

Self-Directed Interactive Video-Based Instruction Versus Instructor-Led Teaching for Myanmar House Surgeons: A Randomized, Noninferiority Trial

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OBJECTIVE: To compare self-directed interactive video-based instruction (IVBI) with instructor-led teaching in the acquisition of basic surgical skills by House Surgeons at University of Medicine 1, Yangon.

DESIGN: A prospective, 1:1 randomized controlled trial was conducted. Participants were randomized into 2 teaching arms: (1) self-directed IVBI or (2) instructor-led teaching. Self-directed IVBI participants were provided with a portable DVD player that could play, fast forward, rewind, and skip through skills modules. Participants in the instructor-led teaching group were taught in small groups by standardized instructors. Pretesting and posttesting of 1-handed knot tie, 2-handed knot tie, vertical mattress suture, and instrument tie was performed using the Objective Structured Assessment of Technical Skills (OSATS). Students randomized to self-directed IVBI completed an exit survey to assess satisfaction. Demographic data were collected of all participants.

SETTING: University of Medicine 1, Yangon, Myanmar.

PARTICIPANTS: Fifty participants were randomly selected from 78 eligible House Surgeons who were enrolled in their basic surgery rotation.

RESULTS: Demographic characteristics and baseline skills were comparable in participants randomized to IVBI and

instructor-led teaching. Mean OSATS score increased from pretest to posttest in both groups ($p < 0.001$). The mean posttest OSATS score of the IVBI group was 0.72 points below that of the instructor-led teaching group (90% CI: -3.8 to 5.2), with the 90% CI falling below the a priori noninferiority margin, satisfying criteria for noninferiority. More than 90% of students marked either “agree” or “strongly agree” to the following statements on the exit survey: further expansion of IVBI into other skills modules and integration of IVBI into training curriculum.

CONCLUSION: IVBI is noninferior to instructor-led teaching of surgical skills based on OSATS scores. House Surgeons highly rated self-directed IVBI. Self-directed IVBI has the potential to significantly reduce the personnel required for skills teaching and may serve as a long-term learning adjunct in low-resource settings. (J Surg Ed ■■■■■. © 2017 Published by Elsevier Inc. on behalf of the Association of Program Directors in Surgery)

KEY WORDS: medical education, self-directed interactive video-based instruction, global surgery, knot tying, suturing

COMPETENCIES: Patient Care, Medical Knowledge, Practice-Based Learning and Improvement

INTRODUCTION

Myanmar's health care system is burdened with aging infrastructure, limited resources, and high rates of disease

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and injury.¹ However, the country has only 31,000 physicians caring for its population of 53.2 million.^{2,3} A challenge faced by many low- and middle-income countries is the training of adequate numbers of qualified physicians, and Myanmar is no different. To help alleviate its physician shortage, by 2011 nearly 14,000 medical students were enrolled across the country's 4 medical schools (University of Medicine 1 [UM1], Yangon; University of Medicine, Mandalay; University of Medicine 2, Yangon; and University of Medicine, Magway).⁴ In 2011, Myanmar's medical education governing body convened to discuss and vote on policies to improve the quality of physician training. This group voted to reduce the total annual medical student intake by half with the goal of providing more individualized training for students.⁵

Myanmar's medical school curriculum is based on the United Kingdom's MBBS degree system, and Myanmar's House Surgeons—medical students in their final year of training—serve as the primary medical providers for patients in many hospitals across the country. Equivalent to the American College of Surgeons' "Essentials for Medical Students and PGY-1 Residents", Myanmar's "Reference Handbook" is a text outlining core skill sets and objectives that House Surgeons are expected to learn during their hospital rotations, including emergency and routine procedures.⁶ It is imperative that all House Surgeons master these basic skills to progress in their training as a means to provide safe and essential health care to the population.

Surgical skills training at medical schools around the world is traditionally led by instructors or faculty. However, skills training in low-resource settings is limited by several factors, such as the availability of qualified instructors, variations in knowledge and teaching style between instructors, and the absence of dedicated educational infrastructure (e.g., classrooms, skills laboratories, and simulation models). Interactive video-based instruction (IVBI) is an alternative to traditional instructor-led teaching. With IVBI, students learn skills from instructional videos, using interfaces that permit control of speed of video play, replay of video segments, and video access at any time. IVBI relies on voice-over narration and on-screen annotation to guide learning. As IVBI modules are centrally recorded and then disseminated, IVBI learning is innately standardized across students and institutions. Studies have demonstrated improved skills acquisition and retention with IVBI compared to traditional modalities.⁷⁻⁹ Of note, IVBI has been shown to be effective in a self-directed learning environment. IVBI's defining features should make it adaptable and useful in low-resource settings, but its effectiveness and cost have not yet been studied in a low-resource medical school environment.^{10,11}

In this study, we introduce a systematic approach for testing the effectiveness of IVBI for basic surgical skills training in Myanmar, a country with a low-resource medical training system. Our objective was to compare the efficacy

of self-directed IVBI with instructor-led teaching in the acquisition of basic surgical skills by House Surgeons at a large academic referral hospital in a major urban center. We hypothesized that self-directed IVBI is noninferior to instructor-led teaching for learning 1-handed knot tie, 2-handed knot tie, vertical mattress suture, and instrument tie. Our secondary goal is to assess both the level of student satisfaction with IVBI, and the cost of deploying this low-fidelity, self-directed IVBI setup for use in low-resource settings.

METHODS

Study Setting

This prospective, 1:1 randomized controlled trial was conducted in January 2016 at UM1, Yangon, Myanmar.

Student Sample

Eligible House Surgeons were those enrolled in their 3-month surgery rotation at the time of the study. House Surgeons who had previously completed their surgery/OBGYN rotation and were enrolled in a rotation other than surgery during January 2016 were ineligible to participate. A total of 125 House Surgeons registered to participate in this study, but only 74 were deemed eligible.

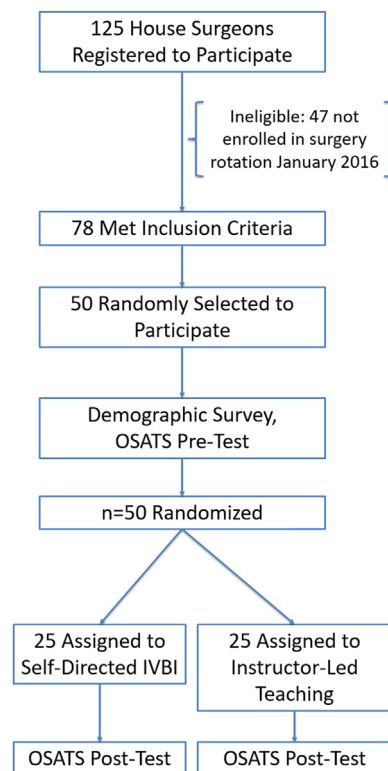


FIGURE 1. Flow diagram depicting House Surgeon selection and study design.

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