OPEN ACCESS ORIGNAL ARTICLE

THE EFFECTIVENESS OF OPEN BOOK ASSIGNMENTS IN ENHANCING LEARNING ACROSS BASIC AND CLINICAL MEDICAL SCIENCES: A MULTI-YEAR MBBS PERSPECTIVE.

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ABSTRACT

BACKGROUND: Deep learning and clinical reasoning may be limited by the traditional evaluation methods used in medical school, which frequently place an emphasis on rote memory. OBAs, or open book assignments, are a cutting-edge method of encouraging critical thinking, information integration, and real-world application. Although OBAs are being used in some areas, such as pharmacology, little is known about how they affect students from different years across disciplines. **OBJECTIVES:** To assess how well OBAs work in enhancing the academic performance, critical thinking abilities, and learner satisfaction of MBBS students in their first through fourth years in the following important subjects: anatomy, physiology, biochemistry, pathology, pharmacology, and community medicine.**METHODS:** At Suleman Roshan Medical College, a prospective, multidisciplinary study was carried out between September 2023 and January 2024. 320 MBBS students in all, 80 annually from first to fourth grade, took part. Students finished open-book assignments related to their courses in public health (Community Medicine), paraclinical (Pathology, Pharmacology), and basic science (Anatomy, Physiology, Biochemistry). Academic gains were quantified by pre- and post-assessment scores, while satisfaction and perceived benefits were assessed by surveys. **RESULTS:** The mean pre-assessment score was 66.9%, while the post-assessment score was 84.2%, indicating a significant improvement in overall academic performance ($p < 0.001$). The clinical application tasks in pathology and community medicine showed the greatest improvements. Feedback from students was very positive: 76% felt more prepared for making medical decisions in the real world, 85% said their critical thinking had improved, and 80% said they preferred OBAs over standard assessments. **CONCLUSION:** OBAs work well in a variety of MBBS course levels and subjects. They encourage critical thinking, inter-subject integration, and greater comprehension. Future physicians' academic performance and professional preparedness may be improved by using OBAs as a regular formative tool.

KEYWORDS: Open Book Assessment, Medical Education, Critical Thinking, Multidisciplinary Learning, MBBS Students

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INTRODUCTION

Medical education spans a wide range of disciplines that evolve from basic sciences in the early years to clinical and community-based subjects in later stages. Traditional assessments often focus on factual recall rather than the ability to apply concepts in real-world scenarios[1]. This restriction is most noticeable in first- and second-year courses like anatomy, physiology, and biochemistry. It also persists in clinically focused courses like pathology, pharmacology, and community medicine in third and fourth years. Medical education covers a broad range of subjects, from the fundamental sciences in the early years to clinical and community-based research in later stages. Research on the impact of giving closed-book vs open-book tests on long-term learning is summarized in this review. Two strong conclusions emerged from the mixed overall effects of assessment format on learning: students preferred taking open-book assessments, and closed-book assessments resulted in a lower rate of forgetting (i.e., the percentage change in information participants remembered on an initial test compared to that of the final test) than open-book assessments[2]. Conventional assessments sometimes place greater emphasis on the capacity to apply concepts in real-world scenarios than on fact recall. Anatomy, physiology, and biochemistry are among the first- and second-year courses where this constraint is most apparent. It also continues in clinically oriented courses such as community medicine, pharmacology, and pathology in the third and fourth years. Unlike closed-book exams, OBAs help with clinical reasoning, problem-solving, and knowledge synthesis[3,4]. In order to evaluate the overall educational value of OBAs, this study examines their utilization across a range of specialties and MBBS year groups.

METHODOLOGY

Study Design and Participants: Participants and Study Design: From September 2023 to January 2024, Suleman Roshan Medical College carried out a prospective, quasi-experimental study. 320 MBBS students from four different years participated: first-year anatomy and physiology, third-year pathology and pharmacology, second-year biochemistry, and fourth-year community medicine. The Institutional Review Board granted ethical clearance.

OBA Implementation: Assignments were tailored for each subject:

1st Year: Anatomical diagrams with clinical correlations, physiological case analyses.

2nd Year: Biochemical pathways applied to metabolic disorders.

3rd Year: Drug selection and rationale in simulated patient cases (Pharmacology); differential diagnosis and histopathology interpretation (Pathology).

4th Year: Public health intervention planning based on real-world epidemiological data (Community Medicine).

Each assignment emphasized:

Integration of core knowledge

Application in problem-based scenarios

Justification using literature and clinical reasoning

Assessment Tools: Pre- and post-tests (MCQs and SAQs) were administered for each subject. Surveys collected feedback on utility, clarity, and learning value of OBAs[5].

Data Analysis: Paired t-tests assessed knowledge gains; descriptive statistics summarized perception data.

RESULTS

Participant Demographics: Of the 320 enrolled students, 298 completed all assessments (response rate: 93.1%). Mean age: 21.6 ± 1.3 years; gender ratio: 51% female, 49% male.

Academic Improvement: Across all year groups, post-assessment scores improved significantly:
1st Year: Pre = 65.8%; Post = 82.1%
2nd Year: Pre = 66.4%; Post = 83.7%
3rd Year: Pre = 67.5%; Post = 85.9%
4th Year: Pre = 68.0%; Post = 84.8% (All $p < 0.001$)

TABLE 1. DESCRIPTIVE STATISTICS FOR ASSESSMENT SCORES

Year	Pre-Assessment Mean (%)	Post-Assessment Mean (%)	Improvement (%)
1st Year	65.8	82.1	16.3
2nd Year	66.4	83.7	17.3
3rd Year	67.5	85.9	18.4
4th Year	68.0	84.8	16.8

PERCEPTION SURVEY HIGHLIGHTS:
85% agreed OBAs promoted deeper understanding
80% found assignments clinically relevant
76% preferred OBAs over conventional closed-book exams
72% reported increased motivation and engagement

TABLE 2. SURVEY RESPONSE SUMMARY

Survey Question	Agreement (%)
OBAs promoted deeper understanding	85%
Assignments were clinically relevant	80%
Preferred OBAs over traditional exams	76%
Increased motivation and engagement	72%

Qualitative Themes:
1st Year: "Assignments helped visualize anatomical structures in a clinical context."
2nd Year: "I understood metabolic disorders much better by solving case-based biochemical problems."
3rd Year: "Clinical pharmacology tasks improved my prescription-writing confidence."
4th Year: "The assignment in community medicine gave me real insight into public health planning."

DISCUSSION

This multi-year, multi-subject study demonstrates the significant potential of OBAs to promote critical thinking, retention, and multidisciplinary integration. Beyond memorization, students were encouraged to investigate, reason, and synthesize knowledge—skills crucial to modern medical practice[6,7].

Comparative Insights: Our results are consistent with international research

showing that OBAs are more effective than standard tests at promoting higher-order thinking. Benefits for students of all academic levels demonstrate how OBAs can be modified to match foundational, paraclinical, and public health material[8,9]. Our findings support global studies demonstrating that OBAs are superior to traditional assessments in fostering higher-order thinking. Benefits for students of various academic levels show how OBAs can be adapted to align with public health, paraclinical, and foundational content[10,11].

Advantages: Facilitates long-term retention
Enhances clinical and community-based application
Supports independent and self-directed learning

CHALLENGES: Some students reported difficulty managing time and synthesizing large volumes of data. Others relied heavily on resources, risking superficial learning. These concerns can be addressed through clearer rubrics and structured guidance. Some students said they had trouble organizing their time and combining a lot of info. Others risked superficial learning by relying too much on resources. Clearer rubrics and organized instructions can allay these worries.

LIMITATIONS: Single-institution setting
No control group (closed-book only)
Subjective biases in student feedback

RECOMMENDATIONS

Expand RCTs on pedagogical formats across multiple institutions.

Research-skills curriculum integrated throughout MBBS programs.

CONCLUSION

For MBBS students, open-book assignments are a game-changing teaching tool. They enhance learning in the areas of anatomy, physiology, biochemistry, pathology, pharmacology, and community medicine when they are carefully created. OBAs provide a successful, adaptable, and learner-centered strategy that is in line with clinical and community realities as the medical education landscape changes.

ETHICS APPROVAL: The Erc Gave Ethical Review Approval.

CONSENT TO PARTICIPATE: Written And Verbal Consent Was Taken From Subjects And Next Of Kin.

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