Effectiveness of Integrative Case-Based Learning and Case Seminar Approaches in Teaching Pathology Laboratory for the PharmD Program

Garalla HM, Burgeia A

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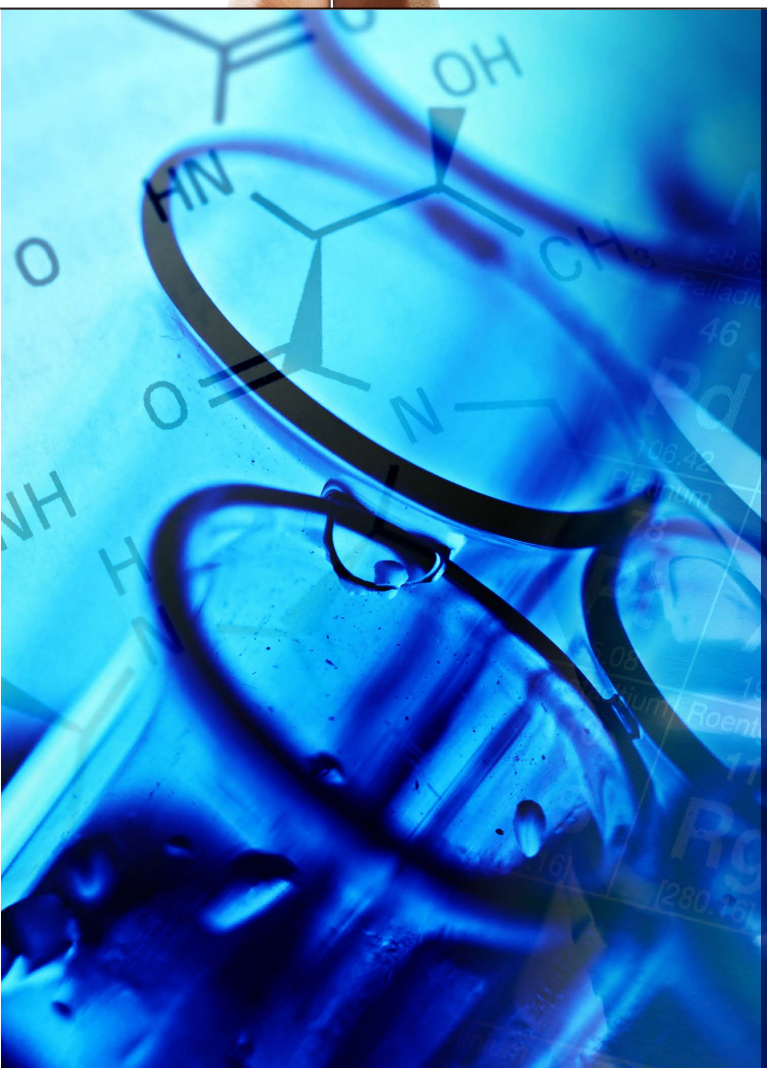

Evaluating the Effect of Online Research Methodology Course on Undergraduate Research Skills

Cumulative Identity-Based Stress in Medical Education: The Trauma of Microaggressions

Iraqi Medical Students' Perceptions Towards Undergraduate Breast Curricula During the COVID-19 Pandemic

Relationship Between Emotional Intelligence and Academic Performance

Therapeutic Potential of Natural Compounds in Neurotransmitter Diseases

Medical Education for Community Health Workers: Empowering ASHAs, Midwives, and Frontline Workers for Improved Public Health Outcomes

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The Use of Data Analytics in Improving Health Education Outcomes

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Introduction

The World Journal of Medical Education and Research (WJMER) (ISSN 2052-1715) is an online publication of the Doctors Academy Group of Educational Establishments. Published on a quarterly basis, the aim of the journal is to promote academia and research amongst members of the multi-disciplinary healthcare team including doctors, dentists, scientists, and students of these specialties from around the world. The principal objective of this journal is to encourage the aforementioned, from developing countries in particular, to publish their work. The journal intends to promote the healthy transfer of knowledge, opinions and expertise between those who have the benefit of cutting edge technology and those who need to innovate within their resource constraints. It is our hope that this will help to develop medical knowledge and to provide optimal clinical care in different settings. We envisage an incessant stream of information flowing along the channels that WJMER will create and that a surfeit of ideas will be gleaned from this process. We look forward to sharing these experiences with our readers in our editions. We are honoured to welcome you to WJMER.

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A WELCOME MESSAGE FROM THE EDITORS

Dear Reader,

It is our great pleasure to present the thirty-second edition of the World Journal of Medical Education and Research (WJMER). This issue brings together a diverse collection of scholarly articles that reflect current innovations, challenges, and opportunities in medical education, health sciences, and public health across global contexts. The contributions highlight the evolving nature of healthcare education, with a particular emphasis on learner development, equity, pedagogy, and improvement at a systems level.

The opening article by Alarar et al. evaluates the effectiveness of an online scientific research methodology course for undergraduate students at Syrian universities. Using pre- and post-course assessments, the authors demonstrate significant improvements in students' research knowledge and skills, underscoring the value of structured e-learning approaches in strengthening research capacity, particularly in crisis-affected and resource-limited settings.

In the following article, Ponce-Garcia et al. explore microaggressions in medical education and reframe them as cumulative, identity-based trauma rather than isolated interpersonal incidents. Drawing on interdisciplinary evidence, the paper highlights the biological, psychological, and educational consequences of chronic identity-based stress and calls for trauma-informed institutional reforms to foster inclusive and supportive learning environments.

The next study by Nojoum et al. examines Iraqi medical students' perceptions of undergraduate breast curricula during the COVID-19 pandemic. Through qualitative interviews, the authors identify key themes related to e-learning, gaps in breast disease education, and barriers to clinical examination. The findings reveal widespread dissatisfaction with current teaching approaches while highlighting structural challenges that were exacerbated by the pandemic.

Farooq et al. investigate the relationship between emotional intelligence and academic performance amongst undergraduate medical students in Pakistan. The study demonstrates a significant positive correlation between emotional intelligence and academic success, suggesting that emotional competencies may play an important role in student performance, stress management, and motivation within demanding medical programmes.

This issue also includes a narrative review by Pratham and Bhalekar on the therapeutic potential of natural compounds in neurotransmitter-related diseases such as Parkinson's and Alzheimer's disease. The authors discuss emerging evidence on compounds such as curcumin and flavonoids, highlighting their neuroprotective and anti-inflammatory properties while emphasising the need for further research to translate these findings into effective clinical applications.

Singha and Majumder focus on medical education for community health workers. The paper synthesises evidence on educational strategies that enhance competencies, motivation, and public health outcomes, advocating for competency-based, digitally-supported, and rights-based approaches to professional development as a foundation for equitable health systems.

The effectiveness of integrative case-based learning and case seminar approaches in teaching pathology laboratory concepts to PharmD students is examined by Garalla and Burgeia in the next study. The findings indicate that active learning strategies significantly improve knowledge acquisition, critical thinking, and clinical preparedness compared to traditional teaching methods, reinforcing the value of learner-centred pedagogies.

In the subsequent article, Ayub Khan et al. assess alumni perceptions of a Master in Health Professions Education (MHPE) program in Pakistan. Using the RE-AIM framework, the study highlights perceived gains in teaching capacity, curriculum development, and leadership skills, while identifying areas for improvement in educational evaluation and mentorship to maximise programme impact across career stages.

The final article by John et al. explores the use of data analytics in improving health education outcomes, presenting a human-centred framework that integrates technology, pedagogy, ethics, and organisational capability. The paper offers practical recommendations for education leaders, demonstrating how analytics can enhance learner engagement, institutional decision-making, and community health literacy when implemented responsibly.

We sincerely hope that you find the articles in this edition educational, thought-provoking, and relevant to your academic and professional interests. Together, these contributions reflect WJMER's ongoing commitment to advancing scholarship that informs practice, promotes equity, and strengthens health education globally.

Ms Karen Au-Yeung
Associate Editor

Dr Rebecca Williams
Associate Editor

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Effectiveness of Integrative Case-Based Learning and Case Seminar Approaches in Teaching Pathology Laboratory for the PharmD Program

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Abstract:
In the evolving landscape of medical education, efficient teaching methodologies are crucial for achieving desired educational outcomes. Active learning strategies, such as Case-Based Learning (CBL) and the case seminar approach, have become popular for enhancing student engagement and facilitating a deeper understanding of complex concepts like pathology. The data were analyzed using qualitative content analysis. Approximately 40% of participants rated CBL and seminars as very effective for knowledge acquisition, which is significantly higher than the 27% rating for traditional methods. Additionally, 40.9% believed these active learning strategies enhanced critical thinking skills. A strong preference was noted, with 45.2% preferring CBL and seminars for clinical preparation, compared to 29% for traditional approaches. This study demonstrate that integrative CBL and the case seminar approach significantly enhance the understanding of pathology concepts, critical thinking, and strengthen the connection between theoretical knowledge and clinical practice among PharmD students.

Key Words:
Case Seminar; Case-Based Learning (CBL); Student-Centred Activities; PharmD Students; Pathology

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Introduction

Traditional pathology education relies on lectures, autopsy demonstrations and microscopy exercises, often resulting in passive learning. Research indicates these methods do not consistently produce robust learning outcomes[1,2,3]. Educational theory supports active learning, where students construct knowledge through participation and interaction. This study aims to align educational outcomes with active learning by emphasising critical thinking and practical application. Case-based learning (CBL) and seminars are employed to achieve these goals. Their effectiveness is measured through a questionnaire that evaluates how well student perceptions align with the intended outcomes.

Medical education is shifting towards student-centred methods such as case-based learning (CBL) and case seminars, which are recognised for increasing engagement and deepening understanding. CBL transforms lectures into interactive, student-led problem-solving sessions that apply theory to clinical scenarios. Case seminars support this by encouraging collaborative analysis and discussion of real cases, assisting students to interpret information in relevant contexts.

Research on student learning identifies two primary approaches: surface (reproduction-directed) and deep (meaning-directed) learning[9]. CBL and case seminars promote meaning-directed learning by encouraging students to engage deeply with the material and connect it to their academic and professional experiences. This active engagement is associated with intrinsic motivation, where a genuine interest in the studies identifies two main learning approaches: surface and deep learning. CBL and case seminars encourage deep learning by prompting students to engage with material and relate it to their experiences. This active engagement fosters intrinsic motivation and a firmer commitment to learning. The introduction of innovative teaching methods in the third and fourth academic years aims to promote meaningful learning.

Materials and Methods

This cross-sectional survey compared case-based teaching with traditional methods in the PharmD pathology curriculum. The study population consisted of PharmD students at the Faculty of Pharmacy, Libyan International Medical University, during the 2024-2025 academic year.

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Design of the Case Seminar

The case seminar has been implemented for the first time as a teaching approach for histopathology laboratory material for PharmD students by Dr. Hanan M Garalla, Associate Professor of Pathology. The case seminar evaluated in this study comprises two sessions, named "macro" and "discussion". The case seminar has been implemented in the pathology course, which is delivered through lectures and histopathology laboratory material. This seminar format enables students to collaborate in small groups, analyze gross and microscopic images of surgical specimens, and review patient histories prepared by the pathology teacher. Each group selects a leader to present their cases to peers, describe the specimens using gross and microscopic images, ask questions, explain the associated diseases, causes, and pathological mechanisms at the tissue level, and make a diagnostic suggestion.

The seminar employs diverse forms of dialogue: instructors pose clarifying questions to ensure comprehension, probing questions to foster deeper thinking, and summative questions to assess understanding. During the discussion session, instructors review the pathological mechanisms depicted in the images. At the conclusion, students participate in an interactive quiz and group discussion with the instructor. These seminars enable instructors to address questions and challenges, supporting a deeper understanding of the material.

Case-Based Learning Methodology

Case-based learning (CBL) was incorporated into the pathology course to enhance the education of PharmD students. Following each tutorial, students collaborated in groups on clinical cases pertaining to the covered topics. Group leaders presented diagnoses and discussed the associated risk factors and outcomes. This initial implementation of CBL aimed to cultivate critical thinking and practical skills. Real-time faculty feedback offered immediate clarification and guidance, enhancing understanding and facilitating the adoption of this model at other campuses.

Data Collection and Analysis

A structured questionnaire evaluated students' experiences and perceptions of the instructional methods. Ninety-three third- and fourth-year PharmD students took part in the study. The questionnaire was distributed electronically via Moodle to ensure accessibility. Quantitative data were analysed in Microsoft Excel using descriptive statistics.

Results

A total of 93 participants responded to the survey regarding the effectiveness of CBL and case seminars as newly developed teaching methods in the pathology curriculum. The data indicated that the majority of students in their professional years of the PharmD programme were in their fourth year (53.8%), closely followed by third-year students (46.2%) as depicted in ***Figure 1***.

Regarding understanding pathology concepts, the majority of the students rated case-based learning and case seminars as very well

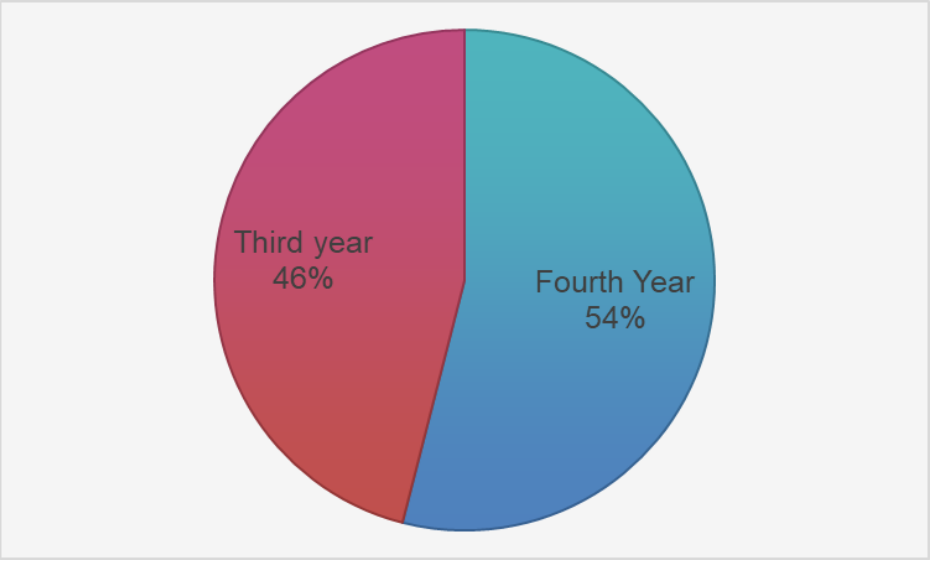

Figure 2: *Educational Stage Representation in PharmD Curriculum*

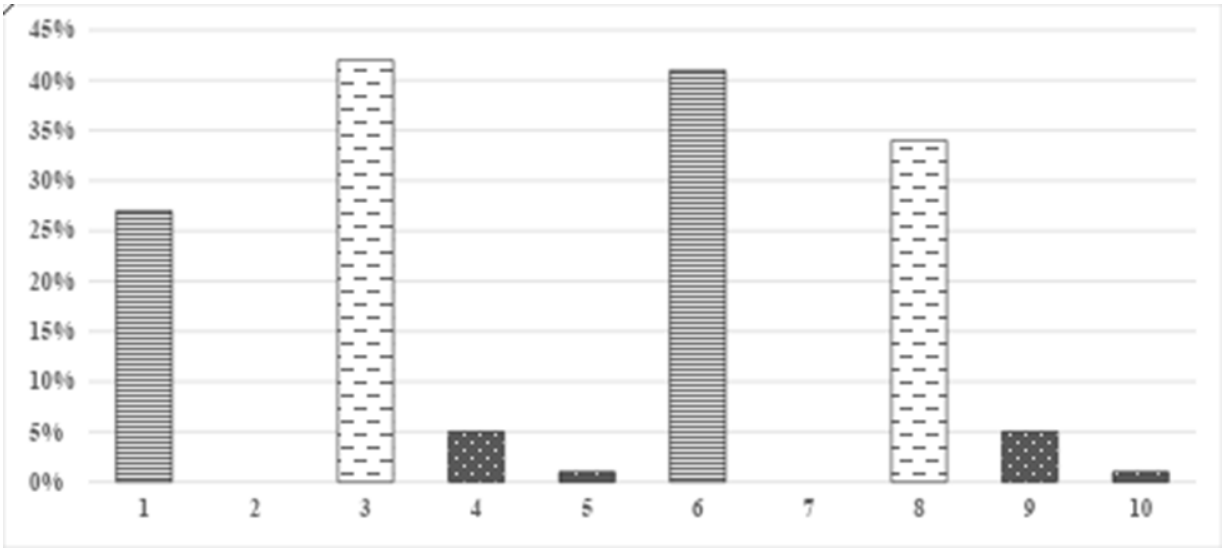

Figure 2: *Comparison of Student Perceptions on the Effectiveness of Didactic Teaching vs. Case-Based Teaching in Understanding Pathology Concepts*

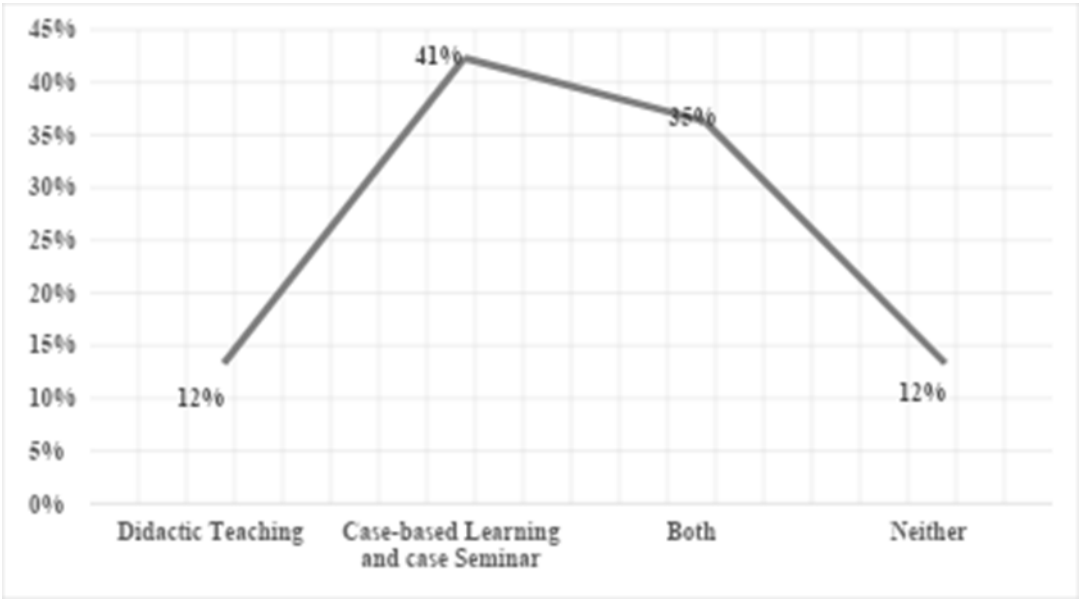

Figure 3: *Student Preferences for Teaching Methods that Enhance Critical Thinking Skills*

(approximately 40%) which promotes efficient knowledge building, maximising students' understanding of pathology through real clinical cases.

While only around 27% was received by traditional teaching, as indicated in ***Figure 2***. As illustrated in Figure 3, the findings reveal that the majority of students (40.9%) believe that case-based teaching and case seminars are the most effective methods for enhancing critical thinking skills. In contrast, traditional didactic teaching received 35.5% of the responses, indicating a strong preference for more interactive and applied learning approaches. The effectiveness of each teaching method in connecting theoretical knowledge with clinical practice was also assessed. A significant number of students rated case-based teaching as "very effective" (around 40%) in Figure 4, whereas traditional didactic teaching received fewer positive responses.

When asked which learning method best prepares them for clinical application in pharmacy, 45.2% of the students preferred case-based learning and case seminars, as illustrated in Figure 5, in contrast to 15% who preferred traditional methods. These findings highlight the value of contextual learning, demonstrating that students value the applicability of case-based experience to their future clinical practice.

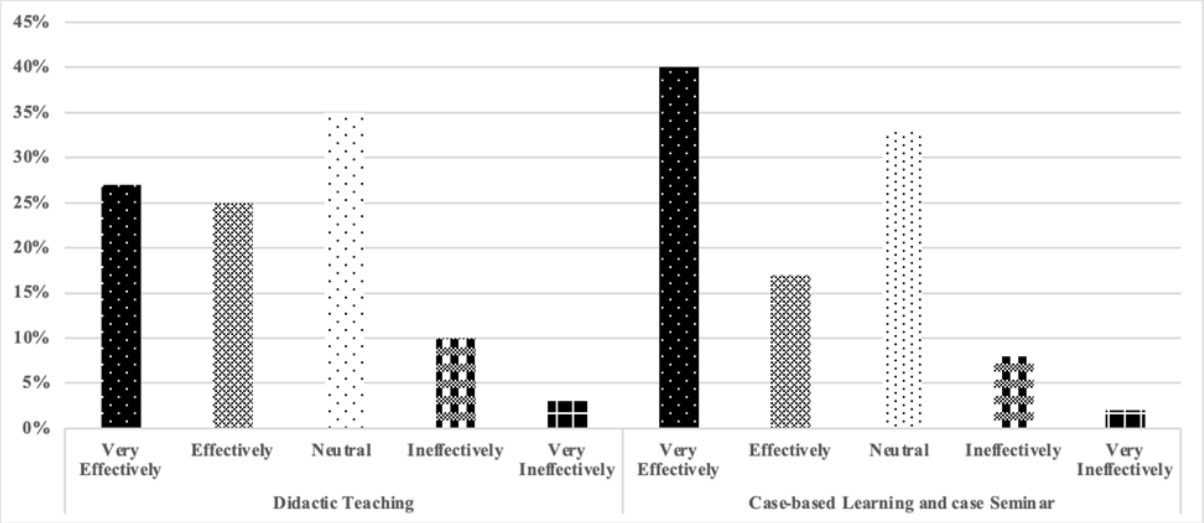

Figure 4: *Bridging Theoretical Knowledge with Clinical Practice*

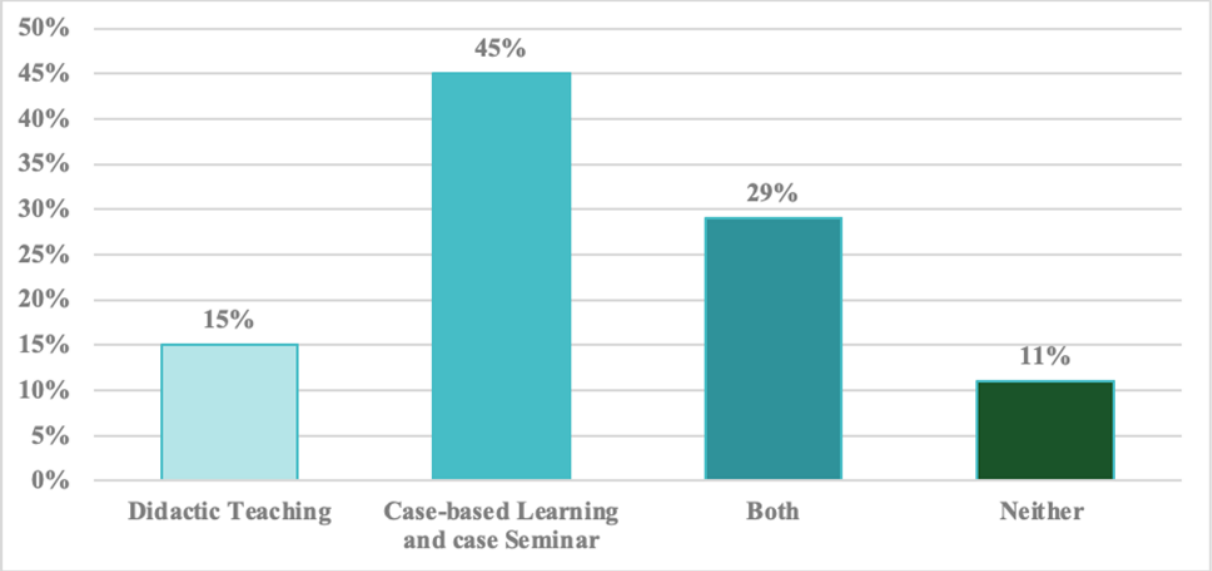

Figure 5: *Teaching Approach Best Equips Pharmacy Students for Practical Application in Pharmacy*

Discussion

The current research assessed the success of integrative case-based learning (CBL) and case seminar methods in teaching pathology to PharmD students at the Faculty of Pharmacy within Libyan International Medical Students. The results show that most students indicated that the case seminars and CBL provided a beneficial learning experience. Several key factors that contribute to learning were recognised, including motivational elements, knowledge construction, contextual factors, collaborative dynamics, and the relevance of case-based experiences in clinical practice.

Active Learning and Engagement

The results demonstrated that a substantial majority of students (approximately 40%) rated CBL and case seminars as highly effective in enhancing their understanding of pathology concepts. This aligns with existing literature that emphasises the benefits of active learning strategies in fostering deeper comprehension and preservation of complex material[14,15]. The transition from passive to active learning environments is critical in medical education, where the application of knowledge to real-world scenarios is essential for developing competent healthcare professionals.

Critical Thinking Development

One of the most notable outcomes of this study was the preference expressed by 40.9% of participants for CBL and case seminars as the most effective methods for enhancing critical thinking skills. This finding supports previous research highlighting the role of CBL in promoting analytical skills[16]. During the seminars, students engaged in small group work, which many found beneficial.

They highlighted the collaborative aspects of learning, such as the opportunities to discuss topics with peers and instructors, as well as having time to ask questions. Research on the cognitive impact of small group learning in case-based learning indicates that group discussions facilitate the activation of prior knowledge, enhance information recall, evaluate evidence, and develop differential diagnoses, thereby enhancing the cognitive skills essential for clinical practice[17].

Clinical Application and Relevance

The preference of 45.2% of students for CBL and case seminars as the methods that best prepare them for clinical application. The ability to connect pathology concepts with clinical scenarios is vital for PharmD students, as it facilitates a comprehensive understanding of disease processes and their implications for patient care[17]. The study's findings suggest that students perceive these methodologies as instrumental in providing a contextual framework that enhances their readiness for clinical responsibilities.

Limitations of Traditional Didactic Methods

The integration of traditional lecturing with problem-based learning, particularly through case-based learning, enhances educational engagement. Lectures efficiently provide a clear and organised presentation of content, cover extensive material within a limited timeframe, and ensure uniform educational standards across the curriculum[18]. Traditional teaching methods can lack the interactive elements necessary for fostering critical thinking and problem-solving skills[19]. In contrast, CBL and case seminars engage students actively, promoting collaboration and critical thinking through real-world clinical scenarios. However, CBL and case seminars require more time and resources, and their success is contingent upon group dynamics and instructor efficacy[20]. A balanced integration of these methodologies is pivotal for optimising learning outcomes in pathology education.

Implications of Integrating Case-Based Learning in Pathology Education

The incorporation of case-based learning (CBL) and case seminars into the pathology curriculum bears profound implications for medical education[21]. These student-centred activities facilitate the application of fundamental sciences to clinical medicine, bridging the divide between normal and abnormal physiology and histology. By fostering collaboration, discussion, and practical knowledge application, CBL and case seminars augment student motivation and engagement[22,23]. Additionally, these methods cultivate lifelong learning skills, indispensable for adapting to the dynamic healthcare landscape, ultimately equipping students to become competent healthcare professionals[24].

Conclusion

In summary, this study's findings advocate the adoption of integrative CBL and case seminar methodologies as effective teaching strategies for pathology in PharmD programmes. These innovative approaches actively engage students by incorporating surgical specimen images, microscopic visuals, and patient clinical histories, which not only stimulate their interest and motivation but also cultivate active participation, critical thinking, as well as connecting theoretical knowledge to real-life scenarios and practical applications. Students reported that these experiences enhanced their comprehension and retention of pathology concepts while encouraging meaningful discussions with both peers and instructors. These methods elevate the educational experience, underscoring the significance of student-centered learning techniques and better-equipping students for their future roles as healthcare professionals.

Limitations

This research has several constraints that ought to be acknowledged. Firstly, the sample size was rather limited, which restricts the applicability of the results to a broader population. Moreover, the study was conducted at only one institution, which may introduce contextual biases not representative of students in diverse educational settings. Lastly, whilst the study concentrated on short-term outcomes, it did not evaluate the long-term retention of knowledge or skills gained through CBL and case seminars.

Future Work

Future research ought to build upon the findings of this study and include longitudinal investigations to assess the long-term retention of knowledge gained through case-based learning (CBL) and case seminars. Expanding the research to encompass diverse medical schools will enhance generalizability. Comparative research across various medical fields will highlight the advantages and disadvantages of these methodologies.

Acknowledgments

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Declaration of Interest

No conflict of interest is declared by the authors. This research received no specific grant from any funding agency in the public, commercial, or non-profit sector.

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