

Exploring Pharmacy Service Factors Shaping Tertiary Care Hospital Service Quality in Karachi: A Qualitative Study

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Abstract

Pharmacy services play a significant role in patient safety, cost management and operational efficiency in tertiary care hospitals. In low- and middle-income countries (LMICs), however, e.g. in Pakistan, pharmacists are frequently restricted to dispensing and procurement tasks. This underuse results in the lack of efficient use of resources, increased healthcare expenses, and the unattended chance to improve patient care. There is further complication due to the absence of qualitative studies that would entrap the understanding and experience of pharmacy-led practice by the key stakeholders in LMIC hospital environments. In the attempt to address this gap, the present research investigated the perception of pharmacists, administrators, and clinicians in tertiary care hospitals in Karachi. Guided by the Resource-Based View (RBV) and Scientific Management Theory (SMT), semi-structured interviews were conducted with 10 participants, and data were analyzed using a hybrid thematic analysis approach. Six major themes emerged: patient-centered care, operational efficiency, cost-effectiveness, clinical integration, communication and collaboration, and Intravenous-to-oral (IV to PO) therapy conversion. Stakeholders consistently described pharmacists as both strategic resources and operational enablers who improve safety, reduce wastage, and streamline workflows. The impact of this study lies in demonstrating that investing in and integrating pharmacy services can transform hospital performance in LMICs. Beyond cost savings and efficiency, pharmacists contribute to safer, more coordinated, and patient-centered care. These insights provide evidence for healthcare leaders and policymakers to strengthen institutional support, expand pharmacists' roles, and design sustainable models of hospital pharmacy practice that can improve both organizational outcomes and patient well-being in resource-limited settings.

Keywords: Pharmacy services, Tertiary care hospitals, Operational efficiency, Cost-effectiveness, Patient safety, Healthcare, Pakistan

Introduction

As demand for healthcare rises and resources remain constrained, the efficiency of tertiary care hospitals has become a critical concern. Pharmacy services represent a strategic lever for improving hospital performance through cost containment, streamlined workflows, and better clinical outcomes. While the expanded role of pharmacists has gained international recognition, there remains a gap in qualitative literature exploring how these roles are perceived and experienced by stakeholders in low-

and middle-income countries (LMICs).

Globally, pharmacy has moved beyond its traditional focus on dispensing. Pharmacists now play key roles in clinical care, cost-effectiveness, patient safety, and organizational efficiency. These functions are especially vital in tertiary care hospitals, which manage high patient volumes and complex needs while serving as referral centers for primary and secondary facilities. Despite evidence that pharmacist-led interventions reduce adverse drug events, optimize therapy, and deliver significant cost savings (Dalton, 2017; CegedimRx, 2025; Elizabeth, 2021; PharmacPract, 2021), most studies emphasize quantitative outcomes and neglect qualitative insights into stakeholder perceptions. Moreover, areas such as expiry management, sterile IV admixture preparation, and IV-to-PO therapy conversion remain underexplored, despite their potential for cost reduction and improved efficiency (Ashcroft, 2024; Jankelová, 2023; Dalton, 2017).

In LMICs like Pakistan, pharmacists are often confined to procurement and dispensing, with limited institutional support or interdisciplinary integration (Murtaza et al., 2015). Yet international studies demonstrate the strategic value of pharmacists in inventory management, procurement leadership, and clinical optimization (Noble et al., 2022; Baehr, 2019; Al-Jazairi & Alnakhli, 2020; Al-Maqbali et al., 2022). Qualitative research from the Philippines highlights pharmacists' resilience and adaptability during crises (Flotildes et al., 2023), while regional studies point to systemic barriers such as understaffing and role ambiguity (Khan et al., 2014). These findings underscore the need to understand how pharmacists and administrators in LMIC tertiary hospitals experience and interpret pharmacy services.

Research Gap

Although pharmacist-led services improve outcomes and generate cost savings, their integration into operational and clinical workflows in Pakistan remains limited. Few studies have evaluated their economic impact, and qualitative perspectives on their organizational value are largely absent (Ahmed et al., 2021; Amir et al., 2024).

Problem Statement

This underutilization contributes to inefficient resource use and increased healthcare costs, leaving critical functions such as expiry management and sterile compounding insufficiently studied in the local context.

Research Objectives

- To investigate how pharmacists and healthcare administrators perceive and interpret the contribution of pharmacy services toward enhancing cost-effectiveness in tertiary care hospitals in Pakistan.
- To explore the perspectives of pharmacists and healthcare administrators on the role of pharmacy services in strengthening operational efficiency within tertiary care hospital settings in Pakistan.

Research Questions

1. How do pharmacists and healthcare administrators experience, understand, and interpret pharmacy services in relation to improving cost-effectiveness in a tertiary care hospital in Pakistan, as a representative LMIC?
2. How do pharmacists and healthcare administrators perceive the influence of pharmacy services on operational efficiency in a tertiary care hospital setting in Pakistan?

Theoretical framework

Guided by Resource-Based View (RBV) and Scientific Management Theory (SMT), this study addresses these gaps by qualitatively exploring stakeholder perspectives on four underexamined yet high-impact pharmacy practices: inventory management, expiry control, sterile IV admixture

preparation, and IV-to-PO conversion. By focusing on lived experiences and organizational realities, this research seeks to uncover how pharmacy-led interventions shape cost-effectiveness and operational efficiency in tertiary care hospitals. RBV frames pharmacists' expertise as a strategic resource that can deliver competitive advantage in cost reduction and operational efficiency (Kosiol et al., 2023; Noble et al., 2022; Baehr, 2019). SMT emphasizes efficiency, standardization, and workflow optimization, aligning closely with pharmacy operations in resource-limited hospitals (Dar, 2022; Waring, 2016; Khan et al., 2019). Together, these frameworks guide the analysis of how pharmacy services enhance hospital performance under constrained conditions.

Research Propositions

RP1: Pharmacy-led services—such as procurement, expiry management, sterile IV admixture preparation, and IV to PO switching—are perceived by stakeholders to significantly contribute to cost optimization, reduce medicinal wastage, and support more effective resource utilization in tertiary care hospitals.

RP2: Pharmacist-led interventions across key operational domains are viewed as instrumental in improving workflow efficiency, medication safety, and overall hospital performance, thereby enhancing the quality and reliability of healthcare service delivery

Significance of the study

This research provides context-sensitive insights into how pharmacy services are understood and enacted in LMIC tertiary hospitals. By documenting stakeholder perspectives on critical pharmacy-led practices, it aims to inform organizational strategies and policy frameworks that optimize pharmacist contributions to both patient care and hospital performance.

Methodology

Study Design and Paradigm

This qualitative study used Interpretative Phenomenological Analysis (IPA) to explore how healthcare professionals experience and interpret pharmacy services in tertiary care hospitals in Karachi. Phenomenology was chosen to examine lived experience and meaning-making (Jackson et al., 2018), while IPA enabled interpretation of participants' professional realities (Oxley, 2016) and an idiographic focus on individual accounts before moving to shared themes (Rajasinghe et al., 2024). The research adopted an interpretivist–constructivist paradigm, recognizing that realities are socially constructed and context dependent (Ryan, 2018).

Settings and Participants

The study was conducted in tertiary care hospitals across Karachi (LMIC context), focusing on Department of Pharmacy Services where pharmacy-led interventions are practiced. Using purposive sampling, 10 key stakeholders were recruited—pharmacy managers, pharmacy leaders, hospital administrators, physicians, and nursing staff—selected for their regular interaction with pharmacy services to provide in-depth, context-rich perspectives.

Data Collection

Data were gathered through semi-structured interviews (45–60 minutes) conducted in person or virtually. Interview topics included procurement, inventory and expiry management, sterile IV admixture preparation, and IV-to-PO conversion. All interviews were audio-recorded with participants' consent. The interview guide is provided in Annexure A.

Data Analysis

Analysis combined phenomenological orientation with reflexive thematic analysis. Guided by Moustakas's phenomenological approach, transcripts were read repeatedly to bracket assumptions and

foreground participants' voices (Moustakas, 1994). Thematic coding followed Braun and Clarke's six-phase framework (Braun & Clarke, 2006; Braun et al., 2023): familiarization, inductive and deductive coding, candidate theme development, review and refinement, and analytic narrative construction. Deductive codes were informed by the literature (e.g., cost containment, workflow efficiency; Noble et al., 2022; Baehr, 2019; Al-Jazairi & Alnakhli, 2020; Al-Maqbali et al., 2022), while inductive codes emerged from participants' accounts (e.g., expiry management, IV to PO conversion). Iterative grouping and checking against the full dataset produced six final themes: patient-centered care, operational efficiency, procedural practices, communication and collaboration, cost-effectiveness/resource management, and clinical integration.

Methodological Rigor

Rigor was addressed through credibility, dependability, confirmability, and transferability. Credibility was supported by rich, verbatim interviews and informal member validation during interviews. Dependability was enhanced by maintaining a systematic audit trail of coding and thematic decisions. Confirmability was promoted through reflective field notes to surface researcher assumptions and biases. Transferability was supported by providing thick description of the study setting and participant characteristics to enable readers to judge applicability in other LMIC contexts. The appropriateness of IPA for resource-constrained, complex healthcare settings is supported in recent qualitative work (Flotildes et al., 2023) and local studies of pharmacists' roles (Khan et al., 2014).

Results

Analysis of ten semi-structured interviews with administrators, pharmacy leaders, nurses, consultants, and registrars (7–20 years of experience, aged 32–55, 7 females and 3 males) produced six major themes:

1. Patient-centered care as a strategic resource
2. Operational efficiency through process standardization
3. Procedural practices (IV to PO conversion and sterile IV admixtures)
4. Communication and collaboration across departments
5. Cost-effectiveness and resource management
6. Clinical integration into broader care pathways

Patient-Centered Care as a Strategic Resource

Participants consistently described pharmacists as safeguarding patients from harm while minimizing unnecessary costs.

“When the pharmacist reviewed the medications before dispensing, we avoided duplication and unnecessary antibiotics. That saved the patient from both side effects and extra costs.” (Administrator, F, 37)

This positioned pharmacists as VRIN resources under RBV, with expertise that was seen as both clinically protective and financially beneficial.

Operational Efficiency through Process Standardization

Pharmacy-led tracking and expiry checks were viewed as improving timeliness and reducing stress in care delivery.

“Delays in getting medicines used to frustrate both staff and families. With pharmacy-led tracking and expiry checks, things move faster now.” (Head Nurse, F, 40)

This reflects SMT principles, showing how standardization enhances workflow efficiency.

Procedural Practices: IV to PO Conversion and Sterile IV Admixtures

Though less frequently mentioned, these interventions were highlighted for both cost-saving and improved patient transitions.

“Switching from IV to oral medication not only reduced costs but also made discharge smoother for patients who didn't need prolonged IVs.” (Consultant, F, 39)

These practices symbolized professionalism, safety culture, and efficiency.

Communication and Collaboration across Departments

Pharmacists were valued for reducing errors through improved interdepartmental communication.

“Whenever there is open communication with pharmacy, the chances of errors reduce. It makes nurses more confident during high-pressure shifts.” (Director Nursing Services, F, 55)

Trust-building and collaboration were seen as strategic resources (RBV) and structured processes (SMT).

Cost-Effectiveness and Resource Management

Participants emphasized pharmacists’ role in minimizing wastage through expiry and stock management.

“Before, we had a lot of wastage due to expired medicines. Now with pharmacist monitoring, we save resources that can be used elsewhere.” (Administrator, M, 39)

This demonstrated convergence between RBV’s focus on resource optimization and SMT’s emphasis on systematic efficiency.

Clinical Integration into Broader Care Pathways

Pharmacists’ involvement in rounds and decision-making improved accountability and prevented errors.

“When pharmacists join clinical rounds, it feels like decisions are more balanced. They often catch small things before they become big problems.” (Faculty Registrar, F, 32)

This highlighted pharmacists’ clinical expertise as a non-substitutable resource and illustrated SMT principles of coordinated roles.

Summary

Across six themes, pharmacists were perceived as critical to both patient safety and hospital efficiency. Their contributions aligned with RBV (strategic expertise) and SMT (standardization and efficiency), supporting the propositions that pharmacy-led practices enhance cost-effectiveness, operational performance, and clinical outcomes in tertiary care hospitals.

Discussion

Patient-Centered Care as a Strategic Resource

Pharmacists were consistently described as protectors of medication safety and treatment optimization, aligning with Al-Jazairi and Alnakhli (2020). Their expertise was framed as a VRIN resource under RBV (Kosiol et al., 2023), reducing duplication, avoiding unnecessary antibiotics, and minimizing adverse events. These findings support RP1 by linking patient safety to cost containment and RP2 by showing pharmacists’ clinical insights improve operational reliability.

Operational Efficiency through Process Standardization

Workflow optimization, timely dispensing, and error reduction reflected pharmacists’ role in enhancing efficiency, consistent with SMT principles (Dar, 2022; Waring, 2016). Similar to Lean interventions described by Noble et al. (2022), pharmacy-led expiry checks and monitoring systems reduced delays and improved staff confidence. These interventions embed SMT principles into practice, supporting RP1 and RP2.

Procedural Practices: IV to PO Conversion and Sterile IV Admixtures

Though less frequently noted, IV to PO conversion and sterile IV admixtures were seen as hallmarks of professional pharmacy services. They were associated with cost savings and smoother discharges, echoing Baehr (2019). These practices directly supported RP1 by optimizing costs and RP2 by

streamlining transitions.

Communication and Collaboration across Departments

Pharmacists were valued as facilitators of interdepartmental communication, reducing errors and strengthening teamwork, similar to findings by Al-Maqbali et al. (2022). The dual theoretical lens positions communication as both a strategic human resource (RBV) and a structured process (SMT). This supports RP2 by demonstrating how collaboration improves operational performance.

Cost Effectiveness and Resource Management

Pharmacist-led expiry checks and stock monitoring were viewed as essential for minimizing wastage and rationalizing resources, paralleling Noble et al. (2022) and Vlahovic-Palcevski et al. (2021). From an RBV perspective, pharmacists' ability to manage scarce resources enhanced sustainability, while SMT emphasized standardization to reduce inefficiency. These findings affirm RP1.

Clinical Integration into Broader Care Pathways

Participants emphasized the value of pharmacists during ward rounds for accountability, early error detection, and balanced decision-making. This is consistent with Al-Maqbali et al. (2022) and Al-Jazairi and Alnakhli (2020). RBV frames their expertise as a strategic asset, while SMT highlights integration as structured coordination. Both RP1 and RP2 are supported, showing pharmacy-led integration improves cost optimization, efficiency, and safety.

Summary of Results

Across all themes, pharmacists were perceived as both:

- **Strategic Resources (RBV):** Expertise in safety, inventory, and clinical judgment that contributes to cost-effectiveness and organizational advantage.
- **Process Optimizers (SMT):** Standardization, monitoring, and collaboration that enhance workflow, reduce errors, and minimize waste.

This study extends previous research (e.g., Noble et al., 2022; Hodgson et al., 2023) by offering qualitative insights into how these contributions are experienced in LMIC tertiary hospitals, showing that pharmacists add relational, communicative, and integrative value to hospital operations.

Conclusion

Pharmacy services in Pakistan's tertiary hospitals are perceived as both strategic assets and process enablers, confirming RBV and SMT relevance. Pharmacist-led interventions support cost optimization, efficiency, and patient safety, offering practical implications for institutionalizing pharmacy services as integral components of hospital management and care.

Practical Implications

Hospital administrators can gain measurable safety, efficiency, and cost benefits by integrating pharmacists into operational and clinical workflows. Policymakers should develop frameworks that formalize these roles and foster interprofessional collaboration to reduce duplication, errors, and communication gaps. Pharmacists' dual role as clinical and resource managers makes them essential for sustainable LMIC healthcare systems.

Limitations

This study has some limitations. With only ten participants from Karachi, the findings cannot be generalized to all hospitals or other LMIC settings. The qualitative design provided rich insights but did not offer measurable outcomes or causal evidence. Patient perspectives were not included, which could have deepened the understanding of service impact. Despite efforts to minimize bias through reflexivity and audit trails, researcher subjectivity remains a possibility. Finally, as the study was cross-sectional, it captures only a single point in time and does not reflect changes over the long term.

Recommendations for Practice and Policy

Hospitals should embed pharmacists in ward rounds, case reviews, and discharge planning; adopt standardized protocols for IV to PO conversion, sterile admixtures, and expiry monitoring; upgrade health information systems; and expand interprofessional training. Policymakers should prioritize resources to expand hospital pharmacy services and recognize pharmacists' clinical roles.

Recommendations for Future Research

Future studies should include quantitative analyses of cost savings and safety outcomes, cross-country comparisons in LMICs, and longitudinal tracking of integration effects. Patients' perspectives and implementation science approaches are also needed to guide scaling of pharmacist-led practices in resource-constrained settings.

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