Replicating an Established Open Skills Curriculum: Are the Same Results Obtained in a Different Setting?

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INTRODUCTION: The aim of this study was to ascertain whether the University of Texas, Southwestern (UTSW) open skills curriculum (Goova et al.[13]) could be successfully implemented in the University of Minnesota (UMN) multisite training program. We posed 4 questions: (1) Is the curriculum feasible? (2) Did residents' skills improve? (3) Did UMN residents achieve the same level as UTSW residents? (4) What factors were associated with posttest success?

METHODS: Postgraduate year-1 residents ($n = 22$) were enrolled in the curriculum, which included orientation, access to video instruction, 3 months of independent practice using portable kits and practice logbooks, presurveys and postsurveys, and pretesting and posttesting. Evaluation was based on UTSW proficiency measures (time, errors, and total proficiency score). Descriptive statistics, paired sample t tests, analysis of variance, and bivariate correlations were calculated. Results were compared with Goova.

RESULTS: Startup costs at UMN were $9804 vs $776 at UTSW. Our curriculum required 51 direct faculty hours vs 376 at UTSW. UMN trainees' skills improved significantly (mean score = 973 [standard deviation = 267] at baseline vs 1325 [standard deviation = 215] at posttest), but they achieved proficiency in only 38.6% of tasks at posttest, compared with 88.7% by UTSW trainees. Best predictors of UMN posttest proficiency score were (1) categorical vs preliminary resident status ($p < 0.001$), (2) pretest proficiency score ($r = 0.510$, $p = 0.008$), and (3) self-assessed baseline proficiency ($r = 0.415$, $p = 0.027$). Participation in skills laboratories during clerkship or fourth year medical school, estimated number of cases (surgeon or first assistant), and number of practice repetitions recorded in booklets were not predictive of the posttest score.

CONCLUSIONS: The UTSW open skills curriculum is feasible and effective in a new setting. Differences from UTSW-published success rates may be related to their superior onsite monitoring of practice and a policy requiring residents to achieve proficiency for each task before posttesting. (J Surg 71:e97-e103. © 2014 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgery, residents, education, technical skills, assessment, curriculum

COMPETENCY: Patient Care

INTRODUCTION

Increasing technical complexity associated with minimally invasive surgery and an increasing emphasis on patient safety have required a shift in the method of surgical training from the apprentice model to thoughtful, deliberate curricula rooted in simulation.[1,2] Technical skills curricula for postgraduate year-1 (PGY-1) residents are especially important to instill correct operative technique, pretraining residents on basic skills before operating room (OR). Especially effective curricula have been demonstrated to improve trainee performance in the OR.[3-5] The Residency Review Committee for Surgery has mandated implementation of simulation curricula in all surgery residencies.[6] To fulfill these needs, program directors are continuously scanning published literature for effective skills curricula to incorporate into their own training programs. However, a recent PubMed review reported there are few published curricula devoted to open surgical skills.[7]

We were interested in identifying an open skills course to fill a gap in our PGY-1 skills curriculum. Curricula with a deliberate practice model have been shown to produce acquisition of new skill.[8,9] If the practice schedule is laid out in a distributed fashion, the acquired skills have been shown to be more durable over time.[10,11] Curricula with an independent home practice component have been shown to

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result in distributed practice with more repetitions than learners who have only simulation center–based practice options.[12] The University of Texas, Southwestern (UTSW) open skills curriculum met these education methods criteria. In addition, published data provided strong evidence of effective proficiency training in basic knot tying and suturing within a 12-week period using this curriculum.[13,14] For these reasons, we decided to adapt the UTSW course to our institution. However, there are little data in the literature regarding the implementation of an established curriculum in a different institution.

Replication studies of existing curricula or courses are desirable to assure that the results of the original study are valid. But more practically, and therefore possibly more important to program directors, a replication study helps to determine how implementation factors related to costs, faculty, program structure, and policies may affect success of the curriculum.[15] Our specific interest was whether the UTSW basic skills course, which had been successfully replicated at the University of Michigan in a single-campus site, could also be successfully implemented in our multihospital site environment, in which PGY-1 residents (as a group) are on campus only 1 morning a week. Understanding implementation factors is helpful for others in the surgical education community.

Our research questions were as follows:

1) Could the UTSW PGY-1 knot-tying and suturing course be successfully implemented in the University of Minnesota (UMN) residency program?
2) Did UMN residents' skills improve?
3) Did UMN residents achieve the same level as UTSW residents?
4) What factors were associated with posttest success?

METHODS

Course Design

We performed a replication study of the open skills curriculum found in Goova et al.[13] We carefully reviewed the curriculum, materials, and assessments and duplicated them to the extent our environment allowed. Adapting the course to our setting required some changes. The UMN PGY-1 class comprises specialty residents from orthopedic surgery, neurosurgery, otolaryngology, urology, and integrated plastic surgery as well as those from categorical and preliminary general surgery. These residents train at 5 different hospitals in the Minneapolis and St. Paul metropolitan area. The UMN simulation skills center (SimPORTAL) is located on the University campus. More than half of our residents are away from the University campus at any given time and do not have access to the SimPORTAL; therefore, faculty intensive practice sessions are not possible in our environment. Access to independent after-hours practice away from the SimPORTAL was needed.

Materials

To overcome our site and time limitations, we created individual practice kits and distributed them to residents to take and use independently, wherever they rotated, for 3 months. The SimPORTAL purchased the supplies and instruments to create practice kits. Each kit contained an OR-quality needle driver and forceps, a suture scissors, and a Potts scissors. It also included an Ethicon suture board, a DASIE Surgical Training Model (DASIE Surgical Training Tools, Canada), a ruler, and a stopwatch. Disposables included suture and sections of Penrose drain.

Subjects

We enrolled all PGY-1 surgery residents in the course as a part of our simulation curriculum. Participant residents ($n = 22$) included the following: 6 from categorical general surgery, 1 preliminary general surgery, 8 orthopedic surgery, 3 urology, 1 otolaryngology, 2 neurosurgery, and 1 integrated plastic surgery.

Administration

Following the UTSW protocol, the residents were provided with a hands-on introduction to the skills curriculum and distribution of practice kits during the PGY-1 orientation. They were given access to online videos demonstrating the tasks, strategies, and common mistakes. The residents were given a pretest within the first 2 weeks after beginning training with us. Immediately following the pretest, faculty provided feedback and suggestions to the residents. The residents were given practice booklets outlining tasks and specific targets for quality and time. A posttest was administered 12 weeks later.

Study Design

We used a pretest and posttest study design, followed by a comparison of posttest scores between UMN and UTSW residents. We also investigated the relationships between baseline and process variables on UMN residents' posttest scores.

Process Variables

Data collected included a preparticipation survey, repetitions recorded by residents in their practice logbook (modeled after 1 used at the University of Michigan), and a survey at the end of the curriculum. On the preparticipation survey, participants recorded their surgical specialty, exposure to surgical skills training during medical school,