Research Article

From Training to Practice: Assessing Entrustable Professional Activities as Milestones for House Officers Clinical Development: A Cross-Sectional Study

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Abstract

Background: Entrustable Professional activities (EPAs) are specific tasks or responsibilities within the medical profession that can be entrusted to newly graduated students as they advance through their training and education. Evaluation via EPAs offer a method to implement competency-based assessment comprehensively.

Objectives: To determine the mean entrustable professional activities score of the house officers of public sector hospitals in Lahore.

Methods: This descriptive cross-sectional study was conducted from 01-06-24 to 15-07-24, at a public sector hospital in Lahore. House officers' performance was assessed using a questionnaire which evaluated competencies based on Entrustable Professional Activities (EPAs). The questionnaire had two variants: a self-evaluation form for house officers and a supervisor evaluation form. Data was analyzed using descriptive statistics and Wilcoxon Signed rank test.

Results: 139 House Officers participated in this research, currently employed at a public sector hospitals in Lahore. The mean age of all house officers was 23.5 ± 0.866 years. Of the 139 participants, 67.6% (n=94) were males and 32.4% (n=45) were females. The descriptive statistics reveal that self-evaluated scores of house officers tend to be higher than supervisor evaluated scores. Moreover, total EPA Wilcoxon analysis reveals that the supervisor's EPA scores for all the 5 domains (Z=X, p<0.001) are lower than the self-evaluated score of house officers in a majority of cases (106 out of 139), higher in a smaller number of cases (33 out of 139), but never equal

Conclusion: This research can guide the policymakers to establish a structured feedback system for house officers, encourage the house officers for realistic self-assessment & train the supervisors for constructive feedback. This kind of collaborative assessment culture and & promotion of reflective practice can better enhance the skills of house officers. Moreover, future research is necessary for cross-context comparisons of different institutions in the country.

Keywords | Entrustable Professional Activities (EPAs), House Officers, Clinical Competency, Milestones

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Introduction

Entrustable professional activities (EPAs) are defined as specific tasks or responsibilities within the medical profession that can be entrusted to newly graduated resident students as they advance through their training and education.[1,2] The purpose of these activities is to evaluate and enhance students' proficiency, abilities, skills and their preparedness for engaging in clinical practice. Competencies refer to the learner's skills and attributes, whereas EPAs outline distinct units of work that the learner can effectively perform.[3]

In 2014, the Association of American Medical Colleges (AAMC) introduced EPAs to set unified standards for assessing and evaluating the performance of senior medical students in USA.[4] EPAs provide a way to fully apply competency-based medical education and assessment comprehensively. They address the real-world physician tasks that are essential for a particular specialization, requiring specialized training and yielding measurable outcomes.[5]

The field of EPA-based workplace performance evaluation is developing and is anticipated to incorporate a wide range of methods and techniques in the near future, becoming an integral part of competency based medical education. EPAs for residency entry and entrustment rating scales have recently demonstrated educational benefits in both evaluation and assessment methods, including self-assessment by post-graduate residents and evaluations from supervisors and program directors.[6,7] This corroborates not only an incoming worldwide shift in medical education from traditional learning to competency based leaning but also an expedite trend of evaluation of competency via EPAs.[8]

A study conducted in 2020 by Holzhausen et al. in Dieter Scheffner Centre for Medical Education and Educational Research, Charité-Universitätsmedizin Berlin, Germany evaluated workplace performance of medical Graduates using EPAs. According to its results, more than 75% of the participants did better than 90% task performance.[9,10]

This study is needed to conduct in Pakistan as there is lack of structured competency-based evaluation of house officers. This study aims to determine the mean entrustable professional activities score of the house officers of public sector hospitals in Lahore. Thus, it is necessary to conduct a study to evaluate their clinical readiness and improve training programs to enhance their performance.

Methodology

Research employed a cross-sectional study design. Ethical approval was obtained from the Institutional Review Board (IRB) of King Edward Medical University. The sample size of 139 House Officers was estimated by using Cochran's sample size formula, based on a 95% confidence interval (Z=1.96), an absolute precision of 5% and a prevalence (p) of 90%[9]. Non-probability convenient sampling technique was used and informed consent was taken from the eligible participants. Data was collected over the period of 1.5 months from 1st June, 2024 to 15th July, 2024. A validated questionnaire developed by Peters et al. in 2019 was used, consisting of two versions: a supervisor version and a student evaluation version[11]. Both versions were filled out by the respective HOs and their supervisors separately. The questionnaire consisted of five domains, each assessing specific competencies. Domain 1 addressed the clinical encounter, involving factors such as common disease patterns and the typical course of diseases, with a total of 26 questions. Domain 2 evaluated the House Officers based on their performance of general procedures and contains 13 questions. Domain 3 assessed the House Officers' communication patterns with patients and includes 8 questions. Domain 4 evaluated their communication patterns with colleagues and consists

of 9 questions. Finally, Domain 5 assessed the House Officers' further professional activities and comprises 18 questions. Overall, the questionnaire included 74 questions rated on a Likert scale from 1(least) to 6 (best), indicating the level of independence in performing each activity. All the domain scores are transformed into 0-100 linearly, 0 being the worst score and 100 being the best score.

Both male and female house officers employed at a public sector hospital namely Mayo Hospital, Lahore and who have completed at least one year of clinical rotation were included whereas those who were debarred, expelled or absent from their training for extended period, those who were failed to communicate effectively in Urdu/English and failed to fulfill the questionnaire were excluded.

Data was entered and analyzed by SPSS version 26. Mean and standard deviation were calculated for quantitative variables while frequency and percentages were calculated for qualitative variables. The normality of the data was checked by applying the Kolmogorov-Smirnov test. As the data was not normally distributed Wilcoxon signed rank test was used for statistical analysis of Data.

Result

139 House Officers participated in this research, currently employed at public sector hospitals in Lahore Pakistan. The mean age of all HOs is 23.5±0.866 years. Of the enrolled participants, 67.7% (n=94) were males and 32.4% (n=45) were females.

The descriptive statistics for the self-evaluation domains' score and the supervisor-evaluated domains' score are summarized in Table 1. The mean and IQR indicate that self-evaluation scores tend to be higher and more variable than supervisor scores. This suggests that house officers may perceive their competencies more favorably compared to their supervisors' evaluations.

The normality of data was checked using the Kolmogorov-

Table 1: *Descriptive Statistics for Self-Evaluated and Supervisor evaluated EPA Domains*

Domains	Mean	IQR
Self-Evaluated Domain 1 Score	64.04	26.25
Self-Evaluated Domain 2 Score	63	27.08
Self-Evaluated Domain 3 Score	74	32.29
Self-Evaluated Domain 4 Score	74.89	28.19
Self-Evaluated Domain 5 Score	69.08	36.67
Supervisor Evaluated Domain 1 Score	50.92	15
Supervisor Evaluated Domain 2 Score	47.7	20.38
Supervisor Evaluated Domain 3 Score	53.24	19.17
Supervisor Evaluated Domain 4 Score	54.4	21.67
Supervisor Evaluated Domain 5 Score	53.76	20

Smirnov test. The significant p-values (>0.05) from the Kolmogorov-Smirnov test confirmed that none of the domains followed a normal distribution. This finding accentuated the use of non-parametric tests for subsequent analyses, ensuring the robustness of the results.

The comparison of self-evaluated and supervisor-evaluated EPA scores of all the 5 domains was conducted through Wilcoxon Signed Rank test and showed significant results (Z=X, p < 0.001), details of which are given in table 2. Supervisors generally rated the house officers lower than their self-evaluations. Supervisor's total EPA scores are lower than the self-evaluated scores in a majority of cases (106 out of 139), higher in a smaller number of cases (33 out of 139), and never equal (Z=X, p < 0.001).

The significant differences between self-evaluation and

Table 2: *Comparison of Self Evaluated and Supervisor Evaluated Wilcoxon Signed Rank test*

|		N	Mean Rank	Sum of Ranks
Supervisor Evaluated domain 1 Self Evaluation domain 1 score	Negative Ranks	99[a]	78.68	7789.50
	Positive Ranks	40[b]	48.51	1940.50
	Ties	0[c]		
	Total	139		
Supervisor Evaluated domain 2 Self Evaluation domain 2 score	Negative Ranks	100[d]	77.43	7743.00
	Positive Ranks	37[e]	46.22	1710.00
	Ties	2[f]		
	Total	139		
Supervisor Evaluated domain 3 Self Evaluation domain 3 score	Negative Ranks	109[g]	78.28	8532.50
	Positive Ranks	30[h]	39.92	1197.50
	Ties	0[i]		
	Total	139		
Supervisor Evaluated domain 4 Self Evaluation domain 4 score	Negative Ranks	106[j]	78.42	8312.00
	Positive Ranks	33[k]	42.97	1418.00
	Ties	0[l]		
	Total	139		
Supervisor Evaluated domain 5 Self Evaluation domain 5 score	Negative Ranks	99[m]	79.12	7833.00
	Positive Ranks	40[n]	47.43	1897.00
	Ties	0[o]		
	Total	139		
supervisor Evaluated Total EPA Score Self Evaluated total EPA score	Negative Ranks	106[a]	78.85	8358.50
	Positive Ranks	33[b]	41.56	1371.50
	Ties	0[c]		
	Total	139		

* Negative Rank = Supervisor-Evaluated domain transformed score < Self-Evaluated domain transformed score
* Positive Rank = Supervisor-Evaluated domain transformed score > Self-Evaluated domain transformed score

supervisor scores highlighted a discrepancy between how house officers view their competencies versus how their supervisors evaluate them. This discrepancy underscores

potential overconfidence among house officers or a stricter evaluation standard by supervisors.

Lastly, Data was stratified based on gender and Wilcoxon signed rank test analysis comparing EPA scores of all the 5 domains were performed. The results revealed a statistically significant difference, Z = X, p < 0.001, showing that male participants consistently rated themselves higher than their supervisors did, whereas female participants' self-evaluations were closer to their supervisors' ratings. The gender-specific analysis revealed that male participants tend to overrate their competencies compared to their supervisors' assessments, whereas female participants show a closer alignment between self-evaluations and supervisor ratings.
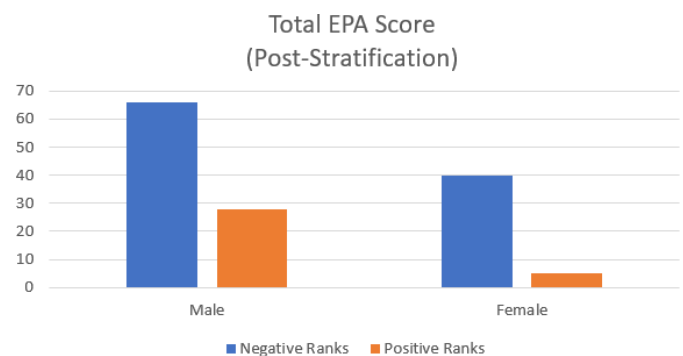
Figure 1. *Comparison of self-Evaluated and supervisor evaluated total EPA Scores by Wilcoxon signed rank test keeping gender as an effect modifier*

* Negative Rank = Supervisor-Evaluated domain transformed score < Self-Evaluated domain transformed score

* Positive Rank = Supervisor-Evaluated domain transformed score > Self-Evaluated domain transformed score

Discussion

According to our study, the use of Entrust able Professional Activities (EPAs) is crucial for ensuring the development of competent and skilled professionals. This study is pionee-ring in Pakistan as it is the first to utilize EPAs in a workplace performance assessment, employing a questionnaire-based research design

The descriptive statistics suggest significant differences across the five domains. Domain 3 (i.e. communication with patients) has the highest mean transformed score (74.00), indicating better performance in this domain compared to the others. In contrast, Domain 2 (performance of general procedures of a physician) has the lowest mean transformed score (63.00), suggesting room for improvement. These findings show that House Officers are not working independently i.e., without supervision. This contradicts the findings of a research conducted by Ten Cate et al. in 2018[2], [18] where final year students were very much able to perform

indepen-dently further comparison shows that Supervisors ensuring house officers demonstrate required skills before advancing. This is important to ensure everyone involved (including the learners) clearly understands how learner progress is measured and to help learners move forward tend to rate house officers higher in Domains 1(Clinical Encounter) i.e.,74.2% and 5 (Further professional activities of a physician) i,e,77.3%. whereas the House officers tend to rate themselves higher in Domains 3 (Communication with patients) i.e. mean score: 79.17 and 4 (Communication with colleagues) i.e. mean score: 83.33. The differences bet- ween supervisors' and house officers' ratings are relatively small, ranging from 2.9% to 5.7%. This variability is impor- tant because it's not typically seen with other scales used in workplace-based assessment of medical training. This corre- lates with similar findings in a research study conducted by Crossley J et al. in 2011.13,19

It's quite evident from our findings that the house officers often rated their own skills higher than their supervisors did. This highlights the value of self-assessments in understanding how HOs view their abilities, but it also shows that supervisor evaluations are important for giving a more accurate and fair judgment of their skills. HOs are often entrusted to per- form clinical activities without supervisio [5]. We observed that a clinical activity in which HOs were more proficient in performing without supervision was communicating with patients. This finding contradicts the results deduced by Peters et al. in 2019 in which students excelled in performance of general procedures.[11] The use of Entrustable Professional Activities (EPAs) can effectively aid the seamless transition of house officers to postgraduate in cardiology, intensive care, emergency medicine, and anesthesiology, and enable a shortening of those residencies.[13] Thus, EPAs acting as a guide should be able to assist educators interested in develop- ment of curricula.[1] Additionally, Unlike other assessment methods that focus on how someone performed in the past, EPA assessments focus on how well the learner is expected to perform in the future. This means supervisors are deciding if they can trust the learner to take care of future patients or handle new challenges. In making this decision, supervisors are taking some risks, but they believe those risks are reason- able and manageable.[14,15] The longer a supervisor works with a learner, the better the supervisor can estimate the learner's capabilities and limitations. This further results in a good entrustable relationship between HOs and their corresponding supervisors which ensures accurate and reliable decision regarding patient health.[16,17] EPAs provide an authentic assessment of performance in real-world settings, allowing for focused feedback and targeted improvement. This approach supports competency-based progression,

ensuring house officers demonstrate required skills before advancing. This is important to ensure everyone involved (including the learners) clearly understands how learner progress is measured and to help learners move forward based on their skills and competence.[15,16] The post-stratifi- cation Wilcoxon signed rank test for gender revealed that male Hos rated themselves higher than females. On the contrary, female house officers demonstrated a more realistic perception of their own capabilities, likely contributing to their better self-assessment accuracy. Interestingly, the study found no such significant bias on par with a research study conducted by Chen HC et al. in 2015.[18,19] Age was not consi- dered as a stratification factor in this study, as it was not deemed relevant in this context, differing from the findings of Brown DR et al., 2017, where age was highlighted as a significant variable influencing entrustment decisions in medical education. Further exploration of age as a factor in various medical training environments may shed light on its role in competency assessments.[20]

Notably, we observed that house officers exhibited profi- ciency in several key areas, though the study has some limi- tations that should be acknowledged. First, our investigation was confined to house officers from a single hospital i.e. Mayo Hospital, Lahore, limiting the generalizability of our findings. Additionally, our sample consisted of self-selected volunteering students, which potentially introduces selection bias into the study. Despite these limitations, our study offers valuable insights into the workplace performance of house officers through the application of an EPA tool.

Conclusion

Our study found that generally house officers tend to over- rate their workplace performance as compared to their super- visors' evaluation. House officers showed better performance in Domain 3 i.e. communication with patients as compared to the rest of the domains. Male house officers tend to over- rate their performance more as compared to the female house officers. This assessment provides a realistic measure of the capabilities of the house officers and can help not only to enhance patient safety but also to standardize the assessment criteria and to improve supervision. This research can guide the policymakers to establish a structured feedback system for house officers, encourage the house officers for realistic self-assessment & train the supervisors for constructive feedback. This kind of collaborative assessment culture and & promotion of reflective practice can better enhance the skills of house officers. Moreover, future research is necessary for cross-context comparisons of different institutions in the country.

Conflict of interest: All the authors declare that there is no conflict of interest.

Ethical approval: was obtained from IRB of King Edward Medical University, Lahore

Authors' Contributions:

ASe: Acquisition of data, analysis & interpretation of data, drafting of article.

AM: Conception & design, analysis & interpretation of data, critical revision for important intellectual content.

ASh:Acquisition of data,critical revision for important intellectual content.

AN: Analysis & interpretation of data, drafting of article

FH: conception, Analysis & interpretation of data.

MA: conception and design,data analysis, methodology , validation and the original draft writing.

All authors have approved the final version and are responsible and accountable for the accuracy and integrity of the work.

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