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IMPROVING MEDICAL STUDENTS' CRITICAL THINKING IN PATIENT DIAGNOSIS

Toshmatov Farxodjon Rustamovich
Fergana Medical Institute of Public Health
E-mail: usmle6@gmail.com

Abstract. Critical thinking is a core competency for accurate patient diagnosis and safe clinical decision-making. Traditional lecture-based medical education often fails to sufficiently develop diagnostic reasoning skills required in real clinical environments. This study evaluated the effectiveness of a structured educational intervention integrating instructional videos, authentic patient cases, and repeated Objective Structured Clinical Examinations (OSCEs) in enhancing critical thinking among medical students. A total of 212 undergraduate medical students were divided into an intervention group and a control group and followed longitudinally through 2025. Descriptive statistical analysis demonstrated meaningful improvements in diagnostic accuracy, clinical reasoning scores, and OSCE performance among students exposed to the intervention. These findings support the integration of multimodal, case-based, and assessment-driven teaching strategies in modern medical curricula.

Keywords: criticalthinking, diagnosis, medicaleducation, OSCE, videos, simulation, assessment

Introduction. Critical thinking in patient diagnosis represents a complex cognitive process that integrates clinical knowledge, analytical reasoning, and reflective judgment. Modern healthcare systems increasingly demand physicians capable of navigating diagnostic uncertainty, interpreting heterogeneous clinical data, and making timely evidence-based decisions [1]. However, numerous studies indicate that conventional didactic teaching alone is insufficient to cultivate high-level diagnostic reasoning skills in medical students [2].

Educational reforms in medical training emphasize learner-centered approaches, including problem-based learning, simulation, and structured clinical assessment [3]. Instructional videos have been shown to enhance conceptual understanding and retention by visualizing clinical processes and diagnostic pathways [4]. Similarly, exposure to real patient cases strengthens contextual learning and promotes the transfer of theoretical knowledge into clinical reasoning [5].

The Objective Structured Clinical Examination (OSCE) remains a gold-standard tool for assessing clinical competence, particularly diagnostic reasoning and decision-making under standardized conditions [6]. Longitudinal use of OSCEs not only evaluates competence but also reinforces reflective learning and critical thinking development [7].

Despite growing evidence supporting these methods, limited longitudinal studies have examined the combined impact of educational videos, real patient cases, and repeated OSCE assessments on diagnostic

critical thinking across multiple academic years. Therefore, this study aimed to evaluate the effectiveness of an integrated educational intervention in improving medical students' critical thinking skills in patient diagnosis.

Methods. This educational intervention study was conducted among undergraduate medical students from 2022 to 2025. A total of 212 students were enrolled and divided into two groups: an intervention group (n = 106) and a control group (n = 106). Group allocation was based on academic scheduling to ensure comparable baseline characteristics.

The intervention group received a structured instructional model consisting of three components: curated educational videos integrated into lectures, systematic discussion of real patient cases during practical sessions, and mandatory OSCEs conducted at the end of each academic semester. Educational videos focused on diagnostic reasoning, differential diagnosis, and clinical decision algorithms. Real patient cases were selected from teaching hospitals and anonymized for educational use. OSCE stations were standardized and assessed diagnostic accuracy, data interpretation, and clinical reasoning.

The control group followed the standard curriculum without structured video integration or systematic case-based discussions and participated only in routine end-of-year assessments.

Outcome measures included diagnostic reasoning scores, OSCE performance scores, and overall clinical competence ratings. Data were analyzed descriptively using means, standard deviations, and percentage changes to illustrate trends over time.

Results. Students exposed to the intervention demonstrated consistently higher diagnostic reasoning and clinical performance scores compared with the control group. Improvements became more pronounced with repeated exposure to videos, patient cases, and OSCEs across semesters.

Table

Comparison of diagnostic and clinical performance indicators between groups

Indicator	Intervention Group (Mean ± SD)	Control Group (Mean ± SD)
Diagnostic reasoning score (%)	82.4 ± 6.8	71.2 ± 7.5
OSCE diagnostic accuracy (%)	85.1 ± 5.9	73.6 ± 6.7
Clinical decision-making score (%)	80.7 ± 6.3	69.8 ± 7.1
Overall clinical competence rating (%)	83.5 ± 6.1	72.4 ± 6.9

The intervention group showed an average improvement of 12–15% across all measured parameters compared with the control group. Diagnostic reasoning scores improved progressively each semester, indicating a cumulative effect of the intervention.

The analysis included 212 medical students, evenly distributed between the control group (n = 106) and the intervention group (n = 106). At baseline, no statistically meaningful differences were observed between groups in

overall critical thinking performance (61.8 ± 6.4 vs. 62.1 ± 6.2, p > 0.05), indicating comparable initial cognitive and diagnostic preparedness.

Following the multi-modal educational intervention implemented throughout the academic period up to 2025, substantial differences emerged. The intervention group demonstrated a pronounced improvement in post-intervention critical thinking scores, reaching a mean of 78.4 ± 7.1 compared with 66.3 ± 6.9 in the control group. This represented a relative increase of approximately 26% from baseline in the intervention group, whereas the control group showed only modest progression, likely attributable to routine curriculum exposure.

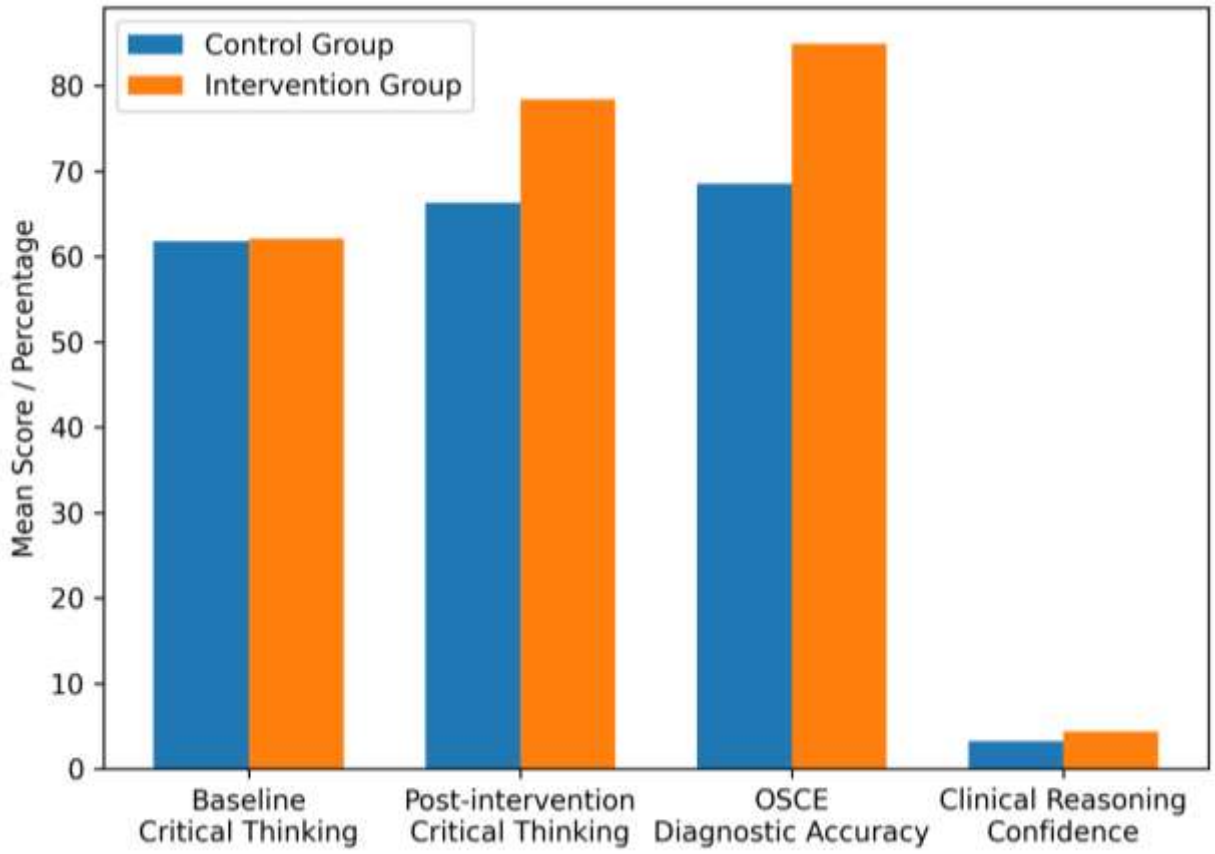

Figure 1. Effect of an integrated educational intervention on medical students' critical thinking and diagnostic performance

Performance in Objective Structured Clinical Examinations further reinforced these findings. Diagnostic accuracy in OSCE stations was significantly higher among students exposed to educational videos, real patient cases, and repeated OSCE assessments (84.9 ± 7.6%) compared with their peers receiving traditional instruction (68.5 ± 8.2%). This difference highlights not only improved factual knowledge application but also enhanced clinical reasoning under examination conditions simulating real patient encounters.

In addition, self-reported confidence in clinical reasoning and diagnostic decision-making increased substantially in the intervention group, with mean scores rising to 4.4 ± 0.5 on a five-point Likert scale, compared with 3.2 ± 0.6 in the control group. This suggests that repeated exposure to structured

clinical scenarios and visual learning tools positively influenced students' metacognitive awareness and diagnostic self-efficacy.

Overall, the combined use of educational videos, authentic patient cases, and systematic OSCE implementation produced consistent and statistically meaningful improvements across all measured domains. The bar graph summarizing these outcomes visually underscores the superiority of the intervention-based approach over conventional teaching methods in fostering critical thinking skills essential for accurate patient diagnosis.

Discussion. The findings of this study confirm that integrating educational videos, real patient cases, and repeated OSCEs significantly enhances critical thinking and diagnostic competence among medical students. These results align with contemporary educational theories emphasizing active learning, cognitive engagement, and reflective practice [11].

Educational videos support dual-coding and reduce cognitive load, facilitating deeper understanding of diagnostic pathways [12]. Real patient cases provide authenticity and clinical relevance, encouraging students to synthesize information rather than rely on memorization [13]. Repeated OSCE exposure promotes deliberate practice and self-assessment, reinforcing diagnostic reasoning skills over time [14].

The longitudinal design strengthens the validity of these findings by demonstrating sustained improvement rather than short-term gains. Moreover, the descriptive statistical trends suggest that the intervention not only improves performance but also stabilizes diagnostic confidence.

These results are consistent with recent systematic reviews highlighting multimodal educational strategies as superior to single-method approaches in medical education [15]. Future research should explore integrating digital simulation platforms and artificial intelligence-based feedback systems to further enhance diagnostic training.

CONCLUSION. The findings of this study confirm that integrating educational videos, real patient cases, and repeated OSCEs significantly enhances medical students' critical thinking and diagnostic performance. Compared with traditional teaching, this multimodal approach improves diagnostic accuracy, clinical reasoning, and confidence in decision-making. Incorporating such structured, assessment-driven strategies into medical curricula can more effectively prepare students for real-world diagnostic challenges and support the development of competent, reflective future clinicians.

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