



Quality improvement strategies and service effectiveness in healthcare delivery system: The place of health data quality improvement process in Nigeria

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ABSTRACT

Background/Objectives: Quality improvement (QI) remains central to strengthening health systems globally. It provides a structured approach for enhancing clinical processes, workforce performance and system-wide outputs. In Nigeria, health service effectiveness continues to be influenced by system fragmentation, limited resources and inconsistent adherence to evidence-based practices. **Design/Methods:** This review sought to map existing evidence on how quality improvement strategies influenced service effectiveness in the Nigerian healthcare system, with a specific focus on health data quality improvement processes. Databases searched include Google Scholar, Pubmed, NJOL, AJOL and ResearchGate for relevant studies with no language restrictions. Works included are empirical studies, programme evaluations, policy documents and grey literature focusing on QI, healthcare quality, health services effectiveness or health data quality improvement in Nigeria. **Results** A cornerstone of any QI effort is the availability of accurate, accessible, comprehensive, timely and consistent health data. Health data quality forms the foundation for planning, monitoring, evaluation and performance management. It is however discernible that the Nigeria's health data management systems face recurring challenges, including delayed reporting, incomplete documentation and variable EMR adoption. **Conclusion:** The continuous desire for high quality healthcare from health service consumers, combined with the system's push for effective and efficient resource application, has placed much pressure on healthcare professionals, stakeholders and organizations. Devising all humanly possible means, health data quality improvement processes should be upheld.

Keywords: Health data quality; Health information management; Healthcare system; Quality improvement, Total quality management

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INTRODUCTION

High-quality health services involve the right care, at the right time, responding to the service users' needs and preferences, while minimizing harm and resource waste. Quality healthcare increases the likelihood of desired health outcomes and is consistent with seven measurable characteristics: Effectiveness, safety, people-centredness, timeliness, equity, integration of care and efficiency. For instance, in Pakistan, increasing first-contact accessibility to healthcare workers through the Lady Health Worker Programme

improved management of pneumonia and lowered neonatal mortality¹.

Quality is a complex and multifaceted concept that requires the design and simultaneous deployment of combinations of discrete interventions. The development, refinement and execution of a national quality policy and strategy are a growing priority as countries strive to systematically improve health system performance. Most approaches to national quality strategy development involve one or more of the following processes¹:

1. A quality policy and implementation strategy as part of the formal health sector national plan.
2. A quality policy document developed as a stand-alone national document, usually within a multi-stakeholder process, led or supported by the ministry of health.
3. A national quality implementation strategy with a detailed action agenda, which also includes a section on essential policy areas.
4. Enabling legislation and regulatory statutes to support the policy and strategy.
5. A health data quality improvement process².

Seven categories of interventions stand out and are routinely considered by health system stakeholders, including providers, managers and policy-makers, when trying to improve the quality of the healthcare system:

1. Changing clinical practice at the front line.
2. Setting standards.
3. Engaging and empowering patients, families and communities.
4. Information and education for healthcare workers, managers and policy-makers.
5. Use of continuous quality improvement programmes and methods.
6. Establishing performance-based incentives (financial and non-financial) and
7. Legislation and regulation.

This study sought to review the effects of quality improvement strategies, which include health data quality on healthcare services quality and effectiveness and in addition, reappraised the Nigeria healthcare systems.

METHODS

This review sought to map existing evidence on how quality improvement strategies including health data quality influenced service effectiveness in the Nigerian healthcare system. Databases searched include Google Scholar, Pubmed, NJOL, AJOL and ResearchGate for relevant studies with no language restrictions. Works included are empirical studies, programme evaluations, policy documents and grey literature focusing on QI, healthcare quality, health services effectiveness or health data quality improvement in Nigeria. Studies with no relevance to QI or health data systems or conducted outside Nigeria without transferable relevance were excluded.

RESULTS/DISCUSSION

Service Effectiveness

Health is a multi-dimensional construct with diverse aspects as well as multiple determinants. Among factors that could influence the health outcome is the adequacy of healthcare services, which in many settings are designed to be available, affordable, accessible, appropriate as well as being equitably distributed. These services could be delivered from multi-tier system and from privately or publicly owned health facilities. For either public or private health facilities, there continues to be the concern of whether healthcare services are delivered in a way that guarantees optimal clients and other stakeholders' satisfaction with services provided^{3,4}.

A critical goal of healthcare delivery in both developing and developed countries is the achievement of sustainable high quality of care at reasonable cost. This is premised on the assumption that quality can be measured, monitored and improved. The demand for high quality and affordable healthcare is spurred-up from the ever-evolving demographic, epidemiology and political systems in the world as well as greater complexities in the pattern of diseases and the preferences of the health consumers. Patients' satisfaction after a healthcare delivery encounter is now accepted as an indicator of quality healthcare delivery and this can act as a guide to the level of patient-centred healthcare that is provided by the healthcare facilities. Indeed, the relationship between the quality of healthcare services and satisfaction of the patients with the services provided had been established in previous studies^{5,6}.

Beside the burgeoning influence of consumerism in healthcare, other drivers of quality in healthcare include the knowledge and competence of healthcare providers, patient cooperation, health data quality improvement health insurance, leadership and management styles in health facilities, collaboration, available referral system, job satisfaction of the healthcare providers and so on^{7,8}.

Quality has become an increasingly predominant part of our lives. People are constantly looking for quality products and services. The existence of this desire for quality has caused firms and organizations around the world to consider it as an essential component of any service and production process. Quality is a strategic differentiation tool for sustaining competitive advantage. Improving quality

through improving structures and processes leads to a reduction of waste, rework and delays, lower costs, higher market share and a positive company image^{9,10}.

Healthcare service is an intangible product and cannot physically be touched, felt, viewed, counted, or measured like manufactured goods. Producing tangible goods allows quantitative measures of quality, since they can be sampled and tested for quality throughout the production process and in later use. Healthcare service quality however depends on service process and customer and service provider interactions^{11,12}.

Some healthcare quality attributes such as timeliness, consistency and accuracy are hard to measure beyond a subjective assessment by the customer. It is often difficult to reproduce consistent healthcare services. Healthcare services can differ between producers, customers, places and daily. This ‘heterogeneity’ can occur, because different professionals (e.g. physicians, nurses, HIM Professionals, etc.) deliver the service to patients with varying needs.

Unlike manufactured goods, it is less likely to have a final quality check. Healthcare outcomes cannot therefore be guaranteed. Quality healthcare is a subjective, complex and multidimensional concept. Donabedian defined healthcare quality as ‘the application of medical science and technology in a manner that maximizes its benefit to health without correspondingly increasing the risk¹³. He distinguishes three components of quality: 1) technical quality, 2) interpersonal quality and 3) amenities. Technical quality relates to the effectiveness of care in producing achievable health gain. Interpersonal quality refers to the extent of accommodation of patient needs and preferences. Amenities include features such as comfort of physical surroundings and attributes of the organization of service provision¹⁴.

Understanding the factors that affect healthcare service quality helps benchmark for best practices, deliver appropriate care and improve processes to reduce the frequency and severity of medical errors. Healthcare service providers are encouraged to regularly monitor healthcare quality and accordingly, initiate continuous quality improvement programmes to maintain high levels of patient satisfaction. Healthcare quality can be improved by supportive leadership, proper planning,

education and training, and effective management of resources, employees and processes¹⁵.

In the Nigerian context, the right care is often made available by the right providers at the right place and at the right time by those, who can afford such services. High prevalence of out-of-pocket payments for health coupled with low government investment in health, disproportionate distribution of healthcare funds, regional inequity in healthcare expenditure and a high level of poverty are however making the right care not to get to the right patient at the right time¹⁶.

Quality Improvement Strategies

Quality improvement is the combined and unceasing efforts of everyone, healthcare professionals, patients and their families, researchers, payers, planners and educators, to make the changes that will lead to better patient health outcomes, better healthcare system performance and better healthcare professional development¹⁷. Quality improvement is more traditionally associated with manufacturing and business due to its historical roots. Nonetheless, these same tools can and have been used to deliver better healthcare at lower cost at the bedside. Educating clinicians and other care providers in effective quality improvement techniques is critical to the future of healthcare. The blended approach of quality improvement methodologies coupled with healthcare subject matter expertise has made the Mayo Clinic Quality Academy successful in this charge¹⁸.

Quality improvement methodologies, originally used in industry, include frameworks such as the Plan-Do-Study-Act (PDSA), the Malcolm Baldrige Model, Lean and Six-Sigma. All of these QI frameworks require adhering to an iterative, methodical process, where the underlying system is systematically examined at the project outset. A number of different tools may be employed to understand variation in underlying performance.

In a study on QI, newly recruited managers seem more inclined to express that after the intervention, they appreciate co-workers, who challenge current ways of working¹⁹. Experienced and established managers may not have sufficient energy to handle inspired co-workers and, therefore, feel that co-workers with new ideas have become a nuisance. Expressions like “we have tried that” or “it did not work before” are not uncommon¹⁹. Since all improvement involves change, whereas all changes

do not entail improvements, these measurements can also be used as criteria for finding out whether a particular change would constitute an improvement.

Some tested Quality Improvement Strategies

“Just do it”

This is the most basic kind of quality improvement effort “just do it.” This is a simple, low risk local project, where a problem can be identified and fixed by a small group of people, who completely control that process. These are things like fixing a broken piece of equipment or locating a misfiled patient’s health record. Empowering workers to feel that they can contribute to the quality of their work is critical to creating a culture of quality, and recognizing that not every improvement has to be a project helps ensure that quality improves continuously. In a “just do it” situation, however, there is a risk of not understanding the upstream and downstream effects that a change may have. Adequate understanding of the systems processes and global workflows thence, remains important when deciding if an opportunity for improvement is really of the “just do it” variety¹⁸.

“Plan-Do-Study-Act (PDSA)”

The PDSA is a step up from the “just do it” mentality. In these projects, a structured planning approach is used to appropriately plan an intervention, test on a small level and iteratively improve and enlarge the project. A tool or process could be piloted by an individual, studied, improved, adopted by a work unit, improved again and rolled out to a larger department. This PDSA cycles allow for more opportunities for studying some of the downstream impacts a change may have and optimizing a process. More importantly, PDSA brings in change management principles, allowing for studying how to adapt and implement successful models of change from one area or pilot into other similar areas, studying the culture and workflow as it spreads throughout¹⁸.

Lean

Lean is an approach to reduction of waste. The goal of Lean is to improve value as perceived by the customer (in healthcare, typically the patient) by recognizing those activities that do not add value and reducing or eliminating them. The most common example in healthcare is waiting and delays. Although there are certain wait time that are

unavoidable (e.g. patient’s documentation, analytic time for laboratory tests and so on), the amount of time spent in a exam room, hospital room or waiting room without any kind of provider is a known ‘dissatisfier’ to patients and contributes little to their overall care. Lean projects identify which sort of wasteful activities like that can be reduced through serial process improvements, such as improving the flow of persons or materials throughout an emergency department to reduce the total “down time” a patient may have during an intense evaluation.

5S

In healthcare, 5S is probably the best known Lean method. The first “S” is “sorting,” going through the area and removing that which is truly not necessary. The second “S” is “set in order,” where items are rearranged to fit the workflows, commonly required tools are co-located to make them easier to find and quicker to gather together. The third S is “Shine,” where a workplace is clean and organized enough to make it obvious, when something is out of place. This leads to the fourth “S,” “standardize”, where procedures are put in place to help ensure that the organizational schema is easy to follow. The final S “Sustain,” looks to move the first 4S’s into the organizational culture, encouraging workers to continuously find areas for improvement, and reassess if an area slips into disorder to restart the process. Although typically thought of as a way of organizing physical space, 5S principles have been successfully applied to time in schedule-based projects. Thus, the principles can be applied to a broad array of situations, where there is a gap in efficiency¹⁸.

Six sigma

Six Sigma is traditionally associated with quality improvement, and has its roots in manufacturing. Unlike Lean, where the emphasis is on waste reduction and improving efficiency, Six Sigma targets defects and finds ways to reduce defects. Indeed, it gets its name from the target that a defect should only occur at the sixth standard deviation (sigma), or 3.4 defects per million opportunities. Although the six sigma level may be more conceptual or aspirational for many areas in healthcare, in many more, it can and has been achieved. Six sigma works via a five step process. These steps are:

1. A problem is defined. Ensuring an adequate definition of the gap between the current state and an achievable future state informs all future steps in a six sigma project.
2. Measure: Emphasizes the statistical and scientific elements of Six Sigma. A thorough baseline evaluation of the present state to assess current functionality in a way that's reliable and reproducible so that performance can be re-measured and re-analyzed as needed. Tools used include mapping a process, histograms, observations and check sheets.
3. Analyze: Data from the measurement is reviewed to determine what driving the gap in quality identified in "define." This emphasizes some statistical tools like control charts, correlation analysis and Pareto diagrams, but can also include more qualitative analytic tools like root cause analysis and cause and effect diagrams. From the analyze phase, drivers of the quality gap are identified and targeted for improvement.
4. Improve: Is where the improvements are actually developed and triaged. There are some standard improvements for specific project, but often times, this ends up being a phase of iterative improvement, harkening back to the PDSA cycle.
5. Once a project is successful, it moves into the "control" phase, where the team seeks to ensure gains aren't lost by transitioning ownership to a group that will continue to function once the quality project team is disbanded, and appropriate guard rails are in place to prevent backsliding. This often includes such features as a measurement, which can continue to be followed and an action plan if defects or adverse events exceed a certain threshold¹⁸.

The blended approach

There are a variety of different tools used for quality improvement in healthcare. Mayo Clinic viewed the "plan-do-study-act" (PDSA) cycle as the fundamental tool used in her quality improvement framework. Using this framework, a small test of change can identify a potential solution to a problem, and using appropriate techniques, scaled and

improved to a larger level. In this "blended framework," Mayo Clinic viewed the tools of six sigma and Lean as complementary ways of going from a PDSA cycle to a larger comprehensive quality project. Mayo Clinic fit the larger project into the Define-Measure-Analyze-Improve-Control (DMAIC) framework from Six Sigma, though the phases of DMAIC can be applied to Lean and other projects¹⁸.

Health data quality and service improvement

Quality improvement (QI) remains central to strengthening health systems globally. It provides a structured approach for enhancing clinical processes, workforce performance and system-wide outputs. In Nigeria, health service effectiveness continues to be influenced by system fragmentation, limited resources and inconsistent adherence to evidence-based practices. A cornerstone of any QI effort is the availability of accurate, accessible, comprehensive, timely and consistent health data. Health data quality forms the foundation for planning, monitoring, evaluation and performance management². It is however discernible that the Nigeria's health data management systems face recurring challenges, including delayed reporting, incomplete documentation and variable EMR adoption¹⁹⁻²³.

Effects of Quality Improvement Strategies on Service Effectiveness

A study identified the three most important priorities for QI within some healthcare systems. The most important priorities identified were: 1). development of quality standards and guidelines improving patient safety, 2). orientation and 3). involvement, improving the assessment and evaluation of QI, improving health data quality and reporting systems and achieving better value for money¹⁹. The most frequently cited achievements in QI were: 1). establishing national accreditation or quality assurance systems, 2). establishing a national society for quality in healthcare, extending patient choice, patient rights and patient safety and 3). improving the training and assessment of professionals²⁴.

Policies on quality improvement in healthcare have largely developed at a national level in EU member states, and have been driven by largely national concerns. Nevertheless, it has been observed that some degree of policy convergence in

areas such as the widespread adoption of legal or statutory requirements for healthcare organizations to put quality improvement systems in place, the development of specific mechanisms such as accreditation programmes and the recent policy priority accorded to patient safety in many member states²⁴.

The potential benefits of effective healthcare systems (people-centred and integrated healthcare services) include:

To individuals and their families: increased satisfaction with care and better relationships with healthcare providers, improved access and timeliness of care, improved health literacy and decision-making skills that promote independence, shared decision-making with healthcare professionals¹⁵.

To communities: improved access to care, particular for marginalized groups, improved health outcomes and healthier communities, including greater levels of health seeking behaviour, better ability for communities to manage and control infectious disease and respond to crises, greater influence and better relationships with healthcare providers¹⁵.

To healthcare professionals, improved job satisfaction, improved workloads and reduced burnout, role enhancement that expands workforce skills so they can assume a wider range of responsibilities and education and training opportunities to learn new skills, such as working in team-based healthcare environments¹⁵.

To health systems: enables a shift in the balance of care so that resources are allocated closer to needs, improved equity and enhanced access to care for all, improved patient safety through reduced medical errors and adverse events, increased uptake of screening and preventive programmes¹⁵.

Challenges of Quality Improvement Strategies toward Service Effectiveness

There are many common challenges to full, consistent implementation of sound QI methods across any healthcare organization. These include competing strategic priorities, inadequate leadership support, limited QI education, limited physician engagement, inappropriate focus on interventions and lack of recognition for QI are among the challenges that organizations face. Working to overcome these and other barriers in an expanding healthcare workforce is a challenge that healthcare

organizations will continue to face in the years ahead²⁵⁻²⁷.

In summary, healthcare quality improvement is a sought-after remedy to the erratic healthcare services in our facilities of care and keeping to the tenets of QI remains one major means of enhancing provider-patient relationship and trust. There are a lot of tested strategies to achieve healthcare services quality improvement and healthcare providers need not re-inventing the wheel. Remarkably, the pace of development of quality healthcare services in Nigeria as earlier highlighted in this review remains quite unsatisfactory. Nigeria, a highly populous nation has a world health system ranking of 187 of 200 countries; still has weak or non-existent healthcare standards and accreditation systems, poor quality health data management, poor quality healthcare services, inequitably-distribution and insufficient healthcare service delivery. Despite the investments into primary, secondary and tertiary healthcare, coverage for basic healthcare services, especially for the rural populace of the country is yet to be attained. These provide stronger imperative to validate and fast-track implementation of national health plans and ongoing health reforms.

CONCLUSION

The continuous desire for high quality healthcare from health service consumers, combined with the system's push for effective and efficient resource application, has placed much pressure on healthcare professionals, stakeholders and organizations. This is to ensure that their delivery of healthcare services and clinical practice in general are based on sound evidence-base.

Health data quality improvement is well-placed at the centre of good healthcare and effort should be geared toward its maintenance. This would also result in health outputs measured in terms of increased life expectancy and quality of life. Quality of care should never be a myth for the Nigerian populace but, should indeed be a reality made possible by the enabling efforts of all stakeholders responsible for such.

Recommendations

1. Healthcare professionals and other healthcare services contributors should take patients as 'king' they are and as such, offer their best to keep them.
2. Health facilities as well as healthcare professionals in Nigeria should deploy

- necessary existing strategies to ensure services quality improvement in their deliveries.
3. Devising all humanly possible means, health data quality improvement processes should be upheld.
4. Government of Nigeria at all levels should formulate and enforce policies regarding healthcare services quality improvement measures.

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AIT conceived of the study, initiated the design, participated in literature search and review, data collection, analysis and coordination. OSM, SQB, IIA, IU and AWA participated in the design, technical process, literature review, data analysis and coordination, mentoring and reviewed the final manuscript.

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