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## SELF-PERCEIVED COMPETENCE OF NEW DENTAL GRADUATES IN PAKISTAN – A MULTI-INSTITUTION STUDY

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### ABSTRACT

**Objective:** To investigate the self-perceived competence of house-officers from three dental institutions in Pakistan.

**Study Design:** Cross-sectional study.

**Place and Duration of Study:** Islamabad Dental Hospital, Fatima Memorial Dental Hospital and Islamic International Dental Hospital, from Jan to Dec 2018.

**Methodology:** House-officers from three dental institutions were invited to participate in a cross-sectional study. A previously validated preparedness assessment scale was used to gauge the perceptions and experiences of the participants on a range of clinical, cognitive and affective skills. The results were compared to data from Dental Foundation Trainees in the UK.

**Results:** In total 128 house-officers responded to the online questionnaire (18 participants were excluded due to missing data). All but four participants were in the 20-25 years age group (96.4%). The mean overall score of participants was 70/100 (SD  $\pm$  11.71). Self-perceived competence was reported to be low for clinical skills in radiography, crowns, cast-partial dentures and endodontics on multi-rooted teeth.

**Conclusions:** This study investigated self-perceived competence amongst new graduates and provides information for comparison with data from Foundation Dentists in the UK. Pakistani House-Officers felt less prepared than Dental Foundation Trainees in 49/50 attributes. Several areas were identified where graduates from both countries may benefit from further education, training and consolidation. The findings may be of interest to dental educators and other stakeholders.

**Keywords:** Competence, Dental, House officers, Preparedness.

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### INTRODUCTION

Undergraduate dental education is designed to help dental students acquire the knowledge, skills, attitudes, and behaviours required to practise in a safe, effective, and professional manner<sup>1</sup>. The aim is to develop a rounded professional who, in addition to being a competent clinician will have the range of professional skills required to begin working as part of a dental team and be well prepared for independent practice<sup>2</sup>. The process of developing the capacity for independent practice in health-care professions typically extends well beyond the temporal confines of undergraduate education<sup>3</sup>.

A newly qualified dentist experiences a variety of challenges in the clinical environment and it may take several years to consolidate their knowledge, skills, and attitudes. Dental graduates in Pakistan are required to undertake house job training for a period of one year which is aimed at facilitating transition of dental graduates from the dental school into independent dental practice. While there is substantial information available on the strengths and weaknesses of

dental graduates from developed countries, less is known about the preparedness of dental graduates from Pakistan<sup>4-6</sup>.

The aim of this study was to investigate the self-perceived competence of new dental graduates in Pakistan and compare their preparedness to graduates from developed countries using a previously validated Preparedness Assessment Scale<sup>7</sup>. This scale has been shown to be a valid and reliable tool for measuring a broad range of skills and attributes expected from new dental graduates.

### METHODOLOGY

It was a cross-sectional study based on an online survey and involved three dental institutions in Pakistan, from January to December 2018. The inclusion criteria was Dental House Officers in active training. Exclusion criteria consisted of dental students and graduates who had completed their house job. The questionnaire was hosted on Google forms (<https://www.google.com/forms/about/>) target population consisted of 172 house officers registered at three dental institutions of Pakistan. Consecutive purposive sampling was used for this study. Invitations to the participants were sent through the Head of each institution and were accompanied by a participant

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information sheet explaining the aims of the study and purpose of data collection. A reminder was sent two weeks after the initial invitation. All participants were required to sign a consent form online prior to providing their responses.

The questionnaire used in the study was developed using a pilot study followed by validation of the in a national study in the UK using qualitative methods and item-response theory psychometric modelling<sup>7</sup>. An expert panel consisting of 10 experienced dental academics in Pakistan reviewed the questionnaire and its language, wording and structure were judged to be appropriate for use in Pakistan. The questionnaire included 50 items: part A of the questionnaire consisted of 24 items related to clinical competence; and part B consisted of 26 items related to cognition, communication, and professionalism skills. Each of the 50 items were scored as follows: No experience scored 0, With verbal/practical help scored 1, and On my own, independently scored 2.

The study was approved by the Institutional

Review Board (ref No. IMDC-17-09-2017).

The data analysis was carried out using the R statistical environment for Windows (R Core Team, 2015). The responses of participants were converted into percentage scores with the descriptive statistics and score distributions. A *p*-value <0.05 was considered as statistically significant. Data collection and analysis were completed in six months.

## RESULTS

In total 128 House officers responded to the online questionnaire, yielding a response rate of 74.4%. However, 18 participants had missing data and were excluded. The final data analysis was restricted to 110 participants which included 91 females (82.7%) and 19 males (17.3%). All but four of the participants were in the 20-25 years age group (96.4%).

The mean score of participants was 70/100 (SD ± 11.71) with a minimum score of 37 and a maximum score of 94. The responses to Part A of the questionnaire are shown in table-I. Across all 24 items related to

**Table-I: Summary of response proportions for part A of preparedness assessment scale - The table provides the percentage proportions of each response type; the items are ordered by the 'no experience' column descending.**

Item	Questionnaire	No Experience (%)	With help (%)	On my own (%)
A5	I am able to undertake bitewing radiographs	66.4	28.2	5.5
A21	I am able to provide crowns using principles of tooth preservation	41.8	40.0	18.2
A22	I am able to provide mechanically sound cast partial dentures	39.1	30.9	30.0
A4	I am able to undertake periapical radiographs	20.0	27.3	52.7
A20	I am able to perform endodontic treatment on multi rooted teeth appropriately	19.1	51.8	29.1
A7	I am able to assess the treatment needs of patients requiring orthodontics	15.5	60.0	24.5
A23	I am able to provide mechanically sound full dentures	6.4	47.3	46.4
A8	I am able to formulate a comprehensive treatment plan which addresses all treatment needs of my patients	5.5	69.1	25.5
A11	I am able to obtain a valid consent from my patients prior to undertaking any treatment.	5.5	21.8	72.7
A12	I am able to carry out patients' treatment sessions in an appropriate order	5.5	40.0	54.5
A15	I am able to perform non-surgical periodontal treatment using appropriate methods	5.5	28.2	66.4
A9	I am able to provide a range of treatment options to my patients based on their individual circumstances	3.6	50.0	46.4
A3	I am able to prescribe appropriate dental radiographs	2.7	25.5	71.8
A14	I am able to administer inferior dental nerve blocks effectively	2.7	8.2	89.1
A10	I am able to explain the merits and demerits of various treatment options to my patients	1.8	36.4	61.8
A13	I am able to prescribe drugs to my patients appropriately	1.8	50.0	48.2
A18	I am able to restore teeth with amalgam fillings appropriately	1.8	9.1	89.1
A24	I am able to undertake non-surgical tooth extractions appropriately	1.8	12.7	85.5
A2	I am able to undertake a comprehensive, clinical oral examination	0.9	37.3	61.8
A6	I am able to interpret common findings on dental radiographs	0.9	35.5	63.6
A16	I am able to remove dental caries effectively	0.9	10.0	89.1
A17	I am able to restore teeth with tooth coloured fillings appropriately	0.9	12.7	86.4
A19	I am able to perform endodontic treatment on single rooted teeth appropriately	0.9	19.1	80.0
A1	I am able to obtain a complete medical history from my patients.	0.0	30.0	70.0

clinical competence, more than half of the participants felt prepared to perform 15 of the 24 clinical procedures on their own. However, >40% of the participants felt they had no experience for two of the clinical pro-

pected oral cancer (B30), evaluating new dental materials and products using an evidence-based approach (B33) and feeling confident to interpret the results of research which may influence their practice (B34).

**Table-II: Summary of response proportions for Part B of Preparedness Assessment Scale - The table provides the percentage proportions of each response type; the items are ordered by the 'No experience' column descending.**

Item	Question	No experience (%)	Mostly (%)	Always (%)
B33	I am confident to evaluate new dental materials and products using an evidence-based approach	44.5	44.5	10.9
B30	I feel confident referring patients with suspected oral cancer	40.9	27.3	31.8
B34	I am confident to interpret the results of research which may influence my practice	32.7	52.7	14.5
B35	I use an evidence-informed approach in my clinical practice.	27.3	52.7	20.0
B44	I maintain accurate records of my clinical notes	16.4	48.2	35.5
B42	I am able to manage the behaviour of children to enable appropriate dental treatment	12.7	69.1	18.2
B49	I feel able to raise concerns about inappropriate behaviour of my colleagues	10.0	56.4	33.6
B41	I feel confident managing anxious patients with appropriate behavioural techniques	8.2	69.1	22.7
B38	I feel confident to address barriers to effective communication with patients appropriately	7.3	54.5	38.2
B32	I have sufficient knowledge of scientific principles which underpin my dental practice	6.4	72.7	20.9
B29	I am able to refer patients with complex treatment needs appropriately	4.5	32.7	62.7
B31	I reflect on my clinical practice in order to address my learning needs	4.5	59.1	36.4
B39	I feel confident to communicate potential risks of operative procedures to patients	2.7	49.1	48.2
B45	I am able to work within the constraints of clinical appointment schedules	2.7	71.8	25.5
B27	I recognise my personal limitations in clinical practice	1.8	42.7	55.5
B37	I provide opportunities for my patients to express their expectations from dental treatment	1.8	50.9	47.3
B47	I am aware of my legal responsibilities as a dental professional	1.8	36.4	61.8
B50	I take appropriate measures to protect patient confidentiality	1.8	33.6	64.5
B25	I feel I can manage people's expectations of their treatment	0.9	78.2	20.9
B26	I feel able to motivate my patients to encourage self-care for their dental needs	0.9	60.9	38.2
B28	I feel comfortable asking for help from supervisor or colleague if needed	0.9	30.0	69.1
B36	I feel I can manage to communicate effectively with my patients	0.0	40.9	59.1
B40	I feel confident to communicate appropriately with my colleagues	0.0	36.4	63.6
B43	I am able to fulfil my responsibilities as an effective member of the dental team	0.0	61.8	38.2
B46	I take responsibility for my continuing professional development	0.0	35.5	64.5
B48	I restrict my relations with my patients to a professional level	0.0	20.0	80.0

cedures: being able to undertake bitewing radiographs (A5); and being able to provide crowns using principles of tooth preservation (A21). Moreover, only 39.1% participants felt confident to provide mechanically sound partial dentures (A22).

Responses to part B of the questionnaire are shown in table-II. All participants felt they had some experience of managing to communicate effectively with their patients. All participants reported they had some confidence in communicating appropriately with their colleagues. For the items related to professionalism and communication, the proportions for which participants were "always" able to carry out the task ranged between 10.9% and 69.1%. Over 30% participants felt they had no experience in referring patients with sus-

## DISCUSSION

To our knowledge this is the first study describing the self-perceived competence of new graduates in Pakistan. Involvement of the private sector has seen a very rapid growth of dental institutions in Pakistan<sup>8</sup>.

The authors have previously reported on the self-perceived competence of Dental Foundation Trainees (DFTs) in the UK using the same Scale<sup>7</sup>. A mean score of 77 was reported for the DFTs and comparison of the data from these two studies shows that DFTs were better prepared than the house officers in Pakistan. The differences between UK DFTs and Pakistani House officers were significant ( $p < 0.05$ ) for 46/50 items and highly significant ( $p < 0.001$ ) for 34 /50 items. Unlike the UK-graduates who undertake at least one year of post-

qualification training in general dental practice<sup>9</sup>, the new graduates in Pakistan complete their post-qualification training in dental institutions with rotations in several dental disciplines.

Although lack of exposure to general dental practice environments may partly explain the deficiencies in the skills of Pakistani graduates, the differences may be predominantly attributed to undergraduate teaching, training and assessments as explained below.

Deficiencies in radiography skills were identified amongst the Pakistani House officers; only 5.5% felt able to undertake bitewing radiographs (A5) on their own compared to 98.5% of the DFTs. Similarly, only 52.7% of Pakistani House officers reported feeling competent in undertaking periapical radiographs (A4) compared to 96% of UK DFTs<sup>7</sup>. Ali *et al* (2017) reported that a vast majority of undergraduate students in the UK are also self-reportedly competent in undertaking intra-oral radiographs<sup>10</sup>. These findings are further supported by the experiences of General Dental Practitioners who have expressed concerns regarding the radiography skills of overseas dentists from non-European countries<sup>11</sup>. Deficiencies in radiography skills may be primarily attributed to lack of adequate training and assessments during undergraduate education. Radiographs in Pakistani institutions are usually undertaken centrally by radiographers in the dental radiology departments and students get limited opportunities to take radiographs.

The participants in this study also reported limited experience in the construction of crowns and cast partial dentures and this appears to be more significant in magnitude compared to those reported amongst not only DFTs but also undergraduate students in the UK<sup>7</sup>. A major challenge for dental students in Pakistan is lack of structured practical training in restorative procedures in simulated dental learning environments. Pakistani graduates have limited clinical experience in providing crowns to patients. Similarly, the experience of undergraduate students and House officers in Pakistan is largely limited to the construction of acrylic partial dentures; experience in the provision of cast partial dentures is generally lacking.

Undergraduate students and House officers gain adequate experience in tooth extractions due to wide availability of patients with un-restorable teeth. The data from this study supports these observations as 85.5% participants reported feeling competent to perform non-surgical tooth extractions independently (A24).

Several weaknesses amongst House officers were identified which are common with UK graduates and DFTs even though the magnitude of deficiencies related to these attributes was more marked amongst the House officers. These included deficiencies in endodontic skills, particularly on multi-rooted teeth (A20). Similar findings are reported in studies on undergraduate students and DFTs in the UK by Gilmour *et al*, (2016)<sup>11</sup>. Participants also reported limited confidence in their abilities to interpret research which may influence clinical dental practise (B34); evaluating new dental materials and products using an evidence-informed approach (B33). Although the aforementioned attributes are included in the learning outcomes for dentists by the GDC2, DFTs and undergraduates in the UK have also reported lack of preparedness in these attributes<sup>11</sup>. These findings are corroborated by other studies in Finland and USA by Nieminen *et al* (2016) and Straub-Morarend *et al* (2016) respectively<sup>13,14</sup>. These findings highlight that the undergraduate students lack confidence regarding their knowledge and skills in evidence-based practice. Confidence in the ability to refer suspected oral cancer was found to be low amongst the participants. Similar results have been reported by studies from the UK by Ali *et al*, (2017) and USA by Burzynski *et al*, (2002)<sup>10,15</sup>. Finally, the ability to raise concerns about the inappropriate behaviour of colleagues (B49) was found to be deficient amongst the participants of this study as well as DFTs from the UK<sup>10</sup>.

The findings of this study highlight several deficiencies in the skill set of overseas dentists. This may serve to inform dental institutions and clinical educators involved in mentoring them to provide more targeted training. Deficiencies in the teaching and training of dental graduates in Pakistan need to be addressed early, ideally during the undergraduate curricula.

Though valuable, the current work has some limitations. Responses by the participants were based on self-assessment and it is possible the scores may be biased, or not accurately reflect actual practical competence. Although the self-assessment is used widely, poor correlations between perceived self-confidence and observed competence need to be recognised<sup>16-18</sup>. Future studies to compare the scores of self-assessments with assessment by dental educators may provide more valid and realistic measurement of the competence of trainees. Secondly, only three dental institutions from Punjab were included in this study and not be fully representative of dental graduates across

Pakistan. Nevertheless, this paper provides a useful snapshot of core skills and competencies of Pakistani graduates.

### CONCLUSION

To evaluate the self-perceived competence of house officers at three dental institutions in Pakistan. It highlights the strengths and weaknesses in the self-perceived competence of House Officers on a range of clinical, cognitive, and affective attributes. In comparison to Dental Foundation Trainees in the UK, the Pakistani House Officers felt under-prepared in several areas related to clinical and non-clinical skills. The findings of this study may be of interest to dental educators and other stakeholders in Pakistan.

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### CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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