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Digital health equity: Access barriers and ethical challenges for low-income and minority communities in the United States

Francis Makut [1, *], Maame Araba Oduro [2], Gerald Nkogbu [3] and Freda Frimpongmaa Botwe [4]

[1] *University of Notre Dame, Indiana, USA.*
[2] *Social Justice and Rural Health Initiative, NC, USA.*
[3] *Fox Chase Cancer Center, Philadelphia, USA.*
[4] *Kwame Nkrumah University of Science and Technology, Ghana.*

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Abstract

The rapid expansion of digital health technologies has transformed healthcare delivery in the United States, offering new opportunities to improve access, efficiency, and quality of care. However, these advances have also exacerbated existing health inequities, particularly among marginalized and underserved populations. This study critically examines digital health equity by synthesizing evidence on disparities in access, utilization, and outcomes associated with telemedicine, mobile health applications, electronic health records, and data-driven health systems. The analysis reveals that structural barriers such as unequal broadband access, gaps in digital literacy, socioeconomic disadvantage, and systemic bias embedded in technological design significantly constrain the equitable distribution of digital health benefits. While digital tools have demonstrated potential to reduce geographic and logistical barriers to care, their effectiveness is uneven and often contingent on broader social determinants of health. The study further highlights governance and policy gaps, including insufficient regulatory oversight, limited community engagement in technology development, and fragmented accountability across public and private actors. Addressing digital health inequities, therefore, requires more than technological innovation; it demands coordinated policy action, inclusive design practices, and sustained investment in digital infrastructure and skills. The paper concludes that advancing digital health equity is essential to ensuring that digital transformation contributes to improved population health rather than reinforcing existing patterns of exclusion.

Keywords: Digital Health; Health Equity; Telemedicine; Digital Divide; Healthcare Access

1. Introduction

The rapid digitalization of healthcare in the United States has transformed medical service delivery, creating opportunities to improve health outcomes while exposing persistent inequities in access and use. Digital health technologies, including telemedicine platforms, electronic health records, mobile health applications, and AI-driven diagnostic tools, are now central to modern healthcare delivery (Kim and Backonja, 2025). Yet these technologies are not equitably available. Low-income and minority communities face substantial barriers to access and engagement (Blount et al., 2023). The COVID-19 pandemic accelerated the adoption of digital health solutions, highlighting gaps in technological infrastructure, digital literacy, and healthcare access among vulnerable populations (Kaihlanen et al., 2022). These disparities go beyond technology, reflecting power imbalances, usability challenges, and mistrust in institutions, all of which undermine human dignity in healthcare (Koehle et al., 2022).

* Corresponding author: Francis Makut

Human dignity in healthcare encompasses the right to access services, participate in health decisions, receive respectful treatment, and obtain care that recognizes individual autonomy and cultural values (Hayes, 2025). Low-income and minority populations face compounded disadvantages rooted in historical inequities, systemic discrimination, and resource deprivation, which manifest in digital health disparities (Larnyo et al., 2025). African American, Hispanic, Native American, and other marginalized communities experience higher rates of chronic disease yet encounter greater obstacles to using digital health tools for disease management and preventive care (Raza et al., 2023). Algorithmic bias in AI-based clinical systems further entrenches inequities by producing predictions that disadvantage minority patients (Joseph, 2025). The digital divide encompasses not only connectivity but also the adequacy, acceptability, and affordability of technologies, shaping whether digital health interventions reduce or exacerbate disparities (Hollimon et al., 2025).

Despite growing attention to digital health equity, gaps remain in understanding how access barriers and ethical challenges affect the human dignity of low-income and minority communities in the U.S. Research has documented disparities in telehealth use and technological access, but human rights perspectives are rarely integrated with digital health equity scholarship (Sun et al., 2020). Structural inequities, algorithmic bias, and institutional power imbalances continue to undermine human dignity in digital healthcare, especially for communities historically subjected to medical exploitation and systemic discrimination (Cannon, 2021). Moreover, ethical considerations are often overlooked when implementing digital health interventions in underserved communities, with limited attention to cultural relevance, community engagement, and meaningful participation (Kim and Backonja, 2024). This gap is particularly pressing as digital health becomes the dominant mode of care, risking a two-tiered system where vulnerable populations are excluded from quality services (Wilson et al., 2024).

This study examines the relationship between digital health equity and human dignity, focusing on access barriers and ethical challenges facing low-income and minority communities in the United States. The study shall explore the factors limiting equitable participation in digital healthcare from an ethical perspective while paying close attention to the dynamics surrounding the telehealth expansion after the COVID-19 pandemic. Through this analysis, the study synthesizes current knowledge, identifies persistent gaps, and informs the development of equitable and ethically grounded digital health policies.

The study focuses on digital health equity and human dignity within low-income and minority communities in the U.S., examining access barriers and ethical challenges reported in peer-reviewed literature from 2020–2025. It emphasizes telehealth, electronic health records, mobile health applications, and AI-driven technologies, particularly during and after the COVID-19 pandemic (Ternes et al., 2025). The research does not cover healthcare systems outside the U.S. or analyze specific clinical outcomes or the cost-effectiveness of particular digital health interventions.

2. Methodology

2.1. Research Design

This study used a systematic literature review to examine digital health equity and human dignity, focusing on access barriers and ethical challenges faced by low-income and minority communities in the United States. Given the fast-paced evolution of digital health technologies and the urgent need for evidence-based policies, this methodology provides the rigor necessary to inform both scholarship and practice.

2.2. Data Sources and Search Strategy

Literature was collected through systematic searches of multiple academic databases, including Google Scholar, PubMed/MEDLINE, Web of Science, Scopus, and ResearchGate, covering medicine, public health, health informatics, bioethics, and social sciences. The search strategy was developed iteratively, drawing on preliminary literature and refined to capture the study's core concepts. Searches combined key terms in four thematic areas: digital health technologies ("digital health," "telehealth," "mHealth," "electronic health records," "artificial intelligence," "algorithmic bias"), equity and access ("health equity," "health disparities," "digital divide," "access barriers"), population descriptors ("low-income," "minority communities," "African American," "Hispanic," "vulnerable populations"), and ethics and rights-based language ("human dignity," "human rights," "ethical challenges," "health justice") and contextual factors ("COVID-19 pandemic," "rural health," "digital literacy," "broadband access").

Forward and backward citation tracking of seminal articles ensured comprehensive coverage. Manual searches of key journals such as npj Digital Medicine, Journal of the American Medical Informatics Association, Health and Human Rights, and Journal of Telemedicine and Telecare also supplemented database searches. Grey literature from agencies

like the NIH and CDC was reviewed for context, though only peer-reviewed publications were included in the final analysis.

2.3. Inclusion and Exclusion Criteria

Inclusion criteria required that studies: be published between 2015 and 2025, focus on digital health, equity, access barriers, or ethical challenges within the U.S., address low-income or minority populations, be published in peer-reviewed outlets, and be in English. Studies were excluded if they focused solely on technical efficacy, examined international contexts, predated 2015, were opinion pieces or non-peer-reviewed commentaries, or addressed administrative digital systems unrelated to human health and dignity. Titles and abstracts were screened for relevance, followed by full-text review to confirm alignment with research objectives.

2.4. Data Analysis

Data from the 22 selected articles were analyzed using a narrative synthesis, organizing findings according to research objectives and emerging patterns. Relevant information was coded into thematic clusters: digital health access barriers, including technological deficits, economic constraints, digital literacy gaps, and systemic discrimination; ethical challenges, including algorithmic bias, power imbalances, institutional mistrust, and threats to human dignity; population-specific impacts on African American, Hispanic, rural, and low-income communities; and frameworks, interventions, and policy recommendations for advancing equity while preserving dignity. Within each category, evidence was synthesized to highlight convergent findings, contradictions, gaps, and areas needing further research. Particular attention was given to studies on the COVID-19 pandemic as a pivotal moment in telehealth adoption and equity challenges.

2.5. Ethical Considerations

This study posed minimal ethical risk, relying entirely on publicly available literature rather than primary data. No IRB approval was required. Nevertheless, ethical principles guided the research. The study aimed to represent marginalized communities accurately without perpetuating stigma or deficit-based narratives. Citation practices acknowledged diverse scholars, including those from underrepresented backgrounds.

2.6. Limitations of the Study

Several limitations shape the interpretation of findings. Restricting to English-language publications may exclude relevant work on immigrant or non-English-speaking communities. Rapid changes in technology and policy may not yet be reflected in peer-reviewed literature. Systematic review methodology cannot address questions requiring primary empirical data, such as local barriers or untested interventions. Variability in terminology and frameworks across studies posed challenges for consistent categorization. The focus on U.S. contexts limits transferability to other health systems but allows detailed analysis of U.S.-specific structural factors. Finally, publication bias may overrepresent studies showing disparities or intervention failures, potentially providing an incomplete picture of digital health equity challenges.

3. Key Findings and Discussions

3.1. Multidimensional Nature of Digital Health Access Barriers

The findings show that digital health access barriers extend well beyond basic connectivity, reflecting an interlocking set of infrastructural, economic, educational, and systemic constraints that limit equitable participation for low-income and minority communities. Rather than operating in isolation, these barriers reinforce one another, producing cumulative disadvantage. Digital health inequity manifests across five interrelated dimensions: infrastructure availability, resource adequacy, practical accessibility, cultural acceptability, and affordability (Hollimon et al., 2025). Together, these factors shape who can meaningfully engage with digital healthcare and who is left behind. Rural communities face persistent broadband deficits, while many urban neighborhoods experience concentrated technological deprivation despite physical proximity to healthcare systems and digital resources.

Infrastructure gaps remain a foundational barrier. Large segments of low-income households lack reliable high-speed internet, functional computing devices, or smartphones capable of supporting telehealth platforms. Among African American communities, disparities in internet access and device ownership closely track socioeconomic status, with low-income households experiencing significantly lower connectivity than higher-income counterparts (Larnyo et al., 2025). These gaps became especially visible during the COVID-19 pandemic, when telehealth expanded rapidly and technological prerequisites effectively excluded populations already facing elevated health risks. Rural communities

confront additional challenges linked to limited broadband coverage, unstable cellular networks, and geographic isolation, which compound transportation barriers rather than alleviate them (Ko et al., 2023). Even when connectivity exists, device limitations persist, as many individuals rely on smartphones with restricted data plans, small screens, and insufficient storage, all of which undermine usability for complex health applications.

Economic constraints further restrict access by shaping both initial adoption and sustained use of digital health technologies. For low-income households, the costs of devices, internet service, data plans, and technical support compete with essential expenditures such as housing, food, and medication. These financial pressures extend beyond acquisition to include maintenance, upgrades, and troubleshooting, creating ongoing strain (Blount et al., 2023). Digital-first healthcare models also impose hidden burdens, requiring patients to manage multiple platforms, credentials, and interfaces while investing significant time learning unfamiliar systems. These demands disproportionately affect workers in precarious employment, who often lack schedule flexibility, private spaces for virtual visits, or job security that allows them to prioritize healthcare needs.

Digital literacy presents another critical barrier. Effective engagement with digital health systems requires more than basic technical skills; it demands the ability to assess health information credibility, navigate poorly designed portals, manage privacy settings, and resolve technical problems independently (Wilson et al., 2024). Older adults in minority communities face compounded challenges as age-related unfamiliarity intersects with educational inequities and limited prior exposure to digital tools. Language barriers further restrict access for immigrant and non-English-speaking populations, as many platforms offer limited translation and poorly adapted interfaces. The cognitive burden imposed by fragmented systems—often requiring separate platforms for appointments, prescriptions, test results, and communication—can overwhelm individuals managing chronic illness or mental health conditions, reducing sustained engagement (Kaihlanen et al., 2022).

Systemic discrimination shapes access through design assumptions and institutional practices that privilege certain users while marginalizing others. Digital health platforms often presume stable housing, reliable connectivity, high literacy, and familiarity with dominant biomedical norms, assumptions that disadvantage communities whose lived realities differ from these expectations (Koehle et al, 2022). Institutional policies that require digital participation for scheduling, communication, or medication refills without offering alternatives effectively exclude patients lacking technological capacity. During the rapid telehealth expansion prompted by COVID-19, many systems prioritized speed over equity, deploying platforms without sufficient attention to inclusive design, community consultation, or user support (Ternes et al., 2025).

3.2. Ethical Challenges: Algorithmic Bias and Threats to Human Dignity

Algorithmic bias emerges as a central ethical challenge, threatening both health equity and human dignity through discrimination embedded in artificial intelligence systems used for diagnosis, risk assessment, and resource allocation. Algorithms trained on historical data inevitably reproduce existing inequities, creating feedback loops in which biased predictions shape care delivery and generate further skewed data (Joseph, 2025). The proprietary nature of many algorithms deepens these harms by limiting transparency, preventing scrutiny, and restricting opportunities for challenge or correction. Racial bias has been documented in tools that underestimate illness severity among Black patients, perform less accurately for darker skin tones, or allocate fewer resources to minority communities based on utilization patterns that reflect access barriers rather than actual need (Chin et al., 2023).

These biases stem from structural failures in data collection and model development. Training datasets frequently overrepresent affluent white populations while underrepresenting minority groups, resulting in models optimized for dominant populations. The use of proxy variables such as healthcare spending embeds historical discrimination into algorithmic logic, misclassifying disparities as differences in need (Alderman et al., 2025). Homogeneity among developers further contributes to bias, as design choices reflect unexamined assumptions and blind spots. Validation processes that fail to test performance across diverse populations allow biased systems to be deployed widely despite documented harms.

Power imbalances within digital health ecosystems constitute another ethical concern. Decision-making authority is concentrated among technology firms and healthcare institutions, while patient voices and community knowledge are marginalized. Digital tools are typically adopted through top-down processes driven by efficiency and commercial priorities, with limited engagement from the populations most affected (Kim and Backonja, 2024). Low-income and minority communities exert little influence over platform design, data use, or algorithmic decision-making. These imbalances extend to data governance, where patient information is extracted and monetized with minimal patient control or transparency.

Mandatory digital engagement further erodes autonomy. As healthcare systems require portal use, telehealth participation, or app-based communication as conditions of care, patients are effectively coerced into digital participation regardless of readiness or preference. When refusal results in delayed or denied care, meaningful consent is undermined, violating core principles of autonomy and respect (Hayes, 2025). For patients reliant on safety-net providers, limited alternatives intensify this coercion, forcing acceptance of systems that may be inaccessible or misaligned with patient values.

Institutional mistrust compounds these ethical challenges. Minority communities carry collective memories of medical exploitation and ongoing discrimination that justify skepticism toward new technologies promoted by healthcare institutions (Koehle et al., 2022). Contemporary experiences of unequal treatment reinforce fears that digital systems may replicate existing harms. Privacy concerns are especially salient for communities subjected to surveillance and immigration enforcement, as digital data collection raises legitimate fears of misuse. The commercialization of health data further deepens mistrust when patients recognize that data serve multiple institutional interests beyond patient care.

Together, these dynamics pose direct threats to human dignity. Dignity in healthcare entails respect, autonomy, participation, privacy, and equitable access. Digital systems undermine dignity when they exclude individuals through technological requirements unrelated to health needs, signaling that some lives are less worthy of accommodation (Sun et al., 2020). Platforms that fail to account for linguistic diversity, disability, cultural practices, or resource constraints reflect institutional disregard for the equal moral standing of marginalized communities.

3.3. Population-Specific Impacts and Differential Vulnerabilities

African American communities experience distinct digital health disadvantages shaped by legacies of segregation, educational inequity, wealth gaps, and healthcare discrimination. Disparities in broadband access and device ownership persist even after accounting for income, translating into reduced access to telehealth, patient portals, and remote monitoring tools (Larnyo et al., 2025). Algorithmic bias disproportionately affects these communities, as predictive models trained on skewed data underestimate health needs and distort care recommendations. Historical exploitation and ongoing discrimination reinforce institutional mistrust, heightening concerns about data privacy, algorithmic fairness, and whether digital systems will reproduce patterns of disrespect (Raza et al., 2023).

Hispanic communities face barriers shaped by language, immigration-related fears, cultural dynamics, and economic insecurity. Many digital platforms provide inadequate Spanish-language support, limiting effective communication and shared decision-making. The scarcity of Spanish-speaking providers on telehealth platforms further constrains access. Immigration status concerns discourage engagement, as registration requirements and data collection raise fears of exposure to enforcement (Makut and Djokoto, 2025). These challenges are compounded by higher poverty rates, lower insurance coverage, and employment in sectors with limited flexibility, all of which restrict sustained digital health use (Blount et al., 2023).

Rural communities encounter digital health exclusion driven primarily by infrastructure deficits and geographic isolation. Inadequate broadband coverage prevents reliable video consultations and remote monitoring, while higher costs for inferior service create affordability barriers even where connectivity exists (Ko et al., 2023). Distance to reliable access points undermines telehealth's promise to reduce geographic barriers. Provider shortages intensify these challenges, as rural clinicians must manage multiple platforms with limited technical support, reducing the effectiveness of digital tools.

Low-income communities across all settings experience compounded disadvantage as economic deprivation intersects with limited education, housing instability, and precarious employment. Restricted access to functional devices and reliable internet undermines engagement with digital health systems (Hollimon et al., 2025). Housing instability disrupts continuity of care by limiting secure access points and stable records. Employment conditions further constrain participation, as low-wage workers often lack flexibility, privacy, or employer support to manage health needs digitally. These intersecting vulnerabilities ensure that digital health inequities are not incidental but structurally produced.

3.4. COVID-19 Pandemic as Catalyst and Revealer of Digital Health Inequities

The COVID-19 pandemic acted both as a catalyst for rapid telehealth expansion and as a clear exposé of entrenched digital health inequities that disproportionately harmed vulnerable populations during a period of acute crisis. Telehealth use surged in 2020, rising from roughly 1% of outpatient encounters before the pandemic to more than 40% at peak periods, driven by infection control measures, regulatory flexibility, and payment parity policies (Ternes et al., 2025). This expansion unfolded with limited attention to equity. Healthcare systems prioritized speed over inclusive

design, community engagement, and patient support, revealing how institutional unpreparedness disproportionately affected populations already facing structural disadvantage. As providers rushed to deploy virtual care, patients lacking devices, connectivity, or digital skills encountered new barriers to essential services.

Disparities in telehealth access became unmistakable. Low-income individuals, racial and ethnic minorities, older adults, and rural residents consistently reported lower telehealth use than younger, wealthier, and urban populations, despite often facing greater COVID-19 health risks (Kaihlanen et al., 2022). Telehealth's technical requirements—reliable internet, appropriate devices, digital literacy, and private spaces, excluded many patients precisely when in-person care was unsafe or unavailable. Reported barriers included lack of internet access, difficulty navigating scheduling systems, unstable video connections, inadequate language support, and privacy concerns in crowded living environments. The rapid transition to digital-first care effectively produced a two-tiered system in which technologically equipped patients maintained continuity of care while disadvantaged populations lost access to routine services, preventive care, and chronic disease management that could not be sustained through audio-only encounters.

Rather than narrowing disparities, telehealth expansion in the absence of equity safeguards often widened them. Rural communities, despite the promise of virtual access to distant specialists, experienced reduced care as clinics closed or scaled back operations while broadband infrastructure remained inadequate (Ko et al., 2023). Older adults, who faced heightened COVID-19 risk, demonstrated lower telehealth use due to limited digital familiarity and reduced access to appropriate devices. Minority communities, already experiencing disproportionate COVID-19 morbidity and mortality, simultaneously confronted technological barriers, language limitations, and reduced availability of safety-net services. Reliance on scheduled video visits further disadvantaged working-class individuals whose employment conditions, workplace monitoring, and lack of private space constrained participation during standard hours.

As telehealth persists at levels far above pre-pandemic norms, concerns emerge that emergency measures may harden into permanent systems that institutionalize inequity. Many healthcare organizations have retained digital-first features such as portal-based communication, online scheduling, and hybrid care models, creating ongoing challenges for patients unable to engage digitally. The normalization of these systems risks making technological capacity an implicit requirement for care access, excluding individuals and communities lacking resources or support (Wilson et al., 2024). At the same time, the pandemic increased awareness of digital inequities, stimulated new research, and prompted policy discussions on broadband expansion, digital literacy, and institutional responsibility to provide alternative access pathways.

3.5. Frameworks and Recommendations for Advancing Digital Health Equity

Advancing digital health equity while upholding human dignity requires integrated frameworks that address technological access alongside economic, educational, and systemic drivers of inequality. Emerging equity-oriented models emphasize universal design, community participation, cultural humility, algorithmic transparency, and explicit attention to power dynamics shaping technology development and use (Kim and Backonja, 2025). These approaches shift focus away from deficit narratives that blame marginalized communities and instead locate responsibility within institutional practices, policy choices, and design decisions.

Cross-disciplinary frameworks draw on public health, health informatics, bioethics, human rights, and community organizing to address digital health inequity holistically. One influential model identifies intervention needs across structural policy environments, healthcare institutions, technology development processes, and community capacity-building efforts (Raza et al., 2023). This perspective underscores that expanding access alone is insufficient without confronting discrimination, bias, and exclusion embedded in healthcare systems. Another framework centers power, usability, and trust, highlighting how imbalances in authority erode confidence in digital systems and shape whether technologies are experienced as supportive or exclusionary (Koehle, et al., 2022).

Infrastructure-focused recommendations frame broadband access as a social determinant of health requiring sustained public investment. Meaningful connectivity demands not only infrastructure deployment but also affordability protections through subsidies and regulatory oversight to prevent exploitative pricing in low-income communities (Hollimon et al., 2025). Device access initiatives should provide subsidized or free equipment with technical support and replacement services to ensure continued usability. Healthcare organizations can further reduce barriers through device lending programs, mobile hotspot distribution, and the provision of private, internet-enabled spaces in clinics and community facilities.

Digital literacy strategies emphasize building both technical skills and health-specific competencies. Community-based organizations are well positioned to deliver culturally responsive training tailored to local needs and languages (Kim

and Backonja, 2024). Within healthcare settings, hands-on guidance during clinical encounters can help patients complete essential tasks using their own devices. Peer navigator models, staffed by trusted community members, show promise in strengthening skills while fostering trust. These efforts should also support critical engagement with digital health information, privacy awareness, and patient advocacy.

Algorithmic accountability requires robust oversight mechanisms. Algorithms should be tested for bias across demographic groups before deployment, with mandatory disclosure of performance disparities and clear standards prohibiting discriminatory systems (Alderman et al., 2025). Transparency requirements should include disclosure of data sources, model purposes, and validation methods (Chin et al., 2023). Community advisory bodies should participate in development and deployment decisions to ensure alignment with community values. Regulatory frameworks must establish enforceable accountability, including penalties and remediation when algorithmic harm occurs (Makut and Aryee, 2025a). Continuous monitoring is essential to detect bias as systems evolve in real-world use.

Platform design recommendations prioritize universal design, multilingual functionality, and accessibility from the outset. Co-design processes that involve community members throughout development improve usability and relevance (Wilson et al., 2024). Platforms should offer flexible navigation pathways and interfaces suited to varying skill levels. Language support must extend beyond translation to include culturally appropriate communication and interpretation services. Accessibility features addressing sensory, cognitive, and motor needs should be integral to initial design rather than post hoc additions (Makut and Aryee, 2025b).

Policy reforms are critical to sustaining equity. Healthcare systems should preserve multiple access pathways so patients can engage digitally, by phone, in person, or through community-based assistance without penalty (Blount et al., 2023). Payment parity for audio-only visits recognizes that video-based care is not universally accessible. Equity impact assessments should precede implementation of new digital tools, with required mitigation strategies for anticipated disparities. Public investment should support community organizations providing navigation, advocacy, and access services while advancing systemic reform.

3.6. Summary of Findings

Table 1 synthesizes the central findings of the study

Core Theme	Key Insight	Implications for Equity
Nature of the Problem	Digital health equity is a multidimensional challenge shaped by structural inequality, institutional practices, and ethical failures rather than connectivity alone.	Narrow, technology-only solutions are insufficient and risk overlooking the root causes of exclusion.
Access Barriers	Barriers include device availability, digital capability, affordability, cultural relevance, and systemic exclusion embedded in healthcare delivery models.	Digital systems reproduce existing social inequalities unless access is addressed comprehensively.
Population-Level Disparities	African American, Hispanic, rural, and low-income communities face distinct but overlapping disadvantages rooted in historical and structural inequities.	Equity strategies must be tailored rather than universal, recognizing differentiated vulnerability.
Impact of COVID-19	The pandemic accelerated telehealth adoption while exposing how digital systems can intensify exclusion during periods of heightened need.	Crisis-driven digital expansion can widen disparities if equity safeguards are absent.
Ethical Risks	Algorithmic bias, constrained patient autonomy, and erosion of human dignity emerge when equity is not embedded in design and governance.	Digital health can institutionalize harm under the guise of efficiency or innovation.
Limits of Technical Solutions	Technical innovation alone cannot achieve equity without addressing power, accountability, and participation.	Equity requires structural and ethical reform alongside technological development.
Systemic Gaps Identified	Gaps include weak integration of human rights frameworks, limited community involvement, underexamined intersectional vulnerabilities, and inadequate regulatory oversight.	These gaps allow inequities to persist and undermine trust in digital health systems.

Equity Frameworks and Solutions	Effective equity strategies must address structure, design, and power, rather than relying solely on technology.	Advancing equity is essential to preserving human dignity in digital healthcare.

3.7. Future Research Directions

Despite widespread agreement on the need to advance digital health equity, comprehensive evidence on the effectiveness, scalability, and durability of proposed interventions remains limited. Future research must rigorously evaluate which strategies meaningfully reduce disparities under real-world conditions and across diverse healthcare contexts. Comparative effectiveness studies should assess approaches to digital literacy support, device provision, platform design, and care delivery models, identifying which interventions and/or combinations produce sustained equity gains for specific populations.

Policy-focused research is equally critical. Scholars should examine regulatory frameworks and enforcement mechanisms capable of preventing algorithmic discrimination, mandating transparency in healthcare AI systems, and ensuring accountability when digital health technologies produce documented harm. Economic analyses can further strengthen the evidence base by assessing the costs and long-term benefits of equity-focused interventions from patient, system, and societal perspectives. Such work is necessary to challenge narratives that portray equity as a financial burden rather than a cost-effective investment that improves population health while reducing downstream healthcare expenditures.

4. Conclusion

Digital health equity has emerged as one of the central moral challenges confronting contemporary healthcare systems. The evidence reviewed makes clear that without deliberate, equity-oriented intervention, digital health innovations risk entrenching existing disparities rather than alleviating them. In such a landscape, access to care becomes increasingly contingent on technological capacity and socioeconomic position, undermining the principle that healthcare should respect the equal dignity of all patients.

Achieving meaningful digital health equity requires a fundamental shift in how healthcare institutions conceptualize and implement technological innovation. Justice-oriented approaches must replace technology-first models, placing community participation, algorithmic accountability, and protection of human dignity at the center of digital transformation efforts. Progress will depend on sustained commitments to infrastructure investment, policy reform, and institutional change, alongside genuine inclusion of marginalized communities in technology development and governance.

Ultimately, digital health equity is not a technical challenge that can be solved through innovation alone. It is a moral and political imperative that demands collective responsibility and sustained action. Ensuring that digital health systems advance rather than undermine health justice requires affirming the inherent worth of every individual, regardless of race, ethnicity, or economic circumstance, and designing healthcare systems that reflect that commitment in practice.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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