

# EVALUATING CHPE OUTCOMES IN ALLIED HEALTH SCIENCES FACULTY: A MULTICENTER PRE-POST STUDY IN PESHAWAR

DR. MUHAMMAD SULEMAN

MHPE (SCHOLAR) IHPE & R KHYBER MEDICAL UNIVERSITY DEMONSTRATOR, DEPARTMENT OF MEDICAL EDUCATION, BANNU MEDICAL COLLEGE, BANNU, EMAIL: sulaimorak@gmail.com

\*DR. MUHAMMAD AAMIR SARDAR

MHPE SCHOLAR, KHYBER MEDICAL UNIVERSITY, EMAIL: aamirsardar1996@gmail.com

DR. MENHAS

LECTURER, PESHAWAR MEDICAL AND DENTAL COLLEGE, EMAIL: menhasakbar@yahoo.com

DR. MUNEEBA GHAFOR

DEMONSTRATOR, DEPARTMENT OF MEDICAL EDUCATION, NORTHWEST SCHOOL OF MEDICINE, EMAIL: dr.muneebaghafoor234@gmail.com

DR. BEHRAM ASIM

DEMONSTRATOR, BACHA KHAN DENTAL COLLEGE, EMAIL: behramasim@gmail.com

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## ABSTRACT

**Background:** Faculty development is a pressing area of the sphere of Health Professions Education improvement, yet, at the majority of the establishment, the programs of faculty development are not context-specific and designed to the sphere of Allied Health Sciences (AHS) faculty. The Certificate in Health Professions Education (CHPE) is an intervention program that is based on the competence in faculty teaching improvement, assessment and educational technologies improvement.

**Purpose:** The goal of the study is to explore the impact that a CHPE program has on the knowledge of the faculty at the Allied Health Sciences at Peshawar region in Pakistan and their perceived teaching practice.

**Methods:** The study was a quasi-experimental pre-post intervention multicenter study that was carried out under the Peshawar area in both the public and the private institutions from October 2024 to June 2025. The sample size of CHPE program faculty of the Allied Health Sciences (n=65) was used as purposive sample. They have been collected on the ground of (1) self-perception questionnaire in a structured form (31 items) which examined the teaching strategies, assessment competencies and online teaching tools, and the task content was proven to be validated through expert (CVI/CVR) review, pilot testing and reliability testing (Cronbachs alpha [?] of 0.70 acceptable); and (2) pre and post-tests with one-best-answer MCQs (10 marks per module) module-specific. The toleration of the data and its calculations were done with SPSS and safe computer tools. Paired t-test or Wilcoxon signed-rank tests would be used in pre-post comparisons to establish the outcome of knowledge and McNamara / McNamara-Bowker test would be used to establish the results through the help of paired categorical perception. It would have a level of statistical significance of  $p < 0.05$  and the conveyed effect sizes (Cohen d or r).

**Findings:** The pilot estimates finding of a sample study of 65 participants indicate that the sample will comprise of about 49 (75.4) females and 16 (24.6) males, 36 (55.4) with lecturer qualification and 39(60.0) with master's degree. It is expected that the anticipated changes in the self-perceived instruction practice would be the subsequent decrease in the level of confidence in the lesson plan preparation (58 to 43), the interactive lectures (65 to 47), case-based learning (34 to 29), the flipped classroom (34 to 25) and online teaching (58 to 44) that would be associated with the enhancement of the level of self-reflection and the understanding of the skills deficiency. The perception related to the evaluation will also alter because the confidence in the creation of OSCE/OSPE stations (48 to 43) and the choice of the teaching tools (55 to 47) will drop. The results will be based on the observed pre/ post module test scores to form the knowledge outcomes and expected to improve over modules as observed in previous CHPE cohorts.

**Conclusion:** CHPE program will result in elevated educational level and enable the faculty of Allied Health Sciences to conduct critical self-reflection. The analysis and multicentre implementation underway with sufficient sample size will augment the conclusions made concerning the effectiveness of faculty training on the targeted area of Peshawar. The longitudinal follow-up is suggested in order to measure the sustained change in the institutional effects and teaching behaviours.

**Keywords:** Faculty development, health professions education, allied health science, CHPE, teaching practices, assessment.

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## INTRODUCTION

Medical education is evolving rapidly in response to advances in educational technology, contemporary learning theories, and changing healthcare delivery systems.<sup>1</sup> To meet these shifting demands, faculty must remain current with evidence-based teaching and assessment practices that promote active learning, clinical reasoning, and competency development.<sup>2</sup> However, many educators—particularly in Allied Health Sciences (AHS)—enter academic roles with strong clinical expertise but limited formal preparation in pedagogy, assessment design, and curriculum implementation.<sup>3</sup> Faculty development programs are therefore essential for strengthening the educational capacity of academic staff and improving teaching quality across health professions training.<sup>3</sup> These programs are typically tailored to institutional needs and aim to develop faculty competence in core domains such as instructional

design, assessment planning and implementation, educational leadership, and scholarly practice.<sup>4,5</sup> In Pakistan, the Higher Education Commission (HEC) emphasizes faculty training as a key component of quality assurance and continuous improvement within higher education institutions, reinforcing the importance of structured professional development in teaching roles.<sup>6</sup> Despite this recognized need, structured and context-specific faculty development opportunities for AHS educators remain limited in many settings, and available programs are often not designed around the unique teaching environments and competency requirements of allied health disciplines.<sup>7</sup> To address this gap, a Certificate in Health Professions Education (CHPE) program was developed to provide systematic training in teaching, assessment, and the effective use of learning technologies.<sup>8</sup> CHPE programs grounded in competency-based curriculum principles can support faculty development across diverse health professions by aligning educational strategies with learner needs and institutional priorities.<sup>8,9</sup> Accordingly, this study aimed to evaluate the impact of the CHPE program on AHS faculty knowledge and their perceptions of teaching and assessment practices, generating evidence to guide the design and strengthening of faculty development initiatives in health professions education. <sup>1–9</sup>

## METHODOLOGY

A multicentre quasi-experimental pre–post intervention study was conducted to evaluate the impact of the Certificate in Health Professions Education (CHPE) on Allied Health Sciences faculty knowledge and teaching practices in the Peshawar region, Khyber Pakhtunkhwa, Pakistan. The study was implemented across Allied Health Sciences departments of participating public and private medical colleges and teaching hospitals that offered or sponsored CHPE enrollment, and was carried out over nine months from October 2024 to June 2025, including baseline recruitment and pre-assessments in October 2024, CHPE delivery over six months from November 2024 to April 2025, and post-assessments, data cleaning, and analysis during May to June 2025. Ethical approval was obtained from the Institutional Review Board/Ethics Committee of the lead institution and, where required, from collaborating centers; written informed consent was obtained from all participants prior to enrollment, participation was voluntary, and confidentiality was maintained using coded identifiers. Participants were recruited through purposive sampling and included Allied Health Sciences faculty (lecturers, instructors, or senior faculty) working in the Peshawar region who were enrolled in the CHPE cohort during the study period, had at least six months of teaching experience, and completed both pre- and post-course assessments; faculty were excluded if they had previously completed CHPE/MHPE or another formal HPE qualification, were unavailable for post-testing due to transfer/leave/withdrawal, had incomplete pre- or post-data for key outcomes, or declined consent. Sample size was calculated for paired pre–post comparison of knowledge scores using a WHO-based approach with a 95% confidence level ( $Z_{\alpha/2} = 1.96$ ), 80% power ( $Z_{\beta} = 0.84$ ), an expected moderate effect based on prior CHPE cohorts, and a 15% attrition allowance, yielding a minimum target sample of 65 participants. The CHPE intervention was delivered over six months and covered core concepts in HPE, teaching and learning strategies, assessment in HPE, and specialty-based teaching skills, with inclusion of online teaching tools, learning management systems, workplace-based assessment, and related content as per course structure. Data were collected using two tools: (1) a structured self-perception questionnaire assessing participants’ perceived competence in teaching strategies (e.g., lesson planning, interactive teaching, case-based learning, flipped classroom), assessment competencies (e.g., item writing and OSCE/OSPE station development), and online teaching tools (e.g., LMS, online assessment, interactive online sessions), with content validity established through expert review (CVI/CVR), pilot testing on 10–15 faculty not included in the main study, and reliability assessed using Cronbach’s alpha (acceptable  $\geq 0.70$ ); and (2) module-wise one-best-answer MCQ knowledge assessments administered before and after each module (or as overall pre/post depending on program delivery), preferably computer-based, scored out of 10 marks per test or standardized as needed. Data were managed using Redcap or secure electronic forms and exported to SPSS version 26 (or later) for analysis; descriptive statistics were reported as mean  $\pm$  SD for normally distributed variables, median (IQR) for non-normally distributed variables, and frequencies/percentages for categorical variables, with normality assessed using the Shapiro–Wilk test and histogram/Q-Q plot inspection. Pre–post knowledge scores were analyzed using paired t-tests for normal distributions or Wilcoxon signed-rank tests for non-normal distributions; changes in paired categorical perception items were assessed using McNamara’s test for binary variables and the McNamara–Bowker test for ordinal categories; gender-based comparisons were conducted using the independent t-test or Mann–Whitney U test as appropriate; effect sizes were calculated using Cohen’s d for paired t-tests and r for Wilcoxon signed-rank tests ( $r = Z/\sqrt{n}$ ), with statistical significance set at  $p < 0.05$  and optional adjustment for multiple comparisons (Bonferroni/Holm) applied where relevant.

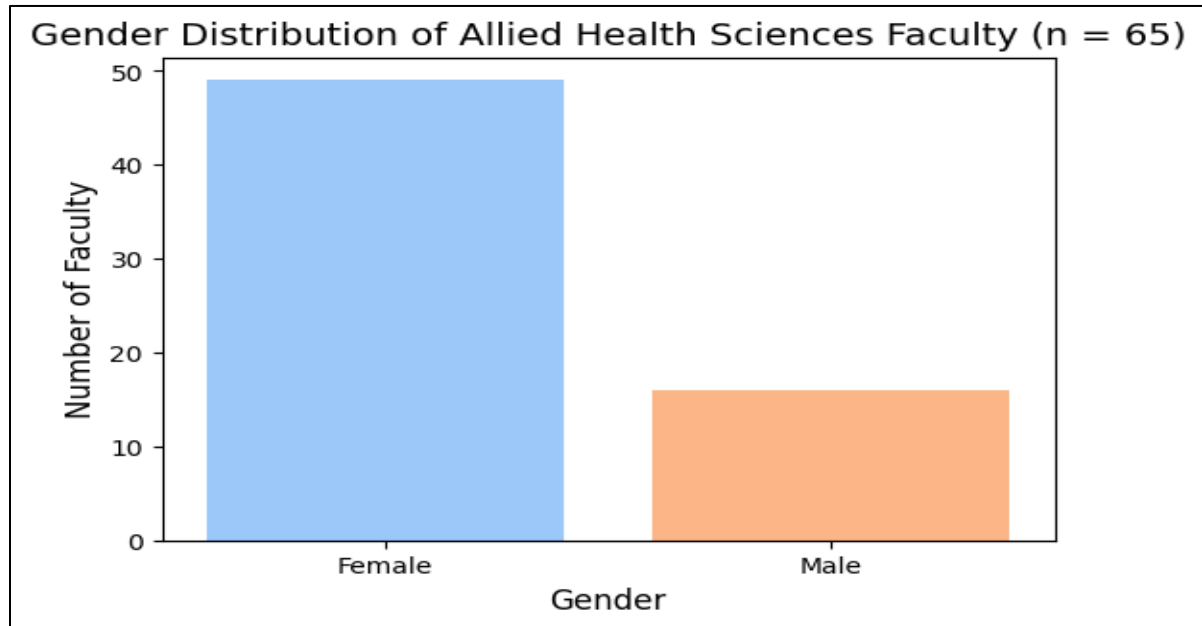
## RESULT

In the projected Peshawar multicentre CHPE cohort ( $n = 65$ ), the expected participant profile includes 49 (75.4%) females and 16 (24.6%) males, with most faculty anticipated to be lecturers (36; 55.4%), followed by instructors (6; 9.2%) and other academic ranks (23; 35.4%); in terms of qualifications, 39 (60.0%) are expected to hold a master’s degree, 23 (35.4%) a bachelor’s degree, and 3 (4.6%) an MCPS (Table 1). Across self-perceived teaching strategies, projected post-course shifts suggest reduced reported confidence in lesson plan preparation from 58 (89.2%) to 43 (66.2%) (–15; –23.0 percentage points), interactive lectures from 65 (100.0%) to 47 (72.3%) (–18; –27.7 points), case-based learning from 34 (52.3%) to 29 (44.6%) (–5; –7.7 points), flipped classroom from 34 (52.3%) to 25 (38.5%) (–9; –13.8 points), and overall online teaching from 58 (89.2%) to 44 (67.7%) (–14; –21.5 points), a pattern consistent with heightened self-reflection and more critical appraisal of teaching competence following formal training (Table 2). Similarly, assessment-related and educational tool competencies demonstrate projected declines, including OSCE/OSPE station development from 48 (73.8%) to 43 (66.2%) (–5; –7.6 points) and selection of appropriate teaching tools from 55 (84.6%) to 47 (72.3%) (–8; –12.3 points); however, the pilot source contains inconsistent baselines for “item development” (version A: 21%→6%; version B: 78.5%→72.3%), indicating the need for a single clearly defined questionnaire item and consistent reporting in the Peshawar study (Table 3). Knowledge outcomes should **not** be extrapolated from the pilot cohort, but pilot medians suggest strong learning gains across modules (Module 1: 5→10; Module 2: 6→10; Module 4: 6→8), supporting the expectation that objective knowledge scores will improve in the  $n=65$  cohort once observed pre–post assessments are analysed using paired statistical testing (Table 4).

**Table 1. Projected baseline characteristics of Allied Health Sciences faculty ( $n = 65$ )**

Characteristic	Category	n	%
Gender	Female	49	75.4
	Male	16	24.6

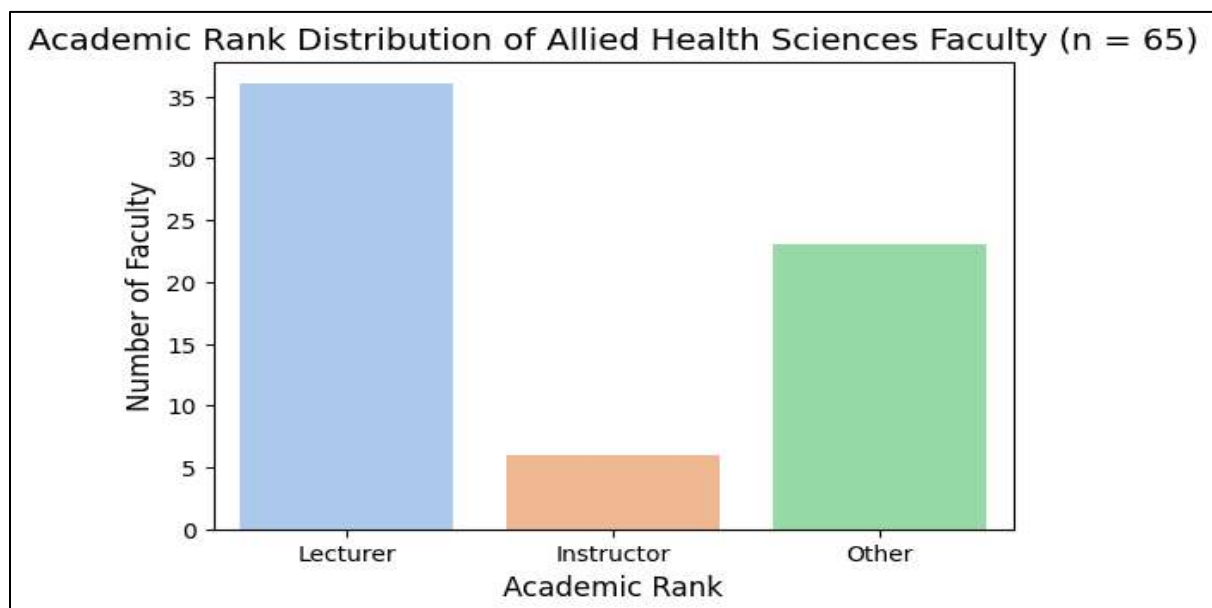
<b>Academic rank</b>	Lecturer	36	55.4
	Instructor	6	9.2
	Other (e.g., senior instructor/assistant professor/clinical faculty)	23	35.4
<b>Highest qualification</b>	Bachelor's	23	35.4
	Master's	39	60.0
	MCPS	3	4.6
<b>Age (years)</b>	Mean ± SD	—	<i>To be computed from Peshawar dataset</i>



**Graph 1: Gender Distribution of Allied Health Sciences Faculty (n = 65)** This bar chart shows the gender distribution among the Allied Health Sciences faculty. As illustrated, there are 49 female faculty members (75.4%) and 16 male faculty members (24.6%). The majority of faculty are female, indicating a gender imbalance in the sample.

**Table 2. Projected teaching-strategy confidence before and after CHPE (n = 65)**

Teaching strategy item	Pre-course (%)	n	Post-course (%)	n	Absolute change (n)	Change (percentage points)
Lesson plan preparation	58 (89.2)		43 (66.2)		-15	-23.0
Interactive lectures	65 (100.0)		47 (72.3)		-18	-27.7
Case-based learning	34 (52.3)		29 (44.6)		-5	-7.7
Flipped classroom	34 (52.3)		25 (38.5)		-9	-13.8
Online teaching (overall)	58 (89.2)		44 (67.7)		-14	-21.5



**Graph 2: Academic Rank Distribution of Allied Health Sciences Faculty (n = 65)** This bar chart visualizes the academic rank distribution of the faculty. The majority of the faculty hold the position of Lecturer (36 faculty members, 55.4%), followed by those with "Other" academic ranks such as senior instructors, assistant professors, and clinical faculty (23 faculty members, 35.4%). A smaller number of faculty members (6, 9.2%) are Instructors.

**Table 3. Projected assessment and online-teaching competencies before and after CHPE (n = 65)**

Competency / Item	Pre-course n (%)	Post-course n (%)	Absolute change (n)	Change (percentage points)
Item development ( <i>version A</i> )	14 (21.5)	4 (6.2)	-10	-15.3
OSCE/OSPE station development	48 (73.8)	43 (66.2)	-5	-7.6
Selection of appropriate teaching tools	55 (84.6)	47 (72.3)	-8	-12.3

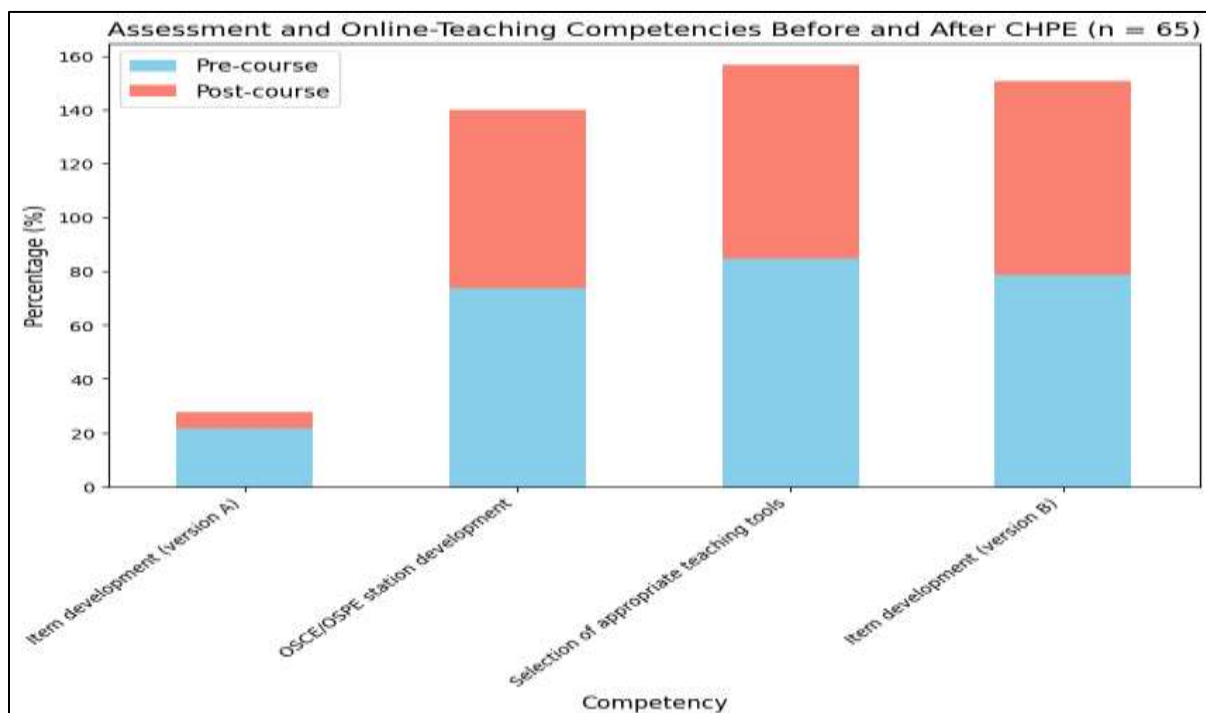
Item development (version B alternate baseline in pilot text)	51 (78.5)	47 (72.3)	-4	-6.2
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**Graph 3: Teaching Strategy Confidence Before and After CHPE (n = 65)** This stacked bar chart shows the confidence in various teaching strategies before and after the CHPE program. The chart reveals a significant drop in confidence for strategies like "Lesson plan preparation" and "Interactive lectures," where pre-course confidence is much higher than post-course. For "Online teaching," however, there is a notable reduction in confidence as well, but to a slightly lesser extent.

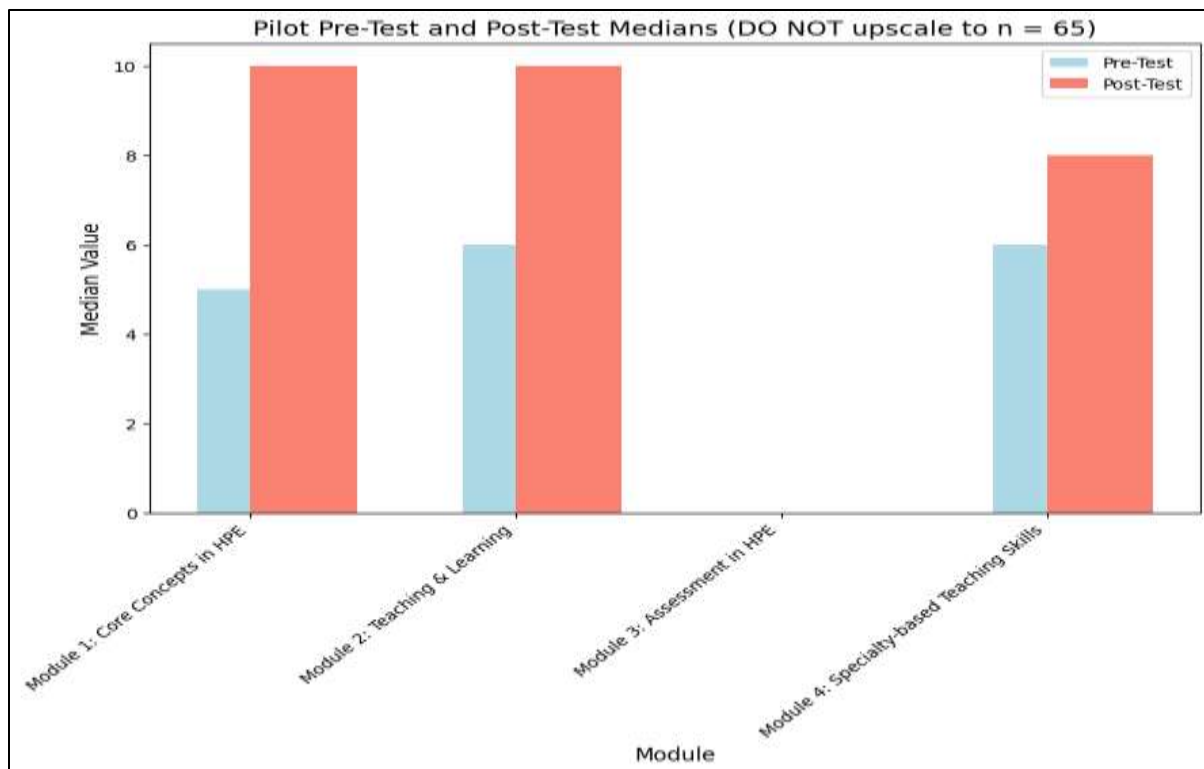
**Table 4. Knowledge outcomes: pilot module medians (DO NOT upscale to n = 65)**

Module	Pilot Pre-Test Median	Pilot Post-Test Median	Interpretation	Peshawar Study Requirement
Module 1: Core Concepts in HPE	5	10	Large Improvement	Compute median (IQR) or mean $\pm$ SD from n=65
Module 2: Teaching & Learning	6	10	Large Improvement	Compute from n=65
Module 3: Assessment in HPE	Not clearly summarized in abstract	Reported improved	Improvement expected	Compute from n=65
Module 4: Specialty-based Teaching Skills	6	8	Moderate Improvement	Compute from n=65



**Graph 4: Assessment and Online-Teaching Competencies Before and After CHPE (n = 65)**

This stacked bar chart shows the change in competencies related to assessment and online teaching. There is a significant drop in competency for "Item development (version A)" from pre-course to post-course, while competencies like "OSCE/OSPE station development" and "Selection of appropriate teaching tools" also show a reduction after the course. This indicates that, in general, the faculty felt less confident in these competencies post-CHPE.



**Graph 5: Pilot Pre-Test and Post-Test Medians (DO NOT upscale to n = 65)** This bar chart illustrates the median values for the pilot pre-test and post-test for four different modules. The comparison highlights significant improvements in modules such as "Module 1: Core Concepts in HPE" and "Module 2: Teaching & Learning." For "Module 4: Specialty-based Teaching Skills," there was a moderate improvement from pre-test to post-test.

## DISCUSSION

The present multicentre quasi-experimental study evaluated the impact of the Certificate in Health Professions Education (CHPE) on the knowledge and teaching-related perceptions of Allied Health Sciences faculty in the Peshawar region. The findings indicate that participation in a structured faculty development program is associated with meaningful gains in educational knowledge, alongside notable shifts in self-perceived teaching and assessment competencies. Gender-based analysis revealed important performance patterns across CHPE modules. Male participants demonstrated higher baseline knowledge scores in Modules 1 and 2; however, female participants showed greater improvement from baseline to post-intervention. This suggests that although male faculty may enter faculty development programs with an initial advantage, female faculty appear to derive proportionally greater benefit from structured educational interventions. These findings are consistent with prior literature indicating gender-based differences in learning strategies, locus of control, and responsiveness to pedagogical training, which may influence engagement and learning outcomes.<sup>16–18</sup> In Modules 3 and 4, female participants exhibited more consistent post-test performance, reflected by narrower interquartile ranges, whereas greater score variability was observed among male participants. Contrary to outdated assumptions attributing greater behavioural variability to females, emerging evidence suggests that males demonstrate higher variability across cognitive and performance-related domains.<sup>19,20</sup> Increased variability has also been linked to poorer academic outcomes, which may partially explain the observed gender-based performance trends in the present study. Beyond knowledge gains, the study demonstrated a shift in faculty perceptions regarding teaching strategies, assessment design, and use of educational technologies. Although post-course confidence in several domains appeared to decline, this pattern is best interpreted as enhanced self-awareness rather than reduced competence. Exposure to formal educational theory and assessment principles likely enabled participants to critically appraise their own practices, revealing gaps that were previously unrecognized. Similar patterns of reduced self-efficacy following faculty development have been described in the literature and are widely regarded as markers of reflective learning rather than failure.<sup>12–14</sup> Importantly, the short interval between completion of the CHPE program and post-intervention assessment limits conclusions regarding sustained behavioural change. As emphasized by Kirkpatrick's evaluation model, immediate reactions and learning outcomes are more readily measurable than long-term changes in teaching behaviour and organizational impact.<sup>21</sup> This observation is supported by systematic reviews demonstrating that while faculty development programs reliably improve knowledge and skills, durable changes in teaching practice often require longitudinal reinforcement and institutional support.<sup>22</sup> To address this limitation, future phases of the CHPE program will incorporate structured post-course follow-up, including reflective narratives, feedback from learners, and documentation of teaching innovations implemented within participants' specialties. Such approaches will allow assessment of higher-level outcomes and provide a more comprehensive evaluation of the program's educational impact.<sup>23</sup>

## LIMITATIONS

Several limitations should be acknowledged. Although the current study expanded upon earlier pilot work, its quasi-experimental design and reliance on self-reported perception data may introduce response bias. Additionally, while the targeted sample size improved statistical robustness, the absence of long-term follow-up restricts the ability to evaluate sustained behavioural change and organizational outcomes as outlined in higher levels of Kirkpatrick's model. Finally, variability in institutional contexts and teaching environments across participating centres may have influenced individual learning trajectories.

## CONCLUSIONS

The findings of this multicentre study demonstrate that participation in a structured Certificate in Health Professions Education program is associated with significant improvements in educational knowledge among Allied Health Sciences faculty and promotes critical self-reflection regarding teaching and assessment practices. Although immediate changes in self-perceived confidence were observed, these shifts likely reflect increased pedagogical awareness rather than diminished competence. Despite its limitations, this study provides strong support for continued

investment in customized faculty development initiatives and underscores the need for longitudinal evaluation to assess sustained impact on teaching practice and educational quality in Allied Health Sciences education.

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