et al. (2008) who stated that employers gave 'poor' ratings for three domains and 'satisfactory' for another two domains. The contrast in employer-perceived competency may be due to differences in supervision and monitoring by employers. A better ratio of employers to graduates allowed for the employers to observe more skills than before. This improved rating can also be attributed to the regular curriculum reviews that have incorporated suggestions from previous studies to improve the quality of our graduates.

Separating the effects of the curriculum to those of experience is difficult in this type of study. Post-graduate training courses, attachment at specialists' clinics, certification in certain clinical skills and continuous professional developments provide an advantage to senior graduates and confound the findings of this study. To address this issue, limiting the alumni to those who have graduated in the past ten years has been suggested (Dagenais et al. 2003; Shugars, Bader & O'Neil 1992). In the present work, respondents were limited to 4 years of post-graduation to reduce the confounding factors. Similar findings in the different graduating batches for six out of the seven poorest skills assessed suggest that the effects of post-graduation experience were minimal.

This study is limited by its reliance on the perception of the graduates themselves and their employers to assess competence. Future studies can include multiple aspects of assessment, including performance data and patient satisfaction surveys from the graduates' workplace to ensure an unbiased assessment of competence. Other limitations include the difference in the opportunity for the graduates to demonstrate certain competencies such as interpersonal skills and management of emergencies as these require both the opportunity as well as the proximity of employers to the graduates to assess them accurately. This is demonstrated in this study where the graduates overrated themselves across the seven skills rated 'poor' by the employers, despite the strong correlation between the scores of graduates and their employers.

CONCLUSION

The graduates showed a generally high level of perceived competence as assessed by themselves and their employers, with a strong association between the scores given by both the graduates and their employers. Poor competency in crucial skills such as basic life support in medical

emergencies was highlighted. These outcomes allowed the identification of areas for improvement in the curriculum for future revisions. Training after graduation at the workplace can also address the lack of competency in certain key skills highlighted in this study.

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