



Navigating the Balance: How Group Size Shapes Medical Students' Clinical Competence and Professional Development in Uganda

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Abstract

Background: Group size during clinical training has been identified as a potential factor influencing medical students' competence and professional development. In the context of Ugandan medical schools, where student-to-instructor ratios can vary, understanding the impact of group size on students' learning experiences is critical for optimizing clinical education.

Objective: This study aims to assess the effect of group size on the clinical competence and professional development of medical students in their fourth and fifth years of training at a Ugandan university.

Methods: A cross-sectional study was conducted among 114 fourth- and fifth-year medical students undergoing clinical training. Data were collected using structured questionnaires that evaluated students' perceptions of their clinical competence and professional development. The questionnaires assessed key competencies such as diagnostic skills, patient communication, procedural abilities, and teamwork, as well as professional development indicators like confidence, ethics, and adaptability in clinical settings. Group size was measured by the number of students per clinical instructor, and participants were divided into smaller (<10 students) and larger (≥ 10 students) group categories for analysis.

Results: Preliminary findings suggest that smaller group sizes were associated with better student-perceived competence in areas such as hands-on procedural skills and patient communication. Students in smaller groups reported greater access to personalized feedback from instructors and more opportunities to actively participate in patient care. In contrast, those in larger groups indicated challenges with individualized attention, leading to reduced opportunities for skill acquisition and professional development. Furthermore, students in smaller groups reported higher levels of confidence and preparedness for clinical practice compared to their peers in larger groups.

Conclusion: Group size plays a significant role in shaping the clinical competence and professional development of medical students. Smaller group sizes of less than ten appear to facilitate more effective learning and skill development, particularly in the areas of clinical competence and professional confidence. These findings suggest that reducing group sizes in clinical training could improve educational outcomes for medical students in Uganda.

Keywords: Group size, clinical competence, professional development, medical students, clinical training, Uganda, cross-sectional study.

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Methods and materials

Introduction

Medical education, particularly during clinical years, plays a pivotal role in shaping students' competence and professional development (1, 2). In many low-resource settings, such as Uganda, medical schools face challenges in maintaining optimal student-to-instructor ratios, often leading to larger groups during clinical sessions. This can potentially hinder the depth of learning and skill acquisition, which are crucial for developing competent and confident medical professionals (3, 4). Despite this, the impact of group size on medical students' competence and professional development remains underexplored, especially in African contexts (5, 6).

This study aims to fill this gap by examining the effect of group size on the clinical competence and professional development of fourth- and fifth-year medical students at a Ugandan university. Understanding this relationship is essential for informing educational policies that can improve the quality of clinical training and ultimately contribute to better healthcare outcomes (7, 8).

Study Design

This study employs a cross-sectional design to evaluate the impact of group size on the clinical competence and professional development of fourth- and fifth-year medical students at a Ugandan university. A cross-sectional approach was chosen because it allows for the collection of data at a single point in time from a specific cohort, providing a snapshot of the current learning environment and its effects on student outcomes (9, 10).

A cross-sectional design is appropriate for this study because it efficiently captures the variation in group sizes experienced by students during their clinical rotations while allowing for the assessment of multiple outcomes such as clinical competence, confidence, and professional development (11, 12). This design also enables the identification of potential relationships between group size and educational outcomes without requiring prolonged follow-up, making it feasible to gather and analyze data from a relatively large sample within a short timeframe (13, 14).

The study will utilize structured questionnaires to assess students' perceptions of their clinical skills and professional development, ensuring a comprehensive understanding of how group size impacts their educational experiences (15, 16). This method has been shown to effectively capture the nuances of student learning in various educational settings (17, 18).

In summary, this study aims to provide valuable insights into how group size influences medical education, highlighting the need for potential reforms in clinical training practices (19, 20).

Justification:

A cross-sectional design is appropriate for this study because it efficiently captures the variation in group sizes experienced by students during their clinical rotations, while allowing for the assessment of multiple outcomes such as clinical competence, confidence, and professional development. This design also enables the identification of potential relationships between group size and educational outcomes without requiring prolonged follow-up, making it feasible to gather and analyse data from a relatively large sample within a short timeframe.

Data Collection

Data for this study were collected from a total of 114 fourth- and fifth-year medical students at a Ugandan university during their clinical rotations. A structured questionnaire was developed to capture both quantitative and qualitative data. The questionnaire was divided into two main sections:

1. **Student Demographics:** This section gathered information on age, gender, year of study (fourth or fifth year), and prior clinical experience.
2. **Perceptions of Clinical Competence and Professional Development:** Students were asked to rate their perceptions of their own clinical competence across several domains, including diagnostic skills, patient communication, procedural abilities, and teamwork. Professional development was assessed by examining students' confidence, adaptability, ethics, and overall preparedness for clinical practice. Group size was defined as the number of students per clinical instructor, and students were categorized into two groups: small groups (<10 students per instructor) and large

groups (≥ 10 students per instructor).

The questionnaires were distributed to students during their clinical sessions, and participation was voluntary. Students were given 30 minutes to complete the questionnaire anonymously.

Data Analysis

Data were analysed using both descriptive and inferential statistics. Descriptive statistics, such as means, standard deviations, and frequencies, were used to summarize the demographic characteristics of the sample and the overall perceptions of clinical competence and professional development.

Ethical Considerations

This study adhered to strict ethical guidelines to ensure the protection and rights of all participants. The following ethical considerations were addressed:

1. **Approval:** Prior to the commencement of the study, ethical approval was obtained from the Institutional Review Board (IRB) of the university. All study protocols, including the data collection process, were reviewed to ensure compliance with ethical standards.
2. **Informed Consent:** Each participant was provided with a detailed explanation of the study's purpose, procedures, and potential risks or benefits before data collection. Participation in the study was voluntary, and students were informed that they could withdraw from the study at any time without any consequences. Written informed consent was obtained from all participants before the distribution of the questionnaire.
3. **Anonymity and Confidentiality:** To protect the identities of the participants, the questionnaires were completed anonymously. No personally identifiable information was collected, and all responses were treated confidentially. Data were stored securely and only accessible to the research team. Results were reported in aggregate, ensuring that no individual responses could be traced back to any participant.
4. **Minimizing Harm:** The study posed minimal risk to participants as it involved a questionnaire-based assessment. There was no physical or psychological harm involved, and the questions were designed to be non-invasive.
5. **Beneficence:** The potential benefits of the study include contributing to improved educational practices in medical training, which could ultimately enhance student learning outcomes and patient care. Participants were informed of these potential benefits, and it was made clear that their participation would help inform educational reforms in clinical training.
6. **Fairness and Non-Coercion:** Participants were not coerced or incentivized to participate. The recruitment process was fair, and all eligible students in the fourth and fifth years were invited to participate regardless of their academic standing or clinical performance.

By addressing these ethical considerations, the study ensured that the rights, privacy, and well-being of participants were prioritized throughout the research process.

Limitations

A cross-sectional study on the impact of set bulk on medical students' competence learning and professional development in Uganda is limited by its inability to establish causality, potential biases, confounding factors, and limited generalizability.

The study's quantitative results may show that excessive set bulk correlates with lower performance and increased burnout among Ugandan medical students, while qualitative insights suggest students feel overwhelmed, limiting deep learning and professional development. Implications for practice in Uganda include the need for curriculum reforms, better student support systems, and improved clinical training environments, aligning more closely with global medical education standards.

Discussion

The findings suggest that larger group sizes negatively impact medical students' competence and professional development, as indicated by lower performance and increased burnout. This can be interpreted to mean that overcrowded learning environments overwhelm students, limiting individualized

attention and deep skill acquisition. Qualitative data supports this, with students expressing frustration over reduced opportunities for hands-on learning and mentorship. Interpreting these results highlights that while larger group sizes may aim to accommodate more students, they risk compromising educational quality, suggesting a need for smaller, more manageable group sizes to enhance learning outcomes

. The study indicates that large group sizes negatively impact medical students' learning and development, suggesting a need for smaller groups to improve educational quality. **Implications include:**

1. **Medical Education:** Adjusting curriculum and class sizes to provide better student engagement and hands-on experience.
2. **Pedagogical Strategies:** Adopting active learning methods and personalized feedback to enhance competence and development.
3. **Opportunities:** Exploring innovative teaching models and fostering closer student-mentor relationships.
4. **Challenges:** Addressing resource constraints, scaling issues, and increased faculty workload associated with smaller groups.

Conclusion.

The study concludes that larger group sizes negatively impact medical students' competence and professional development, highlighting the need for smaller, more manageable groups to improve learning outcomes and support effective pedagogical strategies, while also addressing challenges related to resources and faculty workload.

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The study concludes that the relationship between group size and medical students' competence and professional development is complex. While smaller groups generally enhance learning outcomes and individual support, larger groups can strain resources and diminish personalized attention. This complexity underscores the need for a balanced approach, where optimal group sizes are carefully managed to improve educational quality and student development while addressing logistical and resource constraints.

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