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Quality Improvement Activities for Surgical Services at District Hospitals in Developing Countries and Perceived Barriers to Quality Improvement: Findings From Ghana and the Scientific Literature

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Abstract
Background Most quality improvement (QI) activities in developing countries, established with funds from external donors, are focused on specific diseases or outreach programs, such as family planning or child survival. District hospitals in developing countries serve as the primary entry point for patients with surgical problems in developing countries, yet little is known about the extent to which formal QI activities for surgical services are present in these settings or the perceptions of hospital staff about the barriers to improving quality in this setting. This study aimed to document surgical QI efforts at district hospitals and perceived barriers to improving quality in a developing country—Ghana. It also provides a summary of the existing published scientific literature concerning surgical QI in developing countries.
Methods A survey team visited 10 government district hospitals in Ghana, one in each of Ghana's 10 regions. The number and type of QI activities (surgical and nonsurgical) at these district hospitals and the perspectives of hospital staff regarding the steps required to improve the quality of surgical services in their facility were recorded.
Results Of the 10 hospitals assessed, nine reported having some type of QI activity, ranging from satisfaction surveys to assessing quality of infection prevention. Only one hospital reported having QI activity addressing surgical care. To improve the quality of surgical care, seven hospitals reported the need for trained specialists in surgery, obstetrics, and gynecology. Six cited the need for an appropriately equipped operating theater and recovery ward. The primary barrier to achieving these recommendations, cited by 70 % of the hospitals, was the inability to recruit and retain qualified specialists with surgical skills.
Conclusions For Ghana to improve significantly the quality of surgical care provided in its district hospitals, greater emphasis is needed for continuous, systematic QI monitoring and for solving the problems identified. Increasing the number of appropriately trained surgical care providers is essential to strengthen the quality of surgical services in district hospitals. These findings likely apply to other resource-limited countries as well. Increased attention to improving the quality of surgical services at district hospitals in developing countries is urgently needed.

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Introduction

In its landmark report in 2007, Framework for Action, the World Health Organization (WHO) identified quality

improvement (QI) activities as one of the essential ingredients for improving and strengthening health systems, improving health outcomes, and achieving greater efficiency [1]. Quality improvement activities have played a critical role in improving patient care services in developed countries and are a fundamental requirement for accreditation of health facilities [2]. However, QI activities in low-income countries remain limited, mostly to primary health care activities that have had a high public health priority, such as in the areas of family planning, child survival, and tuberculosis control programs. This is unfortunate because health services in low-income countries, particularly those in the public sector, are often characterized as being "in crisis" for many interrelated reasons, only one of which is lack of funding [3, 4].

Issues of access to, and the quality of, emergency and essential surgical services are now beginning to gain increasing attention on the global health agenda. Current estimates are that surgical conditions (including obstetric conditions amenable to surgery) contribute to 11 % of the global burden of disease, with low- and middle-income countries (LMICs) bearing most of the burden [5]. However, only 4 % of the world's surgical procedures are performed in the poorest countries, which constitute one-third of the world's population [6]. LMICs often face large constraints in the availability and distribution of resources, including appropriately trained providers of surgical care—with adverse affects on both access and quality [7].

Quality improvement efforts for health services are now appearing in low-income countries [8–14]. Shortages of funds, trained staff, supplies, and equipment are frequently cited barriers to QI in these environments [15, 16]. Although several examples of successful QI efforts for hospital services in low-income countries have been reported, they have focused on inpatient pediatric and obstetric care [12, 13, 17, 18]. There are no published reports of which we are aware that document the presence of ongoing QI activities in general or for surgical services in particular in public-sector district hospitals in low-income countries. There are also no published reports of the views of hospital staffs about the barriers to improving surgical services in these facilities. The current study addresses these issues for Ghana.

Ghanaian context

Ghana, a country of 23 million people in West Africa [19] has only two physicians per 10,000 people [20]. Medical care is provided largely through government-administered facilities, including community health centers, district hospitals, and tertiary referral centers. The district hospital represents the initial venue of surgical care for the majority of the Ghanaian people, and each is assigned one or more medical officers (physicians who have undergone at least 2 years of a rotating internship prior to being assigned to an outlying hospital). Improving the quality of health services has been a state priority of the Ghanaian Ministry of Health and its Ghana Health Service (GHS) since 1989 [21]. In particular, the GHS has been seeking to improve the quality of patient safety and clinical practice, but these efforts have been directed mainly toward family planning, child survival, maternal and neonatal health, and human immunodeficiency virus/acquired immunodeficiency syndrome services [22]. Previous studies on health care quality in Ghana have also focused on the patients' and health care workers' satisfaction in district hospitals [21, 23], but to our knowledge no studies have been devoted specifically to surgical services in district hospitals. Agyepong [24] noted that client dissatisfaction, high up-front payments required of patients or their families, lack of confidence in the competence of patient care providers, and lack of radiography and laboratory services at subdistrict facilities were common throughout one district in Ghana.

Research objective

The objective of the study was to assess QI activities and priorities for QI at district hospitals in Ghana by identifying the following.

- General characteristics of existing hospital and surgical QI efforts
- Hospital staff perceptions regarding the priority needs for QI of surgical services
- Perceived barriers to achieving desired QI, as identified by hospital staff

Methods

After receiving approval of the proposed study by the GHS and the Institutional Review Board of Johns Hopkins Medicine, the study team, comprising both Ghanaian and US surgeons, conducted in-person structured interviews consisting of 11 questions. This was conducted as part of a larger mixed-method study to determine surgical services capacity at government-administered district hospitals in Ghana in August 2009 [25, 26]. Quantitative information regarding the hospital and its staff, services, and catchment area were collected. We also asked open–ended responses from those interviewed about the nature of QI activities and the quality issues faced in surgery and how they might be overcome. Because of the preliminary nature of the research related to QI and without a clear idea of what we might find, we chose the mixed-methods approach. It

included an open–ended questioning approach for collecting qualitative data regarding QI issues along with more traditional quantitative data for hospital characteristics [27].

The hospitals selected represent a convenience sample with one hospital identified within each of the 10 administrative regions in Ghana (Ashanti, Brong-Ahafo, Central, Eastern, Greater Accra, Northern, Upper East, Upper West, Volta, and Western Regions). Participants included patient care providers and the administrative staff. At each hospital, the study team met with senior leadership and management staff and identified those with knowledge of QI activities and those engaged in the provision of surgical services. All of the relevant people who were at work on the day of the site visit were interviewed using the same interview schedule. Those providing surgical patient care were asked an additional set of questions related to their training background, experience, and current surgical activities.

Quantitative data collection

Facility-level data were collected, including the following.

- The district population served, as abstracted from population statistics maintained by the GHS
- Number of hospital beds
- Number and type of functioning QI activities, each designated by the respondent as "surgical" (specifically for those who provide surgical or obstetric care) or "nonsurgical" (all others)

Qualitative data collection

The interview assessed specific aspects of QI efforts in place at the facilities with open-ended questions, asking respondents the following.

- Does the hospital have some kind of quality assurance/QI program specifically for those who provide *surgical/obstetric* care in your facility? If yes, please describe.
- Does the hospital have any type of quality assurance/QI program? If yes, please describe.
- Is there a need to improve the quality of surgical/obstetric care in your hospital? If yes, why.
- What steps would you recommend to improve the quality of surgical/obstetrical care in your hospital?
- What are the biggest obstacles to implementing your recommendations?

The study team then reviewed the open-ended responses to identify common themes and important issues that have been further described in the findings.

Results

District hospital characteristics

District hospitals included in the present study had an average of 96 hospital beds per facility and served a mean district population of 106,500 people (Table 1). The hospitals reported performing a combined total of 7,764 surgical procedures in 2008, of which 37 % were major surgical procedures (defined as procedures involving muscle or bone or in which a major body cavity was entered). Cesarean section and inguinal herniorrhaphy were the most common major surgical procedures. Based on the reports provided by the hospital administrator, 4,896 minor procedures were performed. In terms of human resources, there were, on average, only 1.6 medical officers assigned to each district hospital for every 100,000 people within its catchment area. None of these hospitals had a fully qualified surgeon or obstetrician-gynecologist who had completed a formal residency program in that specialty.

Survey respondent characteristics

A total of 68 district hospital providers and staff agreed to participate. The majority of respondents were female (59 %), the mean age was 44 years (SD 10.6), and the average tenure at the hospital was 8.3 years (SD 7.9). The number of participants at each hospital ranged from six (in districts in the Eastern, Western, Ashanti, and Upper East regions) to eight (in districts in the Northern and Upper West regions). Hospital positions reported by participants were collapsed into six categories by the study team: Medical Officers, midwives, nurse anesthetists, operating theater nurses, ward assistants, and hospital administrators. The respondent sample included 14 physicians (21 %), 19 nurses (26 %), 9 members of administrative staff (13 %), and 26 participants holding other positions (38 %). The investigators were able to interview 14 of 17 medical officers assigned to the hospitals assessed (Table 2). All of the respondents who were physicians identified themselves as providers of surgical or obstetric care.

Quality improvement activities

Based on the open-ended responses, the following QI activities were identified: surveys of patient satisfaction, infection prevention, morbidity and mortality conferences, and "other" activities (including monitoring the adherence to patient care guidelines, biannual review of medical errors, and drug safety committee). A total of 19 QI activities were identified by the study participants in nine district hospitals. QI activities were totally absent in only one hospital (Table 3). The most frequently encountered QI activity (present in 50 % of facilities surveyed) involved patient satisfaction surveys, which inquired about hospital staff attitudes and promptness of

Table 1 Profiles of the 10 district hospitals

Characteristic	Total	Average per hospital
Population served	1,065,000	106,500
No. of beds[a]	960	96
No. of medical officers	17	1.7
No. of medical officers per 100,000 population	1.6	1.6
Estimated total major and minor surgical procedures performed in 2008[b]	7,764	776

[a] The World Health Organization's data extraction sheet asked only for the range of beds, not the exact number. We estimated the total number of beds as the sum of the midpoints of the range of beds for each facility

[b] This number was reported by the administrator at each of the district hospitals according to their records. There were 2,848 major surgical procedures and 4,896 minor surgical procedures reported

Table 2 Hospital personnel interviewed

Surgical care provider	% (no.) ($n = 68$)
Theater nurses	28 % (19)
Medical officers	21 % (14)
Midwives	19 % (13)
Hospital administrators	13 % (9)
Nurse anesthetists	12 % (8)
Ward assistants	4 % (3)
Theater nurses and other OR personnel	3 % (2)

OR operating room

attention. More rigorous QI activities, such as assessing the quality of infection prevention activities (e.g., implementation of a hand washing policy) were encountered less frequently. Three hospitals reported hosting morbidity and mortality conferences as part of their QI activities. Six facilities reported various other QI activities. Altogether, 70 % of the hospitals reported having a QI team that provides recommendations to hospital management and monitors compliance with QI-related directives. One hospital reported a QI activity that was directly related to surgical services: monitoring to ensure compliance with hospital protocols related to sterilization of surgical instruments, use of protective containers for sharp instruments in the operating room, and use of aseptic measures in the operating room (surgical gloves, face masks, disinfectants). This program did not include monitoring the quality of outcomes of surgical care, however.

Unaddressed needs for and barriers against progress in surgical care quality

Staff in all surveyed hospitals reported a need to improve the quality of surgical care, and all identified steps that could be taken to improve it. The self-identified needs in surgical and obstetric care identified by respondents were as follows: more specialist physicians with surgical training, better equipped operating rooms and recovery wards, more support staff, more training and education. Seven hospitals reported the need for a trained specialist in either surgery or in obstetrics and gynecology to improve the quality of both areas. Six reported that having a better-equipped operating room and recovery ward would be an essential step in improving surgical care. Finally, one-half of the hospitals reported a need for more support staff for surgical services, and two hospitals cited a need for greater in-service training (Table 4). There were two categories of barriers to progress in surgical and obstetric QI that were identified by the hospitals: (1) inability to recruit and retain qualified personnel, and (2) a lack of funds, infrastructure, and/or equipment. The primary barrier identified was the inability to recruit and retain qualified personnel, cited by 70 % of the hospitals. This was followed by the lack of funds, leading to an inability to improve facilities and equipment, cited by 60 %.

Discussion

Our findings demonstrate that although QI activities were present in 9 of the 10 district hospitals in our study, only one hospital had any QI activities devoted specifically to surgical services. The one surgical QI activity we identified was concerned solely with the proper sterilization of surgical instruments. The greatest need for improving the quality of surgical services according to those interviewed was for better-trained surgical providers. QI activities devoted specifically to surgical services can help with surgical outcomes. To date, little is known regarding existing QI efforts relating to surgical care in low-income countries and other resource-limited settings.

Approaches to quality improvement in district hospitals

Health care quality can be considered the "degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" [28]. High-quality health care is achieved when the services are "available, accessible, acceptable, affordable, and controllable" [29]. It is essential to monitor domains such as access to care, outcome of care, patient experience of care, population health, process of care, structure of care, and use of services when assessing health care quality [30]. QI programs consist of "an organized, structured process that selectively identifies improvement teams to achieve improvements in products or services" [29]. The aim of QI is to improve the

Table 3 Hospital quality improvement activities at 10 district hospitals in Ghana

Activity	Hospital quality improvement										
	Ashanti	Brong-Ahafo	Central	Eastern	Greater Accra	Northern	Upper East	Upper West	Volta	Western	Total (%)
Nonsurgical quality improvement activities											
Patient satisfaction survey		√		√	√		√		√		50
Infection prevention		√			√		√		√		40
M&M conferences				√			√		√		30
Other programs[a]	√		√	√			√	√		√	60
Surgical quality improvement activities											
Instrument care assessment[b]									√		10

M&M morbidity and mortality

[a] Includes implementing general patient care guidelines, conducting meetings to review and assess any medical errors (separate from a morbidity and mortality conference), and organizing a drug committee to ensure safe administration of drugs

[b] Includes sterilization of instruments

Table 4 Needs and barriers to improving the quality of surgical care at 10 district hospitals in Ghana

Parameter	% ($n = 10$)
Self-identified needs	
More specialist physicians with surgical training	70
Better equipped operating room and recovery ward	60
More support staff	50
More training and education	20
Self-identified barriers	
Inability to recruit and retain qualified personnel	70
Lack of funds/infrastructure/equipment	60

current practice. It can be done through several process models such as "focus-analyze-develop-execute" (FADE) and "Plan-Do-Study-Act" (PDSA) [31–33], which generally focus on a sequence of events: (1) process or planning; (2) collecting and analyzing the data; (3) developing an action plan to improve conditions and processes; (4) carrying out the plan. Comprehensive QI programs did not exist at the district hospitals included in our study.

The three main measures utilized for QI efforts include (1) measures of inputs (or structure), such as the quality of health care personnel, supplies, and equipment; (2) measures of process, such as diagnostic and therapeutic procedures performed and protocols followed; (3) measures of outcomes, such as morbidity and mortality rates as well as employee and patient satisfaction [29, 34].

Our study failed to identify any of these well-developed and well-defined QI programs at the district hospitals in Ghana included in our study, although 9 of the 10 hospitals had at least some type of rudimentary QI activity. It is encouraging to see that GHS has identified the need for QI activities at its district hospitals, but our findings indicate that these QI programs are in their infancy in these facilities. Improving quality is not simply a matter of having more funds but also using existing resources more effectively [14]. One recent experience from a district hospital in Ghana has shown that improving participatory management practices generally and promoting staff ownership and empowerment has resulted in overall hospital performance, including increased revenue generation and improvements in infrastructure and equipment and in staff morale [35].

Approaches to surgical quality improvement

Surgical QI can be defined a "mechanism to ensure that the patient is subjected to the least threatening journey through the hospital during a period of treatment, with an outcome that is deemed acceptable by international standards" [36]. Similar to the definition of health care quality, surgical care quality relies on domains such as access to care, outcome of care, patient experience of care, population health, process of care, structure of care, and use of services, all of which are essential components of surgical quality [30]. Even though it is important to measure quality of surgical care, there is no universally accepted measurement system [37]. Examples of quality metrics specific to the surgical field may include the "structure" (or inputs), such as the availability and technical skills of surgical care providers and the availability and suitability of surgical instruments. Alternatively, quality may be assessed by examining the processes used to deliver surgical care, such as types of procedures and patient protocols employed. Finally, surgical care quality can be measured by comparing outcomes at the patient level (morbidity and mortality rate,

satisfaction), at the facility level (operative volume, length of stay), and at the employee level (employee satisfaction, turnover, and compliance) [37]. Again, we found none of these surgical QI activities and no comprehensive surgical QI program at any of the 10 district hospitals in our study.

The dearth of surgical QI activities at district hospitals in Ghana is not surprising given the fact that essential and emergency surgery at district hospitals has only recently become a critical component of global health [5, 38]. Another contributor to the lack of surgical QI activities is the fact that there are no qualified surgeons in any of the 10 district hospitals surveyed. Professional leadership is a key ingredient of successful QI programs [39].

A meeting of key stakeholders concerned with improving surgical services at the national level in Uganda identified as one of the key activities a need for "effective planning, implementation, and monitoring and evaluation of surgical services" [40]. Previous reports regarding the quality of surgical care in low-income countries have focused mainly on documenting the existing deficiency of surgical resources, such as personnel and equipment [41–44]. Few have documented the results of efforts to improve the quality of surgical care.

In one example, Walker and colleagues documented their efforts to utilize and teach the use of pulse oximetry monitors during surgery in four pilot sites in Uganda, Vietnam, India, and the Philippines. There were 84 donated pulse oximeters, and formal training was provided to health care workers as a means of monitoring patient oxygenation during surgery to prevent complications from anesthesia. After a 15-month period, pulse oximetry machines were utilized in more than 8,000 patients [45]. In another example, the introduction of a 19-item surgical safety checklist introduced at eight hospitals around the world, including one in Tanzania, led to decreased in-hospital mortality for surgical patients [46]. A surgical QI initiative that improved trauma resuscitation knowledge among trauma team members in Tanzania following a special course has been reported [47]. In Trinidad and Tobago, introduction of the advance trauma life support (ATLS) course led to a decrease in the mortality rate among severely injured patients [48]. Quality improvement efforts specifically in cardiac surgery have been documented in collaboration with nongovernmental organizations (NGOs) that provided training to local surgeons for 10–14 days over the course of several years and also provided audio-visual resources about surgical procedures for cardiac surgeons [49].

The need for improvements in patient satisfaction in surgery and emergency care in low-income countries has been documented, but systematic interventions to address this need are lacking. A survey study in a teaching hospital in Nigeria identified the need to improve speed of access to surgery. It also noted that interpersonal skills should be improved, such as health care providers demonstrating genuine concern and courtesy in the emergency care unit. The study, however, did not describe the details of how to achieve these improvements [50].

To our knowledge, the only studies of the quality of surgical services in Ghana have been related to trauma care assessment. Health facilities in four of Ghana's 10 regions were included as part of a multinational study that included facilities in Vietnam, Mexico, and Indonesia. The Ghanaian facilities surveyed (including district hospitals as well as clinics and large referral hospitals) often did not have oxygen and basic equipment for airway management, nor did they have any formal programs to improve the quality of trauma care [51]. In a review of injured patients admitted to an urban hospital in Ghana, it was concluded that shortened times from arrival in the emergency room to beginning surgery and improved initial resuscitation provided to trauma patients in the emergency room were potential low-cost measures to improve quality of care [52].

A recent publication by the Safe Surgery Saves Lives initiative, in collaboration with the WHO, demonstrated a decrease in deaths when a 19-item surgical safety checklist was used at eight hospitals around the world, including one in Tanzania [46]. This simple tool could be valuable in reducing the number of complications and deaths. It could also improve patient safety during surgery at other hospitals with limited resources.

Significantly, the most common barrier to improving surgical services identified in our study was the inability to recruit and retain skilled health care workers, including those with specialized skills. This constraint in human resources reported by the 10 district hospitals participating in our study is felt throughout Ghana. The inability to recruit and retain health care workers may be partly due to workplace obstacles such as low salaries, lack of essential equipment and tools, and delayed promotions, leading to dissatisfaction and a nonmotivated staff [23]. Augmenting the quantity and quality of the surgical care workforce through higher salaries, better short-term training for medical officers, training of nonphysicians to perform procedures under supervision, and ensuring the availability of essential equipment, facilities, and support staff are essential strategies for improving the quality of care at district hospitals.

Implications for the future

Our findings indicate that to improve the quality of surgical care in the district hospitals included in our study as well as in others additional resources should be directed toward surgical training and long-term retention among the

physicians working in these hospitals. Also, there should be efforts to develop comprehensive QI programs that include, among other aspects, measurement of surgical outcomes.

Enhanced training may be accomplished with short-term surgical training programs for Medical Officers who practice in district hospitals. A 6-month training program has been reported in Ethiopia for general practitioners that improved their ability to provide life-saving procedures [53]. Another alternative is to provide surgical training programs targeted for nonphysicians to provide surgical care [54]. Developing comprehensive QI programs and improving the training and retention of surgical providers at district hospitals will require prioritization and sustained funding from the GHS.

Limitations of the study

An important limitation of our study is that only 8 % of Ghana's more than 120 district hospitals were included. In addition, these hospitals were chosen by the study team based on (1) their availability and (2) the feasibility of visiting the hospitals within the time allotted. For the purposes of this descriptive study, we did not want the hospitals to be chosen via a random sample survey. We believe that the hospitals in the survey provide a generalizable description of district-level hospitals in Ghana.

Another limitation of our study is that we did not have the capacity to assess directly the quality of the care provided to patients at these facilities. We did not investigate further the existing QI initiatives including the indications for them or assess the effectiveness of the existing QI activities. Additional research is therefore needed in Ghana on these issues. Similar assessments need to be conducted in district hospitals in other developing countries to better understand what already has been accomplished and to identify the challenges if we are to improve the quality of surgical care. This information will be useful for determining how funds should be allocated to advance surgical care in LMICs.

Conclusions

This study assessed the surgical QI activities in 10 district hospitals in Ghana. About 90 % of the hospitals had at least one QI activity, but only one had any QI activities directly related to surgery. The most common barrier for improving the quality of surgical care as perceived by the hospital staff members who were interviewed is the lack of surgical training among the physicians working in these hospitals. For Ghana and other similar countries to improve the quality of care provided to its surgical patients at district-level facilities, stronger programs to monitor quality are needed. Also critically needed are a greater number of surgical care providers with appropriate training. A small number of studies have documented the deficiencies in the quality of surgical services in developing countries. Research is now needed to assess the effectiveness of QI programs in regard to improving the quality of surgical services at district hospitals in these settings. Governments in low-income countries need to give priority to QI programs at all levels of health services, but surgical services at district hospitals need particular attention.

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