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Health System Factors Influencing the Effectiveness of Mobile Phone Platforms in Promoting Treatment Compliance among Patients with Non-Communicable Diseases in LMICs: A Systematic Review

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ABSTRACT

Non- Communicable Diseases (NCDs) such as hypertension and diabetes have continued to impose a significant health burden in Low and Middle-Income Countries (LMICs), where treatment compliance remains critically low. Systemic barriers including limited healthcare infrastructure, inadequate follow-up mechanisms, and sociocultural factors have impeded patients' ability to adhere to long-term treatment regimens. While mobile health (mHealth) and digital interventions have emerged as potential tools to enhance medication adherence, their effectiveness in LMICs remains uneven and context-dependent. This study aimed to assess the role of health system factors in promoting treatment compliance among patients with NCDs through mobile platforms in LMICs, with a particular focus on Kenya. A qualitative literature review was conducted using purposive sampling of 20 peer-reviewed articles published between 2020 and 2025. The studies were selected based on their focus on health system factors, treatment compliance, and digital or mobile health interventions in LMICs. Data were extracted and analyzed thematically to identify patterns across health system components, digital health strategies, and patient adherence outcomes. The review revealed that systemic barriers including shortages of healthcare personnel, poor digital infrastructure, low health literacy, and financial constraints consistently undermined treatment compliance in LMICs. However, digital tools such as SMS reminders, mHealth apps, and teleconsultations demonstrated improved patient adherence, especially when culturally adapted and integrated into community health frameworks. In Kenya and similar settings, mobile interventions linked with community health workers showed greater success in sustaining long-term engagement. Nonetheless, disparities persisted in digital access, gender equity, and scalability due to infrastructural limitations and weak policy integration. Mobile and digital health platforms offered a promising avenue for improving treatment compliance among NCD patients in LMICs. Their effectiveness was significantly influenced by the readiness of local health systems, sociocultural adaptability, and the extent of integration with human health resources. Despite their potential, many digital interventions remained fragmented, donor-driven, and unsustainable without supportive infrastructure and policy frameworks. To optimize the impact of mobile health (mHealth) interventions, policymakers should invest in digital infrastructure, integrate mHealth into national health systems, and prioritize the training and deployment of community health workers. Future research should include longitudinal and experimental designs to assess long-term outcomes and cost-effectiveness, and emphasize inclusive, culturally tailored approaches to improve equitable access to care.

Keywords;Treatment Compliance, Mobile Health, Non-Communicable Diseases, Low and Middle-Income Countries, Medication Adherence, Digital Health Interventions, Health System Factors, Healthcare Access Barriers

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Background of the study

Treatment compliance, often referred to as medication adherence, denotes the extent to which patients follow prescribed medical regimens, including timely intake of medications, adherence to dosage, and lifestyle modifications (WHO, 2011). Globally, poor treatment compliance has remained a major challenge in the management of non-communicable diseases (NCDs), particularly in Low- and middle-income countries (LMICs). It was associated with adverse health outcomes, increased hospitalizations, and elevated healthcare costs [15]. Studies demonstrated that despite the availability of effective treatments, non-adherence rates were particularly high among patients with chronic conditions such as hypertension and diabetes [5] [28].

In the global context, digital health technologies were increasingly explored to improve treatment compliance. Artificial intelligence (AI) and mobile health (mHealth) solutions showed promising results in enhancing adherence by providing reminders, remote monitoring, and personalized support [2] [22]. However, sustainability and access issues in LMICs limited the widespread implementation of these solutions [13]. Moreover, social determinants such as education, income, and cultural beliefs were found to influence patients' ability and willingness to adhere to treatment protocols [5] [18].

Regionally, in Sub-Saharan Africa and South Asia, barriers such as limited access to healthcare, low health literacy, and socio-cultural factors hampered treatment adherence [23] [12]. Community health workers (CHWs) played a critical role in addressing these barriers by offering localized support, although their efforts were often constrained by inadequate training and resources [7] [28].

Locally, during the COVID-19 pandemic, studies reported that patients with chronic conditions in rural areas experienced disrupted access to care, which further reduced treatment compliance [25] [19]. This disruption highlighted the need for resilient health systems and adaptive community-based interventions to maintain continuity of care during crises.

Given the persistent challenges and high burden of NCDs, improving treatment compliance was crucial to achieving better health outcomes. This study was important as it addressed the multifactorial nature of adherence, evaluated the effectiveness of digital and community-led strategies, and explored culturally relevant interventions tailored to LMICs contexts [23] [20]. Through such efforts, sustainable improvements in chronic disease management could be realized, ultimately reducing the global health burden.

Problem Statement

In many LMICs, particularly in rural and underserved regions, treatment compliance among patients with NCDs had remained critically low. Despite the growing burden of chronic conditions such as hypertension, diabetes, and cardiovascular diseases, adherence to prescribed treatment regimens continued to pose a significant challenge. Several systemic issues including limited physical access to healthcare services, inadequate numbers of trained healthcare workers, insufficient health education, and weak follow-up mechanisms, collectively undermined patients' ability to comply with treatment protocols. These gaps were especially pronounced in areas where primary healthcare systems were fragile or underfunded [12] [17].

Patients in these settings often experienced delays in receiving timely care, lacked consistent medical supervision, and were unable to afford out-of-pocket costs for long-term medication. Additionally, poor health literacy, cultural misconceptions about chronic diseases, and the stigma surrounding long-term medication further discouraged adherence. For example, in many rural communities, patients relied on traditional healers or sporadic consultations, resulting in interrupted treatment and worsened health outcomes [24] [23]. Furthermore, logistical challenges, such as transportation difficulties and drug stock outs, compounded the problem.

Although mHealth platforms had shown promise in improving health service delivery, their adoption in LMICs was uneven and often hindered by infrastructural and digital literacy barriers. Many interventions were donor-funded, lacked sustainability plans, and were not well integrated into national health systems. Consequently, the potential of mobile platforms to support treatment adherence remained largely untapped in these contexts. This study aimed to address these persistent challenges by examining how health system-related barriers

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influenced treatment compliance and by exploring viable interventions, particularly digital and community-based strategies that could be employed to improve adherence and patient outcomes.

Significance of the Study

This study held significant relevance in addressing persistent challenges in healthcare access, medication adherence, and chronic disease management in LMICs. Through an integrative review of recent literature, the research emphasized the transformative potential of digital health technologies, mHealth, CHW led interventions, and AI-driven strategies in enhancing the delivery and sustainability of healthcare services. By analyzing studies, the research highlighted how AI and mHealth tools were leveraged to improve medication adherence and patient monitoring, particularly in managing NCDs like hypertension and diabetes. The findings underscored how digital tools bridged gaps in healthcare systems, especially in underserved rural areas where physical access to healthcare services remained limited.

Furthermore, this study illuminated the sociocultural, economic, and infrastructural barriers outlined in studies by [12] [25], which hindered the effective implementation of digital and community-based interventions. It also recognized the critical role of community engagement, health literacy, and culturally adapted interventions [18] in driving positive health outcomes. In addition, this study contributed to the growing body of evidence supporting integrated, scalable digital health solutions and policy reforms tailored to LMIC contexts. It provided actionable insights for healthcare practitioners, policymakers, and global health stakeholders aiming to reduce disparities and enhance resilience within fragile health systems.

Objectives

Broad Objective

The Role of Mobile Phone Platforms in Enhancing Treatment Compliance among patients with NCDs in LMICs

General Objective

To assess the role of healthcare system factors in promoting treatment compliance among patients with NCDs through mobile platforms in LMICs.

Research questions

How do healthcare system factors influence treatment compliance among patients with NCDs when using mHealth platforms in LMICs?

LITERATURE REVIEW

Treatment compliance was widely recognized as a central determinant of successful chronic disease management, particularly in LMICs. NCDs such as hypertension, diabetes, and cardiovascular disorders required long-term, consistent engagement with health services and medication adherence. However, compliance in LMICs was historically suboptimal due to health system constraints, sociocultural factors, and economic hardships. Studies showed that despite the increasing availability of treatment, adherence among patients remained insufficient to mitigate disease progression and reduce morbidity and mortality [28] [5].

Across LMICs, treatment compliance was undermined by structural health system deficiencies, including underfunded healthcare infrastructure, limited human resources, and fragmented referral systems. For example, [4] identified gaps in care delivery across resource-limited settings due to shortages in equipment and trained personnel. These systemic limitations echoed in primary NCDs care, where poorly coordinated services reduced the continuity and quality of care patients received.

In Nepal, [3] found that barriers to hypertension management were deeply rooted in behavioral and capability-related challenges, but also influenced by poor service access and fragmented follow-up systems. Similarly, [8]

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revealed that mobile phone text reminders, although effective in principle, were not always backed by consistent system support or infrastructure, which limited their sustained impact.

CHWs played a pivotal role in mediating these gaps. Studies such as demonstrated that peer-led and CHW-supported models improved diabetes management and medication adherence [28] [24]. However, in countries like Kenya and Nigeria, CHWs often operated under resource constraints and lacked adequate training, which limited their effectiveness (Osei & Mashamba-Thompson, 2021).

Digital health technologies, particularly mHealth, emerged as promising tools to enhance treatment compliance. A growing body of evidence suggested that interventions such as SMS medication reminders, digital self-management tools, and teleconsultations contributed positively to adherence outcomes [22] [16].

For instance, [1] conducted a randomized controlled trial in Ghana which demonstrated that a pilot mobile phone intervention significantly improved self-care and medication adherence among patients with type 2 diabetes. Similarly, [30] highlighted the efficacy of mobile reminders in improving adherence to medication and healthy lifestyle behaviors in urban Bangladesh.

[2] [10] examined the integration of artificial intelligence (AI) into digital adherence tools, finding that personalized support and predictive analytics enhanced medication adherence in chronic disease populations. Despite the potential, implementation remained uneven. Study identified multiple barriers including cost, weak digital infrastructure, and lack of stakeholder coordination that hindered the successful deployment of mHealth tools in LMICs [27].

In the Kenyan context, mHealth platforms were piloted through SMS reminders and mobile apps with varying success. [20] reported similar findings from Ethiopia, emphasizing that integration with community-based health services enhanced outcomes. However, in both countries, scalability was constrained by donor dependence, digital illiteracy, and inconsistent mobile network coverage.

Compared to Brazil, where [19] reported successful adaptation of digital tools for NCDs management during COVID-19, Kenya's digital health infrastructure was still evolving. Moreover, the need for context-sensitive implementation was repeatedly emphasized, [26] found that cultural norms and beliefs around diabetes influenced self-management behaviors in Africa, and that digital tools needed to address these nuances to be effective.

Cultural and linguistic tailoring of interventions was another critical factor in driving treatment compliance. [6] underscored the importance of mapping the patient journey and recognizing sociocultural determinants to inform digital health designs. [14] added that beyond trust, reliance on digital health systems required transparency, ethical standards, and sustained provider-patient relationships.

Despite advancements, systemic inequities persisted. In South Africa, [21] reviewed virtual healthcare interventions during COVID-19 and found that access gaps remained pronounced among rural and low-income populations. Similarly, studies emphasized the need to consider cultural values in cardiovascular disease self-care, advocating for integrative models that respect patient preferences while promoting adherence.

Moreover, digital interventions without health system alignment often failed to produce long-term benefits. Studies demonstrated that a digital health intervention in Australia improved cardiovascular disease outcomes only when embedded within primary care models. This finding echoed the recommendations of [11], who concluded that health system resilience and care continuity were essential in humanitarian and low-resource settings.

Collectively, the literature confirmed that mobile platforms held transformative potential for improving treatment compliance in LMICs. However, their success was closely tied to the strength of health systems, sociocultural compatibility, and stakeholder collaboration. The effectiveness of digital interventions increased when CHWs were involved, when interventions were co-designed with communities, and when infrastructural support was present [29].

Studies pointed to a clear policy direction: the need for integrated, scalable digital health solutions supported by robust health systems. Implementation strategies must account for social determinants, infrastructure disparities, and patient diversity. Future research should focus on Randomized Controlled Trials (RCTs) and cost-effectiveness studies to generate stronger causal evidence and support health policy development in LMICs.

METHODOLOGY

This study employed a qualitative literature review to examine health system factors influencing treatment compliance in LMICs, with a focus on Kenya. The methodology involved purposive sampling of 20 peer-reviewed articles published between 2020 and 2025. The review emphasized mobile and digital health interventions, particularly in the management of non-communicable diseases. Key methodological components include study design, data collection, sampling strategy, analysis techniques, and ethical considerations to ensure the reliability and applicability of findings across LMIC contexts.

Study Design

This study employed a systematic review and comparative cross-sectional design to investigate the influence of health system factors on treatment compliance, with mobile platforms acting as an intervening variable. The design enabled a critical synthesis of published empirical findings and comparative analysis across LMICs, with a focus on Kenya. Similar study designs have been effectively used in reviews assessing digital health and medication adherence [15] [13].

Study Location and Population

The geographic focus of the study included Kenya and selected LMICs in Africa, Asia, and Latin America. The population of interest comprised individuals with NCDs, such as hypertension, diabetes, and cardiovascular conditions, who required long-term treatment adherence. In Kenya, the study specifically focused on rural and peri-urban populations where mobile platforms have been increasingly adopted in healthcare delivery [7] [22].

Sample Size and Sampling Technique

A purposive sampling technique was used to identify and select 33 peer-reviewed articles published between 2020 and 2025. These articles were drawn from reputable journals and databases such as Google Scholar and PubMed. Articles were included if they Addressed health system factors or treatment compliance, focused on LMICs, including Kenya, and evaluated or discussed the role of mobile or digital health platforms. The selected studies encompassed diverse LMICs contexts to enable cross-national comparison [20] [12] [19].

Data Collection Methods

Data was systematically extracted from the selected articles using a standardized data extraction form developed

for this study. The form captured key variables including the author(s) and publication year, country or region of study, study population and associated health conditions, identified health system factors, the nature of mobile or digital health interventions applied, and outcomes related to treatment adherence or compliance. Both qualitative and quantitative data were considered, allowing for triangulation of findings and a comprehensive synthesis of evidence. This mixed-methods review approach enabled the integration of diverse insights from different study designs, enhancing the robustness of the analysis [17] [25].

Reliability and Validity

To ensure reliability and validity, only articles published in peer-reviewed journals were included. The use of a standardized extraction form helped minimize inconsistencies in data collection. Cross-validation of extracted themes by comparing studies from different regions also enhanced the credibility of the synthesis [22] [7].

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Furthermore, inclusion of both qualitative and quantitative findings allowed for methodological triangulation, improving the robustness of the analysis.

Data Analysis Techniques

Data was analyzed using thematic content analysis and comparative synthesis. Key themes were drawn across three variables: Health system factors (e.g., workforce, infrastructure, financing), treatment compliance outcomes (e.g., medication adherence, service utilization), and mobile platform interventions (e.g., mHealth, SMS reminders). Quantitative outcomes such as adherence rates were descriptively summarized. Patterns were compared between LMICs [28] [5].

Ethical Considerations

Since the study used secondary data from published literature, no direct ethical approval was required. However, ethical principles of transparency, accuracy, and acknowledgment of sources were upheld. All data were sourced from publicly available and open-access journals, ensuring responsible scholarship [2] [23]

Risk of Bias

Although this study employed a structured and systematic approach to reviewing literature on treatment compliance and mHealth interventions in LMICs, several potential sources of bias may have influenced the findings:

1. **Selection Bias:** The study relied on purposive sampling to select 33 peer-reviewed articles, which may have introduced selection bias. This non-random method could have excluded relevant studies that did not meet the predefined inclusion criteria or were not published in the selected academic databases. Furthermore, studies published in non-English languages were not considered, potentially omitting valuable regional insights and leading to an overrepresentation of English-speaking countries.
2. **Publication Bias:** The review exclusively included articles from peer-reviewed journals, which may be subject to publication bias. Studies with statistically significant or positive results are more likely to be published, while those reporting null or negative findings may be underrepresented. As a result, the review may have disproportionately emphasized successful mHealth interventions while underreporting implementation failures or limitations.
3. **Data Extraction Bias:** Although a standardized data extraction form was used, subjective interpretation during data collection could have introduced bias. Some variables, such as cultural adaptability or user engagement, may have been inconsistently assessed across studies due to differences in how authors reported qualitative outcomes. Without a double-reviewer process for data extraction, inconsistencies or omissions could have occurred.
4. **Reporting Bias in Primary Studies:** Several included studies may themselves be subject to selective outcome reporting. For example, studies may have emphasized improved adherence without fully disclosing contextual barriers or methodological weaknesses. This type of bias within source studies could have skewed the synthesis toward more optimistic conclusions about digital health efficacy.
5. **Geographical and Contextual Bias:** The included studies covered a range of LMICs but had a stronger emphasis on African countries, particularly Kenya and Ethiopia. While this focus aligned with the study's geographical scope, it may limit the generalizability of findings to other LMIC contexts in Latin America or Southeast Asia where health system structures and cultural dynamics differ.
6. **Limited Evaluation of Study Quality:** This review did not employ a formal risk of bias tool such as the Cochrane Risk of Bias Tool (RoB 2) or the Critical Appraisal Skills Programme (CASP) checklist to assess the methodological rigor of the included studies. Consequently, it was not possible to weigh findings based on study quality, which could affect the reliability of synthesized conclusions.
7. **Timeframe Limitations:** The inclusion of studies published between 2020 and 2025 may have excluded foundational literature published prior to this period. While the intention was to capture the most recent developments, especially those related to COVID-19-era interventions. This restriction could have limited the historical context and depth of evidence considered.

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Mitigation Strategies

To minimize the impact of these biases, the study applied a transparent search strategy, used a data extraction template to ensure consistency, and cross-validated findings across regions and intervention types. Future reviews should consider broader search terms, include non-English sources, and apply formal quality appraisal tools to enhance the validity and robustness of the evidence synthesis.

RESULTS

This systematic review of 30 peer-reviewed articles provided valuable insights into the interplay between health system factors, treatment compliance, and mHealth interventions in LMICs.

A prominent theme across studies was the impact of systemic and structural barriers on treatment adherence. Challenges such as shortages of trained healthcare personnel, under-resourced facilities, weak health information systems, and inconsistent access to essential medicines were common, particularly in rural areas [12] [4]. These limitations contributed to missed appointments, poor follow-up, and interruptions in care continuity. Socioeconomic determinants including high out-of-pocket costs, low health literacy, and chronic disease stigma further undermined adherence [3] [26]. In Kenya and similar contexts, financial constraints and competing livelihood demands frequently caused patients to abandon treatment regimens [24] [17].

Digital health tools emerged as potential solutions to bridge these gaps. Several studies found that mobile-based interventions such as SMS medication reminders, remote monitoring, and teleconsultations significantly improved adherence outcomes [1] [30]. AI-enhanced features, including adaptive reminders and predictive behavior analytics, provided more personalized and responsive engagement, particularly when linked with community health workers and primary care [2] [10]. Interventions were most effective when they were culturally adapted and implemented through local structures. Community-based approaches that involved local stakeholders and community health workers improved patient engagement and sustained behavior change [7] [28] [20]. In Kenya, mobile platforms integrated with community health services enhanced communication and follow-up adherence [24].

Despite the promise, digital health adoption faced significant constraints. Poor digital infrastructure, limited smartphone penetration, and low digital literacy reduced scalability and usability, especially in rural or underserved areas [21] [27]. Many interventions were pilot-driven, donor-funded, and lacked sustainability mechanisms [23] [13]. Gender and age-based digital divides were also prevalent. Older adults and women often had less access to digital tools due to affordability and sociocultural limitations [8], highlighting the need for inclusive design strategies. Notably, even in fragile or humanitarian settings, coordinated and context-specific digital interventions showed potential when supported by strong collaboration among stakeholders [11]. Countries like Brazil, with better infrastructure and digital policy frameworks, demonstrated more successful national implementation compared to fragmented efforts observed in Kenya [19].

DISCUSSION

Summary of Key Findings

This review identified that mobile and digital health platforms can substantially enhance treatment compliance among patients with NCDs in LMICs, including Kenya. Studies reviewed reported that interventions such as SMS reminders, mHealth apps, and teleconsultations contributed to improved medication adherence and service utilization ([2] [22]. Additionally, supportive health system structures such as trained community health workers and policy frameworks were associated with better implementation outcomes [24] [28].

Health System Integration and Human Support

Effective mHealth interventions were typically those embedded within broader health system frameworks. Countries with well-established community health structures leveraged lay health workers to facilitate digital engagement, particularly in resource-limited settings [7] [24]. In Kenya, this integration has shown promise,

highlighting the importance of human support in scaling digital tools and overcoming issues of digital literacy and trust.

Barriers to Implementation

Despite these successes, numerous barriers were noted. Key challenges included limited access to mobile devices, poor network infrastructure, and low digital literacy among target populations [20] [17]. These issues were especially pronounced in rural areas, where technological infrastructure is often weakest. Furthermore, affordability and data costs presented major access challenges, particularly among vulnerable groups.

The Importance of Contextual and Cultural Adaptation

Interventions that were contextually tailored on taking into account language, health beliefs, and local needs were more likely to be accepted and effective [23] [18]. This underlines the importance of participatory approaches in the design and implementation of digital health solutions to ensure relevance and sustainability in diverse LMICs settings.

Gaps in Evidence and Future Research Directions

While the studies reviewed provided valuable insights, most relied on observational or cross-sectional data, with few randomized or longitudinal studies to confirm causality [15] [5]. There remains a need for more robust evaluation methods, including cost-effectiveness analyses and impact assessments that capture long-term outcomes.

Policy and Practice Implications

To maximize the impact of digital health interventions on treatment compliance, policymakers should focus on strengthening underlying health systems, expanding digital infrastructure, and ensuring equitable access. Interventions should be co-designed with end-users and implemented alongside community-based health strategies to enhance reach and effectiveness [12].

CONCLUSION

This review highlights the critical role of mobile and digital health interventions in improving treatment compliance for NCDs in LMICs, including Kenya. The findings suggest that digital platforms such as mHealth applications, SMS reminders, and teleconsultation tools can enhance medication adherence and service utilization, particularly when integrated with supportive health systems and community health worker programs.

Despite their potential, the effectiveness of these interventions is often hindered by systemic barriers, including limited technological infrastructure, affordability challenges, and low levels of digital literacy. Furthermore, the success of digital solutions is closely tied to how well they are adapted to local cultural and contextual realities.

Future research should focus on rigorous evaluations using experimental designs, with particular attention to scalability, sustainability, and equity. Policymakers and health system stakeholders must prioritize digital inclusivity, infrastructure investment, and community engagement to ensure that digital health tools reach and benefit the most vulnerable populations.

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APPENDIX: LITERATURE MATRIX

#	Author(s)	Year	Title	Study Type	Focus/Theme	Key Findings
1	Asante et al.	2020	Mobile phone intervention for diabetes in Ghana	RCT	mHealth for diabetes	Mobile app improved diabetes management in urban Ghana
2	Babel et al.	2021	AI for adherence in NCDs	Review	AI and adherence	AI improves NCD medication adherence
3	Bhandari et al.	2021	Hypertension barriers in Nepal	Qualitative	Behavioral determinants	COM-B framework identified critical barriers
4	Chandrashekhar et al.	2020	STEMI management in LMICs	Policy guidance	Cardiovascular emergency care	Resource-sensitive care pathways needed
5	Chaturvedi et al.	2024	Non-adherence in NCDs in LMICs	Meta-analysis	Behavioral barriers	Identifies consistent behavioral adherence barriers
6	Devi et al.	2020	Patient journey for NCDs in LMICs	Narrative review	Patient pathways	Financial and systemic barriers disrupt patient continuity
7	Feroz et al.	2020	Role of CHWs in digital health in Pakistan	Empirical	Community-based mHealth	CHWs effectively extend NCD digital interventions
8	Huang et al.	2022	Digital SRH for adolescents in LMICs	Umbrella review	Digital SRH strategies	Digital tools improve adolescent health outcomes
9	Ibeneme et al.	2021	SMS reminders in HIV care	Systematic review	Text reminders, adherence	SMS improved medication, exercise adherence in HIV
10	Jake-Schoffman et al.	2021	AI for adherence in NCDs (duplicate)	Review	AI and NCDs	AI promising but needs LMIC contextualization
11	Jaung et al.	2021	Care models for hypertension/diabetes in humanitarian crises	Systematic review	Humanitarian care models	Needs flexible, resilient NCD models in emergencies
12	Khatun et al.	2020	Feasibility of mHealth in rural Bangladesh	Pilot study	mHealth feasibility	mHealth feasible, but constrained by literacy gaps
13	Kiberu et al.	2020	Digital health in Uganda	Case study	Health system integration	Government buy-in improved uptake of digital tools
14	Koonin et al.	2020	Telehealth expansion during COVID-19	Policy analysis	Telemedicine scale-up	Telehealth rapidly adopted, challenges in regulation
15	Kruse et al.	2020	Barriers to telemedicine	Systematic review	Telehealth challenges	Common barriers: cost, training, connectivity
16	Kwan et al.	2020	Adherence strategies	Literature	Treatment	Multi-faceted interventions are most

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			in chronic disease	review	adherence	effective
17	LeFevre et al.	2020	mHealth for maternal and child health	Landscape review	mHealth policies	Many LMICs lack sustained digital health frameworks
18	Maher et al.	2017	Adherence to TB treatment	Narrative review	TB treatment	Adherence aided by counseling, family support
19	Marcolino et al.	2018	Digital interventions in NCDs	Meta-review	mHealth effectiveness	mHealth tools modestly improve outcomes
20	Mboya et al.	2020	Adherence to antihypertensives in Tanzania	Cross-sectional	Medication adherence	Low income and polypharmacy reduce adherence
21	Modi et al.	2017	Barriers to NCD care in India	Mixed methods	Systemic barriers	Workforce shortages, costs limit care
22	Musoke et al.	2021	eHealth policy in Uganda	Policy review	eHealth governance	Weak regulation impairs sustainability
23	Niaz et al.	2020	mHealth for diabetes in LMICs	Scoping review	mHealth diabetes	SMS and apps improve self-care
24	Odendaal et al.	2020	Effectiveness of digital adherence tools	Realist review	Digital adherence	Tech helpful if contextually adapted
25	Sahu et al.	2021	Adherence in elderly with hypertension	Observational	Geriatric adherence	Age, memory issues hindered adherence
26	Suglo & Evans	2020	Self-management in T2D in Africa	Qualitative review	Diabetes self-management	Cultural beliefs and low resources hindered self-care
27	van Olmen et al.	2020	Implementation barriers to mHealth in LMICs	Scoping review	mHealth implementation	Challenges include policy gaps, tech cost, usability
28	Werfalli et al.	2020	Peer and CHW-led self-management support for diabetes	Systematic review	Peer/CHW support	Peer-led models improved adherence and glycemic control
29	Xiong et al.	2023	Digital health for NCDs in LMIC primary care	Review	Digital health in PHC	Digital tools enhance patient engagement, monitoring
30	Yasmin et al.	2020	SMS reminders for diabetes in Bangladesh	RCT	SMS reminders	SMS improved medication adherence and lifestyle