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Abstract

Background: Surgical outreach trips to low- and middle-income countries have been increasing. Outcome collection on these trips, however, has been inconsistent and often incomplete. We conducted a qualitative study of surgeons, administrators, and patients to identify the barriers and facilitators to outcome collection on hand surgery outreach trips to Hospital 175 in Ho Chi Minh City, Vietnam. **Methods:** A purposive sample of surgeons, administrators, and patients from Hospital 175 were interviewed about their beliefs regarding outcome collection. We used a semi-structured interview guide based on the Theoretical Domains Framework to systematically explore barriers and facilitators. Interviews were recorded, transcribed, and analyzed using content analysis. Beliefs underlying similar responses were identified and aggregated to describe barriers and facilitators of outcome measurement. **Results:** Twelve surgeons and administrative staff (3 visiting and 9 local) and 5 patients were interviewed before saturation was achieved. All stakeholders believed outcome collection on hand surgery outreach trips is important. Barriers identified were primarily related to environmental context and resources (eg, cost of returning) and memory, attention, and decision process (eg, difficulty in remembering patient follow-up intervals). The most commonly identified barriers address the distance patients live from the hospital/clinic, the resources required for them to return, and the lack of an organized system to assist in follow-up. **Conclusions:** Multiple barriers to outcome collection exist at Hospital 175 in Vietnam. Understanding these barriers informs context-specific implementation approaches to collect outcomes on hand surgery outreach trips, which may improve the safety and quality of care provided.

Keywords: global surgery, outcome measurement, outreach trips

Introduction

The global surgical burden is exemplified by the 5 billion people who lack access to safe and affordable surgical and anesthetic care and the notion that an additional 143 million surgical procedures are needed in low- and middle-income countries (LMICs) annually to prevent disability and save lives.¹ As global surgical outreach, the practice of surgeons traveling to provide care to patients in LMICs, becomes more common to meet these global needs, it is increasingly important for organizations to assess postoperative patient outcomes. For example, it has been estimated that poor-quality health systems result in more than 8 million deaths annually; in addition, “poor-quality care” has since been identified as a greater detriment to reducing mortality than is poor access.² As such, efforts to ensure the hand surgery

care provided during an outreach trip is of high quality are paramount to prevent loss of function and unnecessary pain from surgical intervention.

It was more than 100 years ago that E.A. Codman contended that the measurement and study of a patient’s “end

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results” were entrenched in our professional role.³ Although initially ostracized for his views,^{4,5} outcome measurements have become standard in countries with robust resources.⁶ Today, collecting patient outcomes postoperatively is central to ensuring patient safety, improvement in patient function and pain, and informing improvement efforts. For example, you cannot improve what you do not measure. Outcome collection, however, is challenging, even in robust health care systems where collection mandates exist and reimbursements are rewarded or withheld based on collection.⁷⁻¹⁰ These challenges are magnified on surgical outreach trips to LMICs where resources are scarce and the context of care delivery varies. Prior work has demonstrated that outcome collection is lacking not only in quantity but also in quality as LMICs and organizations sponsoring outreach trips collect few outcomes and those that are collected are of poor quality (eg, lack of follow-up period or type of facility reported).¹¹

While all stakeholders recognize the importance of ensuring patients demonstrate an improvement in their health after treatment through outcome collection, implementation of such collection remains low on outreach trips. This may be due to several barriers (eg, cost constraints, difficulty in locating patients) or influenced by facilitators (eg, short surveys, electronic survey implementation).^{2,11-15} As such, identifying determinants of behavior that influence the collection of outcomes is a recommended step to develop interventions and tools to ensure patient safety and high-quality care.¹⁶⁻¹⁸ Our purpose was to describe this process to inform quality improvement efforts, in addition to developing methods for other organizations similarly prioritizing patient outcome collection. To this end, we used a qualitative approach to explore surgeons’, administrators’, and patients’ beliefs about the collection of outcomes on hand surgery outreach trips to Hospital 175 in Ho Chi Minh City, Vietnam.

Material and Methods

Participants

We conducted a qualitative study of 12 surgeons and administrative staff (9 local and 3 visiting) and 5 patients from a hand surgery outreach trip to Ho Chi Minh City, Vietnam, in February 2020 (n = 17). As a quality improvement initiative, institutional review board approval was not necessary. Local and visiting surgeons and administrative staff were identified as those participating in patient care on the surgical outreach trip. Patients were identified as those receiving surgical care by the visiting and local surgeons on the surgical outreach trip. Surgeons, administrative staff, and patients were approached for enrollment and invited to arrange an interview. Interviews were conducted with the assistance of a certified interpreter when English was not the primary

language of the surgeon, administrative staff, or patient. We assured physicians, administrators, and patients that their participation and responses would not affect patient care or an organization’s willingness to return.

Data Collection

We used the Theoretical Domains Framework (TDF) to develop an interview guide to understand the targeted behaviors on collecting patient outcomes at Hospital 175. The TDF is a conceptual model developed to identify influences on the behaviors of health professionals and provides a theoretical lens through which to view various behavioral influences.¹⁹ It is commonly used to explain implementation problems and inform the development of theory-based behavioral change; it has been applied to the field of orthopedic surgery (eg, to identify factors influencing compliance of diagnostic imaging guideline recommendations, to identify barriers and facilitators of orthopedic surgeons’ use of decision aids)¹⁹⁻²¹ as well as in the implementation of electronic health records in LMICs.

Semi-structured interview questions were generated based on each domain of the TDF in consultation with experts in TDF, hand surgery outreach, and outcome collection and were informed by previously published research^{2,8,11,15,20-22} (Table 1). These questions were adapted to apply to each stakeholder group. Open-ended follow-up questions and probing questions were used when necessary for further clarification.^{19,23} Interviews were prefaced by stating that the researchers were interested in understanding barriers and facilitators of outcome measure collection on hand surgery outreach trips. We did not select a specific outcome measure, nor did we define what kind of outcomes we were inquiring about. When questioned, we described outcomes as any type of follow-up after surgical care on a hand surgery outreach trip. Table 1 illustrates the interview outline, which was adapted for administrative staff and patients.

Interviews were conducted by 2 members of the team with experience in qualitative interviewing (L.M.S. and S.L.E.). Interviews of each stakeholder (surgeons, administrative staff, and patients) were conducted until saturation was reached, meaning no new beliefs or attitudes had been elicited, and in accordance with accepted methodology.^{15,19,24} All transcripts were transcribed for data analysis; patient identifiers were removed, and all records and transcripts were stored ensuring Health Insurance Portability and Accountability Act compliance.

Data Analysis

Three stages of data analysis were conducted in accordance with an implementation approach using a deductive process.²⁵ In phase 1, 2 researchers (L.M.S. and S.L.E.)

Table 1. Theoretical Domains Framework Interview Outline.

Domain	Questions
Knowledge	<ul style="list-style-type: none"> – What are outcome measures? – What does outcome measurement mean to you? – What are your thoughts on measuring outcomes? – What are the intended purposes for measuring outcomes?
Skills	<ul style="list-style-type: none"> – Were you trained to measure outcomes? – What skills are needed to measure outcomes? – In what ways do you prepare to measure outcomes? – How do you measure outcomes?
Social/professional role and identity	<ul style="list-style-type: none"> – Do you feel that measuring outcomes is part of your job?
Beliefs about consequences (anticipated outcomes)	<ul style="list-style-type: none"> – What are the disadvantages of outcome measurement? – Does outcome measurement affect care?
Intentions	<ul style="list-style-type: none"> – How important is outcome measurement? – How likely are you to measure outcomes in the future? – If it were mandatory to collect outcome measures, what would you do?
Memory, attention, and decision processes	<ul style="list-style-type: none"> – How did you remember (or remind yourself) to measure outcomes? – Does anything make this easier or harder? – Is this something you do routinely?
Environment context and resources	<ul style="list-style-type: none"> – What do you need to measure outcomes? – Where do you measure outcomes? – How do you get there? – How convenient is this for you? – Are there any barriers to getting there? – Are there any facilitators to getting there? – What resources do you have to support outcome measurement? – How is your environment favorable or unfavorable to outcome measurement? – What would the ideal outcome measurement collection system look like? – Was there anything that facilitated outcome measurement? – Was there anything that got in your way of measuring outcomes?
Social influences (norms)	<ul style="list-style-type: none"> – Are there people, organizations, and so on that influenced your decision to arrange for measuring outcomes? – Do you know other (people, companies, etc) that measure outcomes? – What does your community or your peers (people or organization) think about measuring outcomes?
Emotion	<ul style="list-style-type: none"> – How do you feel about measuring outcomes? – How do you feel after outcome measurement? – How did any beliefs or values you have influence your decision to measure outcomes?
Behavioral regulation	<ul style="list-style-type: none"> – Were there any things you had to do in preparation for measuring outcomes? – Are there things in your life/organization that make outcome measurement difficult?
Beliefs about capabilities	<ul style="list-style-type: none"> – How confident are you that you can measure outcomes for your patients?
Optimism	<ul style="list-style-type: none"> – What are the benefits of outcome measurement?
Goals	<ul style="list-style-type: none"> – How often is doing something else a higher priority than measuring outcomes? – What are your goals for measuring outcomes?
Reinforcement	<ul style="list-style-type: none"> – What are the incentives (or disincentives) to measuring outcomes?

independently coded interview transcripts by classifying each response into 1 of the TDF domains (based on predetermined, literature-based definitions adapted to the study context).²⁶ Pilot coding consisted of an independent coding of 5 transcripts. The 2 coders compared their results, and domain definitions were refined. The 2 coders subsequently coded all transcripts independently.

In phase 2, belief statements were generated based on the coded interview responses (eg, adequate technological support tools or lack thereof affect outcome collection) such that statements could describe similar responses from

different stakeholders. Belief statements were reviewed by a third researcher (R.N.K.).

In the final phase, domains and belief statements most likely to influence behavior were identified based on the frequency of domains and beliefs across transcripts and the perceived strength of the belief in influencing the behavior.

Results

On our second trip to Hospital 175, we interviewed 9 local surgeons and administrative staff, 3 volunteer surgeons, and

5 patients. Across the 17 interview transcripts, 319 phrases, representing 31 specific beliefs, were coded into the 14 domains, according to the TDF. All the 14 domains were identified as relevant. Table 2 illustrates the domains of the TDF with belief statements, example quotes, and frequency counts. Table 2 summarizes the specific beliefs that were identified within each theme, if each belief represented a barrier, facilitator, or both (depending on how it was viewed), and the frequency of each domain and specific belief was mentioned.

The most common domains driving behavior included the environmental context and resources, memory attention and decision processes, and goals. The most frequently cited beliefs that affect the ability to collect outcomes include the availability of staff and resources, the goal of outcome collection (being to improve the health and wellness of patients), and the presence or absence of adequate technological support. Other commonly cited beliefs included that the doctor, patient, or family member has to remember to follow up, the presence or absence of interpretation services or cultural differences, the resources available to the patient (eg, social support, insurance), and the distance the patient lives from the location of follow-up. Specific quotes that serve as examples to illustrate these beliefs are illustrated in Table 2.

Discussion

Despite the known importance of measuring postoperative surgical outcomes for the purposes of accountability, providing high quality, safe care, and improvement efforts, the execution of such collection is challenging in LMICs. This study identified barriers and facilitators of outcome collection that can inform future efforts to implement structures and processes for outcome collection at Hospital 175. While the results of our study are not generalizable to all LMICs, many of the noted barriers to outcome collection are likely a common theme in other LMICs (eg, lack of adequate technological support tools). Moreover, the methods we used to understand barriers/facilitators within this local context can be applied by other organizations participating in outreach in other LMICs.

The most frequently identified barriers were related to environmental context and resources as well as memory, attention, and decision processes. Our findings not only support previously described barriers^{2,11-15} but also provide an organizational framework within which to understand outcome measure collection and implement change. Commonly cited barriers included the lack of resources of both surgeons (eg, time, administrative support) and patients (eg, time, money, insurance, health, social support) and the lack of an organized, standardized data collection protocol and/or system. Representative phrases describing the lack of resources include “[some patient] live like 1000-2000 miles away,” “some patients are very poor so they can’t

come to the hospital,” and “I have to do that [outcome collection] on my own.” Many quotes describe how patients receive a piece of paper on discharge with their follow-up information or how surgeons have to remember a specific patient’s procedure, contact information, and follow-up intervals.

Notably, all stakeholders described outcome measure collection on hand surgery outreach trips as important. Representative quotations to illustrate this include “I think that following patients after the operation very important. It contributes to the success of the operation” and “I think the measuring outcomes, besides operation, measuring outcomes play an important role in the treatment for the patient.” Despite these ideas being universal throughout stakeholders interviewed, outcomes were not consistently measured on outreach trips to this specific hospital and are not routinely collected on outreach trips in general. In a systematic review of literature on the quality of essential surgical care in LMICs, Saluja et al found that studies related to orthopedic surgery were unlikely to report on any process measures (odds ratio [OR]: 0.08), mortality (OR: 0.38), safety (OR: 0.27), and equity (OR: 0.54), in reference to those studies evaluating “multiple categories of surgery” illustrating the gap in outcome collection.

The lack of a centralized, searchable, and semi-automated system to assist with outcome collection represents an opportunity. Accordingly, many surgeons mentioned the role technology could play in facilitating outcome collection, “So in the future we will have digital data and when we can easily tie to them the observation and we will tack on the information and observation, it is good for us to follow the patient.” In developed countries, the implementation of an electronic health record system has been demonstrated to increase the rate of outcome measure collection.⁷ Although not only for the collection of outcome measures, Quinn et al developed the Surgical Quality Assurance Database (SQUAD) to collect patient-reported data (throughout an entire episode of care) in Uganda.²⁷ In a validation study, 93% of patients were captured by SQUAD over a 2-week period. Tools, such as an electronic health record, may represent a potential solution for many of the barriers identified in this study.

While not mutually exclusive from the above barriers, many phrases discussed the lack of a team or surgeon extenders that may assist with outcome collection (both in-person and remotely)—“We don’t have much general practitioner. But to my way of thinking, the general practitioner is very important because the patient can get close to the GP, more than the specialist, after the surgery.” Solutions that connect and encourage integration of members of the health care system and/or task shifting (eg, delegating responsibilities that are typically assigned to higher specialized workers to lower specialized workers and/or the use of an electronic health record system) may improve access to care for the purpose of outcome collection.^{28,29}

Table 2. Summary of Findings.

TDF domain	Specific belief	Example	Frequency
Knowledge (16)	I know or do not know what elements to measure and to collect outcomes	Well normally it would be functional and imaging results. And it depends on which fracture or which treatment. Of course, I have to check that their function is good, their range of motion is good, the imaging, the x ray or MRI.	15
	I want to learn new methods of outcome collection that I don't currently know.	I love to try the new techniques and when I want to try it I want to apply it in this hospital.	1
Skills (6)	Prior knowledge and experience are used to collect outcomes	I think aside from the skill of the language translation, I think it could be done pretty easily.	5
	It is important to understand what skills are needed to collect outcomes	What does their skill set need to be? The question is whether that person needs any medical knowledge or not and so to me that depends on what kind of outcomes you're looking at.	1
Social/Professional role and identity (5)	Outcome collection is part of a doctor or surgeon role.	The follow up is the responsibility of the doctor. It is part of the doctor job.	5
	Collecting outcome data affects the treatment outcome and results	I think the measuring outcomes, besides operation, measuring outcomes play an important role in the treatment for the patient. If we don't measure the outcome, we cannot receive the information, the treatment, to inform the patient how will we do, how will we treat the patient.	14
Beliefs about consequences (anticipated outcomes) (18)	Collecting outcome data helps me improve my skills, etc	I think the advantage of measure outcomes is, I can improve my skill and my spirit	4
	I collect outcomes to improve the care of patients	I think when you follow your patients, it is better for patient care	8
Intentions (12)	Outcome collections help with physician learning	As we learn the nuances of what's working and what's not working, reevaluate and assess why they're working and whether they're not working and make adjustments accordingly	2
	I collect outcomes because it is required for my master's thesis	So when I just finish the university, I measured outcomes to finish my thesis.	2
Memory, attention, and decision processes (35)	I have to manage or remember patient data to collect outcomes	Sometimes the patient go to the hospital and they give me the mobile phone number but cannot remember the mobile number	5
	The doctor, patient, or family member has to remember when to follow up or call the patient for follow-up.	So my memory is working pretty well so I can remember it, also I will tell my relatives to make sure it is remembered	30
Environment context and resources (155)	Collecting outcomes is difficult because patients are sometimes noncompliant.	Maybe if the hospital can encourage the patient and patients can be more compliant to doctors recommendations it will work	7
	Patients feel follow-up is unnecessary if they are feeling well.	I think when patients achieve what function they want, they cut off contact and it's very hard	7
	Adequate technological support tools or lack thereof affect outcome collection.	I love to do a system something like we can search on the patient, searching for all information about a patient on the computer. CT, MRI, about history, everything. It would be very perfect for us. So in the future we will have digital data and when we can easily tie to them the observation and we will tack on the information and observation, it is good for us to follow the patient.	35

(continued)

Table 2. (continued)

TDF domain	Specific belief	Example	Frequency
	Distance from the hospital or clinic affects the ability to follow up with a patient.	One more thing that a lot of our patients, if they live another city and come back to our hospital it's a long distance. In Vietnam it's very difficult to come back to us to follow up. (Some patients) live like 1000-2000 miles away. Some patients are very poor so that they can't come to the hospital.	21
	Availability of team members, physician, and hospital support staff/resource affects the ability to collect outcomes.	The second is that we need to have something like a family doctor so that he will, the family doctor will take care of the patient when they go back to their family. So the family doctor will help to recollect the patient function. Right now, I have to do that (outcome collection) on my own. We don't have much general practitioner. But to my way of thinking, the general practitioner is very important because the patient can get close to the GP, more than the specialist, after the surgery	37
	Patent resources (social support, insurance, etc) affect outcome collection.	The other factor is the economics of the patient. If the patient, some patient very poor so they can't come to the hospital	22
	Interpretation and/or cultural difference affect outcome collection.	I think the biggest barrier is proper translation both from those of us speaking English to someone from Vietnam who speaks English and then their Vietnamese to whatever the patient understood.	25
	Existing policies affect outcome collection.	When the patients get treatment from level 1 or special level, but later they will go to the province and there is only level 2 hospital there. Right now the system and the government encourage people to come to level 2 if it's not something severe.	1
Social influences (norms) (4)	Social influences from host to volunteers or volunteers to host, respectively, may affect outcome collection.	That's something that they may not usually do but I don't think it means that they were not supportive, I got the idea that they were supportive.	4
Emotion (3)	I feel good or happy about outcome collection.	Yeah, I feel good. Very good	3
Behavioral regulation (2)	I am aware that outcome collection will need to change from how it is currently conducted.	I think it made us dedicated to having a longer conversation with the patient post operatively. In some other countries, rounding on the patient post operatively means just looking at them being like "you look good" walking away	2
Beliefs about capabilities (6)	I don't feel confident about outcome collection because I am disorganized. I feel confident about outcome collection.	It's hard. I don't know. I'm not a very good organizer. Confident. I think it's totally attainable	1 5

(continued)

Table 2. (continued)

TDF domain	Specific belief	Example	Frequency
Optimism (11)	Confidence that collecting outcomes is for the best and will help attain goals.	It's a great idea and I think it's a huge opportunity so I'm glad that this is happening.	11
Goals (36)	The goal of outcome collection is to improve the health and wellness of patients.	The ultimate goal of the outreach is to improve patient care overall and that doesn't mean just for that week that you're there but that also means that it's sustainable over time by the local physicians. I think that following patients after the operation very important. It contributes to the success of the operation. I think the measuring outcomes, besides operation, measuring outcomes play an important role in the treatment for the patient	36
Reinforcement (10)	Showing good outcomes will increase volume in the future (word of mouth, patients return if the perceive care is good, etc). Collecting outcomes is required. Collecting outcome is driven by finances.	So when we measure good outcome, the patient comes back to us and we can help them more and more. The patient when he go back to the home he can tell their friend how good my hospital is. I think my director and my hospital require me to follow the patient The hospital you're visiting is funding it so there's money from somewhere and I think that having this data in some way either can help you raise the money to go on the trips or say how many patients you helped	3
	Outcome collection may affect morale and reinforce or dissuade behaviors.	To truly understand, to put yourself out there that the things that you're doing have a positive effect or don't have a positive effect and to be willing to adjust the style of your outreach based on that I think is the most powerful way.	4 1 2

Note. TDF = Theoretical Domains Framework; MRI = magnetic resonance imaging; CT = computed tomography; GP = general practitioner.

Notably, many phrases and sentiments represent both facilitators and barriers depending on how they are framed (eg, regarding the “distance from the hospital or clinic affects the ability to follow up with a patient” belief—patients living close to the hospital represent a facilitator, whereas patients living far away represent a barrier). An overwhelming facilitator was that most stakeholders described the goal of outcome collection as improving the health and wellness of patients. This facilitator, among others, can be leveraged to implement outcome collection on outreach trips.

This study should be viewed within the context of its limitations. As this investigation was conducted at a large, urban hospital serving the general public of Ho Chi Minh City, Vietnam, and its large bordering referral networks, the results may not be generalizable. This study, however, was designed to study 1 health care setting in depth, understanding the significance context plays in each system. It is possible these broad themes may be similar and transferrable to those of other LMICs; however, this warrants further study. If similar, these themes can be used as a lens through which the barriers and facilitators of other systems may be understood. We aimed to fully understand the issue at hand by interviewing local and host surgeons and administrative staff as well as patients. In addition, we understand there may be other stakeholders involved (eg, patients’ family members, general practitioners) whose beliefs may have informed potential solutions. We did however reach saturation with the interviews conducted. Finally, the solutions presented here represent ideas to improve outcome collection based on high-frequency beliefs and in the context of solutions presented or implemented elsewhere in the literature. These ideas must first be understood and applied in the context of each setting.

Despite these limitations, the barriers and facilitators identified provide insight and inform future implementation efforts. For example, the development and implementation of an electronic health record system and/or the usage of a short message system platform to collect patient data may help circumvent some of the aforementioned barriers and improve outcome collection. Additional solutions may include having a dedicated team member (either local or visiting) who is responsible for outcome collection or the collection of general practitioner contact information for future data integration. The implementation of these strategies, however, relies on understanding the context.

Despite the notion that outcome collection is important for the provision of safe and high-quality care, it is not routinely performed on hand surgery outreach trips to LMICs. Many barriers exist, primarily related to environmental context and resources and memory, attention, and decision processes. Understanding such barriers and the framework domains in which they exist allows for the development and implementation of novel and multifaceted approaches to

enable the collection of outcome measures on hand surgery outreach trips to ensure safe and quality care delivery.

Authors’ Note

The content of this work is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

Ethical Approval

This study was approved by our institutional review board.

Statement of Human and Animal Rights

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008.

Statement of Informed Consent

Informed consent was not obtained from patients, given that this study was considered quality improvement.

Declaration of Conflicting Interests


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