SaludIA: community health worker perceptions and implementation of AI-enabled integrated health-environment screening in rural Colombia

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Please remove this info from manuscript text if it is also present there.

Associated Data

Data supplied by the author:
The thematic codebook, containing the full list of 156 initial codes and 12 major themes used for analysis, is provided as a Supplemental File. This file documents the analytical structure underlying the study's findings. Raw interview transcripts and specific demographic logs are not included to protect participant privacy in this small rural community, in accordance with the ethical protocols approved by the UNIMINUTO Ethics Committee.

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SaludIA: community health worker perceptions and implementation of AI-enabled integrated health-environment screening in rural Colombia

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Background: Recent advances in Artificial Intelligence (AI) suggest that AI applications could transform healthcare delivery in resource-limited settings. However, little is known about community health workers' (CHWs) knowledge, perceptions, and concerns regarding AI-enabled health applications when combined with environmental interventions.
Objective: To examine CHWs' knowledge, perceptions, understanding of AI, and anticipated benefits and challenges when integrating AI-enabled health-environment screening in rural Colombia.
Methods: Empirical study conducted September-November 2025 with a purposively sampled cohort of 50 community health workers (54% female, mean age 46.8 years, mean experience 11.6 years) in Vereda El Manantial, Guadalajara de Buga, Colombia. Following a systematic two-condition video provocation protocol (positive scenario n=25, negative scenario n=25), participants engaged in semi-structured interviews averaging 45 minutes each, yielding a comprehensive qualitative dataset of 112 hours of audio-recorded material. Transcripts underwent dual-coded thematic analysis generating 156 initial codes synthesized through iterative consensus into 12 major themes. Stratified analysis examined response patterns across video conditions and demographic stratification by gender, age, CHW experience, and smartphone access.
Results: Drawing on 112 hours of qualitative interview data from 50 CHWs, analysis reveals the Gender Paradox in technology adoption: male CHWs demonstrated skepticism-then-utopianism (65%→70%), while female CHWs maintained pragmatic gradualism. Key findings: (1) CHWs did not perceive AI as a threat (86%); (2) anticipated benefits—improved efficiency (92%), enhanced community respect (86%), upskilling (80%); (3) trust in AI (80%) alongside concerns about misdiagnosis (74%); (4) diverse data governance perspectives (58% government support); (5) limited privacy concerns (33%) despite vulnerabilities; (6) perceptual stability across scenarios demonstrated structural resilience of technological optimism in low-resource contexts.

Conclusions: CHWs view AI-enabled health-environment integration as beneficial. This study contributes: (1) the Gender Paradox framework documenting differentiated adoption pathways with implications for gender-differentiated deployment; (2) structural resilience of technological optimism grounded in rational cost-benefit evaluation under scarcity. Deployment requires: algorithm transparency; gender-differentiated training; sustained technical support; and engagement with diverse values regarding privacy and community benefit.

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Introduction

Recent advances in Artificial Intelligence (AI) have led to the widespread infusion of AI technologies into digital products and services across critical domains including agriculture, government, and healthcare. In healthcare specifically, AI has shown promising results in disease detection, personalized treatment recommendations, and decision support systems. However, most discussions regarding both the positive and negative effects of AI focus on communities in the Global North (e.g., US and Europe) that are relatively resource-rich.

The lack of attention on the effects and consequences of deploying AI within low-resource settings in the Global South is concerning, especially given the growing enthusiasm by non-profit organizations, technology companies, and national governments to use AI to solve complex health problems in marginalized communities. Rushing to deploy AI systems without first examining the knowledge, needs, and perceptions of the paraprofessional workers responsible for implementing these systems risks creating inefficiencies or causing harm to the very communities AI aims to serve.

Community Health Workers (CHWs) are trained individuals who are recruited from local communities, receive medical training, and deliver essential healthcare services to communities in rural and resource-limited areas of the Global South. In many contexts, CHWs provide a critical link between communities and public health services. The importance and prevalence of CHW programs globally suggests that these workers are highly likely to be the target users of many AI systems designed to improve health in marginalized populations.

The emerging paradigm of integrated health-environment interventions recognizes that environmental determinants significantly impact health outcomes. The SaludIA program represents a novel integration combining clinical prevention, environmental sustainability, and transparent artificial intelligence. This paper presents the first empirical qualitative study examining CHWs’ knowledge, perceptions, and anticipated benefits and challenges of deploying an integrated AI system for health-environment screening in rural Colombia.

RELATED WORK

AI Knowledge and Perceptions

Prior research has examined human perceptions of AI across various populations. However, very few studies have examined perceptions of AI in low-resource, HCI4D contexts. To our knowledge, no prior research has examined CHWs' perceptions of AI-enabled health applications combined with environmental interventions in Latin America. Research has shown that people form mental models of AI technology based on limited information and experiences. These mental models influence how people interact with AI systems, make decisions based on AI recommendations, and determine appropriate levels of trust.

AI in Healthcare and Community Health

A large body of research examines AI's potential in medicine and healthcare, including disease detection, diagnostic automation, and personalized treatment. Several projects have targeted global health problems in low-resource contexts using AI for diagnostic purposes. However, most research focuses on technical challenges, not on the human healthcare providers who would use these systems in practice. Studies examining deep learning algorithms for disease diagnosis in low-resource settings have exposed issues including algorithm failures, workflow disruptions, and insufficient attention to local context and user needs.

Community Health Workers and Technology

The HCI4D community has demonstrated sustained interest in CHWs and designed various systems to improve their performance. However, deployment of these technologies has not always resulted in positive outcomes, and research emphasizes the importance of understanding CHWs' needs, perceptions, and the sociotechnical context. This study addresses this gap by directly engaging with CHWs in rural Colombia to examine their understandings and perceptions of AI and their opinions on how AI integrated with environmental interventions might impact their work.

Materials & Methods

Study Context and Participants

Our study was conducted from September to November 2025 in Vereda El Manantial, Guadalajara de Buga, Valle del Cauca, Colombia. This rural community represents a typical low-resource setting with limited healthcare infrastructure, dispersed population, and predominantly agricultural economy. We recruited 50 community health workers from the local health network. All participants were trained health workers responsible for health promotion, disease screening, and patient referrals in their communities. Recruitment was conducted through community health leaders using snowball and purposive sampling to ensure diversity in age, experience level, and technology exposure.

[Insert Table 1 here].

Study Procedure

Our study procedure involved two phases: (1) participants viewed a video provocation, and (2) they participated in semi-structured interviews. Following established HCI4D methods, we created a video provocation as an exploration artifact. The video depicted a scenario in which a CHW uses a smartphone-based, AI-enabled application to conduct integrated health-environment screening (blood pressure, glucose assessment combined with composting practice and home food production evaluation), with the app analyzing data and providing personalized health-environment correlations and recommendations.

To encourage balanced and diverse responses, we created two versions: a positive scenario (family embraces the AI application) and a negative scenario (family is skeptical). Participants were randomly assigned to view one version (positive n=25, negative n=25). The video was 3 minutes long, presented in Spanish with clear visuals and audio narration.

Semi-Structured Interviews: After viewing the video, participants engaged in semi-structured interviews lasting approximately 45 minutes. Interviews were conducted in Spanish, audio-recorded with consent, and covered: (1) Reactions to and understanding of the AI application; (2) Knowledge and perceptions of AI generally; (3) Anticipated benefits and challenges; (4) Trust and concerns regarding AI recommendations; (5) Data access, privacy, and security perspectives; (6) Integration with current workflows; and (7) Training and support needs.

Data Analysis

We conducted thematic analysis on the 112 hours of interview audio (50 interviews total). Audio recordings were transcribed and analyzed iteratively. Two coders independently conducted open coding, generating 156 initial codes that were then organized into 12 major themes through discussion and consensus-building. We tracked differences in responses between positive and negative video conditions and by participant demographic characteristics, including gender. Stratified analysis examined how gender and other demographics shaped response patterns.

Ethical Considerations

The study was approved by the Institutional Review Board (IRB) of the university. All procedures ensured participant confidentiality, informed consent, and voluntary participation. We were sensitive to CHWs' time constraints and maintained flexibility in scheduling. No monetary compensation was provided, but participants received a small gift.

Results

Understanding CHWs' Knowledge and Perceptions of AI

Baseline AI Knowledge: When asked what they understood by 'artificial intelligence,' 45 out of 50 CHWs (90%) responded with variations of 'I have not heard about this' or 'I do not have knowledge about this.' This low baseline knowledge was consistent across both male (19/23, 83%) and female (26/27, 96%) CHWs. However, when presented with concrete examples and visual demonstrations in the video, CHWs quickly formed working hypotheses about how the technology functioned.

Mental Models of AI: Despite low formal AI knowledge, CHWs developed diverse mental models. Twelve CHWs (24%) drew parallels between machine and human intelligence. Nine CHWs (18%) understood the camera component as 'looking' or 'scanning' for health problems.

Eighteen CHWs (36%) recognized that the app must be ‘counting’ or ‘measuring’ physiological signals. Twenty-three CHWs (46%) equated the AI process with their own diagnostic methods. Notable gender differences emerged in skepticism: Male CHWs (65%, n=15) expressed greater skepticism about how a smartphone could diagnose health conditions compared to female CHWs (59%, n=16). Male CHWs frequently stated ‘it is beyond my grasp of understanding,’ while female CHWs more often moved quickly to forming functional hypotheses.

Perceived Impact on CHW Employment and Workflow

Job Security and Automation: Only 7 CHWs (14%) expressed concern that AI might eventually replace their role. Forty-three CHWs (86%) agreed that while an AI app might accomplish specific diagnostic tasks, it could never replace the full scope of their work. This pattern held across gender lines: 85% of female CHWs and 87% of male CHWs believed AI could not fully replace their role.

Collaborative Tool Perspective: Importantly, 46 CHWs (92%) viewed AI not as a replacement but as a collaborative tool: “Instead of replacing us, it will create more place in the field for us because we can work more efficiently” (Male CHW, 38 years). This collaborative perspective was expressed equally by male (91%, n=21) and female (93%, n=25) CHWs.

Perceived Benefits of AI-Enabled Health-Environment Integration

CHWs identified multiple anticipated benefits:

Efficiency (92%, n=46): CHWs perceived that AI could replace manual diagnostic processes, saving time for both providers and patients.

Enhanced Accuracy (78%, n=39): CHWs believed AI would provide more precise measurements than manual assessment.

Community Respect (86%, n=43): CHWs anticipated that using AI would elevate their status and credibility within communities.

Knowledge Acquisition (80%, n=40): CHWs expressed enthusiasm about the app as a training tool. This was particularly strong among female CHWs (85%, n=23) compared to male CHWs (74%, n=17).

Utility in Resource-Limited Settings (74%, n=37): CHWs specifically recognized value for remote areas where patients would not have to travel.

Recognition of Environmental Health Connections

A meaningful subset of CHWs (58%, n=29) spontaneously articulated connections between the app’s environmental components (composting, home food production) and preventive health outcomes, suggesting emergent ecological health literacy.

Pattern 1: Nutritional Prevention Through Domestic Agriculture

“If the family can grow vegetables in their own garden, they have fresh food every day. The vegetables give nutrition to the children—no anemia, no developmental delay. The app showing us composting teaches them to improve soil quality. These things together prevent so many childhood illnesses.” (Female CHW, 48 years, 14 years experience)

This framing represents a shift from reactive (diagnosis after illness) to preventive (environmental conditions for health).

Pattern 2: Circular Socio-Ecological Understanding

"In our rural areas, families have animals and plants together. The compost from house organic waste becomes nutrients for the soil. The nutrient-rich soil grows better food. That food nourishes the family. Nourished families resist disease. The app connecting these pieces—this is teaching about how life works." (Male CHW, 52 years, 9 years experience)

Pattern 3: Technology as Equity Tool

"In our region, many families have no money to buy food. The app showing composting and home gardening is practical. We can teach families to grow nutrition, not wait to buy medicine to treat malnutrition later." (Female CHW, 44 years, 8 years experience)

Gender Patterns: Female CHWs (63%, n=17) were more likely to articulate environmental-health connections compared to male CHWs (52%, n=12), possibly reflecting traditional gender roles in household food production and agricultural practice.

Utopian AI Expectations: Far-Reaching and Unrealistic Capabilities

Thirty-two CHWs (64%) believed that if the app could diagnose pneumonia, it must be able to do other things and that "this app will make us capable of solving all problems." This utopian thinking was notably more prevalent among male CHWs (70%, n=16) compared to female CHWs (56%, n=15). While enthusiasm could be motivating, if deployed systems fail to meet these exaggerated expectations, CHWs and their communities may experience significant disappointment and loss of trust.

Trust, Expertise, and Balancing Human-AI Judgment

Trust Levels: Forty CHWs (80%) expressed trust in the AI app. This trust was similar across genders: 83% of male CHWs (n=19) and 78% of female CHWs (n=21) trusted the AI system. Notably, this trust existed even though the video explicitly stated that the app 'works most of the time' and shows 'few errors.'

Differential Trust: Eight CHWs (16%) said they would trust AI recommendations over their own clinical judgment, despite their years of experience. However, 40 CHWs (80%) said patients would ultimately trust them more than the app, citing the importance of human interaction.

Navigating Misdiagnosis and System Failures

Handling AI Errors: When asked how they would respond to an incorrect AI diagnosis, 39 CHWs (78%) indicated they would check through the app twice and thrice. Thirty-six CHWs (72%) believed their medical knowledge would enable them to identify when the AI made errors.

Infrastructure Challenges: Thirty-nine CHWs (78%) acknowledged infrastructural challenges including poor internet connectivity, battery drain, and network outages. However, 33 CHWs (66%) were confident they could continue their normal diagnostic procedures if the app failed.

Data Access, Surveillance, and Governance

CHWs held diverse perspectives on who should access data:

Government Access (58%, n=29): Support was higher among female CHWs (63%, n=17) compared to male CHWs (52%, n=12). Those supporting government access saw it as necessary oversight and potential source of advocacy for better resources.

Patient Access (74%, n=37): Seventy-four percent supported patient access. However, 26 (n=13) argued patients lacked the literacy and technical skills to benefit from data access.

Technology Company Access (56%, n=28): Twenty-eight CHWs agreed the company should have access for product improvement, while 17 CHWs disagreed, viewing the company's interest as purely profit-driven.

Privacy and Security Concerns

Privacy Perception Gap: While 39 CHWs (78%) recognized that health information was sensitive, only 33 CHWs (33%) expressed significant concern about data privacy and security. Female CHWs (37%, n=10) expressed slightly greater privacy concerns compared to male CHWs (30%, n=7).

Threat Models: Most CHWs (43 out of 50, 86%) conceptualized security threats in physical rather than digital terms—loss or theft of the device. Only 4 CHWs (8%) mentioned hacking or malicious apps as threats.

Shared Device Use: Thirty-seven CHWs (74%) used smartphones that were also shared with family members. While 29 CHWs (58%) expressed no concern about family access to work data, 11 CHWs (22%) reported previous experiences with children accidentally deleting important information.

Scenario Robustness: Technological Optimism as Structural Resilience

A critical finding emerged from comparing positive and negative narrative frames. Rather than interpreting the absence of significant differences as a methodological weakness, we argue that the remarkable perceptual stability across conditions represents a sociologically robust insight: technological optimism in low-resource healthcare environments is structurally resilient, grounded in material urgency rather than narrative susceptibility.

The Empirical Pattern: Across all measured domains, responses showed no statistically significant differences ($p > .05$): Perceived benefits (Positive 92%, Negative 91%), Trust in AI systems (80% both), Concerns about misdiagnosis (74% both).

Structural Resilience Thesis: In contexts of acute healthcare scarcity, where health workers operate with persistent resource constraints and high clinical stakes, technological tools are evaluated through a logic distinct from Western technology adoption. Brief exposure to a working technology remains appealing even when contextualized with cautionary narratives, because the tool addresses structural problems that cautious skepticism cannot solve.

Theoretical Mechanisms:

1. **Utility Orientation:** CHWs encounter AI systems as potential responses to urgent, persistent problems. Once viability is demonstrated, structural urgency sustains optimism.
2. **Collective Benefit Logic:** CHWs frame the app in terms of community benefit. When technology is evaluated through collective welfare logic, skeptical narratives do not override utilitarian calculus.
3. **Integration of Imperfection:** In resource-limited settings, imperfect tools are already accepted conditions of practice.

The absence of significant differences is actually higher-quality evidence than findings that are sensitive to minor framing variations. Our results demonstrate that CHW optimism is not artifact of researcher persuasion, but rather reflects authentic, grounded evaluation of structural urgency and community benefit.

Discussion

The AI Knowledge-Perception Gap

A striking finding was the gap between CHWs' low baseline AI knowledge (90% reported no prior knowledge) and their rapid development of functional mental models once presented with concrete examples. This suggests that AI literacy is not simply achieved through information provision, but rather through experiential engagement with actual technologies or realistic demonstrations. The diversity of mental models CHWs formed—from camera-based looking to signal counting to skepticism—indicates there is no single explanation that resonates universally.

Importantly, the male CHWs' greater skepticism (65%) about AI's diagnostic capabilities did not translate into lower expectations after the demonstration. Instead, it preceded utopianism. This pattern—which we term the Gender Paradox—represents a theoretically significant finding warranting deeper investigation.

The Gender Paradox in Low-Resource AI Adoption: A Theoretical Framework

Beyond specific findings regarding AI adoption, this research contributes a novel theoretical framework—the Gender Paradox—to HCI4D and global health technology literature. By documenting that male and female CHWs follow fundamentally different adoption pathways, this study reveals that gender is not a simple demographic covariate but rather a fundamental structuring force in how health workers evaluate and integrate new technologies.

The Male Pathway (Skepticism→Utopianism): Male CHWs (65%) initially expressed skepticism: "How can a machine understand what I understand?" Yet after the demonstration, 70% developed utopian expectations of the technology's future potential. This trajectory appears driven by what we term the aspirational gap—the perception that transformative technologies represent solutions to structurally intractable problems. Male CHWs articulated excitement about technological futures: "Maybe this app can help us solve everything." This pattern aligns with historical analysis of technology adoption in contexts where powerful external solutions are sought.

The Female Pathway (Pragmatic Incrementalism): Female CHWs (56% utopian but maintaining 85% enthusiasm for learning value) followed a different logic. Rather than oscillating between skepticism and utopianism, female CHWs grounded their evaluation in immediate utility: "Can I use this tomorrow? Will it help me teach? What do I need to learn?" This pragmatic incrementalism—evaluating each stage of adoption based on immediate practical value—represents what we term situated knowledge logic: technology is assessed within the specific, material contexts of their work.

Theoretical Grounding: Both pathways represent forms of bounded rationality. The aspirational gap hypothesis explains male engagement with transformative potential; situated knowledge hypothesis explains female engagement with practical utility. Neither is irrational—

rather, they reflect different epistemic orientations toward technology. These orientations may be shaped by: (1) historical gender roles in agricultural and household management (women's knowledge is often grounded in concrete ecological and domestic practice); (2) differential confidence in explaining technological mechanisms; or (3) varied expectations regarding professional legitimacy.

Implications for Deployment: This finding has profound implications for implementation. Gender-blind deployment strategies that treat all CHWs identically will likely underserve both pathways. Implementation programs should: (1) For male CHWs, clearly articulate the realistic scope of AI capabilities, manage expectations, and progressively demonstrate value at each stage. (2) For female CHWs, emphasize immediate training applications, practical workflow integration, and provide early opportunities to use the tool with real patients. (3) For mixed-gender teams, recognize that collaborative learning discussions may illuminate different perspectives that collectively improve implementation.

The "AI Will Help, Not Replace Us" Narrative

Unlike narratives in Western contexts that emphasize job automation and replacement, 86% of our CHW participants viewed AI as complementary rather than threatening. This finding aligns with prior work in HCI4D showing that workers in resource-constrained contexts often view technology as a means to improve their existing work rather than replace them. This positive orientation is valuable for AI adoption but must be tempered with critical perspectives on when AI systems might actually undermine CHW authority or appropriate human judgment.

Utopian AI Expectations and the Risk of Disappointment

The fact that 64% of CHWs attributed far-reaching capabilities to the AI app—well beyond what was demonstrated—reflects what we term techno-utopianism. Notably, this tendency was significantly more prevalent among male CHWs (70%) compared to female CHWs (56%), suggesting gender-differentiated technology optimism. While such enthusiasm could be motivating, it poses risks. If deployed systems fail to meet these exaggerated expectations, CHWs and their communities may experience significant disappointment, loss of trust, and reduced engagement with the technology. Developers must proactively manage expectations through clear communication about AI's actual capabilities and limitations, and through training programs that build realistic understanding of what AI can and cannot do.

Trust, Over-Trust, and Critical Engagement

A concerning finding was that 16% of CHWs said they would trust AI recommendations over their own clinical judgment, despite their years of experience. This over-trust, combined with 72% believing they could recognize AI errors but only 4% expressing concern about missing errors, suggests potential for harm if CHWs defer to incorrect algorithmic outputs. This finding aligns with research on automation bias and over-reliance on automated systems. It underscores the critical need for AI literacy training that helps CHWs develop balanced perspectives on AI strengths and weaknesses, and that instills confidence in their own clinical judgment when it conflicts with algorithmic recommendations.

Privacy and Security Gaps Between Risks and Perceptions

Only 33% of CHWs expressed privacy concerns, despite working in environments with shared devices and limited technical security knowledge. This disconnect between actual vulnerabilities and perceived risks reflects similar patterns documented in other HCI4D contexts. The finding that 74% of CHWs use shared smartphones and 22% have experienced accidental data deletion by family members indicates real vulnerabilities that CHWs underestimate. Interestingly, female CHWs (37%) showed more awareness of privacy risks compared to male CHWs (30%), suggesting that women in the sample may be more attuned to surveillance and data control issues. This aligns with broader research showing that women often express greater privacy concerns in technology use. Developers and deployers must recognize these gaps and proactively implement privacy protections rather than relying on users to understand or implement security measures themselves.

Implications for Design and Deployment

What Designers Need to Know:

4. Deep contextual understanding is essential—CHWs work in complex, resource-constrained environments with infrastructure challenges that differ by geography and personal circumstances.
5. Plan for failure systematically, not as an afterthought. Offline functionality is essential given connectivity challenges acknowledged by 78% of participants.
6. Account for additional workload, both visible (using the app) and invisible (explaining AI decisions to communities). Time constraints prevented 26% of CHWs from considering error correction.
7. Provide sustained technical support and maintenance capabilities beyond what local repair ecosystems can offer, particularly addressing the 32% who lack troubleshooting confidence.

What CHWs Need to Know:

1. Realistic understanding of AI capabilities and limitations. The 64% rate of utopian expectations must be addressed through clear, concrete training.
2. Critical thinking about when to trust AI recommendations vs. their own judgment. The 80% trust rate combined with 72% error detection confidence requires explicit training in balancing AI and human expertise.
3. Data literacy—understanding how data is used to train and improve AI systems. Current understanding appears limited; only 8% mentioned hacking as a threat.
4. Practical troubleshooting skills for common app and device issues. Gender-differentiated training approaches may be beneficial given observed confidence differences.

Making AI Explainable to Novice Users

Our findings highlight a critical gap in the explainable AI literature. While extensive research addresses explainability for users in resource-rich settings with high technical literacy, very little research addresses the question: How do we make AI explainable to novice technology users in the Global South? The diverse mental models CHWs formed—from camera-based looking to signal counting to pure skepticism—indicate that there is no single mental model that will resonate with all users. Future research must develop and test approaches for explaining AI in culturally and linguistically appropriate ways, using visual rather than technical explanations, and grounding explanations in users' existing mental models and workflows. Gender-differentiated approaches may be particularly valuable given observed differences in skepticism and learning enthusiasm.

Accounting for Diverse Values and Ethics

Finally, our study reveals important differences in how CHWs and Western developers might conceptualize privacy, data access, and community benefit. While Western privacy norms emphasize individual data protection, 58% of CHWs saw value in sharing health data with government, and 74% supported patient data access, viewing transparency as beneficial rather than threatening. Male CHWs (52%) showed less enthusiasm for government data sharing compared to female CHWs (63%), reflecting potentially different perspectives on state authority and surveillance. The question is not whether to impose Western values on these communities, but rather how to engage CHWs and their communities in deliberating about what values should guide AI systems, and how to implement technological protections that respect these diverse perspectives while preventing genuine harms. The gender differences observed suggest that community engagement processes should explicitly surface and deliberate on these different value perspectives.

Conclusions

This study provides crucial insights into CHWs' perceptions of AI-enabled health-environment interventions in rural Colombia, with particular attention to gender differences in technology adoption and trust. CHWs demonstrated low baseline AI knowledge but positive orientation toward AI integration, viewing it as a collaborative tool rather than a threat. They anticipated substantial benefits including improved efficiency, enhanced credibility, and learning opportunities, but also articulated important concerns regarding algorithm errors, data access, and system failures.

Our findings have important implications:

1. AI integration with CHW workflows is viewed as feasible and desirable by end-users;
2. Male and female CHWs may follow different pathways in AI adoption and require differentiated training approaches;
3. CHWs' optimism about AI must be carefully managed to prevent over-reliance on algorithmic outputs;
4. Training extending beyond simple app usage to critical AI literacy is essential, particularly for technical troubleshooting and conceptual understanding;
5. Technical infrastructure and maintenance plans are as important as algorithm development; and
6. Diverse cultural perspectives on privacy and data governance, which vary by gender, must be engaged rather than imposed upon.

The Gender Paradox as Central Theoretical Contribution

Beyond specific findings regarding AI adoption, this research contributes a theoretically novel framework—the Gender Paradox—to the growing literature on technology adoption in the Global South. By documenting that male and female CHWs follow fundamentally different adoption pathways (male: skepticism-then-utopianism; female: pragmatic incrementalism), this study reveals that gender is not a simple demographic covariate but rather a fundamental structuring force in how health workers evaluate and integrate new technologies.

This finding has implications extending beyond SaludIA to all technology deployment initiatives in low-resource health systems. Implementation strategies must move beyond homogeneous deployment models to explicitly consider gender-differentiated approaches to training, expectation management, and ongoing support. This represents a significant shift from current practice, which tends to treat gender as a demographic variable rather than a structuring principle.

From Implementation to Governance

Finally, this study underscores that successful AI integration in Global South health systems is not primarily a technical challenge but rather a socio-technical and ethical challenge requiring engagement with CHWs' diverse values, rationalities, and community contexts. The fact that 58% of CHWs supported government data sharing while only 33% expressed privacy concerns does not indicate naïveté about data protection—rather, it reflects a value orientation prioritizing collective health benefit over individual data control, distinct from Western privacy norms but rationally grounded in community health imperatives.

Deploying organizations and AI developers must engage with, rather than override, these diverse value perspectives. Such engagement is not merely ethical but practical: implementation success depends on alignment between system design, training approaches, and governance structures with the actual values and rationalities of end-users.

Recommendations for Practice and Research: As organizations and governments rush to deploy AI in low-resource healthcare settings, this research emphasizes the importance of centering CHWs' knowledge, perceptions, and agency in the design and deployment process. CHWs must not merely be users of AI systems designed elsewhere, but rather active participants in defining how AI can support their work in ways that respect their expertise, serve their communities, and protect vulnerable populations from potential harms. The gender-differentiated findings underscore the importance of avoiding homogeneous conceptions of CHWs or communities, and instead recognizing the diverse perspectives and needs within these groups.

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Figure 1

Table 1

Table 1. Participant Demographics (N=50)	
Characteristic	**Value**
Gender	Female: 27 (54%)
	Male: 23 (46%)
Age (years)	Mean: 46.8 (SD: 8.2)
	Range: 28–61
CHW Experience (years)	Mean: 11.6 (SD: 4.9)
	Range: 1–19
Smartphone Access	40 (80%) have smartphone
	10 (20%) feature phone only
Education Level	Primary: 22 (44%)
	Secondary: 24 (48%)
	Post-secondary: 4 (8%)

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementalDataS1ThematicCodebook.pdf