

Establishing a surgical partnership between Addis Ababa, Ethiopia, and Toronto, Canada

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Background: Academic partnerships between high- and low/middle-income countries can improve the quality of surgical education and health care delivery in each setting. We report the perceived needs related to collaborative surgical education in a resource-limited setting.

Methods: We used qualitative methods to elicit the opinions of surgical faculty members and surgical residents and quantitative methods to outline surgical procedure type and volume.

Results: Ethiopian faculty members identified the management of trauma and emergency surgical care as a priority. They identified supervision in the operating room (OR), topic-specific lectures and supervising resident assessments in the clinic as appropriate roles for partners. Residents were in agreement with faculty members, highlighting a desire for supervision in the OR and topic-specific lectures.

Conclusion: We present specific experiences and needs of a surgical teaching unit in a low-income country, paving the way to form a meaningful and responsive relationship between 2 surgical departments in 2 universities.

Contexte : Les partenariats universitaires entre pays riches et pays à revenus faibles ou moyens peuvent améliorer l'enseignement de la chirurgie et la prestation des soins de santé dans chaque contexte. Nous faisons état des besoins perçus en matière de collaboration pour la formation en chirurgie dans un milieu aux ressources limitées.

Méthodes : Nous avons utilisé des méthodes qualitatives pour sonder l'opinion des professeurs et des résidents en chirurgie, ainsi que des méthodes quantitatives pour faire le point sur les types d'opérations et leur volume.

Résultats : Les professeurs éthiopiens ont établi comme priorités la traumatologie et les soins chirurgicaux d'urgence. Ils ont évoqué la supervision au bloc opératoire, les conférences sur des thèmes précis et la supervision de l'évaluation clinique des résidents comme rôles appropriés pour les partenaires. Les résidents ont été du même avis que les professeurs et ont confirmé leur souhait d'être supervisés au bloc opératoire et d'entendre des conférences sur des thèmes précis.

Conclusion : Nous présentons les expériences et les besoins particuliers d'une unité d'enseignement de la chirurgie dans un pays à faible revenu, et nous pavons ainsi la voie pour l'établissement d'un lien de collaboration important et pertinent entre les départements de chirurgie de 2 universités.

Surgical services are often sophisticated and expensive in high-income countries (HICs); however, relatively inexpensive surgical procedures can improve the lives of many. These interventions (e.g., chest tube placement, tracheostomy, management of fractures, treatment of burns) cost between \$7 and \$215 USD per disability-adjusted life years averted and are neglected low-cost opportunities in low-income countries (LICs).¹ Postgraduate surgical education within LICs is the cornerstone for developing local workforce capacity to train and deliver services in-country. Academic partnerships between universities in HICs and those in LICs can be equitable, educational relationships that support postgraduate training to ensure that a health workforce is capable of delivering services in a sustainable fashion.²

In this study, we outline relevant metrics to guide the initiation of such a partnership. The needs of local surgical faculty members and residents should

strengthen a residency program, enabling the delivery of quality care to a population.

METHODS

This work represents the efforts of the departments of surgery at Addis Ababa University (AAU) and the University of Toronto (UofT) within the context of a broader partnership, termed the Toronto Addis Ababa Academic Collaboration. The relationship between the 2 universities started in 2003 with the partnering of our respective departments of psychiatry to supplement training for the first psychiatry residency training program in Ethiopia. The collaboration now involves partnerships between more than 6 faculties and 14 departments/divisions, including nursing, medicine, pediatrics, library sciences and engineering.

We used a mixed methods design whereby surgical activity data at Black Lion Hospital (also known as the Tikur Anbessa Hospital), the primary AAU teaching hospital in Addis Ababa, Ethiopia, were collected by retrospective review of operative logs and emergency consultation logs. We performed needs assessment surveys to collect educational and work environment data from both faculty members and residents. Finally, validation strategies were used.

Survey development

Two comprehensive questionnaires were developed based on previously published studies³ and current curricula at both institutions. One questionnaire was intended for AAU surgical faculty members and the other for surgical residents. Drafts underwent several revisions based on input from both partners. Two UofT surgical residents (D.C. and M.B.) worked alongside their Ethiopian counterparts in Addis Ababa for 6 weeks before making the final revisions to the questionnaires for local clinical sensibility and terminology. The final surveys were then reviewed with Ethiopian project supervisors (A.B. and M.D.); the final surveys, including the faculty survey, resident survey and program-specific information to accompany the resident survey, are provided in Appendix 1 (available at cma.ca/cjs). The survey and plans for its administration were submitted for ethics approval at both institutions. Each of the ethics review boards granted approval before administration of the survey.

Assessing the surgical activity by reviewing operative and emergency consultation logs at Black Lion Hospital

Information regarding surgical activity at Black Lion Hospital was collected by retrospective review of operative case logs for general surgery, neurosurgery and orthopedic surgery. General and orthopedic surgery data were collected for 3 consecutive months; neurosurgery data were collected for 6 consecutive months.

Perceived needs surveys: administration and validation

We requested individual interviews with the faculty surgeons and administered the resident surveys in small groups. Faculty surgeons were asked their opinions about resident education and surgical care in Ethiopia; we did not limit the number of answers. Residents were polled about their educational activities in 4 domains: clinic responsibilities, on-call duties, operating room (OR) experience and overall educational experience (including educational resources and specialty-specific knowledge base). After completion of the survey, we analyzed the results and presented the information to Ethiopian faculty members and residents to ensure it was accurate. A validation questionnaire was administered (Appendix 1).

Data analysis

We used Microsoft Excel (2008 for Mac) to tabulate results and prepare figures.

RESULTS

We identified 3 surgical training programs at Black Lion Hospital: general surgery (20 faculty members, 31 residents), neurosurgery (3 faculty members, 7 residents) and orthopedic surgery (6 faculty members, 8 residents). Residents represented all levels of training (junior through senior).

Surgical caseload at Black Lion Hospital

A total of 466 general surgery, 96 neurosurgery and 134 orthopedic surgery patients presented to Black Lion hospital during the analysis period. A clear trend emerged whereby 38% of general surgery, 47% of neurosurgery and 62% of orthopedic surgery procedures were trauma-related. Appendix 1 summarizes the surgical procedure types and their frequency within each field.

Faculty member and resident surveys: response rate and validation

We had an overall response rate of 86% among surgical faculty members and 80% among surgical residents (all disciplines); 95% of residents who completed the original survey also completed the validation survey. Residents unanimously agreed that their experiences were accurately reflected (quantified and reported in the appendix).

Faculty member survey

In all, 43 answers from the faculty members highlighted reasons for limited surgical care across Ethiopia. Perceived deficits in resident education made up 26% of the

responses. Faculty members cited a lack of knowledge on managing emergency surgical conditions, lack of subspecialized surgical services and a lack of disease-specific knowledge. The rest of the answers fell outside the direct effects that strengthening surgical training might be expected to achieve, although a successful academic partnership might be expected to influence some of these important issues. These concerns included the emigration of surgeons to neighbouring countries and surgeons choosing to work in local clinics outside the public health system for greater pay. Within Ethiopia, surgical care is clustered in urban environments, resulting in delayed or inaccessible care for many patients who live in rural Ethiopia. Only 16% of responses related to infrastructure, where limited equipment, surgical beds and a lack of anesthesia and nursing support were cited.

When asked how the UofT surgeons could help train residents, AAU faculty members suggested that efforts would be best spent by offering supervision in the OR, providing topic-specific lectures and supervising resident assessments in the clinic.

Specific educational activities of residents

All AAU surgical residents attend clinics with their faculty supervisors for an average of 10.6 (range 5–30) hours per week and review an average of 26 (range 8–30) patients during that time.

All surgical residents take call shifts (mean 9.2 [range 8–16] nights per month). In addition to call responsibility during training, many surgical residents also take call for private general practice to supplement income (mean 3.4 [range 0–12] nights per month).

Training in the OR occurred at least twice weekly for all surgical residents. Junior residents spent an average of 17.9% (range 0%–80%) of their time operating as the primary surgeon, whereas senior residents spent an average of 44.3% (range 10%–80%) of their time operating as the primary surgeon. Residents rated faculty supervision in the OR as less than optimal (mean ranking 2.8 [standard deviation; SD 1.04] on a scale of 1–5).

Residents reported spending many hours each week on self-directed or small group learning: general surgery residents spent an average of 10.6 hours per week, neurosurgery residents 12.1 hours per week and orthopedic surgery residents 14.6 hours per week. Residents reported inadequate access to the Internet, journals and books.

Residents reviewed a specialty-specific list of topics to identify strengths and deficiencies in their clinical learning. The results are presented in Figure 1. Several specialty-specific deficits in training were highlighted.

- General surgery: vascular, cardiothoracic and oncology surgery.
- Neurosurgery: peripheral nerve, neuropathology and vascular neurosurgery.

- Orthopedic surgery: degenerative spine, arthroscopy and spinal trauma.

Some of the identified training deficits reflect subspecialties that are not currently practised in Ethiopia at present. For example, vascular neurosurgery is only emerging as a subspecialty in Ethiopia and is taught to residents under the supervision of visiting faculty members.

Surgical residents were asked how the UofT faculty could best help to strengthen the surgical training program. Residents primarily desired more supervision in the OR and some specific, topic-related lectures. Other responses are summarized in Appendix 1.

Barriers to optimal surgical residency in Ethiopia

The surgical faculty at AAU was polled about specific barriers preventing them from providing optimal surgical training to residents. Using a 5-point scale, where 1 represented “least hindering” and 5 represented “most hindering,” a clear trend emerged whereby educational resources (mean rank 4.16 [SD 0.94] out of 5) and surgical equipment (mean rank 4.12 [SD 0.93] out of 5) were the top 2 perceived barriers.

Surgical residents were asked about the availability of specific resources to augment their education. Using a 5-point scale, where 1 represented “not available” and 5 represented “available,” the following resources emerged as lacking: educational tools, including journals and access to the Internet (mean rank 1.57 [SD 1.0] out of 5); clear goals for each level of training (mean rank 2.64 [SD 1.6] out of 5); and supervision in the OR (mean rank 2.82 [SD 1.04] out of 5). In addition, only 55% of all residents perceived that their progress in the residency program was consistently tracked and that they received feedback about their strengths and weaknesses.

DISCUSSION

We used a mixed methods design to determine the perceived needs of both faculty members and residents engaged in an academic surgical training program in a resource-limited setting. Our aim was to gain an understanding of how an academic partnership may be able to strengthen the current state of surgical training. Ethiopian faculty members identified the management of trauma and emergency-related surgical care as a priority. The faculty members identified supervision in the OR, topic-specific lectures and supervising resident assessments in the clinic as appropriate roles for partners. Residents were in agreement with faculty members, highlighting a desire for supervision in the OR and topic-specific lectures. When questioned about specific knowledge gaps, respondents in general surgery, neurosurgery and orthopedic surgery named specific areas of study (Fig. 1) and described a lack of educational resources, including books, journals, formal

evaluations and an organized curriculum. This sets forth a specific and achievable set of objectives by which a university partnership could improve surgical training in Ethiopia. Equally important to recognize is that surgical residents are extremely dedicated to the practice of medicine, spending long hours on call for both residency training and private practice. Dedication to patient care is not a

problem, whereas the lack of educational resources, including teaching manpower, is.

These results highlight a shortage in the educational work force (both faculty members and residents expressed a desire for UofT partners to assist in the ORs and clinic) and specific gaps between Ethiopia's need for surgical services and the current educational curriculum (trauma and

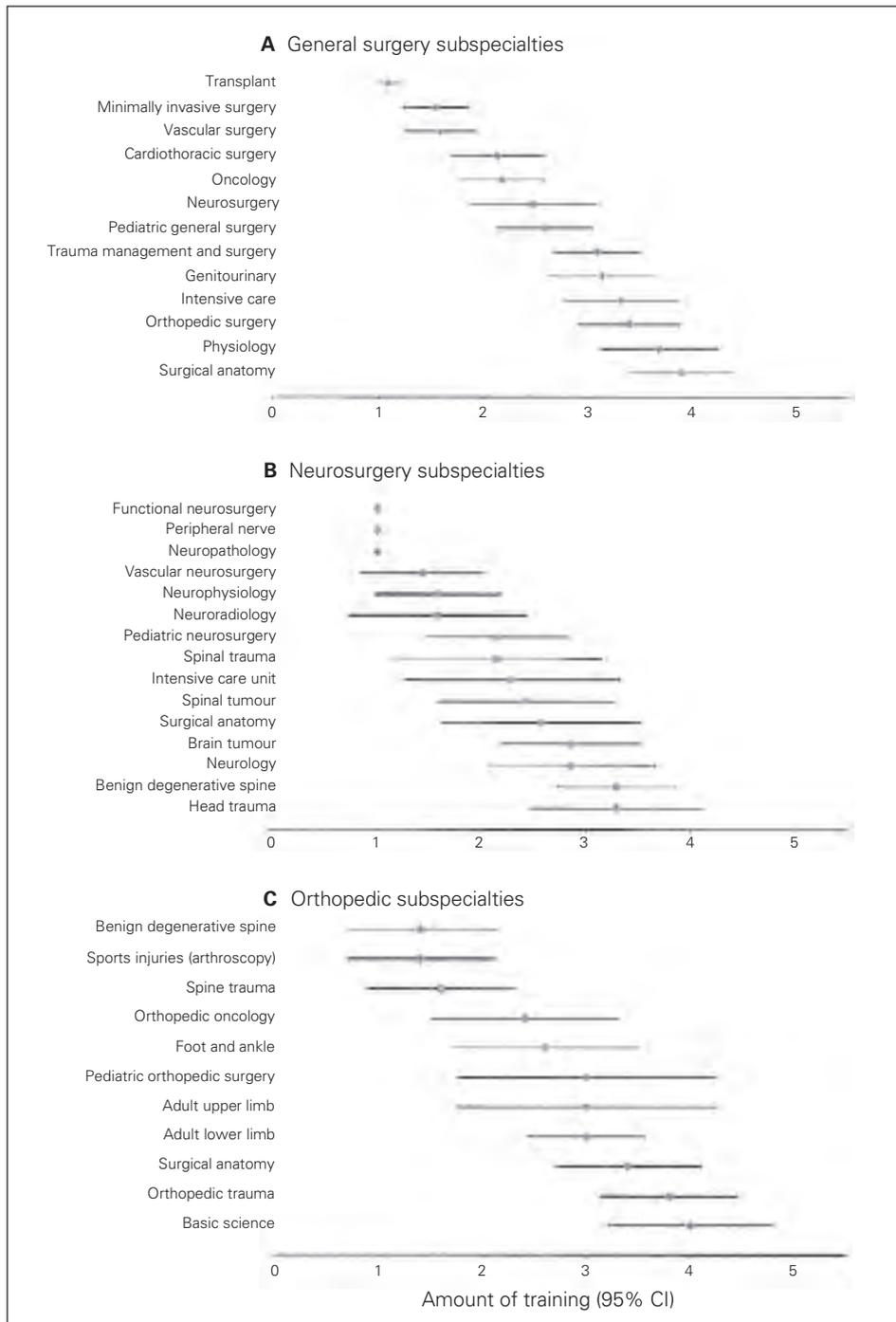


Fig. 1. (A) General surgery, (B) neurosurgery and (C) orthopedic surgery residents were asked to rate the amount of training in subspecialty areas using a 5-point Likert scale, where 1 represented "very little" and 5 represented "optimal." The responses were charted in order of most deficient areas of training to optimal areas of training. CI = confidence interval.

emergency care). Ethiopia, like many LICs, faces an enormous shortage of surgeons to meet the needs of its population. The World Health Organization (WHO) has set a minimum density of 2.28 health care workers per 1000 population to achieve desired levels of important health interventions.⁴ Currently, Ethiopia has 0.03 physicians and 0.21 nurses and midwives per 1000 population for a combined total of 0.24 health care workers — far short of the desired level.⁵ Our effort represents a unique contribution among a number of investigations that attempt to outline strategies for improved health delivery to LICs. Drain and colleagues^{6,7} point out the increasing mobility of the world's population and the need to understand disease at an international level through clinical rotations during residency training. Bernstein⁸ has commented on the ethical dilemmas encountered in the international setting. We report on the present surgical training activities in a major training centre at AAU along with the needs perceived by faculty members and residents. By involving both AAU and UofT in the design of this study and collection of this information, we hope to have fostered an equitable academic partnership.

The concept of an academic partnership includes an equitable exchange. The surgical treatment of disease is logistically demanding, and we must separate areas where an academic partnership can primarily contribute from impacts that may accrue as a result. For example, 74% of faculty members' responses were related to concerns such as physician emigration, practice patterns or infrastructure. Ethiopia started registering its health professionals by category in 1987. Between 1987 and 2006, of the 4394 Ethiopian doctors (3476 general practitioners and 918 specialists) registered, 73.2% had left public hospitals to work for nongovernmental organizations or to emigrate overseas. Whereas in 1965 the doctor:population ratio in Ethiopia was 1:85 000, in 2006 it was 1:118 000, a 74.1% deficit according to WHO's minimum doctor:population ratio.⁹ This concern might be addressed as a side effect of an educational partnership and the development of a "critical mass" of physicians. Of interest, in the first UofT-AAU partnership between the departments of psychiatry, unpublished data indicate a 95% retention rate among the 30 Ethiopian trained psychiatrists 9 years after the program was established.

The second aspect of an equitable partnership comes in the form of what UofT will gain from such an endeavour. Although we did not directly study this aspect, other groups have highlighted improved clinical acumen in the absence of advanced diagnostic testing and exposure to a variety of disease that is often not present in developed countries.⁷ Increased exposure to culturally sensitive situations is another,¹⁰ with a heightened ability to teach across cultures.

CONCLUSION

The strength of this research is in the effort to consider the specific experience and needs of a potential partner in an

LIC, paving the way to form a meaningful and responsive relationship between 2 surgical departments in 2 universities. Involving both faculty members and residents in the design and implementation of the needs assessment built a foundation for collaboration. Severe material and personnel resource limitations at Black Lion Hospital make operative care challenging. However, exploring the broader limits and needs particularly identified by the surgical faculty sets a context for the partnership within an experienced understanding of a resource-limited health care system. The main weakness of this research is that it represents a cross-sectional snapshot in a complex and changing system. It will be important to continue to reassess the needs of both surgical faculty members and residents in Ethiopia as the partnership grows. In addition, it will be important to evaluate the perceived needs of UofT faculty members and residents as they engage in the educational partnership. Surgical decision-making is rooted in a deep understanding of the pathobiology of disease. Equally important is an understanding of what resources are available to help our patients and our colleagues. Students and educators from both the developed and developing world have a lot to gain by working together.

Competing interests: None declared.

Contributors: D.W. Cadotte, M. Blankstein, A. Bekele, C. Pain, M. Derbew and A. Howard designed the study. D.W. Cadotte, M. Blankstein, A. Bekele, D.S. Dessalegn and M. Derbew acquired the data. D.W. Cadotte, M. Blankstein, D.S. Dessalegn, M. Bernstein and A. Howard analyzed the data. D.W. Cadotte, M. Blankstein and A. Howard wrote the article. All authors reviewed the article and approved its publication.

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