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R E S E A R C H A R T I C L E Self-reported cultural competence of final-year dental students before and after a three-day workshop in Lahore, Pakistan: a single-cohort pre–post study

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RESEARCH ARTICLE

Self-reported cultural competence of final-year dental students before and after a three-day workshop in Lahore, Pakistan: a single-cohort pre–post study

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Abstract

Background: Dental students in Pakistan treat patients who differ from them in language, region, religion and socioeconomic position, yet the undergraduate dental curriculum has no structured teaching on cultural competence. We designed a short workshop and examined whether final-year students' self-reported cultural competence was higher after it than before it.

Methods: Single-cohort pre–post study at Fatima Memorial Hospital College of Medicine & Dentistry, Lahore (May–July 2023). All 76 final-year students attended a three-day, nine-hour workshop built on the five dimensions of the Healthcare Provider Cultural Competence model (15–17 June 2023). Students completed a contextualised 41-item Healthcare Provider Cultural Competence Instrument (HPCCI) one week before and within four days after the workshop. Eleven negatively worded items were reverse-scored. The forms carried no shared identifier, so pre and post responses were compared as two groups using Welch's t-test, with Hedges' g, 95% confidence intervals (CI), Mann–Whitney U tests and Holm adjustment across domains.

Results: All 76 students returned both questionnaires. The overall HPCCI score rose from 3.59 (SD 0.31) to 3.83 (SD 0.34), a difference of 0.24 (95% CI 0.14 to 0.35; $p < 0.001$; $g = 0.74$). Gains were largest for cultural competence behaviours ($g = 0.82$) and patient-centred communication ($g = 0.61$), smaller for awareness and sensitivity ($g = 0.57$) and self-assessment ($g = 0.38$), and absent for practice orientation (difference 0.08, 95% CI -0.08 to 0.25). Change was concentrated in positively worded items (mean item change +0.32) rather than reverse-worded items (+0.03).

Conclusions: After a brief, structured workshop, final-year dental students described themselves as more culturally competent, particularly in what they do and how they communicate with patients. Their beliefs about sharing decisions with patients did not shift. Because there was no control group, outcomes were self-reported and measured immediately, and responses could not be linked, these findings show short-term change in self-perception, not proven gains in clinical competence. Longitudinal teaching, a comparison cohort and observed assessment are the next steps.

Keywords: Cultural competence; Dental education; Undergraduate dental students; Patient-centred communication; Workshop; Curriculum development; Pakistan

Background

A dentist in Lahore may see, in one clinic session, a Punjabi-speaking farmer from a nearby village, a Saraiki-speaking family who have travelled from the south of the province, and a patient who grew up abroad and is more comfortable in English. Each arrives with different expectations about pain, about who in the family makes decisions, and about what counts as a reasonable treatment plan. Responding well to that variety is what is usually meant by cultural competence: the awareness, knowledge and communication skills that let a clinician provide care that fits a patient's social, cultural and linguistic needs [1, 2]. A useful refinement is cultural humility, which treats this as an ongoing, self-critical practice rather than a stock of facts about groups [3].

In dentistry, cultural competence matters at concrete moments: taking a history, explaining prevention, negotiating treatment, and obtaining consent. Supervisors in dental schools report that students who struggle across cultural and language differences also struggle to communicate clinically [4], and dental schools in Australia, North America and Europe have introduced dedicated teaching in response [5, 6]. Evaluations of that teaching consistently show improvements in students' self-reported awareness and skills [7–9], although systematic reviews note that most studies use self-report, lack comparison groups and rarely measure patient outcomes [10, 11].

Pakistan has comparatively little published work in this area. Studies have described cross-cultural competence among medical students in Karachi [12] and awareness of culturally competent care among nurses in Punjab [13], but we did not find an evaluated cultural competence intervention for dental students. Dental curricula in the country have historically emphasised technical skill [14], and communication teaching at our institution did not address cultural difference explicitly. During clinical rotations, faculty observed that final-year students found it hard to talk with patients whose language or background differed from their own.

We therefore developed a three-day workshop for final-year students, organised around the Healthcare Provider Cultural Competence model of Schwarz and colleagues [15]. The model has five interlocking dimensions: awareness and sensitivity, cultural competence behaviours, patient-centred communication, practice orientation, and self-assessment (Fig. 1). The same authors developed the Healthcare Provider Cultural Competence Instrument (HPCCI) to measure these dimensions, and Mariño et al. adapted it for dental students [16].

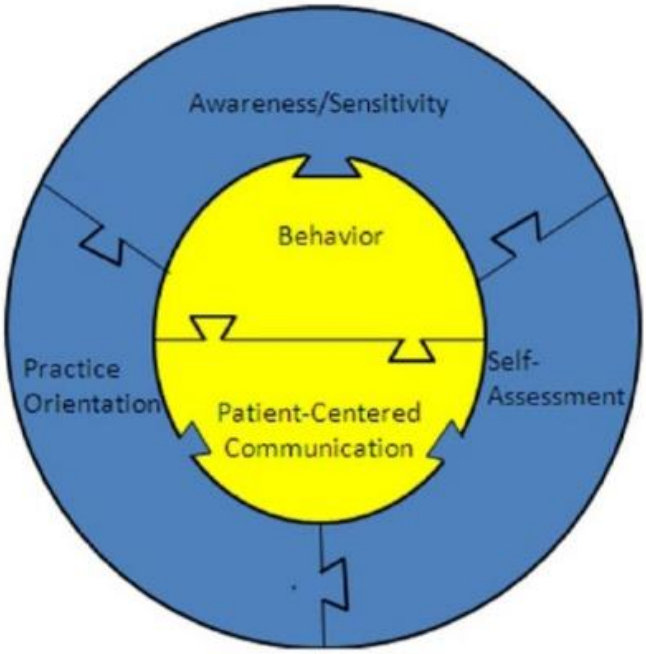


Fig. 1 Healthcare Provider Cultural Competence model. Behaviour and patient-centred communication sit at the centre, surrounded by awareness/sensitivity, practice orientation and self-assessment. Reproduced from Schwarz et al. [15]

The aim of this study was to examine whether final-year dental students' self-reported cultural competence, overall and in each HPCCI domain, was higher after the workshop than before it. We expected improvement in all five domains.

Methods

Study design and setting

This was a single-cohort, pre–post educational intervention study without a control group, reported in line with the GREET guideline for educational interventions [17] (Additional file 2). It took place at the Dental College of Fatima Memorial Hospital College of Medicine & Dentistry (FMHCMD), Lahore, a private teaching institution affiliated with the University of Health Sciences, Lahore. The overall study ran from May to July 2023 (Fig. 2).

Participants

All final-year Bachelor of Dental Surgery students enrolled in 2023 (n = 76) were eligible and invited, making this a census of the cohort rather than a sample. Students who were detained or on medical leave during the study window would have been excluded; none were. The workshop was delivered to the whole class as part of teaching, and completing the questionnaires for research was voluntary and covered by written informed consent.

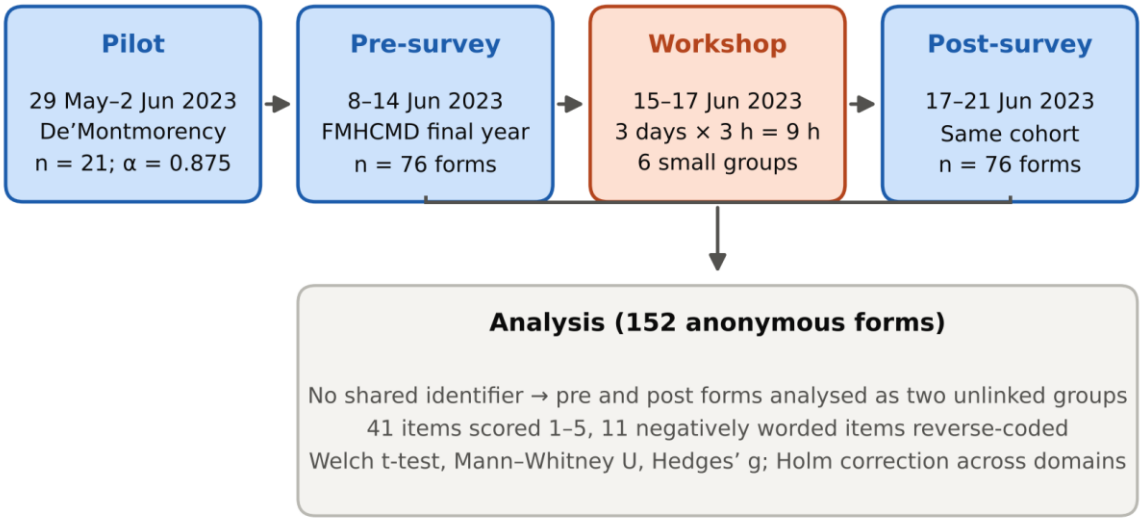


Fig. 2 Study timeline and analysis. The pilot was run at a separate institution; pre- and post-workshop questionnaires were completed by the same FMHCMD cohort but could not be linked at the individual level.

Intervention

The workshop ran on three consecutive days (15–17 June 2023), three hours per day, for a total of nine contact hours. Students worked in six fixed small groups led by the principal investigator, a dental educator, with a co-facilitator present throughout. The design was constructivist: students started from their own cultural identity, moved to the culture of the group, and then applied those ideas to the dentist–patient encounter through cases and role play. One week beforehand, each group received a pre-reading "advance organiser": three groups worked from the Mariño et al. study of Australian dental students [16] and three from a student-perspective article on negotiating care across cultures. Table 1 sets out the components against the five dimensions of the model. The full session plan, worksheets and cases are provided in Additional file 3. The workshop was approved for continuing medical education credit by the University of Health Sciences, and students received a participation certificate.

Table 1 Workshop components mapped to the five dimensions of the Healthcare Provider Cultural Competence model (GREET items 3–11)

Element	Description
Learners	Whole final-year BDS cohort, FMHCMD (n = 76), six fixed groups of 12–13
Facilitators	Principal investigator (dental educator) with a co-facilitator in every session
Format and dose	Face-to-face; 3 days × 3 h = 9 contact hours (15–17 June 2023); pre-reading one week before
Learning objectives	Reflect on and share one's own cultural identity; discuss how culture shapes daily life; recognise how a dentist's culture and assumptions can affect care; practise patient-centred, culturally responsive communication; self-assess cultural competence
Awareness and sensitivity	Pictorial "cultural identity" maps shared within groups; poll on "what is culture?"; short

Element	Description
	videos; awareness and sensitivity worksheets
Cultural competence behaviours	Analysis of patient behaviours in dental scenarios; discussion of when students had "crossed a line" relative to a patient's cultural boundaries
Patient-centred communication	Role plays of history taking and treatment discussion in a dental clinic setting, with peer and facilitator feedback; use of interpreters and family members
Practice orientation	Case discussions on who decides, power and partnership in the dentist–patient relationship
Self-assessment	Structured self-assessment with the HPCCI; reflective writing on patient encounters during clinical rotations
Feedback	Verbal and written feedback from students at the end of each day

BDS, Bachelor of Dental Surgery; HPCCI, Healthcare Provider Cultural Competence Instrument. Shaded rows are the five model dimensions.

Outcome measure

We used the HPCCI [15], with written permission from its lead author and from Mariño, who adapted it for dental students [16]. Wording was contextualised for Pakistan (for example, references to local languages and to oral health practitioners). The version used here had 41 items in five domains: awareness and sensitivity (9 items), cultural competence behaviours (10), patient-centred communication (4), self-assessment (10) and practice orientation (8). Items were rated on five-point scales (strongly disagree to strongly agree, or never to always). Eleven items are worded so that agreement indicates a less culturally competent position (for example, "I find it hard to ask patients about their cultural backgrounds" and "The oral health practitioner is the one who should decide what is talked about during a visit"). These were reverse-scored (6 − response) so that higher scores always indicate a more culturally competent response. Domain and overall scores are the means of their items (range 1–5). The questionnaire also recorded age, sex, self-described cultural identity, languages spoken, home language and the birthplace of the student and their parents.

Before the main study, the questionnaire was piloted with 21 final-year students at De'Montmorency College of Dentistry, Lahore, who did not take part in the main study. No changes to the questionnaire were recommended, and Cronbach's alpha was 0.875. In the main study we recalculated alpha for each domain and for the full scale at each time point [18].

Data collection

Students completed the paper questionnaire 8–14 June 2023 (one week before the workshop) and again 17–21 June 2023 (immediately to four days after it). To protect anonymity, the forms carried no name or student number, and responses were entered into SPSS as two independent sets of 76 forms. As a result, an individual student's pre- and post-workshop forms cannot be matched. We checked this

directly: when forms were aligned in data-entry order, recorded sex agreed in only 67% of pairs and age in 39%, and the two sets contain different numbers of women (56 and 59).

Statistical analysis

Because responses were unlinked, we treated the pre- and post-workshop forms as two groups. Our primary analysis compared group means with Welch's t-test, which does not assume equal variances [19]. We report the mean difference with its 95% CI and Hedges' g, the bias-corrected standardised mean difference, with its 95% CI [20]. This approach ignores the within-student correlation that a paired design would exploit, so it is conservative: it widens confidence intervals rather than overstating precision. Several domain distributions departed from normality (Shapiro–Wilk $p < 0.05$), so we repeated every comparison with the Mann–Whitney U test. The five domain tests were adjusted with the Holm procedure [21]; the overall score was the primary outcome and is reported unadjusted. Item-level comparisons (Mann–Whitney, Holm-adjusted across 41 items) are exploratory.

We ran two sensitivity analyses. The first repeated the comparisons using the scores originally computed at data entry, which summed raw responses without reverse-scoring and omitted four items from the domain totals. The second compared the mean change in positively worded and reverse-worded items, as a check on acquiescent responding [22]. Sex and age were compared between the two sets of forms with the chi-square and Mann–Whitney tests. Data were entered in IBM SPSS Statistics 24, and the analyses were performed from the item-level data in Python 3 (pandas, SciPy). Two-sided $p < 0.05$ was considered statistically significant.

Ethical considerations

The study was approved by the Institutional Review Board of FMHCMD (FMHCMD-15/2/2023-IRB-1180), the main study site; the Ethical Review Committee of Aga Khan University (ERC 2023-8467-25059), where the principal investigator was registered for her postgraduate study; and the Institutional Review Board of De'Montmorency College of Dentistry (No. 3112), the pilot site. All students gave written informed consent. Data were anonymised at collection, stored with password protection and accessible only to the investigators.

Results

Participants

All 76 students completed both questionnaires (response rate 100%), giving 152 forms with no missing HPCCI items. Students were 20–24 years old (mean 22.3, SD 0.87), and about three-quarters were women (Table 2). Almost all described their cultural identity as Punjabi and spoke Urdu at home. Most

also spoke Punjabi fluently. The pre- and post-workshop forms did not differ in sex (p = 0.71) or age (p = 0.71).

Table 2 Characteristics of respondents on the pre- and post-workshop questionnaires

Characteristic	Pre-workshop (n = 76)	Post-workshop (n = 76)
Age, years, mean (SD)	22.3 (0.87)	22.3 (0.83)
Sex, n (%)		
Female	56 (73.7)	59 (77.6)
Male	20 (26.3)	17 (22.4)
Self-described cultural identity, n (%)[a]		
Punjabi	74 (97.4)	69 (90.8)
Other	1 (1.3)	5 (6.6)
Language most spoken at home, n (%)		
Urdu	71 (93.4)	69 (90.8)
Punjabi	3 (3.9)	3 (3.9)
Other (incl. Saraiki)	2 (2.6)	4 (5.3)
Fluent in Punjabi in addition to Urdu, n (%)	59 (77.6)	60 (78.9)
Place of birth, n (%)		
City in Pakistan	61 (80.3)	64 (84.2)
District, tehsil or village in Pakistan	12 (15.8)	9 (11.8)
Outside Pakistan	3 (3.9)	3 (3.9)
Pakistani citizen, n (%)	75 (98.7)	76 (100.0)

[a] Missing: 1 pre, 2 post. Pre and post rows describe the same cohort, but because forms were anonymous, small differences between columns reflect inconsistent self-report rather than different students.

Change in HPCCI scores

The overall HPCCI score was 0.24 points higher after the workshop (95% CI 0.14 to 0.35; Welch t = 4.61, df = 148.7; p < 0.001), equivalent to a medium-to-large standardised difference (g = 0.74, 95% CI 0.42 to 1.07) (Table 3, Fig. 3). Four of the five domains improved after Holm adjustment. The largest changes were in cultural competence behaviours (+0.43; g = 0.82) and patient-centred communication (+0.38; g = 0.61). Awareness and sensitivity (+0.20; g = 0.57) and self-assessment (+0.16; g = 0.38; Holm p = 0.042) changed less. Practice orientation, which captures beliefs about sharing power and decisions with patients, did not change (+0.08, 95% CI -0.08 to 0.25; p = 0.320). It was also the lowest-scoring domain at both time points. Mann–Whitney tests gave the same pattern of results (Table 3).

Table 3 HPCCI domain and overall scores before and after the workshop (unlinked groups, n = 76 each)

Domain (items)	α pre / post	Pre mean (SD)	Post mean (SD)	Difference (95% CI)	Welch t (df)	p (Holm)	Mann–Whitney p	Hedges' g (95% CI)
Awareness and sensitivity (9)	0.53 / 0.55	3.71 (0.35)	3.92 (0.36)	+0.20 (0.09, 0.31)	3.54 (149.9)	0.002	<0.001	0.57 (0.25, 0.90)
Cultural competence behaviours (10)	0.78 / 0.79	3.48 (0.54)	3.92 (0.51)	+0.43 (0.26, 0.60)	5.06 (149.5)	<0.001	<0.001	0.82 (0.49, 1.15)
Patient-centred communication (4)	0.61 / 0.74	3.87 (0.62)	4.25 (0.61)	+0.38 (0.18, 0.58)	3.79 (149.9)	<0.001	<0.001	0.61 (0.29, 0.94)
Self-assessment (10)	0.74 / 0.61	3.66 (0.44)	3.82 (0.42)	+0.16 (0.02, 0.30)	2.33 (149.5)	0.042	0.041	0.38 (0.06, 0.70)
Practice orientation (8)	0.57 / 0.75	3.33 (0.46)	3.41 (0.57)	+0.08 (-0.08, 0.25)	1.00 (142.5)	0.320	0.289	0.16 (-0.16, 0.48)
Overall HPCCI (41)	0.83 / 0.86	3.59 (0.31)	3.83 (0.34)	+0.24 (0.14, 0.35)	4.61 (148.7)	<0.001^a^	<0.001	0.74 (0.42, 1.07)

Scores are item means on a 1–5 scale; higher scores indicate a more culturally competent response after reverse-scoring of 11 negatively worded items. α, Cronbach's alpha. Domain p-values are Holm-adjusted across the five domains. [a] Primary outcome, unadjusted. Bold: statistically significant ($p < 0.05$).

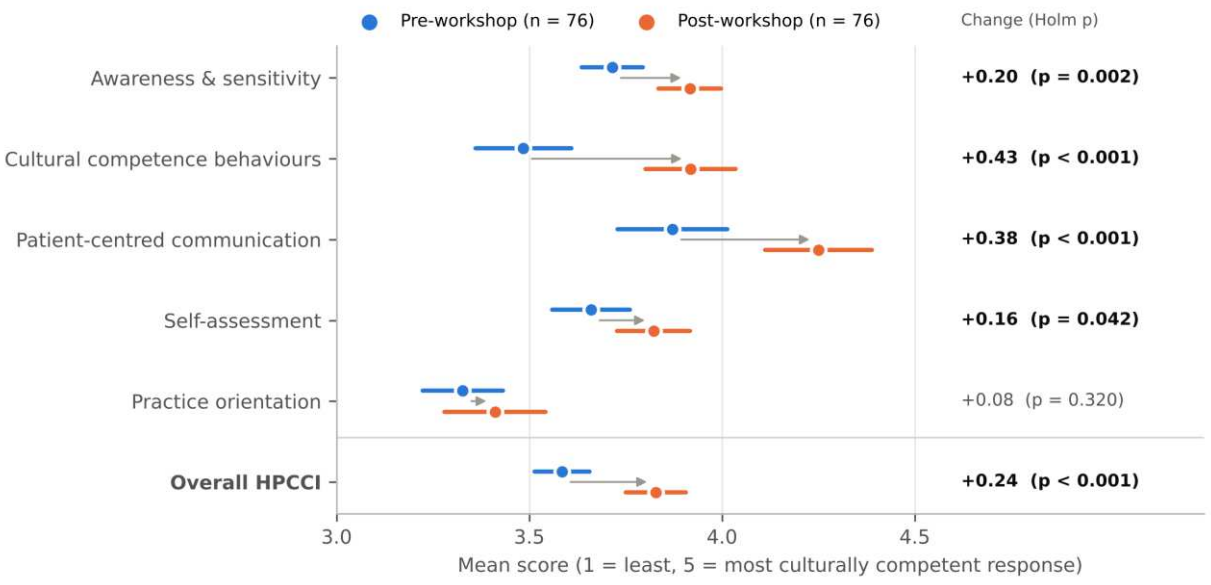


Fig. 3 Mean HPCCI domain scores before (blue) and after (orange) the workshop. Horizontal bars show 95% confidence intervals; grey arrows show the direction of change. The right-hand column gives the mean difference and Holm-adjusted p-value (overall score unadjusted).

Figure 4 shows the full distributions. After the workshop, the whole distribution moved to the right rather than a few students improving sharply. The clearest shift was in patient-centred communication, where the share of students averaging 4.5 or more rose substantially. Standardised effect sizes with their confidence intervals are shown in Fig. 5. Only the interval for practice orientation crosses zero.

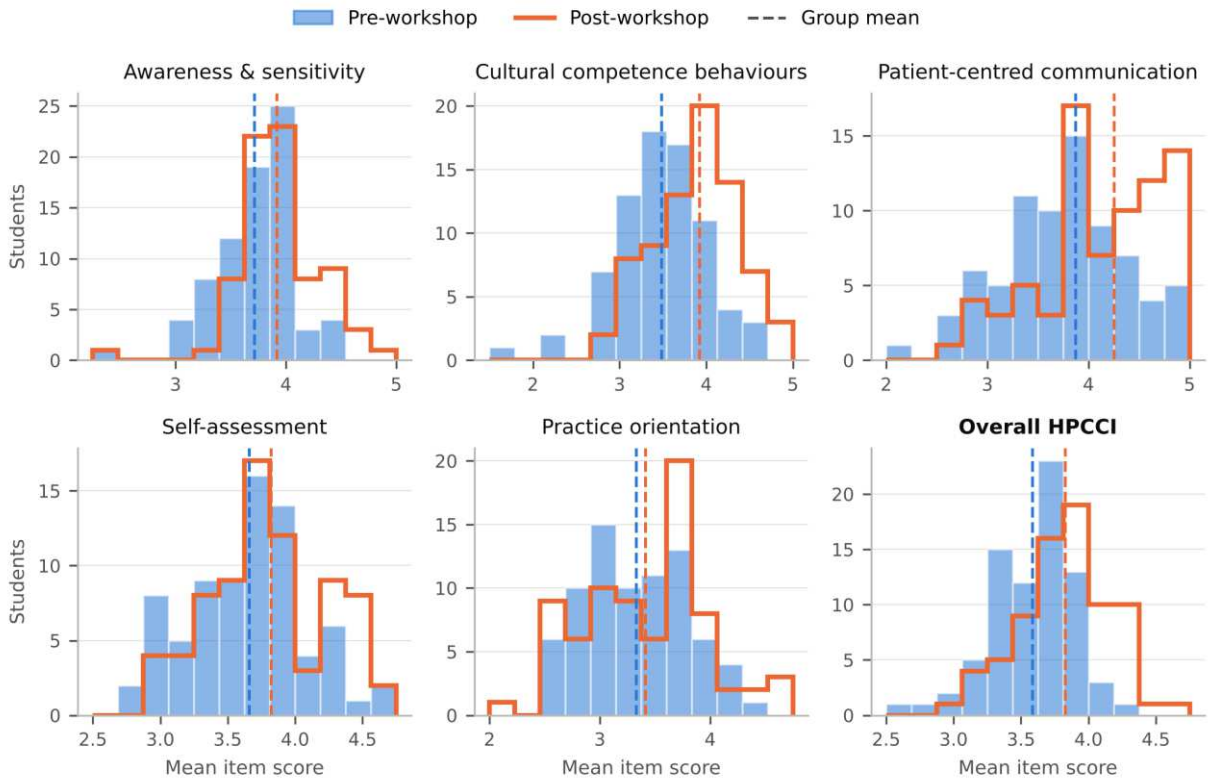


Fig. 4 Distribution of HPCCI domain and overall scores before (blue bars) and after (orange outline) the workshop. Dashed lines mark group means.

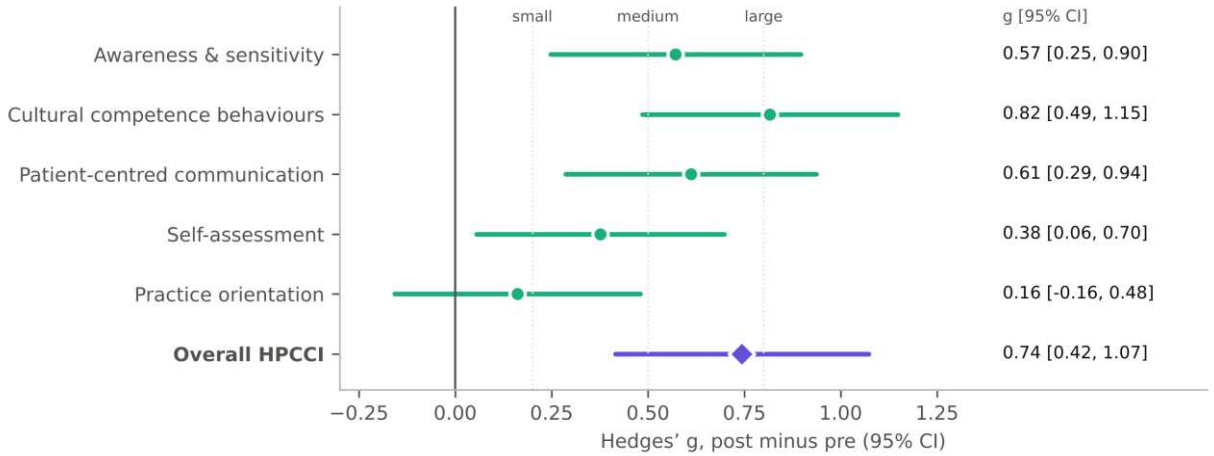


Fig. 5 Standardised mean differences (Hedges' g, post minus pre) with 95% confidence intervals. Dotted reference lines mark conventional small (0.2), medium (0.5) and large (0.8) effects.

Item-level change

Seven of 41 items changed significantly after Holm adjustment (Additional file 1). The biggest shifts were in concrete behaviours (Fig. 6). Before the workshop, 41% of students said they rarely or never sought feedback from patients about how they related to the patients' culture; afterwards, 16% did. Agreement that interpreters help communication rose from 47% to 83%. Taking note of cultural factors

during history taking, seeking information about a patient's cultural background when relevant, and watching for non-verbal cues also increased.

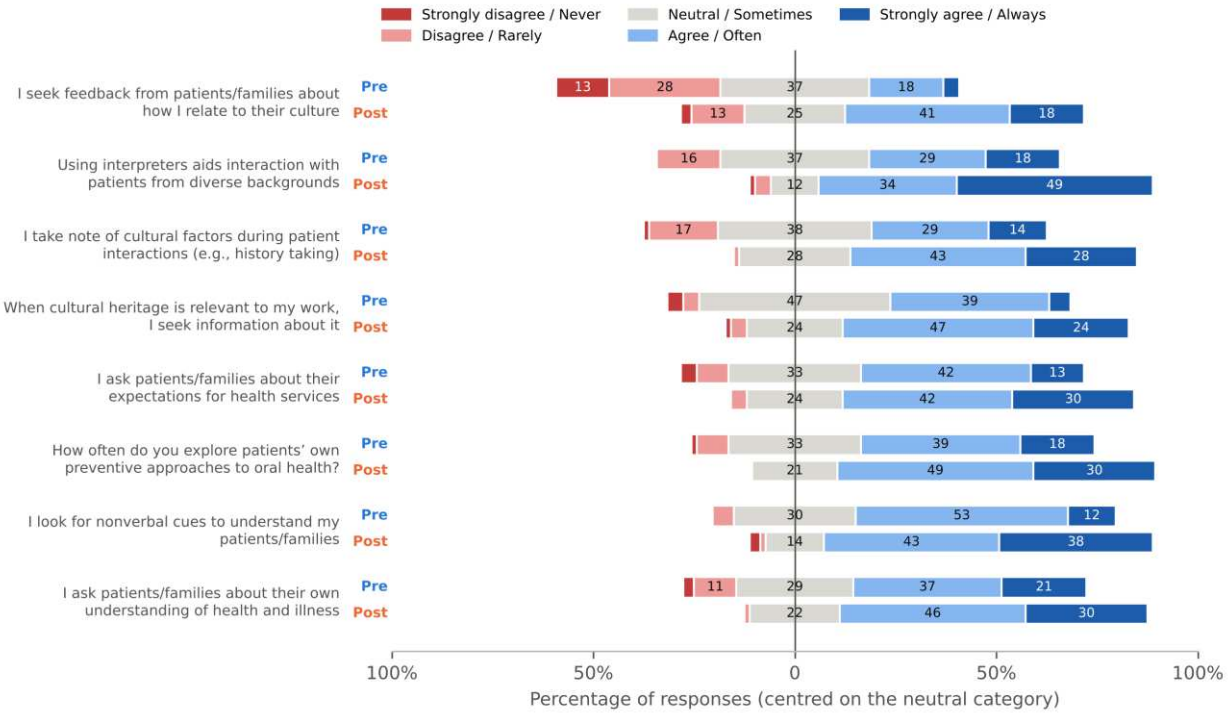


Fig. 6 Response distributions for the eight items with the largest mean change. Bars are centred on the neutral category; numbers are percentages (labels under 9% omitted).

Sensitivity analyses

Using the original data-entry scores (raw sums without reverse-scoring), the overall score again rose (3.51 to 3.74; $p < 0.001$; $g = 0.73$), as did behaviours, communication and awareness. Practice orientation remained unchanged ($p = 0.725$). The self-assessment difference was smaller and not statistically significant under that scoring ($p = 0.064$), so we regard it as our weakest finding. The comparison of item types was more informative. The mean change across the 30 positively worded items was +0.32, compared with +0.03 across the 11 reverse-worded items, none of which changed significantly. Put simply, students endorsed culturally competent statements more readily after the workshop but did not move away from the opposing statements.

Free-text comments

The questionnaire ended with an optional open question. Seventeen of 152 forms contained text, and 14 of these were "no" or "no issue". The three substantive comments were too few for thematic analysis. They are reported only for transparency: one student before the workshop described the challenge of "convincing the patient that myths in their culture are wrong", and after the workshop one asked for "a session between the patient and the doctor" and another called it a "wonderful and different experience".

Discussion

In this evaluation of a cultural competence workshop for dental students in Pakistan, final-year students rated themselves as more culturally competent after nine hours of structured teaching. The overall difference was modest in raw terms (about a quarter of a point on a five-point scale) but medium-to-large in standardised terms ($g = 0.74$). The gains were not uniform. They were concentrated in what students say they do and how they communicate, and were absent in their beliefs about who should hold power in the clinical encounter.

Our results look much like those reported from dental schools elsewhere. Alrqiq et al. reported gains in perceived awareness, knowledge and skills after a cultural competency curriculum [7], and Venturin et al. found that both lecture- and experience-based training improved dental students' self-assessed competence [8]. Reviews across the health professions reach the same conclusion: training reliably improves self-reported knowledge, attitudes and skills, while evidence for effects on patient outcomes remains thin [10, 11]. Our largest effects were on items describing observable behaviours, such as asking for feedback, noting cultural factors in a history and valuing interpreters. This is what we would expect from a workshop built around role play and clinic-based cases, and it fits with reviews that favour experiential, practice-linked teaching of cultural competence over purely didactic formats [6, 23].

The practice orientation result is, to us, the most telling. Items in this domain ask whether the dentist should decide what is discussed, whether patients should rely on the practitioner's knowledge, and whether disagreement signals a lack of respect. These are deeply held views about professional authority, shaped over years of hierarchical clinical training and by wider social norms, and a short workshop is unlikely to shift them [24, 25]. Practice orientation was also the lowest-scoring domain at both time points, which makes it the clearest target for future teaching. Doing that well will probably require longitudinal reinforcement in the clinic, including faculty role-modelling of shared decision-making, rather than a single block.

We also need to be careful about how far these gains can be taken. All eight practice-orientation items, and three items in other domains, are phrased so that disagreement is the culturally competent answer. Almost all of the change occurred in positively worded items. One reading is that students learned to endorse the behaviours the workshop modelled without yet rejecting the attitudes it challenged. Another is acquiescence or social desirability: students who have just completed a workshop on cultural competence know which answers are expected [22]. Response-shift bias is a third possibility, since students may have judged themselves against a different standard once they understood what cultural competence involves [26]. None of these can be ruled out with our design,

and together they are a strong reason not to treat higher self-ratings as evidence of higher competence [27].

Strengths and limitations

The study included the entire cohort with complete responses, used an established instrument with permission and a pilot, and describes the intervention in enough detail to be reproduced. We reanalysed the data from item level, reverse-scored negatively worded items, reported effect sizes and confidence intervals, and corrected for multiple comparisons.

There are important limitations. First, there was no control group, so the differences cannot be attributed to the workshop alone. Testing effects, demand characteristics and concurrent clinical experience could all contribute. The short interval between surveys limits maturation but increases the risk of demand effects. Second, because the forms were anonymous and unlinked, we could not analyse individual change. The independent-groups analysis is conservative but cannot show which students benefited. Third, outcomes were self-reported and measured within days of the workshop, so we cannot comment on retention or on behaviour with patients. Fourth, internal consistency was low for awareness and sensitivity ($\alpha \approx 0.55$) and for practice orientation before the workshop ($\alpha = 0.57$), and one contextualised item ("Language barriers particularly impact Punjabi as compared to other cultures") is ambiguous. Domain-level findings for those scales should therefore be read with care, and the adapted instrument needs a formal validation study in Pakistani dental students. Fifth, this was a single institution with a largely Urdu-speaking, Punjabi-identifying, urban-born cohort, which limits transferability [28].

Implications for education and research

For curriculum planners, the results suggest that a short, active workshop is a feasible way to introduce cultural competence and can shift how students describe their behaviour and communication. It should be a starting point, not the whole intervention. Teaching on shared decision-making and professional power needs more time and must continue into clinical supervision. For researchers, the next cohort offers a practical opportunity to address our main weaknesses. We plan to assign each student a self-generated code so that pre and post forms can be linked, add a retrospective "then-test" to estimate response shift, compare against a delayed-intervention group or a neighbouring college, follow students up at three to six months, and add an observed measure such as a standardised-patient OSCE station.

Conclusions

A three-day, nine-hour cultural competence workshop was followed by higher self-reported cultural competence among final-year dental students in Lahore, mainly in behaviours and patient-centred communication. Their beliefs about sharing power and decisions with patients did not change. Given the single-group design, unlinked self-reported data and immediate follow-up, the findings show short-term change in students' self-perception, not proven gains in clinical competence. They support introducing cultural competence teaching into the undergraduate dental curriculum in Pakistan, together with stronger, longitudinal evaluation.

Abbreviations

Abbreviation	Meaning
BDS	Bachelor of Dental Surgery
CI	Confidence interval
FMHCMD	Fatima Memorial Hospital College of Medicine & Dentistry
GREET	Guideline for Reporting Evidence-based practice Educational interventions and Teaching
HPCCI	Healthcare Provider Cultural Competence Instrument
OSCE	Objective structured clinical examination
SD	Standard deviation

Declarations

Ethics approval and consent to participate

The study was conducted in accordance with the Declaration of Helsinki. It was approved by the Institutional Review Board of Fatima Memorial Hospital College of Medicine & Dentistry, Lahore (FMHCMD-15/2/2023-IRB-1180), the Ethical Review Committee of Aga Khan University, Karachi (ERC 2023-8467-25059), and the Institutional Review Board of De'Montmorency College of Dentistry, Lahore (No. 3112). Written informed consent was obtained from all participants.

Consent to publish

Consent to Publish declaration: not applicable. The manuscript contains no identifiable information about any individual participant, such as names, photographs or personal details.

Data availability

The de-identified datasets generated and analysed during the current study are available from the corresponding author (dr.salimanaveed@gmail.com) on reasonable request.

Competing interests

The authors declare that they have no competing interests.

Funding

This research received no external funding.

Authors' contributions

SNM conceived the study, designed and delivered the workshop, collected the data, performed the analysis and drafted the manuscript. SB and SS supervised the study design and analysis and critically revised the manuscript. AA and MI facilitated institutional implementation and data collection and critically revised the manuscript. All authors read and approved the final manuscript.

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Additional file

Item-level pre- and post-workshop scores for all 41 HPCCI items (Table S1, below).

Table S1 Item-level HPCCI scores (means after reverse-scoring; Mann–Whitney U, Holm-adjusted across 41 items)

Domain	Item	R	Pre	Post	Δ	p (Holm)
Awareness	People with a common cultural background may think and act alike		3.83	4.04	+0.21	0.110
Awareness	Cultural diversity needs to be considered for each individual and group		3.86	4.13	+0.28	0.183
Awareness	If I know about a person's culture, I do not need to consider their personal preferences for health services	Yes	3.41	3.36	-0.05	1.000
Awareness	Spirituality and religious beliefs are important aspects of our cultural groups		4.00	4.13	+0.13	1.000
Awareness	An individual person may identify with more than one cultural group		3.58	3.99	+0.41	0.003
Awareness	Language barriers particularly impact Punjabi as compared to other cultures		3.32	3.26	-0.05	1.000
Awareness	I understand that people from different cultures may define the concept of "health care" in different ways		3.78	3.96	+0.18	1.000
Awareness	I think that knowing about different cultural groups helps direct my work with individuals and their families		3.93	4.30	+0.37	0.003
Awareness	I enjoy working with people who are culturally different from me		3.74	4.08	+0.34	0.165
Behaviours	When I identify that cultural heritage and needs of individuals are relevant to my work, I seek information about them		3.38	3.88	+0.50	0.007
Behaviours	I am aware of potential barriers to oral health care that might be encountered by people of different cultures		3.59	3.99	+0.39	0.122
Behaviours	I endeavour to remove obstacles to oral health for people of different cultures when I identify such obstacles		3.83	4.21	+0.38	0.293
Behaviours	I learn from my peers about people with different cultural heritages		3.64	3.99	+0.34	0.951
Behaviours	Evaluation from my colleagues about how I interact with people of different cultures is not relevant	Yes	3.37	3.41	+0.04	1.000
Behaviours	I take note of cultural factors during patient interactions, such as during history taking		3.38	3.97	+0.59	0.006
Behaviours	I ask patients and/or their families about their own understanding of health and illness		3.63	4.05	+0.42	0.293
Behaviours	I ask patients and/or their families to tell me about their expectations for health services		3.53	3.99	+0.46	0.111
Behaviours	I seek feedback from patients and/or their families about how I relate to their culture		2.72	3.59	+0.87	<0.001
Behaviours	I find ways to adapt my services to my patient's preferences		3.76	4.11	+0.34	0.266
Communication	When there are a variety of treatment options, how often do you give the patient and their family a choice when making a decision?		4.26	4.33	+0.07	1.000
Communication	When there are a variety of treatment options, how often do you give the patient and their family control over decisions about their		4.07	4.33	+0.26	0.880

Domain	Item	R	Pre	Post	Δ	p (Holm)
	treatment?					
Communication	How often do you explore with patients, their own preventive approaches to oral health?		3.66	4.09	+0.43	0.110
Communication	The use of interpreters aids in interacting with patients and families from diverse cultural backgrounds		3.50	4.25	+0.75	<0.001
Self-assessment	I understand how to lower communication barriers with patients and their families		3.75	3.99	+0.24	0.951
Self-assessment	I look for nonverbal cues to add to my understanding about my patients and/or their families		3.71	4.13	+0.42	0.011
Self-assessment	I am able to foster a friendly environment with my patients and their families		3.87	4.18	+0.32	0.227
Self-assessment	I attempt to demonstrate a high level of respect for patients and their families		4.36	4.50	+0.14	1.000
Self-assessment	I consistently reflect on my skills as I work with diverse groups of patients and their families		3.96	4.29	+0.33	0.371
Self-assessment	A genuine sense of trust with my patient and their family is important when interacting with my patients		4.38	4.38	+0.00	1.000
Self-assessment	I make every effort to understand the unique circumstances of each patient and their family		4.18	4.29	+0.11	1.000
Self-assessment	I find it hard to ask patients about their cultural backgrounds	Yes	2.88	2.86	-0.03	1.000
Self-assessment	I rarely self-assess my abilities when working with patients and their families of diverse backgrounds	Yes	2.67	2.84	+0.17	1.000
Self-assessment	I find it difficult to manage cultural issues as well as clinical issues when providing oral health care	Yes	2.84	2.76	-0.08	1.000
Practice orientation	The oral health practitioner is the one who should decide what is talked about during a visit	Yes	2.59	2.72	+0.13	1.000
Practice orientation	The patient and their family should rely on their oral health practitioners' knowledge and not try to find out about their condition(s) on their own	Yes	3.25	3.21	-0.04	1.000
Practice orientation	When oral health practitioners ask a lot of questions about a patient and their family's background, they are prying too much into personal matters	Yes	3.24	3.22	-0.01	1.000
Practice orientation	If oral health practitioners are truly good at diagnosis and treatment, their interactions with patients and their family are not that important	Yes	3.75	3.67	-0.08	1.000
Practice orientation	The patient and their family should be treated as if they are partners with the oral health practitioner, equal in power and status		3.55	3.75	+0.20	1.000
Practice orientation	When the patient and their family disagree with their oral health practitioner, it signifies that they do not respect or trust the health care provider.	Yes	3.12	3.13	+0.01	1.000
Practice orientation	A treatment plan cannot succeed if it is in conflict with the patient and their family's lifestyle or values		3.75	3.92	+0.17	1.000
Practice orientation	It is not that important to know a patient and their family's culture and background to treat the client's illness	Yes	3.37	3.66	+0.29	0.777

R, reverse-scored item. Δ, post minus pre. Bold: Holm-adjusted $p < 0.05$.