

Pilot implementation of Entrustable Professional Activities (EPAs) for competency-based assessment in undergraduate medical education in Community Medicine

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Abstract:

Introduction: By directly observing real-world professional tasks, Entrustable Professional Activities (EPAs) make competency-based assessment possible. There is very less structured use of EPAs in undergraduate community medicine. The study's objectives were to develop, validate and pilot test an EPA module for Community Medicine among undergraduate students. **Methods:** Over the course of five months, single-center prospective interventional pilot research was carried out at the Punjab Institute of Medical Sciences' Department of Community Medicine in Jalandhar. Experts developed an EPA module titled "Assessment of nutritional status in a 3-year-old child," which was which had milestones in the emotional, cognitive, and psychomotor domains. The Item-Content Validity Index (I-CVI) and Scale-Content Validity Index (S-CVI) were evaluated. Direct Observation of Procedural Skills with entrustment levels was used to evaluate thirty Phase III Part I MBBS students. Feedback from students and faculty was obtained. **Results:** The EPA module showed high content validity, with I-CVI values ranging from 0.86 to 1.00 and an overall S-CVI of 0.94. Most students achieved entrustment level ≥ 3 for height (86.7%), weight (83.3%), MUAC measurement (73.3%), informed consent (80.0%), and communication skills (76.7%). Clinical judgement demonstrated lower entrustment, with 66.7% achieving Level ≥ 3 and 20.0% reaching Level 4. Student satisfaction rate was 86.7%, while all faculty expressed satisfaction. EPA feasibility was reported by 83.3% of students and 85.7% of faculty. Key challenges included time constraints, assessor calibration, and learner orientation. **Conclusion:** The EPA module was found to have strong validity, high satisfaction and feasibility among both students and faculty.

Keywords: Medical Education; Clinical Competence; Community Medicine; Undergraduate Medical Education; Feasibility; Competency-Based Education

Introduction:

Medical education has increasingly shifted from traditional time-based training to competency-based medical education (CBME) due to concerns that traditional curriculum and end-point tests do not consistently ensure graduates' readiness for professional

practice. CBME strongly emphasizes clearly stated objectives and the alignment of teaching, learning, and assessment with those skills in order to meet the needs of patients and society.^[1] Van van Vleuten and Schuwirth emphasized that evaluating professional competence needs variety of assessments techniques, repeated

Quick Response Code	Access this article online	How to cite this article : Sharma M, Arora R, Cheema H. Pilot implementation of Entrustable Professional Activities (EPAs) for competency-based assessment in undergraduate medical education in Community Medicine Healthline. 2026;17(2): 157-167
	Website : www.healthlinejournal.org	
	DOI : 10.51957/Healthline_831_2026	

Received : 17-03-2026

Accepted : 23-06-2026

Published : 23-07-2026

observations, and professional judgment in a variety of contexts and times.^[2] Conventional undergraduate tests focus more on information or simulated performance and may not accurately represent students' real skills in the real world. Workplace-based assessment (WBA) was developed to close this gap, but its instructional value is often compromised by insufficient feedback, checklist-driven methods, and restricted observation.^[3]

The idea of programmatic assessment, which aggregates several low-stakes student assessments throughout time to promote learning and justifiable progression decisions, has been put up to improve CBME assessment.^[4] Entrustable Professional Activities (EPAs) have become a viable method for operationalizing CBME within this framework. EPAs are professional work units that include many competences and result in an entrustment judgment on the degree of supervision needed for safe performance.^[5]

Although EPAs were first designed for postgraduate training, their usage in undergraduate medical education (UGME) has grown dramatically. International literature has demonstrated successful implementation of EPAs in undergraduate and postgraduate medical education across multiple disciplines, with studies reporting improved authenticity of assessment, structured feedback, learner engagement, and integration of cognitive, psychomotor, and professional domains into a single assessment framework.^[6] Previous Indian literature has also highlighted the educational value of EPAs in strengthening workplace-based assessment and promoting progressive entrustment within CBME frameworks.^[7] However, most published work has focused either on postgraduate training or conceptual discussions, while structured implementation studies in undergraduate Community Medicine remain limited.

In Community Medicine, EPAs offer a promising strategy to assess authentic community-based professional activities through direct observation and structured entrustment decisions. The present study contributes to existing literature by developing and validating a context-specific EPA module for

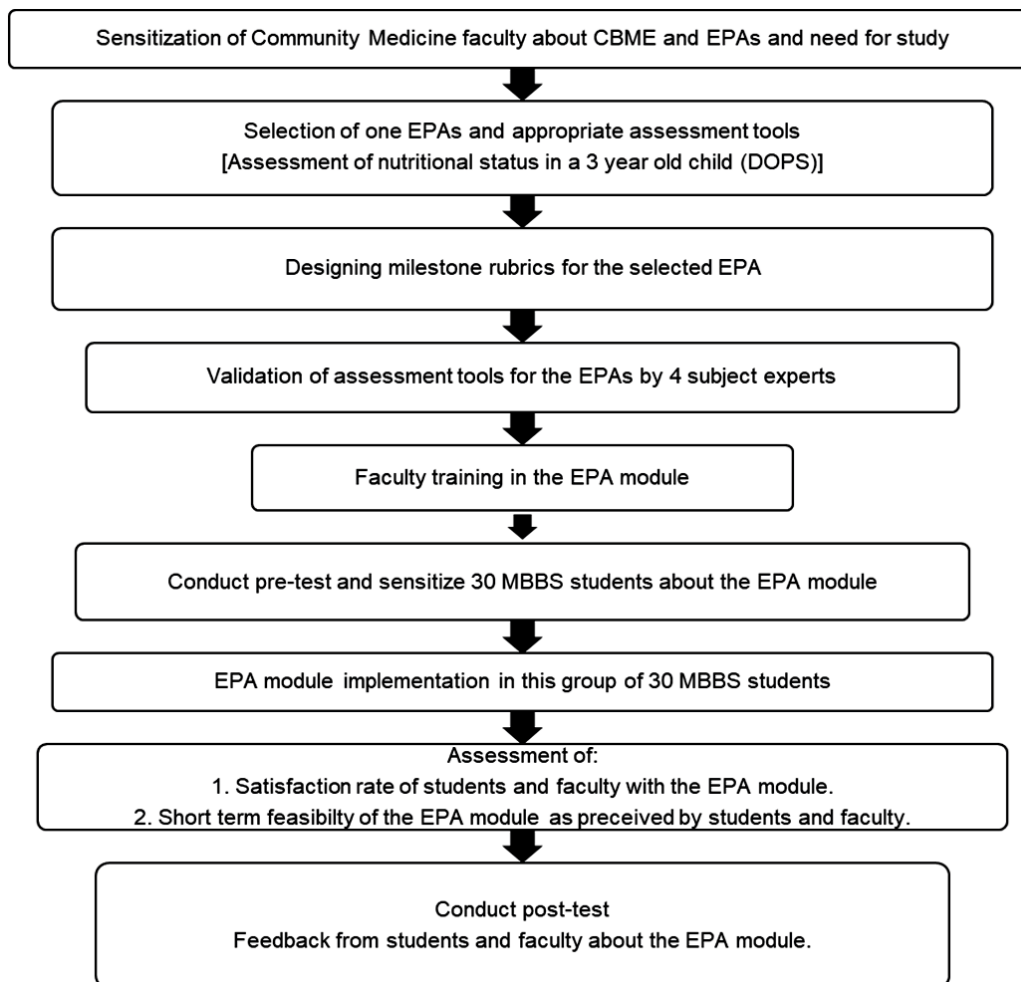
undergraduate Community Medicine and demonstrating its feasibility, acceptability, and educational utility within routine undergraduate teaching settings. The objectives of the study were to 1) develop and validate a milestone-based EPA module for assessment of nutritional status in a 3-year-old child among undergraduate medical students; 2) to assess student performance using entrustment-based assessment levels during pilot implementation of the EPA module; 3) to evaluate the satisfaction and perceived feasibility of the EPA module among students and faculty members; and to 4) identify challenges and suggestions related to the implementation of EPA-based assessment in undergraduate Community Medicine.

Material and Methods:

The present study was conducted as a single-center, prospective, interventional pilot study from September 2025 to January 2026, in the Department of Community Medicine at Punjab Institute of Medical Sciences, Jalandhar. The study population comprised a small batch of 30 Phase 3 Part 1 MBBS students attending routine clinical posting in the department. Students were included in the study after obtaining written informed consent. Participation in the study and submission of feedback were entirely voluntary. Students were informed that their decision to participate or decline would not influence their academic evaluation, internal assessment, attendance, or relationship with faculty members in any manner. Community Medicine faculty members were involved in the implementation and assessment of the module. Students who failed to complete the EPA module were excluded from the study (Figure 1).

A structured method was used to develop the chosen Entrustable Professional Activity (EPA). A group of four subject matter experts directed the module's development. Benchmark levels for milestones were established along with specific learning objectives. The development of the EPA module was based on the framework proposed by Srivastava et al^[7], which served as the conceptual foundation and inspiration for the

Figure 1. Study methodology flowchart



design and implementation of the module. Both the frequency of assessments and the environment in which they would take place were decided. The level of student performance was then evaluated and categorized using a milestone-based rubric. To ensure appropriateness and validity of the rubric, it was validated both internally and externally by two internal and two external experts.

For evaluating an EPA pertaining to measuring and interpreting a 3-year-old child's mid-upper arm circumference (MUAC), we developed a milestone-based rubric (Annexure). It describes five levels of entrustment that reflect students' increasing competency development, from knowledge only (observation) to independent performance and the capacity to instruct others. Level 3 or above was considered indicative of acceptable supervised performance, as this level reflects the ability to perform the activity with indirect or

decreasing supervision. Levels 4 and 5 represented progresses toward independent performance and the ability to supervise or teach others. The rubric assesses a number of areas, such as communication with parents, clinical judgment, getting informed consent, and comprehension of anthropometric measurements (weight, height, and MUAC). The assessment plan was one assessment per student for 30 students, resulting in a total of 30 assessments. As this was a pilot implementation study, the EPA assessment was intended to evaluate feasibility, acceptability, and initial entrustment patterns rather than to provide formal summative certification of competence in the students. Therefore, one structured workplace-based observation was conducted per student using a milestone-based rubric. Data were collected using a pre-designed semi-structured study feedback questionnaire It included a

milestone-based assessment table with five levels of competency covering areas such as anthropometric measurements, informed consent, clinical judgement, and communication skills. The form also collects structured feedback from both students and faculty regarding satisfaction with the EPA assessment, its feasibility, and suggestions for improvement using yes/no responses and a Likert scale.

Descriptive analysis was done on the feedback responses on Likert scale and a thematic analysis was carried out for open ended questions after identifying recurring themes or patterns in qualitative feedback (open-ended questionnaire responses).

Informed consent was taken from all study participants before the start of the study. Ethical Approval was obtained on 29/11/2025 from Institutional Ethics Committee (IEC) vide letter no ECR/1413/Inst/PB/2020/RR-25 before study commencement.

Results:

Validation of EPA module

The teaching–learning methods comprised case presentation and small-group discussion, followed by Direct Observation of Procedural Skills (DOPS) for workplace-based assessment, as specified in the study

proforma. The EPA module underwent a structured validation process during the development stage. Four subject experts were involved to assess both the internal and external validity of the module. In addition, all faculty members of the department evaluated the EPA module across six predefined milestones encompassing the cognitive, psychomotor, and affective domains. The faculty reviewed the module for its relevance, clarity, and representativeness of the milestones^[8], which included indications and anatomical landmarks for height, weight, and MUAC measurement, obtaining informed consent, clinical judgement, and communication skills. The level of agreement among the faculty was quantified using the Item Content Validity Index (I-CVI) and Scale Content Validity Index (S-CVI). Milestone-wise agreement among the seven faculty members demonstrated strong content validity, with I-CVI values for individual milestones ranging from 0.86 to 1.00 (Figure 2). The overall S-CVI for the EPA module was calculated to be 0.94, indicating a high level of agreement regarding the content validity of the module. This pattern indicated that the EPA content was perceived as highly relevant and appropriate, with relatively greater scope for refinement in MUAC landmarking and clinical judgement descriptors.

Figure 2. Content validity of the EPA module components

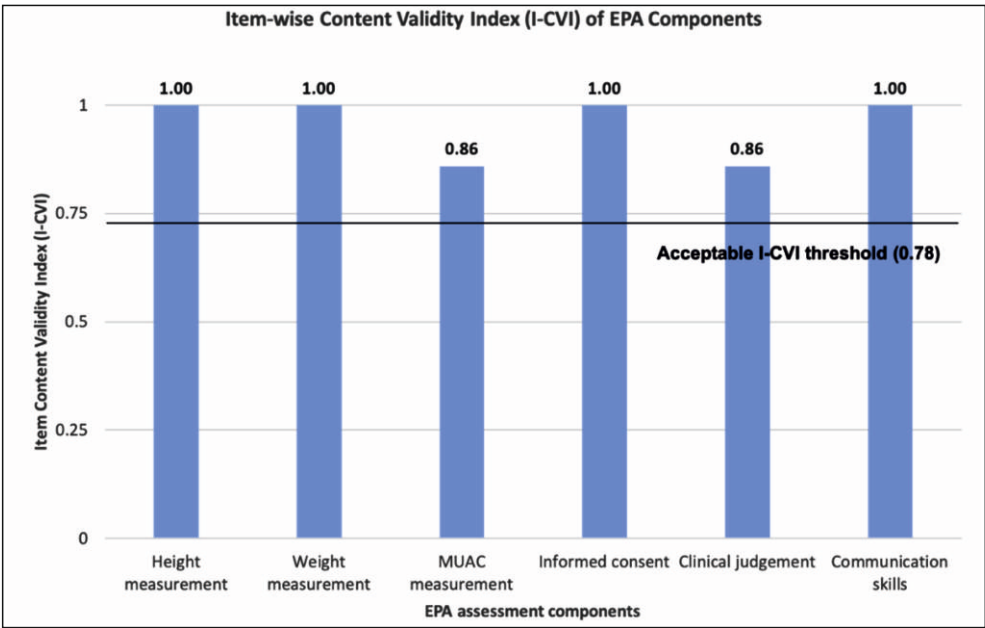
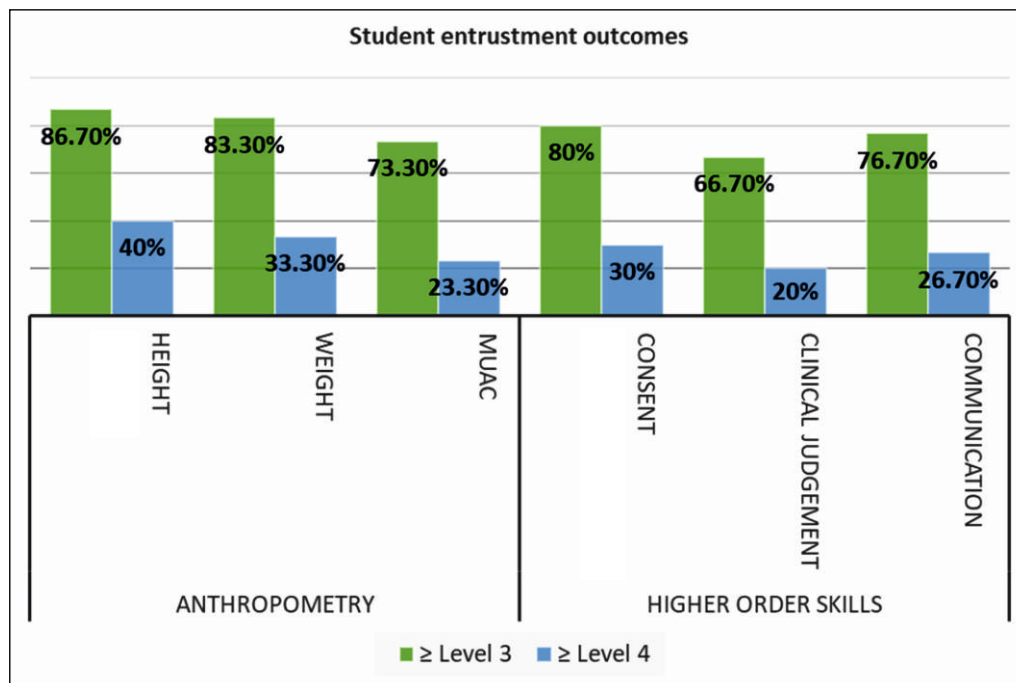


Figure 3. Student performance assessed using the EPA module Table 1



Student performance

Student performance was recorded across five entrustment levels for each of the six milestones. Results were summarized as proportions achieving Level 3 or above (can perform with decreasing supervision), and Level 4 (independent), in keeping with entrustment-based reporting conventions (Figure 3). The distribution of entrustment levels across different competency domains showed that most students achieved Level 3 or Level 4 performance in the EPA assessment. For height measurement, 46.7% students achieved Level 3 and 40.0% achieved Level 4, while only 13.3% remained at Level 2. Similarly, for weight measurement, half of the students (50.0%) achieved Level 3 and 33.3% achieved Level 4. MUAC assessment demonstrated comparatively lower entrustment, with 26.7% students at Level 2, 50.0% at Level 3, and 23.3% at Level 4. In the informed consent domain, 50.0% students achieved Level 3 and 30.0% achieved Level 4. Clinical judgement showed relatively lower performance compared to procedural domains, with 40.0% students each at Levels 2 and 3, while only 20.0% achieved Level 4. Communication skills demonstrated moderate entrustment progression, with 50.0% students achieving

Level 3 and 26.7% achieving Level 4. Overall, procedural and anthropometric domains showed higher entrustment levels compared to higher-order domains such as clinical judgement and communication skills. Overall, the entrustment profile suggested that while most students reached supervised performance for core anthropometry steps, fewer reached higher entrustment in clinical reasoning and counselling.

Satisfaction and feasibility among students and faculty

A majority of students reported satisfaction with the EPA-based assessment, with 26 out of 30 students (86.7%) indicating that they were satisfied. Among these, 24 students reported being “very satisfied,” while 2 reported being “satisfied.” Four students (13.3%) expressed dissatisfaction with the assessment process. The dissatisfaction reported by these students appeared to be related to logistical and transitional factors, including limited time during assessments, lack of initial orientation to the EPA framework, and anxiety associated with direct observation during skill assessment.

Faculty feedback was also obtained to evaluate satisfaction with the EPA-based procedural assessment.

All faculty members expressed satisfaction with the EPA structure, and most reported that the framework provided a clearer basis for observation and feedback during assessment. Among the seven faculty members, six (85.7%) reported being “very satisfied,” while one (14.3%) reported being “satisfied.”

Most students perceived the EPA module to be feasible, with 25 out of 30 students (83.3%) responding positively. Similarly, six out of seven faculty members (85.7%) considered the EPA-based assessment to be feasible.

Thematic analysis of challenges in the implementation of EPAs

Qualitative feedback obtained from the open-ended responses of students and faculty regarding the EPA module was analysed using thematic content analysis (Table 1). The suggestions provided by students for improving the EPA module are presented in Table 2, while the suggestions provided by faculty members are summarised in Table 3.

Table 1 : Thematic Analysis of Challenges in The Implementation of EPAs

Theme	Description	Illustrative quotes
Time constraints and operational feasibility	Both students and faculty perceived EPA-based assessment as more time-intensive than conventional methods. Direct observation, documentation of entrustment levels, and provision of feedback were challenging within routine schedules, especially in large undergraduate batches.	“Direct observation and feedback take more time than routine practical assessment, especially when many students are posted at the same time.” (Faculty) “Sometimes the observation felt rushed because of time constraints, which affected detailed feedback.” (Student)
Need for assessor calibration and consistency	Faculty highlighted variability in interpreting entrustment levels, particularly for higher-order domains such as clinical judgement and communication. The need for calibration and shared understanding among assessors was emphasized to reduce subjectivity.	“Different faculty may interpret the same performance differently unless we have common benchmarks.” (Faculty) “Clear examples of what each level means would help in giving uniform scores.” (Faculty)
Learner orientation and assessment-related anxiety	Students reported initial unfamiliarity with the EPA framework and entrustment levels, leading to uncertainty and anxiety during direct observation. Orientation and transparency were suggested to improve acceptance and confidence.	“At first, it was not very clear what was expected at each level of assessment.” (Student) “If we are explained beforehand how we will be assessed, it will reduce anxiety during observation.” (Student)
Need for clearer descriptors and behavioural anchors	Both students and faculty recommended refinement of the EPA tool through explicit behavioural descriptors and anchors. Clearer rubrics were perceived to enhance objectivity, guide learning, and improve feedback quality.	“If specific actions are mentioned for each level, it will be easier to decide the entrustment level.” (Faculty) “Clear points on what we should do correctly would help us improve in the next assessment.” (Student)

Table 2 : Thematic Analysis of Suggestions by Students for Improvement of The EPA Module

Stakeholder group	Theme	Description / Interpretation	Illustrative quotes
Students	Need for prior orientation and clarity of expectations	Students felt that clearer explanation of the EPA framework, entrustment levels, and assessment expectations before implementation would improve confidence and preparedness.	“If we are told clearly what is expected at each level beforehand, it will be easier to perform.” “A short orientation before assessment will reduce confusion and anxiety.”
Students	More opportunities for practice and formative assessment	Students suggested that repeated formative EPA encounters before summative judgement would enhance skill acquisition, particularly for MUAC measurement and counselling.	“If we get more chances to practice with feedback, we can improve before final assessment.”
Students	Detailed and actionable feedback	Students emphasized the need for specific feedback linked to performance and entrustment levels, rather than general comments.	“Feedback should tell us exactly where we went wrong and how to improve.”
Students	Adequate time allocation during assessment	Students felt that rushed observation limited demonstration of skills and depth of feedback; protected time was suggested.	“Sometimes the assessment feels hurried; more time would help us perform better.”

Table 3 : Thematic Analysis of Suggestions by Faculty for Improvement of the EPA Module

Stakeholder group	Theme	Description / Interpretation	Illustrative quotes
Faculty	Faculty training and calibration	Faculty highlighted the need for structured training and calibration to ensure consistent interpretation of entrustment levels across assessors.	“All faculty should have a common understanding of what each entrustment level means.”
Faculty	Refinement of milestone descriptors and entrustment anchors	Faculty recommended clearer behavioural descriptors, especially for higher-order domains such as clinical judgement and communication.	“Clear behavioural anchors will reduce subjectivity while deciding entrustment levels.”
Faculty	Streamlining documentation and assessment workflow	Faculty suggested simplifying assessment forms or documentation to reduce workload while maintaining assessment quality.	“The tool can be made more concise so that documentation does not become time-consuming.”
Faculty	Integration of EPAs into routine teaching and assessment	Faculty recommended embedding EPAs within regular practical sessions or internal assessments for sustainability.	“EPAs should be part of routine practical teaching rather than an additional activity.”

Discussion:

The findings of our pilot study are particularly relevant in the context of the global and national shift from traditional competency frameworks toward entrustment-based assessment, which aims to bridge the gap between theoretical competence and real-world clinical performance. Dhaliwal et al. emphasized that conventional competency-based approaches often fail to ensure integrated, workplace-ready performance, necessitating tools such as EPAs that assess observable professional activities across multiple domains simultaneously.^[9] The current study operationalized this principle by embedding cognitive, psychomotor, and affective domains within a single EPA and evaluating students using DOPS-based entrustment levels, aligning well with the conceptual framework proposed by Dhaliwal and colleagues.^[9]

The thorough validation procedure, which included departmental faculty and subject matter experts, was one of the study's main advantages. Excellent overall content validity was indicated by the Scale-Content Validity Index (S-CVI) of 0.94 and the Item-Content Validity Index (I-CVI) ranging from 0.86 to 1.00. Similar results have been documented in both Indian and foreign literature.^[10] Shrivastava et al., in their community medicine postgraduate EPA study, reported an S-CVI of 1.00 for Mini-CEX and CBD and 0.87 for DOPS, highlighting similarly high levels of expert agreement while noting slightly lower scores for procedural components.^[11] These results are supported by the slightly lower I-CVI values found in the current study for MUAC measurement (0.86) and clinical judgment (0.86), which indicate that procedural precision and higher-order reasoning are consistently more difficult to operationalize and standardize across assessors. Additionally, Gummesson et al. noted that although EPAs are generally regarded as pertinent and significant, scope definition and descriptor clarity frequently need iterative improvement during validation.^[6]

Patra highlighted that EPAs are particularly valuable because they assess integrated professional functioning, unlike traditional tools that isolate

knowledge or skill components.^[12] Undergraduate students can be trusted to perform ethical and interpersonal tasks under supervision, as evidenced by the fact that 80.0% of students in the current study attained Level e"3 in informed consent and 76.7% in communication skills. But only 30.0% and 26.7%, respectively, attained Level 4, supporting Patra's^[12] claim that EPAs are more appropriate for progressive entrustment than for pass-fail choices. This was further supported by Thaman et al, who suggested that EPAs function as a bridge between competencies and clinical practice by mapping multiple milestones onto a single professional task.^[13] The present findings substantiate this claim, as students who performed well in procedural milestones did not necessarily demonstrate equivalent proficiency in judgement-based milestones, highlighting the discriminatory capacity of EPAs in identifying domain-specific learning needs.

High levels of acceptability were observed among both students and faculty. In the present study, 86.7% of students reported satisfaction with EPA-based assessment, with the majority being "very satisfied," while 100% of faculty expressed satisfaction, including 85.7% who were very satisfied. These findings are concordant with Shrivastava et al., who reported that postgraduate students perceived EPA-based assessment as task-specific and less subjective, and faculty valued the clarity provided by rubrics and milestones.^[14] Begum et al. similarly noted that the use of descriptive rubrics alongside EPAs improved transparency, facilitated feedback, and encouraged learner reflection.^[15]

Furthermore, 83.3% of students and 85.7% of faculty in our study rated the EPA module as feasible for assessment within existing infrastructure and medical education system. This is important, as undergraduate EPAs are often considered as logistically challenging due to the number of students in a batch. Shrivastava et al. have repeatedly highlighted that EPAs are more commonly implemented at the postgraduate level because of feasibility concerns. However, they suggested that EPAs can be successfully integrated at the undergraduate level if the module is context-specific and

is carefully designed.^[14] Gummesson et al^[6] also highlighted that feasibility improves when EPAs are well defined and aligned with curriculum outcomes, which were also the key design features of our module. The current study provides empirical support for this suggestion of Shrivastava by demonstrating high feasibility and satisfaction rates among students and faculty.

Limitations:

There are a few limitations of the present study:

1. The study was conducted among 30 MBBS Phase III Part I students and 7 faculty assessors, which limits the statistical power and generalizability of the findings.
2. As the study participants were undergraduate students undergoing routine departmental postings, the possibility of response bias in feedback responses cannot be completely excluded despite assurances regarding voluntary participation, anonymity, and non-impact on academic evaluation.
3. As the study was carried out in a single medical institution, the findings may reflect local teaching–learning practices, faculty experience, and institutional culture.
4. The study assessed entrustment levels at a single point during pilot implementation. Progression of entrustment over time, retention of skills, and transition from supervised to independent performance could not be evaluated due to the absence of longitudinal assessment.
5. Student and faculty satisfaction and feasibility were measured using self-reported responses, which are susceptible to response bias
6. The study did not include a parallel comparison with traditional assessment approaches (e.g., checklist-based practical examination), limiting the ability to objectively determine whether EPA-based assessment resulted in superior performance or learning outcomes.

Conclusions:

It is concluded that the developed EPA module for assessment of nutritional status in a 3-year-old child demonstrated high content validity, with I-CVI values ranging from 0.86 to 1.00 and an overall S-CVI of 0.94, indicating strong agreement among subject experts regarding the relevance, clarity, and representativeness of the defined milestones. Feedback from both students and faculty revealed a high level of satisfaction with the EPA-based assessment approach, reflecting its acceptability and perceived educational value among key stakeholders. The EPA module was also found to be feasible within the existing undergraduate teaching–learning and assessment framework, suggesting its potential for integration into routine formative assessment in Community Medicine. Overall, the findings indicate that EPA-based assessment offers a structured, authentic, and integrative approach for evaluating clinical competence among undergraduate medical students.

Thus, EPA-based assessment may be integrated into undergraduate medical education within the CBME framework to support authentic, workplace-based evaluation of clinical and public health competencies. Faculty development and orientation programs are essential to ensure consistent understanding of entrustment and effective implementation. Further multicentric and longitudinal studies are recommended to evaluate scalability, progression of entrustment, and long-term impact on competency development.

ACKNOWLEDGEMENTS

This study was part of the Advance Course in Medical Education (ACME) project and thus we extend our sincere gratitude to ACME faculty at Christian Medical College (CMC) Ludhiana.

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ANNEXURE-1

Milestone Rubric for EPA for measuring and interpreting mid-upper arm circumference in a 3-year-old child

Level 1: Knowledge only, can observe	Level 2: Can do under direct supervision	Level 3: Can do under loose supervision	Level 4: Can do independently	Level 5: Can teach others
Has understanding of indications for weight measurement and relevant anatomical marking				
Has clear knowledge about the indications and demonstrates the anatomical markings for weight measurement.	Has understanding of the technique of weight measurement.	Has understanding of the technique of weight measurement and its indications.	Can independently perform weight measurements.	Can demonstrate weight measurement to juniors.
Has understanding of indications for height measurement and relevant anatomical marking				
Has clear knowledge about the indications and demonstrates the anatomical markings for height measurement.	Has understanding of the technique of height measurement.	Has understanding of the technique of height measurement and its indications.	Can independently perform height measurements.	Can demonstrate height measurement to juniors.
Has understanding of indications for MUAC measurement and relevant anatomical marking				
Has clear knowledge about the indications and demonstrates the anatomical markings for MUAC measurement.	Has understanding of the technique of MUAC measurement.	Has understanding of the technique of MUAC measurement and its indications.	Can independently perform MUAC measurement.	Can demonstrate MUAC measurement to juniors.
Obtaining informed consent				
Knows about the importance of obtaining informed consent prior to performing the procedure.	Tells the parents and child about the procedure without explaining it.	Explains the procedure to the child and the parents.	Obtains written informed consent from the parents.	Can teach juniors about how to obtain written informed consent before the procedure.
Clinical judgement				
No knowledge about the anthropometric measurements or its interpretation.	Knows about anthropometric measurements but not about its interpretation.	Knows about anthropometric measurements and can interpret the findings.	Knows about anthropometric measurements, can interpret the findings and prepare a management plan.	Can teach others about the interpretation, correlation with history, management plan and preventive strategies.
Communication skills				
Tries to communicate with the parents	Can communicate with the parents confidently	Has confidence in communicating with the parents and respond to their queries about MUAC	Can advise parents about the findings of anthropometric measurements.	Can communicate the findings to junior effectively.

Assessment plan: 1 assessment per student.

30 students

30 students x 1 assessment = 30 assessments total.