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EFFECT OF A TRANSCULTURAL TRAINING PROGRAMME ON THE CULTURAL COMPETENCE OF NURSING STUDENTS IN KARACHI, PAKISTAN: A QUASI-EXPERIMENTAL STUDY

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ABSTRACT

Background. Evidence of structured training for nursing students in Pakistan regarding cultural competence is limited, and nurses need to provide culturally sensitive care to patients from diverse backgrounds. This study assessed the impact of a transcultural training programme on the cultural competence of nursing students in Karachi and examined if there was impact difference based on students' characteristics.

Methods. The quasi-experimental pre-test/post-test with control group was used, based on the model of Campinha-Bacote, and Adult Learning Theory. The Nurse Cultural Competence Scale (20 items) was used to assess cultural knowledge, sensitivity and skill pre- and post-programme. The data were analysed using t-tests, moderation by gender, education level, previous multicultural clinical experience and age, and mixed ANOVA and ANCOVA.

Results. Both groups improved, but the intervention group improved far more (total score 64.90 to 77.85, $d = 1.67$, versus 64.64 to 66.45, $d = 0.34$, in the control group). The intervention group scored 11.17 points higher than the control group (95% CI [9.34, 13.00]), $F(1, 197) = 144.75$, $p < .001$, partial $\eta^2 = .42$, with significant differences in knowledge, sensitivity and skill. The effect was not different for males and females but greater for diploma students, and for students with no multicultural experience and for younger students.

Conclusions. The transcultural training programme had a significant impact on the cultural competence of nursing students. The results confirm the need to incorporate transcultural training into nursing training programs and to modify it for more advanced learners.

KEYWORDS: *cultural competence; transcultural nursing; nursing students; training programme; quasi-experimental study; Pakistan*

1. INTRODUCTION

Nurses of today's day and age are educated for a workplace that has patients with a variety of languages, religions, ethnicities, and beliefs on health and illness. Nurses have the most time with the patient than any other health care worker and their understanding and response to cultural differences impact the quality of care. It is broadly recognized that cultural competence is a key component of inclusive, equitable and respectful health care (Baig & Mumtaz, 2025). It is more likely that misunderstandings of illness beliefs, communication gaps and care that is not aligned with a patient's values will occur when nurses do not possess it. This concern has been raised for specific patient groups, such as South Asian women receiving perinatal care (Sandhu, 2010).

Cultural competence is not a single skill, but rather a complex combination of skills. Recent efforts have been made to map its parts. An integrative review of the nursing literature suggested that the concept of cultural competency has the following domains and attributes: cultural competency wheel (Skaria et al., 2025). The Campinha-Bacote model sees it as a continuous process involving cultural awareness, cultural knowledge, cultural skill, cultural encounters and cultural desire (Campinha-Bacote, 2002). Research in other specialties has also highlighted the need to promote and assess cultural competence to monitor its development (Kallakorpi, 2025). This study focuses on three dimensions of cultural competence that can be measured in students: cultural knowledge, cultural sensitivity and cultural skill.

These skills are developed primarily in the context of education. Nursing education has been characterized as a means to change patient care practices in a way that takes into account cultural difference (Rehder, 2021). There is mixed evidence regarding the effectiveness of training in doing this. In a scoping review of healthcare professionals in low- and middle-income countries, Bolarinwa and Nkansah (2025) found that there are clear gaps in cultural competence training. Training is not limited to the classroom. Structured support has been associated with greater self-efficacy with providing culturally competent care when working with foreign nurses (Presley & Mokoboto-Zwane, 2023). Interprofessional education and clinical supervision is also incorporating diversity and

cultural competence (Manaf & Ba-Break, 2026). These sources indicate that if training is designed well, it can help, but the content, delivery and impact of training must be tested in the context in which it will be applied.

Pakistan is one such setting. Karachi is a big, multiethnic and multilingual city where the nursing students will work with patients from diverse communities while on clinical placement. This could be part of a structured programme in transcultural nursing to prepare them for this reality. There is little evidence of such programmes in Pakistani nursing education and few studies have examined whether a programme is more effective for some students than others. The design of the training is also important. Adult Learning Theory holds that adult learners are self-directed, bring prior experience to their learning and learn best when content is relevant to their practice (Knowles et al., 2015). A programme designed along these lines may then be appropriate for the nursing students, who are adults transitioning into a professional career.

The degree of training effect might also rely on the learners. Students are not all the same gender, age, level of education or have prior experience with patients from other cultures. Younger pupils or those with a different educational experience might be at different stages of knowledge or confidence. Students who have already worked with multicultural patients might not gain as much from this course, as they have already encountered some of the material in practice. If effects are found to be different in this manner, one programme might need to be adapted for different groups. There are few studies that directly test this, and it is the second focus of the present research.

This study makes three contributions. First of all, it compares a structured transcultural programme with a control group, rather than comparing it to a single-group before and after comparison, a much better basis for making judgements of the effectiveness of training. Second, it provides separate reporting of effects on knowledge, sensitivity and skill, allowing educators to observe the effects in each of these aspects of cultural competence. Third, it examines if the impact varies depending on student characteristics, which is crucial in determining who should be a part of the programme and how it should be modified.

This study was designed to assess the impact of a transcultural training programme on cultural competence of nursing students in Karachi, Pakistan with quasi-experimental pre-test and post-test design with intervention group and control group. Based on the conceptual model, two hypotheses were tested. The first hypothesis (H1) was that the programme increases cultural knowledge, cultural sensitivity and cultural skill in comparison to baseline and compared to the control group. The second hypothesis (H2) was that the impact of the programme varies according to gender, age, level of education and previous multicultural clinical experience.

2. METHODS

2.1 Study design

A quasi-experimental pre-test/post-test design with a non-equivalent control group was adopted to assess the effect of a transcultural training programme on the cultural competence of nursing students. The programme was given to students in the intervention group, and students in the control group continued with their regular curriculum. Both groups filled out the same questionnaire at the beginning and end of the programme. The study is reported following the Transparent Reporting of Evaluations with Nonrandomized Designs (TREND) statement (Des Jarlais et al., 2004). The conceptual framework was based on the Campinha-Bacote model of cultural competence (Campinha-Bacote, 2002) and Adult Learning Theory (Knowles et al., 2015).

2.2 Setting and participants

The study was conducted in a large and culturally diverse city of Karachi in Pakistan, where students of nursing were studied. The planned sample was 400 students, of which 200 were in the intervention group, and 200 were in the control group. Students were from three educational pathways: Diploma in Nursing, Generic Bachelor of Science in Nursing (BSN), and Post-RN BSN programmes.

Students could be included if they had been in one of these programmes, were willing to participate, and filled in the questionnaire at both measurements. Students who were unable to take both measurements were excluded from analysis. The sample size of 200 was selected to provide enough power to detect medium-sized effects and to conduct moderation analysis across subgroups, consistent with the general guidelines for power analysis (Cohen, 1988; Faul et al., 2007). Since participants were not randomly assigned, pre-group differences were explored and reported in the Results.

2.3 Intervention

The intervention group was given a transcultural training programme that aimed to increase the three components of cultural competence which were assessed in this study: cultural knowledge, cultural sensitivity and cultural skill. In keeping with the Campinha-Bacote model, the programme was based on the view that cultural competence is a process of becoming, which involves awareness, knowledge, skill, encounters and desire. Its teaching methods were based on Adult Learning Theory, which holds that adult learners are self-directed, bring prior experience to their learning, and learn best when content is relevant to their practice (Knowles et al., 2015). The teaching was interactive and practice-oriented, enabling students to tie new content to their own clinical experience. Attendance was taken to describe the amount of programme received by students. The regular curriculum was provided to the control group without any extra transcultural training for the duration of the study.

2.4 Instrument

Two questionnaires were used for data collection. Part A gathered background information on gender, age, level of education (Diploma in Nursing, Generic BSN, or Post-RN BSN), previous multicultural clinical experience (yes or no), marital status, and other background items.

Part B consisted of the 20-item Nurse Cultural Competence Scale (NCCS) created by Perng and Watson (2012) to assess nursing students' cultural competence. The scale was based on a longer item pool and was Mokken-scaled, placing items in order of increasing difficulty. The items were adapted to Turkish according to the scale (Gözüm et al., 2016). All items are rated on a 5-point agreement scale (1 = strongly disagree, 5 = strongly agree). The total score is from 20 to 100; higher scores reflect greater cultural competence. Three dimension scores were obtained by summing items: cultural knowledge (items 3, 9, 11, 12, 13 and 15; range 6 to 30), cultural sensitivity (items 17 and 20; range 2 to 10) and cultural skill (items 1, 2, 4, 5, 6, 7, 8, 10, 14, 16, 18 and 19; range 12 to 60). In the present sample, the internal consistency of the total scale and both knowledge and skill subscales was checked using the usual guidelines for Cronbach's alpha (Tavakol & Dennick, 2011). Since the sensitivity dimension has only two items, Cronbach's alpha can not be used as an index. The inter-item correlation and the Spearman-Brown coefficient were reported for this dimension instead (Eisinga et al., 2013).

2.5 Procedure and ethical considerations

The study received ethical approval from the relevant institutional ethics committee and permission to undertake data collection from the institutions involved. Students received an information sheet prior to data collection, which included information about the purpose of the study, procedures, voluntary participation, the right to withdraw at any time without penalty, and the confidentiality of their responses. All students gave written informed consent. The study followed the principles of the Declaration of Helsinki (World Medical Association, 2013).

All participants in both groups took a pre-test prior to the programme. The intervention group was then given the programme. Both groups completed the same questionnaire for the post-test at the end of the programme. Students were assigned a coded identifier to ensure that responses to the pre-test and post-test did not contain names. Paper questionnaires were filled out and checked for completion upon return. Matched pre-test and post-test pairs were analysed.

2.6 Data analysis

Data were analysed with IBM SPSS Statistics. The level of statistical significance was determined at $\alpha = .05$ (two-tailed). The dimension and total scores were calculated as described above. Means and standard deviations were used for continuous variables, and frequencies and percentages for categorical variables.

Independent-samples t-tests were used to determine baseline equivalence for continuous variables (age, pre-test scores), and chi-square tests were used for categorical variables (gender, education level, multicultural experience, and other background items). The Shapiro-Wilk test, histograms, and Q-Q plots were used to assess normality, while Levene's test was used to assess equality of variances. If the variances were different, the results were confirmed using either a Welch t-test or heteroscedasticity-consistent (HC3) standard errors.

The change within each group from pre-test to post-test was tested using paired-samples t-tests, and differences between the groups at post-test were tested using independent-samples t-tests for the first hypothesis. The primary test of programme effect was a mixed design ANOVA with time (pre-test, post-test) as the within-subjects factor, and group as the between-subjects factor, where the Time × Group interaction indicated whether there were differences in change between groups. Since participants were not randomised, an analysis of covariance (ANCOVA) was then conducted on the post-test scores with the group as the factor and the pre-test score as the covariate (Miller & Chapman, 2001). The assumptions of ANCOVA were examined: normality of residuals (Shapiro-Wilk test); equality of error variances (Levene's test); and homogeneity of regression slopes (Group × Pre-test interaction). The ANCOVA was performed again for each of the three measures of knowledge, sensitivity, and skill.

Moderation was tested in separate ANCOVA models for the second hypothesis. The group effect and one of the moderators and its interaction were included in each model, with the pre-test total score as a covariate. Gender, level of education, and previous clinical experience with multicultural patients and age (centred on its mean) were the moderators. The difference between the programme effect and the moderator effect was interpreted as a significant Group × moderator interaction. The mean change in each subgroup in the intervention group was reported for significant interactions. One-way ANOVA and Bonferroni post hoc comparisons were conducted for differences in change for the three levels of education.

All main tests were reported in terms of effect size, Cohen's d for t-tests (Cohen, 1988; Lakens, 2013) and partial eta squared for ANOVA and ANCOVA, as well as 95% confidence intervals for mean differences. Values around 0.2, 0.5 and 0.8 were interpreted as small, medium and large, respectively, and partial eta squared values around 0.01, 0.06 and 0.14 were interpreted in the same way (Cohen, 1988). For paired tests, d was the mean change divided by the standard deviation of the change scores, and for independent tests, the mean difference divided by the pooled standard deviation.

2.7 Rationale for the analytic strategy

Several analyses were employed since each addresses a different question. Paired tests are used to determine if a group changed, but they cannot determine if the change is greater than the change in a comparison group. The mixed ANOVA corrects for this by examining the interaction between the two factors (Time × Group). Because

the groups were not randomly formed, the post-test scores of the groups at the same pre-test level were compared using ANCOVA. It was centred at the mean age before it was added to the moderation model, so that the group effect could be read at the mean age of the sample. As a check, robust standard errors were used, since it is not assumed that the errors are equal if one group changes more than the other. Analyses were conducted on the overall score, and on each dimension separately, as a programme may increase knowledge more than attitudes or skills.

3. RESULTS

3.1 Sample and baseline equivalence

The results are presented in the order of the hypotheses. The first part of the report outlines the sample and examines the baseline comparability of the groups. The second and third parts of the test determine if the programme affected cultural competence within and between groups (H1). The fourth part shows the adjusted analyses and checks, and the last part tests whether the effect varied by student characteristic (H2).

All 200 students took both measurements, 100 in the intervention group and 100 in the control group. The attendance rate for intervention students was 88.9% (SD = 7.5, range 73 to 100) of the programme sessions. The two groups were compared with respect to their characteristics as presented in Table 1. The groups did not differ significantly in gender, $\chi^2(1) = 0.11$, p = .741, level of education, $\chi^2(2) = 3.98$, p = .137, previous multicultural clinical experience, $\chi^2(1) = 0.19$, p = .667, marital status, $\chi^2(1) = 1.59$, p = .207, or place of residence, $\chi^2(1) = 1.02$, p = .313. The only baseline difference was age, with the intervention group slightly younger (M = 22.86 years) than the control group (M = 23.64 years), t(198) = 2.20, p = .029, d = 0.31. Pre-test total scores were very similar (intervention M = 64.90, SD = 12.88; control M = 64.64, SD = 11.83), t(198) = 0.15, p = .882, and similar were the pre-test scores on each dimension (all p > .55), which is why the groups started at the same level of cultural competence. Age was considered a possible confounder and was also analyzed as a moderator (see Section 3.5).

This sample had a high internal consistency on the scale. The total scale alpha was .94 at pre-test and .96 at post-test; knowledge was .84 and .86 at pre-test and post-test, and skill was .90 and .93 at pre-test and post-test. Pre-test inter-item correlation for two items of the sensitivity dimension was r = .44 (Spearman-Brown = .61), and post-test was r = .59 (Spearman-Brown = .74).

Table 1: *Characteristics of the Intervention and Control Groups at Baseline*

Characteristic	Intervention (*n* = 100)	Control (*n* = 100)	Test
Age in years, *M* (SD)	22.86 (2.37)	23.64 (2.63)	$t(198) = 2.20$, $p = .029$
Gender, female, *n* (%)	75 (75.0)	77 (77.0)	$\chi^2(1) = 0.11$, $p = .741$
Education level, n (%)			
Diploma in Nursing	35 (35.0)	35 (35.0)	
Generic BSN	53 (53.0)	43 (43.0)	$\chi^2(2) = 3.98$, $p = .137$
Post-RN BSN	12 (12.0)	22 (22.0)	
Previous multicultural clinical experience, *n* (%)	40 (40.0)	43 (43.0)	$\chi^2(1) = 0.19$, $p = .667$
Married, *n* (%)	10 (10.0)	16 (16.0)	$\chi^2(1) = 1.59$, $p = .207$
Lives in Karachi, *n* (%)	56 (56.0)	63 (63.0)	$\chi^2(1) = 1.02$, $p = .313$
Pre-test total score, *M* (SD)	64.90 (12.88)	64.64 (11.83)	$t(198) = 0.15$, $p = .882$

Note. M = mean; *SD* = standard deviation; BSN = Bachelor of Science in Nursing. Chi-square tests compare the distribution of categories across groups.

3.2 Within-group changes

Table 2 presents the results of paired-samples t-tests, indicating an improvement in both groups from pre-test to post-test. In the intervention group, the total score rose from 64.90 to 77.85, t(99) = 16.74, p < .001, with a very large effect (d = 1.67). All three dimensions improved significantly: knowledge (d = 1.24), sensitivity (d = 0.91), and skill (d = 1.56), all p < .001. In the control group, the total score rose by a much smaller amount, from 64.64 to 66.45, t(99) = 3.37, p = .001, with a small effect (d = 0.34). This gain came from skill, t(99) = 3.27, p = .001, d = 0.33, whereas knowledge, t(99) = 1.70, p = .092, and sensitivity, t(99) = 0.37, p = .711, did not change significantly. The slight improvement in the control group could be attributed to the normal learning process in clinical training, or to a practice effect in taking the questionnaire.

Table 2: *Pre-Test and Post-Test Cultural Competence Scores by Group*

Dimension	Pre-test *M* (SD)	Post-test *M* (SD)	Change	*t*(99)	p	d
Intervention group (n = 100)						
Total score	64.90 (12.88)	77.85 (13.90)	12.95	16.74	< .001	1.67
Knowledge	19.69 (4.33)	23.53 (4.21)	3.84	12.40	< .001	1.24
Sensitivity	6.55 (1.60)	7.92 (1.70)	1.37	9.12	< .001	0.91
Skill	38.66 (7.67)	46.40 (8.54)	7.74	15.59	< .001	1.56
Control group (n = 100)						
Total score	64.64 (11.83)	66.45 (11.86)	1.81	3.37	.001	0.34
Knowledge	19.35 (3.77)	19.78 (3.82)	0.43	1.70	.092	0.17
Sensitivity	6.59 (1.55)	6.64 (1.55)	0.05	0.37	.711	0.04
Skill	38.70 (7.29)	40.03 (7.38)	1.33	3.27	.001	0.33

Note. Change = post-test mean minus pre-test mean. *d* = mean change divided by the standard deviation of the change scores.

3.3 Between-group differences

The intervention group had significantly higher scores than the control group on the total score and each dimension on the independent-samples t-tests at post-test (Table 3). The difference was large for the total score (77.85 versus 66.45), $t(198) = 6.24$, $p < .001$, $d = 0.88$. Differences were also large for knowledge (23.53 versus 19.78, $d = 0.93$), sensitivity (7.92 versus 6.64, $d = 0.79$), and skill (46.40 versus 40.03, $d = 0.80$), all $p < .001$. The change score was compared with Welch's test because unequal variances were detected with levene's test for total score. The intervention group gained 12.95 points on average against 1.81 points in the control group, $t(176.49) = 11.83$, $p < .001$, $d = 1.67$.

Table 3: *Post-Test Differences Between the Intervention and Control Groups*

Dimension	Intervention *M* (SD)	Control *M* (SD)	*t*(198)	p	d
Total score	77.85 (13.90)	66.45 (11.86)	6.24	< .001	0.88
Knowledge	23.53 (4.21)	19.78 (3.82)	6.60	< .001	0.93
Sensitivity	7.92 (1.70)	6.64 (1.55)	5.57	< .001	0.79
Skill	46.40 (8.54)	40.03 (7.38)	5.64	< .001	0.80
Change in total score	12.95 (7.73)	1.81 (5.37)	11.83†	< .001	1.67

Note. d = mean difference divided by the pooled standard deviation. a Welch's t-test, df = 176.49, because the variances were unequal.

3.4 Mixed ANOVA and ANCOVA

The mixed-design ANOVA showed a significant main effect of time, $F(1, 198) = 245.64$, $p < .001$, and a significant Time × Group interaction, $F(1, 198) = 139.93$, $p < .001$, partial $\eta^2 = .41$. The interaction indicated that the improvement over time was greater in the intervention group than in the control group (Figure 1).

Post-test total scores were analyzed using an ANCOVA with pre-test total as the covariate to account for pre-test differences (Table 4). Even after adjustment, the intervention group still scored significantly higher than the control group, $F(1, 197) = 144.75$, $p < .001$, partial $\eta^2 = .42$. The adjusted means were 77.73 (SE = 0.66) for the intervention group and 66.57 (SE = 0.66) for the control group, a difference of 11.17 points (95% CI [9.34, 13.00]). The same result was obtained using separate ANCOVAs for each dimension. The intervention group scored significantly higher on knowledge, $F(1, 197) = 87.49$, $p < .001$, partial $\eta^2 = .31$, on sensitivity, $F(1, 197) = 50.56$, $p < .001$, partial $\eta^2 = .20$, and on skill, $F(1, 197) = 102.76$, $p < .001$, partial $\eta^2 = .34$. All results were still significant following a Bonferroni correction for three dimension tests.

Homogeneous regression slopes were found for the total score, $F(1, 196) = 0.002$, $p = .966$, and for each dimension (all $p > .44$). The residuals were normally distributed (Shapiro-Wilk $W = .995$, $p = .747$). An unequal-error-variance test (Levene) revealed unequal error variances for the total-score model, $F(1, 198) = 13.50$, $p < .001$. Therefore, the group effect was re-estimated using robust (HC3) standard errors, and remained highly significant ($t = 11.91$, $p < .001$, 95% CI [9.32, 13.02]). The three-dimensional models were not significant for Levene's tests (all $p > .05$).

Table 4: *ANCOVA of Post-Test Scores With the Matching Pre-Test Score as Covariate*

Dimension	Adjusted M intervention (SE)	Adjusted M control (SE)	*F*(1, 197)	p	ηp²	Slope test p
Total score	77.73 (0.66)	66.57 (0.66)	144.75	< .001	.42	.966
Knowledge	23.40 (0.26)	19.91 (0.26)	87.49	< .001	.31	.445
Sensitivity	7.93 (0.13)	6.63 (0.13)	50.56	< .001	.20	.996
Skill	46.42 (0.45)	40.01 (0.45)	102.76	< .001	.34	.528

Note. ηp² = partial eta squared. The slope test is the Group × Pre-test interaction; a non-significant result means the regression slopes were parallel.

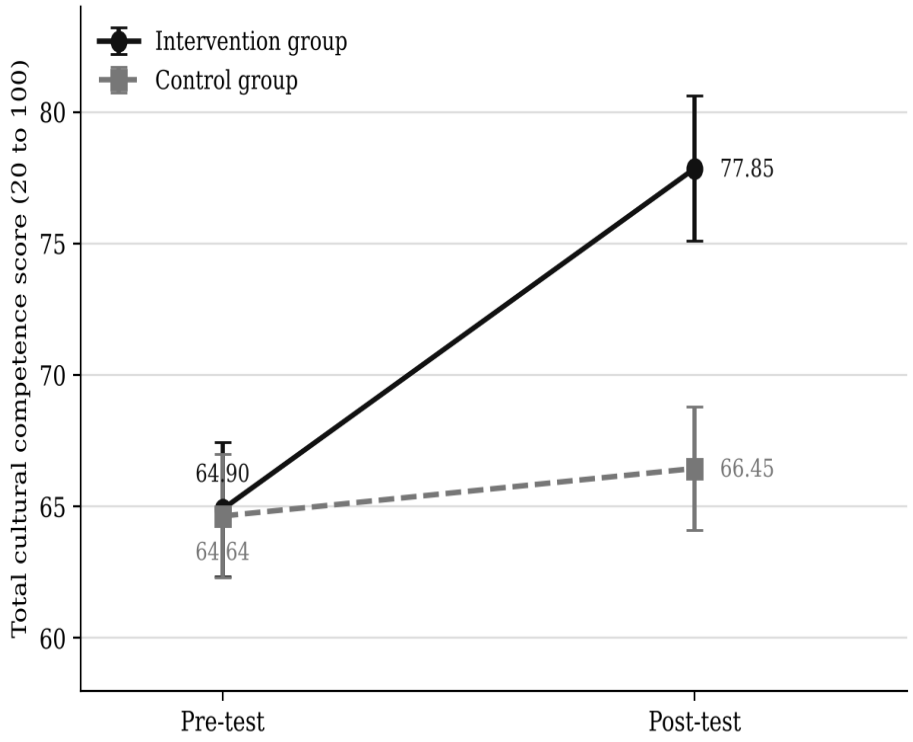


Figure 1. Mean total cultural competence score at pre-test and post-test, by group. Error bars show 95% confidence intervals.

3.5 Moderation by gender, education, experience and age

The effect of the programme was compared across student characteristics in four ANCOVA models (Table 5). The effect did not differ by gender, Group × Gender F(1, 195) = 0.65, p = .422, partial η² = .003. Men gained 11.84 points and women 13.32 points on average in the intervention group. The effect did differ by level of education, Group × Education F(2, 193) = 7.85, p = .001, partial η² = .075. In the intervention group, mean gains were largest for Diploma students (16.66), smaller for Generic BSN students (12.02), and smallest for Post-RN BSN students (6.25), F(2, 97) = 10.64, p < .001. Bonferroni comparisons indicated that all three groups were significantly different from each other (p < .05): Diploma versus Generic BSN, Diploma versus Post-RN BSN, and Generic BSN versus Post-RN BSN.

The effect was also moderated by previous clinical experience with multicultural patients (Group × Experience F(1, 195) = 12.82, p < .001, partial η² = .062). Students who had no experience earned 15.48 points, while students who had experience earned 9.15 points. Finally, the effect differed by age, Group × Age F(1, 195) = 11.29, p = .001, partial η² = .055. The programme effect was smaller with each additional year of age (b = −1.23, SE = 0.36). Therefore, the programme benefited younger students more than the older students.

In conclusion, the findings support the first hypothesis that the programme contributed to an increase in cultural knowledge, sensitivity and skill compared to baseline and compared to the control group and that the increase was stable across the checks conducted. The second hypothesis was partially confirmed: the effect was not gender specific, but was different by level of education, previous multicultural clinical experience, and age.

Table 5: *Moderation of the Programme Effect by Student Characteristics*

Moderator	Group × moderator	p	ηp²	Mean change in intervention group
Gender	$F(1, 195) = 0.65$	.422	.003	Male ($n = 25$) 11.84; Female ($n = 75$) 13.32
Education level	$F(2, 193) = 7.85$	.001	.075	Diploma ($n = 35$) 16.66; Generic BSN ($n = 53$) 12.02; Post-RN BSN ($n = 12$) 6.25
Multicultural experience	$F(1, 195) = 12.82$	< .001	.062	No ($n = 60$) 15.48; Yes ($n = 40$) 9.15
Age (centred)	$F(1, 195) = 11.29$	.001	.055	Interaction $b = -1.23$, $SE = 0.36$ per year

Note. Each row is a separate ANCOVA with the pre-test total score as covariate. ηp² = partial eta squared. Age was centred on its mean.

4. DISCUSSION

4.1 Effect of the programme on cultural competence

The aim of the study was to find out whether a transcultural training programme enhances the cultural competence of nursing students in Karachi and whether there is differential benefit between the students. The results are consistent with the first hypothesis. The intervention group showed large gains in total cultural competence and in knowledge, sensitivity, and skill, and these gains remained after adjustment for pre-test scores, the approach recommended when groups are not randomised (Miller & Chapman, 2001). When compared to the control students, intervention students had about 11 points higher at the same starting level, which is considered a large effect by conventional standards (Cohen, 1988). The control group also improved slightly, on the total score and on skill only, which is most likely explained by ordinary learning during clinical training or by familiarity with the questionnaire.

The gains across each of the three dimensions align with the Campinha-Bacote model that cultural competence is a result of knowledge, skill, and related attributes (Campinha-Bacote, 2002). They also support the argument that interactive, practice-based teaching is suited to the adult learner who has their own clinical experience to draw upon (Knowles et al., 2015). However, the programme was tested as a package, and the data cannot demonstrate which part of the programme caused the gains. The effect was somewhat smaller for sensitivity (partial $\eta^2 = .20$) than for knowledge (.31) and skill (.34). Attitudes are more likely to change than information or practical ability, and were measured with less precision than the latter, with only 2 items for measuring sensitivity. This comparison must be taken with a grain of salt.

The measure employed here is restricted to knowledge, sensitivity, and skill, and is only one of the domains that have been discussed in the recent reviews of cultural competence (Skaria et al., 2025). Awareness, encounters, and desire were not assessed independently, and a wider range of outcomes may react differently to the same programme.

One should also ask how extendable the design is for a causal reading. The control group is used to eliminate some alternative explanations. The gains would have been expected to be due to maturation during the school year, to repeated testing, or from general clinical experience, and the control group did not show such gains. The pre-test equivalence of the groups, and the ANCOVA adjustment, reduce the likelihood of selection bias. Random assignment gives the researcher some degree of confidence that the groups were not different in some unmeasured characteristic, such as motivation, as the results are interpreted as strong evidence of an effect rather than proof of the size of the effect.

There was also a high level of attendance, with intervention students attending approximately 90% of sessions on average. Therefore, the results represent a programme which was delivered almost entirely to the majority of students. The impact may be less if there were fewer pupils attending in normal teaching, and schools should take care to plan for regular attendance when the programme is implemented.

4.2 Relation to earlier work

It has been stated that cultural competence is a key element of inclusive, equitable and respectful care (Baig & Mumtaz, 2025). The present results demonstrate that it is possible to significantly raise it in a structured educational programme. They align with the argument that nursing education can change practices of patient care to be responsive to cultural differences (Rehder, 2021). Clear gaps in cultural competence training among health professionals from a scoping review of training in low- and middle-income countries (Bolarinwa & Nkansah, 2025). This work provides evidence from a Pakistani context and demonstrates the effectiveness of a programme in a nursing student context.

The items on the scale ask students if they can explain, teach, and implement culturally appropriate care, and the scores are based on perceptions as well as knowledge. Therefore, the high scores on the skill items in this study may reflect increased self-confidence, and this study is similar to the research on self-efficacy in culturally competent care among foreign nurses (Presley & Mokoboto-Zwane, 2023). The findings also apply to the nurses working with South Asian women, who have been identified as needing culturally competent perinatal care (Sandhu, 2010). The programme tested here could be expanded to interprofessional clinical supervision (Manaf & Ba-Break, 2026), and diversity and cultural competence have been discussed in relation to this. Lastly, the

evaluation of cultural competence, as performed in this study, with a brief validated instrument, is a feasible method to track progress by specialty, as previously emphasized in psychiatric care (Kallakorpi, 2025).

4.3 For whom the programme works best

The second hypothesis was partially confirmed. The programme was effective for both men and women and can be used in mixed classes. This conclusion is limited by the small number of men, which reduces the power to detect a difference.

This impact was greater for Diploma students than for Generic BSN students, and least for Post-RN BSN students. It was also bigger for students who had no previous clinical experience with multicultural patients, and for younger students. One reason is that the more experienced and older students, who are likely to be Post-RN students, have already acquired some of this content through practice, and thereby have less need for an introductory programme. The other is that the content might have been pitched for beginners. None of these data can determine which of these explanations is correct. Since age, education, and experience are also related to each other, it is not possible to fully separate their separate contributions in a design which tests one moderator at a time.

On a practical level, the findings imply that the programme should be introduced at an early stage in training, when the students have the most to gain, and that an advanced version of the programme should also be offered for more experienced students and Post-RN students, to provide challenge. The smallest subgroup gain, for Post-RN students, was positive, indicating that the programme remains of value for them, albeit perhaps on a different level of content.

4.4 Implications for nursing education

Nursing schools in Karachi and other multicultural environments may incorporate a formal transcultural component into their curriculum, using participatory approaches and integrated with clinical experiences involving patients from diverse communities. The module and the scale could be taken as a foundation for the development of common standards in cultural competence education by nursing councils and institutions. It would also be helpful if faculty who teach the module were prepared in transcultural nursing to ensure consistency of the content.

The findings also provide a practical means for teachers to determine who is most in need of the programme. Using a short baseline measurement with the scale can indicate which classes begin with low scores and may benefit the most. Repeat measurement following the programme provides an easy method for each school to assess the effectiveness of the teaching and make enhancements between cohorts. Because of the size of the effect, the policy makers would be interested to know that a relatively brief and systematic investment in teaching can bring about measurable change in the cultural competence of future nurses.

4.5 Directions for future research

Future studies should be conducted using a cluster-randomised or randomised design to overcome the major limitation of the present design. Several months after the programme, follow-up measurements would indicate whether the gains are maintained as students enter into clinical practice. Scores other than self-report, like ratings from clinical supervisors or patient experience, would reveal the effects of higher scores on outcomes of care. Qualitative research might focus on why younger students and students with no prior experience benefit more and what advanced content has to offer to experienced students. Lastly, research in other provinces and other health disciplines would demonstrate the extent to which the results are applicable.

5. LIMITATIONS

This study has a number of limitations. Although the pre-test scores were very similar and the analysis was adjusted for pre-test scores, participants were not randomly assigned, which means that unmeasured differences between the groups may have influenced the results. There was also a slight difference in age at baseline between the groups, which was not controlled for in the main model. Second, cultural competence was assessed using a self-report instrument, which is based on one's perception of competence and can be influenced by social desirability. Thirdly, the post-test was conducted shortly after the programme, and it is not possible to determine whether the benefits are sustainable in the longer term. Fourth, the study was carried out in one city, and results may differ in other regions. Fifth, there are only two items in the sensitivity dimension. Sixth, the moderation analyses were exploratory, were run one moderator at a time, and some subgroups were small, particularly Post-RN students and male students. Seventh, there may have been some sharing between students from different groups, which would, if anything, have lessened the difference between groups as measured. Eighth, attendance was measured, but the relationship between number of sessions attended and size of the gain was not explored, and thereby the dose of the programme required for an effect is unknown. Lastly, the scale was used with items translated into Turkish and was highly internally consistent in this sample, but further evidence of the structure of the scale in Pakistani students would enhance future research.

6. CONCLUSIONS

The Adult Learning Theory, which is the core of the Campinha-Bacote model, proved to be effective in enhancing the cultural knowledge, sensitivity, and skills of nursing students in Karachi, as compared to a control group, which showed only minimal improvements. The impact was greatest on younger students, those with a Diploma education and no prior multicultural clinical experience, and was not different between males and females. The results of this study indicate that structured transcultural training should be incorporated into the nursing

curriculum, with more complex material for more experienced students. Future research should incorporate cluster or randomisation designs and follow-up to understand the sustainability of the gains, as well as whether improved student competence results in improved patient experience.

DECLARATIONS

Data availability. The data supporting the findings of this study are available from the corresponding author on reasonable request.

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