



Public health meets global surgery: a synergistic approach to better outcomes

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Background: Global surgery (GS) aims to improve access to timely, quality, and affordable surgical care worldwide, yet it remains underrepresented in public health education.

Objective: This cross-sectional study assessed the awareness and knowledge of GS among 242 public health professionals.

Methods and results: Data collected via a self-structured questionnaire using SPSS 25 revealed significant gender and age diversity, with the majority being young professionals (76.4% aged 20–29). Most participants (71.5%) held a master's degree, and 55% had 1–5 years of public health experience. While 60% were familiar with the term “Global Surgery,” a considerable portion lacked a comprehensive understanding. Participants emphasized the need to integrate GS into public health curricula through faculty development, practical training, scholarships, and research collaborations.

Conclusion: These strategies aim to bridge the knowledge gap and enhance the role of surgical care in global health. Despite being essential for addressing a significant portion of the global disease burden, surgical care remains inaccessible to many in LMICs due to systemic barriers. This study underscores the importance of fostering international partnerships and promoting a multidisciplinary approach to improve surgical care access, ultimately contributing to better health outcomes globally.

Keywords: global surgery, health disparities, LMICs, public health education, surgical care access

Introduction

Global surgery (GS) seeks to improve access to timely, quality, and affordable surgical care for all^[1]. It involves all fields related to surgical care, including surgical sub-specialties, obstetrics and gynecology, anesthesia, peri-operative care, emergency medicine, rehabilitation, palliative care, nursing, and allied health fields, among others^[2]. Surgical care is usually thought of as too complicated, costly, or limited in addressing the global disease burden^[3]. There are an estimated 266 million operations performed globally per annum^[4], they are largely restricted to

HIGHLIGHTS

- Global surgery aims to improve access to timely, quality, and affordable surgical care worldwide, yet it remains underrepresented in public health education.
- This cross-sectional study assessed the awareness and knowledge of global surgery among 242 public health professionals.
- This study underscores the importance of fostering international partnerships and promoting a multidisciplinary approach to improve surgical care access, ultimately contributing to better health outcomes globally.

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high-income countries (HICs), with the poorest third of the world's population only receiving 3.5% of these^[5].

In 2008, Dr Paul Farmer famously referred to surgery as “the neglected stepchild of global public health”^[6]. Drs Jim Kim and Paul Farmer are considered the fathers of GS. The Lancet Commission on Global Surgery (LCoGS) coordinated the publication of several landmark papers, which identified considerable injustice in access to safe surgical care. One of LCoGS' vital contributions to literature was the Global Surgery 2030 report, which provided international communities with data and logic to advocate for increased global health attention in surgical care. Updating DCP2's estimate, the Global Surgery 2030 report established that up to 30% of the global disease burden might require surgery^[7].

The connection between surgery, anesthesia, public health, and global health has developed due to various academic and strategic initiatives, notably the LCoGS^[8]. Additionally, the growing global burden of non-communicable diseases, many requiring surgical interventions^[9], has highlighted the

healthcare workforce gap. A recent estimate places the number of surgeons, obstetricians, and anesthesiologists at just over 2 million worldwide^[4], with an additional 1.27 million needed by 2030 to meet the minimum workforce requirement^[10]. A study shows that 42% of overall research production from Pakistan was from 2017–19^[11]. Low- and middle-income countries (LMICs) face significant infrastructure challenges, limiting access to surgical healthcare facilities and delaying care provision^[12]. In Pakistan, there is a deficit of 17 million surgeries annually, with preventable deaths from surgical conditions surpassing those caused by infectious diseases^[13]. Additionally, only one Pakistani agency, the Higher Education Commission (HEC), ranks among the top ten most frequent funding organizations. Experts have discussed that, in Pakistan, the lack of focus on research expenditure directly affects research output^[14]. Surgeons in LMIC who wish to contribute to global surgical research face systemic hurdles. The most commonly cited barriers include a lack of sustainable funding and time for research, insufficient research training, a declining research culture, competition from private practice, and difficulties with record-keeping and data management^[15]. Efforts to strengthen health research capacity should address these barriers, overcome research disincentives, ensure local ownership, and foster trust, cooperation, and a locally relevant agenda^[16].

GS is a movement that advocates for access for every individual to safe and affordable surgery, regardless of geographic location or socioeconomic status. It has recently received increased attention within the global health arena, but many patients are still without access to care because of geographical, social and economic disparities. Due to the multi-disciplinary nature of surgical services, GS requires that a worldwide network of healthy surgical systems be developed and sustained. Lack of awareness is one of the major dilemmas contributing to the declining recognition of surgical procedures in Pakistan. Public health practitioners do not know about the impact of GS on the community. Our study bridges this gap by bringing surgeons and patients together on a common platform to save more lives. The primary aim of this study was to assess the awareness and knowledge of GS among public health professionals. Secondary aims included identifying demographic differences, such as sex and age, to understand their influence on familiarity with GS and inform tailored educational strategies.

Methodology

This is a cross-sectional study utilizing a quantitative and descriptive approach. The study was conducted over six months and included 242 participants. A convenience sampling technique was employed to select the participants. Data were collected using a self-structured questionnaire, developed based on an extensive review of existing literature and consultations with subject matter experts in GS and public health. The questionnaire was designed to capture three main domains:

Demographic Information: Age, gender, professional background, and years of experience in public health.

Awareness and Knowledge: Familiarity with global surgical initiatives, understanding the role of surgical care in public health, and sources of information on GS.

Table 1

Demographic Characteristics and their relationship with awareness about global surgery

	Frequency	Percentage	P
Gender			
Male	108	44.6	0.003
Female	134	55.4	
Age			
20-29	185	76.4	0.677
30-39	41	16.9	
40-49	15	6.2	
Greater than 50	1	4	
Level of education			
MBBS	5	2.1	0.000
Bachelor Degree	48	19.8	
Master Degree	173	71.5	
Doctorate	16	6.6	
Years of experience in public health			
Less than 1 year	72	29.8	0.000
1-5 years	133	55	
6-10 Years	27	11.2	
More than 10 years	10	4	
Total	242	100	

Integration in Education: Opinions on current educational programs, inclusion of surgical care in public health curricula, and recommendations for improvement.

To ensure content validity, the initial draft of the questionnaire was reviewed by a panel of five experts in public health and GS. Their feedback was incorporated into the final version to enhance clarity, relevance, and comprehensiveness. The questionnaire underwent a pilot testing phase with a sample of 20 public health professionals from similar demographics. This phase aimed to evaluate clarity, feasibility, and reliability. Adjustments were made based on participants' feedback to refine the wording and structure of the questions. Internal consistency reliability was assessed using Cronbach's alpha, with an overall value of 0.82, indicating good reliability. Face validity was confirmed through qualitative feedback from the expert panel, ensuring the questionnaire effectively measured the intended constructs.

Participants were invited through an email containing the study's aims, ethical considerations, and their voluntary role. The invitation emphasized that participants could withdraw at any time without any consequences, and their responses would remain anonymous and be used solely for research purposes. The collected data were analyzed using SPSS Version 25 (Statistical Package for the Social Sciences). Descriptive statistics were computed to identify demographic trends, and inferential statistics were applied to assess correlations and significant findings related to GS awareness and knowledge. The work has been reported in line with the STROCSS criteria^[17].

Results and interpretations

The survey revealed several notable demographic and professional trends among respondents. As shown in Table 1, the majority were women (55.4%), with men comprising 44.6%. Awareness of GS was higher among women, with a *P*-value of 0.03, indicating a statistically significant difference. Most

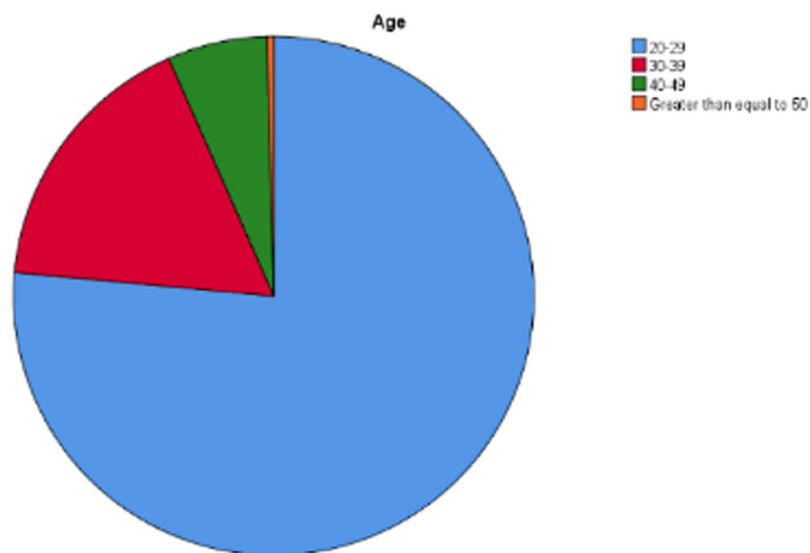


Figure 1. Pie chart showing the age distribution of respondents.

participants (76.4%) were aged 22–29 years, followed by 16.9% aged 30–39 years, and 6.2% aged 40–49 years. Minimal representation was observed among participants aged 50 years or older (0.4%) with a *P*-value of 0.677. These results suggest that demographic factors such as sex and age influence familiarity with GS, emphasizing the need for targeted awareness campaigns. Comparisons based on sex and age were performed using chi-square tests, with *P*-values calculated to identify statistically significant differences in awareness and knowledge of GS. These variables were selected due to their potential impact on educational exposure, professional opportunities, and access to global health knowledge. Figure 1 illustrates this age distribution, highlighting the predominance of

young professionals in the study. Regarding educational qualifications, a significant portion (71.5%) held a master's degree, with smaller proportions holding a bachelor's degree (19.8%), doctorate (6.6%), or an MBBS degree (2.1%). In terms of public health experience, 55% had 1–5 years of experience, while 29.8% had less than one year. A minority had 6–10 years (11.2%) or over 10 years of experience (4%).

The survey also assessed participants' awareness and knowledge of GS. Figure 2 highlights participants' familiarity with the impact of surgical interventions, common surgical conditions in LMICs, and the role of GS in addressing public health issues. While 80% demonstrated high familiarity with the impact of surgical interventions and 68% understood the scope of GS, 80% demonstrated high familiarity with the impact of surgical interventions and 68% understood the scope of GS,

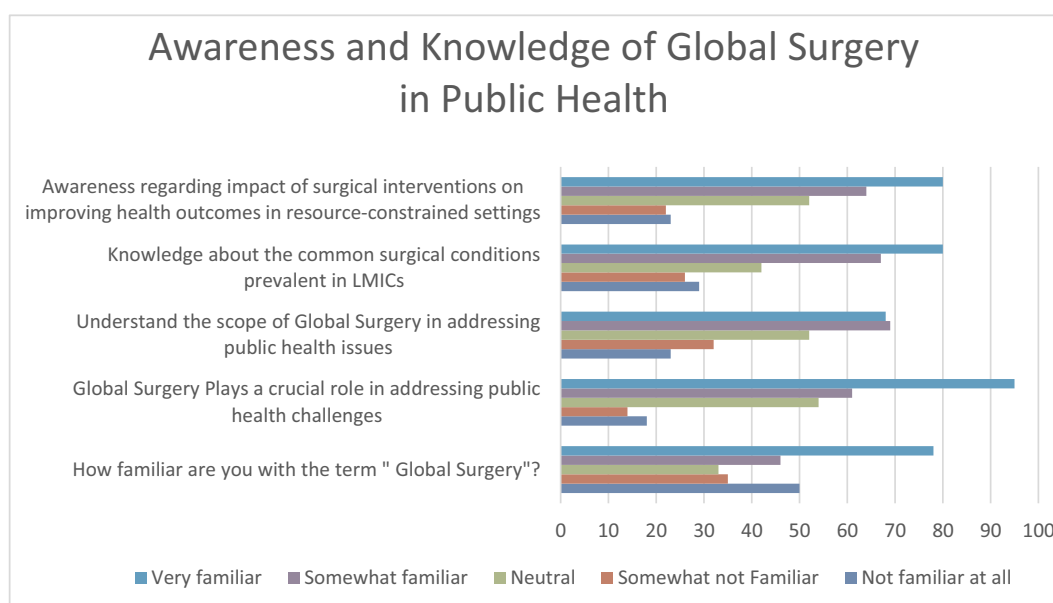


Figure 2. Awareness and knowledge of global surgery in public health.

Table 2
Thematic Analysis

Q	Sr#	Themes
What strategies do you believe would enhance the integration of Global Surgery within public health education?	1.	Add Global Surgery into the public health courses curriculum
	2.	Faculty development programs on global surgeries
	3.	Integration of practical training or hands-on experiences in surgical settings
	4.	Providing funding or scholarships specifically for students interested in Global Surgery
	5.	Encouraging student-led research projects or initiatives related to Global Surgery
	6.	Collaborative projects or research opportunities with surgical departments or organizations
	7.	Establishing partnerships with international organizations or institutions specializing in Global Surgery

notable gaps were identified. A substantial proportion were unfamiliar with surgical conditions in LMICs (29%) or lacked understanding of GS’s role in public health (23%). Familiarity with the term “global surgery” was mixed; 78% were familiar, but 22% were unfamiliar, highlighting the need for improved education and awareness.

Thematic analysis of the survey responses, as summarized in Table 2, explored strategies to integrate GS within public health education. Respondents suggested the development of structured curricula incorporating GS topics and faculty development programs that include workshops, training, and mentorship opportunities. They also emphasized the need to establish partnerships with surgical settings for practical training opportunities, offer scholarships and grants to support GS research, and encourage interdisciplinary collaboration between public health and surgical professionals. Additionally, participants advocated for creating a GS research network to facilitate innovation and knowledge sharing. These measures could significantly enhance the integration of GS into public health education and contribute to better health outcomes worldwide.

Discussion

GS is an important component of global health, with research and practice targeted at improving timely access to quality surgical care for all people around the world. In this study, most of the participants were young adults, and around 70% of the participants had more than 1 year of public health experience, and around 60% of the participants were familiar with the term “global surgery.” Around 65% of the participants agreed that “global surgery” plays a pivotal role in the realm of public health. Despite all participants holding a minimum educational attainment of 16 years, a notable proportion lacked fundamental comprehension and acquaintance with the domain of GS.

The integration of GS into the curriculum of public health education garnered widespread support, particularly given the substantial prior experience in public health among around 70% of participants. The significant associations between demographic factors, such as sex, age, and awareness of GS, highlight the importance of tailoring educational and training programs. Women and mid-career professionals demonstrated higher awareness, possibly reflecting differences in professional

exposure and priorities. Addressing these disparities through customized interventions can enhance the integration of GS into public health practice.

Additionally, various measures were proposed to facilitate the seamless incorporation of GS within public health education, including faculty development initiatives, hands-on experiential learning opportunities, scholarships for students, encouragement of student-led global health research endeavors, and collaborative research programs.

Within the ambit of public health, the domain of GS endeavors to refute the notion of surgery as a privilege accessible solely to affluent segments of society^[18]. Affordable Surgical, Obstetric and Anesthesia (SOA) care has been regarded as an integral component of public health care and universal health care coverage. Billions of people around the world, especially in LMICs have poor access to SOA care.^[19,20] Notably, a majority of study participants exhibited familiarity with surgical conditions prevalent in LMICs and recognized the potential of GS in ameliorating public health outcomes.

The imperative of ensuring facile and high-quality access to surgical interventions for prevalent health conditions necessitating surgical management underscores the significance of GS within the broader public health discourse. Around 30% of world health problems necessitate surgical interventions^[20]. In Pakistan, 187 deaths per 100 000 population are caused by illnesses requiring surgical care, more than the 164 deaths per 100 000 population caused by infectious diseases.^[21]

The LCoGS recommends a workforce of at least 20 SOA per 100 000 population^[20], a benchmark that Pakistan falls short of with only six SOA per 100 000 population^[22]. Hence, there is an urgent call for policymakers to allocate resources and attention toward bolstering the field of GS. Despite its vital role, GS remains relatively underfunded and resource-constrained^[23].

A greater surgical workforce is needed to facilitate accessible and high-quality surgical care in LMICs. Enhancing awareness of GS among medical students and trainees holds promise in cultivating interest and understanding of the career prospects within the field^[24]. Incorporating GS into the curricula of medical education and public health stands as a pivotal step in augmenting interest and motivation toward pursuing careers in GS^[23].

Nearly 80% of articles published in the field of GS after 2015 had senior authors from HICs^[25]. The realm of GS needs a much focused collaborative community of academic surgeons from

across the world who can identify and bridge the gap of disparities in delivering essential surgical care through research and education^[26]. Low per capita income in LMICs makes it nearly impossible for many people to access essential surgical care. These collaborative opportunities can have a great impact in providing essential surgical care in LMICs. Dr. Sanduk Ruit's Tilganga Eye Center in Kathmandu, Nepal, which pioneered work in providing cost-effective cataract surgeries is a great testament to this potential^[26–28]. LMIC surgeon and researchers should be encouraged to seek collaboration and partnerships with their peers from HICs to achieve health equity^[29–32]. Symbiotic exchange programs between trainees of HICs and LMICs can also help bridge this gap. They will provide opportunities for surgical trainees from LMICs to learn more about the advancements in the field, and they will provide trainees from HICs to know more about the patient needs in LMICs and the limitations that are encountered while delivering essential care and it provides them opportunity to learn how to navigate these challenges while delivering care.

GS is integral to public health by providing equitable access to surgical care worldwide. It complements innovative medical strategies like mRNA vaccines^[33] and nanovaccines in addressing healthcare disparities^[34]. The field benefits from interdisciplinary collaboration akin to what AI might facilitate in anatomy education^[35], while also considering environmental impacts on disease dynamics similar to zoonotic diseases under climate change scenarios^[36]. Furthermore, emerging therapies such as stem cell treatments offer potential synergies with surgical interventions when integrated into broader healthcare frameworks focused on equity and access^[37,38].

Limitations

Participants who had an interest in the field of GS may have been more likely to participate, leading to sampling bias. Participants' specific field of study might vary widely, although all of them had a minimum educational attainment of 16 years, this may affect their comprehension and acquaintance with GS.

Furthermore, the online survey methodology introduced some limitations. Selection bias may have occurred, as only individuals with internet access were able to participate, potentially excluding certain populations with limited technological resources. The anonymity of the survey may have also resulted in less detailed responses compared to more interactive methods, such as face-to-face interviews, where participants could seek clarification. These factors, combined with the broad range of academic backgrounds, may have influenced the reliability and depth of the data collected.

Conclusions

This study highlights the urgent need to integrate GS into public health education to address disparities in surgical care access, especially in LMICs. Despite recognizing its importance, many public health professionals lack sufficient awareness and knowledge. By enhancing surgical training, promoting research collaborations, and addressing systemic barriers, we can strengthen the global surgical workforce and improve health outcomes. Fostering international partnerships is essential to achieving equitable surgical care and meeting the goals of the LCoGS 2030.

Policy recommendations

- Integrate GS into Education.
- Develop National Surgical, Obstetric, and Anesthesia Plans (NSOAPs).
- Expand Training for Surgical Workforce.
- Promote Research and Collaboration.

Ethical approval

Ethical approval for this study (Ethical Committee No-DRB/VIPD/HSA/0004 was provided by the Ethical Committee Violence, Injury Prevention and Disability (VIPD) Unit of the Health Services Academy (HSA) Islamabad, Pakistan, on 5th March 2024 (with a copy attached).

Consent

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author's contribution

All authors have contributed equally.

Guarantor

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Not applicable.

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