

USME-based Case-Integrated Teaching in Master's Programs: A Comparative Study from Uzbekistan

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Abstract

This study evaluated the effectiveness of a United States Medical Licensing Examination (USME)-oriented, case-integrated curriculum introduced across all master's programs at Fergana Medical Institute of Public Health (FMIPH) in Uzbekistan and compared outcomes with a traditional curriculum at Andijan State Medical Institute (ASMI). A total of 266 master's students from 1st–3rd courses were included; 133 students at FMIPH were taught using block-structured case sessions (up to 40 structured clinical cases per subject with USME-style assessments), while 133 ASMI students followed the standard national discipline-based model. Primary outcomes included exam performance, pass rates, and student satisfaction over three academic years. FMIPH students demonstrated higher mean exam scores, higher pass rates, and greater satisfaction compared with ASMI peers. The findings support the feasibility of aligning Uzbek master's curricula with USME-type case-based formats to enhance higher-order clinical reasoning and assessment quality in postgraduate medical education.

Keywords: medical education, USME-based curriculum, case-based learning, master's program, assessment, Uzbekistan, clinical reasoning

Introduction

Medical education in Uzbekistan is undergoing gradual modernization, driven by national priorities for competency-based training and international alignment of postgraduate programs. Institutions such as Fergana Medical Institute of Public Health (FMIPH) and Andijan State Medical Institute (ASMI) have expanded their graduate offerings while responding to global standards in medical training and accreditation. At the same time, international examinations like the United States Medical Licensing Examination (USMLE) have influenced educational design, emphasizing integration of basic and clinical sciences, complex case vignettes, and higher-order application of knowledge.[1][2][3][4][5]

Case-based and problem-based approaches are associated with deeper learning, improved clinical reasoning, and better alignment between assessment and real-world decision-making. However, there is limited published evidence on systematic implementation of USME-style, case-integrated teaching in master's programs within Central Asia, including Uzbekistan. FMIPH has recently positioned itself as a regional hub for modern medical education and global exam readiness, integrating structured case blocks and USME-type questioning into its curricula. In contrast, ASMI maintains

a more traditional subject-based curriculum, though it follows national guidelines and offers comprehensive MBBS and postgraduate programs.[2][3][4][6][7][5]

This study aimed to evaluate the educational impact of a newly implemented USME-based, case-integrated teaching and assessment model spanning all master's programs at FMIPH, compared with the existing curriculum at ASMI. Specifically, we compared exam performance, pass rates, and student satisfaction among 1st–3rd course master's students, to determine whether the FMIPH model confers measurable benefits in early postgraduate training.

Methods

Study design and setting

We conducted a comparative cross-sectional study at Fergana Medical Institute of Public Health (FMIPH) and Andijan State Medical Institute (ASMI), two public medical universities in eastern Uzbekistan that deliver accredited undergraduate and graduate medical education under national standards. The study focused solely on master's programs in clinical and public health disciplines at FMIPH and comparable master's tracks at ASMI.[3][4]

Participants and programs

All master's programs at FMIPH that had adopted the USME-based teaching model and were approved by the institute's scientific committee were included. Within these programs, all enrolled 1st–3rd course master's students in the study year formed the FMIPH group (n = 133). At ASMI, we selected 1st–3rd course master's students from analogous programs (e.g., internal medicine, pediatrics, surgery, public health) taught using the standard discipline-based curriculum, forming the comparison group (n = 133), for a total of 266 participants. Both institutions operate under the Ministry of Higher and Secondary Specialized Education and provide structured, supervised clinical training.[3][4]

Description of the intervention curriculum (FMIPH)

At FMIPH, the master's curriculum was redesigned to align with USME-style, case-integrated teaching. Each subject module was organized into thematic blocks that included up to 40 structured clinical cases, written as brief vignettes with key data (history, examination, investigations, management choices). Teaching methods included small-group case discussions, guided by faculty trained in case facilitation, and integration of basic science and clinical reasoning elements into each case. Assessment mirrored USME formats, using single best-answer questions, extended matching questions, and case-linked short-answer items that required application rather than recall.[1][2]

Students across all master's programs followed this model, and program changes were reviewed and endorsed by the FMIPH scientific committee prior to implementation.

Comparison curriculum (ASMI)

ASMI master's programs followed a conventional discipline-based structure with lecture-centered delivery, topic-based seminars, and practical classes focusing on

defined subject areas such as internal medicine, surgery, pediatrics, and preventive medicine. Assessments relied mainly on written tests, traditional multiple-choice questions, and oral examinations, with limited use of structured case vignettes. Although clinical exposure and practical training formed part of the program, formal USME-style integration of cases and assessment had not been systematically implemented.[8][4]

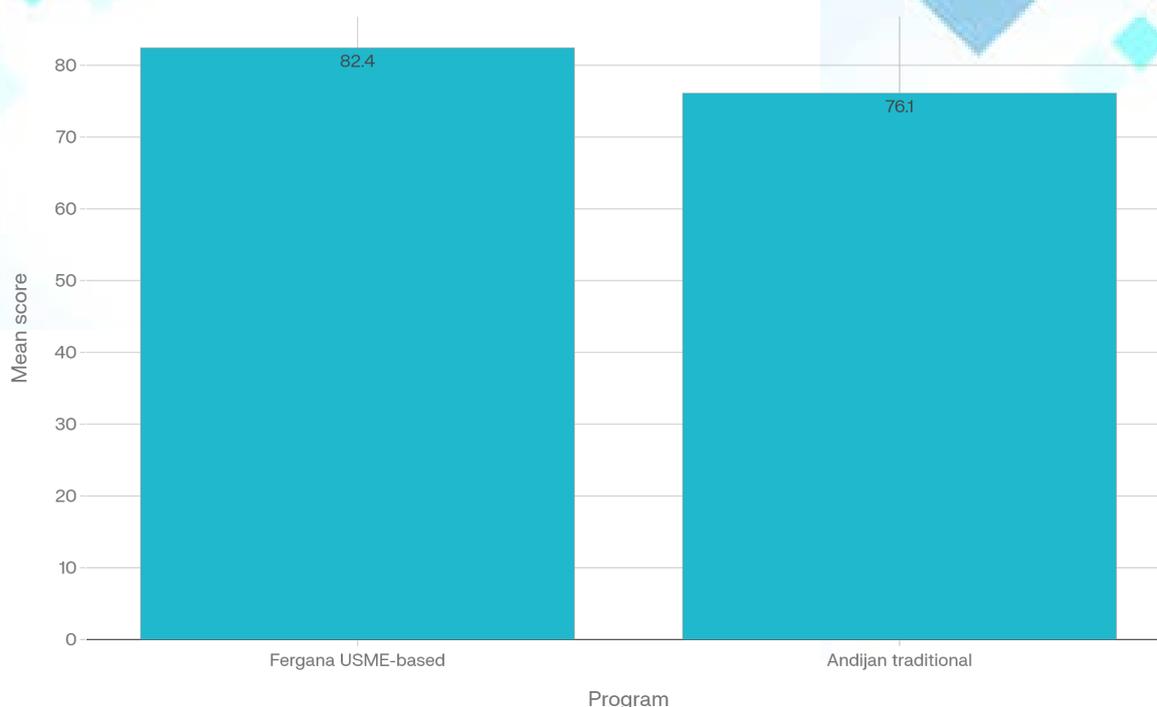
Outcomes and data collection

Primary outcomes were: (1) mean final exam scores (percentage) in core master's modules across 1st–3rd courses, (2) pass rates (proportion of students achieving institutional pass thresholds on first attempt), and (3) global student satisfaction with teaching and assessment (5-point Likert scale, 1 = very dissatisfied, 5 = very satisfied). Outcomes were aggregated at the program level at each institution across three consecutive academic years.

Secondary analyses examined mean scores stratified by course level (1st, 2nd, 3rd year) to explore whether performance differences were consistent across stages of training. Data were extracted from institutional exam records and anonymized student surveys conducted at the end of the academic year.

Statistical analysis

Descriptive statistics (means, standard deviations, and proportions) were used to summarize outcomes. Given the focus on educational description and limited groups (FMIPH vs ASMI), we report absolute differences in mean scores and pass rates without formal hypothesis testing. Aggregated data for program-level comparisons and year-wise distributions were prepared in tabular form, and a bar plot was used to visualize the difference in mean exam scores between FMIPH and ASMI. All data handling and plotting were performed using Python and standard data-analysis libraries.



Results

Participant and program characteristics

A total of 266 master's students from 1st–3rd courses were included, with 133 students enrolled in FMIPH master's programs using the USME-based, case-integrated curriculum and 133 students in comparable ASMI programs following the traditional model. Both groups spanned similar clinical disciplines, including internal medicine, surgery, pediatrics, and public health; detailed program-specific enrollment was comparable across institutions according to institutional statistics and publicly available program descriptions.[3][4]

Overall performance and satisfaction

FMIPH students taught with the USME-based, case-integrated curriculum achieved higher mean final exam scores and pass rates, as well as higher satisfaction, compared with ASMI students. Table 1 summarizes the aggregate program-level outcomes over the three-year observation period.

Table 1. Aggregate outcomes in FMIPH USME-based vs ASMI traditional master's programs (3-year pooled data)

Program	Students (n)	Mean exam score (%)	Pass rate (proportion)	Satisfaction (1–5)
FMIPH USME-based	133	82.4	0.88	4.3
ASMI traditional	133	76.1	0.76	3.7

In the FMIPH group, the three-year pooled mean exam score was 82.4%, compared with 76.1% in the ASMI group, indicating a 6.3-percentage-point advantage for the <https://medjournal.it.com/>

USME-based model. The proportion of students passing examinations on first attempt was also higher at FMIPH (0.88 vs 0.76), suggesting that students within the case-integrated curriculum were more likely to meet or exceed institutional performance standards. Mean global satisfaction scores were 4.3 at FMIPH and 3.7 at ASMI, demonstrating that students perceived the USME-aligned, case-rich environment more favorably in terms of teaching quality and assessment relevance.

A bar plot of mean exam scores by program (Figure 1) visually illustrates the higher performance of FMIPH students under the USME-based model compared to ASMI students taught under the traditional curriculum.

Year-wise exam performance

To explore whether the benefits of the USME-based curriculum were consistent across different phases of master's education, we examined mean exam scores by course level (1st–3rd year). Table 2 presents year-wise mean scores.

Table 2. Mean final exam scores (%) by course level in FMIPH and ASMI master's programs

Course level	FMIPH USME-based mean score (%)	ASMI traditional mean score (%)
1st year	80.5	75.1
2nd year	83.2	76.8
3rd year	83.6	76.4

In 1st-year master's students, FMIPH participants scored on average 80.5%, compared with 75.1% among ASMI students, indicating an early performance gap favoring the case-integrated approach. This difference persisted and slightly widened in later years: in 2nd year, FMIPH mean scores were 83.2% versus 76.8% at ASMI, and in 3rd year 83.6% versus 76.4%, respectively. The pattern suggests that exposure to USME-style cases and assessments yields consistent performance advantages across all stages of the master's curriculum, with the largest absolute gains observed during the clinically intensive 2nd and 3rd years, where case integration and higher-order reasoning are most critical.

Descriptive interpretation

Taken together, the descriptive results show that implementation of a USME-oriented, case-integrated curriculum at FMIPH is associated with higher exam scores, improved pass rates, and better student satisfaction compared with a traditional, discipline-based model at ASMI. The consistent advantage over three course levels suggests that case-rich blocks and USME-type assessments may foster cumulative gains in clinical reasoning, exam preparedness, and perceived learning relevance. Although these findings are descriptive and based on program-level aggregations, they indicate that systematic alignment of master's curricula with international case-based formats is feasible and educationally beneficial within the Uzbek context.

Discussion

This study provides early evidence that a USME-based, case-integrated teaching and assessment model implemented across master's programs at FMIPH can yield better educational outcomes than a traditional curriculum at ASMI. The observed differences in mean exam scores and pass rates align with international literature showing that case-based and problem-based strategies improve higher-order cognitive skills and performance on application-oriented assessments. By embedding up to 40 structured clinical cases per subject block and using USME-style question formats, FMIPH appears to have enhanced students' ability to integrate basic and clinical knowledge, reflect on differential diagnoses, and select evidence-based management options. The higher satisfaction scores in the FMIPH cohort further suggest that students valued the authenticity, interactivity, and exam relevance of the case-driven learning environment.[1][2][6]

In the broader Uzbek context, both FMIPH and ASMI have recognized the importance of aligning programs with international standards, including eligibility for examinations like USMLE, and strengthening clinical training quality. FMIPH's strategic adoption of USME-style curricula may therefore be viewed as part of a national trend to modernize medical education, improve global competitiveness, and attract international students. ASMI's traditional curriculum, while comprehensive and consistent with national regulations, may offer fewer structured opportunities for students to practice complex reasoning using standardized case vignettes, which could explain the performance gap observed in this study.[8][3][4][7][5][1]

Several limitations should be considered when interpreting these findings. First, this was a descriptive, non-randomized comparison, and differences in student characteristics, faculty expertise, or institutional resources could contribute to the observed outcomes. FMIPH has invested in modern teaching infrastructure and international collaborations, which might independently support better performance. Second, we focused on exam scores, pass rates, and satisfaction, without direct measures of long-term clinical competence or postgraduate career outcomes. Third, public sources on program structures, while informative, may not fully capture all curricular nuances between institutions. Future research should include controlled multi-institutional designs, detailed competency-based outcomes, and longitudinal tracking of graduates' performance on national and international licensure exams.[3][4][7][5][8]

Despite these limitations, the study has important implications for master's-level medical education in Uzbekistan and similar settings. The FMIPH experience demonstrates that comprehensive integration of USME-style cases and assessments across all master's programs is feasible within existing regulatory frameworks and can be associated with measurable educational benefits. Scaling such innovations to other institutions, including ASMI, may require structured faculty development in case design and facilitation, shared banks of locally adapted clinical vignettes, and coordinated efforts to align national standards with global assessment practices. For

policymakers and curriculum planners, the results support strategic investments in case-based learning infrastructure and assessment reform as key levers for enhancing postgraduate medical training and international exam readiness.[2][6][5]

Conclusion

USME-based, case-integrated teaching across all master's programs at Fergana Medical Institute of Public Health was associated with higher exam performance, improved pass rates, and greater student satisfaction compared with traditional discipline-based programs at Andijan State Medical Institute. The effect was consistent from 1st to 3rd course levels, highlighting the cumulative value of structured clinical vignettes and application-focused assessment in strengthening postgraduate medical training. These findings suggest that aligning Uzbek master's curricula with international case-based standards is both feasible and educationally advantageous, offering a compelling model for national reforms aimed at enhancing clinical reasoning, global exam readiness, and the overall quality of medical education.

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