REVIEW ARTICLE

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Advancing Patient Safety in Low-Resource Primary Health Care: A Narrative Review of Barriers and Strategies

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ABSTRACT

Patient safety in low-resource primary health care (PHC) remains an under-prioritized aspect of health system strengthening, despite its central role in reducing preventable harm and advancing universal health coverage. This narrative review synthesizes current evidence (2019–2025) to identify key barriers affecting patient safety in low-resource PHC settings and examine strategic approaches to address them. Major barriers include workforce shortages, weak safety culture, underreporting of adverse events, medication safety vulnerabilities, infrastructural limitations, and insufficient community health literacy. Strategic pathways emphasize strengthening leadership commitment, building non-punitive reporting systems, expanding workforce capacity, improving medication safety, adopting digital health innovations, engaging communities, and investing in essential diagnostic and infrastructure components. Addressing patient safety in low-resource PHC requires coordinated system-level and frontline interventions supported by policy alignment, adequate financing, and sustained capacity building.

Keywords: *Health Policy; Patient Safety; Primary Health Care; Low-resource setting.*

INTRODUCTION

Patient safety represents a cornerstone in achieving high-quality healthcare delivery, essential for reducing avoidable harm and improving health outcomes[1]. Primary healthcare (PHC), as the foundation of universal health coverage and a key driver of Sustainable Development Goal 3, plays a pivotal role in ensuring safe, effective care[2,3]. However, patient safety in PHC has historically received less attention than hospital care, despite evidence that adverse events are frequent and often preventable[4]. This challenge is particularly acute in low-resource settings where systemic constraints, including workforce shortages, weak infrastructure, underdeveloped reporting systems, and poor medication safety, compound risks[5,6]. Addressing these issues is critical to achieving resilient health systems and equitable access to safe care.

This narrative review synthesizes recent literature to identify key barriers affecting patient safety in low-resource PHC settings and to examine context-appropriate strategies for improvement. By integrating findings across clinical, organizational, community, and policy levels, this review aims to provide a comprehensive and actionable overview to support policymakers, PHC managers, and practitioners in strengthening safety systems.

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METHODS

This narrative review was conducted in accordance with the Scale for the Assessment of Narrative Review Articles (SANRA) to ensure methodological transparency, comprehensiveness, and scientific rigor. The review followed structured procedures in literature searching, article selection, data extraction, and synthesis.

Search Strategy

A comprehensive literature search was performed in PubMed, Scopus, and the World Health Organization (WHO) Global Index Medicus. The search covered publications from January 2019 to January 2025. Boolean operators were applied to combine relevant terms related to patient safety, primary health care, and low-resource settings. The search strategy included combinations such as: “patient safety” AND “primary health care” AND (“low-resource” OR “resource-limited” OR “LMIC”) “safety culture” AND “primary care” AND “adverse events” AND “primary health care” AND “low-income countries” AND “medication

safety" AND "primary health care" AND "LMIC".

Reference lists of the included studies and relevant policy documents were also manually screened to identify additional articles.

Inclusion and Exclusion Criteria

Studies were included if they met the following criteria:1) Published in English between 2019–2025; 2)Focused on patient safety in primary health care settings; 3)Conducted in low-resource, resource-limited, or LMIC contexts; 3)Empirical studies, reviews, policy reports, or implementation evaluations.

Exclusion criteria were: 1)Studies focusing exclusively on hospital-based care; 2)Articles not addressing patient safety outcomes or determinants; 3)Commentaries without substantive evidence.

Screening and Selection Process

The initial database search yielded 143 records. After removing duplicates (n = 28), 115 titles and abstracts were screened for relevance. Of these, 42 articles were assessed in full text. Following the application of inclusion/exclusion criteria, 19 studies met eligibility requirements and were included in the final synthesis.

Data Extraction and Synthesis

A structured extraction process was applied to capture key themes, including barriers to patient safety, safety culture dynamics, incident reporting practices, medication-related risks, infrastructural challenges, and strategic interventions. The synthesis followed a narrative, thematic approach consistent with SANRA domains.

RESULT

A synthesis of the 19 included articles revealed clear thematic patterns relating to the determinants of patient safety in low-resource primary health care systems. The results comprise two principal domains: (1) barriers embedded within workforce, infrastructure, organizational culture, and community-level factors, and (2) strategic pathways identified across the literature to strengthen safety culture, improve reporting systems, enhance medication safety, expand workforce capacity, leverage digital innovations, and align policy and community engagement. Each domain is described in detail in the sections that follow.

Barriers to Patient Safety in Low-Resource Primary Health Care Settings

Patient safety in low-resource PHC settings is influenced by multiple, interrelated barriers that arise from systemic, organizational, and sociocultural constraints. This review identified six major categories of barriers, which are summarized in Table 1 to provide a concise overview of the key challenges and the corresponding strategies proposed across the literature.

1. Workforce Shortages and Skill Gaps

Human resources constitute the foundation of primary healthcare service provision; however, many low- and middle-income countries (LMICs) continue to experience a chronic shortage of adequately trained health professionals[1]. Inadequate staffing, coupled with heavy patient loads, results in rushed consultations and limited time for thorough assessments. This situation often leads to diagnostic errors, treatment delays, and avoidable adverse outcomes[2,7]. In many contexts, the shortage is exacerbated by uneven distribution of healthcare workers, where rural areas experience severe gaps in access to qualified staff[8]. Burnout among existing staff further compounds the risk, creating a cycle

Table 1. Key barriers to patient safety in low-resource primary health care and proposed strategies

Barriers	Proposed Strategies
Workforce shortages and skill gaps (2,7,9)	Task-shifting, community health workers, continuous safety training
Underreporting of adverse events (10-13)	Non-punitive reporting culture, anonymous reporting systems
Medication safety risks (6,14)	Pharmacovigilance training, standard labeling, secure storage
Weak safety culture (11,15)	Leadership commitment, team communication, psychological safety
Infrastructure and resource limitations (8,16,17)	Basic equipment, digital health tools, improved utilities
Patient and Community Factors (18,19)	Enhance patient and community engagement

where high workloads lead to fatigue, which in turn increases the likelihood of mistakes[9].

Skill gaps add another layer to this barrier. Many frontline providers in resource-constrained PHC systems lack training in critical areas such as pharmacovigilance, error reporting, and patient-centered communication. This lack of competencies reduces their ability to detect and mitigate risks, particularly when managing complex cases without diagnostic tools or specialist support[7].

2. Underreporting of Adverse Events

The culture of reporting safety incidents is poorly developed in many low-resource settings. Formal reporting systems are often absent or fragmented, and where they exist, they are rarely utilized effectively[10]. One key factor is the persistence of a blame-oriented culture, which discourages staff from acknowledging errors for fear of punitive action[11]. In such environments, healthcare workers may view reporting as an admission of incompetence rather than an opportunity for learning and system improvement[12]. The absence of feedback mechanisms further reduces motivation to report. Consequently, organizations fail to capture critical data that could inform corrective measures and prevent recurrence[13].

3. Medication Safety Risks

Medication errors constitute a significant contributor to patient harm globally, and their impact is magnified in low-resource PHC settings[6]. Weak pharmaceutical supply chains often result in stockouts or the circulation of substandard drugs. Poor-labeling practices, look-alike packaging, and lack of standardized prescribing protocols create further vulnerabilities[14]. Inadequate training in medication management and pharmacovigilance increases the likelihood of dosing errors and drug interactions, particularly in patients with chronic conditions requiring polypharmacy[6]. The absence of digital prescription systems means that handwritten orders, often illegible, remain common, further amplifying risks.

4. Weak Safety Culture

A robust safety culture is a cornerstone of safe care delivery, yet in many PHC facilities, this concept is poorly understood and rarely operationalized[15]. Hierarchical team structures discourage open dialogue, and psychological safety is often lacking, preventing staff from speaking up about near misses or hazardous conditions[11]. Leadership commitment to safety is often superficial or absent, with little emphasis on continuous improvement. The result is a work environment where risks go unaddressed until they culminate in adverse events.

5. Infrastructure and Resource Limitations

Infrastructure deficits remain a major obstacle to safe PHC in low-resource settings. Many facilities lack essential utilities, secure storage for medications, or functioning diagnostic equipment[16]. The absence of electronic health records compromises continuity of care and hinders data-driven quality improvement[17]. Overcrowded facilities and the lack of private consultation spaces also undermine patient safety and confidentiality. These challenges become more acute during health emergencies, when fragile systems are easily overwhelmed[8].

6. Patient and Community Factors

Low health literacy, cultural beliefs, misconceptions about illness, and reluctance to seek early care contribute substantially to patient safety risks. Delayed presentation increases clinical complexity and reduces opportunities for timely intervention. Limited patient engagement in treatment decisions, coupled with inadequate communication from providers, further weakens adherence and continuity of care. In marginalized communities, distrust of the health system may exacerbate barriers to reporting symptoms or seeking preventive services[18,19].

Strategic Pathways for Improving Patient Safety in Low-Resource PHC Settings

Improving patient safety requires multifaceted, contextually grounded strategies that address both system-level and frontline barriers. The review identified six strategic pathways.

1. Strengthening Safety Culture and Leadership

Effective leadership serves as a cornerstone in nurturing a culture of safety. Prioritizing patient safety demands the creation of supportive conditions that encourage error reporting without blame, teamwork, and continuous communication[11]. Training leaders to model safety behaviour and integrating safety goals into performance metrics can reinforce accountability. Initiatives such as safety huddles, regular team debriefings, and leadership walk-rounds have been associated with improved safety culture in PHC settings[15].

2. Building Effective Reporting and Learning Systems

Robust reporting systems enable organizations to learn from errors and near misses. In resource-limited environments, simple, low-cost reporting mechanisms, such as anonymous paper forms or mobile applications, can increase participation[10]. Digital platforms have been successfully piloted in several LMICs, allowing real-time data capture and feedback loops without imposing excessive burdens on frontline staff[16]. Importantly, reporting must be linked to learning. Regular review meetings, root cause analyses, and dissemination of lessons learned can transform reporting from a punitive exercise into a driver of

improvement[13].

3. Enhancing Medication Safety

Interventions to improve medication safety should focus on standardizing prescribing practices, ensuring clear labeling, and strengthening supply chain integrity[6]. Training health workers in pharmacovigilance and safe dispensing practices is critical, as is engaging patients in medication management through education and counselling[14]. Where feasible, introducing electronic prescribing systems, even in simplified forms, can reduce transcription errors and enable drug–drug interaction checks.

4. Human Resource Capacity Building and Task-Shifting

Investments in workforce development are essential to reduce safety risks in PHC. Continuous professional development programs focusing on diagnostic reasoning, infection prevention, and communication skills can enhance competence[7]. Task-shifting to trained community health workers for routine services can alleviate workloads and allow clinicians to focus on complex cases[8]. Incentive schemes, including non-financial rewards such as recognition programs, can improve staff motivation and retention in underserved areas.

5. Leveraging Digital Health Innovations

Digital health tools offer promising avenues to strengthen safety in resource-limited PHC systems. Mobile health applications can support reporting of adverse events, medication adherence monitoring, and clinical decision support[17]. Telemedicine platforms can mitigate the effects of workforce shortages by providing access to remote expertise[16]. While challenges related to connectivity and digital literacy remain, evidence suggests that incremental adoption of digital solutions can yield significant safety benefits over time.

6. Policy Alignment, Community Engagement, and Infrastructure Investments

Sustainable improvements in patient safety require supportive policy frameworks. National governments should integrate patient safety goals into primary health care strategies and allocate resources for safety initiatives[1]. Policy alignment, community engagement, and essential infrastructure investments emerged from the reviewed literature as critical strategic pathways to improving patient safety outcomes.

Policy alignment is essential for institutionalizing patient safety across PHC systems. National policies that explicitly incorporate patient safety standards, reporting requirements, accreditation frameworks, and quality improvement indicators provide the structural foundation needed for consistent implementation. When patient safety goals are integrated into PHC strategic plans, budgeting processes, and regulatory systems, they become part of routine governance rather than isolated initiatives. Strong policy support also enhances accountability and encourages adherence to safety protocols at the facility level.

Community engagement plays a pivotal role in improving safety by addressing sociocultural determinants of health, including low health literacy, misconceptions about illness, and delayed care-seeking[18,19]. Engaging patients and communities through health education campaigns, outreach clinics, culturally appropriate communication strategies, and involvement of community health workers strengthens trust and encourages earlier reporting of symptoms and adherence to treatment plans. Empowering patients to understand their rights, participate in decision-making, and recognize potential safety risks enhances overall quality of care and reduces preventable harm.

Infrastructure investments are foundational to safe PHC service delivery. Essential diagnostic tools, such as blood pressure monitors, glucometers, thermometers, and pulse oximeters, enable accurate assessment and timely clinical decisions. Reliable water supply, adequate sanitation, proper waste disposal systems, functional sterilization equipment, secure medication storage, and sufficient space for confidential consultations are critical components of a safe care environment. In many resource-limited settings, basic infrastructure deficiencies compromise infection prevention, medication safety, and continuity of care. Investment in core facility infrastructure therefore represents a non-negotiable element of any sustainable patient safety improvement strategy.

Taken together, policy alignment, community engagement, and infrastructure improvements create the structural and social conditions necessary to support safety initiatives at the frontline. These system-level interventions reinforce organizational and clinical strategies, providing a cohesive framework for delivering safer, equitable, and resilient primary health care services.

DISCUSSION

The findings of this narrative review highlight the multifaceted and interconnected nature of patient safety challenges in low-resource primary health care (PHC) settings. This section interprets these findings within broader health system dynamics, emphasizing implications for practice, governance, and future research.

Integrating System-Level and Frontline Approaches

Improving patient safety in low-resource PHC requires robust

integration between system-level policies and frontline clinical practices. Many challenges identified, such as underreporting of incidents, weak safety culture, medication errors, and limited capacity among health workers, cannot be attributed solely to individual provider performance. Instead, they stem from structural and organizational constraints including insufficient leadership support, inadequate resource allocation, and fragmented health governance.

Effective safety improvement therefore demands a systems-thinking approach. System-level directives, for example, national reporting policies, must be complemented by facility-level non-punitive reporting systems, staff training, and psychological safety for frontline workers[11,16]. Similarly, digital health tools can enhance reporting and decision-making only when aligned with national health information strategies and when frontline workers receive adequate training and support to adopt them.

A key insight from the reviewed literature is that stand-alone interventions are insufficient. Leadership training without adequate infrastructure, reporting systems without functioning feedback loops, or community outreach without supportive facility policies will not generate sustained improvements[15]. Durable progress in patient safety requires reinforcing interactions between governance structures, workplace culture, human resource capacity, community engagement, and material resources.

Implications for Primary Health Care Systems

The review underscores that patient safety is not an isolated clinical concern but a marker of PHC system resilience. Persistent workforce shortages, medication safety failures, and weak safety culture reflect deeper systemic issues in planning, resource allocation, and accountability mechanisms.

Strengthening PHC systems therefore requires embedding patient safety into routine processes such as performance monitoring, supervision, safety audits, and team communication practices. Leadership visibility and commitment are particularly influential: open communication, modelling of non-punitive behavior, and regular safety walk-rounds can transform facility culture and encourage proactive risk identification[11,15].

Community engagement also emerged as a critical yet underutilized strategy. Improving health literacy, addressing cultural misconceptions, encouraging early care-seeking, and building trust between communities and PHC facilities can significantly reduce preventable harm. Context-appropriate communication strategies, outreach clinics, and involvement of community health workers help reinforce treatment adherence and facilitate early detection of complications[18,19].

Importantly, the review highlights that many effective safety improvements are low-cost and scalable. Tools such as anonymous reporting forms, structured checklists, simple digital reporting applications, and targeted in-service training can produce meaningful gains, even in the most resource-constrained settings, when supported by collective commitment and basic infrastructure.

Research Gaps

Despite expanding attention to patient safety across LMICs, substantial gaps persist in the evidence base. Very few studies rigorously evaluate the effectiveness of specific interventions in PHC settings, and even fewer assess their adaptability or scalability across diverse contexts. Research examining safety culture interventions, medication safety programs, digital incident-reporting platforms, and task-shifting models remains scarce, especially in rural and underserved communities.

Cost-effectiveness analyses are also lacking, making it difficult for policymakers to prioritize investments in safety interventions within constrained budgets. Evidence is particularly limited regarding long-term outcomes of safety strategies, sustainability of digital tools, and the interaction between community engagement and patient safety improvements.

Future research should prioritize implementation science, focusing on how interventions operate in real-world PHC environments and identifying contextual facilitators and barriers. Strengthening data systems and supporting longitudinal research will also be essential to monitor safety outcomes over time and to generate actionable evidence for policymakers and PHC leaders.

CONCLUSION

Patient safety remains a fundamental yet under-addressed component of primary health care in low-resource settings. The findings of this review reveal that preventable harm in PHC arises from a constellation of systemic, organizational, and sociocultural factors, including workforce shortages, weak safety culture, medication errors, fragmented reporting systems, infrastructural gaps, and limited community health literacy. These barriers underscore the need for comprehensive and context-appropriate strategies that extend beyond frontline clinical interventions.

Strengthening patient safety in PHC requires coordinated action across multiple levels of the health system. Leadership commitment, non-punitive reporting mechanisms, ongoing workforce development, improved medication safety practices, digital health innovations, and active community engagement all play pivotal roles in enhancing safety. Equally important are investments in essential infrastructure and the alignment of

national policy frameworks with facility-level implementation capacity.

Sustainable improvements will depend on embedding patient safety into routine PHC operations through supportive supervision, continuous learning, and governance structures that prioritize equity, transparency, and accountability. As health systems strive toward universal health coverage, advancing patient safety in PHC is not only a technical necessity but also an ethical imperative to ensure that all individuals, regardless of resource constraints, receive safe, reliable, and high-quality care.

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AUTHORS CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

SC: Concept, Design and manuscript writing

HH: Concept and literature research

IAA: Data Analysis

BPS: Manuscript writing

ANU: Manuscript editing and review

TMI: Manuscript editing and review

Authors agree to be accountable for all respects of the work in ensuring that questions related to the accuracy and integrity of any part of the work are appropriately investigated and resolved.

CONFLICT OF INTEREST

None

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