International journal of applied management and economics
Vol : 02 , N° 20 , June 2026
ISSN : 2509-0720

Adoption and Usability of Mobile Health Applications for Chronic Disease Management in Sub-Saharan and North Africa.

– **AUTHOR 1 :** YAKOUBI Fatima Ezzahra,
– **AUTHOR 2 :** BELKASMI Hanan,
– **AUTHOR 3 :** HANTEM Aziz,

(1) : Phd Student, National Business School of Business and Management, Ibn Zohr University, Agadir, Morocco.
(2) : Phd Student, National Business School of Business and Management, Ibn Zohr University, Agadir, Morocco.
(3) : Qualified Professor, National Business School of Business and Management, Ibn Zohr University, Agadir, Morocco.

Conflict of interest: The author reports no conflict of interest.

To quote this article: YAKOUBI .F E, BELKASMI .H & HANTEM .A (2026) « Adoption and Usability of Mobile Health Applications for Chronic Disease Management in Sub-Saharan and North Africa », IJAME : Volume 02, N° 20 | Pp: 321 – 333.

DOI : 10.5281/zenodo.20669116

Abstract

Background: The burden of chronic non-communicable diseases, including diabetes, hypertension, and HIV/AIDS, continues to rise across Sub-Saharan and North Africa while health system resources remain strained. Mobile health (mHealth) applications have attracted growing interest as scalable interventions to bridge care delivery gaps, yet adoption remains uneven and sustained clinical impact limited. Existing literature examines the two sub-regions largely in isolation, leaving cross-regional comparison absent. Objectives: This paper aims to examine the adoption dynamics, usability challenges, and clinical outcomes associated with mHealth applications for chronic disease management across Sub-Saharan and North Africa, and to identify the factors that facilitate or impede their sustained use within these contexts. Methods: A convergent mixed-methods design was adopted, combining a systematic literature review of 68 peer-reviewed and grey literature sources with five purposively selected case studies from Kenya, Nigeria, Ghana, Morocco, and Egypt. The Unified Theory of Acceptance and Use of Technology (UTAUT) framework was applied to identify key determinants of adoption. Results: mHealth tools demonstrate significant potential for improving patient engagement, medication adherence, and remote monitoring. However, adoption is consistently hampered by infrastructure deficits, low digital literacy, linguistic barriers, and culturally unadapted interfaces. Platforms embedded in formal care pathways and co-designed with target communities showed stronger and more sustained uptake than standalone tools. Conclusions: Well-designed, contextually adapted, and health-system-integrated mHealth solutions can improve chronic disease outcomes across both sub-regions. Distinct policy recommendations are offered for North Africa and Sub-Saharan Africa, targeting policymakers, app developers, and healthcare institutions aiming to scale mHealth equitably and sustainably.

Keywords: mhealth, Adoption attitude, UTAUT, Africa, digital health, patient outcomes

1 Background

The global burden of chronic non-communicable diseases (NCDs) has shifted progressively toward low- and middle-income countries. In Sub-Saharan Africa (SSA) and North Africa, conditions such as type 2 diabetes, hypertension, cardiovascular disease, and HIV/AIDS account for a growing share of morbidity and mortality, placing enormous pressure on health systems already struggling with limited infrastructure, physician shortages, and uneven geographic coverage. The World Health Organization estimates that NCDs are responsible for over 37% of deaths in Africa, with projections indicating this figure will continue to rise over the next two decades (World Health Organization, 2022).

Against this backdrop, mobile health applications, software tools designed to deliver health services and information through smartphones and mobile devices, have garnered considerable attention as low-cost, scalable interventions capable of bridging existing gaps in care delivery (Mehl & Labrique, 2014). With mobile phone penetration exceeding 80% in many African countries and smartphone adoption growing steadily, the technological infrastructure for mHealth deployment is increasingly favorable (GSMA, 2023). Yet the translation of this promise into sustained clinical impact remains uneven: initial uptake of mHealth tools is often followed by rapid abandonment, limited integration into formal care pathways, and incomplete realization of expected health outcomes (Free et al., 2013; Tomlinson et al., 2013).

The literature on mHealth adoption in Africa remains fragmented along regional lines. Studies tend to focus either on Sub-Saharan Africa or on North Africa in isolation, obscuring the comparative insights a cross-regional perspective can offer, particularly as both regions face a converging NCD burden and increasingly similar mobile penetration dynamics. Existing reviews also tend to examine adoption through a single theoretical or methodological lens, without integrating both quantitative and qualitative approaches. The result is a body of evidence that is geographically partial and methodologically siloed.

This paper addresses both limitations. It examines Sub-Saharan and North Africa together as a comparative unit, combining a systematic review of 68 studies with five purposively selected case studies to offer an analysis that is regionally comprehensive and empirically grounded. Three core inquiries guide the paper: What factors facilitate or impede mHealth adoption? How do usability characteristics shape sustained engagement? And what evidence exists regarding impact on patient outcomes?

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), provides the primary theoretical lens. UTAUT posits those four constructs, performance expectancy, effort expectancy, social influence, and facilitating conditions, are the primary determinants of behavioral intention to use a technology (Venkatesh et al., 2003). In African mHealth contexts, these constructs are shaped by health literacy, digital literacy, language barriers, community norms, and infrastructure constraints (Abaza & Marschollek, 2017; Aranda-Jan et al., 2014; Chib et al., 2015).

2 Methodology

2.1 Research Design

This study adopts a convergent mixed-methods design, integrating a systematic literature review with purposive, illustrative case study analysis. A narrative synthesis was selected over quantitative meta-analysis given the heterogeneity of mHealth interventions and outcomes across the two sub-regions. Case studies provide the qualitative depth that the literature review alone cannot deliver, and combining both approaches enables triangulation of findings. The review process followed the PRISMA 2020 reporting guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) (Figure 1).

2.2 Literature Search Strategy

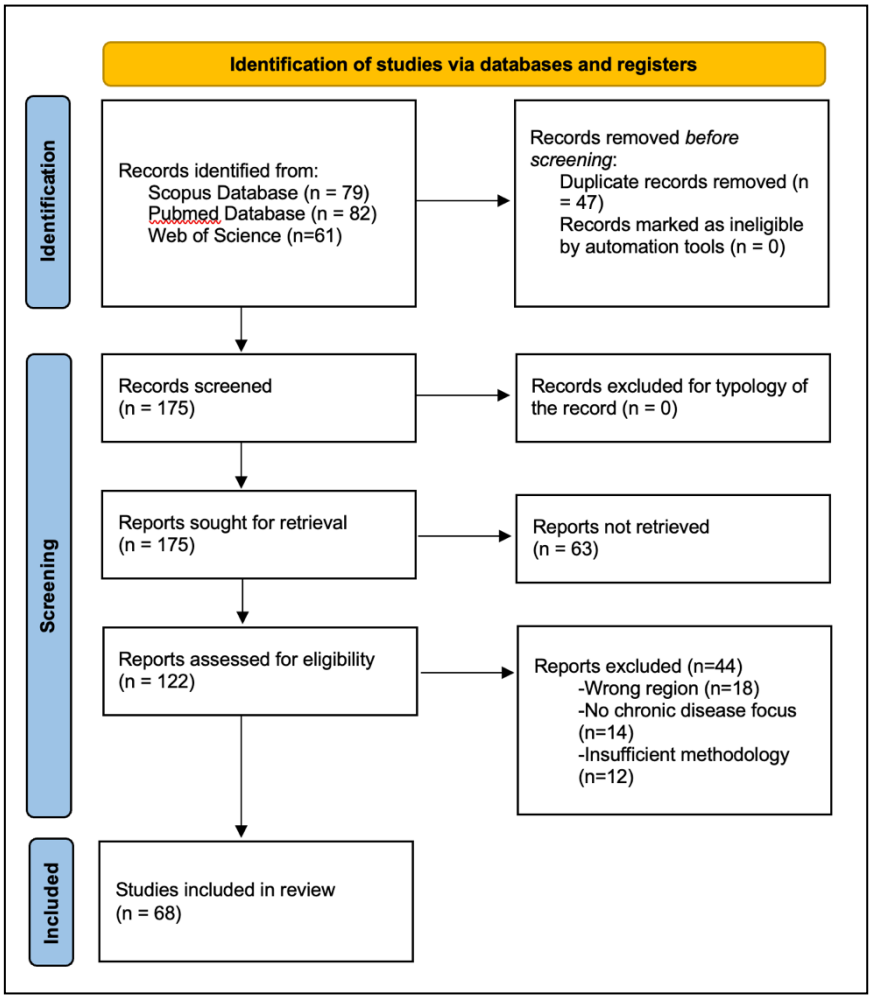
A systematic search was conducted across PubMed, Scopus, Google Scholar, and the WHO Global Digital Health Index, supplemented by grey literature from the WHO, the GSMA Intelligence portal, and country health ministry publications. Searches were conducted between January and March 2025 using queries combining mHealth terminology, target chronic disease conditions, and geographic scope terms for Sub-Saharan and North African countries. Studies published between 2015 and 2025 were prioritized, with foundational works before 2015 included where their contribution remained authoritative (Venkatesh et al., 2003; Wyber et al., 2015).

2.3 Inclusion and Exclusion Criteria

From an initial pool of over 222 publications, 68 were selected following a two-stage screening process. Studies were included if they: (a) concerned mobile health applications or SMS-based health tools; (b) targeted chronic disease prevention, management, or adherence outcomes; (c) were conducted in Sub-Saharan or North African countries; and (d) reported empirical data on adoption, usability, or patient outcomes. Studies were excluded if they focused exclusively on

maternal or child health without chronic disease components, were conducted outside the target regions without explicit transferability arguments, or lacked sufficient methodological documentation. Full-text review was applied to 112 studies, with final inclusion decisions reached by consensus between the two lead authors.

FIGURE 1. PRISMA flow diagram for the literature review (Page et al., 2021)



2.4 Case Study Selection and Data Collection

Five platforms were purposively selected to maximize contextual variation: M-Tiba (Kenya), mDoc (Nigeria), MOTECH (Ghana), Dabadoc (Morocco), and Vezeeta/mDiabetes (Egypt). Selection criteria included documented deployment at scale or within a formally evaluated pilot, coverage of at least one chronic disease condition, geographic representation across both sub-regions, and availability of published evaluations or organizational reports. Together, the platforms span three sub-regions, four disease categories, and a range of deployment models from government-partnered rollouts to private digital health startups.

2.5 Analytical Framework

For the literature review, thematic synthesis was applied, with findings coded deductively against the four UTAUT constructs and inductively to capture emergent themes such as cultural adaptation and health system integration. For the case studies, a structured template was applied across all five platforms covering deployment context, target population, chronic disease focus, adoption metrics, usability features, documented outcomes, and barriers and facilitators. Cross-case comparison was conducted by mapping each platform against the same UTAUT constructs (Wyber et al., 2015).

3 Results

The most fundamental barrier to mHealth adoption is the inconsistency of telecommunications infrastructure. While urban centers have experienced rapid improvements in mobile broadband access, rural and peri-urban areas face unreliable coverage, high data costs, and frequent power outages (GSMA, 2023). In Nigeria, despite a national mobile penetration rate exceeding 85%, patients in northern rural regions are significantly less likely to report sustained mHealth use, with connectivity cited as the primary obstacle (Abaza & Marschollek, 2017). Energy poverty compounds this challenge: in many SSA countries, fewer than half of rural households have reliable electricity, driving interest in offline-capable and USSD-based tools. M-Tiba's original USSD design was instrumental in its early scaling precisely because it did not require internet access (Chib et al., 2015).

Digital literacy varies enormously across NCD populations. Older adults, who bear a disproportionate burden of chronic disease, are significantly less likely to adopt mHealth tools, not due to unwillingness but due to limited prior exposure to digital interfaces (Aranda-Jan et al., 2014; Tomlinson et al., 2013). This has critical implications for application design, training protocols, and the role of community health workers as digital navigators.

Linguistic diversity presents a further usability barrier. The vast majority of commercially available health applications are designed in English, French, or Arabic without accommodating local languages or dialects (Abaza & Marschollek, 2017). In North African contexts, Islamic health values shape attitudes toward diet, fasting, and pharmaceutical use, and applications designed without cultural sensitivity may conflict with users' health beliefs. Moroccan users of Dabadoc consistently cited Arabic and Darija language support as decisive for their engagement (Boubekri et al., 2024; Chib et al., 2015; Hantem et al., 2024).

Institutional support is a critical facilitating condition. Applications endorsed or prescribed by healthcare providers are substantially more likely to be adopted and sustained. In Egypt, integration of chronic disease apps into primary care protocols was identified as a key success factor, with clinician recommendation cited as patients' primary motivation for adoption (Marcolino et al., 2018; Venkatesh et al., 2003).

4 Case Studies from Sub-Saharan and North Africa

4.1 M-Tiba Health Platform – Kenya

Launched in 2016 through a partnership between Safaricom, PharmAccess, and CarePay, M-Tiba is a mobile health wallet incorporating chronic disease management features including appointment reminders, medication adherence support, and health education messaging. By 2023, it had enrolled over six million users, making it one of the continent's most widely adopted mHealth platforms. Its integration with M-Pesa lowered the effort expectancy barrier substantially, while USSD functionality extended access to users without smartphones. However, chronic disease-specific features were used by a relatively small share of the enrolled base, and health literacy interventions showed modest engagement among older users (Abajobir et al., 2021).

4.2 Dabadoc Teleconsultation Platform – Morocco

Founded in 2013, Dabadoc evolved from an appointment booking service into a comprehensive digital health platform offering teleconsultation, medical record management, and chronic disease follow-up. By 2024 it reported over ten million registered users across Morocco. Its Arabic and French interfaces were cited as key differentiators for adoption. However, rural uptake remained limited, reflecting the urban concentration of both internet access and the platform's physician network. Currently available in Tunisia and Algeria (Jallal et al., 2023).

4.3 mDoc – Nigeria

Founded in 2013 in Lagos, mDoc operates through its CompleteHealth™ application, providing patients with diabetes and hypertension 24/7 access to virtual coaches, personalized self-care support, and multidisciplinary providers. By integrating tele-education, digital nudges, and community-based support hubs, mDoc represents a promising model for bridging chronic disease care gaps in resource-constrained settings. However, peer-reviewed outcome evidence remains limited, underscoring the need for rigorous evaluation to validate its effectiveness (Jennifer Orisakwe, 2023).

4.4 MOTECH – Ghana

Launched in 2009 through a partnership between the Ghana Health Service, Grameen Foundation, and Columbia University, MOTECH comprised the Mobile Midwife application, delivering voice-based health messages in local languages, and the Client Data Application for frontline health worker tracking. A cost-effectiveness analysis found a 100% probability of cost-effectiveness at Ghana's willingness-to-pay threshold, with potential to save nearly 60,000 lives over ten years (Willcox et al., 2019). On the NCD front, the NCD Care application, introduced in 2022 through collaboration between PharmAccess Foundation, Luscii Healthtech, and the University of Ghana Medical Centre, enabled patients with hypertension and diabetes to submit daily readings for real-time clinician monitoring across three hospitals (GHANA NEWS AGENCY, 2022).

4.5 Vezeeta and mDiabetes Programme – Egypt

Vezeeta, founded in 2012, enables appointment booking, teleconsultation, and medication delivery across 41 specialities and four million patients in six countries. Egypt's mDiabetes programme, launched in 2016 under the WHO/ITU Be He@lthy, Be Mobile partnership, delivered evidence-based SMS messages on diabetes self-management, with a dedicated mRamadan module addressing culturally specific fasting practices. Evaluation data showed 59% of participants achieved a mean HbA1c reduction of 0.45%, with 70% rating the service as useful, among the strongest documented clinical outcomes from any mHealth programme in Africa (Deepa V Narwani, 2020; World Health Organization, 2016).

5 Discussion

The synthesis of findings reveals a landscape of considerable promise but persistent structural challenges. This section interprets findings through the four UTAUT constructs before drawing out cross-cutting themes and study limitations.

5.1 Performance Expectancy

Performance expectancy emerged as the most influential predictor of sustained adoption. The strongest evidence comes from Egypt's mDiabetes program, where 59% of participants showed measurable HbA1c reductions and 70% rated the service as useful (Deepa V Narwani, 2020; World Health Organization, 2016). The program's integration into national infrastructure, backed by WHO and ITU, created institutional conditions under which performance expectancy could be validated and communicated through trusted channels. By contrast, mDoc in Nigeria

presents a case where performance expectancy remains aspirational: its design is clinically coherent, yet limited peer-reviewed outcome data constrain users' and providers' ability to form evidence-based expectations of benefit (Jennifer Orisakwe, 2023). The evidence suggests performance expectancy in low-resource settings requires deliberate investment in evaluation and feedback to user communities.

5.2 Effort Expectancy

Effort expectancy is acutely shaped by digital literacy, language, and interface design. Patients over 55, who bear a disproportionate NCD burden, are significantly less likely to adopt mHealth tools due to limited digital interface exposure (Aranda-Jan et al., 2014). M-Tiba addressed this by building USSD functionality within a familiar M-Pesa environment, while Dabadoc invested in Arabic and French interfaces as its primary effort-reduction strategy (Abajobir et al., 2021; Jallal et al., 2023). These approaches address different dimensions of effort expectancy, and the evidence suggests effective design in low-resource settings requires simultaneous attention to connectivity requirements, interface language, and cognitive load.

5.3 Social Influence

Social influence operates through several mechanisms. Clinician endorsement is the most consistently documented: applications recommended by trusted providers are substantially more likely to be adopted and sustained, as demonstrated by Egypt's mDiabetes protocol integration (Marcolino et al., 2018; Venkatesh et al., 2003). Community health workers represent a second underutilized vector: MOTECH's Client Data Application engaged frontline workers as active participants rather than passive referrers, amplifying social endorsement within communities (Willcox et al., 2019). Community and household norms, including gender dynamics and institutional trust, further shape whether tools are perceived as legitimate, and designs that ignore these social architectures risk producing tools that are technically sound but socially inert.

5.4 Facilitating Conditions

Facilitating conditions represent the most binding constraint on adoption. Connectivity infrastructure remains deeply uneven, with rural populations facing coverage gaps, high data costs, and energy poverty (Abaza & Marschollek, 2017; GSMA, 2023). M-Tiba's USSD architecture and MOTECH's voice-based messaging both reflect deliberate choices to operate within existing constraints rather than assume unavailable connectivity (Abajobir et al., 2021;

Willcox et al., 2019). Dabadoc's limited rural reach illustrates the cost of infrastructure dependence (Jallal et al., 2023). At the organizational level, the NCD Care application in Ghana demonstrates how multi-institutional partnership, between PharmAccess, Luscii Healthtech, and the University of Ghana Medical Centre, can provide the scaffolding that individual developers rarely possess (GHANA NEWS AGENCY, 2022). Moving from pilot to scale is fundamentally an institutional challenge as much as a technical one.

5.5 Cross-Cutting Themes

Three cross-cutting themes transcend individual UTAUT constructs. First, co-design and local adaptation: applications developed with target communities consistently outperform those transferred from high-income settings. The mDiabetes mRamadan module exemplifies how cultural specificity translates directly into user relevance (World Health Organization, 2016). Second, health system integration: apps disconnected from formal care pathways show high initial uptake followed by rapid attrition, while clinically embedded platforms demonstrate more durable engagement. Third, equity-conscious design: current adoption patterns show a pronounced urban and socioeconomic gradient, systematically underserving the populations with the highest NCD burden. This is a political and resource allocation challenge requiring explicit attention from funders and governments, not merely a design problem.

5.6 Limitations

Several limitations warrant acknowledgement. First, reliance on published evaluations introduces publication bias toward platforms with positive outcomes; failed or discontinued initiatives are underrepresented, likely inflating apparent success rates. Second, heterogeneity of outcome measurement limits cross-study comparability and precludes quantitative synthesis. Third, the five case studies cannot represent the full landscape of mHealth deployment; Francophone West Africa and the Horn of Africa are notably underrepresented. Fourth, this paper is an expanded and revised version of a conference proceedings paper; readers should interpret the scope of claims accordingly. Future research should prioritize prospective, multi-site evaluations with standardized outcome measures.

Conclusion

Mobile health applications represent a genuinely promising instrument for addressing the growing chronic disease burden in Sub-Saharan and North Africa. The evidence confirms that well-designed, contextually adapted, and health-system-integrated mHealth tools can improve medication adherence, patient engagement, and selected clinical outcomes. The five case studies illustrate both the variety of approaches being explored and the structural challenges that constrain impact.

In North Africa, where infrastructure is comparatively stronger and urban connectivity higher, the priority policy lever is formal integration of validated mHealth tools into national chronic disease protocols, as Egypt's mDiabetes program demonstrates. Governments should leverage primary care networks to mandate clinician endorsement and invest in culturally adapted interfaces, including local dialect support, as a condition of public procurement. In Sub-Saharan Africa, where infrastructure gaps are more acute, the imperative is equity by design: funding bodies should require offline functionality, low data consumption, and accessibility for users with limited literacy as baseline investment criteria, while community health workers should be formally repositioned as digital health navigators within national workforce strategies.

Moving forward demands a shift from technology-led to health-system-led thinking: beginning not with the app, but with the patient, the community, and the health system. This reorientation, combined with the entrepreneurial energy evident across the continent's digital health ecosystem, offers genuine grounds for optimism about the future of mHealth for chronic disease management in Africa.

References

Abajobir, A., de Groot, R., Wainaina, C., Njeri, A., Maina, D., Njoki, S., Mbaya, N., Donfouet, H. P. P., Pradhan, M., & Janssens, W. (2021). The impact of i-PUSH on maternal and child health care utilization, health outcomes, and financial protection: Study protocol for a cluster randomized controlled trial based on financial and health diaries data. *Trials*, *22*(1). Scopus. https://doi.org/10.1186/s13063-021-05598-7

Abaza, H., & Marschollek, M. (2017). mHealth Application Areas and Technology Combinations: A Comparison of Literature from High and Low/Middle Income Countries. *Methods of Information in Medicine*, *56*(S 01), e105–e122. https://doi.org/10.3414/ME17-05-0003

Aranda-Jan, C. B., Mohutsiwa-Dibe, N., & Loukanova, S. (2014). Systematic review on what works, what does not work and why of implementation of mobile health (mHealth) projects in Africa. *BMC Public Health*, *14*(1), 188. https://doi.org/10.1186/1471-2458-14-188

Boubekri, Z., Niyonsaba, A., Mouzoun, F. Z., Jallal, M., Serhier, Z., & Othmani, M. B. (2024). Understanding Patient Perspectives on Mhealth Adoption in Morocco: Willingness, Interest, and Reasons. *2024 International Conference on Circuit, Systems and Communication (ICCSC)*, 1–4. https://doi.org/10.1109/ICCSC62074.2024.10616773

Chib, A., Van Velthoven, M. H., & Car, J. (2015). mHealth Adoption in Low-Resource Environments: A Review of the Use of Mobile Healthcare in Developing Countries. *Journal of Health Communication*, *20*(1), 4–34. https://doi.org/10.1080/10810730.2013.864735

Deepa V Narwani. (2020). *Egypt embraces digital transformation*. https://www.worldhealthexpo.com/insights/health-innovation/egypt-embraces-digital-transformation

Free, C., Phillips, G., Galli, L., Watson, L., Felix, L., Edwards, P., Patel, V., & Haines, A. (2013). The Effectiveness of Mobile-Health Technology-Based Health Behaviour Change or Disease Management Interventions for Health Care Consumers: A Systematic Review. *PLoS Medicine*, *10*(1), e1001362. https://doi.org/10.1371/journal.pmed.1001362

GHANA NEWS AGENCY. (2022). *NCD Care app improves access to hypertension, diabetes care in Ghana*. https://gna.org.gh/2022/09/ncd-care-app-improves-access-to-hypertension-diabetes-care-in-ghana/

GSMA. (2023). *The Mobile Economy Sub-Saharan Africa 2023*.

Hantem, A., Emzi, K., Youssoufi, N., Emzi, K., Mkik, M., & Outaaza, K. (2024). Factors Influencing Patient Satisfaction with the Use of Teleconsultation in Morocco. *Lect. Notes Networks Syst.*, *1108 LNNS*, 441–451. https://doi.org/10.1007/978-981-97-6588-1_33

Jallal, M., Serhier, Z., Berrami, H., & Bennani Othmani, M. (2023). Current State and Prospects of Telemedicine in Morocco: Analysis of Challenges, Initiatives, and Regulatory Framework. *Cureus*. https://doi.org/10.7759/cureus.50963

Jennifer Orisakwe. (2023). *Nigeria embraces healthtech solutions*. https://www.worldhealthexpo.com/insights/medical-technology/nigeria-embraces-healthtech-solutions

Marcolino, M. S., Oliveira, J. A. Q., D'Agostino, M., Ribeiro, A. L., Alkmim, M. B. M., & Novillo-Ortiz, D. (2018). The Impact of mHealth Interventions: Systematic Review of Systematic Reviews. *JMIR mHealth and uHealth*, *6*(1), e23. https://doi.org/10.2196/mhealth.8873

Mehl, G., & Labrique, A. (2014). Prioritizing integrated mHealth strategies for universal health coverage. *Science*, *345*(6202), 1284–1287. https://doi.org/10.1126/science.1258926

Tomlinson, M., Rotheram-Borus, M. J., Swartz, L., & Tsai, A. C. (2013). Scaling Up mHealth: Where Is the Evidence? *PLoS Medicine*, *10*(2), e1001382. https://doi.org/10.1371/journal.pmed.1001382

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward A Unified View. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Willcox, M., Moorthy, A., Mohan, D., Romano, K., Hutchful, D., Mehl, G., Labrique, A., & LeFevre, A. (2019). Mobile Technology for Community Health in Ghana: Is Maternal Messaging and Provider Use of Technology Cost-Effective in Improving Maternal and Child Health Outcomes at Scale? *Journal of Medical Internet Research*, *21*(2), e11268. https://doi.org/10.2196/11268

World Health Organization. (2016). *"Be He@lthy Be Mobile" for diabetes mellitus (mDiabetes) in Egypt*. https://www.emro.who.int/ehealth/ehealth-news/mdiabetes-egypt.html

World Health Organization. (2022). *Noncommunicable Diseases Progress Monitor 2022* (1st ed). World Health Organization.

Wyber, R., Vaillancourt, S., Perry, W., Mannava, P., Folaranmi, T., & Celi, L. A. (2015). Big data in global health: Improving health in low- and middle-income countries. *Bulletin of the World Health Organization*, *93*(3), 203–208. https://doi.org/10.2471/BLT.14.139022