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Title

What is the value of simulated patient assessment in structured clinical examinations of undergraduate students and how should it be used?

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Abstract

Aims: To explore correlations between clinical assessor and simulated patient (SP) scores drawn from summative Integrated Structured Clinical Examination (ISCE) and inform the best use of SP scores in future assessments.

Methods: This retrospective study explores summative clinical assessor and formative SP numeric scores drawn from summative ISCE assessments spanning three academic years (2017-18 to 2019-20). Analyses were carried out using R 3.5.1 (R Core Team, 2018), with the stats package.

Results: The sample consisted of 169 Final Year BDS students across the three cohorts and included 95 females (56.2%) and 74 males (43.8%). Data from eight substations where SPs were included, were explored. Kendall's Tau, a non-parametric correlation, was used to investigate the relationships between the assessor and SP scores. Clinical assessor scores were out of a total of 20 points across various assessed domains within each substation. The formative SP assessment was out of 10 points with the same five affective domains related to communication included in each substation. Overall, the assessor and patient substation scores were not correlated ($\tau = 0.04$, $p = .272$) indicating that communication skills alone, as assessed by patients, do not correlate with more holistic performance across other domains. There was significant positive correlation for two of the eight substations with the other substations showing very little correlation.

Conclusions: This study shows that assessment of student performance by SPs does not show a correlation with examiner scores and may provide additional information relating to affective skills of students. Notwithstanding the limitations of this study, the findings underscore the need to investigate further the value of involvement of SPs in clinical assessments to explore if scores by SPs can be used to enhance the validity of assessments if used summatively.

Key words: Communication skills, dental, student, undergraduate,

Introduction

Effective communication is accepted as an underpinning prerequisite to clinical care, is one of the four domains of the GDCs Preparing for Practice Learning Outcomes for the Dental Team¹ and is related to enhanced patient satisfaction.^{2, 3} It is widely accepted that formative assessment activities and receiving feedback from patients (real or simulated) can improve clinicians' communication and that such patients will support learning in complementary domains to the clinician expert, especially enhancing the humanistic elements over the more observable checklist content.⁴⁻⁶ Once the graduated healthcare student is in the workplace, it is likely that patients will be judging them on a daily basis, and to be fully prepared for practice perhaps this patient voice should be highlighted in their undergraduate studies. Patient involvement has been encouraged in contemporaneous medical education to reinforce patient centred care and shared decision-making.^{7, 8}

There is a growing literature relating to the use of 'patients' for summative assessment and high stakes professional activities, with the term patient incorporating numerous variations in meaning.⁹ It is proposed that patients can be used in teaching and assessment as reliably as clinician experts can, provided they are suitably trained.^{8,9} Studies in dental settings have found that patients tend to assess more leniently than clinicians, and that fewer students fall into the borderline category – that is patients tend to make more definite satisfactory or unsatisfactory decisions.^{10, 11}

Final year dental students on the Bachelor of Dental Surgery (BDS) programme at our Dental school are examined using various different summative assessments, including the Integrated Structured Clinical Examination (ISCE).¹² The ISCE examination is generally similar to the traditional Objective Structured Clinical Examination (OSCE).¹³ However, in contrast to an OSCE which often tests individual skills on separate

stations, the ISCE embeds linked elements between individual OSCE style substations forming longer overarching stations. These longer stations, at which students must demonstrate complex combinations of skills, are used with the aim of representing the real clinical situation more authentically.¹⁴ The ISCE at our school involves student rotations through stations related to four clinical disciplines: paediatric dentistry and orthodontics; oral medicine and oral surgery; periodontics; and restorative dentistry. Each typically lasts 30 minutes and usually involves multiple aspects of management of a single patient such as assessment, diagnosis, operative skills, follow-up, and referral. It is a high stakes summative assessment in which simulated patients (SPs) are used in a formative manner in the assessment of communication skills. SPs involved in our assessments are professional actors who are trained for assessments by an external provider. All SPs are provided additional training for the Dental ISCE by the lead assessor and are also calibrated prior to the assessments.

The aim of this study was to explore correlations between clinical assessor and SP scores drawn from summative ISCE assessments to inform the best use of SP scores in future assessments.

Methods

Study design and participants: A retrospective study design was used to explore correlations between assessor and SP numeric scores drawn from summative ISCE assessments spanning three academic years (2017-18 to 2019-20).

Setting: University of Plymouth, Peninsula Dental School in the South West region of England

Data collection: The data for summative clinical assessor scores for ISCE substations and formative SP scores for the same substations over three academic years were collated.

Data analyses: Analyses were carried out using R 3.5.1 (R Core Team, 2018), with the stats package.¹⁵

Ethics approval: Ethics approval for the study was received from the institutional ethics committee (Reference Number 16/17-695). Although the data was analysed retrospectively, the participants had consented for the assessment data to be used anonymously for monitoring and research by the institution.

Results

The sample consisted of 169 Final Year BDS students across the three cohorts and included 95 females (56.2%) and 74 males (43.8%). The demographic characteristics of the participants are summarised in Table 1.

Data from eight substations were used (Table 2) with the summative clinical assessor score being out of a total of 20 points across a varying number of domains within each substation. The formative SP assessment being out of 10 points with the same five domains assessed for each substation (Table 3).

For the assessor scores the variances were similar by year, $F(2,448) = 1.74$, $p = .176$, but the data did not meet the assumption of normality, $W = 0.94$, $p = < .001$; this also applied to the patient assessor data ($F(2,448) = 1.31$, $p = 0.271$, and $W = 0.90$, $p = < .001$) (Figure 1). Kendall's Tau, a non-parametric correlation, was used to investigate the relationships between the assessor and SP scores, overall and by substation.

Overall, the assessor and patient substation scores were not correlated ($\tau = 0.04$, $p = .272$) indicating that communication skills alone, as assessed by patients, do not correlate with performance across all the domains (Figure 2). At substation level, there was significant positive correlation for two of the eight substations (2A in 2018-19 and 2019-20) with the other substations showing very little correlation (Table 4).

With communication skills only being assessed via one domain in more than half of the substation summative assessments by the expert clinical assessor ($n=5$) the correlations between the patient scores (all relating to communication skills) and the communication specific domains of the summative assessments were further

investigated (Tables 5 and 6). No real improvement was observed in the correlations, ranging from -0.002 to 0.332, with two of the eight again being significantly correlated (2A in 2018-19 and 1B in 2019-20).

Discussion

Patients are assuming an active role in medical education and can play a meaningful role to teach and assess communication skills and professionalism. With appropriate training, support and remuneration, patients can become colleagues in medical education.¹⁶ There is a growing trend to use patient assessors in clinical assessments such as OSCE, most often as a formative exercise. Structured clinical examinations such as OSCE are widely accepted globally as a valid and reliable form of assessment of clinical skills at level three of Miller's clinical competency pyramid.^{7, 17} However, the role of patients in summative assessment activities has not been adopted widely, and there are a variety of grading methodologies that can be used (including global ratings, checklists, open-ended comments and rating scales).^{9, 10}

Effective therapeutic communication of healthcare professionals play a fundamental role in patient experience, satisfaction, successful care outcomes, and reduced patient anxiety.¹⁸⁻²⁰ Authentic scenarios in OSCE provide opportunities for assessment of student performance and patient feedback on student performance can be valuable in improving student communication skills and can be used as a reliable learning tool.^{4, 21} Where patients are supported and trained appropriately "*they can teach and assess as reliably as doctors*" and there may be no significant differences between using simulated and real patients.^{8, 22} Previous studies on medical students have also shown that SP ratings can have a reliable correlation with assessor ratings, and therefore may be used formatively.²³ In contrast, Our results show that assessment of affective skills by SP provides additional information about student performance which may not be

captured by the examiners. Significant positive correlations between assessor and patient scores were only observed for substation 2A in 2018-19 and 2019-20 which involved obtaining a medical and dental history. Other stations focused on consent, treatment planning and medical emergencies and compared to the assessors, patients may have different expectations *vis a vis* the communication skills and professionalism of students. This may suggest that these SPs are picking up on important nuances in the authentic patient-clinician relationship that can be overlooked by clinical assessors, who may be focussing on the 'what' not the 'how'. Given the importance of communication between the clinician and the patient, and the fact that following successful completion of this assessment students will graduate and begin their independent clinical role, it may be prudent to take proper account of these SP judgements. Notwithstanding the limitations of our study, it does highlight the need to consider the use of SP ratings in summative assessments in conjunction with examiner assessment.

Several limitations of this study need to be acknowledged. Firstly, the sample was restricted to a single programme from one institution. Secondly, sample size was relatively small, and the differential performance of participants based on demographic factors could not be explored.

Overall, we observed very little or no correlation between assessor and patient scores – even when only correlating patients scores with specific communication domains in the assessor criteria. These results may be related to differences in the assessment design i.e., the total scores for SP was 10 but the elements related to communication skills in various substations and associated assessor scores varied considerably across substations and across the three cohorts. Moreover,

domain 5 in SP assessment could be interpreted a “*global*” grade as it relates to “Candidate’s level of communication skills overall”.

There is merit in undertaking further studies on with a larger sample-size involving multiple institutions. Also, a greater consistency in the number and weighting of elements related to communication skills could be incorporated between assessor and SP scores.

Conclusions

This study shows that assessment of student performance by SPs does not show a correlation with examiner scores and may provide additional information relating to the affective skills of students. The findings underscore the need to further investigate the value of using SP scores summatively in clinical assessments and if this may enhance validity of the ISCE assessment.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

Author contributions

K Ali led the study and drafted the manuscript.

S Hanks contributed to drafting the manuscript.

J Cockerill contributed to data analysis.

Funding Information

Not applicable

Conflict of Interest

None of the authors / co-authors have any conflict of interest to declare.

Ethics Information

The study complies with the ethics guidelines and ethics approval for the study was received from the institutional ethics committee (Reference Number 16/17-695).

Table 1: Substations included in the sample

Year	Substation	Descriptor
2017-18	2A	Oral Medicine – Medical and dental history
	4A	Restorative Dentistry – Treatment planning
2018-19	2A	Oral Medicine – Medical and dental history
	3A	Oral Surgery – Consent
	4A	Restorative dentistry – Treatment planning
2019-20	1B	Paediatric Dentistry – Radiograph and treatment options
	2A	Oral Medicine – Medical and dental history
	3C	Oral Surgery – Medical emergency

Table 2: Assessment domains and scores assessed by simulated patients

Number	Domain	Scores*
1	Candidate listened to you, invited questions, and encouraged discourse	0/1/2
2	Candidate faced you, made eye contact and displayed appropriate body language	0/1/2
3	Candidate provided an explanation of what was happening using appropriate language for you to understand as a 'lay person'	0/1/2
4	Candidate behaved as you would expect a professional would do and gave you confidence	0/1/2
5	Candidate's level of communication skills overall	0/1/2

**0=Below standard; 1=Meets standard; 2=Above standard*

Table 3: Number of students by demographic characteristic group and year

Demographic	Level	2017- 18	2018- 19	2019- 20	Total (%)
Gender	Female	33	30	32	95 (56.2%)
	Male	22	27	25	74 (43.8%)
Ethnicity	Asian	27	25	27	79 (46.7%)
	White	22	24	22	68 (40.2%)
	Other ethnicity	5	6	8	19 (11.2%)
	Not known	1	2	0	3 (1.8%)
Disability	No declared disability	49	48	53	150 (88.8%)
	Specific learning difficulty	4	7	3	14 (8.3%)
	Other disability	2	2	1	5 (3.0%)
Total		55	57	57	169

Table 4: Correlation coefficients for each substation

Year	Sub-station	Kendall's Tau	p-value
2017-18	2A	0.129	0.220
	4A	-0.002	0.982
2018-19	2A	0.332	0.001
	3A	0.079	0.442
	4A	0.169	0.125
2019-20	1B	0.060	0.570
	2A	0.287	0.005
	3C	0.075	0.471

Table 5: Assessor domains specific to student communication skills by substation

Year	Substation	Descriptor	Specific Communication Domains
2017-18	2A	Oral Medicine – Medical and dental history	Introduces him/herself (Domain 1)
	4A	Restorative Dentistry – Assessment of information	Introduces him/herself, and communicates effectively using non-technical appropriate language without jargon (Domain 1)
2018-19	2A	Oral Medicine – Medical and dental history	Keeping calm/reassuring the patient (Domain 1) Ask patient about symptoms (Domain 2) Discusses options that are available after emergency has been dealt with (Domain 6)
	3A	Oral Surgery – Consent	Most domains cover ‘Confirms’, ‘Describes’, ‘Discusses’ (9/10 domains)
	4A	Restorative dentistry – Assessment of information	Introduces him/herself (Domain 1) Discusses history (Domain 5) Feedback to patient (Domain 10)
2019-20	1B	Paediatric Dentistry – Radiograph and treatment options	Ensures good communication throughout and shows empathy and respect and asks the mother if she has any further questions (Domain 9)
	2A	Oral Medicine – Medical and dental history	Communication throughout consultation (Domain 9)
	3C	Oral Surgery – Medical emergency	Communication throughout consultation (Domain 7)

Table 6: Correlation coefficients between patient scores and assessor communication specific domain scores for each substation

Year	Sub-station	Number of Assessor Domains	Kendall's Tau	p-value
2017-18	2A	1	-0.037	0.755
	4A	1	0.035	0.769
2018-19	2A	3	0.333	0.002
	3A	9	0.049	0.633
	4A	3	0.169	0.125
2019-20	1B	1	0.286	0.015
	2A	1	-0.081	0.495
	3C	1	0.175	0.145

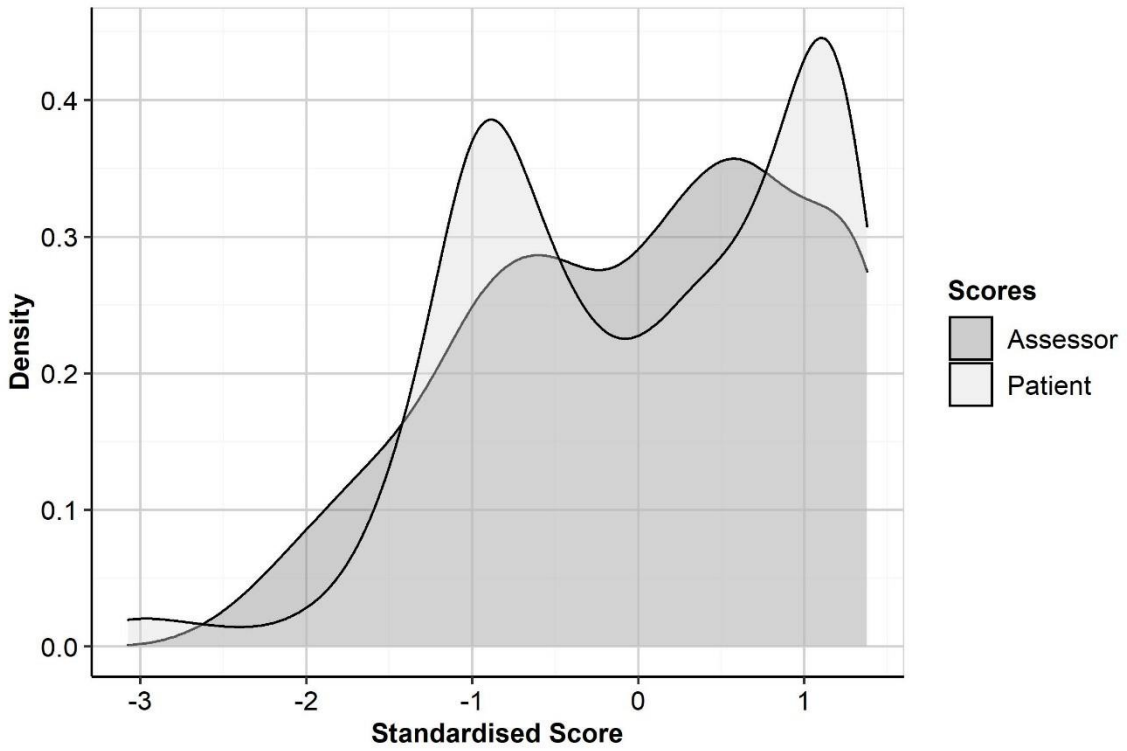


Figure 1 Density curve of standardised summative assessor and formative patient scores

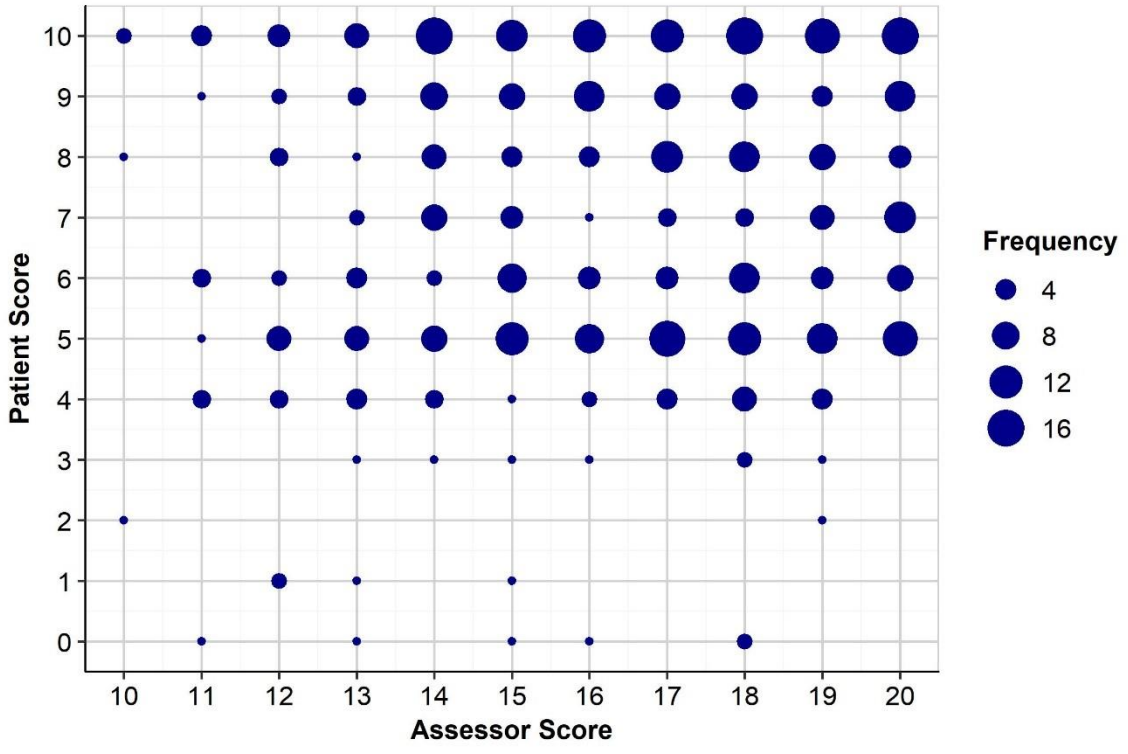


Figure 2 Scatter plot of patient scores against assessor scores

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