Global Surgery Course

Evaluation of Course Outcomes and Future Course Planning

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Abstract — **Having enough trained surgical personnel to perform emergency surgeries in rural areas continues to remain a significant problem for low- and middle-income countries in Asia. Hence, we designed and conducted a cross disciplinary global surgery course in November 2024 with the aim of training surgical trainees and surgeons operating in rural areas to gain confidence in performing emergency essential surgical procedures. Through our pre and post course questionnaire, we have found that the course helped increased participant confidence levels in performing various emergency surgical procedures covered during the course and all participants felt that they would recommend the course to their colleagues. Although there are challenges in defining the scope of a global surgery course and implementing appropriate assessment measures to evaluate participants, this course shows promise as means to train and upskill surgeons operating in rural areas in the region.**

Keywords- Global surgery; Rural surgery; Surgical training in Asia.

I. INTRODUCTION

Access to healthcare, and in particular surgical care, remains a significant problem in Low- and Middle-Income Countries (LMICs) and rural areas in Asia. While the reasons for inequity to essential surgical care are multifactorial, one of the major issues identified in the Lancet commission for Global Surgery 2030 was the insufficient number of surgically trained personnel and their concentration in urban areas [1][2]. The other issues that were identified included the lack of continuous training and supervision in peripheral surgical units, the need for cross-specialty knowledge, and working with limited resources [1].

While training a surgical workforce and building healthcare systems capacity requires interventions at different levels, there was a strong focus on education and training in the World Health Organisation (WHO) Global strategy on Human Health Resources: Workforce 2030 [3]. The idea of having a short course to equip surgeons with skills required in the rural environment is not new but it is rarely conducted as a structured regular course with the frequency and intensity required to sufficiently train rural surgeons in LMICs. From literature, these are often organized by High Income Countries (HICs) for LMICs. Training competencies are often decided by HICs with limited input from LMICs [4]. In addition, there was a paucity of data on programs in Asia.

Hence, our aim is to develop a multidisciplinary global surgery course that would help surgeons operating in rural areas in Asia to gain confidence in performing essential emergency surgical procedures. The secondary aim is to collaborate with participants and gradually refine and adapt the course for countries in the region. After several cycles of the course to solidify the course structure and teaching methods, our long-term goal is to be able to train surgeons in LMICs to replicate and conduct the course themselves in their home countries. This would help ensure sustainability of the course and benefit more participants by increasing access to the teachings.

We organised and conducted the first "Surgery In Rural and Austere Environments Course" (SIRAEC) over 4 days in November 2024 in the Singapore General Hospital Academia (which has a wet skills lab) for 54 participants from neighbouring countries as well as local Singaporean participants.

The focus of the course was on building up cross disciplinary surgical knowledge and providing a hands-on cadaveric practical session to develop participants' surgical skills. Apart from the knowledge component of the course, we also recognised that experiential knowledge can be equally valuable, and time was dedicated for sharing of experiences such as the structure of surgical training programs in the region and challenges that participants faced in their own communities. Guest speakers also shared their own experiences on humanitarian missions with inspiring and humbling stories as well as solutions to shortages in manpower and equipment.

Given the significant costs of training programs including travel, accommodation and course fees, we sponsored participants from LMICs attending the course to reduce barriers to access and improve participation from regional surgeons. Funding was sourced from private donations.

The rest of this paper is organized as follows. Section II describes the course design and evaluation. Section III addresses the analysis of the course evaluation. Section IV discusses some of the limitations of the course design and evaluation. Section V gives a brief conclusion and mentions future work that we are doing. The acknowledgement section closes the article.

II. METHOD - COURSE DESIGN AND EVALUATION

The initial core course design was based upon the three Bellwether procedures – emergency caesarean section, emergency laparotomy, and management of long bone

fractures [1]. Consultant doctors from various specialties in Singapore including general surgery, obstetrics and gynaecology, urology, orthopaedic surgery, plastic surgery, paediatric surgery, and anaesthesia were invited to volunteer to teach in the course. Additional procedures relevant to each subspeciality were then added after a literature search to review other similar emergency rural surgical courses and discussions with team leads from each speciality. Each speciality team also designed their own course material on core conditions and procedures relevant to a rural environment.

We started each speciality training module with didactic lectures followed by a practical session. We utilised simulation models for some of the teachings such as the anaesthesia segment (e.g. intubation, spinal anaesthesia, emergency cricothyroidotomy). The hands-on practical sessions for the surgical specialities (e.g. cholecystectomy, bowel repair/resection, perforated ulcer repair, hysterectomy, etc.) were conducted as cadaveric dissection supervised by consultant specialist volunteers both from Singapore and the region.

Prior to the start of the course, participants were given a pre course questionnaire to determine their level of experience in performing common procedures that were to be taught during the course. This questionnaire was then repeated after the course to evaluate the impact of the course in improving confidence levels with performing various procedures. Participants were also surveyed after the course on their level of satisfaction with the course using open ended questions in the questionnaire to assess the strengths and weaknesses of the course. Finally, participants were also asked about procedures that they would like to have covered or felt were unnecessary to determine how we could refine the course curriculum. The results of the pre and post questionnaires are compared in the next section.

III. RESULTS – ANALYSIS OF COURSE EVALUATION

A. Course demographics

54 participants responded to the questionnaire (described in the previous section) that was administered just before the start of the first lectures and after the entire course had ended. Of these 54 participants, 73% worked in tertiary referral centres, 17% worked in secondary centres, 6% worked in primary healthcare settings and 4% worked in remote medical posts.

48% were specialists or board-certified surgeons, 33% were surgical trainees, 19% were not from the above two categories, and consisted of anaesthesiologists, emergency medicine physicians, obstetrics and gynaecology trainees.

Participants had varying familiarity with the procedures taught. The only procedures which more than half of respondents indicated they performed regularly were soft tissue debridement, vacuum dressing application, chest drain insertion, inguinal hernia repair, and cholecystectomy.

B. Course satisfaction

Participants reported high satisfaction with the SIRAEC with all participants indicating that they "Agree" or "Strongly agree" that they would recommend the course to their colleagues. There was broad satisfaction for the course resources, instructors' knowledge, course organisation and support equipment as well.

C. Procedure confidence

There was a universal increase in percentages of participants indicating they "Strongly agree" or "Agree" that they were more confident in performing the procedures post course. Notably, for procedures which more than half of participants indicated that they performed regularly, there was also an increase in confidence performing them. For instance, the proportion of "Strongly agree" and "Agree" respondents increased from 62% to 83% for soft tissue debridement, 52% to 79% for vacuum assisted dressing, 63% to 88% for chest drain insertion and 57% to 83% for hernia repair.

D. Strengths and weaknesses

When surveyed on the strengths of the course, a large proportion of participants (n = 18) reported the importance of hands-on training contributing to their satisfaction of the course. Having knowledgeable instructors was widely seen as a strength (n = 11). Other themes include good organisation (n = 9), good quality information transfer (n = 8), the collaborative nature of the course i.e. interdisciplinary, multi-national (n = 4), and opportunities for networking (n = 3). Some participants also responded with praise of specific topics, notably component separation (n = 3).

When surveyed on the weakness of the course, there were considerable opinions reported pertaining to the course length and time allocation (n = 11), with seven respondents indicating they would prefer longer practical sessions, four respondents indicating they would prefer shorter theory sessions, three respondents indicating they would prefer the course duration to be longer and one respondent indicating he/she would prefer the course duration to be shorter. Four participants responded that the sessions were too packed, resulting in difficulty focusing.

Some participants also provided feedback pertaining to the theory sessions (n = 3) with one respondent suggesting it should be more practical, one suggesting it should be more focused, and one suggesting it should be more discussion based. Three participants also suggested a greater focus on austere techniques and how they could be practiced in the rural environment. With regards to the learning material, one participant suggested sharing the resources via online platforms beforehand to allow better learning. Seven participants also gave comments with regards to weaknesses in specific skills taught, such as the lack of coverage of pericardial window, obstructed hernias and laparoscopic surgery. Five participants reported no weaknesses.

E. Procedures to be covered

When surveyed on which procedures that were not covered that participants would like to have covered, there

was a spectrum of procedures listed. Categorising these responses into broad categories, we identified the following key areas to include or develop further for future courses: procedures for urinary diversion and managing ureteric/bladder injuries (n=12), commonly performed gynaecological procedures and obstetric complications (n=12), trauma surgery (n=9) and bowel resection/repair and stool diversion (n=8).

IV. DISCUSSION AND LIMITATIONS

The training background of participants from different LMICs in Asia is not uniform, so developing a single course for surgeons / surgical trainees from various countries is challenging. For example, the training needs for a participant from Nepal are quite different from that of a participant from Malaysia or even between different parts the same country depending on how often they are involved in rural surgical practice. This may explain the varied feedback regarding the course curriculum.

What we as organisers from an urban country perceive as important may not always match what participants wish to learn. It is important then that we seriously take into consideration the feedback given by our participants to build a course that is relevant to their needs [4][5][6]. However, given limited resources, we need to find a common curriculum within a single course that can address the majority of our participants' diverse training needs.

Additionally, as the course did not incorporate an observed evaluation component, it was difficult to guarantee each participant's degree of competency. The questionnaire focused on self-assessment of competency and satisfaction with the course. However, we were unable to assess their knowledge, learning and behaviours due to the limited time, training materials and manpower.

There were also limitations in the number of course participants and materials as the course funding was external through donations and insufficient to support a larger group.

V. CONCLUSION AND FUTURE WORK

It is only recently that the term global surgery has emerged together with the acknowledgement that surgery is an important part of global health and its scope is still being defined [7]. Additionally, with only about 4.1% of global health research being related to surgery [6] there is a lack of literature and guidance on designing a global surgery training program curriculum. Determining the depth and breadth of content, method of teaching, mode of training assessment and evaluation continues to remain a challenge and will require time (years) to properly develop [5][6].

Although we have managed to achieve our initial aim of conducting a multidisciplinary global surgery course that would help surgeons operating in rural areas in Asia to gain confidence in performing essential emergency surgical procedures, we still have much to do in terms of refining the curriculum, introducing assessment and scaling up.

We are currently in the process of organising our second course and one of the major changes we are making based on the course feedback is that we are shifting a lot of the didactic teaching to online pre-reading material to give more time for hands-on practical during the in-person 4-day course. We also plan to include a short quiz in the pre and post questionnaire as a form of competency assessment.

Additionally, recognising the differences in healthcare systems between countries, we need to conduct an assessment of the surgical training needs of individual countries if we are to eventually adapt the course design and decentralise the teaching. This would help to build a more sustainable training model and also form long-term partnerships with other countries in the region [4][5][6].

Over time, we hope to scale up the course to be conducted more frequently and have other countries in the region host the course to gradually transfer stewardship and ownership of the course to the home countries of participants. However, a large part of this depends on funding, infrastructure and acceptance of the course by countries in the region.

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