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## Development and validation of scale for self evaluation of soft skills in postgraduate dental students

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### Abstract

**Objective:** To develop and validate a soft skills questionnaire, and to use it for self-evaluation by postgraduate dentistry students.

**Method:** The cross-sectional descriptive study was conducted at University College of Dentistry, University of Lahore, Lahore, Pakistan, from February 2020 to April 2020 and comprised of residents from first to final year of training for either Masters in Dental Surgery or Fellowship of the College of Physicians and Surgeons Pakistan programmes. A soft skills questionnaire was generated and was validated through exploratory factor analysis of the elements and items of the questionnaire using SPSS 23.

**Results:** Of the 60 subjects, 37(61.7%) were MDS residents and 23(38.3%) were Fellowship residents. The mean age of the sample was 29.650±2.815 years, and 26(43.3%) subjects were males. The questionnaire was validated ( $p < 0.001$ ). Three domains measured the attitude of dentists, with 7 scenarios having 5 items per scenario. Both categories of trainees had high agreement in understanding and application of non-technical skills, with the exception of leadership skills. However, the difference between the groups was non-significant ( $p > 0.05$ ).

**Conclusion:** A self-generated questionnaire was successfully validated.

**Keywords:** Soft skills, Non-technical skills, Learning and assessment, Self-evaluation of skills, Validation of scale. (JPMA 70: S-9 [Suppl. 1]; 2021)

### Introduction

In the modern era, there is a need to educate and train dental health professionals to possess not only indispensable knowledge and technical skills, but also non-technical skills, also called the soft skills, to serve society at large with high-quality treatment and care.<sup>1</sup> Soft skills<sup>2</sup> include personality traits, attributes or interpersonal skills, like adaptability, communication skills and teamwork, which distinguish one individual from the rest. Dalaya et al.<sup>1</sup> reported that students are more likely to succeed in challenging circumstances if they are better trained in soft skills. Literature suggests that professionals with soft skills are more employable and collegial, and patients are more satisfied under their clinical care.<sup>1,3,4</sup> The most frequently cited soft skills in literature are communication skills, leadership, critical thinking, professionalism, entrepreneurship, life-long learning and teamwork.<sup>5</sup>

Healthcare education is evolving and progressive institutions are incorporating soft skills training in the core curriculum.<sup>6</sup> However, there is a debate about how these

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skills and attributes should be implemented. Different methodologies have been proposed in teaching soft skills, such as lectures, seminars, case-based studies, problem-based learning (PBL), project-oriented PBL (POPBL), and clinical simulation laboratory activities on specific skills.<sup>7-9</sup> Each methodology has its strengths, and the preference of methodology is largely dependent on institutions' and/or instructors' preference. Mostly, arbitrary methods, including input from the clinical teacher at the chairside, self-assessment, or reflection of the students, are used to assess soft skills that could under- or over-estimate students' capabilities. Robles<sup>10</sup> and Mohamed et al.<sup>11</sup> identified that soft skills are frequently neglected, and formal assessment did not have any impact on the development of the students' soft skills. Therefore, evidence-based and innovative methodologies need to be developed and incorporated in the dental curriculum. To the best of authors' knowledge, there is a lack of an assessment tool to validate teaching and assessment methodology of soft skills in postgraduate dental students in Pakistan. Therefore, the current study was planned to develop and validate a soft skill questionnaire, and to conduct a self-evaluation survey among postgraduate dentistry students.

### Materials and Methods

The cross-sectional descriptive study was conducted at University College of Dentistry (UCD), University of

Lahore, Lahore, Pakistan, from February 2020 to April 2020. The first phase included development of questionnaire items which were extracted from literature<sup>5</sup>, with seven key elements of soft skills. Various scenarios were constructed by the researchers. A standard, 4 items, were made to get descriptive insight of each scenarios' teaching and assessment. These items were then content-validated by the supervisors of all postgraduate dental specialties to finalise the questionnaire.

For validation, a pilot study was conducted at the UCD which is the only private-sector institution in Lahore having both Fellowship of College of Physicians and Surgeons Pakistan (FCPS) and Masters in Dental Surgery (MDS) programmes in dentistry. The study was approved by the institutional ethics review committee, and the participants, who were residents from first to final year of training for either MDS or FCPS, were enrolled after informed consent. Those who did not volunteer were excluded.

Three major domains were created to pool different elements so that factor analysis could be executed. The humane component included communication skills, teamwork and professional ethics and morals. The organisational component included leadership and entrepreneurship skills, while appraisal and consistence were parts of critical thinking and problem-solving skills

and life-long learning and information management component.

Data was analysed using SPSS 23. Exploratory factor analysis (EFA) for validation of the constructed items was held, which is a statistical method to uncover the underlying structure of a relatively large set of variables.<sup>12</sup> Bartlett's test of sphericity was used for validation purposes. Independent sample t test was used to explore the difference of understanding of constructs used for soft skills scale development. Later, frequencies and percentages for positive and negative response evaluation were calculated using descriptive analysis. In the second part, the questionnaire was used for self-evaluation of soft skills in postgraduate students. The difference was explored between MDS and FCPS students with regards to soft skills using independent sample t test. The value of Kaiser-Meyer-Olkin (KMO) test was 0.516 which confirmed that the sample size was adequate.

## Results

In the first phase, 18 scenarios were developed from which 11(61%) were omitted based on expert validation by supervisors of various dental postgraduate specialties. Each of the remaining 7(39%) scenarios had 4 descriptive items, with the final questionnaire having 35 items.

The scale was found to be a valid tool ( $p < 0.001$ ). The internal consistency of all items also validated the tool

**Table-1:** Factor-loading of domains of soft skills.

Component Analysis	Rotated Factor Coefficients		
	Humane	Organisational	Appraisal and Consistence
Communication skills	0.78		
Team work	0.69		
Professional Ethics and Morals	0.66		
Leadership skills		0.86	
Entrepreneurship Skills		0.86	
Critical thinking and Problem solving skills			0.59
Life Long Learning and Information Management			0.90
Cronbach Alpha	0.66	0.66	0.50

**Table-2:** Construct-understanding difference between MDS and FCPS students.

	Courses	Mean	Std. Deviation	t-test	Sig.	95% Confidence Interval of the Difference		
						Lower	Upper	
Soft Skills	Humane component	MDS (N=37)	6.67	1.94	0.12	0.90	-1.04	1.17
		FCPS (N=23)	6.60	2.31				
	Organisational component	MDS (N=37)	2.67	1.85	0.14	0.88	-0.87	1.00
		FCPS (N=23)	2.60	1.61				
	Appraisal and consistence	MDS (N=37)	4.54	1.48	0.47	0.63	-0.61	1.00
		FCPS (N=23)	4.34	1.58				

MDS: Masters in Dental Surgery, FCPS: Fellowship of the College of Physicians and Surgeons Pakistan.

**Table-3:** Percentage of positive and negative responses.

Elements and sub-elements	Yes	No
<b>Communication Skills</b>		
Think of a situation where a complex case has been given to you for management. Do you think you have the ability to effectively educate and motivate the patient regarding your treatment plan?	90%	10%
Were you ever taught about how to educate and motivate a patient for a treatment?	90%	10%
Have you ever been assessed on your skills to educate and motivate a patient (communication skills) by your supervisor?	56.7%	43.3%
<b>Team Work Skills</b>		
Think of a situation where you have to prepare a collaborative poster/oral presentation with someone who is difficult to get along with. Do you think you have the ability to work in a team?	83.3%	16.7%
Have you ever been taught about teamwork?	80%	20%
Have you ever been assessed on how to work as a team by your supervisor?	70%	30%
<b>Professional Ethics and Morals</b>		
Think of a situation where your friend has mismanaged a case due to negligence and now patient is threatening to sue the doctor (your friend). Do you think you have the ability to manage such ethical conflicts?	76.7%	23.3%
Have you ever been taught about professional ethics in daily professional life?	70%	30%
Have you ever been assessed on professional ethics and morals by your supervisor?	53.3%	46.7%
<b>Leadership Skills</b>		
Think of a situation where you are an in-charge of departmental literary activity (book review/journal club/etc.). Do you think you have the ability to supervise and lead such activity?	53.3%	46.7%
Have you ever been taught about such leadership skills?	40%	60%
Have you ever been assessed on your leadership skills by your supervisor?	36.7%	63.3%
<b>Entrepreneurship Skills</b>		
Think of a situation where you have to manage staff and finances of a private dental set up. Do you think you have the ability to do so?	83.3%	16.7%
Have you ever been taught about such entrepreneurial skills?	30%	70%
Have you ever been assessed on entrepreneurial skills during residency?	16.7%	83.3%
<b>Critical Thinking and Problem-solving Skills</b>		
Think of a situation where you have to present and justify your treatment plan of a complex case. Do you think you have to ability to do it?	86.7%	13.3%
Have you ever been taught about such critical thinking/ problem solving skills?	80%	20%
Have you ever been assessed on your critical thinking/problem solving skills by your supervisor?	76.7%	23.3%
<b>Life-Long Learning and Information Management</b>		
Do you think you have the ability to do literature search using multiple search engines such as Scopus, Pubmed, Chocrane regarding a particular topic?	80%	20%
Were you ever taught about how to do literature search and screen the relevant articles?	70%	30%
Have you ever been assessed on your skills to do literature search and screening of the relevant articles by your supervisor?	60%	40%

(Table-1).

For the pilot study, 73 Postgraduate trainees were approached of whom 60(82.2%) responded. Of the 60 subjects, 37(61.7%) were MDS residents and 23(38.3%) were Fellowship residents. The mean age of the sample was 29.650±2.815 years, and 26(43.3%) subjects were males. The majority of the sample was from orthodontics 26(43.3%), followed by oral and maxillofacial surgery 18(30%) and other two specialties accounting for 16(26.6%) respondents. No significant difference was found in understanding and application between the MDS and FCPS residents (Table-2).

Of the 35 items in the questionnaire, 21(60%) had Yes/No answers, and none of the items was dropped to enhance the intra-item internal consistency (Table-3).

## Discussion

Taxonomy of soft skills varies in literature.<sup>12-16</sup> Gonzalez et

al.<sup>5</sup> described soft skills elements and their suggestive sub-elements, being taught and assessed in Malaysia for undergraduate and postgraduate students. The current study piloted a similar trial in the local context to find out the learning and assessment of these soft skills in postgraduate dental students.

The study used 7 scenarios of soft skills that were validated by the experts. Bartlett's test showed that items were unrelated and factor analysis could be used to explore the components for items. The questionnaire had 35 items and 21 of them, which had Yes/No answer, were tested and none was dropped to enhance intra-item internal consistency. The scale was validated through EFA, hence fulfilling the first study objective.

The finalised scale items had 7 elements, with 5 items under each element. Among these, 14 items focussed on teaching and assessment, along with a sub-item each, inquiring about the method. There is a paucity of data in

dental disciplines to compare with, but in surgical disciplines, a Non-Technical Skills for Surgeons (NOTSS) scale was constructed and validated by the Royal College of Surgeons, Edinburgh, through confirmatory factor analysis (CFA).<sup>12</sup> McKernon et al. focussed on the use of simulated situational training in oral surgery so that students may learn the non-technical skills before they actually started clinical training in order to minimise errors.<sup>14</sup>

Self-evaluation of soft skills by postgraduate residents also revealed interesting facts about two streams of postgraduate programmes in Pakistan. The College of Physicians and Surgeons Pakistan (CPSP) administer fellowship track, whereas public and private universities deliver MDS programmes.<sup>17</sup> In few cases, accredited hospitals for both streams are the same and the only difference is in the examining body. These two qualifications are often a source of debate for possible differences in superior training, contribution to society, employability, students' attitude towards learning and assessment, etc.<sup>17</sup> The current findings, that there was no significant difference in the domains of soft skills, was encouraging, and support the notion that university-run programmes are similar in teaching and assessment of non-technical skills. However, the non-significant difference in the current study could be due to one training centre offering both FCPS and MDS programmes.

Among the three domains, teaching and assessment were both found to be sufficient, with the exception of organisational domain. The most prevalent teaching and learning methodology was identified as role modelling either by supervisor or peers, followed by workshop. Responses for communication skills were encouraging perhaps because both the CPSP and the University of Lahore organise dedicated workshops on the said soft skill for postgraduate students.

Assessment of all non-technical skills was majorly (40%) being carried out in the unstructured manner of direct observation, with the exception of professional ethics and morals that were majorly (30%) assessed by feedback of patients and colleagues.

Teamwork and communication skills prevailed the most when perception of soft skills was examined among dental postgraduate students. Therefore, skills that received poor scores in the current study, such as entrepreneurial skills, may be enhanced by using pairing as an instructional strategy.<sup>13</sup> Such skills can also be improved by dedicated workshops, symposia, or by introducing electives of practice management.<sup>18</sup> Formative assessment strategies should be carved out for

these skills. Communication and problem-solving skills should be assessed via mini-clinical examination (Mini-CEx), and other skills can be assessed through multisource feedback or portfolio.<sup>19</sup>

Furthermore, faculty needs to be sensitised regarding the need for soft skills in the learning environment, and a qualitative research may be useful in understanding the development and use of soft skills in clinical practice of dental postgraduate students.<sup>20</sup>

The current study has its limitations. It created items with help from literature alone, and a further qualitative study is needed to identify the themes to best include the perspectives of all stakeholders. Also, similar studies using this questionnaire need to be carried out to get an insight of postgraduate dental residents at various institutions within the country and elsewhere. Progression is also required in the area of validation by taking the next step of performing CFA.

## Conclusion

A scale for self-evaluation of soft skills, also known as non-technical skills, was successfully developed and validated. Training and assessment of soft skills in postgraduate studies was found to have deeper implications. It is paramount for health policy-makers, regulatory bodies and universities to establish learning and assessment strategies for deliberation of soft skills. Supervisors should also formally assess students' behaviour at workplace to foster learning and to ensure a safe clinical environment.

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