Original Research

Open Access

Performance of Dental House Officers at a Single Training Institute in Karachi: A Retrospective Descriptive Analysis of Clinical Assessment, Continuing Professional Development, and Academic Output

[1]A. Zahid, [1]M. Zahid

[1]Akhtar Dental Surgery

Abstract

Background:
The one-year house job (compulsory rotating internship) is the final supervised stage of dental training in Pakistan before independent registration. Institutional evaluation records are a routine source of information on house-officer performance, but little has been published on how these records are composed or how points are distributed across their domains.

Objective:
To describe the year-end evaluation record of one cohort of dental house officers at a single training institute in Karachi.

Methods:
Retrospective, descriptive, cross-sectional record review of all eligible house officers who completed the one-year programme at private dental institute, Karachi in 2025-2026 and had a complete evaluation record (n = 19 of 23 enrolled). No sample size calculation was performed because the whole eligible cohort was included. Descriptive statistics, 95% confidence intervals, each domain's share of total points and exploratory Pearson correlations were computed

Results:
The mean composite score was 411.93 ± 52.11 (95% CI 386.8–437.0), i.e. 74.2% ± 9.4% of the maximum attainable 555.5 (range 299.30–471.68). The assessment score (mean 400.16 ± 51.36) contributed 97.1% of mean total points and CPD 2.8%; the four scholarly domains together contributed 0.04%, because each was recorded on a 0–0.10 scale.

Conclusion:
In this single-institution record, total scores were determined almost entirely by assessment marks because of how the composite is scored, not necessarily because house officers differed little in other domains. The findings describe one cohort and cannot be generalised to house officers in Karachi or Pakistan.

Keywords: *house officers; dental education; internship; workplace-based assessment; composite score; continuing professional development; Karachi; Pakistan*

1. Introduction

In Pakistan, graduates of the Bachelor of Dental Surgery (BDS) programme must complete a one-year supervised house job (internship) before full registration with the Pakistan Medical and Dental Council. This period is widely regarded as the bridge between undergraduate learning and independent practice, during which house officers are expected to consolidate clinical skills, take on greater patient-care responsibility and, depending on the institute, engage in continuing professional development (CPD) and scholarly activity such as journal clubs, workshops, posters and publications.

Most published evidence on the performance of Pakistani house officers is self-reported. A national survey of 862 dental students and new graduates from 27 dental schools, using the Dental Undergraduates Preparedness Assessment Scale (DU-PAS), reported self-perceived deficiencies in specific clinical and soft-skill items, for example in endodontics and radiography (1). A three-institution survey of 128 house officers found a mean self-rated overall score of 70/100 and lower self-

Corresponding Author:

Name: Aimen Zahid

Affiliation: Akhtar Dental Surgery

Email: aimen96@gmal.com

Date of Receiving: August 11, 2026

Date of Revision: September 22, 2026

Date of Acceptance: September 30, 2026

DOI: https://doi.org/10.69491/187w1b38

perceived competence than UK dental foundation trainees in 49 of 50 attributes (2). A mixed-methods study at a private institute in Karachi concluded that multiple rotations with repeated practice enhanced house officers' skills and confidence, with the least-practised procedures scoring lowest (3). Concerns about preparedness for independent practice have also been examined among medical house officers (4). These studies describe how house officers perceive themselves; they do not describe the assessment records that institutions themselves keep.

Workplace-based assessment (WPBA) — structured observation of trainees performing real clinical tasks, with feedback — is intended to assess the upper levels of Miller's pyramid, where "shows how" (performance in an observed setting) and "does" (actual practice) sit above "knows" and "knows how" (5). Its stated purpose is educational: to support learning through feedback, and its reliability and validity depend on how it is implemented (6). Pakistani authors likewise describe the primary purpose of WPBA as constructive feedback to trainees, within an assessment system that also includes examinations (7). Many observation tools exist: one systematic review identified 55 tools for direct observation of trainees with actual patients (8), so the choice of tool, and the evidence behind it, needs to be reported. In Pakistan, WPBA has been introduced at postgraduate and undergraduate levels, and trainee-perception studies in dental postgraduate programmes in Multan and Karachi report generally favourable views (9, 10). In UK dental foundation training, WPBA tools have been evaluated for their educational value and for the equity of the training experience they provide (11, 12). These studies examine how tools are perceived and used; they do not describe how assessment marks are combined into an institutional composite score. Where tools designed to generate feedback are converted into marks that contribute to a single ranked total, their formative and summative functions can become blurred, so the composition of such a total merits description.

CPD supports safe practice by maintaining skills and knowledge, but requirements vary between systems: in a survey of dental educators from 30 European Union countries, about half of the countries had a compulsory CPD system, while in the rest CPD was optional or based on recommended hours (13). Consensus work has also defined core CPD topics for European dentists (14) and guidelines for how dental schools should organise and quality-assure CPD (15). Whether workshops, CPD, posters and publications are required during the Pakistani house job, or are optional activities that depend on what an institute offers, is a matter of regulation and institutional policy. Structured opportunities appear to matter: in three house-officer cohorts at one Karachi dental college, participants in a journal club reported improved literature-search, presentation and confidence skills, although not improved biostatistics or critical-thinking skills (16).

To our knowledge, quantitative descriptions of institutional evaluation records for dental house officers in Pakistan have not been published. This study therefore describes the year-end evaluation record of one cohort of 19 house officers at a single institute in Karachi. Its aims were (i) to describe scores in each of six recorded domains, (ii) to quantify how many points each domain contributes to the composite total, and (iii) to describe participation in the optional scholarly domains. The analysis is descriptive and exploratory. It does not evaluate the validity of the underlying assessment tools, and it is not intended to represent house officers in Karachi or Pakistan.

2. Materials and Methods

2.1 Study design and setting

This was a retrospective, descriptive, cross-sectional analysis (record review) of the year-end evaluation records of house officers at a single dental training institute in Karachi, Pakistan for the academic year 2025-2026. Reporting was guided by the STROBE recommendations for cross-sectional studies (17).

2.2 Study population, eligibility and sample size

The study was a census of all eligible house officers in one annual cohort, not a sample drawn from a larger population. Inclusion criteria were: (i) enrolment in the institute's house-job programme during (2025-2026); (ii) completion of the full 12-month rotating programme; and (iii) a complete year-end evaluation record covering all six domains. Exclusion criteria were an incomplete or missing record, and freeze their house-job rotation. During the study period 23 house officers were enrolled; 4 were excluded due to long leave or medical purpose, leaving 19 for analysis. Because eligibility required completion of the year a complete record, the results describe completers only.

No a priori sample size calculation was performed. Such calculations, as used in survey-based national

studies (1), apply when a sample is drawn to estimate a population parameter; here the whole eligible cohort was analysed and the aim was description rather than hypothesis testing. Because 19 observations yield imprecise estimates, particularly of correlations (18), 95% confidence intervals are reported throughout and all correlations are treated as exploratory.

2.3 Evaluation instrument and domains

The institute's year-end record contains a single numerical score for each of six domains: (i) assessment score, reflecting supervisor-rated clinical performance across rotations; (ii) CPD score; (iii) workshop attendance; (iv) publication; (v) poster presentation; and (vi) academic achievement. The sum of these scores gives a composite total, with a maximum attainable value of 555.5 on the institutional scale. Table 1 summarises how each domain is constructed.

The stated nominal weights were 60% for the assessment score, 15% for CPD and 5% for each of the four scholarly domains. The recorded scores were analysed exactly as entered in the institutional record, and no re-weighting was applied.

The assessment score is treated in this study as an institutional composite of supervisor ratings. This study does not evaluate the validity or reliability of the underlying tools and makes no claim that the assessment score is a validated measure of competence. Validity is not a property of a tool but of the interpretation of its scores for a stated purpose, and it requires several sources of evidence (19), which an institutional record alone does not supply.

CPD, workshop attendance, publication, poster presentation and academic achievement were treated as enrichment domains. Because participation in these activities depends on the opportunities an institute provides as well as on individual effort.

2.4 Data collection and ethical considerations

Records were extracted into a spreadsheet byhouse jobcoordinator andre-identified before analysis: each house officer was assigned a study code, and names, roll numbers and dates were removed.

2.5 Statistical analysis

Data were analysed using SPSS version 26. For each domain and for the composite total we calculated the mean, standard deviation (SD), minimum, maximum and 95% confidence interval (CI) of the mean (t-distribution). Each domain's share of total points was calculated as its mean score divided by the mean total score. Each house officer's total was also expressed as a percentage of the maximum attainable score (555.5) and officers were ranked by total. Participation in the optional scholarly domains was defined as a non-zero recorded score, and proportions are presented with Wilson 95% CIs (20). Pearson correlation coefficients between each domain and the composite total are presented with 95% CIs (Fisher z transformation). Because each domain is a component of the total, such correlations are inflated by construction, especially for a domain that contributes most of the points; they are therefore descriptive. No adjustment was made for multiple comparisons, and p-values (threshold 0.05) are interpreted cautiously.

3. Results

Nineteen house officers' year-end evaluation records were analysed (all eligible house officers; see Section 2.2). The composite total score ranged from 299.30 to 471.68 out of a maximum attainable 555.5 (mean 411.93 ± 52.11, 95% CI 386.8–437.0, corresponding to 74.2% ± 9.4% of the maximum; median 432.75). Table 2 presents descriptive statistics for each domain and each domain's share of the mean total.

Table 2. Descriptive statistics of recorded domain scores and each domain's share of mean total points (n = 19)

Component	Mean	SD	Minimum	Maximum	95% CI of mean	Share of mean total (%)
Assessment score	400.16	51.36	290.10	457.80	375.4–424.9	97.14
CPD score	11.60	1.38	8.40	13.48	10.9–12.3	2.82
Workshop attendance	0.020	0.030	0.00	0.10	0.006–0.034	0.005
Publication	0.063	0.050	0.00	0.10	0.039–0.087	0.015
Poster presentation	0.068	0.048	0.00	0.10	0.045–0.091	0.017
Academic achievement	0.026	0.045	0.00	0.10	0.004–0.048	0.006
Total score (max 555.5)	**411.93**	**52.11**	**299.30**	**471.68**	**386.8–437.0**	**100**

SD, standard deviation; CI, confidence interval. Share = domain mean ÷ total mean. Shares sum to 100% within rounding.

3.1 Composition of the composite score

The assessment score contributed 400.16 of the 411.93 mean total points (97.1%) and CPD 11.60 points (2.8%). The four scholarly domains together contributed 0.177 points (0.04%): each was recorded on a scale with an observed maximum of 0.10, equal to 0.018% of the attainable total of 555.5. The stated nominal weights (60% for assessment, 15% for CPD and 5% for each scholarly domain) therefore did not correspond to the points actually recorded. The mean (400.16) and maximum (457.80) assessment scores also exceed 60% of the attainable total (333.3), so the assessment domain cannot have been capped at 60% of 555.5.

3.2 Assessment score

Assessment scores ranged from 290.10 to 457.80 (mean 400.16, SD 51.36, 95% CI 375.4–424.9; coefficient of variation 12.8%). The correlation between assessment score and total score was r = 0.9997 (95% CI 0.999–1.000). Because the assessment score makes up 97% of the total, this is a part–whole relationship that is expected by construction ($r^2 \approx 0.999$). It shows that ranking house officers by total score is nearly identical to ranking them by assessment score (Figure 1); it should not be read as evidence that clinical performance determined standing independently of the scoring scheme.

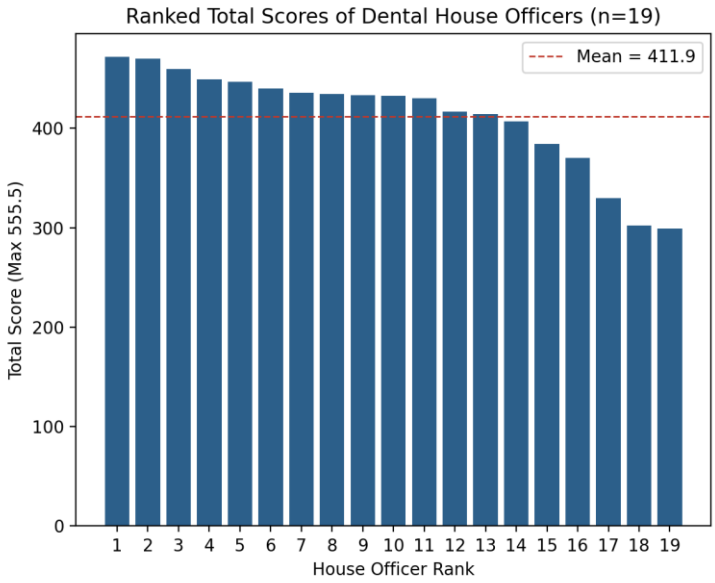


Figure 1. *Ranked total scores of the 19 house officers. The dashed line marks the mean (411.9); the maximum attainable score is 555.5.*

3.3 CPD and optional scholarly domains

The CPD score (mean 11.60 ± 1.38; coefficient of variation 11.9%) correlated moderately with the total (r = 0.53, 95% CI 0.10–0.79, p = 0.019). All 19 house officers (100%; 95% CI 83.2–100) had a non-zero CPD score. Participation in the optional scholarly domains was 36.8% for workshops (7/19), 63.2% for publications (12/19), 68.4% for posters (13/19) and 26.3% for academic achievement (5/19); confidence intervals were wide (Table 3, Figure 2). Correlations of these domains with the total were weak or inconsistent, with confidence intervals spanning zero (workshop r = 0.45; publication r = 0.15; poster r = −0.03; academic achievement r = 0.34). With n = 19, and with each domain contributing less than 0.02% of total points, these estimates provide no evidence for or against a relationship.

Table 3. Participation in optional domains and correlation of each domain with the total score (n = 19)

Domain	Non-zero score, n (%)	95% CI for %	r with total (95% CI)	p
Assessment score	—	—	0.9997 (0.999–1.000)*	<0.001
CPD score	19 (100)	83.2–100	0.53 (0.10–0.79)	0.019
Workshop attendance	7 (36.8)	19.1–59.0	0.45 (−0.01–0.75)	>0.05
Publication	12 (63.2)	41.0–80.9	0.15 (−0.33–0.57)	>0.05
Poster presentation	13 (68.4)	46.0–84.6	−0.03 (−0.48–0.43)	>0.05
Academic achievement	5 (26.3)	11.8–48.8	0.34 (−0.14–0.69)	>0.05

*CI, confidence interval (Wilson for proportions; Fisher z for correlations). *Part–whole correlation, expected by construction. p-values are unadjusted.*

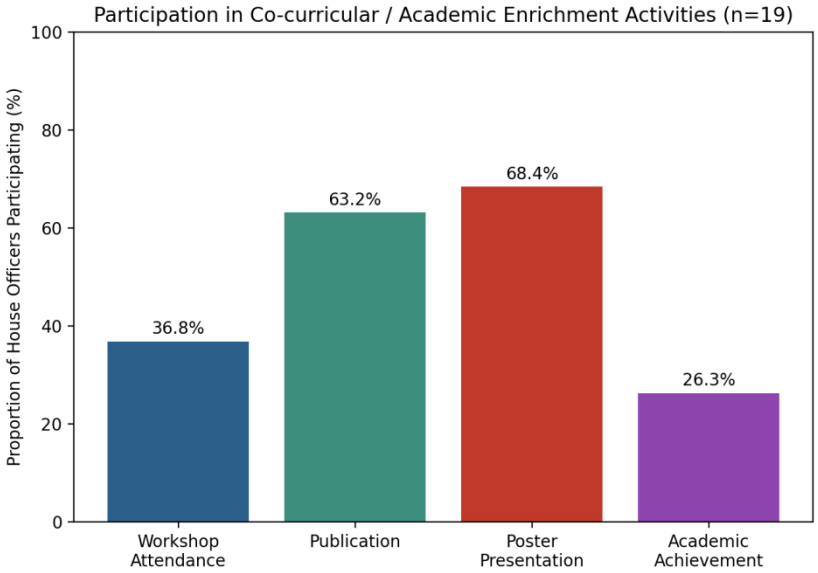


Figure 2. *Proportion of house officers with a recorded non-zero score in each optional scholarly domain (n = 19).*

3.4 Distribution of overall performance

The top-ranked house officer achieved 84.9% of the maximum attainable score and the lowest-ranked 53.9%, a spread of 31 percentage points. Eleven of 19 house officers (57.9%; 95% CI 36.3–76.9) scored above 75% of the maximum and five (26.3%; 95% CI 11.8–48.8) scored below 70%. Because assessment marks account for nearly all recorded points, differences in total score largely mirror differences in assessment marks. The record does not show why assessment marks differed, for example whether through differences in competence, rotation allocation or assessor leniency.

4. Discussion

In this single-institution record of 19 house officers, nearly all recorded points (97.1%) came from the assessment score, and the four optional scholarly domains contributed 0.04% of points despite nominal weights of 5% each. Participation in the optional domains varied, and estimates of participation and of correlation were imprecise. The findings describe how one institute's composite is constructed; they do not show how house officers in Karachi or Pakistan perform.

The dominance of the assessment score is best understood as a feature of the scoring design and not as a finding about house officers. The correlation of r = 0.9997 arises because one component supplies about 97% of the total. The stated weights (summing to 95%), the assessment scores that exceed 60% of the attainable total, and the 0–0.10 scale of the scholarly domains indicate that the recorded scales do not reproduce the intended weighting. An institute that intends CPD and scholarly activity to contribute 5–15% of the composite would need to set each domain's maximum marks accordingly. Alternatively, if these activities are meant as enrichment, they could be reported separately and not added to a ranked total.

Direct comparison with the published Pakistani literature is limited because those studies measured self-perception and this study used institutional records. The national DU-PAS survey (1) and the

three-institution house-officer survey (2) identified lower self-perceived competence in specific areas such as radiography and endodontics, and the Karachi mixed-methods study linked lower confidence to less-practised procedures (3). The present record cannot identify procedure-specific weaknesses, because the assessment domain is a single number. The mean recorded score of 74.2% of the maximum (SD 9.4 percentage points) is of a similar order to the self-rated mean of 70/100 (SD 11.71) reported in the multi-institution survey (2), but the instruments and constructs differ and no inference should be drawn from this. Those studies also illustrate reporting practices that this study has tried to follow: the multi-institution survey reported the respondents excluded for missing data (2), and the Karachi mixed-methods study stated its inclusion criteria and ethical approval (3).

A conceptual issue is the use of WPBA-type ratings in a ranked composite. WPBA was developed as an educational tool in which feedback is central (6). In a survey of foundation dentists in one UK deanery, 84.1% of respondents felt WPBA helped them improve patient care, and the authors concluded that feedback and reflection directed their learning (11); and a national UK evaluation examined both the usefulness of the tools and whether they provided an equitable training experience (12). In Pakistan, most surveyed dental postgraduate trainees in Multan held positive attitudes to WPBA (9), while in a small Karachi cohort 35% of dental residents reported that being observed adversely affected their performance (10). If assessment marks used for ranking are drawn from tools designed for formative feedback, assessors and trainees may behave differently than when the same tools are used only for learning. Institutions should state which components are formative and which summative, and should not convert formative ratings to marks without evidence of their reliability for that purpose.

CPD, workshops and the other scholarly domains are, in this institute's scheme. Their uptake therefore reflects the opportunities offered, and possibly the time and supervision available, as well as individual choice, and the study cannot separate these. Whether CPD is compulsory also varies between systems (13), so the position at the study institute must be stated when interpreting CPD scores. A Karachi journal-club study reported self-perceived gains in literature searching, presentation and confidence, but not in biostatistics or critical thinking (16), and 19 dental students who completed a six-session journal club rated their confidence in critically appraising a clinical trial higher afterwards (21). These data are self-reported and support, at most, the view that structured and scheduled activities may promote engagement. Comparable data on publication and poster rates among dental house officers in Pakistan appear to be sparse, so the rates observed here (63.2% and 68.4%) are not benchmarked.

The assessment domain relied on supervisor ratings from a single source. Multisource feedback, in which peers, co-workers and sometimes patients also rate the trainee, has been reviewed for its reliability, validity and feasibility (22), and its effect on practice depends on how feedback is delivered and acted upon (23). A systematic review of WPBA more broadly found that most included studies were descriptive or observational and that the evidence for practice change after multisource feedback was conflicting (24). Adding a multisource element could help to separate variation in competence from rater effects, although this study cannot show that it would.

Three practical implications follow for institutions that use composite house-job scores. First, maximum marks and weights should be stated for every domain, and the recorded scales should be checked against the intended weights. Second, core clinical assessment should be separated from optional enrichment activities, or the latter should be reported separately. Third, the assessment tools should be named and described, with evidence of reliability such as inter-rater agreement, and their formative and summative roles made explicit.

4.1 Limitations

This study has several limitations. First, it is a census of one cohort from a single institute, so its findings cannot be generalised to other institutes, sectors or years. With n = 19, confidence intervals are wide and all correlations are exploratory. Second, the analysis included only officers who completed the year with a complete record, which may overestimate performance if non-completers differ. Third, the study was a retrospective record review of institutional scores. The tools behind the assessment score, their validity and reliability, the number of assessors and rater variability could not be examined, and the CPD score could not be audited externally. Fourth, the recorded scales do not reproduce the stated weights, which limits interpretation of the domain contributions and correlations, and the correlations with the total are part–whole by construction. Fifth, rotation sequence, assessor allocation and demographic

variables such as gender could not be examined; gender differences in performance have been reported in some dental student cohorts (25). Sixth, the reasons for non-participation in optional activities were not measured. Future multi-institution studies could combine supervisor-rated, validated workplace-based instruments with self-perceived preparedness measures such as DU-PAS, include inter-rater reliability analysis and demographic variables, and use scoring schemes whose recorded scales match their stated weights.

5. Conclusion

In this record of 19 dental house officers from one institute in Karachi, recorded total scores were determined almost entirely by assessment marks (97.1% of points) because the other domains carried very few points, despite nominal weights that together made up 35% of the composite. The finding is about the construction of the institute's composite score and should not be generalised to house officers in Karachi or Pakistan. Participation in optional CPD and scholarly activities varied and depends on opportunity as well as effort. Institutions using composite house-job scores should specify their assessment tools, maximum marks and weights, distinguish formative from summative components, and consider reporting optional scholarly activities separately. Larger multi-institution studies with described and validated instruments are needed.

References

1. Javed MQ, Nawabi S, Bhatti UA, Atique S, AlAttas MH, Abulhamael AM, et al. How well prepared are dental students and new graduates in Pakistan—a cross-sectional national study. Int J Environ Res Public Health. 2023;20(2):1506.
2. Qazi HS, Ali K, Cockerill J, Zahra D, Raja UB, Ataullah K. Self-perceived competence of new dental graduates in Pakistan – a multi-institution study. Pak Armed Forces Med J. 2021;71(3):739–43. doi:10.51253/pafmj.v71i3.5012.
3. Buksh HA, Usmani A, Shaikh SH. Evaluating skills and confidence status of house officers in managing dental patients: a mixed method study in a private dental institute of Karachi. Pak Armed Forces Med J. 2023;73(3):690–4. doi:10.51253/pafmj.v73i3.6059.
4. Gulnaz H, Zaidi SHR, Khan RA. Preparedness of house officers for independent clinical practice: are we there yet? BioMedica. 2022;38(2):70–6. doi:10.51441/BioMedica/5-552.
5. Miller GE. The assessment of clinical skills/competence/performance. Acad Med. 1990;65(9 Suppl):S63–7.
6. Norcini J, Burch V. Workplace-based assessment as an educational tool: AMEE Guide No. 31. Med Teach. 2007;29(9):855–71.
7. Dilnawaz M, Shaikh ZI, Mazhar H, Iftikhar N, Akhtar A, Sadiq S. Workplace-based assessments: the right time to start. J Pak Assoc Dermatol. 2013;23(2):198–208.
8. Kogan JR, Holmboe ES, Hauer KE. Tools for direct observation and assessment of clinical skills of medical trainees: a systematic review. JAMA. 2009;302(12):1316–26.
9. Fatima S, Ul Abideen MZ, Siddiqui AA, Khan FFS, Gillani SW, Hussain MW, et al. Perception, attitude, and preference of trainees towards workplace-based assessment in dental education at a tertiary care institute in Multan, Pakistan. Work. 2023. doi:10.3233/WOR-220132.
10. Ali F, Maaz M, Sukhia RH, Fida M. Evaluation of user experience and satisfaction with workplace-based assessments (WPBAs) in dental postgraduate programmes. J Pak Med Assoc. 2024;74(8):1464–9. doi:10.47391/JPMA.9749.
11. Grieveson B, Kirton J, Palmer NOA, Balmer MC. Evaluation of workplace based assessment tools in dental foundation training. Br Dent J. 2011;211(4):E8.
12. Kirton JA, Palmer NOA, Grieveson B, Balmer MC. A national evaluation of workplace-based assessment tools (WPBAs) in foundation dental training: a UK study. Effective and useful but do they provide an equitable training experience? Br Dent J. 2013;214(6):305–9.
13. Bullock A, Bailey S, Cowpe J, Barnes E, Thomas H, Thomas R, et al. Continuing professional development systems and requirements for graduate dentists in the EU: survey results from the DentCPD project. Eur J Dent Educ. 2013;17(Suppl 1):18–22. doi:10.1111/eje.12046.
14. Bailey S, Bullock A, Cowpe J, Barnes E, Thomas H, Thomas R, et al. Core continuing professional development (CPD) topics for the European dentist. Eur J Dent Educ. 2013;17(Suppl 1):23–8.
15. Suomalainen K, Karaharju-Suvanto T, Bailey S, Bullock A, Cowpe J, Barnes E, et al. Guidelines for the organisation of continuing professional development activities for the European dentist. Eur J Dent Educ. 2013;17(Suppl 1):29–37.
16. Bana KFMA. Journal club is a way forward to adopt evidence based practice among dental house officers. Pak J Med Sci. 2022;38(1):195–200. doi:10.12669/pjms.38.1.4562.
17. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP; STROBE Initiative. The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) statement: guidelines for reporting observational studies. Lancet. 2007;370(9596):1453–7.
18. Bonett DG, Wright TA. Sample size requirements for estimating Pearson, Kendall and Spearman correlations. Psychometrika. 2000;65(1):23–8.

19. Downing SM. Validity: on the meaningful interpretation of assessment data. Med Educ. 2003;37(9):830–7.
20. Brown LD, Cai TT, DasGupta A. Interval estimation for a binomial proportion. Stat Sci. 2001;16(2):101–33.
21. Castro-Rodríguez Y. Impact of a "Journal Club" on the confidence of dental students to critically appraise a clinical trial. J Oral Res. 2022;11(1):1–11. doi:10.17126/joralres.2022.011.
22. Donnon T, Al Ansari A, Al Alawi S, Violato C. The reliability, validity, and feasibility of multisource feedback physician assessment: a systematic review. Acad Med. 2014;89(3):511–6.
23. Ferguson J, Wakeling J, Bowie P. Factors influencing the effectiveness of multisource feedback in improving the professional practice of medical doctors: a systematic review. BMC Med Educ. 2014;14:76.
24. Miller A, Archer J. Impact of workplace based assessment on doctors' education and performance: a systematic review. BMJ. 2010;341:c5064.
25. Sawair FA, et al. Effect of gender on performance of undergraduate dental students at the University of Jordan, Amman. J Dent Educ. 2009;73(11):1313–9.

Conflict of interest: None
Funding Disclosure: None

Author's Contribution:
Aiman Zahid: Conceptualization and design of the study, data collection, interpretation, analysis, drafting and revision of the manuscript.
Mahnoor Zahid: data collection, study design, analysis and interpretation of findings, critical review and revision of the manuscript.

This open access article by International Annals of Health Sciences - Liaquat College of Medicine & Dentistry is licensed under Creative Commons Attribution-Non-Commercial 4.0 International.