Journal of Public Health International

# Evaluating the Effectiveness of Quality Improvement Strategies in Mid-Level Private Healthcare Facilities of Lagos State: A Donabedian Model-Based Approach

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**Research Article**

**Open Access &**

**Peer-Reviewed Article**

**DOI:**10.14302/issn.2641-4538.jphi-23-4871

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**Keywords:**

healthcare quality, quality improvement, Donabedian model, healthcare facilities, patient satisfaction, contraceptive usage

**Received:** December 15, 2023

**Accepted:** January 24, 2024

**Published:** February 03,2024

**Academic Editor:**

Sasho Stoleski, Institute of Occupational Health of R. Macedonia, WHO CC and Ga2len CC.

**Citation:**

Nnenna Mba-Oduwusi, Ifesinachi Eze, Tochukwu Osuji, Mubarak Ahmed, Bolaji Akala et al. (2024) Evaluating the Effectiveness of Quality Improvement Strategies in Mid-Level Private Healthcare Facilities of Lagos State: A Donabedian Model-Based Approach. Journal of Public Health International - 7(1):1-25. https://doi.org/10.14302/issn.2641-4538.jphi-23-4871.

## Abstract

***Background:*** This study evaluates the effectiveness of quality improvement (QI) strategies in mid-level private healthcare facilities in Lagos State, with a focus on the structural components, healthcare processes, and healthcare outcomes. Employing the Donabedian model, the research aims to comprehensively assess and enhance healthcare service quality in these facilities.

***Methods:*** A before-and-after study design was employed, involving a baseline assessment of 321 health facilities and endline assessment of 239 healthcare facilities, and a subsequent 10 - 12-month quality improvement intervention. Data were collected using facility assessments, client exit interviews, and interviews with key stakeholders. The analysis included a before and after analysis of the structural components, healthcare processes, and healthcare outcomes.

***Results:*** The study demonstrates positive outcomes in mid-level private healthcare facilities in Lagos State following quality improvement (QI) interventions. Structural components, including, improved equipment availability, and enhanced compliance with standards, showcased significant improvements. Renovations and heightened registration compliance further underscored commitment to regulatory standards. Challenges in service availability, particularly in family planning and laboratory services, were identified. Importantly, the implementation of a QI scoring system revealed an overall positive impact, with the average score rising from 69% to 74%, signifying enhanced quality across diverse priority areas.

***Implications:*** These findings highlight the success of QI interventions in transforming healthcare processes and structural components. Despite notable

progress, persistent challenges in specific services call for targeted interventions. The substantial increase in patient satisfaction and overall QI scores underscores the transformative potential of sustained efforts and tailored interventions in mid-level private healthcare facilities in Lagos State.

***Conclusions:*** This research comprehensively evaluates the effectiveness of quality improvement strategies implemented in mid-level private healthcare facilities in Lagos State, Nigeria, utilizing the Donabedian Model as a guiding framework. The findings provide valuable insights for policy recommendations, with the aim of aligning healthcare services with the Donabedian model to ensure the provision of high-quality care in mid-level private healthcare facilities in Lagos State. This study contributes to the ongoing efforts to improve healthcare quality in Lagos State.

***Contribution to Knowledge:*** The research provides empirical insights into the effectiveness of quality improvement strategies in mid-level private healthcare facilities, particularly within the context of Lagos State, Nigeria. It highlights the significance of addressing structural components, optimizing healthcare processes, and monitoring healthcare outcomes to enhance the quality of care provided, aligning with the Donabedian model. These findings offer a valuable basis for policy recommendations and further research efforts aimed at improving healthcare quality in similar settings.

## Introduction

Healthcare quality is a matter of profound global concern. Across nations and cultures, the provision of healthcare services is regarded as a fundamental human right and a cornerstone of societal well-being. It is imperative that healthcare be safe, effective, patient-centered, timely, efficient, and equitable. This pursuit of quality is not only a moral and ethical obligation but also a practical necessity for healthcare systems worldwide. Universal Health Coverage (UHC) is a fundamental global health goal that serves as a linchpin for sustainable development and the eradication of poverty, particularly in low- and middle-income countries like Nigeria. At its core, UHC advocates not only for the accessibility of healthcare services to all but also for their quality, which encompasses better health outcomes, safety, patient-centeredness, timeliness, efficiency, and equity. The achievement of UHC, encapsulated within the Sustainable Development Goals (SDGs), hinges on the imperative to address healthcare quality, a task that is of paramount importance when considering mid-level private healthcare facilities in Lagos State.

The emphasis on healthcare quality at the global level is underpinned by a multitude of reasons. Patient safety stands as one of the cornerstones of this concern. According to the World Health Organization (WHO), millions of individuals worldwide suffer harm due to unsafe healthcare practices, including medical errors, infections, and adverse events [43]. Rising healthcare costs further accentuate the significance of healthcare quality; ensuring the effective and judicious use of resources is imperative in the face of escalating expenses. Moreover, health disparities continue to persist, with vulnerable populations often receiving suboptimal care, highlighting the need for improved healthcare quality to promote health equity. The world's aging population poses another unique challenge, demanding high-quality care that is tailored to the evolving healthcare needs of elderly individuals. Advances in medical knowledge and technology, coupled with the emergence of global health threats, underscore the importance of quality healthcare systems capable of harnessing these advancements safely and effectively. The concept of patient-centered care is also gaining momentum globally, with patients increasingly expecting their healthcare to be aligned with their values and preferences [1; 16].

Lagos State, one of Nigeria's most populous and economically significant regions, faces its own distinctive set of challenges and opportunities in the realm of healthcare quality [22]. The state's vibrant

and diverse population, attracted by economic prospects, places substantial demands on its healthcare system. As the economic hub of Nigeria, Lagos State draws a significant influx of individuals seeking better opportunities and living standards, further accentuating the complexity of urban healthcare delivery [37]. It is within this dynamic context that healthcare quality assumes a critical role, particularly given the state's position as a hub of economic and cultural exchange. Within Lagos State's intricate healthcare landscape, private healthcare facilities, especially mid-level healthcare providers, play a significant role in meeting the healthcare needs of the population [29]. These facilities serve as accessible points of care for a wide range of health issues, contributing significantly to the overall healthcare ecosystem. However, the quality of care provided by these facilities varies widely, making them a focal point for quality improvement efforts. The variability in healthcare quality within mid-level private healthcare facilities in Lagos State is influenced by a multitude of factors, encompassing structural, process-related, and outcome-related elements [1]. These disparities necessitate attention and action to institute meaningful quality improvement measures. Enhancing healthcare quality is not only a pragmatic necessity but a moral and ethical obligation to ensure the well-being of the diverse population relying on these facilities.

To address these disparities and to institute meaningful quality improvement measures, this research employs the Donabedian Model as a guiding framework. Developed by Avedis Donabedian, this model has been instrumental in the evaluation and enhancement of healthcare quality [7]. The model proposes three key domains for assessing healthcare quality: structure, process, and outcomes. Structural elements encompass the physical and organizational attributes of healthcare facilities, including infrastructure, resources, and personnel. Process involves the actions and activities within healthcare delivery, encompassing adherence to standards, clinical protocols, and patient care practices. Outcomes evaluate the effects of healthcare interventions on patients' health and satisfaction, providing a holistic perspective on care quality.

The aim of this research is to comprehensively evaluate the effectiveness of quality improvement strategies implemented in mid-level private healthcare facilities in Lagos State, Nigeria, utilizing the Donabedian Model as a guiding framework. Specifically, the objectives are to analyze the structural components of mid-level private healthcare facilities in Lagos State, including infrastructure, resources, and healthcare personnel, to determine their readiness for quality improvement interventions., to assess the processes involved in healthcare delivery within these facilities, focusing on adherence to standards, clinical protocols, and patient care practices, to identify areas for improvement., and to evaluate the impact of quality improvement interventions on healthcare outcomes, patient satisfaction, and the overall quality of care provided by mid-level private healthcare facilities.

## Literature Review

*Introduction to Healthcare Quality and the Need for Quality Improvement*

Healthcare is universally recognized as a fundamental human right, ensuring that individuals receive the medical attention they need when faced with illness or injury [41]. This essential service is deeply embedded in the socio-economic fabric of nations, influencing the well-being of their populations. Universal Health Coverage (UHC), a cornerstone of global health policy, aims to make quality healthcare accessible and affordable to all individuals, regardless of their economic or social status [39]. While UHC primarily focuses on increasing healthcare access, it is also intrinsically linked to healthcare quality.

Quality in healthcare is defined by the effectiveness, safety, patient-centeredness, timeliness, efficiency,

and equity of healthcare services [17]. Effectiveness ensures that medical interventions result in the desired health outcomes, safety minimizes harm to patients, patient-centeredness considers individual preferences and values, timeliness ensures healthcare is delivered promptly, efficiency optimizes the use of resources, and equity guarantees that care is distributed fairly among populations.

Healthcare quality is a global concern due to several pressing reasons. Patient safety is a paramount consideration, with millions of individuals experiencing harm due to unsafe healthcare practices and medical errors [42]. As healthcare costs rise, there is an urgent need to balance the increasing expenses by delivering efficient and effective care [32]. Furthermore, health disparities continue to persist, particularly affecting vulnerable populations, emphasizing the importance of equitable care [4]. The aging global population poses additional challenges, requiring healthcare systems to provide high-quality care that caters to the evolving needs of the elderly [40].

In the context of Lagos State, healthcare quality is of particular concern. Lagos is one of Nigeria's most populous and economically significant states, attracting a diverse and dynamic population seeking better economic opportunities [23]. As the nation's economic hub, Lagos faces substantial healthcare demands as individuals flock to the state in search of improved living standards [38]. Ensuring healthcare quality becomes imperative, given the complexity of delivering healthcare services in a dynamic urban setting.

Mid-level private healthcare facilities in Lagos State have a significant role to play in meeting the healthcare needs of the population [29]. These facilities are accessible and offer services that cater to a wide range of health issues, contributing significantly to the overall healthcare ecosystem. However, the quality of care provided by these facilities varies widely, making them a focal point for quality improvement efforts. This variability in healthcare quality is influenced by various factors, spanning structural, process-related, and outcome-related elements [1]. To address these disparities and institute meaningful quality improvement measures, this research employs the Donabedian Model as a guiding framework.

In this diverse and dynamic context, enhancing healthcare quality is not just a pragmatic necessity; it's also a moral and ethical obligation to ensure the well-being of the diverse population relying on these facilities. This research seeks to assess the effectiveness of quality improvement strategies in mid-level private healthcare facilities in Lagos State using the Donabedian Model as a guiding framework. It aims to evaluate the readiness of these facilities to deliver quality healthcare, identify areas for improvement in healthcare processes, and assess the impact of quality improvement interventions on healthcare outcomes and patient satisfaction. This endeavor aligns with the global pursuit of universal health coverage, emphasizing the importance of both healthcare access and quality [41].

*The Donabedian Model: Structure, Process, and Outcomes*

The Donabedian Model, developed by Avedis [8], remains a seminal framework for evaluating healthcare quality and has become a cornerstone of quality improvement efforts in healthcare [7] (Hogan et al., 2015). This model posits that healthcare quality can be understood through three essential domains: structure, process, and outcomes [7].

*Structure:* The structural domain encompasses the physical and organizational attributes of healthcare facilities [9]. It evaluates the infrastructure, resources, and healthcare personnel available in healthcare settings [9]. Key elements in this domain include the presence of adequate facilities, well-trained healthcare professionals, the availability of necessary equipment and technology, and a safe environment [9]. For the assessment of mid-level private healthcare facilities in Lagos State, examining their structural components is integral to determine the readiness for quality improvement interventions

[14]. Evaluating the infrastructure and resources in these facilities is a foundational step in assessing their potential to provide quality care and the subsequent effectiveness of quality improvement strategies [14].

*Process:* The process domain evaluates the actions and activities that occur within healthcare delivery [9]. It focuses on adherence to standards, clinical protocols, and patient care practices [9]. Quality processes involve the delivery of care, encompassing diagnostics, treatments, and the overall patient experience [9]. In the context of Lagos State's mid-level private healthcare facilities, assessing healthcare processes is pivotal [14]. It enables the identification of areas that require improvement and provides insights into how the application of quality improvement strategies can enhance healthcare practices [14].

*Outcomes:* The outcomes domain evaluates the effects of healthcare interventions on patients' health and satisfaction [10]. It provides a holistic perspective on care quality, as it considers the results of healthcare delivery [10]. Outcomes may encompass patient health improvements, prevention of complications, and enhanced patient satisfaction [10]. For the research in Lagos State, evaluating outcomes is fundamental to comprehensively assess the impact of quality improvement interventions [14]. It allows for the measurement of healthcare effectiveness, patient well-being, and the overall quality of care provided by mid-level private healthcare facilities [14].

*Donabedian Model and Quality Improvement Strategies*

The Donabedian Model serves as a valuable framework for planning and implementing quality improvement strategies in healthcare [10]. This is particularly relevant to the study's aim of evaluating the effectiveness of such strategies in mid-level private healthcare facilities in Lagos State [14].

*Structure Improvement:* Quality improvement strategies often begin with assessing and enhancing the structural elements within healthcare facilities [44]. In Lagos State, this may involve interventions aimed at improving the infrastructure, ensuring an adequate supply of resources, and investing in healthcare personnel training and development [14]. By applying the structural component of the Donabedian Model, the research can assess whether such interventions have indeed enhanced the readiness of these facilities for quality improvement [14].

*Process Enhancement:* Quality improvement initiatives frequently target process improvement [33]. In the context of Lagos State's mid-level private healthcare facilities, this may include interventions to enhance the adherence to clinical protocols and patient care practices [14]. Using the process component of the Donabedian Model, the study can determine the impact of these interventions and identify areas where healthcare processes have improved [14].

*Outcome Assessment:* Quality improvement is ultimately aimed at producing positive healthcare outcomes [6]. In Lagos State, assessing the impact of quality improvement strategies on healthcare outcomes, patient satisfaction, and the overall quality of care is vital [14]. The outcomes component of the Donabedian Model will facilitate the comprehensive evaluation of these effects [14].

The Donabedian Model, with its three core domains of structure, process, and outcomes, provides a comprehensive framework for assessing healthcare quality [10]. This model has been instrumental in guiding quality improvement strategies in healthcare [13]. For the research in Lagos State, it serves as a foundational framework to comprehensively assess the effectiveness of quality improvement strategies in mid-level private healthcare facilities. By evaluating structural components, healthcare processes, and healthcare outcomes using this framework, the research aims to contribute to the enhancement of

healthcare quality in Lagos State and promote quality healthcare in the pursuit of Universal Health Coverage (UHC).

*Structural Components of Healthcare Facilities and Readiness for Quality Improvement*

In the context of healthcare quality assessment, the term "structure" refers to the foundational and organizational attributes of healthcare facilities. These attributes encompass the physical, logistical, and human resources that form the framework within which healthcare services are provided [8]. Evaluating the structure of healthcare facilities is imperative because it serves as the cornerstone for the delivery of high-quality care [24]. In this context, structural elements define the environment within which healthcare services are delivered. This includes the physical aspects, such as the hospital building or clinic, medical equipment, and technologies in use [11]. The availability and adequacy of infrastructure are fundamental for the effective and safe provision of healthcare services. Additionally, structural components extend to the healthcare workforce, encompassing the qualifications and competencies of healthcare personnel. This includes physicians, nurses, support staff, and administrative personnel, all of whom play essential roles in ensuring the delivery of quality healthcare [11]. To assess the structural components of healthcare facilities effectively, it's crucial to understand the key elements that constitute this domain.

*Infrastructure:* This aspect includes the physical assets of healthcare facilities, such as hospital buildings, clinics, medical equipment (e.g., diagnostic tools, surgical instruments), and technologies (e.g., electronic health records) [11]. Adequate infrastructure is fundamental to the effective provision of healthcare services, ensuring a safe and conducive environment for patient care.

*Resources:* The availability and adequacy of resources, both human and material, are fundamental structural elements [11]. Human resources involve the qualifications, competencies, and skill sets of healthcare personnel, such as physicians, nurses, allied health professionals, and support staff. Material resources include the availability of essential supplies, medications, and medical consumables. The presence of skilled healthcare professionals and necessary resources is pivotal for the seamless delivery of quality care.

*Readiness for Quality Improvement Interventions*

The readiness of healthcare facilities for quality improvement interventions is intrinsically linked to the structural components described above. Facilities equipped with robust infrastructure, adequate resources, and a well-qualified workforce are inherently better prepared to embrace and successfully execute quality improvement initiatives [18]. Readiness for quality improvement encompasses both the willingness and capacity of healthcare facilities to implement and sustain interventions aimed at enhancing healthcare quality.

*Structural Interventions in Mid-Level Private Healthcare Facilities*

In the context of mid-level private healthcare facilities in Lagos State, structural interventions are of paramount importance to achieving improved healthcare quality. These facilities exhibit significant variability in structural components, which, in turn, influences the quality of care they provide [22]. Structural interventions can encompass a wide array of strategies, aimed at enhancing facility infrastructure, ensuring the availability of necessary resources, and building the capacity of healthcare personnel [11]. Addressing structural components in mid-level private healthcare facilities is fundamental for preparing them to undergo quality improvement interventions effectively and efficiently. These interventions aim to bolster the structural foundations of these facilities, ensuring that

they are well-equipped to provide high-quality care and promote the health and well-being of their diverse patient populations.

## Methodology

*Study Design:* This research adopts a before-and-after study design to evaluate the effectiveness of quality improvement strategies in mid-level private healthcare facilities in Lagos State. A before-and-after study is a robust approach that allows for the assessment of change over time [12]. The "before" phase will serve as the baseline assessment, while the "after" phase will evaluate the impact of quality improvement interventions. This design allowed for the comparison of healthcare quality-related outcomes and indicators before the implementation of the interventions (baseline) with the outcomes after twelve (12) months of quality improvement intervention (endline).

*Study Population and Coverage:* The study population consisted of mid-level private healthcare facilities operating in Lagos State. The research focused on randomly selected health facilities that met specific selection criteria. These facilities were chosen from 15 Local Government Areas (LGAs) within the state, including Alimosho, Agege, Ajeromi/Ifelodun, Amuwo-Odofin, Apapa, Ifako Ijaye, Ikeja, Kosofe, Lagos Island, Lagos Mainland, Mushin, Ojo, Oshodi/Isolo, Somolu, and Surulere.

*Data Collection and Sources*

*Baseline Assessment:* Data collection commenced with a baseline assessment, which included 321 selected mid-level private healthcare facilities across Lagos State. This assessment aimed to understand the status of service quality across the clinical and administrative processes of these facilities. Data was collected using a consolidated facility quality assessment tool, which incorporated Health Facility Monitoring and Accreditation Agency (HEFAMAA) monitoring standards, healthcare quality standards (WHO's Service Availability and Readiness Assessment – SARA and InSiGHt's Quality Estimation Tool– QuEst), and Lagos State Health Management Agency (LASHMA) empanelment criteria. The tool was administered to Medical Directors (MDs) and facility managers. The assessment covered various aspects, including management and administrative systems, available services, medical equipment, waste management, infection control, financial management, patient care management, quality improvement, maternal, neonatal, and childcare, family planning, and data management. Additionally, one client exit interview was conducted in each of the 321 selected facilities with randomly selected clients.

*Interventions:* Subsequently, the study implemented quality improvement interventions in the selected facilities over a period of 10 - 12 months, strategically employing the PDSA (Plan-Do-Study-Act) model. This comprehensive approach included the development and distribution of facility-specific quality improvement plans, debriefing facilities on findings and the details of the plan, and the constitution of quality improvement systems. These systems comprised dedicated quality improvement teams or champions. Additionally, the study provided relevant guidelines, Standard Operating Procedures (SOPs), charts, job aids, and reporting templates to facilitate the effective implementation of the plans. The intervention strategy also encompassed conducting physical support and monitoring visits, along with offering virtual support to facilities. To enhance the capabilities of healthcare providers and facility staff, the study conducted targeted training and other capacity-building activities. This multifaceted approach, grounded in the PDSA model, aimed to optimize the impact and sustainability of the Quality Improvement Plans (QIPs).

*Endline Assessment:* Following the 12-month quality improvement intervention period, the research conducted an endline assessment. The endline assessment involved data collection at -239 health facilities (the health facilities that sustained participation in the research throughout the intervention period) to evaluate the effects and contributions of the intervention on service provision and accessibility. The quantitative component consisted of facility assessment using the consolidated facility quality assessment tool and client exit interviews, while the qualitative component involved interviews with key stakeholders, including LASHMA, HEFAMAA, and Medical Directors/ facility managers of selected facilities.

*Priority Areas and Scoring*

In our assessment of healthcare facilities, we identified thirteen priority areas crucial for ensuring the quality of Maternal, Neonatal, and Child Health/Family Planning (MNCH/FP) services. These encompass both clinical and administrative aspects, providing a comprehensive evaluation framework. To ensure a standardized and objective scoring process, each area was evaluated against specific indicators, with a maximum attainable score of 2 for each component. The total achievable score for all indicators within each priority area was capped at 100%, resulting in a comprehensive assessment. This scoring methodology aligns with the Health Facility Monitoring and Accreditation Agency's (HEFAMAA) assessment scoring system, providing consistency and comparability across facilities.

*Management and Administrative System (38 points):* This area evaluates the effectiveness of the administrative structure, encompassing elements such as the organogram, board of directors, administrative SOPs, guidelines, workplan, staff recruitment process, staff health insurance, and environmental conditions, including the provision of basic hospital amenities.

*Services Currently Available (22 points):* Focused on the provision of basic health and MNCH services, this area assesses the availability and quality of emergency care, Antenatal Care (ANC), Family Planning (FP), Prevention of Mother-to-Child Transmission (PMTCT) pharmaceuticals, and laboratory services.

*Referral Capacity and Emergency Response (8 points):* Evaluation in this area centers on the facility's readiness for emergencies, including the availability of emergency transportation, well-documented referral forms, and effective patient follow-up services.

*Patient Care Management (42 points):* This area scrutinizes the facility's patient care procedures, emphasizing the availability of documented clinical procedures, guidelines, job aids, essential medical equipment (basic, general, and surgical), and respiratory treatment supplies.

*Adequacy Of Clinical Rooms (56 points):* Focused on the cleanliness, safety, and infection control measures within clinical rooms, including treatment rooms, delivery rooms, consulting rooms, and laboratories.

*Standard Precautions for Prevention of Infections (20 points):* Evaluation here centers on the availability of infection control processes, encompassing handwashing facilities, proper management of sharps, sterilization processes, and the use of Personal Protective Equipment (PPE).

*Waste Management (6 points):* This area assesses the facility's waste management processes, including the availability of color-coded waste bins, proper waste disposal, and adherence to guidelines for waste management.

*Health Management Information System (26 points):* Focused on the facility's information management, this area evaluates the availability and proper usage of Health Management Information System (HMIS)

registers/forms, regular submission of HMIS forms, and the availability of a medical record storage system.

*Maternal, Neonatal and Child Health Care/Family Planning Services and Utilization (96 points):* A comprehensive evaluation covering the availability and quality of maternal care, ANC, newborn and childcare services, use of partograph during delivery, availability and use of Antenatal Record and Follow-up (ARAF) during ANC, availability of FP services with trained and dedicated staff, availability of FP commodity utilization record, and the availability of a diverse FP methods mix.

*Financial Management System (30 points):* Focused on the facility's financial processes, including the availability of a functional accounting system, appropriate accounting tools, adherence to fiscal policies and procedures, and accessibility to funding.

*Quality Assurance and Quality Improvement (34 points):* Evaluates the facility's commitment to quality improvement, including the allocation of resources, supporting policies that drive quality improvement, availability of a functional Quality Improvement (QI) team/champion, SOPs for QI/QA, data and information availability for decision-making, and the presence of a feedback mechanism.

*Registration and Administration (10 points):* This area assesses the facility's registration status with relevant regulatory bodies, including HEFAMAA, Corporate Affairs Commission (CAC), and Public Procurement Agency (PPA).

*Patient Satisfaction (Client exit interview) (14 points):* Evaluation in this area is centered on patients' perceptions of the facility's service delivery, including cleanliness, friendliness, courteousness, skills and abilities of healthcare providers, communication style, and waiting time.

The total maximum score achievable across all priority areas is 402, providing a comprehensive benchmark for assessing the overall quality of MNCH/FP services in the healthcare facilities under consideration.

*Sample Size Determination*: The sample size was determined by the targeted number of mid-level private providers that participated in the Private Providers Readiness Project – a workstream of the Strategic Purchasing for Family Planning (SP4FP) project. For the baseline assessment, 321 mid-level private healthcare providers were selected, covering all facilities enrolled in the project. The selection of this number was predetermined and agreed upon by project coordinators in consultation with HSCL and LASHMA, based on projected target empanelled facilities and available resources. At the endline assessment, 239 health facilities were assessed, taking into consideration those that completed the project cycle. For client exit interviews, 321 respondents were interviewed at the baseline (one client per facility), while 239 respondents were interviewed at the endline. In the endline qualitative component, 20 Medical Directors or facility managers were interviewed, along with one representative each from the project stakeholders (LASHMA, HEFAMAA, and HSCL)

*Data Collection Tools:* The data collection process utilized the following tools: consolidated facility quality assessment tool for health facilities assessment., and the interview guides for providers, partners, and key informant interviews.

*Data Collection, Validation, and Management*:

*Recruitment and Training of Data Collectors and Supervisors:* Prior to the baseline data collection period, a three-day training session was conducted for enumerators and supervisors. Training covered orientation on the research protocol, assessment tools, and safety and security mitigation protocols. A one-day pre-test of all data collection tools followed immediately after enumerator training. Data

collectors underwent a refresher training session before the endline data collection. Pre-testing and refresher training were aimed at ensuring data collection tools' clarity, functionality, and the quality of data collected.

*Data Collection Plan:* Baseline data collection was collected to inform the scope of intervention in each facility. Endline data collection was conducted by a team consisting of twelve members. Four members of the research team conducted key informant interviews, while an additional eight data collectors were sourced from a pool of data collectors within the state, complemented with HEFAMAA monitors for facility assessments. For key informant interviews, the four interviewers were divided into two pairs, with each pair conducting two key informant interviews per day. The data collection process was planned to be completed in twelve days, following a specific schedule.

*Data Collection Method:* This research employed both paper-based and electronic data collection methods. Quantitative data collection utilized the KoboCollect platform on mobile devices for ease of collection, storage, retrieval, and analysis. Health facilities assessments and client exit interviews were administered using electronic questionnaires. Qualitative data collection involved paper-based interview guides for selected respondents. Key informant interviews were audio-recorded (with participants' consent), while notes were taken for respondents who did not consent to recording. The audio recordings were uploaded daily for quality assurance and transcription.

*Data Quality Assurance:* Data collected were synchronized at the end of each data collection day, allowing for daily data validity checks and quality assurance. All mobile devices came with pre-loaded SIM cards with mobile data. Additional devices were available to circumvent issues related to device damage. Spot checks were conducted on a daily basis to verify adherence to the data collection process. During client exit interviews, consistency checks, and validation checks were programmed into the KoboCollect platform, which could not be bypassed. If incorrect data were entered, the system triggered an error message, which could only be rectified by returning to the correct page for entry. Additionally, supervisors oversaw data collection and regularly reviewed the data for accuracy. Validation was performed by confirming the accuracy of data recorded with participants at the point of data collection.

*Data Management and Analysis*

*Data Entry and Cleaning:* Data from the quantitative surveys were entered into the KoboCollect platform and subsequently exported to statistical software for analysis. Qualitative data from interviews were transcribed and reviewed for clarity and accuracy.

*Quantitative Data Analysis:* Descriptive statistics, such as frequencies, proportions, and means, will be used to summarize data. The data was analyzed using SPSS 25.0.

*Qualitative Data Analysis:* Thematic analysis was applied to the qualitative data, allowing for the identification of key themes and patterns emerging from the interviews. These themes were used to inform qualitative data interpretation.

*Ethical Considerations:* This research project adheres to ethical principles, and all research activities are conducted in accordance with the ethical guidelines and principles of research. Approval was secured from the Research Ethics Committee of the State Ministry of Health. Written informed consent was obtained from all study participants, ensuring their right to withdraw from the research at any time without negative consequences. Confidentiality and privacy were assured, and participants were assigned unique identification numbers to protect their identities.

**Result and Discussion**

*Analysis of Structural Components*

The first objective aimed to analyze the structural components of mid-level private healthcare facilities

Table 1. Readiness of Healthcare Facilities

| Indicator | Baseline (2021/2022) | Endline (2022/2023) | Change |
|---|---|---|---|
| *Number of Staff* | | | |
| *Doctors* | 206 | 198 | -8 (-4%) |
| *Nurses/midwife* | 151 | 178 | 27 (18%) |
| *Nurses* | 444 | 256 | -188 (-42%) |
| *Pharmacist* | 40 | 20 | -20 (-50%) |
| *Lab scientist* | 58 | 70 | 12 (21%) |
| *Records officer* | 59 | 68 | 9 (15%) |
| *Financial Officer* | 38 | 37 | -1 (-3%) |
| *Admin staff* | 74 | 71 | -3(-4%) |
| *Availability of Essential Equipment* | | | |
| *General Purpose Equipment* | 98% | 98.3% | *0.3%* |
| *Basic Surgical Equipment* | 98.2 | 98.2% | *0.0%* |
| *Compliance with SOPs* | | | |
| *Are there available protocols (SOPs) for the management of priority disease conditions (malaria, anemia, diarrhea etc.)* | *32.5%* | *46%* | *13.5%* |
| *Facility Renovation* | | | |
| *Ventilation* | *57.4%* | *100%* | *43%* |
| *Source of Electricity* | *99.3%* | *99.2%* | *0.8%* |
| *Water Supply* | *98.1.%* | *99.1%* | *1%* |
| *Facility Registration* | | | |
| *Facilities registered with the Corporate Affairs Commission (CAC)* | *89.8%* | *97.5%* | *7.7%* |
| *Registration status of the facility with HEFAMAA* | *94.4%* | *97.5%* | *3.1%* |
| *Facility's license renewal status with HEFAMAA?* | *41.4%* | *95.4%* | *54%* |
| *Availability and adequacy of Clinical Rooms* | | | |
| *Consulting room* | *77%* | *79%* | *2%* |
| *Delivery room* | *86%* | *89.1%* | *3%* |
| *Treatment room* | *85%* | *90%* | *- 5%* |
| *Laboratory* | *58%* | *58%* | *0%* |
| *Service Availability (e.g., Antenatal, Delivery, etc.)* | | | |
| *Antenatal care* | *94.1%* | *95%* | *0.9%* |

| | | | |
|---|---|---|---|
| *Basic emergency obstetric and* | *87.9%* | *90.4%* | *2.5%* |
| *Delivery services* | *93.5%* | *94.6%* | *1.1%* |
| *Postnatal care* | *93.2%* | *94.9%* | *1.7%* |
| *Family planning* | *79.6%* | *74%* | *- 5.6%* |
| *Expanded program on immunization* | *52.3%* | *56.1%* | *3.8%* |
| *Prevention of mother-to-child transmission (PMTCT)* | *46.4%* | *52.7%* | *6.3%* |
| *Pharmaceutical services* | *69.7%* | *79.1%* | *9.4%* |
| *Emergency services - oxygen* | *98.1%* | *97.1%* | *-1.0%* |
| *Ambulance (emergency transportation plan/arrangement)* | *44.6%* | *80%* | *35.4%* |
| *Child Health Services* | *89.6%* | *87.4%* | *-2.2%* |
| *Referral Capacity* | | | |
| *Referral services available/ Is there an established referral system in place?* | *78%* | *91.1%* | *13.1%* |
| *Emergency service - ambulance (emergency transportation plan/ arrangement)* | *71.4%* | *86.8%* | *15.4%* |
| *Are referral forms available* | *70.3%* | *92.5%* | *22.2%* |
| *Do you do patient follow-up* | *92.3%* | *94.1%* | *1.8%* |
| *Clinical and nursing personnel are trained on LSS/BLS* | *75.5%* | *78.7%* | *3.2%* |
| *Facility has skilled personnel trained on MNCH related emergencies* | *68.9%* | *77%* | *8.1%* |
| *Sterilization and Infection Control* | | | |
| *Does available toilets have any kind of handwashing facilities?* | *85.1%* | *90.3%* | *5.2%* |
| *Do you have an autoclave?* | *94.9%* | *96.6%* | *1.7%* |
| *Do you have a guide on infection control?* | *59.4%* | *78.3%* | *18.9%* |
| *Are the available hand washing facilities within or around the toilets equipped with cleansing agents and water?* | *84.8%* | *51.6%* | *-33.2%* |
| *Waste Management* | | | |
| *Is the facility registered with LAWMA medical and PSP?* | *99.4%* | *100%* | *0.6%* |
| *Are there color-coded bags for waste segregation?* | *91.5%* | *96.2%* | *4.7%* |
| *If yes, what color-coded bins are available?* | *99.4%* | *99.6%* | *0.2%* |
| *Does this facility have any guidelines in health-care waste management??* | *82.9%* | *79.1%* | *-3.8%* |
| *Availability of Laboratory Services* | *81.64%* | *59.8%* | *-21.8%* |

in Lagos State. This analysis assessed infrastructure, resources, and healthcare personnel to determine their readiness for quality improvement interventions.

The result presented (Table 1) contains data on various structural components and indicators in mid-level private healthcare facilities in Lagos State for the years 2021/2022 (baseline) and 2022/2023 (endline), as well as the observed changes over this period. Here's an interpretation of the results:

*Number of Staff:* The dataset reveals notable shifts in the staffing composition of healthcare facilities between the baseline (2021/2022) and endline (2022/2023) periods, accompanied by percentage changes. In terms of doctors, there is a slight decrease from 206 to 198, constituting an 8 (-4%) reduction. Conversely, the count of nurses/midwives has increased from 151 to 178, marking a 27 (18%) rise. However, a significant decline is observed in the overall nurse category, dropping from 444 to 256, signaling a substantial change of -188 (-42%). Pharmacists have experienced a considerable reduction, decreasing from 40 to 20, accounting for a 20 (-50%) change. Lab scientists show growth, increasing from 58 to 70, reflecting a 12 (21%) change. Records officers have seen an increase from 59 to 68, representing a change of 9 (15%). In contrast, financial officers and admin staff exhibit marginal decreases of -1 (-3%) and -3 (-4%), respectively. These nuanced variations necessitate a careful consideration of their implications on healthcare service delivery and underscore the dynamic nature of staffing in these facilities. Continued attention to optimizing staffing for enhanced service quality is essential. Numerous pieces of research have consistently highlighted that staffing levels play a critical role in shaping patient outcomes and satisfaction levels. Inadequate numbers of healthcare professionals can have a detrimental impact on healthcare access and compromise the overall quality of services. The reduced count of nurses and midwives in particular were a challenge for facilities in meeting empanelment requirements. It also points to turnover of trained staff which could explain the impact in areas such as infection prevention and reduced family planning services. It signals a concerted effort to address the long-standing issue of staff shortages, ultimately bolstering the readiness of these healthcare facilities to provide high-quality care. This workforce challenge impacts the facility's ability to meet the healthcare needs of the community but also holds the potential to improve the overall health outcomes and satisfaction of patients, thereby contributing to the broader goal of healthcare quality enhancement.

*Availability of Essential Equipment*: The facilities consistently maintained high compliance with essential equipment throughout the study period, which aligns with findings from previous research [28] emphasizing the pivotal role of proper equipment in healthcare delivery. The availability and functionality of essential equipment are paramount for accurate diagnosis and effective treatment, directly influencing the quality of care provided. The significant compliance levels observed at both the baseline and endline of the study are in line with existing literature that underscores the critical importance of equipping healthcare facilities with the necessary tools and instruments to ensure the delivery of high-quality healthcare services. Properly functioning equipment not only enhances the efficiency of healthcare providers but also contributes to improved patient outcomes. The minimal change in compliance indicators for essential equipment further suggests that the facilities effectively maintained and managed their equipment throughout the study period [28].

*Compliance with SOPs (Standard Operating Procedures):* The study revealed a noteworthy increase in the availability of protocols for priority disease conditions, rising from 32.5% at the baseline to 46% at the endline. This finding strongly resonates with previous research, as exemplified by studies like [26], which underscore the critical importance of standardized protocols in healthcare settings. Adherence to SOPs plays a pivotal role in ensuring evidence-based practice, reducing unwarranted

variations in care, and ultimately enhancing the overall quality of healthcare services. The observed increase in the availability of protocols aligns seamlessly with the existing literature, which highlights the significance of standardized protocols for delivering care that is both consistent and evidence-based. Research has consistently demonstrated that adherence to clinical guidelines and standardized protocols is associated with improved quality of care and enhanced patient outcomes. Therefore, the substantial increase from 32.5% to 46% in the availability of these protocols within the studied healthcare facilities signifies a positive stride toward the delivery of higher-quality care [26].

*Facility Renovation:* The analysis revealed significant enhancements in facility infrastructure, particularly in the areas of ventilation, electricity, and water supply. This transformation is in line with existing research, exemplified by the work of [3], which underscores the pivotal role of quality facility infrastructure in shaping the patient experience and effectively managing infection control. Adequate ventilation and a reliable, clean water supply are not just amenities; they are fundamental prerequisites for maintaining a safe and conducive healthcare environment. These improvements suggest a commendable effort by healthcare facilities to create a more favorable and secure setting for both patients and healthcare providers. The findings align with literature emphasizing the importance of infrastructure improvements in healthcare settings for enhancing patient satisfaction and ensuring infection control measures are me

*Facility Registration:* The data shows encouraging progress in terms of healthcare facility registration and compliance with regulatory requirements. The percentage of facilities registered with the Corporate Affairs Commission (CAC) has grown from 89.8% to 97.5%, indicating that more facilities have obtained official registration. Moreover, registration status with HEFAMAA (Lagos State Health Facility Monitoring and Accreditation Agency) improved from 94.4% to 97.5%. A noteworthy development is the substantial increase in facility license renewal status with HEFAMAA, surging from 41.4% to 95.4%. This reflects a substantial boost in the number of facilities actively renewing their licenses, which is a significant step toward ensuring regulatory compliance. These changes closely align with the existing literature, which consistently underscores the importance of healthcare facilities operating within the legal framework and adhering to regulatory requirements. Proper registration and compliance not only demonstrate commitment to legal standards but also play a pivotal role in building patient trust and elevating the overall quality of services provided. The improvement in these aspects is a positive sign, as it indicates that healthcare facilities in Lagos State are taking the necessary steps to operate within established legal and regulatory guidelines.

*Availability of Clinical Rooms:* The expansion in the availability of clinical rooms, including consulting, delivery, and treatment rooms, is vital for the effective delivery of healthcare services. Existing literature underscores the significance of well-equipped clinical spaces to ensure the provision of diverse healthcare services efficiently (Smith et al., 2016). This improvement in infrastructure suggests a positive stride toward enhancing the overall healthcare environment and capacity to offer a wide range of services.

*Service Availability:* The analysis yielded mixed results in service availability, with some services showing improvements (e.g., antenatal care and postnatal care) while others experienced declines (e.g., family planning). Research has underscored the significance of comprehensive healthcare services, especially in areas related to maternal and child health [21]. Disparities in service availability can have a notable impact on community health outcomes. The fluctuating trends observed in service availability may be attributable to workforce shortages and turn over experienced by the facilities. Nurses are

typically the providers of family planning services [3], [42]. While improvements in antenatal care and postnatal care services are promising, the decrease in family planning services is a cause for concern. The literature emphasizes the need for healthcare facilities to offer a comprehensive range of services to address the diverse healthcare needs of the population. The decline in family planning services, may also necessitate special attention to increasing the availability of family planning commodities, particularly LARCs, outside of the government supply system, as family planning plays a crucial role in maternal and child health.

*Referral Capacity and Emergency Response:* The latest data reveals significant improvements in certain aspects of referral capacity and emergency response within the healthcare facilities. Specifically, the percentage of facilities with an established referral system increased from 78% to 91.1%, demonstrating a positive trend towards ensuring the continuity of care [34]. This enhancement in the referral system aligns with established literature emphasizing the pivotal role of a well-structured referral process in healthcare systems. Emergency transportation arrangements also saw positive progress, with a notable increase from 71.4% to 86.8%. This improvement is crucial for timely and effective responses to emergencies, ultimately contributing to the reduction of morbidity and mortality rates [20]. Additionally, there were positive trends in the availability of referral forms (92.5%) and the practice of patient follow-up (94.1%), both of which are indicative of a comprehensive approach to emergency response and patient care. The data underscores the commitment of the healthcare facilities to strengthen their emergency response capabilities, aligning with global health priorities. These improvements contribute to the overall preparedness of the facilities to handle medical emergencies, ultimately enhancing the quality of care provided to patients. Continuous attention to these aspects will be crucial in sustaining and further advancing the emergency response mechanisms within the healthcare facilities.

*Sterilization and Infection Control:* The analysis of sterilization and infection control indicators revealed a mixture of results, with improvements in some areas and a concerning decline in handwashing facilities equipped with cleansing agents and water. Adequate infection control practices, especially proper hand hygiene, are critical for preventing healthcare-associated infections [31]. Continuous monitoring and improvement in these practices are essential to maintain a safe healthcare environment. The observed improvements in some sterilization and infection control indicators align with the existing literature, which consistently emphasizes the significance of stringent infection control practices within healthcare facilities. However, the decline in the availability of handwashing facilities equipped with cleansing agents and water raises a significant concern, especially considering its potential connection to nursing shortages. Hand hygiene being fundamental in the prevention of healthcare-associated infections is intricately linked to the availability and functionality of handwashing facilities. Nursing shortages have been associated with compromised infection control measures in healthcare settings [36]. The intricate nature of healthcare operations requires an adequate workforce to maintain optimal infection control standards. A shortage in nursing staff could potentially strain the seamless implementation of hand hygiene protocols, contributing to the observed decline in this crucial aspect. To address this concern effectively, further investigation into the specific challenges faced by nursing staff in adhering to infection control protocols is warranted. Strategies for mitigating nursing shortages and enhancing infection control education and resources should be explored to fortify the overall safety of healthcare environments. This integrated approach aligns with the overarching goal of maintaining a robust infection control framework and upholding patient and staff well-being.

*Waste Management:* The evaluation of waste management practices revealed high compliance with

waste management regulations and a noteworthy increase in the availability of color-coded waste segregation bags. Proper waste management is crucial in healthcare settings for infection prevention and maintaining a safe environment [45]. Compliance with waste segregation guidelines plays a pivotal role in reducing the risk of contamination and enhancing overall safety. The high level of compliance with waste management regulations and facilities' registration with LAWMA, coupled with the improved availability of color-coded waste segregation bags, aligns with the guidance provided by existing literature. Numerous studies underscore the significance of effective waste management in healthcare settings for infection control and ensuring the safety of both patients and healthcare professionals.

*Availability of Laboratory Services:* A concerning observation was the decrease in the availability of laboratory services. Laboratory services play an integral role in healthcare for diagnostics and disease monitoring, enabling accurate diagnoses and appropriate treatment [30]. The reduction in the availability of laboratory services raises a significant point of concern and demands further examination. The existing literature consistently highlights the crucial role of laboratory services in diagnostics and comprehensive patient care. This decline underscores the importance of a closer examination of the underlying factors responsible for this change. Understanding the reasons behind the decrease is paramount, as it directly impacts patients' access to essential diagnostic services and potentially compromises the quality of healthcare delivery.

The findings suggest positive changes and improvements in the structural components of mid-level private healthcare facilities in Lagos State. Many of these changes align with the existing literature on healthcare facility infrastructure and readiness for quality improvement. However, areas with declining or stagnant indicators, such as family planning services, the availability of clinical rooms, and the decline in handwashing facilities, require further investigation and intervention to ensure that these facilities are fully prepared to deliver quality healthcare services. The results can serve as a basis for targeted quality improvement efforts and further research to address specific challenges and opportunities in these healthcare facilities.

*Assessment of Healthcare Processes*

The second objective assessed healthcare processes within the facilities, focusing on adherence to standards, clinical protocols, and patient care practices.

The evaluation of healthcare processes, including patient wait times observed, is a crucial aspect of assessing the quality of care provided in healthcare facilities. Table 2 highlights significant improvements in healthcare processes. The patient wait time indicator, as defined, reflects the proportion of patients who experienced shorter waiting times of 30 minutes or less before receiving care. The increase in this indicator from baseline to endline signifies an improvement in the efficiency of healthcare processes within the facilities. Patients spending less time waiting for care is a positive change that can lead to increased patient satisfaction and overall quality of care (Boudreaux et al., 2015). This improvement suggests that the healthcare facilities have made strides in reducing patient waiting times, which is a crucial aspect of healthcare service delivery. Shorter wait times can positively impact patient experience, reduce anxiety, and contribute to better health outcomes.

Table 2. Evaluation of Healthcare Processes

| *Indicator* | *Baseline (2021)* | *Endline (2022)* | *Change* |
|---|---|---|---|
| *Patient Wait Times (in minutes)* | *83.9%* | *89.1%* | *5.2%* |

Table 3. QI Scoring Components Average

| *QI Score Components Average* | *Baseline Avg.* | *Endline Avg.* |
|---|---|---|
| | *69%* | *74%* |

*Evaluation of Healthcare Outcomes*

The evaluation of healthcare outcomes was conducted based on specific priority areas identified inalignment with the project objectives. The scoring components and average scores provide insights into the impact of quality improvement interventions on healthcare outcomes, patient satisfaction, and overall quality of care.

*QI Scoring Components Average*

The overall average QI score, calculated based on priority areas, reflects the comprehensive impact of the quality improvement intervention.

Table 3 shows the average QI score for individual health facilities, and this provides insights into the varied impact of interventions on different providers. The baseline average QI score of 69% suggests a baseline level of quality across facilities. The increase to an endline average QI score of 74% indicates an overall improvement, showing that the majority of facilities experienced positive changes. This finding emphasizes the need for tailoring interventions to address specific challenges faced by

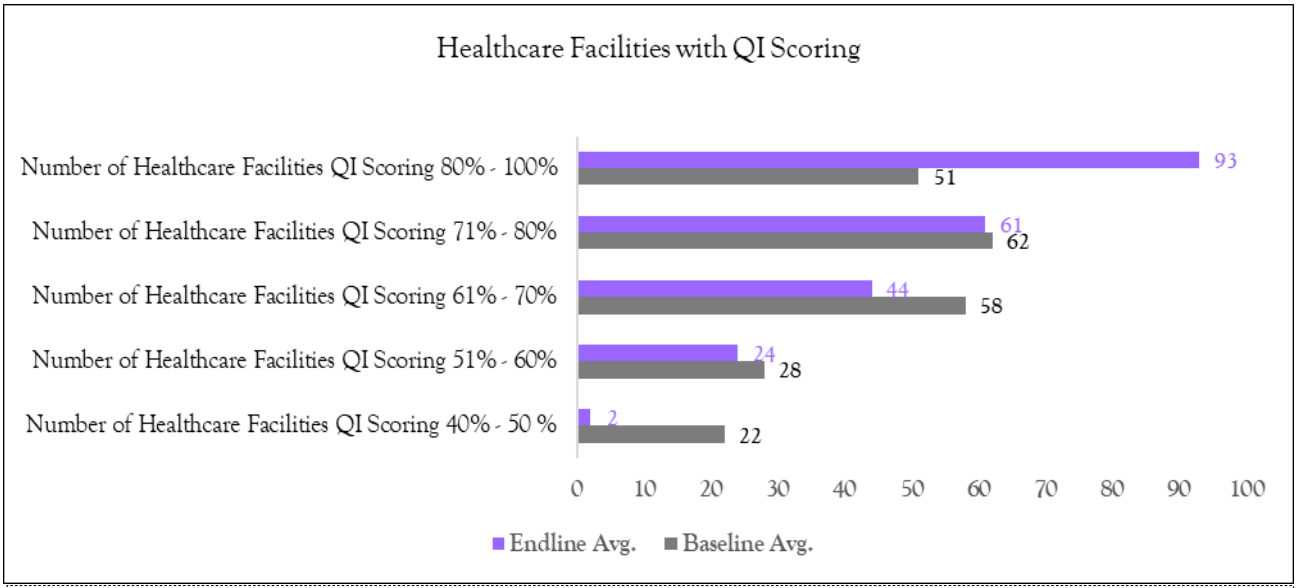


Figure 1. Healthcare Facilities with QI Scoring

Table 4. Priority Areas and QI Scoring Component

| *QI Score Components* | *Baseline Avg.* | *Endline Avg.* | *Difference* |
|---|---|---|---|
| *Management and Administrative System* | *63%* | *63%* | *0%* |
| *Services Currently Available* | *76%* | *80%* | *4%* |
| *Referral Capacity and Emergency Response* | *72%* | *91%* | *19%* |
| *Patient Care Management* | *83%* | *85%* | *2%* |
| *Adequacy Of Clinical Rooms* | *85%* | *87%* | *2%* |
| *Standard Precautions for Prevention of Infections* | *89%* | *80%* | *-9%* |

| | | | |
|---|---|---|---|
| *Waste Management* | *91%* | *92%* | *1%* |
| *Health Management Information System* | *64%* | *67%* | *3%* |
| *Maternal, Neonatal and Child Health Care / Family Planning Services and Utilization* | *52%* | *62%* | *10%* |
| *Financial Management System* | *50%* | *59%* | *9%* |
| *Quality Assurance and Quality Improvement* | *68%* | *77%* | *9%* |
| *Registration And Administration* | *70%* | *84%* | *14%* |
| *Patient satisfaction (Client exit interview)* | *11%* | *83%* | *72%* |
| **Avg. QI Score Total** | **69%** | **74%** | ***5%*** |

individual facilities, acknowledging the diverse contexts and operational nuances that influence the impact of quality improvement initiatives. Figure 1, shows the number of healthcare facilities with their respective quality improvement score average at the baseline and endline.

Table 3 details how the quality improvement scores was computed, and table 4 shows that the priority areas and quality improvement score across the healthcare facilities accessed.

The Management and Administrative System, assessed against structured administrative processes and amenities, maintained a consistent score of 63%. This indicates stability in the organizational structure. Availability of basic health and MNCH services improved from 76% to 80%, showcasing enhancements in service provision.

A notable progress is observed in Referral Capacity and Emergency Response, with the score increasing from 72% to 91%. This improvement indicates a more robust system for emergency transportation, referral forms, and proper documentation, achieving 91% of the maximum obtainable score of 8.

Patient Care Management slightly improved from 83% to 85%, suggesting better adherence to documented clinical procedures and the availability of essential medical equipment.

Adequacy Of Clinical Rooms saw a modest improvement from 85% to 87%, indicating better cleanliness, safety, and infection control measures in clinical areas.

Standard Precautions for Prevention of Infections experienced a decline from 89% to 80%, possibly indicating challenges in maintaining infection control processes, including handwashing facilities and the use of PPE.

Waste Management remained consistently high, with a slight increase from 91% to 92%, indicating effective waste management processes.

Positive change is noted in the Health Management Information System, with the score increasing from 64% to 67%. This suggests improved usage of relevant HMIS registers/forms.

Significant improvement is observed in Maternal, Neonatal, and Child Health Care / Family Planning Services and Utilization, with scores increasing from 52% to 62%.

Positive progress is seen in the Financial Management System, with the score increasing from 50% to 59%. This indicates improvements in the accounting system, fiscal policies, and funding accessibility.

Quality Assurance and Quality Improvement show positive growth, moving from 68% to 77%, indicating enhanced commitment to quality improvement, resource allocation, and supporting policies.

There is substantial improvement in Registration and Administration, with scores increasing from 70% to 84%, indicating progress in meeting registration requirements with relevant authorities.

Table 5. Increase in QI Score

| *Increased QI Scoring (> 0%)* | *Decreased QI Scoring (< 0%)* |
|---|---|
| *157* | *82* |

Patient satisfaction experiences a remarkable improvement from 11% to 83%, reflecting a significant enhancement in patients' perception of the facility's service delivery.

The overall Average Quality Improvement Score demonstrates positive progress, increasing from 69% to 74%, indicating an overall improvement in the quality of MNCH/FP services across the assessed priority areas.

*Increase in QI Score*

A significant finding is the positive change observed in QI scores for a majority of healthcare facilities. Out of the total facilities assessed, 157 demonstrated an increase in QI scores, highlighting the effectiveness of the implemented interventions. This suggests that the quality improvement strategies have been successful in bringing about positive changes across a majority of the assessed facilities. However, it's essential to note that 82 facilities experienced a decrease in QI scores, indicating potential challenges or areas where interventions may need adjustment for better efficacy.

*Implications of the findings*

*Healthcare Workforce and Infrastructure:* The observed changes in the number of staff across various categories have profound implications for both health workforce dynamics and overall infrastructure in the examined healthcare facilities.

*Health Workforce:* The slight decrease in the number of doctors (-4%) may impact the overall capacity for clinical consultation and decision-making. Efforts should be directed toward retaining and attracting qualified medical professionals to maintain high-quality patient care. The notable increase in nurses and midwives (18%) is a positive sign, potentially enhancing the provision of patient care, especially in areas like maternal and child health. This increase is encouraging for meeting the diverse healthcare needs of the community. The significant reduction in the overall number of nurses (-42%) raises concerns about potential challenges in maintaining adequate nursing care. This decline necessitates a focused strategy for recruitment and retention to address the impact on healthcare services. Pharmacists, Lab Scientists, Records Officers, Financial Officers, Admin Staff; the fluctuations in these categories suggest a dynamic work environment. While certain roles have experienced reductions, attention should be paid to ensure that essential functions like pharmacy services, laboratory support, record-keeping, and administrative tasks are not compromised.

*Infrastructure:* The changes in staffing levels emphasize the need for a flexible and adaptive infrastructure. Facilities must be equipped to accommodate fluctuations in personnel to ensure operational continuity. The increase in nurses and midwives may necessitate adjustments in patient care facilities to accommodate the growing workforce, emphasizing the importance of having adequate clinical rooms, equipment, and resources. The changes underscore the need for continuous training and development programs to equip the healthcare workforce with the necessary skills to navigate shifts in staffing and maintain service quality. The reduction in certain administrative staff positions may impact financial and administrative functions. Facilities should evaluate their financial management systems to ensure efficiency in the face of staffing changes.

*Compliance with Standards and Protocols:* The increase in adherence to Standard Operating Procedures (SOPs) and protocols for priority disease conditions is a positive trend. Standardized protocols play a crucial role in ensuring evidence-based practice, reducing variations in care, and enhancing the overall quality of healthcare services. The improvements in compliance with waste management regulations are commendable, contributing to infection prevention and overall safety.

*Implication:* Continued emphasis on adherence to SOPs, guidelines, and waste management protocols is essential. Regular training and monitoring can further enhance compliance, ensuring consistent high-quality care.

*Service Availability and Utilization:* While there were improvements in services like antenatal care, postnatal care, and certain contraceptive methods, the decline in family planning, child health services and laboratory service availability are concerning. Comprehensive healthcare services, especially in maternal and child health, are vital. Understanding the reasons behind the decline in certain services is crucial for addressing gaps.

*Implication:* Addressing the decline in family planning services requires targeted interventions, potentially including commodity security, task shifting to address nursing shortages, and staff training. Investigating the reasons behind reduced laboratory services is essential for ensuring timely and accurate diagnostics.

*Quality Improvement Scores:* The improvement in average quality improvement scores from 69% to 74% indicates an overall positive impact of quality improvement interventions. However, the presence of facilities with decreased scores suggests variations in the effectiveness of these interventions.

*Implication:* Tailoring interventions to individual facility need and consistently monitoring the impact of quality improvement initiatives are crucial. Identifying and addressing challenges faced by facilities with decreased scores will be instrumental in sustaining positive changes across all healthcare providers.

**Policy Recommendations**

The findings of this research carry significant policy implications for the enhancement of healthcare quality within mid-level private healthcare facilities in Lagos State. These implications are delineated below and are vital for guiding future policy development and implementation with regard to structural components, healthcare processes, and healthcare outcomes.

1. While recognizing the autonomy of private healthcare facilities, it's crucial to explore collaborative frameworks with governmental bodies to facilitate the implementation of workforce development and retention policies. These policies should aim to create an enabling environment for an increased number of healthcare professionals, including doctors, nurses, pharmacists, and support staff within mid-level private healthcare facilities. Strategies such as professional incentives and a supportive work environment should be devised to attract and retain competent healthcare personnel. An adequately staffed healthcare workforce is imperative for delivering high-quality care.
2. To promote patient safety and a conducive healthcare environment, healthcare facilities should be encouraged to invest in infrastructure improvement, with a particular focus on ventilation, electricity, and water supply. Regulatory bodies can offer guidelines and incentives for facility renovation and maintenance. Improved infrastructure can lead to enhanced patient experiences,

effective infection control, and overall healthcare quality, thereby benefiting both patients and healthcare providers. In addition, there is a critical need to address financial barriers hindering facility improvement initiatives. Therefore, a complementary policy recommendation is proposed to increase and simplify processes for private facilities to access low or no-interest funding. This strategic intervention aims to facilitate infrastructure development and maintenance, ensuring that healthcare facilities can readily implement necessary improvements. By providing easier access to funds, regulatory bodies can contribute significantly to the enhancement of healthcare infrastructure and, consequently, the overall quality of healthcare services.

3. Regulatory authorities and healthcare facility management should collaborate for rigorous quality assurance measures. This includes ongoing monitoring and support to ensure adherence to clinical guidelines. The implementation of standardized protocols and quality assurance measures fosters evidence-based practice, reduces care variations, and enhances the overall quality of healthcare services, directly impacting patient experiences and healthcare quality.
4. Policymakers should conduct thorough investigations into the fluctuations in service availability, with a special focus on family planning services. Comprehensive healthcare services, including maternal and child health services, should be ensured, with a focus on enhancing access to family planning services. Ensuring a comprehensive range of healthcare services addresses diverse healthcare needs and directly contributes to maternal and child health outcomes and the overall quality of healthcare.
5. Regulatory bodies and healthcare facilities should work together to reverse the decline in hand-washing facilities equipped with cleansing agents and water. Reinforcement of hand hygiene protocols and the provision of necessary resources for infection control should be prioritized. Effective infection control measures, particularly proper hand hygiene, are critical in preventing healthcare-associated infections, creating safer healthcare environments, and benefiting both patients and healthcare providers.
6. Policymakers should intensify investigations into the trends in contraceptive usage, with a focus on addressing any declines in condom usage. Furthermore, there should be a concerted effort to address the reduction in the availability of implant and IUD services, ensuring access to effective contraceptive methods. Comprehensive contraceptive services, encompassing consistent condom usage and access to long-acting reversible contraceptives (LARCs), significantly contribute to reproductive health and family planning, directly impacting healthcare outcomes.
7. Building upon the positive changes observed in QI scores, policymakers should reinforce their commitment to quality improvement initiatives. This can be achieved by allocating resources for ongoing training programs, fostering collaboration among healthcare facilities to share best practices, and periodically assessing the impact of QI interventions. Emphasizing a continuous improvement mindset within the healthcare sector will contribute to sustained positive trends in QI scores, ensuring that facilities consistently meet or exceed defined quality benchmarks.

## Conclusion

This research contributes to the broader discourse on healthcare quality improvement and offers insights into the specific challenges and opportunities within the context of mid-level private healthcare facilities in Lagos State. Further studies and policy actions are needed to continue the journey of enhancing

healthcare quality in the region. The evaluation of mid-level private healthcare facilities in Lagos State reveals positive changes and improvements in various structural components, healthcare processes, and outcomes. Over 60% of the healthcare facility accessed has an increased QI score, indicating the overall success of quality improvement interventions.

While celebrating these achievements, it is crucial to acknowledge the challenges and limitations encountered during the study, including data accuracy concerns, external factors, facility heterogeneity, resource constraints, and the need for nuanced interpretation of results. The recommendations provided aim to guide future interventions, emphasizing contextualized approaches, continuous monitoring, patient-centered quality improvement, collaborative learning, targeted capacity building, adaptability to external factors, and research on declining indicators. Overall, the findings contribute valuable insights to the ongoing efforts to enhance the quality of healthcare services in mid-level private facilities in Lagos State. The commitment to quality improvement demonstrated by these facilities is commendable, and sustained efforts in this direction can further elevate the standard of healthcare delivery, ultimately benefiting the communities they serve.

**Ethical approval:** Ethical approval for the study was obtained from the Health Research and Ethics Committee of Lagos State University Teaching Hospital (LREC), with approval number NHREC04/04/2008.

**Acknowledgement:** This research represents a collective endeavor, acknowledging the collaborative dynamics that have shaped its outcomes. The positive changes documented in healthcare facilities, such as enhanced standards, improved ratings, and organizational insights, emanate from a confluence of initiatives within the healthcare sector. These improvements underscore the collaborative efforts of various stakeholders, including donors, policymakers, healthcare professionals, and administrators.

**Competing interests:** The authors declare that they do not have any conflicts of interest.

**Availability of data and materials:** The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request (info@hscgroup.org).

**Grant information:** This work was supported by the Bill and Melinda Gates Foundation (BMGF) through the Nigerian State-Led Strategic Purchasing for Family Planning grant [grant number: INV-007359] assigned to Health Systems Consult Limited (HSCL).

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