Integrating a Novel Global Surgery and Health Inequity Course to the Surgical Clerkship

Vennila Padmanaban, MD,[*] Parisa Fallah, BS,[†] Sudha Jayaraman, MD, MSc, FACS,[‡] Gregory L. Peck, DO, FACS,[§] and Ziad Sifri, MD, FACS[*]

[*]Department of Surgery, Rutgers—New Jersey Medical School, Newark, New Jersey; [†]Harvard Medical School, Boston, Massachusetts; [‡]Department of Surgery, Virginia Commonwealth University School of Medicine, Richmond, Virginia; and [§]Department of Surgery, Rutgers—Robert Wood Johnson Medical School, New Brunswick, New Jersey

OBJECTIVE: Medical students report growing interest in health inequity and global surgery, subjects not currently integrated to their core curriculum. Currently, fundamental tenets of global surgical inequity are only available to students on an elective basis or in special interest groups. Therefore, an hour-long course with emphasis on global surgery was developed for third-year medical students. The aim of this study was to examine student response to this pilot course and to establish whether course content was applicable to clinical rotations.

DESIGN: A 1-hour structured curriculum was delivered to third-year medical students (MS3s) during the 2-day orientation phase of each rotation of an 8-week surgery clerkship from August 2018 to May 2019. The course targeted approximately 30 students per session in the preclinical orientation at Rutgers—New Jersey Medical School. Upon completion of the 8-week clerkship rotation, a paper survey was administered to evaluate student's exposure to previous content, attitudes toward global health, interest and engagement in course materials, and applicability of learned course content to local environments.

SETTING: Rutgers—New Jersey Medical School, an urban medical school located in Newark, New Jersey.

PARTICIPANTS: A total of 191 students attended the global surgery and health equity course; 146 participants participated in the postcourse survey.

RESULTS: When asked about baseline interest in global or public health, the majority (51%) were extremely interested or very interested. Nearly all participants found the course to be valuable (94%). When asked which educational modality was preferred, 23% of participants favored the traditional lecture component and 29% favored case-based discussions. Nearly half (48%) the respondents found both modalities to be valuable. Fifty students (34% of respondents) reported encounters with patients affected by barriers in access to surgical care during their clerkships.

CONCLUSIONS: Medical students responded favorably to this health inequity and global surgery pilot course and requested supplemental lectures. Additionally, course content was applicable to local clinical experiences. Therefore, 1 modality of integrating global surgery to the established curriculum is under the framework of health inequity and social determinants of health during surgical clerkships. This study demonstrates that meaningful inclusion of global surgery and health inequity can be implemented within the existing curricular structure. (J Surg Ed 77:1106–1112. © 2020 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: Global surgery, Curriculum development, Education, Global health, Medical students, Surgical clerkship

COMPETENCIES: Patient Care, Medical Knowledge, Systems-Based Practice

INTRODUCTION

Academic global surgery is a field in its infancy, originated from traditional commitments to surgical healthcare

Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.
ACGME Competency: Medical Knowledge
Correspondence: Inquiries to Vennila Padmanaban, MD, Department of Surgery, Rutgers - New Jersey Medical School, 185 South Orange Avenue, Newark, NJ.; e-mail: vp379@njms.rutgers.edu

  1931-7204/$30.00
https://doi.org/10.1016/j.jsurg.2020.03.014

service and education.[1,2] Academic global surgery is currently galvanized by medical students entering clerkship years that represent a potential pipeline of surgeons, early in their continuum of training.[3-14] Although an increasing volume of opportunity exists for US medical students in the international setting, no formal global surgery education exists for this demographic at the departmental or medical school level aside from nonstandard electives in low- and middle-income countries or online certificate programs.[7,15,16] Despite the fact that half of all medical students entering general surgery residency programs seek exposure to service in resource-limited settings as a component of their training, there are no foundational tenets for standardizing this participation in international settings.[7] The current medical school curricula have not kept pace with the demand for exposure to global surgery[9,14] or in service of vulnerable populations and related social determinants of health.[12,15] The current medical education system leaves future physicians underprepared to engage this community locally and globally.[8,9]

The Association of American Medical Colleges (AAMC) and National Academy of Medicine have recognized the importance of teaching students about social determinants of healthcare and health disparities.[17] However, given limited resources for global health education at most academic medical institutions and the inflexibility of saturated clerkship schedules, it is unknown as to whether core tenets of global surgery and health equity can be delivered in an integrated fashion within formal medical education. Achieving these educational objectives would better equip students to apply social determinants of healthcare and health disparities to patient care.[18]

Given the feasibility that an integrative strategy may offer in the formal implementation of global surgery to the existing curricula, our descriptive study presents an introduction to a framework of parallel global surgery and local healthcare equity and social determinants of healthcare education.[9] We hypothesize that given the wellspring of interest in global surgery, a short course in the current medical school curriculum will be well received because of parallel educational objectives. In our study, we aim to demonstrate feasibility of integration, medical students' favorable response and engagement with an integrative course, and its applicability given social determinants of health and healthcare disparities so prevalent in the students' local clinical service and education settings. With its foundations in the social determinants of health, we expect that care of populations in low- and middle-income countries will have clinical relevance to the care of impoverished patients in the United States.

METHODS

Curriculum Design and Methodology

A 1-hour structured course was delivered to third-year medical students (MS3s) during the 2-day orientation phase of each rotation of an 8-week surgery clerkship from August 2018 to May 2019. The course targeted approximately 30 students per session in the preclinical orientation at Rutgers—New Jersey Medical School, an urban medical school in Newark, NJ. The course was led by 2 instructors: a trauma surgery faculty member from Rutgers—New Jersey Medical School, and a general surgery resident conducting a 2-year global surgery research fellowship.

The following education objectives were developed from the Lancet Commission on Global Surgery's 2030 Report[19]: global data points that reflect timely, quality and affordable access to surgical care, determinants of access to care, global epidemiologic burden of surgical diseases, and implications of health inequities in surgical healthcare. The course consists of a lecture and case study-based group discussion, with each part allotted one half hour. A broad course overview is summarized in Figure 1.

The case study consisted of clinical cases developed from low-income settings that were used in comparison to cases in high-income settings encountered by the students. Students were asked to categorize cases into access to care barrier types, i.e., timely, quality, affordability, represented from each context and to brainstorm and report potential solutions. An early version of the course and case discussions were attended and reviewed by a visiting physician from Sierra Leone to include context-specific experiential perspective and viewpoints from a low-income setting.

Course Theme	Instructional Modality
I. Health Inequity in Surgery	*Lecture (0.5 hour)*
II. Global Surgical Burden	
III. Access to Surgical Care	
IV. International Clinical Cases	*Case-Based Group Discussion (0.5 hour)*
V. Group Discussion & Concept Application	
V. Potential Solutions	

FIGURE 1. Global surgery and health inequity brief course outline and methodology.

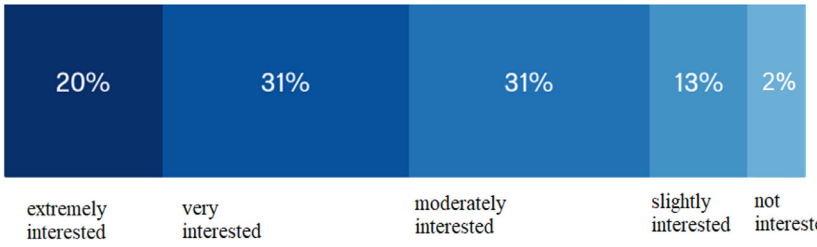

FIGURE 2. Medical student gradation of baseline interest in global or public health, reported as percentages.

Study Instruments and Survey Implementation

Upon completion of the 8-week clerkship rotation, a paper survey was administered. The survey tool was developed by a focus group consisting of global surgery faculty and residents and revised by the global surgery research resident was administered to each participating student anonymously. The survey contained 10 questions formatted to multiple choice, Likert scale, and free-text answers. Outcome measures included student's exposure to previous content, attitudes toward global health, interest and engagement in course materials, and applicability of learned course content to local environments. Free-text responses to students' application of course content to local environments were coded by the study authors to indicate barrier to access observed: "timeliness," "surgical capacity," "safety," and "affordability." Responses were analyzed by 2 study authors independently, with discrepancies arbitrated by the principal investigator.

Data Collection and Analysis

The Qualtrics XM Platform Survey Software (Seattle, WA) study tool was used to collate and analyze data.

Ethics

Study participation was voluntary, with no incentives provided, and anonymous results were collected. The study was approved by the Rutgers—New Jersey Medial School Institutional Review Board.

RESULTS

Course Objectives and Interest in Global Health

Over the 1-year study period a total of 191 students attended the global surgery and health equity course delivered in a total of 6 sessions to rotating cohorts. One hundred forty-six participants (76%) completed the survey. Eight weeks after course completion, a majority of students endorsed coverage of the following concepts: global statistics on access to surgical care, defining the burden of surgical diseases, an overview of the four dimensions of access to surgical care (timeliness, surgical capacity, safety, affordability), and implications of health inequities in surgery.

When asked about baseline interest in global or public health, the majority (51%) were extremely interested or very interested (Fig. 2). Nearly one-third of students surveyed reported moderate interest (31%), while a minority reported slight interest (13%) and 2 students reported no interest (2%).

Student Perceptions of the Course

Student perceptions of the global surgery and health equity clerkship course are summarized in Table 2. Nearly all participants found the course to have educational value (94%). When asked which educational modality was preferred as a comparison, 23% of participants favored the traditional lecture component and 29% favored case-based discussions. Nearly half (48%) the respondents found a combination of the 2 modalities to be valuable.

Nearly all participants (94%) support retention of the course within the medical school syllabus. Additionally, a majority (86%) believe that the medical school should provide more global or public health courses. Of note, 83% of all students who reported "slight" to "no" interest in public health found the clerkship course to have educational value.

Applicability of the Course to Local Clerkship Environments

Fifty students (34% of respondents) reported encounters with patients affected by barriers in access to surgical care during their clerkships. Free-text responses are summarized in Figure 3. Themes extracted from responses demonstrated that 16 students reported interactions with patients who faced financial barriers to care, while 14 students reported interactions with patients who lacked timely access to care. Six students described interactions with patients who faced both barriers.

Student Feedback for Course Improvement

When asked for potential curriculum improvements, respondents provided a diversity of responses. Students

Student awareness of barriers in access to surgical care during 3rd clerkships, free-text responses.
Responses Indicating Patient Encounters with Barrier of Affordability
Absolutely. We had a patient who survived being dragged by a vehicle and had multiple comorbidities. In organizing care for her, it became apparent that her lack of documentation and lack of insurance factored heavily into the quality of care she received and potential for receiving various treatments/surgeries.
Not lack of access care but instead lack of access to appropriate care because of being uninsured, low health literacy, the need for an interpreter (which all too often was replaced with speaking louder or slower) or having the burden of an acute episode on a chronic one.
There were patients with no insurance, we could have prevented the patients from seeking healthcare
One patient could not go home at the appropriate time because her parents could not afford a walker
Reponses Indicating Patient Encounters with Barrier of Timeliness
A patient from clinic who waited so long to repair his inguinal hernia that it became so complicated that he required orchiectomy. This was likely due to his lack of access to surgery
I saw a patient with multiple non-healing wounds, and gangrenous tissue in bilateral lower extremities that were unattended to
Immigrants who couldn't get care or needed surgery until they came to America
Lack of access in large percentage of patients that came to UH with severe advanced disease process (1st time evaluation and disease is progressed)
Responses Indicating Patient Encounters with Barrier of Affordability & Timeliness
Lack of insurance, unable to transfer to skilled nursing
Many patients lack access to healthcare due to financial/transportation logistical issues, and wait till their conditions worsen before presenting, which makes their problems more complex
Patients have issues getting to clinic because of lack of finances to take public transportation
I saw many patients without insurance, without resources to access care, and lack of education about their conditions.
Patients were undocumented and scared to share their personal information and had ongoing health problems and were afraid to seek care
Several uninsured patients lacked adequate access to healthcare and used ED as their main source of care only when symptoms became unbearable.

FIGURE 3. Student free-text responses regarding applicability of course teachings to local clerkship environments and to patients with barriers in access to care, with pertinent themes.

requested (1) a greater focus on solutions for the health disparities presented and an increased focus on disparities in Newark and local environments in New Jersey, (2) an additional emphasis on potential solutions to global surgery disparities, and (3) details on how to become involved in global health as medical students. Finally, respondents requested that information on global health career tracks be included in the curriculum.

DISCUSSION

While medical students are aspiring advocates of global health and surgery, competing demands and time constraints of the medical school curriculum do not usually include foundational tenets on these topics as established by existing global surgery publications.[15] In an effort to address this knowledge gap, we developed a pilot course that consolidates core global surgery concepts with social determinants of health and health disparities with local relevance. This study demonstrates the feasibility of implementing global surgery-related content within a core third-year surgery clerkship and reports medical students' satisfaction with the curriculum. Finally, we describe the applicability of course concepts with respect to barriers in access to care to the local environment in Newark, New Jersey.

This study describes a novel global surgery and health inequity course in the orientation phase of the mandatory surgery clerkship. The surgical clerkship orientation introduces medical students to the diversity of inpatient, outpatient, and operative exposures in surgery and presents topics pertaining to social determinants of health.[20] Clerkship orientation is an opportunity to lay a groundwork of fundamental concepts in global surgery and health inequity toward reaching a larger number of students in a short timeframe. As a consequence of its integration into the third-year surgery clerkship orientation, our course was delivered to 191 students over a one-year period.[9,21] In contrast, lengthy elective seminars and course offerings with clinical exposures are often constrained by logistics and quotas on student involvement, with annual enrollment of eight to thirty medical students.[15,18,22] By developing a short course integrated to the clerkship curriculum, we demonstrate the feasibility of delivering global surgery concepts to

the entire body of students in the third year. Our course content directly addressed student misconceptions and gaps in knowledge of global surgery fundamentals that are documented by prior studies.[9,14]

The postcourse survey distills the perspectives of the majority of students (76%) who underwent instruction. We demonstrate feasibility of instruction in core tenets of global surgery and social determinants of health including economic instability and social contexts by respondents' affirmation of concepts at the time of clerkship completion. While an elective seminar at Oregon Health & Science University School of Medicine discusses the global surgical burden of disease, only a minority of medical schools do so, according to a survey of 18 schools from which 2% of medical students report this topic is part of their required curriculum.[9,22] Our course offers formal instruction on key themes as substantiated by the World Health Organization, the *Lancet Commission on Global Surgery 2030 Report*, and *Disease Control Priorities 3*.[19,23-24] Health inequity and disparities in access to care are common to domestic public health and global health, and are a unifying platform for delivering global surgery concepts.[25] Our findings demonstrate that the 1-hour clerkship curricular modality is a practical method of instruction to deliver core themes of global surgery.

The majority (81%) of study participants reported moderate to strong interest in global health, which is lower than reported rates from other schools.[26] Despite low baseline interest, 94% of students still supported course inclusion as part of the formal curriculum which is comparable to Gopfert et al's findings.[26] Our study findings mirror efforts of medical schools to increasingly include global health as part of the core curriculum.[5] Students' support of the course as part of the formal curriculum is likely underpinned by their demand for more global and public health lectures; students who had no baseline interest were also in favor of the course. As student engagement and interest are a valued aspect of curriculum development, our findings suggest that students find importance in placement of the global surgery and health inequity curriculum within the surgery clerkship.

With regard to course structure, the authors of this study deliberately positioned the course as a preface to the clerkship experience, which represents a formative period for students' clinical interests.[14] While students demonstrated a slight preference for case-based discussions over lectures, the most prevailing opinion (48% of respondents) favored inclusion of both instructional modalities. Case studies are shown to improve student learning engagement and analytical skills, as students benefit from peer and faculty reinforcement.[6,14,27] Additionally, students engaged in discourse about health inequity may be attuned to ways to improving access to surgical care locally.

Over one-third of students applied course concepts to clinical experiences in the local context, relating anecdotes about patients who faced barriers to access and care. As the course was positioned as a preface to clinical exposures in this clerkship, it increased the likelihood that students are sensitized to barriers to surgical access in their local environment. As medical students in-training and new physicians are increasingly facing interactions with culturally diverse populations, sensitivity to determinants of health and cross-cultural issues are necessary.[5] Major governing bodies within medical education have recently heightened the emphasis on social factors in the Medical College Admission Test and Liaison Committee on Medical Education and graduate medical education standards. Liaison Committee on Medical Education standards for medical schools mandate education in cultural competency and understanding underserved populations within the context of healthcare disparities in order to become a clinically proficient physician.[28] Additionally, the experiences related by survey respondents demonstrate that the course may have helped them fulfil a core objective of the surgery clerkship—taking socioeconomic factors into consideration when developing treatment plans.[20]

In our study, students demonstrated sensitivity to complex issues of timely access to care and appropriate postoperative follow-up. Several student anecdotes suggest achievement of cultural competency by recognition of language barriers and acknowledgment of challenges faced by uninsured immigrant populations. These findings echo efforts of the College of Human Medicine at Michigan State University in curricular redesign toward producing a physician workforce that is more attuned to the needs of populations with low socioeconomic status. Students in the College of Human Medicine surgery clerkship who interviewed patients to identify barriers in adherence to treatment and discharge plans went on to demonstrate above-average abilities to work with low-income patients.[29] The most effective way to successfully prepare students is to provide an educational context alongside experiential learning. Student feedback demonstrated that our pilot course provides such a foundational context.[30]

Limitations and Future Directions

There are several important limitations of our study. First, the study represents findings of a single institution at an urban medical school in the United States, which may require course modification prior to generalizability to geographically varied settings. Study duration is limited to 1 year, and therefore may only reflect the attitudes and composition of one medical school class. A significant limitation is that the survey tool is not validated, and there is no precurriculum survey. Survey responses are subjective and may reflect response and

recall bias, although the high response rate suggests the findings are likely to be accurate. The survey does not directly assess objective concept retention, which represents an area of future study. Future studies will pertain to several opportunities for course improvements as a response to requests from students and other stakeholders. Finally, we hope to investigate the effect of the course on specialty selection and physician career choices, particularly toward the care of marginalized populations locally and internationally.

CONCLUSIONS

Sustaining advancements in the field of global surgery requires responding to the unmet appeal from medical students for substantive educational opportunities.[31] We report the feasibility of a short introductory global surgery and health inequity curriculum during the formative clinical period of the third-year surgery clerkship as a way of engaging medical students in this field. This study demonstrates that meaningful inclusion of global surgery and health inequity, which have been historically underemphasized in medical school education, can be achieved within the existing curricular structure. Establishing formal education of these themes is beneficial to medical students, toward the care of local patients as well as broadly to the field of global surgery.

REFERENCES

1. Villavisanis DF, Trinidad SM, Zhang LP. Medical students and global surgery efforts at academic medical centers. *JAMA Otolaryngol Head Neck Surg*. 2019;145. 690.
2. Debas HT. The emergence and future of global surgery in the United States. *JAMA Surg*. 2015;150:833–834.
3. Hoehn RS, Davis BR, Huber NL, et al. A systematic approach to developing a global surgery elective. *J Surg Educ*. 2015;72:e15–e20.
4. Powell AC, Mueller C, Kingham P, et al. International experience, electives, and volunteerism in surgical training: a survey of resident interest. *J Am Coll Surg*. 2007;205:162–168.
5. Drain PK, Primack A, Hunt D, et al. Global health in medical education: a call for more training and opportunities. *Acad Med*. 2007;82:226–230.
6. Blum N, Berlin A, Isaacs A, et al. Medical students as global citizens: a qualitative study of medical students' views on global health teaching within the undergraduate medical curriculum. *BMC Med Educ*. 2019;19:175.
7. Riviello R, Ozgediz D, Hsia RY, et al. Role of collaborative academic partnerships in surgical training, education, and provision. *World J Surg*. 2010;34:459–465.
8. Johnston PF, Scholer A, Bailey JA, et al. Exploring residents' interest and career aspirations in global surgery. *J Surg Res*. 2018;228:112–117.
9. Scott EM, Fallah PN, Blitzer DN, et al. Next generation of global surgeons: aligning interest with early access to global surgery education. *J Surg Res*. 2019;240:219–226.
10. Latifi R, Rivera R, Gachabayov M, et al. Outcomes of 1,327 patients operated on through twelve multispecialty surgical volunteerism missions: A retrospective cohort study. *Int J Surg*. 2018;60:15–21.
11. Rickard J, Ntirenganya F, Ntakiyiruta G, et al. Global health in the 21st century: equity in surgical training partnerships. *J Surg Educ*. 2019;76:9–13.
12. Bales AM, Oddo AR, Dennis DJ, et al. Global health education for medical students: when learning objectives include research. *J Surg Educ*. 2018;75:1022–1027.
13. The author is Association of American Medical Colleges, Achieving Health Equity: How Academic Medicine is Addressing the Social Determinants of Health. Association of American Medical Colleges; 2015. [cited 2019 July 9]Available from: https://www.aamc.org/download/460392/data/sdoharticles.pdf.
14. Mehta A, Xu T, Murray M, et al. Medical student perceptions of global surgery at an academic institution: identifying gaps in global health education. *Acad Med*. 2017;92:1749–1756.
15. Anderson GA, Albutt K, Holmer H, et al. Development of a novel global surgery course for medical schools. *J Surg Educ*. 2019;76:469–479.
16. Unite for sight global health certificate program. [cited 2019 July 1]; Available from:http://www.uniteforsight.org/global-health-university/certificates.
17. Doran KM, Kirey K, Barnosky AR, et al. Developing a novel poverty in healthcare curriculum for medical students at the University of Michigan Medical School. *Acad Med*. 2008;83:5–13.
18. Chin-Quee A, White L, Leeds I, et al. Medical student surgery elective in rural Haiti: a novel approach to satisfying clerkship requirements while providing

surgical care to an underserved population. *World J Surg*. 2011;35:739–744.

19. Meara JG, Leather AJ, Hagander L, et al. Global surgery 2030: evidence and solutions for achieving health, welfare, and economic development. *Lancet*. 2015;386:569–624.

20. O'Neill R, Shapiro M, Merchant A. The role of the operating room in medical student education: differing perspectives of learners and educators. *J Surg Educ*. 2018;75:14–28.

21. Gosselin-Tardif A, Butler-Laporte G, Vassiliou M, et al. Enhancing medical students' education and careers in global surgery. *Can J Surg*. 2014;57:224–225.

22. Moren A, Thiels CA, AlJamal YN, et al. A pilot curriculum in international surgery for medical students. *J Surg Educ*. 2015;72:e9–e14.

23. Holmer H, Lantz A, Kunjumen T, et al. Global distribution of surgeons, anaesthesiologists, and obstetricians. *Lancet Glob Health*. 2015;3:S9–S11.

24. Debas HT, Donkor P, Gawande A, Jamison DT, Kruk ME, Mock. CN, editors. Essential Surgery. Disease Control Priorities, 3rd ed., Washington, DC: World Bank; 2015.

25. Koplan JP, et al. Towards a common definition of global health. *Lancet*. 2009;373:1993–1995.

26. Gopfert A, et al. Do medical students want to learn about global health? *Glob Health Action*. 2014;7:23943.

27. Cendan JC, Silver M, Ben-David K. Changing the student clerkship from traditional lectures to small group case-based sessions benefits the student and the faculty. *J Surg Educ*. 2011;68:117–120.

28. Liaison Committee on Medical Education, Functions and Structure of a Medical School: Standards for Accreditation of a Medical Program Leading to the MD Degree. Chicago, IL: LCME Secretariat; 2019 http://lcme.org/publications/#Standards.

29. Turner JL, Farquhar L. One medical school's effort to ready the workforce for the future: preparing medical students to care for populations who are publicly insured. *Acad Med*. 2008;83:632–638.

30. Hudon C, et al. Medical education for equity in health: a participatory action research involving persons living in poverty and healthcare professionals. *BMC Med Educ*. 2016;16:106.

31. Shaye DA. Medical students and global surgery efforts at academic medical centers-reply. *JAMA Otolaryngol Head Neck Surg*. 2019;145:206–207.