



Dental Undergraduates' Self-Assessed Confidence in Paediatric Dentistry

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ABSTRACT

Aim: Self-assessment based on benchmarked professional standards is an excellent tool to assist in improving the dental curriculum. Areas of strength and weaknesses can be identified. It can also act as a baseline standard when significant changes are introduced to the dental curriculum. The aims of this prospective cross-sectional study was to investigate self-assessed confidence of final year dental undergraduates in paediatric dentistry enrolled at University of Malaya in 2013. **Methods:** 65 undergraduates completed anonymised questionnaires which were formulated based on expected professional competencies in three domains namely clinical skills, patient management, and professional development and clinical governance. Visual analogue score (VAS) represented by a 10cm line with score '0' *no confidence at all* and '10' *complete confidence* was used to measure the level of confidence. **Results:** The overall analysis of self-assessed confidence was very positive with median VAS \geq 5cm in; clinical skills, 7.66 ± 1.31 cm (range=2.41–9.97cm: n=62; 95.4%), patient management 7.73 ± 1.27 cm (range=5.09–9.95cm: n=64; 100.0%), and professional development and clinical governance, 8.13 ± 1.21 cm (range=5.22–10.00cm: n=64; 100.0%). High confidence was reported for routine dental care (fillings and preventive care) while lower confidence reported for basic life support (median VAS=5.65cm) and pulp therapy for immature permanent teeth (median VAS=5.95cm). **Conclusions:** The final year dental undergraduate students of the University of Malaya appear to have good overall self-assessed confidence in core areas in paediatric dentistry.

Keywords: Education, dental, pediatric dentistry, self-assessment, self-concept

INTRODUCTION

Self-assessment is the ability of an individual to introspect on their competence to perform a specific task, which motivates self-evaluation, self-verification, and self-enhancement. Doubts and uncertainties that arise would motivate the individual to enhance knowledge for self-improvement (1).

This skill is critical in health science professionals, as lifelong learning in the form of continuous professional development (CPD) is an important aspect of personal professional behaviour, which is monitored by regulatory bodies for professional registration in most countries. Medical and dental professionals are required to accumulate stipulated CPDs for continued professional registration. This

provides a generic measure to ensure that health professionals update themselves by attending conferences, courses, and lectures so that they would continue to provide a high standard of care to their patients. However, the ability to self-assess will require training and practice, which is incorporated and developed in a good undergraduate curriculum (2).

In paediatric dentistry to date, only one study conducted by Rodd and colleagues (3) compared students' self-assessed confidence in Paediatric dentistry between three dental schools in the United Kingdom (UK) based on the professional learning outcomes set by General Dental Council (GDC) document *The First Five Years* (4). GDC's role in relation to undergraduate dental education lies in the outcomes of the educational process that is to produce knowledgeable and skilful dentists with a positive attitude which would enable undergraduates to attain professional dental registration. This is practiced by dental registration bodies in most countries. This would act as a guide for the Universities to audit their dental curriculum and improve the areas of weakness by improving the curriculum further. However, the methodologies and measured outcomes used by the dental regulatory bodies vary from country to country.

The paediatric dentistry module at the University of Malaya is conducted over two and a half years, which begins at second semester of the third year with the operative dentistry module prior to the commencement of clinical practice. In year four, undergraduates will be assigned several paediatric patients beginning with simple review cases and as their competence increases, new patients are assigned. Four-handed dentistry is practiced with undergraduates working in pairs and students have weekly sessions. Each child is assigned a clinician who will be responsible for the child's oral health care and subsequent recalls. Undergraduates maintain logbooks that are reviewed at the end of each semester (4-time points). At present, all paediatric dentistry teaching are conducted at the dental faculty by full-time academic staff and no outreach programs have been introduced. This dental curriculum is currently being replaced by the new five-year Integrated Dental Curriculum introduced at the University of Malaya in 2010.

Hence the aims of this prospective cross-sectional study was to investigate the self-assessed

confidence in paediatric dentistry of final year dental undergraduates enrolled at the University of Malaya in 2013.

MATERIALS AND METHODS

The target population was the final year dental undergraduates (n=80), enrolled in the second last batch of the dental curriculum introduced in 1997, which was accredited by GDC, enrolled in the five-year program (September 2008-July 2013) at the University of Malaya.

A questionnaire with 32 questions divided into three domains; clinical skills, patient management, and professional development and clinical governance, was formulated based on GDC's learning outcomes (4) related to paediatric dentistry. The GDC document was formulated by a group of experts in the United Kingdom hence the learning outcomes were extracted directly from the document which were then converted into simple questions. Wherever possible the learning outcomes were used in verbatim. The learning outcomes were categorised into three groups. The first was to *be competent at* a procedure, defined as 'having sound theoretical knowledge and understanding with adequate clinical experience to resolve clinical problems without assistance'. The second group was to *have knowledge of* a procedure, defined as 'having sound theoretical knowledge but with limited clinical or practical experience' and lastly *generic* learning outcomes. The questionnaire was pre-tested on two undergraduates and data obtained was excluded from the main study. Subsequently, the questionnaire was modified and undergraduates were blinded to the three domains and levels to minimise over-inflation and biased reporting.

The methodology to quantify self-assessed confidence was a visual analogue scale (VAS) as shown in Figure 1, which was used by Rodd and colleagues (3), the only known study on self-assessed confidence in paediatric dentistry. Using the same scale would allow comparison. Self-assessed confidence was rated by marking 'X' on the 10cm line with **0** representing *no confidence at all* and **10** *complete confidence*. VAS of 5cm and greater (VAS \geq 5) indicated dental undergraduates were confident while scores of less than 5cm (VAS < 5) indicated a lack of confidence.

The formulated questionnaire, participant information sheet and consent forms were submitted to Medical Ethics Committee, Faculty of Dentistry, University of Malaya, for ethical approval [DF CD1308/0074(U)]. Upon approval, these were then distributed to all final year dental undergraduates a few weeks prior to their final professional examination in July 2013. The questionnaires were completely anonymised hence no demographic details were collected to encourage honest self-assessment and minimise over-inflation (5). After a week, the questionnaires were collected. The length of the line was measured from zero to 'X' (Figure 1) using the same 15cm ruler for standardisation purposes by two investigators. The average length was used for further analysis. Inter-examiner reliability was also determined. Data were subsequently recorded and analysed using the Statistical Package for Social Sciences (SPSS) software version 24 for Windows. Descriptive statistics was used to analyse the data obtained. In addition, the data within the three domains (clinical skills, patient management, and professional development and clinical governance) were tested for internal consistency using Cronbach α coefficient.

LEGENDS

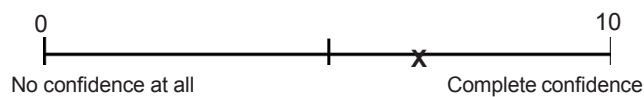


Figure 1: Visual analogue scale with '5' indicating having confidence. The length between '0' to 'X' was recorded as the level self-confidence.

RESULTS

There was a total of 80 final year dental undergraduates. A week after distributing the questionnaires, 65 dental undergraduates responded, 3 forms had incomplete data. All available data were included in data analysis. Inter-examiner reliability between the two investigators (intra-class correlation coefficient=1) was excellent indicating that the measurements were almost identical.

The data distribution was skewed, therefore median values for VAS were used in the analysis. The overall analysis of self-assessed confidence was very positive with median VAS values ranging between 7.66 to 8.13cm for all three domains (Figure 2). Undergraduates were confident of their

competence, with median VAS values ≥ 5 , in clinical skills (95.4%; n=62), patient management (100%; n=64), and professional development and clinical governance (100%; n=64).

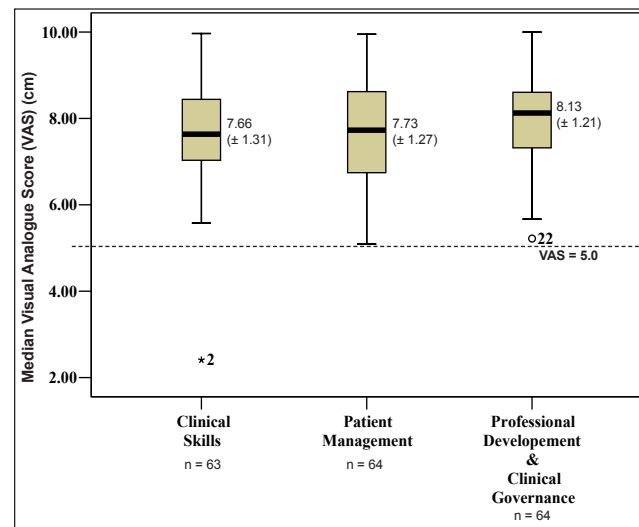


Figure 2: Boxplots showing overall self-assessed confidence in paediatric dentistry for final year dental undergraduates. Median VAS ≥ 5 cm indicate dental undergraduates were confident.

Learning outcomes and levels determined for clinical skills domain (Table 1) indicated that 98% of dental undergraduates felt they were highly competent in fissure sealant and preventive restoration, tooth coloured and amalgam restoration, incisal tip restoration, prevention and fluoride therapy, extraction, and management of caries. However, 95% of dental undergraduates felt they had the lowest competence in the administration of local anaesthesia (LA) and application of rubber dam (median VAS=7.3cm). In the *have knowledge of level*, lower confidence levels were reported for the placement of preformed metal crowns (PMC), and pulp therapy in primary teeth. While the lowest confidence was reported for pulp therapy in immature permanent teeth (median VAS=6.0 cm) (Table 1). In the *generic level*, high confidence was reported in the ability to choose the right dental materials (median VAS=8.1cm).

In the patient management domain, more than 83% of the dental undergraduates were confident that they were *competent at* eight out of nine learning outcomes with median VAS ranging from 7.5 to 8.6cm as indicated in Table 2. However, only 66% of dental undergraduates were

Table 1: Median visual analogue scores (VAS) of undergraduates' self-assessed confidence based on specific learning outcomes for clinical skills at three ordinal levels.

| Clinical skills | | | | | | |
|-------------------|---|------------|---------------------------|------------------------------|---------------------------|------------|
| Level | Learning outcomes | N (filled) | n(%)with VAS \geq 5.0cm | Median VAS (\pm IQR) (cm) | Mean VAS (\pm SD) (cm) | Range (cm) |
| Be competent at | Fissure sealant & preventive restoration | 63 | 62 (98.4%) | 9.13 (\pm 1.40) | 8.97 (\pm 1.31) | 1.60-10.00 |
| | Tooth coloured & amalgam restoration | 63 | 62 (98.4%) | 8.80 (\pm 1.58) | 8.63 (\pm 1.24) | 2.30-10.00 |
| | Incisal tip restoration | 63 | 62 (98.4%) | 8.80 (\pm 1.75) | 8.74 (\pm 1.27) | 2.33-10.00 |
| | Local anaesthesia & rubber dam in children | 63 | 60 (95.2%) | 7.25 (\pm 2.78) | 7.20 (\pm 1.77) | 0.80-10.00 |
| | Extract under LA (excluding topical anaesthesia only extractions) | 63 | 59 (93.7%) | 8.00 (\pm 2.81) | 7.57 (\pm 1.74) | 2.60-10.00 |
| | Active caries diagnosis & non-operative care planning | 63 | 63 (100.0%) | 8.00 (\pm 1.90) | 7.89 (\pm 1.34) | 5.00-10.00 |
| | Oral hygiene instruction, dietary analysis, topical fluoride therapy & fissure sealants | 63 | 62 (98.4%) | 8.70 (\pm 2.40) | 8.37 (\pm 1.58) | 1.45-10.00 |
| Have knowledge of | Preformed metal crown for primary molar teeth | 63 | 59 (93.7%) | 6.90 (\pm 2.60) | 7.02 (\pm 1.93) | 0.70-10.00 |
| | Pulp therapy for primary teeth | 63 | 57 (90.5%) | 6.75 | 6.72 (\pm 1.97) | 0.40-10.00 |
| | Pulp therapy for immature permanent teeth | 63 | 51 (81.0%) | 5.95 (\pm 2.91) | 6.36 (\pm 2.05) | 0.60-10.00 |
| | Trauma-related treatment for permanent and primary teeth | 63 | 52 (82.5%) | 6.80 (\pm 3.60) | 6.78 (\pm 1.83) | 2.95-10.00 |
| Generic | Right choice of dental restorative materials | 63 | 62 (98.4%) | 8.10 (\pm 2.10) | 8.19 (\pm 1.31) | 4.20-10.00 |

IQR-interquartile range

Table 2: Median visual analogue scores (VAS) of undergraduates' self-assessed confidence based on specific learning outcomes for patient management at three ordinal levels.

| Patient management | | | | | | |
|--------------------|---|------------|----------------------------|------------------------------|---------------------------|------------|
| Level | Learning outcomes | N (filled) | n(%)with VAS \geq 5.0 cm | Median VAS (\pm IQR) (cm) | Mean VAS (\pm SD) (cm) | Range (cm) |
| Be competent at | Radiographic report writing with sound interpretation principles | 65 | 65 (100%) | 8.10 (\pm 2.11) | 7.99 (\pm 1.32) | 5.45-10.00 |
| | Anti-microbial therapy prescription in cases with plaque related diseases | 65 | 57 (87.7%) | 7.45 (\pm 2.49) | 7.21 (\pm 1.76) | 2.65-10.00 |

| Patient management | | | | | | |
|--------------------|--|------------|-----------------------|------------------------|----------------------|------------|
| Level | Learning outcomes | N (filled) | n(%)with VAS ≥ 5.0 cm | Median VAS (±IQR) (cm) | Mean VAS (± SD) (cm) | Range (cm) |
| | Informed consent | 65 | 64 (98.5%) | 8.55 (±1.95) | 8.44 (± 1.35) | 4.03-10.00 |
| | Fear & anxiety management with behaviour management techniques | 65 | 58 (89.2%) | 7.55 (±2.34) | 7.17 (±1.82) | 1.25-9.90 |
| | Appropriate referral for GA | 65 | 58 (89.2%) | 7.60 (±2.63) | 7.42 (±1.77) | 2.75-10.00 |
| | Appropriate referral based on assessment | 65 | 59 (90.8%) | 7.75 (±2.85) | 7.66 (±1.70) | 4.05-10.00 |
| | Communicate with patients, other members of the dental team & health professionals | 65 | 63 (96.9%) | 7.98 (±2.76) | 7.93 (±1.43) | 4.75-10.00 |
| | Work with other members of dental team | 65 | 65 (100.0%) | 8.20 (±1.93) | 8.27 (±1.33) | 5.55-10.00 |
| | Resuscitation techniques & immediate management of emergencies | 64 | 42 (65.6%) | 5.65 (±3.85) | 5.93 (±2.52) | 0.70-10.00 |
| Have Knowledge of | Explain & discuss treatments with patients and their parents | 65 | 65 (100.0%) | 8.40 (±2.06) | 8.29 (±1.22) | 5.48-10.00 |
| Generic | Comprehensive history taking, physical examination, findings interpretations & further investigations organisation | 65 | 65 (100.0%) | 8.15 (±2.08) | 8.07 (±1.26) | 5.05-10.00 |
| | Share with patients & parents provisional assessment & formulate plans for investigations & management | 65 | 65 (100.0%) | 8.30 (±2.06) | 8.23 (±1.24) | 5.45-10.00 |

IQR-interquartile range

confident in resuscitation techniques and immediate emergencies management (median VAS=5.7cm). As for *have knowledge of* and *generic* levels, all dental undergraduates reported high self-assessed confidence (median VAS=8.2-8.4cm).

As for professional development and clinical governance domain, more than 87% of dental undergraduates reported confidence (median VAS=7.4-9.0cm) in the *be competent at* and *generic* levels (Table 3).

Table 3: Median visual analogue scores (VAS) of undergraduates' self-assessed confidence based on specific learning outcomes for professional development and clinical governance at three ordinal levels.

| Professional development and clinical governance | | | | | | |
|--|--|------------|------------------------|------------------------|----------------------|------------|
| Level | Learning outcomes | N (filled) | n(%) with VAS ≥ 5.0 cm | Median VAS (±IQR) (cm) | Mean VAS (± SD) (cm) | Range (cm) |
| Be competent at | Maintain full & accurate obtained clinical records | 64 | 60 (93.8%) | 8.04 (±2.20) | 7.83 (±1.55) | 3.85-10.00 |
| Generic | Contemporary methods of electronic communication and information management (such as DEISY system) | 64 | 56 (87.5%) | 7.40 (±2.42) | 7.05 (±2.22) | 0.48-10.00 |

| Professional development and clinical governance | | | | | | |
|--|--|------------|------------------------|------------------------|----------------------|------------|
| Level | Learning outcomes | N (filled) | n(%) with VAS ≥ 5.0 cm | Median VAS (±IQR) (cm) | Mean VAS (± SD) (cm) | Range (cm) |
| | Understanding of dental scientific basis | 64 | 62 (96.9%) | 7.63 (±2.43) | 7.48 (±1.58) | 4.60-10.00 |
| | Understanding of disease process | 64 | 61 (95.3%) | 7.78 (±2.44) | 7.76 (±1.48) | 4.40-10.00 |
| | Moral and ethical responsibility awareness | 64 | 64 (100.0%) | 8.58 (±1.69) | 8.30 (±1.38) | 5.03-10.00 |
| | Importance of audit & clinical governance | 64 | 62 (96.9%) | 7.98 (±3.04) | 7.56 (±1.63) | 4.70-10.00 |
| | Awareness of obligation to provide highest possible quality of patient care at all times | 64 | 64 (100.0%) | 8.90 (±1.81) | 8.55 (±1.24) | 5.60-10.00 |
| | Awareness of one's health condition can affect the ability to practice as a dentist | 64 | 64 (100.0%) | 8.83 (±1.81) | 8.71 (±1.18) | 5.70-10.00 |

The internal consistencies for the three domains (clinical skills, patient management, and professional development and clinical governance) were measured using Cronbach α coefficient reported 0.948, 0.946 and 0.901 respectively, indicating excellent consistency.

DISCUSSION

There is no consensus on the effectiveness of self-assessments which have strengths and weaknesses depending on the objective of the study (6-8). Authors have reported that self-assessment matched clinical and skill development, and accuracy of self-assessment was higher in the later years of study due to increased clinical experience and skill especially when specific criteria were set (5).

Limitations in this study included undergraduates' self-assessed confidence was not correlated to their theoretical and clinical requirements due to ethical considerations and therefore their true clinical competency were not reflected here. It is acknowledged that self-assessment using VAS is highly subjective when used to compare across a cohort of students however for reasons of comparability of results, this scale was chosen. Principle component analysis was not conducted for the three domains as these were based on the GDC's *The First Five Years* (4) document which was developed in conjunction with

a range of stake holders (strategic team, feedback from various groups, public and patients). The questionnaire derived from the learning outcomes within the three domains was not tested for construct validity. However, the questionnaire was pre-tested on two students to assess comprehension, clarity of the questions and to obtain feedback that was used to improve the questionnaire prior to administration. Although the lack of construct validity may affect the results of the study, the questionnaire was formulated by extracting the related learning outcomes (in verbatim where possible) to paediatric dentistry and subsequently, converted into questions. Reliability testing conducted using Cronbach α coefficient showed excellent consistency within the three domains.

Despite these limitations, self-assessment is an excellent tool to assist in improving dental curriculum based on undergraduates' identified areas of low confidence. Conducting this survey at the midpoint of their clinical year would help dental undergraduates understand the standard of care and skill levels that is expected from them (9) in a concise and measurable manner thus motivating them to strive towards improving their competency in paediatric dentistry (10). Repeating the survey in their final year would help them reassess these key competencies. A further benefit could be achieved when self-assessment is given with feedback from academic staff (11).

In general, the results of this study indicated that this cohort of dental undergraduates appear to have good self-assessed confidence. Dental undergraduates reported highest levels of self-assessed confidence in *generic* levels with median VAS of 8.1cm, 8.3cm and 8.1cm for clinical skills, patient management and professional development and clinical governance respectively. This was followed by must have competencies (*be competent at*) with median VAS of 8.3cm (clinical skills), 7.5cm (patient management) and 8.0cm (professional development and clinical governance). Finally, the lowest self-assessed confidence was reported for *have knowledge of* levels with median VAS of 6.6cm (clinical skills) and 8.4cm (patient management).

Overall, the final year dental undergraduates appear to be confident in routine dental care, however, were less confident in the administration of LA and application of rubber dam, placement of PMC, pulp therapy for primary and immature permanent teeth, dental trauma management and basic life support. To improve confidence in the administration of LA and rubber dam in children, competency exam for LA and rubber dam application has been incorporated into the new dental curriculum. In addition, it was good to note that all dental undergraduates were aware of their moral and ethical responsibility and that their health condition can affect the ability to practise as a dentist.

In developed countries, as in Malaysia, the caries prevalence is declining (3, 12). A survey conducted by Ministry of Health in 2008 on oral health status of 12-year-old Malaysian schoolchildren (13) reported mean decayed, missing and filled teeth of less than 1.5 while 60% of school children had a 'caries free' (absence of cavitated lesions) permanent dentition. However, caries prevalence in 5-year-old (14) and 6-year-olds (13) were 76% (mean dmft=5.5) and 75% (mean dmft=3.6) respectively. Children with lower caries risk, provided dental undergraduates with ample practice in preventative care, which included oral hygiene education, non-surgical caries management, and interventions (i.e. fissure sealants, remineralisation, and topical fluoride therapy). Thus, they were more confident in these areas. However, in children with cavitated dental lesions, the disease may be rather advanced hence unsuitable for undergraduates to treat under local anaesthesia and behaviour management alone. Often these children would require specialist care management, which may include treatment under sedation or general anaesthesia. Hence, dental undergraduates may have less opportunity to manage pulp therapy in primary teeth as was reflected by their self-assessed

confidence. In Europe and Australia for instance, to overcome this problem, dental undergraduates are sent to primary care clinics through outreach programs which are incorporated into the curriculum to give undergraduates more exposure to clinical and emergency services in paediatric dentistry (15-17).

Management of dental trauma related emergencies is critical however low self-confidence has been reported by general dental practitioners (18-20) who frequently are the first to manage these emergencies and mismanagement would have significant long-term consequences to child and family. In this study, the undergraduates also reported low self-assessed confidence. Dental undergraduates could be incorporated as observers into consultant led clinics (trauma clinic, on-calls, postgraduate consultation clinics, and day care general anaesthesia) to increase practical exposure and competence in management of dental trauma related emergencies.

Undergraduates also reported the least confidence in handling emergency situations and carrying out resuscitation techniques such as CPR. This could be attributed to limited hands-on experience in reality although they may have adequate theoretical knowledge. At the University of Malaya, the third year dental undergraduates, as a pre-clinical activity, undergo a full day basic life support (BLS) mass training course consisting of a series of intensive lectures, practical teaching on manikins and written test. BLS training was repeated at the end of their final year prior to graduation. It was interesting to note that despite having BLS training prior to this survey, dental undergraduates still lacked in confidence. Understandably, BLS is a mandatory CPD requirement for dental registration in most countries including Malaysia, which is recommended every two years.

The methodology of this study was based on the only available study from the UK in Paediatric dentistry (3) whereby six core areas were assessed by the authors. The mean VAS scores for this study related to these six core areas were calculated (Table 4).

It was interesting to note that, the self-assessed confidence trend of dental undergraduates from the three dental schools in the UK and Malaysia were similar, a lower self-assessed confidence in the selection of patients for GA, risk and instructions, and management of dental trauma. This similarity is purely related to dental undergraduates' perception and does not reflect on their true clinical competence

Table 4: Mean visual analogue scores (VAS) of dental undergraduates for specific learning outcomes in six core areas in paediatric dentistry.

| Learning outcomes | Mean VAS (\pm SD)(cm) |
|--|--------------------------|
| Comprehensive history taking, physical examination, findings interpretations & further investigations organisation | 8.15 (\pm 1.26) |
| Appropriate referral for GA | 7.60 (\pm 1.77) |
| Preventive treatments | 8.92 (\pm 1.19) |
| Oral hygiene instruction, dietary analysis, topical fluoride therapy & fissure sealants | |
| Fissure sealant & preventive restoration | |
| Restorative treatments | 7.81 (\pm 1.60) |
| Preformed metal crown for primary molar teeth | |
| Tooth coloured & amalgam restoration | |
| Incisal tip restoration | |
| Pulp therapy for primary teeth | |
| Trauma-related treatment for permanent and primary teeth | 6.80 (\pm 1.83) |
| Share with patients & parents provisional assessment & formulate plans for investigations & management | 8.30 (\pm 1.24) |

nor dental curriculum of the respective schools. It was thought that increased exposure to paediatric dentistry related clinical and emergency services through attachment at primary care clinics, outreach programs and observation in specialist led clinics may help. However, authors found that subsequent to implementation of changes, self-assessed confidence still remained low (21). Perhaps in the *have knowledge* level, lower self-assessed confidence may be acceptable provided undergraduates have a sound theoretical knowledge and sufficient practical skills at the point of graduation.

CONCLUSION

Within the limitations of this study, the final year dental undergraduate students of the University of Malaya in 2013, appear to have good overall self-assessed confidence in core areas in paediatric dentistry.

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REFERENCES

1. Sedikides C, Strube M. Self-evaluation: to thine own self be good, to thine own self be sure, to thine own self be true, and to thine own self be better. *Advances in experimental social psychology*. Adv Exp Soc Psychol. 1997; 29: 209-69.
2. Pisklavov s, Rimal J, McGuirt S. Role of Self-Evaluation and Self-Assessment in Medical Student and Resident Education. *British Journal of Education, Society & Behavioural Science*. 2013; 4(1): 1-9.
3. Rodd HD, Farman M, Albadri S, Mackie IC. Undergraduate experience and self-assessed confidence in paediatric dentistry: comparison of three UK dental schools. *Br Dent J*. 2010; 208(5): 221-5.
4. General Dental C. *The first five years; a framework for undergraduate dental education*. 3rd ed. London: GDC; 2008.
5. Fitzgerald JT, White CB, Gruppen LD. A longitudinal study of self-assessment accuracy. *Medical education*. 2003; 37(7): 645-9.
6. Eva KW, Cunningham JP, Reiter HI, Keane DR, Norman GR. How can I know what I don't know? Poor self-assessment in a well-defined domain. *Adv Health Sci Educ Theory Pract*. 2004; 9(3): 211-24.

7. Kruger J, Dunning D. Unskilled and unaware of it: how difficulties in recognizing one's own incompetence lead to inflated self-assessments. *J Pers Soc Psychol.* 1999; 77(6): 1121.
8. Colthart I, Bagnall G, Evans A, Allbutt H, Haig A, Illing J, et al. The effectiveness of self-assessment on the identification of learner needs, learner activity, and impact on clinical practice: BEME Guide no. 10. *Med Teach.* 2008; 30(2): 124-45.
9. Wanigasooriya N. Student self-assessment of essential skills in dental surgery. *Brit Dent J.* 2004; 197: 11-4.
10. Gordon MJ. A review of the validity and accuracy of self-assessments in health professions training. *Acad Med.* 1991; 66(12): 762-9.
11. Leaf DA, Neighbor WE, Schaad D, Scott CS. A comparison of self-report and chart audit in studying resident physician assessment of cardiac risk factors. *J Gen Intern Med.* 1995; 10(4): 194-8.
12. Seddon RP. Undergraduate experience of clinical procedures in paediatric dentistry in a UK dental school during 1997-2001. *Eur J Dent Educ.* 2004; 8(4): 172-6.
13. Oral Health Division MoHM. National Oral Health Survey of School Children 2007 (NOHSS 2007). Malaysia: Ministry of Health 2008.
14. Oral Health Division MoHM. National Oral Health Survey of School Children in Peninsular Malaysia 2005 (NOHPS 2005). 2005.
15. Lynch CD, Ash PJ, Chadwick BL, Hannigan A. Evaluation of a UK community-based clinical teaching/outreach program by former dental students two and five years after graduation. *J Dent Educ.* 2010; 74(10): 1146-52.
16. Smith M, Lennon MA, Robinson PG. Students' clinical experience on outreach placements. *Eur J Dent Educ.* 2010; 14(1): 7-11.
17. Hunter ML, Oliver R, Lewis R. The effect of a community dental service outreach programme on the confidence of undergraduate students to treat children: a pilot study. *Eur J Dent Educ.* 2007; 11(1): 10-3.
18. Hamilton FA, Hill FJ, Holloway PJ. An investigation of dento-alveolar trauma and its treatment in an adolescent population. Part 2: Dentists' knowledge of management methods and their perceptions of barriers to providing care. *Br Dent J.* 1997; 182(4): 129-33.
19. Maguire A, Murray JJ, al-Majed I. A retrospective study of treatment provided in the primary and secondary care services for children attending a dental hospital following complicated crown fracture in the permanent dentition. *Int J Paediatr Dent.* 2000; 10(3): 182-90.
20. Kostopoulou MN, Duggal MS. A study into dentists' knowledge of the treatment of traumatic injuries to young permanent incisors. *Int J Paediatr Dent.* 2005; 15(1): 10-9.
21. Walley S, Albadri S. Undergraduates' perceptions of the value of practical inhalation sedation experience in a UK dental school. *Eur Arch Paediatr Dent.* 2015; 16(5): 371-6.

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