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Review Article

Operationalizing CQI Principles in Low and Middle-Income Health Systems

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Abstract

Objective: This article aims to disseminate evidence-based continuous quality improvement (CQI) information about global health, focusing on low-middle-income countries (LMICs). **Methods:** The objective is achieved by examining several topics, such as the interplay between knowledge dissemination and translating knowledge into practice, known as the "translational gap." By reviewing important foundational historical markers for CQI and the major global health influencers and disseminators of global CQI, this paper seeks to evaluate how their recommendations apply to LMICs and African health systems. **Results:** Practical, and implementable CQI concepts and principles for global health will be discussed. A case study of a global health non-governmental organization (NGO) model and its projects are presented to highlight modern and unique ways to implement CQI in African healthcare systems. **Conclusion:** The examples highlight how to start and maintain collaborative and country-initiated patient-centered projects in two low-income African countries, Uganda, and Malawi.

Introduction

The main purpose of knowledge dissemination is to convert knowledge into practice. The inability to convert Continuous Quality Improvement (CQI) evidence-based knowledge and research into practice is known as a "translation gap." When this gap exists in healthcare, it leads to needless deaths, suffering, and inequality [1]. Derman and Jaerger highlighted that "when research is designed to improve health, dissemination is critical to the development of evidence-based healthcare and the adoption of evidence-supported interventions and improved practice patterns" (2, p.121). A lack of dissemination devalues research, wastes resources, and minimizes the opportunity to improve the health of patients and their families. Adopting and implementing health research findings has been slow in low-and middle-income countries [2]. Poor dissemination is one component that accounts for the "translation gap."

A recent review summarized many of the lessons learned about the lack of dissemination and the "translation gap." Passive approaches to uptake are often ineffective. Alternatively, there are demonstrated lessons that support more active and effective dissemination, including: stakeholder involvement in research and evaluation enhances dissemination; dissemination of information to non-scientists is improved by creating interest and emotion; dissemination approaches should be time efficient, consistent with organizational climate, culture, resources; and align with the skills of staff members; and a major objective of evidence-based research dissemination should be to achieve academic and clinical impact [1].

Applying continuous quality improvement (CQI) in global health systems is primarily about catalyzing change. Publishing about CQI principles and their application is only the first step to using CQI to create safer, more effective, efficient, and patient-centered health systems in LMIC. (1) This article identifies CQI global leaders and disseminators of CQI knowledge and practice, examines global health CQI definition, reviews the reasons for

using CQI in LMICs, recognizes what happens in the absence of CQI efforts, notes challenges to implementing CQI, appraises lessons learned from past CQI efforts in LMICs, and investigates options for new models for better outcomes and impact. The concluding section amalgamates the presented content through the experiences of one non-governmental organization's (NGO) model and its African projects.

Defining CQI

There is no universally accepted definition of CQI. A general understanding of CQI can be achieved with two questions, "how are we doing?" and "can we do better?" [3]. The definition of quality assurance has broadened over the years from overseeing how healthcare practitioners deliver their services to reviewing management, processes, systems, outcomes, and patient experience - a total quality approach. A simple definition of CQI is "all actions taken to establish, protect, promote, and improve the quality of health care" [4].

Why promote CQI in LMICs?

In 2015, all the countries in the United Nations adopted the 2030 Agenda for Sustainable Development. The agenda sets out 17 Goals, which included 169 targets. Goal 3 is to ensure healthy lives and promote wellbeing for all at all ages. CQI is pivotal in reaching the WHO's Sustainable Development Goals for health care [5].

Breakdowns in evidence-based care can affect systematic patient assessment, accurate diagnosis, appropriate treatment, and patient education; and have significant impact on CQI outcomes. While there are quality assurance issues throughout LMICs' health systems, there are a myriad of difficulties at the provider-patient level that can affect delivery of such quality care: misdiagnoses, inappropriate treatments, slow implementation of treatment plans, underuse of effective treatments, overuse of ineffective treatments, patient dissatisfaction with treatments, lack of patient education about processes, patient disrespect, and sometimes, patient abuse [6-8]. In 2018, to help address these concerns, major international organizations such as the World Health Organization (WHO); Organization for Economic Co-operation and Development (OECD); World Bank (WB); the National Academies of Sciences, Engineering, and Medicine; and the Lancet Global Health Commission produced reports highlighting the deficits in health delivery on a global scale.

The Lancet Global Health Commission noted there is a cumulative effect of poor healthcare delivery in LMICs to the point that quality of care is a bigger problem than access to care [9]. Inadequate care accounts for about 60% of treatable deaths per year in LMICs; in addition, there are high mortality rates for treatable conditions such as injuries, surgical conditions, maternal and newborn conditions, and cardiovascular disease, which occur at high frequencies. Health providers often are doing less than half of the recommended evidence-based care actions [9].

The WHO, OECD, and WB highlighted concerns on quality, noting: 1) unwarranted variations in health care provision and delivery persist, and a considerable proportion of patients do not receive appropriate, evidence-based care; 2) nearly 40% of LMIC facilities lack clean water, and nearly 20% lack sanitation; and 3) concern about child and infant mortality, in addition to the high number of adults not being diagnosed or treated for common conditions such high blood pressure, is as much as 50% in some countries [10].

The National Academies of Science and World Health Organization estimated that low-quality healthcare accounts for about 15% of the 56 million annual deaths in LMICs [11]. The Academies wrote that healthcare workers and healthcare recipients worldwide are not well-served by their health systems. They identified various health systems' shortcomings that directly affect healthcare worker experience and satisfaction, such as fragmentation, mal-aligned payments, unclear goals, poor training, unreliable supply chains, burdensome rules, inadequate information flows, lack of useful data, corruption, and fear. There are significant costs to this lost productivity to society, at about $1.4 to $1.6 trillion annually [12]. The report stated that annually, approximately $455 billion of the $7.35 trillion spent globally on healthcare is lost to fraud and corruption [11].

Given the available evidence-based data, there is a need for CQI in low- and middle-income countries. CQI can help fulfill the WHO's goal for global health systems in "improving health and health equity, in ways that are responsive, financially fair, and make the best, or most efficient, use of available resources" (12, p. 2). African healthcare opinion leaders have pointed out that doing more of what has been done in the past at the same rate impedes African health systems from achieving their goals. They suggest a comprehensive approach and system-wide changes to produce patient-centered and collaborative health systems in sub-Saharan Africa [13].

Barriers to Implementing CQI

There are numerous barriers to the adoption of CQI. Many of these barriers are summarized by Kostal and Shah in a comprehensive, evidence-based review through a fishbone diagram. (14, figure 1) These factors can serve as a basis for problem solving before and after initiating CQI interventions.
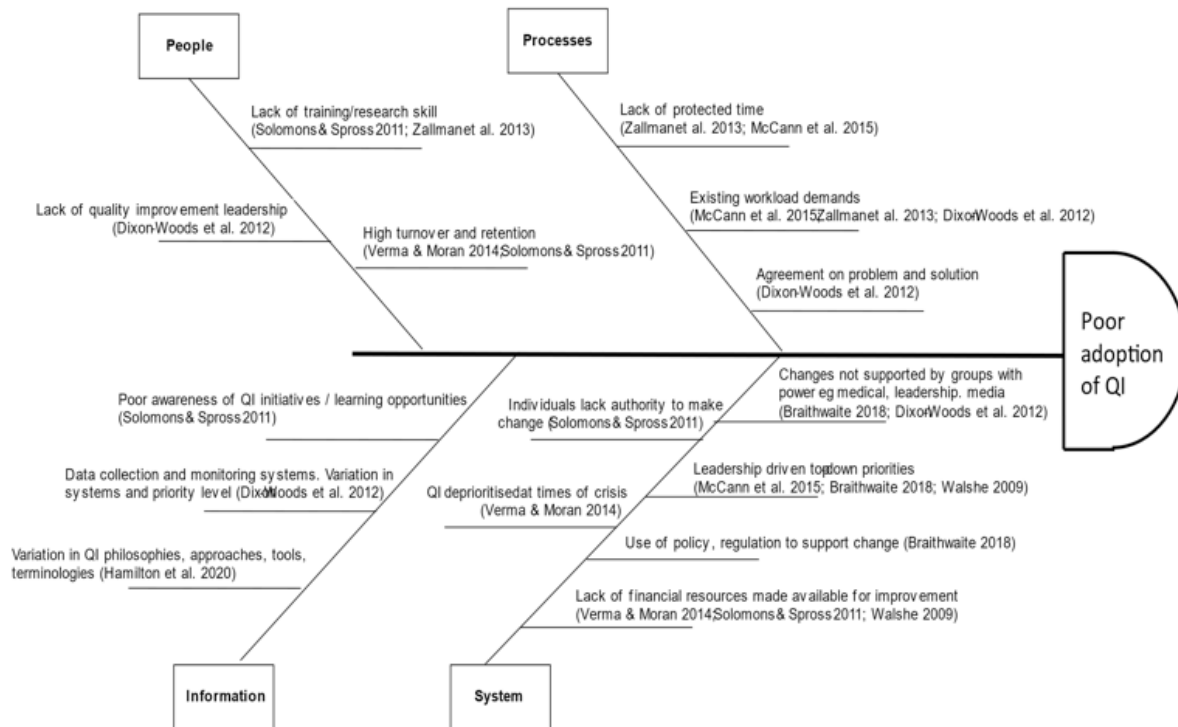
Figure 1: Fish bone diagram of barriers to CQI

Figure 1. Reprinted with permission. Fish bone diagram of barriers to CQI [14].

Implementing CQI can be time-consuming and costly. Failing to implement CQI processes can affect an organization or system at many levels. As a health facility becomes inefficient, quality drops, leading to more patient and family complaints. As a result, health professionals can feel more isolated and unhappy with their work. Their unhappiness can be demotivating and cause them to resist change. Partners can become disengaged as goals are not met and services deteriorate. Worse patient outcomes and higher adverse events can result from substandard care. The organization's culture can deteriorate [15].

CQI lessons learned in LMICs

Unfortunately, decades of initiatives have not achieved the level of success that is needed to provide high quality healthcare in LMICs [9, 13]. Various types of interventions to improve quality have been tried in LMIC.

Two broad categories of interventions have been used for CQI in LMICs: point of care interventions and system-level initiatives. Each has had shortcomings. Point of care practice and behavior are difficult to change with training alone. Healthcare workers revert to past practices if the system around them does not promote suggested changes. Combining incentives with accountability and continuous evaluation systems using institutions and regulatory bodies to assist may produce better outcomes [11].

Further, system level initiatives may have deficits such as operating in silos doing what funders, other countries, and agencies feel are best, which may or may not fit a country's priorities. Examples of this include projects focused on inputs such as providing medications, equipment, or staff gap-filling, rather than addressing process issues; projects that are short-term and unsustainable; project delivery that lacks staff expertise, reliability and adequate measurement of outcomes; projects that promise more than they can achieve; projects that cannot achieve goals because they do not include the context of their situation; projects that do not make use of local resources; and projects that do not look towards collective solutions with their implementation environment [9, 13]. Both point of care and systems approaches have their unique shortcomings, but the identified deficits can be addressed with new approaches, combining point of care CQI with health system changes may help garner greater success versus siloed approaches.

One of the most comprehensive CQI reviews came from Rowe and colleagues who completed a systematic review of the effectiveness and cost of strategies to improve healthcare personnel

performance in LMICs, the Health Care Provider Performance Review (HCPPR) [16]. They reviewed 499 LMIC studies using 161 intervention strategies from 79 countries. Table 1 summarizes the component categories that were examined.

	Component categories	Examples/Definition
1	Patient and community support	Community health education, social marketing of health services, and cash transfers to community members
2	Printed or electronic information for health care practitioners	Distributing pamphlets to health professionals and including job aids
3	High-intensity training	Defined as training over five days with at least one interactive educational component and includes one-on-one training by an opinion leader
4	Low-intensity training	Informal education by a peer, excluding high-intensity training
5	Supervision	Improving routine supervision, benchmarking, audit with feedback, peer review, and health care professionals seeking instructions or second opinions from a higher-level professional
6	Group problem-solving	Continuous quality improvement, improvement collaboratives, and group problem-solving with or without formal teams
7	Other management techniques	Excluding supervision and group problem-solving Group meetings of health care professionals and community members, self-assessment, and changes to improve utilization of health services
8	Strengthening infrastructure	Providing medications, equipment, repairing facilities, IT logistical support
9	Financing and incentives	Adjustments to user fees, medication funding, alterations to insurance systems, contracting in or contracting out services, and financial or non-financial incentives
10	Regulation and governance	Standard drug quality requirements, licensing and accreditation schemes, and resource control by local government or civil society organizations

Table 1: Ten evaluated categories in Health Care Provider Performance Review (HCPPR).

Adapted from Rowe SY, Peters DH, Holloway KA, Chalker J, Ross-Degnan D, et al. A systematic review of the effectiveness of strategies to improve health care provider performance in low- and middle-income countries: Methods and descriptive results [16].

Rowe and colleagues found that training, supervision, and patient and community support were the most common CQI strategies used in LMICs. Most strategies involved patients and health care providers (HCPs), including health workers in hospitals, clinics, pharmacies, and communities [16]. The review concluded that evaluating the effectiveness of CQI interventions in LMICs has been problematic because of methodological problems. Study problems included bias; missing data elements (e.g., sample sizes); and incomplete descriptions of the strategy, methods, and setting. Study heterogeneity such as using data from different countries, varied outcome measures, and differing study time periods hinder the interpretation and generalizability of study findings.

Without a gold standard or well-established scientific proof of techniques to use, there remains uncertainty about the effectiveness of previously tried CQI interventions in Africa and LMIC countries. In other words, after many years of implementing numerous CQI interventions, much of the published data does not support any specific type of CQI intervention, and no intervention stands out above others as being consistently successful [16]. Rowe et al.'s data suggested we need to be better at study designs and find new ways to implement CQI projects.

Moving forward with CQI changes to build high-quality health systems in LMICs

It is important to determine how global health CQI efforts can change to achieve greater success and improve health systems in LMICs and African countries. The path to longer and healthier lives for all Africans by 2030 by Agyepong and others gives direction as to where action can be taken [13]. African leaders want to see future CQI efforts in eight interconnected key areas, as shown in Table 2.

1. People-centred health systems, universal health coverage (UHC), the social determinants of health, and health outcomes
2. Leadership, stewardship, civil society engagement, and accountability at all levels
3. Financing for health
4. Commodity security (e.g., medicines, technologies, essential equipment, tools, and supplies)
5. Public health systems
6. Health workforce development
7. Research and higher education
8. Innovation in products, service delivery, and governance

Table 2: Areas for action - African opinion leaders' perspective [13].

Additionally, Kruk et al., disseminated a how-to-implement framework in High-quality health systems in the Sustainable Development Goals era: Time for a revolution, which suggests three components for intervention to improve health systems: care processes, quality impacts, and foundations. Foundational factors include the population, governance, platforms, workforce, and tools [9]. Figure 2 illustrates their model.
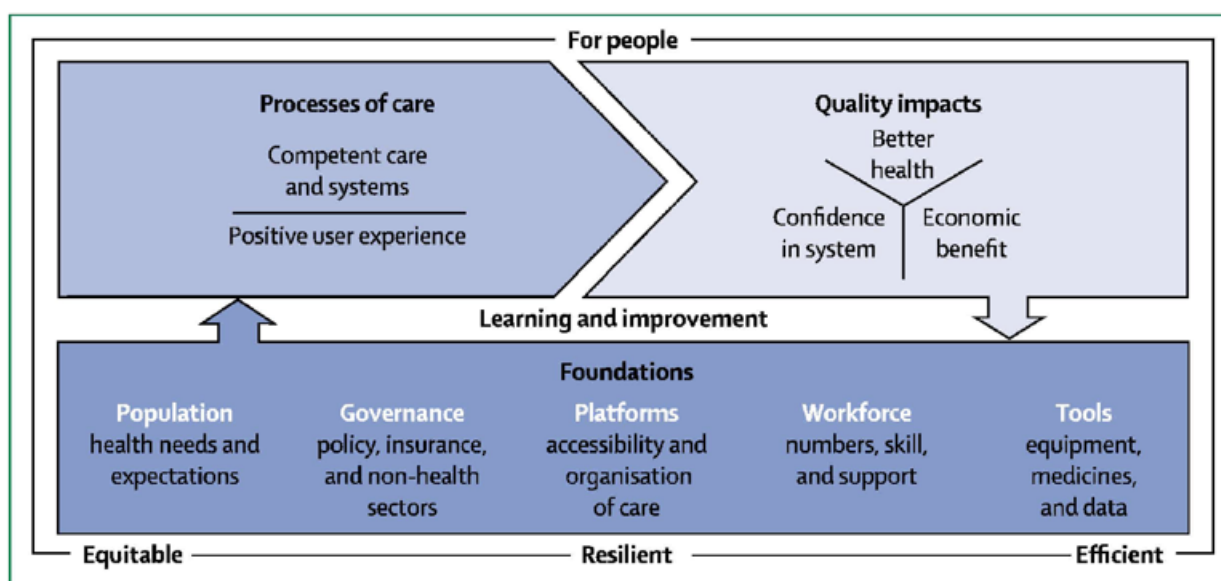

Figure 2: Lancet Commission: Framework for building a high-quality health system.

Reprinted with permission [9].

The Lancet Global Health Commission suggested four universal actions to raise the quality of health systems while recognizing that solutions should be individualized to the context of each LMIC [9]. First, health system leaders should govern for quality, endorsing shared visions and strategies within and outside government. Second, country health systems should emphasize outcomes rather than access to care. Third, health systems should promote competency-based clinical education and introduce ethics training and respectful care to encourage its workforce's highest level of service. Fourth, governments should promote a culture of accountability and expectation of high-quality care among citizens and institutions.

Dissemination

There is immense value in sharing data whether an intervention to improve healthcare delivery is successful or not. Disseminating CQI study results helps build a database for future studies. A stronger database can prevent a repetition of ineffective CQI interventions and promote learning and novel initiatives. Information sharing can empower patients and communities to help themselves and promote

system changes. Data sharing can provide governments and institutions with facts to make evidence-based decisions to achieve best practices [9].

One Non-Governmental Organization's approach in Sub-Saharan Africa

This section highlights how one Non-Governmental Organization has modified its approach to use lessons learned and implement a more collaborative approach towards CQI projects in Africa.

Seed Global Health partners at the invitation of the national government to support high quality healthcare delivery. With a focus on training healthcare providers, Seed prioritizes host countries' needs and their vision for a healthier future. Seed then develops close partnerships with government, academic, and health leaders to offer training and support to address their greatest health challenges, such as reducing maternal mortality, or preparing for the next pandemic and increasing awareness of the effects of climate change on health.

A core aspect of Seed's model is to place nursing, midwifery, and medical professionals (educators) embedded within partner institutions for at least one year. These educators offer dedicated training and mentorship to emerging doctors, nurses, and midwives as well as faculty at training schools to assist in building complete health teams that can provide high-quality care and save lives.

Seed's approach to CQI.

Seed implements its CQI approach based on a theory of change that supporting education and training can increase frequency and application of evidence-based care and impact the quality of care, which will improve health outcomes. Seed works collaboratively with people and governments to help strengthen the health system as a whole.

At the time of this publication, Seed engages in collaborative CQI projects in the low-middle income African countries of Malawi and Uganda. The CQI projects receive endorsement and collaboration from country governments. Partnerships include presidents, government ministers, licensing bodies, regional universities, hospitals, clinics, and clinicians (midwives, nurses, and physicians, before and after graduation). Seed believes having in-country professionals co-develop and lead projects increases CQI project success, promotes multilevel and inter-organizational buy-in, and enhances collaboration among partners.

The educators and partners are supported by in-country teams who are autonomous to manage the delivery of the projects. The country teams support CQI practices by providing support for monitoring and evaluation (e.g. data collection, data analysis, measurement tools), program management (e.g., goals, objectives, and timelines), clinical and educational oversight (e.g. coordination, content assessment and implementation, and human resource support), and financial management support (e.g. budget management, fund distribution, and audits). The following case examples, using Seed's quality improvement approach, show the value of multi-level collaborative approaches, implementing regionally based CQI projects, and how CQI tools can be used to develop and monitor programs for better outcomes.

Uganda: Case example 1

Uganda developed a National Quality Improvement Framework (NQIP) and Strategic Plan (SP), which it started in 2020 and hopes to complete by 2025. The MOH uses a regional collaborative approach among government, university, hospital, and clinic partners. Examples of some of the current projects are:

1. Standardizing the content and accuracy of patient charting on a pediatric ward, specifically looking at medication entries to reduce errors. This initiative involved teaching about charting, creating a standardized chart, providing charts for the staff versus using notebooks and reviewing the charting at intervals after implementation. In August 2022, all patients admitted on the pediatric wards had a patient chart. Within a 6-month period, documentation of malaria results increased from 41% to 78% while documentation of oxygen therapy increased from 52% to 73%. Documentation of the monitoring of hemoglobin levels increased from 52% to 72%. Overall documentation improved by approximately 20%.

2. Increasing partograph use and monitoring pregnancy outcomes for mothers and children to increase timely assessment and treatment of potential complications. At baseline, only 3% of the mothers in labor had a completed partograph and in a period of 6 months, partograph use was at 60%. Efforts to improve completeness are under way.

3. Promoting regular and accurate recording of vital signs during labor and delivery to decrease the morbidity and mortality associated with postpartum hemorrhage. At baseline, less than 17% of mothers had their vitals taken and recorded using the vital chart monitoring tool. So far, the vital chart monitoring tool has been printed and made available, patient monitoring tools have been provided, and training of health workers has taken place. As this is a new project, the results of the project will be seen after 3 and 6 months of implementation.

4. Reducing readmissions and complications to malaria among children at the Regional Referral Hospital. This was done through improving completion of malaria treatment from 20% to 78% receiving complete malaria treatment.

Malawi: Case example 2

Seed's Malawi activities focus on maternal, newborn and child health; community health; and mental health. The projects are at government invitation, crosscut health and non-health professionals, and include partners at multiple levels as previously identified in the Uganda initiatives.

These patient-centered projects highlight the use of specific outcome measures to identify CQI improvement. The projects focus on the theme of improving systematic patient assessment, which has been identified as a significant deficit in LMICs. The projects are as follows:

1. Tetanus toxoid vaccine: Goal: Increase the percentage of women who receive two doses of tetanus toxoid vaccine (TTV) in pregnancy. Outcome: All (100%) of women attending the health clinic received at least 2 doses before delivery.

2. Assessment of waiting antenatal women, post-clinic admission: Goal: Increase daily monitoring of waiting antenatal mothers from a baseline rate of 0% (i.e., there was no monitoring being done) to 50%. The study period was from November 1, 2022, to June 30, 2023. Outcome: The rate rose to 30%.

3. Partograph documentation: Goal: Improve documentation of the partograph from 20 % to 60%. The study period was from January 1, 2023, to June 30, 2023. Outcome: The rate of partograph completion rose to 74%.

4. Perineal tears: Goal: Reduce the incidences of perineal trauma resulting from vagina deliveries from 40% to 20%. The study period was from March 2023 to July 2023. Unfortunately, due to possible inadequate documentation, the outcome measures are not interpretable.

Limitations

The paper is limited in that the data used for conclusions from LMICs individual studies, reviews, and meta-analyses lack consistency in their methodology and data collection. As a result, there is an issue of how generalizable individual study results can be based on uncontrolled variables in each LMIC [16, 17]. CQI suggestions made now and projected into the future may not apply because country and patient expectations are changing, and funding for health-systems are precarious [9, 13].

Many of the suggestions proposed were offered by institutions, organizations, commissions, and researchers and are opinion or consensus driven by experts in CQI and global health. While their opinions are formed on reviewing evidence-based data and studies, most often studies can have methodological issues. However, using large databases and having experts review them for analysis and meaning remains one of the most helpful guides for CQI global projects. Sustainability of CQI is an important and complex topic in global health but beyond this paper. However, Cancedda et al. offer a cogent and salient summary of the issues related to global health and sustainability [18].

Discussion

CQI initiatives and health systems are dynamic and fluid entities that adjust to societal shifts and norms and benefit from data dissemination and past global health efforts. Our literature review showed a shift towards LMIC healthcare projects that promote knowledge exchange and quality versus access to care and structural improvements. Approaches to projects that involve partners at all levels, vertically or horizontally, both within and outside of healthcare, are recommended versus solo projects carried out in isolation. LMICs and their citizens should have greater autonomy to decide their needs and initiate projects. Our review also showed that better data collection and reaching outcome measures are essential to provide the best possible patient-centered care. These changes are possible because of the dissemination of past data and project results [9]. The case examples and Seed Global Health's quality improvement approach show that new knowledge and system-based approaches can be implemented in African LMICs CQI projects.

Conclusion

Novel and innovative approaches to improve the quality of healthcare delivery in LMICs that meet WHO's Sustainable Development Goals have been developed and continue to evolve. Filling the translational gap of knowledge to practice requires dissemination of information about what CQI is and how it can be implemented into LMICs health systems to become patient-centered, collaborative, efficient, outcome-oriented, and impactful. An essential feature of moving forward to improve LMIC health systems and patient satisfaction is the dissemination of ideas, data, results, and conclusions.

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