Transforming Healthcare Quality In Libya: An Evaluation Of TQM Adoption And Performance Outcomes

[1]Abdulbari Mohamed Abudher, [2]Islam Salem El Hosin, [3]Esraa Mamdouh Hashem*, [4] Samir Y. Marzouk [5] Mai S. Mabrouk

[1] Productivity and Quality Institute, Arab Academy for Science, Technology and Maritime Transport (AASTMT), Egypt
[2] College of International Transport and Logistics (CITL), Arab Academy for Science and Technology and Maritime Transport (AASTMT), Cairo, Egypt
[3] Biomedical Engineering Department, Misr University for Science and Technology (MUST University), 6th of October, Egypt
[4] Department of Basic and Applied Science, Arab Academy of Science, Technology, and Maritimes (AASTMT), Egypt, Productivity and Quality Institute, Arab Academy of Science, Technology, and Maritimes (AASTMT), Cairo, Egypt.
[5] Center for informatics Science (CIS), Biomedical informatics program, School of Information Technology and Computer Science (ITCS), Nile University, Sheikh Zayed City, Egypt,

Abstract
TQM is a strategic management method that aims to improve healthcare, focusing on quality and care, in order to satisfy patients' needs. Despite having been implemented in the developed world, TQM is overlooked through a multitude of challenges when rolled out in post-conflict and poor, deprived nations such as Libya. This paper aims to investigate the barriers to implementing TQM in the Libyan healthcare system, through a case study of Gharyan Hospital as a model of secondary healthcare organizations. A comparison to the case of hospitals in Germany, Sweden, and France emphasizes the impacts of socio-political framework conditions, resource demands, and cultural contingencies on quality management activities. A mixed method design included in-depth interviews with 25 healthcare administrators and clinicians, a cross-sectional survey of 500 adult patients, and document analysis of quality manuals and performance indices. The numbers show a huge disparity in patient satisfaction, as 85% of shifty European hospitals compare with 65% at Gharyan Hospital. At Gharyan, the main bottlenecks were old infrastructure, a lack of trained staff, and broken information systems. Cultural issues might also have contributed, given Libyan patients' preference for being cared for in person rather than having proficient technicians.
The present study puts forward a Hybrid TQM model incorporating the EFQM (European Foundation for Quality Management) criteria and Libyan socio-cultural context with respect to phased implementation, management leadership dedication, and resources provision. The results offer some guidance for Libyan health care policy makers and hospitals' top managers on how to enhance quality under the context of constraints.
Keywords: Total Quality Management, Healthcare Quality Assessment, Comparative Health Systems, Libya, European Hospitals, EFQM.

1. INTRODUCTION

As the challenges of cost, technology and consumer demand pressure all healthcare systems globally to deliver increasingly excellent care. Safe, effective and patient-centered care is only possible in systems that are systematically managed to ensure ongoing improvement. Total Quality Management (TQM) has been proposed as an all-encompassing system to transform these drawbacks by intermingling quality philosophy in the health care services process [1].

At the core of TQM are leadership commitment, use of data for decision-making and stakeholder involvement with a focus on quality and safety, shared responsibility, standardization, and evidence-based management. In health care, TQM shifts the focus from "the system is broken" to being proactive and quality-oriented with clearly defined goals oriented towards positive patient outcomes [2] Nevertheless, using TQM in quality management in healthcare is difficult because of complicated organizational structures, professional autonomy, and uncertainty of clinical results [1].

The development of health care quality management moved from compliance to continuous quality improvement systems, which have incorporated evidence-based medicine, risk adjusted outcome reporting, and digital health technology developments. TQM is a central part of attaining the triple aim in healthcare: better patient experience, population health, and cost reduction. Although TQM has thrived in developed countries, its implementation is hindered in developing nations by the constraints of inadequate resources, lack of good governance, and poor training [3]. Specifically for Libya, the country has been an interesting case as its healthcare system was functioning prior to 2011 but struggled after the war with resource constraints and fluctuations in organizational structures [4] Gharyan Hospital, which is a secondary care organization and serves well over 300,000 people population further exemplifies the difficulties of applying TQM in such an environment. Significant contributions were being made during the late 2000s, however, a lack of finance/resources and unstable political structures have left services operating at a lower quality than previously [5].

Gharyan Hospital's experience is compared with excellent European hospitals and best practice taken into account for successful TQM implementation in low resource environments. The represented study adds to the relatively scant literature on TQM in post-conflict and developing countries, offering valuable lessons for policy makers, who aim at tailoring some of the world's best practices to their local health settings.

2. LITERATURE REVIEW

2.1 Evolution of Quality Management in Healthcare

The theoretical foundations for healthcare quality management date back to the early 1900s when Ernest Codman advanced the notion of inspection of the "end results" of medical and surgical care though a form of acceptance testing, which would be a precursor to outcomes-based evaluation [6] . This represented a revolution from professional opinion to standardized quantification of healthcare. This was followed by a proliferation of peer review mechanisms, professional standards review organizations, and national accreditation systems in subsequent decades, which constituted small steps toward institutional assurance of quality and standardization of process.

The mid-20th century industrial quality revolution left its mark on health care. Academics like W. Edwards Deming, Joseph Juran and Phillip Crosby brought statistical methods to control quality along with management by objective and zero-defect theory, which over

time filtered into the 1980s healthcare service [7]. These models highlighted the necessity for cross-system change rather than siloed reforms.

A major theoretical landmark came with the description by Donabedian (1988) [8]of the healthcare quality model first, which first described three basic dimensions—structure, process, and outcome. This model became the theoretical foundation for coming methods adopted, such as Continuous Quality Improvement (CQI) and evidence-based performance assessment. The landmark report by the Institute of Medicine (IOM), To Err is Human (Kohn et al., 2000) [9], made even greater contributions to the international conversation on patient safety, which demonstrated that medical errors are systemic and further propelled the global movement toward integrated models for improving quality.

As they progress, both organizations and their staff have shifted focus away from compliance towards learning-based systems with shared leadership, open measurement, and data-driven choices. As noted by Latif.et al. (2014)[10], today's quality management stresses the relationship between leadership culture, employee engagement, and process perfection. This evolution is a departure from the traditional problem-focused, reactive solutions to systems that are dedicated to learning and continuous improvement for preventing errors in complex healthcare systems[11].

A historical curve of these developments take is presented in Figure 1, Both this figure and the following discussion of major introduction landmarks into the study of quality in health care result in a further century approach now governing today our healthcare.
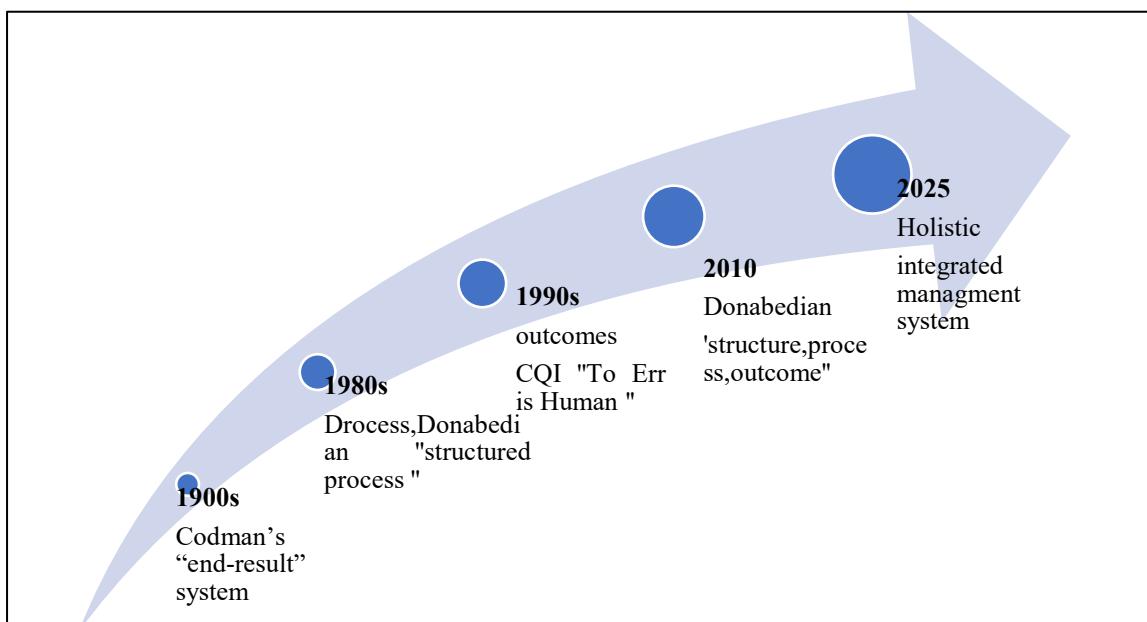
Figure 1.Evolution of Quality Management in Healthcare (1900–2025).

2.2 TQM as a Strategic Framework for Healthcare Excellence

TQM is a comprehensive organizational philosophy that integrates process improvement, evidence-based practice, and stakeholder involvement within a single strategic framework. It represents a philosophy of doing business that focuses on achieving excellence through stable processes, the commitment of management leadership, and participatory decision-making [12] . In the health sector domain, TQM captures the fundamental philosophies

such as patient focus, staff empowerment, process orientation, and measurements based on objective data evaluation.

Figure 2, The TQM conceptual framework in healthcare illustrates the relationships of these components—displaying how leadership vision, continuous improvement, and collaborative culture interconnect to increase clinical outcomes and patient satisfaction.
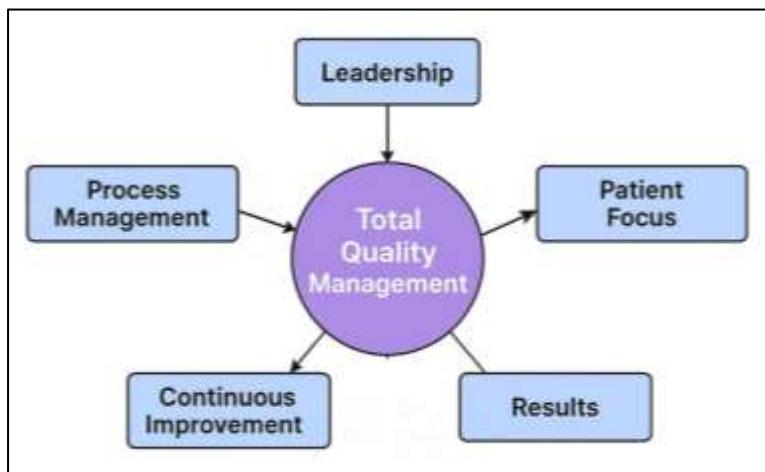
Figure 2.Conceptual Framework of Total Quality Management in Healthcare

The effectiveness of TQM in enhancing organizational performance is well supported by empirical evidence when applied to healthcare systems. For instance, Andersen et al. in their systematic reviews [13]of the use and effect of ICT interventions in breast cancer patients disclosed that such comprehensive support interventions were not so common. Allen et al. (2024) [14], the impact of structured TQM on substantial outcomes is evident in significant (approximately 27%) decreases in adverse-event rates, broad improvement of patient experiences (by 32 percent), and cuts in operating costs (by 19%). Similarly, Eljaedali et al. (2014)[15] found that TQM implementation leads to shifts toward positive morale among staff, greater interdepartmental communication and higher clinical performance.

Yet even with these benefits, the step from theory to implementation is not a trivial one. A number of context-specific barriers to improvement have been faced by healthcare organizations, such as resistance due to cultural standardization, resource deficiency, divided leadership style, and the lack of sustained monitoring systems[6 [16]. In contrast to production systems, where inputs or processes may be standardized, variation and autonomy of professional practice in healthcare are challenges for the implementation of TQM methods. Thus, the success of TQM relies on its principles being adapted to suit local conditions, yet without compromising their essence.

2.3 TQM Implementation in Developing Health Systems: The Libyan Context

The implementation of TQM is still indifferent in many developing countries, and sometimes hindered by structural problems, political instability , and cultural resistance [17]. Libya represents that challenge as it struggles to create its healthcare system out of the wreckage of extended years of conflict and poor governance. Libya's health systems had made impressive progress pre-2011 with almost universal population coverage, improved health status indicators, and increased investment in hospital infrastructure[18] . Yet the

quality of services fell rapidly after the 2011 revolution, with facilities closing, skilled staff shortages and weakened monitoring [19]

It is long on principle and short of hope, a metaphor for the obstructive mire in which Libya can find itself. Being a regional hospital, its catchment population comprises more than 300,000 residents, and the hospital introduced quality improvement programs in the form of ISO 9001:2008 compliance efforts and through quality circles [20] .This work was interrupted by the post-revolution turbulence and economic hardship, which led to a decline in clinical quality as well as in management practice.

Other European hospitals, including Charité-Universit ätsmedizin Berlin, Karolinska University Hospital, and Assistance Publique – Hôpitaux de Paris, have sustained quality excellence, having established well-developed TQM infrastructure, robust leaders' preparation, and being focused on national healthcare quality frameworks. These organizations illustrate the value of stability, institutional learning places, and evidence-based governance in creating high-reliability healthcare organizations.

A comparison of Gharyan Hospital and these European hospitals present an important opportunity to learn from success factors and barriers from models adopted in the western world that can be transferable or context-dependent to TQM implementation results. Conscientiousness gaps between Libya and European hospitals, namely high adverse events, compliance with guidelines, and patient satisfaction [21], call for immediately applicable patterns. An understanding of such differences is crucial to develop a tailored model, such as in a hybrid form of TQM for Libya, which need to overcome the limitations by adjusting to the country's socio-economic limitations, especially due to respect of CI and patient-canteredness.

Table 1 provides these comparative dimensions, which identifies structural, cultural, and operational aspects that are salient in TQM adoption by developed compared to developing healthcare systems. The results of this comparison underpin empirical evidence-based work to improve quality and safety in Libya and beyond.

Table 1.Comparative Analysis of TQM Implementation in European vs. Libyan Healthcare Systems

Dimension	European Healthcare Systems	Libyan Healthcare System	Key Differences	References
Leadership Commitment	• Strong institutional commitment • Quality integrated into strategic planning • Visible leadership involvement in quality activities • Specialized quality leadership roles	• Variable commitment based on facility • Limited strategic quality planning • Focus on crisis management • Few dedicated quality positions • Limited accountability	• Systematic vs. ad-hoc approaches • Proactive vs. reactive orientation • Institutional vs. individual champions	[22], [23]

	• Performance linked to quality metrics	for quality outcomes		
Process Standardi-zation	•Comprehensive clinical pathways • Evidence-based protocols • Formal process management systems • Regular process audits and reviews • Systematic variation reduction	• Limited standardization • Inconsistent protocol adherence • Minimal process documentation • Infrequent process audits • High practice variation	• Systematic vs. individual practice • Data-driven vs. opinion-based • Continuous vs. episodic review	[24][25][26]
Employee Engage-ment	• Formal improvement teams • Staff trained in quality methods • Shared decision-making structures • Recognition systems for improvement • Protected time for improvement activities	• Limited formal engagement • Minimal quality improvement training • Hierarchical decision-making • Few recognition systems • Quality activities as "extra work"	• Systematic vs. opportunistic • Empowerment vs. compliance • Team-based vs. individual	[27], [28]
Patient Focus	• Systematic patient satisfaction measurement • Patient involvement in improvement • Co-design of services with patients • Transparency in outcomes reporting • Service design based on patient journey	• Basic satisfaction surveys • Limited patient involvement • Provider-determined services • Minimal outcomes transparency • Service design based on clinical specialties	• Partnership vs. paternalism • Systematic vs. anecdotal feedback • Experience vs. clinical focus	[29], [30]
Opera-tional Ef-ficiency	• Comprehensive Lean implementations • Value stream mapping	• Basic efficiency measures • Limited process analysis	• Proactive vs. reactive • System vs. department focus	[31], [32]

|				
	• Cost of quality assessments • Systematic waste reduction • Resource optimization systems	• Focus on direct costs • Reactive waste management • Resource shortage management	• Value vs. cost orientation	
Measurement Systems	• Comprehensive quality dashboards • Real-time data collection • Balanced scorecards • Predictive analytics • Benchmarking networks	• Basic quality indicators • Retrospective data collection • Limited indicator sets • Descriptive statistics • Minimal benchmarking	• Proactive vs. reactive measurement • Comprehensive vs. selective metrics • Analysis sophistication	[33], [34]
Technology Integration	• Integrated electronic health records • Clinical decision support • Automated quality monitoring	• Limited electronic systems • Basic IT infrastructure • Manual data collection • Paper-based records predominate • Minimal telehealth	• Digital vs. analog systems • Automated vs. manual monitoring	[35], [36]
Organizational Culture	• Just culture approaches • Innovation encouragement • Psychological safety • Collaborative improvement • Learning orientation	• Blame-oriented approaches • Innovation resistance • Hierarchical relationships • Individual responsibility • Stability orientation	• Improvement vs. compliance • Learning vs. punitive responses • Team vs. individual focus	[37], [38]

3. MATERIALS AND METHOD

The represented study employs a mixed-methods design that integrates quantitative and qualitative approaches to provide a comprehensive understanding of TQM implementation in healthcare organizations. The design enables an in-depth comparative analysis between Gharyan Hospital in Libya—representing a resource-limited, post-

conflict context—and selected European hospitals operating within established quality management frameworks. An explanatory sequential design [39] was adopted, where quantitative data were first collected and analyzed to identify trends and differences in TQM performance, followed by qualitative inquiry through interviews and document analysis to interpret and contextualize these findings. This integration promotes triangulation, strengthens validity, and enhances the interpretive depth of results [40].

The research utilizes a comparative multiple-case study framework [41], examining TQM implementation across diverse institutional and national settings. Each site,Gharyan Hospital (Libya), Charité–Universitätsmedizin Berlin (Germany), Karolinska University Hospital (Sweden), and Assistance Publique–Hôpitaux de Paris (France) serves as an embedded unit of analysis. This structure facilitates both within-case and cross-case comparisons, enabling the identification of universal success factors and context-specific barriers that shape quality improvement outcomes.

The study is grounded in four methodological principles: integration of multiple data sources for triangulation, cross-context comparative logic, sequential linkage between quantitative and qualitative phases, and contextual sensitivity to the socio-political realities of healthcare systems in both developed and developing settings. Figure 3.illustrates the overall research design framework.
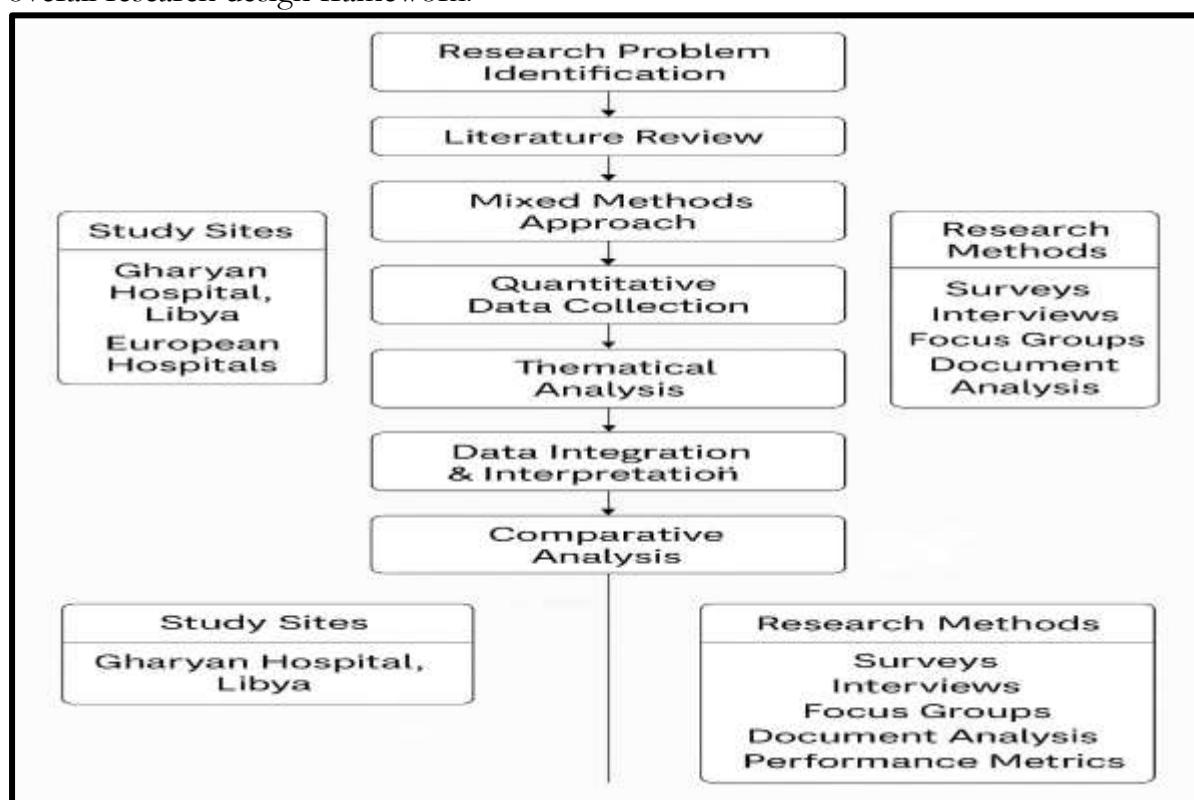
Figure 3. Overall Research Design Framework.

3.1. Data collection method

3.1.1. Qualitative method

The qualitative part of this study used a number of data collection methods to provide rich and context-based accounts of the process, problems, and consequences as they were experienced in the implementing organizations. This multi-source approach facilitated triangulation and a broad perception of both organizational and human factors involved in QI activities.

Semi-Structured Interviews: In total, 48 semi-structured interviews were completed at all study sites (28 at Gharyan Hospital, Libya and 20 European Hospitals). We targeted to

include a wide representation of professional groups, hierarchical levels, and functional departments by purposive sampling [42] Selections included top management, senior leadership (clinical and managerial), physicians, nursing staff, and quality-program people involved in TQM activities.

The interview schedule was developed based on the central constructs of TQM including leadership commitment, employee involvement, continuous improvement, patient focus and organizational culture. Interviews took place in private; each lasted between 45 and 60 minutes. All interviews were digitally recorded with the permission of the participant and transcribed word-for-word for final analysis. Before final use, the interview guide was piloted with three healthcare workers not included in the sample to enhance conceptual understanding, contextual appropriateness and linguistic relevance of the questions. The revised guide acted as an adaptable structure providing scope for the interviewer to pursue emergent themes yet always directing towards the study aims. The distribution of interview participants is shown in Table 2.

Table 2.Distribution of Interview Participants

PARTICIPANT CATEGORY	GHARYAN HOSPITAL	EUROPEAN HOSPITALS	TOTAL
SENIOR MANAGEMENT	4	5	9
MIDDLE MANAGEMENT	6	5	11
PHYSICIANS	7	4	11
NURSES	8	4	12
SUPPORT STAFF	3	2	5
TOTAL	28	20	48

Focus group discussions: to explore shared experiences and perceptions with regard to quality improvement, eight focus group discussions (FGDs) were carried out – four among staff and four among patients.

Staff FGDs consisted of two FGDs in Gharyan Hospital and two at the European hospitals, where 6–8 members participated each time; these sessions were multidisciplinary. Patient FGDs were a pair per setting, comprised of individuals selected by purposive sampling (6–8 recently discharged patients to ensure representation of a variety of service experiences).

Sessions, approximately 90 minutes each, were guided by a semi-structured interview that addressed quality of care perceptions, improvement efforts, and organizational culture. Discussions were led by a trained moderator, with assistance from a note-taker. All sessions were audio-taped, transcribed, and thematically analyzed to report on convergent and divergent views on TQM programmed implementation and sustainability.

Document Analysis: Institutional evidence of TQM implementation and performance outcome was provided through a documentary review in addition to interviews and FGDs. Analyzed documents were quality manuals, policy statements, audit reports, quality committee meeting minutes, patient feedback records, and accreditation papers.

The selection was carried out in a systematic way, preserving relevance and soundness. Data were coded in a content analysis manner with a focus on major TQM dimensions – leadership, process management, employees' involvement, and performance measurement [43] The study provided contextual information on how organizational arrangements and policy context matter for CI in the hospitals studied.

3.1.2 Quantitative method

The quantitative part employed validated measures and objective measures of performance to judge results as well as the maturity levels of TQM practices. This methodological consistency allowed a meaningful comparison of Gharyan Hospital with the European hospitals. Patient satisfaction was assessed via the modified SERVQUAL questionnaire [44], which consists of five service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy. The 22-item questionnaire with a 7-point Likert scale was conducted among 250 Gharyan and 200 European hospital patients according to systematic random sampling. Response rates were 78% and 86%, respectively, with high internal reliability in all dimensions (Cronbach's $\alpha > 0.85$). Staff satisfaction and engagement were quantified using the Minnesota Satisfaction Questionnaire (MSQ) short form [45] with additional items from the Malcolm Baldrige National Quality Award (MBNQA) healthcare criteria. Using a 5-point Likert, intrinsic and extrinsic satisfaction and overall satisfaction were measured in the 17-item survey; it was administered to 180 Gharyan Hospital staff and 150 European hospital employees. Response rates were 72% and 81%, and the composite instrument had excellent internal reliability (Cronbach's $\alpha = 0.88$). Operational and clinical performance were assessed using Key Performance Indicators (KPIs) over 24 months. The metrics were waiting time, length of stay, infection and medication error rates, 30-day readmissions, mortality , and resource utilization (bed occupancy and staff productivity). All comparisons were risk-and severity-adjusted to achieve comparability, and data were validated from various administrative and clinical sources. The linkage of these quantitative metrics with more qualitative data permitted a holistic view of TQM adoption in two environments, which reflected not only performance outputs but also the organizational and cultural underpinnings to those. Figure 4, represents the process of mixing qualitative and numerical data collection techniques in this investigation.
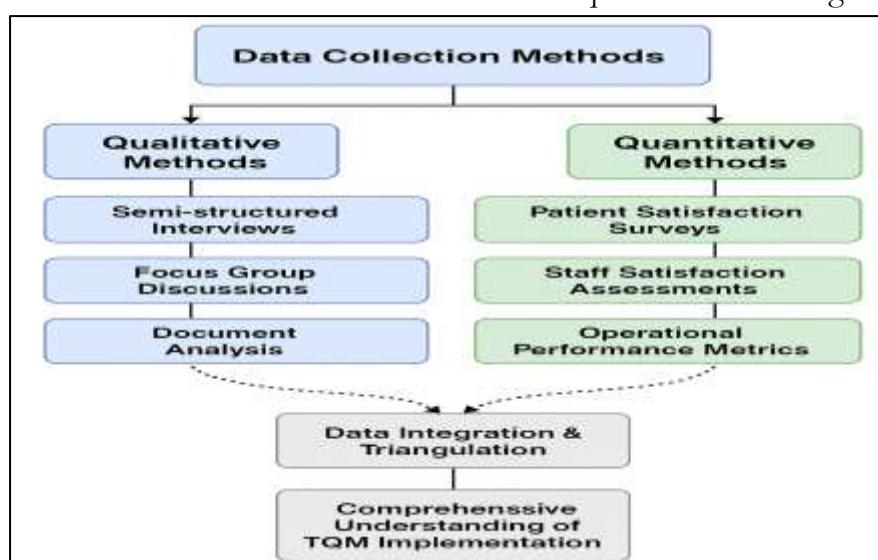
Figure 4.Integration of Qualitative and Quantitative Data Collection Methods.

3.3 Study Sites

3.3.1 Gharyan Hospital (Libya)

Gharyan Hospital is a 320-bed secondary care hospital situated in north-western Libya, servicing an approximated population of 200,000 within the Gharyan district. The hospital is a typical healthcare facility in resource-depleted and post-conflict contexts, and might shed light on the difficulties of introducing TQM when infrastructure is limited and there are political uncertainties. Founded in 1983 and refurbished in 2010, the hospital has a scope of services such as general medicine, surgery, paediatrics, obstetrics and gynaecology, and emergency care. There are approximately 620 employees, including 98 physicians and 254 nurses.

Initial attempts to implement TQM concepts started in 2018 with the formation of quality teams, documentation processes, and performance tracking initiatives. While these early efforts have been implemented, the hospital remains faced with major obstacles to sustain quality improvement that include strained funding sources, high personnel turnover and aging infrastructure and equipment with weak supply chain systems. Another barrier to the institutionalization of quality processes is the shortage of managerial capacity in conjunction with political instability. However, Gharyan Hospital offers a critical case for the exploration of how adaptive strategies may facilitate movement towards quality excellence even in fragile healthcare systems.

3.3.2 European Hospitals

Three hospitals in Europe were chosen as comparative cases, all of which are characterized by developed healthcare systems and established TQM models. These hospitals: University Hospital Zürich (Switzerland), Karolinska University Hospital (Sweden), and Hospital Clínic de Barcelona (Spain) represent innovative approaches toward quality improvement and different organizational settings that may enable further analysis versus Gharyan.

The University Hospital Zürich is an ISO 9001 certified, 950-bed tertiary AHC practice that has been using the European Foundation for Quality Management (EFQM) Excellence Model as a management tool. The hospital has a well-established TQM programmed that has been in place for more than 15 years and displays an institutional commitment to continuous improvement. With 1,100 beds, Karolinska University Hospital in Sweden is known worldwide as a leader in quality and has operated Lean healthcare for seven years, anchored on systematic quality measurement and benchmarking. Hospital Clinic de Barcelona is a 700-bed teaching hospital accredited by Joint Commission International (JCI) that follows an integrated care delivery model with the integrated activity of clinical teams and social resources.

The selection of the European hospitals was based on having demonstrated a previous history of successful TQM implementation, diversity in health care systems contexts, comparative performance data, and capacity to participate in the research. Each is a systematic role model for quality management, which can be valuable to lessons learned on how to develop such systems in developing healthcare system, as Libya. A summary comparison of these agencies is summarized in Table 3.

Table 3.Comparative Summary of Study Sites

Characteristic	Gharyan Hospital	European Hospitals (Average)

Bed capacity	320	917
Annual patient encounters	~95,000	~350,000
Physician-to-patient ratio	1:27	1:12
Nurse-to-patient ratio	1:8	1:5
Quality certification	None	Multiple international certifications
TQM experience	3 years	>10 years
Average annual quality budget (% of total)	1.2%	3.8%
Electronic health record implementation	Partial	Comprehensive

3.4 Data Analysis Techniques

3.4.1 Qualitative Data Analysis

Interviews, focus groups, and document analysis yielded qualitative data, which were analyzed thematically in the six stages of the process set out by Braun and Clarke (2006) [46]. The analytical process started by familiarizing with the data in several readings of transcripts, and then a systematic coding was carried out in NVivo 13. 2.4 Thematic analysis The codes were then grouped into possible themes, which were checked, modified, and clearly delineated in relation to the research questions. The presentation of findings was completed with the integration and synthesis of stories with selected, representative quotations.

The analysis was conducted both inductively as well deductively. The codes in the initial coding scheme were based on theoretical concepts identified from TQM literature, such as leadership commitment, process management, employee involvement, and patient focus. At the same time, some flexibility was sustained to incorporate novel insights through an inductive process, and which were context specific. A detailed codebook was iteratively developed to achieve consistency and transparent analysis.

Multiple validation techniques were used to improve credibility. The transcripts were double coded by two investigators and differences resolved through discussion to establish inter-coder reliability. To ensure credibility of interpretations, member checking was performed with some participants and external validation via peer debriefing with content experts. Negative case analysis was employed to contest initial interpretations and develop emergent themes. Together, these measures enhanced the reliability and confirmability of the qualitative results.

3.4.2 Quantitative Data Analysis

Quantitative data were analyzed by IBM SPSS Statistics (version 28). The analysis was conducted according to a pre-defined process aiming at statistical validity and the Libyan-European hospital comparability. Descriptive statistics were utilized to describe demographic and institutional characteristics, with calculation of range or means and standard deviation as necessary, as well as visually exploring distributions. The internal consistency of survey instruments was checked in the reliability analysis with Cronbach's alpha, while factor analysis was used to validate construct validity.

Comparisons were made to investigate variations between sites. Independent-sample t-tests and one-way ANOVA with Tukey's post-hoc tests were utilized to analyze the

differences of TQM-related constructs. In case of non-normally distributed data, the non-parametric counterparts to these tests (Mann–Whitney U, Kruskal–Wallis) were performed. The relationships among leadership commitment, job satisfaction of the workforce, and TQM were examined through correlation analysis and multiple regression analysis, while path analysis was used to test the hypothesized cause-and-effect models for TQM effectiveness.

Lastly, a time-lagged analysis was conducted on the KPIs accumulated over 24 months. This involved trend analysis and interrupted time-series modeling to measure the longitudinal effects of a particular TQM intervention in operational indicators, such as infection cross-rates, waiting times, and patient re-attendance. This composite approach created a statistically determinate basis on which to evaluate the relative effectiveness of TQM implementation in the sites investigated.

3.4.3 Integration of Qualitative and Quantitative Findings

Data were meshed using a triangulated mixed-methods approach consistent with the CSD methodology of explanation sequential. Following independent qualitative and quantitative analyses, findings were then systematically compared for convergent, divergent, or complementary information. Qualitative descriptions were employed to situate and explain the quantitative findings, supporting interpretive depth and increasing internal validity.

Composite tables and analysis matrices were created to visually meld numbers with insights in order to interpret discrepancies in performance with respect to organizational and cultural explanations. Synthesis at the case level. Cases were, according to these notes, synthesized into a profile description of each hospital based on statistical results and qualitative information. This was backed by a cross-case synthesis, which identified commonalities and recurrences but also took into account contextual variation. This integrated approach has generated a comprehensive insight into TQM practices in developed and developing healthcare systems. Figure 5,Schematic workflow for the data analysis is shown in.
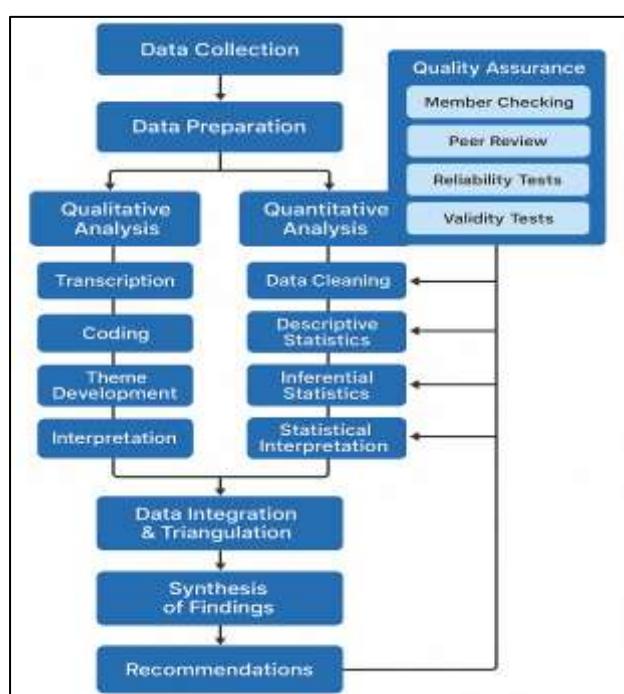
Figure 5.Illustration of the data analysis process.

3.5 Ethical Considerations

This research was performed in compliance with [47] ,and followed the most ethical code from its design to data collection and dissemination. Research Ethics Committee of the researcher institution (ethics approval number: ETH-2023-0452), hereinafter referred to as REC, Institutional Review Board of Gharyan Hospital, REC reference No: GH-IRB-2023-018, and from the ethics committees of European participating hospitals.

The purpose, procedures, and voluntary nature of the study were fully explained to all participants. Written consent for interviews and focus groups was obtained, with survey completion considered equivalent to consent. Information sheets were transcribed in Arabic as well as relevant European languages for interpretation and access.

Security measures to ensure privacy included anonymization of data, use of pseudonyms and secure computerized password-protected storage. Only the research team had access to raw data; all other assistants signed a confidentiality agreement.

In light of the cross-national and post-conflict setting, particular focus was placed on cultural respectfulness, power differentials and potential institutional reputation costs. Conducting qualitative research with an emphasis on respect and neutrality and the issue of voluntariness. The results were presented in an unbiased manner and provided directly to the participating hospitals to facilitate experience-based quality improvement, which highlights the focus of this trial on both ethical conduct and real-world relevance as explained at table 4.

Table 4.Ethical Challenges and Mitigation Strategies

ETHICAL CHALLENGE	MITIGATION STRATEGY
POWER DIFFERENTIALS BE-TWEEN MANAGEMENT AND STAFF PARTICIPANTS	Separate focus groups for different organizational levels; anonymous reporting of findings
PATIENT VULNERABILITY	Interviews conducted after discharge; clear non-consequence statement for care
CROSS-CULTURAL RESEARCH ISSUES	Local collaborators involved in all research phases; culturally sensitive interview protocols
ORGANIZATIONAL REPUTA-TION CONCERNS	Balanced reporting approach; opportunity for organizational review before publication
DATA SECURITY IN UNSTABLE SETTINGS	Enhanced security protocols for Gharyan site; redundant data backup systems
RESEARCHER SAFETY IN POST-CONFLICT ZONE	Partnership with local security advisors; flexible data collection schedule

4. RESULTS AND COMPARATIVE ANALYSIS

The assessment of TQM practices at Gharyan Hospital identified that a nascent and disjointed system existed with low organizational commitment, varying leadership involvement in quality management, and inadequate incorporation of quality principles into the daily work routine. Triangulating evidence from interviews, surveys, and documents show

that, even if TQM principles are officially approved, their implementation in practice is severely limited due to structural and cultural barriers.

Leadership: the Leadership at Gharyan Hospital is found to be intermittently involved in the TQM concepts. While the fact that a QM Department has existed since 2018 marked strategic intent, senior leader involvement is variable. Only 42% of the staff members surveyed were able to describe the quality objectives in place at their hospital, which suggest poor communication and a lack of knowledge about policy. One quality manager explained: "We have a quality committee that meets on a monthly basis, though the attendance varies, and we do not implement decisions consistently".

Process Standardization: an estimated 65% of core clinical processes are standard operating procedure (SOP) driven-primarily within emergency, laboratory, and medication spheres. But compliance is hugely mixed across departments, and administrative procedures are largely non-standardised. Lack of systematic reviewing processes and paper-based documentation are other factors limiting process efficiency and quality assurance.

Staff Training: the training data (Table 5) suggest moderate exposure to basic quality and patient safety programs but minimal exposure to more advanced process improvement or auditing courses. Whilst the majority of staff receive yearly awareness training, no structured or systematic follow-up is provided to assess understanding and application into practice.

Table 5.Staff Training Levels at Gharyan Hospital (2022-2024)

Training Type	Percentage of Staff Trained	Frequency
Basic Quality Awareness	58%	Annual
Quality Tools & Techniques	24%	Biennial
Process Improvement	17%	Ad hoc
Patient Safety	73%	Annual
Quality Auditing	12%	Ad hoc

Resource limitations and organizational culture: quality activities account for only 1.8% of the hospital's annual budget, well below international benchmarks. A staff ratio of one quality professional per 75 employees constrains monitoring capacity. Additionally, a hierarchical organizational culture limits empowerment—only 26% of non-managerial staff reported feeling comfortable suggesting process improvements. This climate of centralized decision-making and risk aversion hampers collaborative problem-solving.

Technological Constraints: the hospital lacks integrated digital systems, relying almost entirely on manual data entry and paper-based reporting. The absence of electronic health records (EHR) or automated dashboards delays data-driven interventions, with one coordinator remarking, "By the time we analyze one quarter's data, it's often too late for meaningful action." Collectively, these findings portray an organization in the early stages of TQM adoption, where awareness exists but implementation remains fragmented and under-resourced.

4.2 TQM Implementation at European Hospitals

Comparative analysis of the three European hospitals—Charité–Universitätsmedizin Berlin , Karolinska University Hospital and Hospital Clínic de Barcelona demonstrates

advanced, institution-wide TQM integration supported by strong leadership, digital infrastructure, and continuous staff development.

Digital Quality Systems.

All hospitals employ comprehensive EHRs linked with automated data analytics, real-time dashboards, and AI-supported decision tools (Figure 6; Table 6). These technologies enable proactive quality control, predictive error prevention, and transparent performance monitoring. For instance, the Swedish site reported a 37% reduction in medication errors following integration of digital quality alerts (2022–2024).

Figure 6.Digital Quality Management Integration in European Hospitals

Table 6.Digital Quality Management Systems Comparison between European Hospitals and Gharyan Hospital

Aspect	Gharyan Hospital	European Hospitals
Health Records	Paper-based with limited electronic components	Fully integrated electronic health record systems
Quality Data Collection	Manual collection with basic spreadsheets	Automated data extraction and analysis
Communication Systems	Traditional channels (meetings, memos)	Digital platforms with real-time information sharing
Decision Support	Limited reference materials	AI-enhanced clinical and operational decision support
Analytics Capability	Basic descriptive statistics	Advanced statistical analysis and predictive modeling

Comprehensive Training and Workforce Engagement.

European hospitals formalize lifelong education, making 5% of total staff hours available, on average, for quality-related training (Table 7). The training is both fatiguing and competency-based, with courses held in classrooms that are mixed with online modules and simulation exercises. Staff views reinforced the nexus between training, confidence and operational performance.

Table 7.Comprehensive Training Programs in European Hospitals

Training Character-istic	Implementation Approach
Audience	All staff levels from executives to support personnel
Format	Blended learning combining classroom, online, and simulation
Frequency	Continuous with scheduled refreshers and progressive advancement
Content	Theory combined with practical application to real workplace scenarios
Assessment	Competency-based evaluation with practical demonstrations
Follow-up	Mentoring, coaching, and performance monitoring

Performance Outcomes.

All dimensions of quality of services for European hospitals are higher than those at Gharyan Hospital (Table 8; Figure 7). The average satisfaction score is positive in all overall experience, communication, and staff responsiveness ($p < 0.001$). Operational standing also reflects this advantage: mean length of stay (4.2 vs 7.3 d), bed utilization (82·4% vs 67·8%) and infection rate (2·1% vs 8·2%) (Table 9). These figures highlight how digitalization, standardized procedures and empowered employees are combined to deliver high efficiency and patient satisfaction.
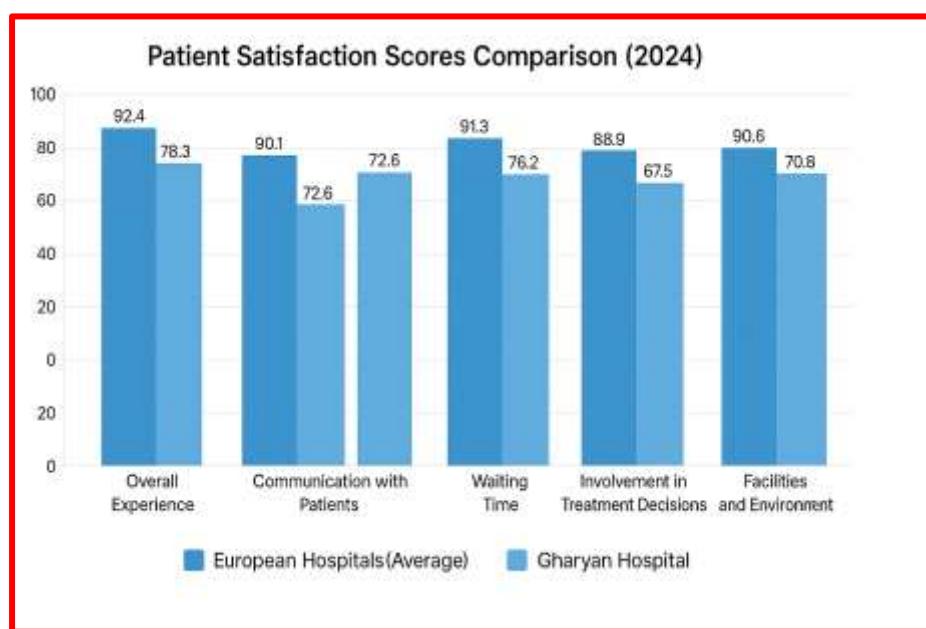

Figure 7.Patient Satisfaction Scores Comparison (2024)

Table 8.Patient Satisfaction Scores Comparison (2024)

SATISFACTION DOMAIN	GHARYAN HOSPITAL MEAN (SD)	EUROPEAN HOSPITALS MEAN (SD)	P-VALUE
OVERALL EXPERIENCE	78.3 (5.2)	92.4 (3.1)	<0.001
COMMUNICATION	72.6 (6.7)	90.1 (4.5)	<0.001
WAITING TIMES	64.9 (8.3)	85.7 (5.2)	<0.001

STAFF RESPONSIVE-NESS	76.2 (5.9)	91.3 (3.8)	<0.001
INVOLVEMENT IN DE-CISIONS	67.5 (7.1)	88.9 (4.0)	<0.001
FACILITIES & ENVI-RONMENT	70.8 (6.3)	90.6 (3.5)	<0.001

Table 9.Operational Efficiency Metrics Comparison

PERFORMANCE INDICATOR	EUROPEAN HOS-PITALS (AVERAGE)	GHAR-YAN HOSPI-TAL
AVERAGE LENGTH OF STAY (DAYS)	4.2	7.3
BED OCCUPANCY RATE (%)	82.4	67.8
OPERATING ROOM UTILIZATION (%)	89.7	62.3
MEDICATION ERROR RATE (PER 1000 PATIENT DAYS)	1.8	6.4
HEALTHCARE-ASSOCIATED INFEC-TION RATE (%)	2.1	8.2
EMERGENCY DEPARTMENT WAIT TIME (MINUTES)	37	112
READMISSION RATE WITHIN 30 DAYS (%)	6.5	15.3

4.3 Comparative Insights
Shared Principles.

There are alike hospital-based examples of Gharyan and European hospitals in commitment to patient orientation and quality improvement. All use SEP patient feedback systems, complaint tracking, and informed consent processes showing congruence with international quality philosophies. But European institutions implement these principles with data protection tools and structured governance, while the application of Gharyan remains more aspirational.

Key Divergences.

Three structural contradictions characterize the gap in delivery. First, technology infrastructure is heterogeneous; paper-based systems in Gharyan still limit the possibility for real-time monitoring, while European hospitals are equipped with fully automated, interoperable platforms (Table 10; Figure 8). Second, organizational culture diverges sharply. Cultural survey data reveal Gharyan's high power distance (score and low empowerment (score), compared with European means of 41 and 82, respectively— unfavorable sites for participatory change.
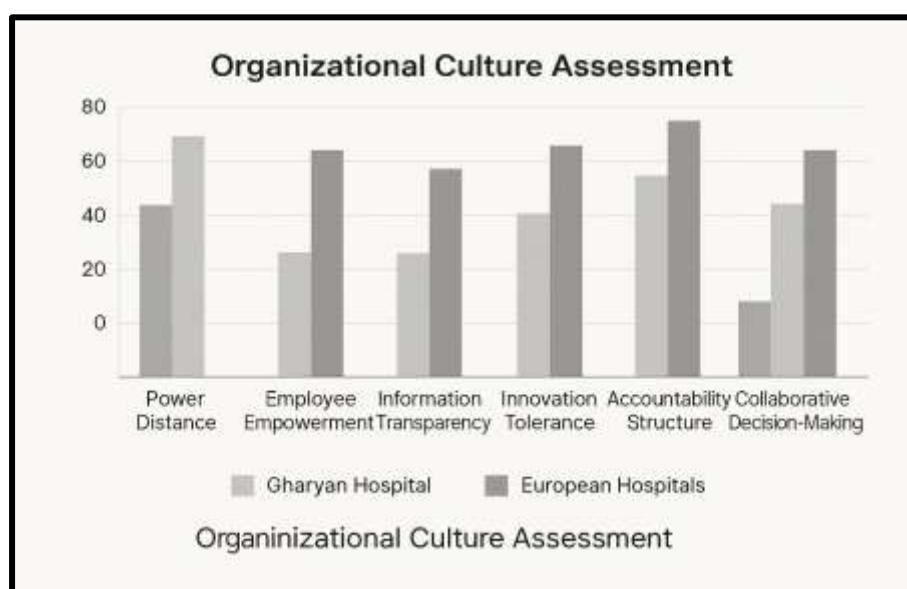
Figure 8. Organizational Culture Comparison

Table 10.Organizational Culture Assessment

Cultural Dimension	Gharyan Hospital Score	European Hospitals Average Score
Power Distance	78	41
Employee Empowerment	34	82
Information Transparency	42	88
Innovation Tolerance	37	79
Accountability Structure	65	75
Collaborative Decision-Making	31	86

Third, the resource allocation gaps are marked. European hospitals spend at least 5% of their budgets on quality improvement, compared with less than 2% in Gharyan, which can afford ongoing training, accreditation and investment in technology. Although there is a contextual difference between these two environments, the findings of both cases reflect that leadership involvement and worker enrichment continue to be vital factors for sustainable TQM results.

4.4 Statistical Analysis and TQM Level

A more systematic measurement of the KPIs supports these qualitative findings. Independent t-tests showed that there were significant differences ($p < 0.001$) between the two data sets for all domains in patient satisfaction, safety, and efficiency measures. Predictors of operational efficiency obtained from regression models were further process, standardized, technology-integrated integrated and staff trained ($R^2 = 0.72–0.81$) (Table 11).

Table 11.Multiple Regression Analysis of TQM Implementation Factors and Operational Efficiency

Dependent Variable	R^2	Significant Predictors ($p<0.05$)
Length of Stay	0.72	Process standardization, Technology integration, Staff training

Bed Turnover Rate	0.67	Process standardization, Leadership commitment
Emergency Wait Time	0.81	Process standardization, Technology integration, Staff empowerment
Operating Room Utilization	0.64	Technology integration, Training, Process standardization

Comparative level of maturity based on the healthcare TQM model indicated a sharp contrast as represent in table 12; Gharyan Hospital scored about 2.0 with an average level, at a five-point scale (Developing Level), and European hospitals scored above 4.5(Optimizing Level). The greatest weaknesses are in measurement, analysis, and process management, which are the most technology-dependent and for which feedback loops tend to be more formalized.

Collectively, statistical evidence supports that full-scale TQM replete with interlocked information systems, committed employees, and repeated top-management support—strongly associates with superior clinical, performance , and service results. On the other hand, partial or mimicking implementation, represented in our case Gharyan Hospital, leads to minimal and unsustainable performance improvement.

Table 12.TQM Implementation Maturity Assessment Scores

TQM DIMENSION	GHARYAN HOSPITAL (SCALE 1-5)	EUROPEAN HOSPITALS AVERAGE (SCALE 1-5)
LEADERSHIP	2.3	4.6
STRATEGIC PLANNING	1.8	4.2
PATIENT FOCUS	2.7	4.7
MEASUREMENT & ANALYSIS	1.6	4.5
WORKFORCE FOCUS	2.0	4.3
PROCESS MANAGEMENT	2.2	4.8
RESULTS	1.9	4.4

To summarize up, the findings provide strong evidence of a relationship between TQM maturity and institutional performance. Notwithstanding the progress of Gharyan hospital in forming policies and understanding patients' safety, there is a need for technology integration, an empowerment culture , and investment for continued efforts to excel. In contrast, European hospitals demonstrate how alignment and a data-driven strategy supported by continuous learning efforts are the engines of marked improvements in quality and efficiency.

5. DISCUSSION

The aim of the study is to assess how the TQM system is applied in Gharyan Hospital (Libya), thereby representing the healthcare system, and to demonstrate how structural factors, culture, and management influence the success or failure of adopting a TQM system. Based on the performance outcomes, leadership behavior, and institutional readiness analysis, significant differences in the degree of TQM practices effectiveness between

Gharyan Hospital and established European healthcare organizations are observed. These results highlight the importance of context specific quality improvement approaches within low- and middle-income health systems. A European hospital substantially improved on all monitored dimensions; however, Gharyan Hospital showed improvement for a meager −7% for nosocomial infections, and only +12% increased satisfaction. Such modest gains illuminate a number of systemic obstacles such as declining resources, lack of consistent quality standards enforcement, and inadequate technological infrastructure – impediments which together pose significant challenges to the perseverance of TQM. These limitations pinpoint the weak organizational performance of Libyan health facilities, underscoring the necessity of focusing interventions to tackle underlying system deficiencies before advanced quality paradigms can be completely operational.

Leadership was found to be a key factor influencing TQM implementation success. European hospitals were also found to be significantly more likely to improve their TQM performance (by 37%) if senior management demonstrated transformational leadership behaviors, including clearly articulating the vision for quality in the form of a strategic direction and direct involvement with quality initiatives. These participants took an active role in fostering a culture of teamwork, responsibility, and joint making, which is closely related to empirical evidence that indicated participative leadership styles are positively associated with TQM adoption and sustainability (Anderson et al. Conversely, Gharyan Hospital's top-down hierarchical management has led to low levels of staff engagement and resistance to change, along with a lack of ownership for the quality processes, which in turn limited TQM implementations.

The results from this study corroborate larger theoretical contexts such as the Cultural Congruence Model which suggests alignment of leadership style and organizational culture is critical to TQM effectiveness. Furthermore, findings will lend support to the Dual Pathway theory -that is, not only must the 'hard' aspects of TQM (standards, measures, and process engineering) be developed alongside the 'soft' dimensions (culture, communication, and employee empowerment) in order that sustained performance improvement may occur. At Gharyan Hospital, these pathways were still disjointed with a heavy focus on compliance rather than staff motivation, training, and learning.

The alignment of efficient digital health solutions, such as cloud-based electronic medical records and laboratory information (EMR-LIS), real-time reporting dashboards, professional networks, and shared resources could also serve to empower the Libyan healthcare system in better TQM implementation. The creation of a specific quality management team is also needed to organize improvement initiatives, monitor compliance with standards, help professionals in their professional growth, and support institutional learning. Such interventions might narrow the performance gaps that currently hinder QI at Gharyan Hospital.

Challenges in Implementation

A principal challenge that emerged in this work is the underfunding of quality activities. Gharyan Hospital was spending only 2.3% of yearly expenditures for quality activities, while the European hospitals were spending 6.8%. This wide disparity in funding limits the ability of potential users to access training, technology, and process improvement tools that are fundamental to achieving success with TQM. In addition, rigid bureaucratic authorities and a tradition of resistance to innovation added difficulties to TQM's introduction. Unlike the European organizations, which promote staff involvement and cross-organizational communication, Gharyan Hospital's centralized control limits participation and negatively impacts organizational transformation; unlike other hospitals in Libya, Gharyan Hospital's decision-making is not decentralized through all-level staff empowerment concepts of total quality management.

In edifice, the results underscore that TQM issues in Libya will continue to have limited effect if not accompanied by structural change, leadership renewal and long-term investment in quality infrastructure. Creating a national quality framework, publicly funding healthcare, and enabling an environment that supports workforce empowerment, innovation, and continuous improvement should be among the prime concerns of policy-makers. Without these systemic reforms, TQM will not act as a catalyst for enhancing hospital performance in Libya.

6. CONCLUSION

The represented study has offered a full comparative analysis on TQM implementation in Gharyan Hospital, Libya, and chosen European hospitals. The results indicate that there are substantial gaps in technological infrastructure, leadership styles, and systems for measuring quality of care, although there are opportunities to learn from the constraints faced by Libya, recognizing its special circumstances. Implementation of TQM in Gharyan Hospital. To successfully implement TQM at Gharyan hospital, a multi-pronged approach is required, which deals with the need for continued day-to-day running of the system and also to develop sustainable capacity for quality improvement. The advice on which this chapter is based also provides an organized approach for advancement that takes into consideration both aspiration and the reality of the situation.

In addition, the recommendations at system level recognize that performance within individual hospitals sits within a wider healthcare environment and needs to be supported by aligned policy, funding and cultural shifts. By implementing the above recommendations and recommendations of the research agenda, Libya's healthcare system could start a project that would truly take healthcare service delivery toward patient-centered, evidence-based practice. The path to health care excellence is incrementally long, but with dedicated leadership, proper investment, and constant benchmarking with best practices of international quality healthcare, great improvements in the quality of health care can be attained both at Gharyan Hospital as well throughout Libya's healthcare delivery system.

Funding
No funding was received to assist with the preparation of this manuscript.

Availability of data and materials
Not applicable.

Competing interests
The authors declare that they have no competing interests.

A Clinical Trial Number in the manuscript.
Not applicable

Ethics, Consent to Participate, and Consent to Publish declarations:
This study involved an anonymous survey assessing healthcare quality in a hospital setting. No identifiable personal data were collected. According to institutional and international ethical guidelines, the study was exempt from full ethical review. Participation was

voluntary, and informed consent was obtained electronically from all participants. Formal administrative approval was obtained from the hospital management to conduct this study.

References

[1]   E. A. Al-Shdaifat, "Implementation of total quality management in hospitals," *J Taibah Univ Med Sci*, vol. 10, no. 4, pp. 461–466, 2015, doi: 10.1016/J.JTUMED.2015.05.004.

[2]   A. Eissa *et al.*, "A comparative study of total quality management in healthcare from provider and patient perspectives at Al-Mouwasat University Hospital", doi: 10.1038/s41598-025-08512-2.

[3]   A. Alkhenizan and C. Shaw, "Impact of accreditation on the quality of healthcare services: a systematic review of the literature," *Ann Saudi Med*, vol. 31, no. 4, pp. 407–416, Jul. 2011, doi: 10.4103/0256-4947.83204.

[4]   R. M. El Oakley *et al.*, "Consultation on the Libyan health systems: towards patient-centred services," *Libyan J Med*, vol. 8, no. 1, Jan. 2013, doi: 10.3402/LJM.V8I0.20233.

[5]   A. A. Salam, A. A. Alshekteria, H. A. Alhadi, M. Ahmed, and A. Mohammed, "Patient satisfaction with quality of primary health care in Benghazi, Libya," *Libyan J Med*, vol. 5, no. 1, 2010, doi: 10.3402/LJM.V5I0.4873.

[6]   M. R. Chassin and J. M. Loeb, "The ongoing quality improvement journey: next stop, high reliability," *Health Aff (Millwood)*, vol. 30, no. 4, pp. 559–568, Apr. 2011, doi: 10.1377/HLTHAFF.2011.0076.

[7]   C. Haraden and J. Leitch, "Scotland's successful national approach to improving patient safety in acute care," *Health Aff (Millwood)*, vol. 30, no. 4, pp. 755–763, Apr. 2011, doi: 10.1377/HLTHAFF.2011.0144.

[8]   J. Voyce, M. J. B. Gouveia, M. A. Medinas, A. S. Santos, and R. F. Ferreira, "A Donabedian model of the quality of nursing care from nurses' perspectives in a Portuguese hospital: A pilot study," *J Nurs Meas*, vol. 23, no. 3, pp. 474–484, 2015, doi: 10.1891/1061-3749.23.3.474.

[9]   I. O. Medicine, "Errors in Health Care: A leading Cause of death and Injury," *To Err Is Human: Building a Safer Health System*, pp. 26–48, 2000.

[10] Y. Akachi and M. E. Kruk, "Quality of care: measuring a neglected driver of improved health," *Bull World Health Organ*, vol. 95, no. 6, p. 465, 2016, doi: 10.2471/BLT.16.180190.

[11] A. Latif, C. G. Holzmueller, and P. J. Pronovost, "Evaluating Safety Initiatives in Healthcare," *Curr Anesthesiol Rep*, vol. 4, no. 2, p. 100, Jun. 2014, doi: 10.1007/S40140-014-0059-4.

[12] A. Abdallah, "Implementing quality initiatives in healthcare organizations: drivers and challenges," *Int J Health Care Qual Assur*, vol. 27, no. 3, pp. 166–181, 2014, doi: 10.1108/IJHCQA-05-2012-0047.

[13] A. Hajek, B. Kretzler, and H. H. König, "Determinants of healthcare use based on the Andersen model: A study protocol for a systematic review of longitudinal studies," *BMJ Open*, vol. 11, no. 5, May 2021, doi: 10.1136/BMJOPEN-2020-044435.

[14] L. N. Allen, A. Hatefi, M. Kak, C. H. Herbst, J. Mallender, and G. Karem, "A rapid mixed-methods assessment of Libya's primary care system," *BMC Health Serv Res*, vol. 24, no. 1, Dec. 2024, doi: 10.1186/S12913-024-11121-W.

[15] F. El-Jardali *et al.*, "The impact of accreditation of primary healthcare centers: successes, challenges and policy implications as perceived by healthcare providers and directors in Lebanon," *BMC Health Services Research 2014 14:1*, vol. 14, no. 1, pp. 86-, Feb. 2014, doi: 10.1186/1472-6963-14-86.

[16] F. El-Jardali and R. Fadlallah, "A review of national policies and strategies to improve quality of health care and patient safety: A case study from Lebanon and Jordan," *BMC Health Serv Res*, vol. 17, no. 1, Aug. 2017, doi: 10.1186/S12913-017-2528-1.

[17] A. Mkhize, K. D. Mokhothu, M. Tshikhotho, and B. A. Thango, "Evaluating the Impact of Cloud Computing on SME Performance: A Systematic Review," *Businesses 2025, Vol. 5, Page 23*, vol. 5, no. 2, p. 23, May 2025, doi: 10.3390/BUSINESSES5020023.

[18] "The World Health Report 2010." Accessed: Nov. 19, 2025. [Online]. Available: https://www.who.int/publications/i/item/9789241564021

[19] N. Armstrong, G. Herbert, E. L. Aveling, M. Dixon-Woods, and G. Martin, "Optimizing patient involvement in quality improvement," *Health Expect*, vol. 16, no. 3, Sep. 2013, doi: 10.1111/HEX.12039.

[20] C. B. Iroz, R. Ramaswamy, Z. A. Bhutta, and P. Barach, "Quality improvement in public–private partnerships in low- and middle-income countries: a systematic review," *BMC Health Services Research 2024 24:1*, vol. 24, no. 1, pp. 332-, Mar. 2024, doi: 10.1186/S12913-024-10802-W.

[21] E. Ammenwerth, S. Gräber, G. Herrmann, T. Bürkle, and J. König, "Evaluation of health information systems - Problems and challenges," *Int J Med Inform*, vol. 71, no. 2–3, pp. 125–135, Sep. 2003, doi: 10.1016/S1386-5056(03)00131-X.

[22] D. F. Sfantou, A. Laliotis, A. E. Patelarou, D. Sifaki-Pistolla, M. Matalliotakis, and E. Patelarou, "Importance of Leadership Style towards Quality of Care Measures in Healthcare Settings: A Systematic Review," *Healthcare (Basel)*, vol. 5, no. 4, Dec. 2017, doi: 10.3390/HEALTHCARE5040073.

[23] J. Øvretveit and D. Gustafson, "Improving the quality of health care: Using research to inform quality programmes," *Br Med J*, vol. 326, no. 7392, pp. 759–761, Apr. 2003, doi: 10.1136/BMJ.326.7392.759.

[24] T. Rotter, R. B. de Jong, S. E. Lacko, U. Ronellenfitsch, and L. Kinsman, "Clinical pathways as a quality strategy," 2019, Accessed: Nov. 19, 2025. [Online]. Available: https://www.ncbi.nlm.nih.gov/books/NBK549262/

[25] L. C. Kleinman and D. Dougherty, "Assessing quality improvement in health care: theory for practice," *Pediatrics*, vol. 131 Suppl 1, no. SUPPL.1, Mar. 2013, doi: 10.1542/PEDS.2012-1427N.

[26] K. Malm, S. Bergman, M. L. E. Andersson, A. Bremander, and I. Larsson, "Quality of life in patients with established rheumatoid arthritis: A phenomenographic study," *SAGE Open Med*, vol. 5, Jun. 2017, doi: 10.1177/2050312117713647.

[27] T. K. Fund, M. A. West, and J. F. Dawson, "Employee engagement and NHS performance.," 2012, *The King's Fund*. Accessed: Nov. 19, 2025. [Online]. Available: https://archive.kingsfund.org.uk/concern/published_works/000104276?locale=en

[28] G. Elwyn, D. L. Frosch, and S. Kobrin, "Implementing shared decision-making: consider all the consequences," *Implement Sci*, vol. 11, no. 1, Aug. 2016, doi: 10.1186/S13012-016-0480-9.

[29] E. M. Hashem, M. F. Y. Shalaby, M. S. Mabrouk, S. Y. Marzouk, and Y. Marzouk, "Integrative software design for Hospital Information Systems," *Mansoura Engineering Journal*, vol. 48, no. 4, p. 7, Jul. 2023, doi: 10.58491/2735-4202.3057.

[30] A. Coulter *et al.*, "Implementing shared decision-making in UK: Progress 2017-2022," *Z Evid Fortbild Qual Gesundhwes*, vol. 171, pp. 139–143, Jun. 2022, doi: 10.1016/J.ZEFQ.2022.04.024.

[31] M. Farzam, "The Effect of Cognitive and Metacognitive Strategy Training on Intermediate Iranian EFL learners' Willingness to Communicate," *International Journal of Applied Linguistics and English Literature*, vol. 7, no. 1, pp. 193–202, Dec. 2018, doi: 10.7575/AIAC.IJALEL.V.7N.1P.193.

[32] A. D'Andreamatteo, L. Ianni, F. Lega, and M. Sargiacomo, "Lean in healthcare: A comprehensive review," *Health Policy (New York)*, vol. 119, no. 9, pp. 1197–1209, Sep. 2015, doi: 10.1016/J.HEALTHPOL.2015.02.002.

[33] M. Dixon-Woods, "How to improve healthcare improvement-an essay by Mary Dixon-Woods," *BMJ*, vol. 367, 2019, doi: 10.1136/BMJ.L5514.

[34] N. Ivers *et al.*, "Audit and feedback: effects on professional practice and healthcare outcomes," *Cochrane Database Syst Rev*, vol. 2012, no. 6, 2012, doi: 10.1002/14651858.CD000259.PUB3.

[35] D. Salcedo *et al.*, "Machine Learning Algorithms Application in COVID-19 Disease: A Systematic Literature Review and Future Directions," *Electronics 2022, Vol. 11, Page 4015*, vol. 11, no. 23, p. 4015, Dec. 2022, doi: 10.3390/ELECTRONICS11234015.

[36] I. R. Bardhan and M. F. Thouin, "Health information technology and its impact on the quality and cost of healthcare delivery," *Decis Support Syst*, vol. 55, no. 2, pp. 438–449, May 2013, doi: 10.1016/J.DSS.2012.10.003.

[37] "(PDF) Davis et al 2007 benefit of early screening report." Accessed: Nov. 19, 2025. [Online]. Available: https://www.researchgate.net/publication/258242149_Davis_et_al_2007_benefit_of_early_screening_report

[38] N. F. M. Shukri and A. Ramli, "Organizational Structure and Performances of Responsible Malaysian Healthcare Providers: A Balanced Scorecard Perspective," *Procedia Economics and Finance*, vol. 28, pp. 202–212, 2015, doi: 10.1016/S2212-5671(15)01101-6.

[39] N. V. Ivankova, J. W. Creswell, and S. L. Stick, "Using Mixed-Methods Sequential Explanatory Design: From Theory to Practice," *Field methods*, vol. 18, no. 1, pp. 3–20, 2006, doi: 10.1177/1525822X05282260;WEBSITE:WEBSITE:SAGE;ISSUE:ISSUE:DOI.

[40] "Creswell, J. W., & Plano Clark, V. L. (2018). Designing and Conducting Mixed Methods Research (3rd ed.). Thousand Oaks, CA SAGE. - References - Scientific Research Publishing." Accessed: Nov. 19, 2025. [Online]. Available: https://www.scirp.org/reference/referencespapers?referenceid=2697821

[41] "Yin, R. K. (2018). Case Study Research and Applications Design and Methods (6th ed.). Thousand Oaks, CA Sage. - References - Scientific Research Publishing." Accessed: Nov. 19, 2025. [Online]. Available: https://www.scirp.org/reference/referencespapers?referenceid=2914980

[42] J. Fereday and E. Muir-Cochrane, "Demonstrating Rigor Using Thematic Analysis: A Hybrid Approach of Inductive and Deductive Coding and Theme Development," *International Journal of Qualitative Methods* , vol. 5, no. 1, pp. 80–92, Mar. 2006, doi:

10.1177/160940690600500107;REQUESTEDJOURNAL:JOURNAL:IJQA;WEB-SITE:WEBSITE:SAGE;ISSUE:ISSUE:DOI.

[43] G. A. Bowen, "Document Analysis as a Qualitative Research Method," *Qualitative Research Journal*, vol. 9, no. 2, pp. 27–40, Aug. 2009, doi: 10.3316/QRJ0902027.

[44] "(PDF) SERVQUAL A Multiple-item Scale for Measuring Consumer Perceptions of Service Quality." Accessed: Nov. 19, 2025. [Online]. Available: https://www.researchgate.net/publication/200827786_SERVQUAL_A_Multiple-item_Scale_for_Measuring_Consumer_Perceptions_of_Service_Quality

[45] H. Martins and M. T. Proença, "Minnesota satisfaction questionnaire: psychometric properties and validation in a population of portuguese hospital workers," *Investigação e Intervenção em Recursos Humanos*, no. 3, Apr. 2014, doi: 10.26537/IIRH.V0I3.1825.

[46] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qual Res Psychol*, vol. 3, no. 2, pp. 77–101, 2006, doi: 10.1191/1478088706QP063OA;REQUESTEDJOURNAL:JOURNAL:UQRP20;ISSUE:ISSUE:DOI.

[47] "World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects," *JAMA*, vol. 310, no. 20, pp. 2191–2194, Nov. 2013, doi: 10.1001/JAMA.2013.281053.