Hooda *et al.*
Implementation Science Communications (2026) 7:3
https://doi.org/10.1186/s43058-025-00823-9

Implementation Science Communications

RESEARCH Open Access

'Empowerment' as a proximal implementation outcome for task shifting with informal cadres: findings from a qualitative study with traditional healers in rural Uganda

Misha Hooda[1], Madison Stead[2], Gabriel Nuwagaba[3], Sylvia Natukunda[3], Constance Birungi[3], William Bugeza[3], Maureen Tushabe[3], Srija Gogineni[1], Denis Nansera[3], Winnie Muyindike[3], Juliet Mwanga-Amumpaire[3] and Radhika Sundararajan[1,4*]

Abstract

Background Task shifting and task sharing (TSS) are widely used implementation strategies to expand HIV service delivery in low-resource settings. Informal lay health workers, such as traditional healers (THs), have been proposed as critical partners in bridging service delivery gaps. However, the mechanisms that support their successful integration into formal health systems remain underexplored. This qualitative sub-study aimed characterizes a novel proximal implementation outcome – empowerment – based on lived experiences of THs participating in a TSS intervention in rural Uganda.

Methods Between July and August 2023, we conducted 22 in-depth interviews with THs in rural Uganda who completed a three day training to become lay HIV supporters. The curriculum included HIV transmission, ART adherence, stigma reduction, and HIV self-testing. Interviews were conducted in the local language, transcribed, translated into English, and analyzed using a thematic approach. Our analysis was guided by Lee and Koh's empowerment framework, which links role transformation to domains of empowerment.

Results THs reported experiencing empowerment across four domains: meaningfulness, competence, self-determination, and impact. Participants described strong alignment between their traditional caregiving roles and new responsibilities in HIV support. They reported increased HIV-related knowledge, confidence in client care, autonomy in decision-making, and a sense of contributing meaningfully to improved health outcomes. Notably, we identified a fifth domain – external validation – defined as recognition and legitimacy conferred by representatives of the biomedical health system. This domain was central to participants' perceived integration, motivation, and potential sustainability of their involvement in these types of programs.

Conclusions We propose empowerment as a novel proximal implementation outcome that reflects the internal and external transformations necessary for successful implementation with informal providers. Our findings support expanding Lee and Koh's empowerment framework to include external validation, particularly for cadres operating outside the formal system. Positioning empowerment as a proximal outcome offers a valuable lens for evaluating

*Correspondence:
Radhika Sundararajan
ras9199@med.cornell.edu
Full list of author information is available at the end of the article

© The Author(s) 2025. **Open Access** This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by/4.0/.

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

early success of broad implementation strategies that involve role transformation, such as training trainers, or engaging community champions.

Trial registration ClinicalTrials.gov, NCT05943548. Registered 2023–07-13, https://clinicaltrials.gov/study/NCT05943548.

Keywords Medical pluralism, Task-sharing, Lay cadre, Africa, Implementation outcomes, Health systems research

Contributions to the Literature

- Task-shifting to community health workers has been widely implemented to address workforce shortages, but implementation with lay cadres remain understudied. Therefore, little is known about potentiating and evaluating successful engagement with these important cadres.
- This study extends Lee and Koh's empowerment framework by identifying *external validation*—recognition from the formal healthcare system—as a crucial factor in sustaining lay worker engagement in task-shifting programs.
- This study responds to the call by Proctor et al. (2011, 2023) advance the identification of new implementation outcomes. In the 2023 agenda, Proctor et al. noted the specific need to identify measurable proximal outcomes to help understand how a strategy works to achieve what it is targeted to change.

Introduction

As Uganda inches closer to the 95–95-95 targets established by UNAIDS, persistent gaps in HIV care continuity—particularly in rural areas—highlight the need for implementation strategies that reach underserved population [1]. Barriers such as geographic remoteness, health worker shortages, and low perceived need for biomedical care undermine progress across the HIV care cascade in rural settings [2, 3]. To address these challenges, task shifting and task sharing (TSS) have emerged as core implementation strategies designed to expand service delivery capacity without overburdening formal health systems [4–11]. TSS encompasses two complementary approaches: task shifting, which redistributes care responsibilities to less specialized providers, and task sharing, which builds capacity among additional cadres to take on identified tasks without removing them from existing roles [6, 12–14]. This implementation strategy correspond to the Expert Recommendations for Implementing Changes (ERIC) taxonomy's implementation strategy of "revising professional roles" [15], and have become foundational to HIV care delivery in sub-Saharan Africa, where they have improved ART adherence, clinical outcomes, and service reach [8, 9, 16–22].

Despite successful implementation of community health worker (CHW) task-shifting initiatives through village health teams, significant implementation gaps persist. While these programs have positively impacted antiretroviral therapy (ART) adherence and clinic retention rates [23, 24], rural populations remain significantly under-engaged throughout the HIV care continuum when compared to their urban counterparts. Current viral suppression rates of 69.0% in rural areas versus 75.5% in urban areas indicate suboptimal implementation reach and effectiveness in rural settings [1]. Overburdened rural health systems and existing community outreach programs are unable to mitigate longstanding barriers to HIV care that plague rural populations, including distance to clinics, wait times, and HIV-related stigma [25–30]. This implementation gap has prompted policymakers to seek novel strategies for reaching rural people living with HIV who remain disconnected from formal healthcare systems.

Recent TSS initiatives have increasingly incorporated community-based lay providers to bridge this gap [31, 32]. Yet, the majority of large-scale TSS programs focus on formalized cadres —such as community health workers, peer supporters, and village health teams —who are integrated into the formal health system and benefit from established training and supervision structures. In contrast, *informal* providers, particularly traditional healers (THs), remain largely underutilized in the design and delivery of TSS interventions despite their central role in community health and their frequent contact with hard-to-reach populations [33]. In Uganda, 80% of rural populations use traditional healers, who often serve as first points of contact for healthcare needs given high accessibility due to their community presence, and whose services are used instead of or in adjunct to biomedical care services [34–36]. As such, leveraging traditional healer support to improve testing, linkage to care, and adherence to ART in rural areas has been proposed as a way to engage people living with HIV (PLWH), who may have splintered relationships with existing biomedical care systems [34, 37–40].

Our ongoing cluster randomized controlled trial (NCT05943548) evaluates the implementation of a

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

TSS approach where THs provide psychosocial support to PLWH to improve HIV testing and retention in care in rural Uganda [41]. In these communities, THs a provide various treatments for illness, offering herbal remedies, spiritual consultations, and counseling that address both physical and social dimensions of health. Their longstanding trust within communities and holistic orientations towards health and wellness make them influential actors in shaping care-seeking behaviors [42–45]. Though TSS programming has been extensively implemented across low- and middle-income countries, research that explores how informal providers engage with TSS roles, or what factors influence their sustained participation and delivery fidelity remains poorly understood. In particular, the implementation outcomes that mediate the success of TSS among informal cadres remains limited [8, 46].

Implementation outcomes—defined as "the effects of deliberate and purposive actions to implement new treatments, practices, and services" [47] — are central to understanding how and why interventions succeed. As outlined by Proctor et al., these outcomes serve as early markers of implementation progress, indicators of success, and mediators linking strategies to clinical effects. Yet most implementation research in TSS settings has focused on outcomes such as feasibility, acceptability, or fidelity—without examining the transformative effects of TSS that may drive success or failure of these programs, particularly with lay cadres who are not already integrated into health programming [47].

While effective knowledge transfer and worker engagement strategies are recognized as crucial components of TSS programming [6, 10, 19, 48–51], very little is known about the experiences of informal providers who operate outside the scope of biomedical health systems. While THs have been the focus of prior task shifting programs, attention has not been paid to their experiences with the task shifting work. For example, how might they integrate new responsibilities with their traditional roles, and what facilitates their sustained involvement in health programs? THs' marginal position in the health system, distinct identities, and community roles may shape how they perceive and adapt to new expectations in ways that differ from formal health workers such as community health workers [10, 52].

We conducted a qualitative sub-study nested within our ongoing TSS programming trial (NCT05943548) to examine traditional healers' experiences with task shifting training and role transformation. The primary objective was to characterize implementation-relevant experiences and identify factors that facilitate or impede successful TSS programming implementation among this informal lay cadre. This study contributes to the growing body of literature on task-shifting and task-sharing by providing empirical insights on TSS programming with lay health workers. We use a theory-driven approach to decompose the effects of TSS and characterize a novel proximal implementation outcome, supported by end-user perspectives.

Methods

Study design

This qualitative sub-study was embedded within a cluster randomized hybrid type I effectiveness-implementation trial. The overall goal of the trial is to evaluate if healers can improve HIV viral suppression through delivery of adherence and psychosocial support to PLWH in communities in the Mbarara and Rwampara Districts of southwestern Uganda [41].

To ensure that intervention arm healers were adequately trained to complete the tasks of HIV testing, pre- and post-test counselling, facilitating linkage to HIV care, and providing psychosocial support to PLWH, THs completed a three day training course in July 2023, prior to trial initiation. The TSS curriculum for Ugandan healers was developed and pilot-tested in 2022 [43] and was adapted to meet the knowledge requirements of the parent trial. Curriculum included education on HIV transmission and prevention, training on ART adherence support, facilitating serostatus disclosure, and information on clinical HIV services.

This study was conducted following ethical standards and was approved by the Mbarara University of Science and Technology Research Ethics Committee (MUST-2022–646), the Weill Cornell Medicine Research Ethics Committee (22–09025268), and the Uganda National Council for Science and Technology (HS2780ES). All participants provided written informed consent prior to participation in both the parent trial as well as this qualitative sub-study.

Study population

All twenty-two traditional healers enrolled in the parent study intervention arm at the time of the TSS training were invited to participate in a single one-on-one, semi-structured, in-depth qualitative interview to explore their views of the study and their lived experiences following training. This census-based sampling ensured full representation of the intervention cadre and supported thematic saturation.

Data collection

Qualitative interviews lasted approximately 60 min and explored various constructs guided by the Consolidated Framework for Implementation Research (CFIR) framework (intervention characteristics, outer setting, inner

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

setting, individual characteristics, and implementation process) [53]. The CFIR framework was used to guide development of the interview guide to ensure that potential implementation determinants were evaluated in a rigorous and comprehensive manner. The interviews were conducted in private locations in Runyankole (the local language) by trained members of the Ugandan qualitative research team (GN, MT, CB, EA) who had no prior relationship with the participating TH prior to study commencement. Training sessions on qualitative research methods and implementation science were conducted to enhance qualitative interviewing skills among the research team. All members of the study team have considerable research experience conducting community-based healthcare and HIV service delivery.

All interviews followed interview guides, which were initially developed in English, translated into Runyankole, and then translated back to English to maintain fidelity of meaning. Interview guides were used to ensure consistency of topics covered in each interview while allowing the interviewer to explore novel concepts in real time. All interviews were audio-recorded and concurrently translated and transcribed into English by the interviewer. The study Qualitative Data Coordinator (author GN), fluent in Runyankole and English, also reviewed the English transcripts against the audio recordings to verify translation accuracy and integrity of meaning. To ensure data security, all audio files and transcripts were stored on encrypted, password-protected institutional servers accessible only to authorized study personnel. Transcripts were de-identified and pseudonyms used in all analyses and reports to maintain participant confidentiality.

Data analysis

Employing an inductive, thematic-analysis approach, all transcripts were reviewed to develop a coding scheme to capture trial participants' experiences, organized initially within CFIR domains. In vivo codes were then independently developed by three authors (MH, MS, RS) through repeated engagement with the data set. Each author coded a subset of three transcripts individually. Coding schemas were then compared, with discrepancies in codes resolved through discussion until a consensus was reached. Using a deductive framework approach, coded data was organized by topic and entered into an analytical matrix in Microsoft Excel. Authors MH and MS reviewed the matrix to identify concepts which reflected lived experiences and perceptions of TH regarding their training and new role in HIV care programs. Our author team consisted of three male authors (GN, WB, and DN) and nine female authors (MH, MS, SN, CB, MT, SG, WM, JMA, RS), with the first author and senior author being women.

We noted congruence between our thematic analysis and Lee & Koh's empowerment framework [54] (described below), which guided subsequent deductive mapping. While Lee & Koh's framework was originally derived from research in formal organizational settings, it has more recently been applied to evaluating CHW engagement with health programming efforts [55].

Theoretical model

Building on Proctor et al.'s [47, 56] conceptualization, we conceive of empowerment within Lee and Koh's framework as a *proximal implementation outcome*, or an intermediary indicator of success of an strategy along the path of implementation. Proximal outcomes are direct and measurable products of the implementation strategy and can serve as benchmarks towards achieving long term (distal) outcomes, such as adoption or sustainment [57]. Here, we describe how empowerment could be conceived as a necessary – but not sufficient – proximal outcome for successful task shifting implementation among lay workers.

Originally developed in organizational psychology, Lee & Koh's framework for worker empowerment [54] describes the four dimensions of employee empowerment as a "subordinate perceiving… meaningfulness, competence, self-determination, and impact, which is affected by empowering behaviors of a supervisor" [54].

In their model, *meaningfulness* is defined as an individual perceiving value in their task, goal, or purpose that is also tied to congruence between their beliefs and values, and the requirements of their role. *Competence* lies in an individual's belief in their ability to execute tasks effectively in their employment context. *Self-determination* refers to an individual's perceived autonomy involving decisions within their work roles. Finally, *impact* relates to an individual's perception of their ability to influence outcomes in their working environment.

Though our findings were mostly congruent with Lee and Koh's framework, we also identified a fifth element pertaining to TH engagement, which we defined as *external validation*. This refers to an individual's perceived sense of legitimacy and acceptance within their work environment, reinforced through recognition and support from formal external structures or authorities. Unlike the other four domains, which focus on internal self-perception, external validation captures social affirmation by formal actors—especially salient for THs whose roles have historically been stigmatized or excluded from formal health services programming. This validation enhances the individual's motivation by affirming their role and contributions as integral to broader

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

organizational or community goals. We propose this as a novel, fifth dimension of empowerment with particular relevance for implementation research involving informal providers or those from minoritzed cadres.

Results

Twenty-two individual interviews were conducted with TH assigned to the study intervention arm. Among the 22 TH enrolled, most were female (64%) and literate or semi-literate (96%), with spiritualists being the most common specialty (45%) and the majority (68%) residing more than 5 km from the nearest HIV clinic. A more detailed summary of participant demographics is shown in Table 1.

Our findings indicate that following the task-shifting training, THs experienced a multidimensional sense of empowerment that enabled a significant transformation in how they understood and planned to enact their roles. Rather than simply adding new skills, the training facilitated a deeper shift—supporting THs to integrate biomedical responsibilities into their traditional caregiving identities. Participant perceptions and reactions to the training aligned with the four dimensions in Lee & Koh's employment empowerment framework (meaningfulness, competence, choice, impact). Additionally, our analysis identified a novel fifth domain, external validation, reflecting the significance of formal recognition from formal institutions in reinforcing healer legitimacy. Definitions of these five domains in the context of our study are summarized in Table 2.

Table 1 Traditional Healer Demographics ($n = 22$)

Gender	
Female	14 (64)
Literacy Level (n,%)	
Literate	12 (55)
Semi-Literate	9 (41)
Illiterate	1 (4)
Speciality (n,%)	
Herbalist	5 (23)
Traditional Birth Attendant	5 (23)
Spiritualist	10 (45)
Bonesetter	2 (9)
Age (median, IQR)	
Median Age	45 (37 - 57)
Distance from nearest HIV clinic (n,%)	
Less than 5 km	7 (32)
More than 5 km	15 (68)

Meaningfulness

Meaningfulness is characterized by the personal significance TH attribute to their work and how their new TSS roles align with their intrinsic values and motivations. Healers were particularly motivated by long-standing relationships with clients and their desire to provide care where it is most needed. They expressed that the training was not only about gaining new skills but also about reinforcing their inherent role as trusted caregivers in their communities.

> *They [PLWH] also believe and trust in me because of the way we have been working together as traditional healers; they know we are very good at keeping secrets. Most of these clients are the people we know; we love and care of them so much. In fact, the care that we [healers] give them is much more than that of their own parents, family, and friends. Because of that, they [PLWH] will not hesitate when it comes accepting our support for HIV care. – Female, 45 years old.*

For several participants, training reinforced their community role and introduced a new sense of professional identity that blended traditional and biomedical caregiving.

> *At the moment, I look at myself more than the healer. I am like a health worker. I am so attached to my clients living with HIV because they are vulnerable and need special attention. – Female, 61 years old.*

Table 2 Key Themes

Key Theme	Description
Meaningfulness	TH found their roles personally significant, aligning with their cultural responsibilities and strong community ties
Competence	TH felt prepared to effectively and appropriately support their clients with HIV
Self-Determination	TH felt more autonomous, with increased capacity to make informed decisions in HIV care
Impact	TH recognized their role in reducing barriers to HIV care, such as stigma and inaccessibility
External Validation	Recognition from the formal health system reinforced TH legitimacy and motivation

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

Competence

Competence in this context refers to the traditional healers' enhanced belief in their ability to support PLWH effectively. Before the training, many healers felt constrained in their ability to provide comprehensive care due to a lack of formal HIV-related knowledge.

The training was described as helping healers overcome their initial fears in supporting PLWH due to their limited knowledge on the subject. By addressing this knowledge gap, the training fostered a new sense of professional identity by expanding their capacity to offer more comprehensive support to clients with HIV, bridging traditional and biomedical paradigms.

> *I am sure that now if I got any of my clients living with HIV at my place, I feel I am the right person to help and support him or her to live a healthy life. I am not afraid anymore. I am skilled, an expert, and a professional in supporting PLWH. – Male, 38 years old.*

> *After the study training, I went back home when I was fully loaded with enough information and knowledge about HIV, ready to start supporting people. As I speak, I feel like I am also a health worker because I trained. I am so blessed because I am skilled in providing services to my clients in two ways, both a traditional healer and a person providing services to PLWH. –Female, 45 years old.*

Healers also acknowledged that even though they had previously referred their clients living with HIV to clinics before receiving the training, they still gained a sense of confidence that allowed them to provide auxiliary support to biomedical care.

> *The moment I discover that a client is HIV positive, I will try linking them to the hospital for ART initiation and HIV management. I also used to give the PLWH counselling, only that I had not been competent to counsel HIV clients professionally. But now, after the study training, I will be counselling my clients correctly. – Male, 32 years old.*

Self-Determination

Self-determination reflects traditional healers' increased autonomy in making decisions related to HIV care. Though healers practice outside the realm of the formal biomedical care system and have independence in individual practices, healers described limited autonomy in dealing with clients living with HIV due to lack of knowledge about the disease. Following the training, healers noted a different feeling, where they could now autonomously support their clients throughout their HIV care experience, from diagnosis through ART adherence counselling.

> *Before training, I would reach a time and be handcuffed whenever I was faced with a challenging situation of an HIV-positive person. But now I am happy that I will be able to help people from the villages who would usually be left unattended and more affected by HIV and its related infections. – Male, 43 years old.*

> *We used to (offer services) our best but all in vain. You would not see any improvement. You pray, but no change. Sometimes, we knew the HIV status of those clients but not on treatment, and we did not know how to support them to get back to care… This training has really changed me and opened my eyes in things related to HIV… after the training, I learnt a lot, and I am ready and prepared to do the work. – Female, 37 years old.*

Furthermore, traditional healer participants noted their appreciation for maintaining their own care practices while collaborating with the biomedical healthcare system to address HIV.

> *If this project is sustained, we shall be able to rout HIV in our communities. The project should stay and stay forever because we believe that it does not negatively affect our activities as traditional healers, and yet it helps our clients living with HIV to get better. – Female, 45 years old.*

Impact

Impact involves participants' perceived ability to improve their clients' health outcomes and have a positive influence on the broader community by improving access to HIV care. Healers recognized their ability to provide crucial socio-emotional support for PLWH that formal healthcare systems often struggle to deliver, especially in rural areas. They felt that their involvement would make a significant difference by facilitating self-efficacy and encouraging PLWH to remain in formal HIV care. This further reinforced their self-concept as legitimate, capable health actors—a hallmark of role transformation.

> *I have stayed with these people for a very long time. When a person comes to me, I usually know what they have been going through … People who are nearer to me, we meet at village functions and do farm work together, which makes them not fear me… The same way you told me that this is a conversation, my counselling sessions with my patients are conversations too. I ask the patients how they are doing, and when they tell me about challenges with*

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

their HIV medicines, I will advise them according to how we were trained. – Female, 57 years.

Furthermore, healers elaborated on their ability to provide a stigma-free environment for HIV testing, counseling, and serostatus disclosure. Pre-existing, close relationships between healers and their clients was described as the foundation of this trusting relationship – a significant difference from the HIV clinical environment.

People in villages do not usually disclose their secrets to formal health workers in health facilities, they are feared, not friendly, and very busy. They [PLWH] would rather disclose to me than health care workers.... It becomes easy to disclose to me as we talk about our usual things. They [PLWH] always see me as an adviser, since I am old and knowledgeable in my specialty. They trust me with their secrets. – Female, 70 years old.

It will be easier for my clients to go and test themselves from our location than going to the clinics where their HIV status will be exposed to the public. HIV testing at the healer location is good and confidential. It is private, no issues of HIV stigma and worries are not there. –Female, 37 years old.

External Validation

External validation emerged as a distinct and critical dimension of empowerment for task shifting among our participants. This theme, rooted in formal acknowledgment from members of institutional and biomedical healthcare systems, was instrumental in fostering a stronger sense of belonging, legitimacy, and motivation among our traditional healer participants. Recognition came in various forms, including physical tokens, symbolic respect, and social inclusion, each contributing significantly to healers' enthusiasm for participating in the training and their subsequent roles in HIV care. Participants emphasized the value of receiving a tangible symbol of their new role which solidified THs' evolving professional identities through formal recognition as valued contributors to public health efforts.

I was also given an HIV training certificate. I am so proud of it, and when I came from the training, I showed it to my village Local Chairperson. I will be able to support my clients living with HIV, and I will not hesitate at any one time to test, counsel and link them to HIV care and treatment at the health facility. – Female, 49 years old.

They also highlighted how inclusion in an HIV study run by local biomedical professionals bridged social gaps between traditional and biomedical practitioners, and represented a long-overdue acknowledgment of their contributions to health in their communities, addressing feelings of historical neglect:

I appreciate the study so much for recognizing us, the traditional healers, as important people, mixing with us, equipping us with knowledge. We used fear to come near doctors, but during training, we sat with them. They come in our homes and sit with us; this showed me the love and respect you have for us [traditional healer] without discriminating against us. – Female, 55 years old.

For us healers, we have always been ignored and forgotten as far as health that is not concerned with spirituality is concerned...we were always ignored and left behind. I was very happy to be trained, get good connections with health workers to improve the wellbeing of our rural people. Thank you so much for thinking and remembering us. I hope it was God's plans. – Male, 57 years old.

Each domain of empowerment reflects a distinct yet interrelated pathway through which the strategy of TSS produces engagement:

- Meaningfulness reflects perceived alignment between their identity and their newly assigned roles. Alignment is critical for role legitimacy and internal motivation, and may predict implementation success.
- Competence describes an increased confidence and self-efficacy, driven by technical knowledge acquisition. In this case, merging traditional and biomedical roles enhanced legitimacy as HIV supporters and strengthened connection to the formal health system.
- Self-determination reflects perceived autonomy. In contrast to assumptions that intervention fidelity must come at the expense of autonomy, we suggest that empowering implementers to adapt their roles within the bounds of core intervention components may reinforce engagement and create a sense of ownership.
- Impact relates to the perception or experience that the intervention will lead to a tangible benefit for the target population. This may act as a motivational reinforcement loop that sustains implementation of TSS even in the face of resource or structural constraints.
- External validation, the novel domain identified in this study, underscores the critical role of recognition from actors in the formal healthcare sector as part of empowerment. Echoing legitimacy theory, which posits that perceived institutional recognition enhances identity coherence and promotes role sta-

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

bility [58], external validation legitimized the work of THs within the broader health system. This may be particularly important for lay providers who have been historically excluded from institutional structures, or are members of a stigmatized class [59–61].

Together, these five empowerment domains are integral to the process of role transformation as part of a TSS program. THs began to see themselves not only as traditional caregivers but as hybrid providers who could confidently navigate both cultural and biomedical realms. This identity shift is foundational to the domains of empowerment (Fig. 1). Our qualitative data suggest that as providers transform their roles, the domains of empowerment can facilitate intervention adoption, fidelity and maintenance. Conversely, the absence or erosion of these empowerment elements—such as limited role alignment, inadequate training, constrained autonomy, minimal perceived impact, or lack of recognition from biomedical actors—could function as barriers to implementation by weakening trust, motivation, and engagement. This suggests that empowerment is not only a positive result of participation, but could be considered a necessary condition for sustaining role transformation and effective task-shifting.

Discussion

As global health systems confront persistent workforce shortages and structural barriers to equitable care, task shifting and task sharing (TSS) continue to be widely endorsed implementation strategies for closing health service gaps, particularly in resource-limited settings [6, 15]. However, evaluating the success of this strategy with informal lay providers such as traditional healers remains underexplored, both conceptually and operationally. This study addresses that gap by identifying empowerment as a proximal implementation outcome can indicate successful uptake, engagement, and sustainment of TSS interventions.

A critical gap identified in implementation science concerns the relationship between implementation strategies and implementation outcomes – particularly how strategies generate measurable changes that predict successful adoption, fidelity, and sustainability. Proctor's 2011 and 2023 [47, 56] research agendas explicitly called for theory-building studies that use implementation outcomes to model mechanisms of implementation success [47], yet few studies examine these linkages [56]. Our study responds to this gap by proposing that empowerment—particularly among informal, community-based implementers—serves as both a proximal outcome and a passthrough mechanism that potentiates the success of TSS interventions.

By applying Lee and Koh's empowerment framework [54] and expanding upon it with the novel concept of external validation, we conceptualize empowerment as a multi-dimensional construct comprising meaningfulness, competence, self-determination, impact, and recognition. This approach aligns with foundational public health frameworks, including the Alma Ata Declaration and Ottawa Charter, which identify community empowerment as central to equitable, sustainable health system development [62–64]. Our findings position these dimensions as proximal implementation outcomes as they not only reflect early indicators of implementation progress (i.e. adoption, fidelity), but

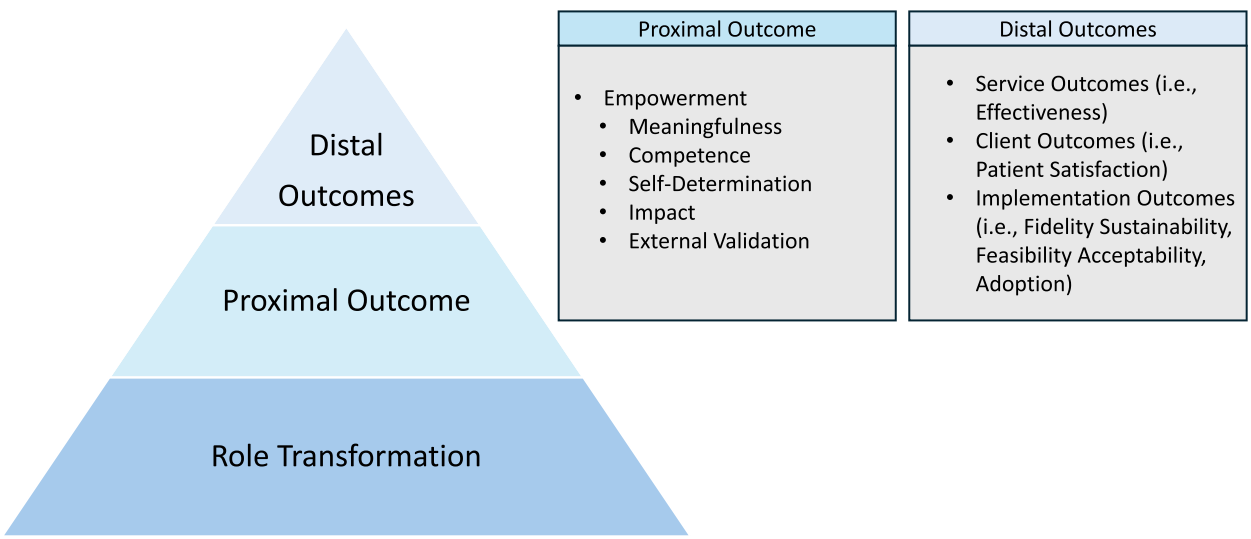


Fig. 1 Summary of empowerment as a proximal implementation outcome, bridging the process of role transformation in TSS programs with broad distal outcomes of interest

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

also illuminate the mechanisms by which task shifting exerts its effects.

In line with Proctor's emphasis on user-centered implementation outcomes [47], we frame empowerment as a psychologically grounded construct that connects the implementation strategy of TSS to behavioral change. This builds on emerging literature recognizing internal states—such as self-efficacy, perceived legitimacy, and motivation—as central to successful implementation [65–67]. While our study identified the proximal outcome of empowerment in light of a TSS program, we believe that role transformation is an integral component of any implementation strategy that involves training and knowledge transfer, including common strategies such as train-the-trainer and identify/prepare champions. Therefore, empowerment could be a broadly relevant proximal outcome for other types of implementation research.

Our findings also offer several implications for implementation programs involving the lay cadre:

Target empowerment explicitly

Empowerment should be positioned as an explicit goal rather than a secondary outcome. While often conflated, motivation and empowerment are conceptually distinct. Motivation may yield short-term engagement, but empowerment—by integrating personal fulfilment with organizational purpose—supports distal implementation outcomes [52]. Training approaches should be designed intentionally to intentionally foster meaningfulness, competence, autonomy, perceived impact, and acceptability by institutional stakeholders— not only as side effects but as core targets of implementation efforts.

Embed mechanisms of formal recognition

To ensure sustainability, consider strategies that involve formal recognition such as certificates, stipends, public acknowledgment, or structured inclusion in care coordination. These are not merely symbolic gestures; they directly address historical exclusion and help legitimize the roles of informal providers within the health system and contribute towards empowerment.

Measure empowerment systematically

Capturing empowerment outcomes requires measurement approaches that reflect their experiential and identity-based nature. Unlike traditional outcomes—such as fidelity or feasibility—which are typically assessed through system-level indicators, empowerment outcomes are best evaluated through qualitative inquiry or tailored psychometric tools. Developing rapid-assessment instruments could enable implementers to detect early signs of disengagement and adjust strategies accordingly [68].

Bridge frameworks to connect individual and system-level change

Our findings suggest that empowerment outcomes complement—but do not replace—established implementation outcome frameworks such as Proctor's outcomes, CFIR and COM-B [33, 47, 56, 69]. Whereas Proctor's outcomes focus primarily on organizational performance and intervention-level metrics (e.g., feasibility, fidelity, adoption), empowerment outcomes highlight individual-level psychological and social mechanisms through which implementation strategies exert their effects. This multi-level integration advances calls for frameworks that bridge individual, organizational, and systemic levels of implementation [70, 71].

We note a few limitations of this qualitative study. Interviews were conducted immediately following the initial healer training and focused on participant motivation to participate in the study rather than the effectiveness of healers in their TSS role. Future work can understand how participant motivation and empowerment correspond with clinical effectiveness over the course of the study. Our findings capture early experiences of role transformation rather than long-term integration of new HIV-support responsibilities with traditional practices. Future research during the implementation and post-implementation phases of our study will explore how these roles evolve and become embedded in day-to-day healer practice. We also note that our characterization of empowerment reflects a self-assessed outcome measure. The broader utility of this new implementation outcome could be assessed through future research on quantifying the domains of empowerment, similar to how the Theoretical Framework of Acceptability evaluates components of acceptability [72].

Conclusion

Our findings advance implementation science by proposing a refined, multi-dimensional conceptualization of empowerment as a proximal implementation outcome leading to successful TSS. We present a theory-driven analysis of qualitative data of traditional healers' experiences following HIV lay supporter training illustrate five interrelated empowerment domains—meaningfulness, competence, self-determination, impact, and external validation. By adopting a user-centered perspective, this study contributes to expanding our understanding of implementation outcomes and deepening our understanding of how the strategy of task-shifting achieves its intended effects. Empowerment as a proximal implementation outcome suggests an important indicator for assessing and optimizing task shifting or other strategies involving informal cadres.

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

Future research is needed to potentially validate quantitative measures of empowerment outcomes across diverse contexts and examine their predictive value in relation to traditional implementation outcomes such as adoption, fidelity, and sustainability.

Abbreviations

ART	Antiretroviral Therapy
CHW	Community Health Worker
HIV	Human Immunodeficiency Virus
IRB	Institutional Review Board
PLWH	People Living With HIV
TH	Traditional Healer(s)
TSS	Task Shifting and Task Sharing
UNAIDS	Joint United Nations Programme on HIV/AIDS

Acknowledgements
The authors acknowledge the contributions of the traditional healers who participated in the study and the research staff at Mbarara University of Science and Technology (MUST) and Weill Cornell Medicine for their support in data collection and analysis. We also thank the Uganda National Council for Science and Technology (UNCST) for ethical oversight and the National Institute of Mental Health (NIMH) for funding this research.

Authors' contribution
WM, DN, JMA, and RS conceived and designed the study. RS and JMA provided overall supervision and oversight for the study, with RS securing funding to support study activities. GN, SN, CB, WB, MT collected study data. MH and MS performed the qualitative analysis under the supervision of RS. GN, SG, SN, CB, WB, and MT contributed to refinement of codes and themes. MH drafted the first draft of the manuscript with support from MS and RS. All authors reviewed and approved the final manuscript.

Funding
This study was supported by funding from the National Institute of Mental Health (R01MH132440, PI: Sundararajan). The funding body had no role in the study design, data collection, analysis, interpretation, or manuscript writing.

Data availability
The datasets generated and analyzed during this study are not publicly available due to confidentiality agreements with participants but are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
This study was conducted following ethical standards and was approved by the Mbarara University of Science and Technology Research Ethics Committee (MUST-2022–646), Weill Cornell Medicine Research Ethics Committee (22–09025268), and the Uganda National Council for Science and Technology (HS2780ES). All participants provided written informed consent before participation in both the parent trial and this qualitative sub-study.

Consent for publication
Not applicable, as the manuscript does not contain any identifiable individual data, images, or personal information requiring consent for publication.

Competing interests
Radhika Sundararajan is an Associate Editor for Implementation Science Communications.

Author details
[1]Weill Cornell Medicine (WCM), 1300 York Avenue, New York, NY 10021, USA. [2]Cornell University, 410 Thurston Avenue, Ithaca, NY 14850, USA. [3]Mbarara University of Science and Technology (MUST), P.O BOX 1410, Mbarara, Uganda. [4]Weill Cornell Medicine - Center for Global Health, 402 E. 67th Street, New York, NY 10065, USA.

Received: 30 June 2025 Accepted: 3 November 2025
Published online: 29 November 2025

References

1. Ministry of Health (MOH), Uganda. Uganda Population-based HIV Impact Assessment 2020–2021 (UPHIA 2020- 2021) Final Report. Kampala: MOH, Uganda; 2024.
2. Zakumumpa H, Taiwo MO, Muganzi A, Ssengooba F. Human resources for health strategies adopted by providers in resource-limited settings to sustain long-term delivery of ART: a mixed-methods study from Uganda. Hum Resour Health. 2016;14(1):63.
3. Ministry of Health (MOH), Uganda. Human Resources for Health Strategic Plan 2020–2030. 2021 Mar p. 166.
4. World Health Organization, PEPFAR, UNAIDS. Task shifting : rational redistribution of tasks among health workforce teams : global recommendations and guidelines. 2007;88.
5. Zachariah R, Ford N, Philips M, S.Lynch, Massaquoi M, Janssens V, et al. Task shifting in HIV/AIDS: opportunities, challenges and proposed actions for sub-Saharan Africa. Trans R Soc Trop Med Hyg. 2009;103(6):549–58.
6. World Health Organization. PEPFAR, UNAIDS. Task shifting: Global recommendations and guidelines. 2008;1:88.
7. Dambisya YM, Matinhure S. Policy and programmatic implications of task shifting in Uganda: a case study. BMC Health Serv Res. 2012;12(1):61.
8. Callaghan M, Ford N, Schneider H. A systematic review of task- shifting for HIV treatment and care in Africa. Hum Resour Health. 2010;8(1):8.
9. Mbouamba Yankam B, Adeagbo O, Amu H, Dowou RK, Mbouamba Nyamen BG, Ubechu SC, et al. Task shifting and task sharing in the health sector in sub-Saharan Africa: evidence, success indicators, challenges, and opportunities. Pan Afr Med J. 2023;46. Available from: https://www.panafrican-med-journal.com/content/article/46/11/full. Cited 2024 Nov 4.
10. Glenton C, Colvin C, Carlsen B, Swartz A, Lewin S, Noyes J, et al. Barriers and facilitators to the implementation of lay health worker programmes to improve access to maternal and child health: qualitative evidence synthesis. In: The Cochrane Collaboration, editor. Chichester, UK: John Wiley & Sons, Ltd; 2013. p. CD010414.
11. Hirnschall G, Harries AD, Easterbrook PJ, Doherty MC, Ball A. The next generation of the World Health Organization's global antiretroviral guidance. J Int AIDS Soc. 2013;16(1):18757.
12. Orkin AM, Rao S, Venugopal J, Kithulegoda N, Wegier P, Ritchie SD, et al. Conceptual framework for task shifting and task sharing: an international Delphi study. Hum Resour Health. 2021;19(1):61.
13. European Commission. Directorate General for Health and Food Safety. Task shifting and health system design. LU: Publications Office; 2019. Available from: https://doi.org/10.2875/42878. Cited 2024 May 23.
14. World Health Organization. Task sharing to improve access to Family Planning/Contraception. 2018 Nov p. 12. Report No.: WHO/RHR/17.20.
15. Powell BJ, Waltz TJ, Chinman MJ, Damschroder LJ, Smith JL, Matthieu MM, et al. A refined compilation of implementation strategies: results from the Expert Recommendations for Implementing Change (ERIC) project. Implement Sci IS. 2015;12(10):21.
16. Ludwick T, Brenner JL, Kyomuhangi T, Wotton KA, Kabakyenga JK. Poor retention does not have to be the rule: retention of volunteer community health workers in Uganda. Health Policy Plan. 2014;29(3):388–95.
17. Kok MC, Dieleman M, Taegtmeyer M, Broerse JE, Kane SS, Ormel H, et al. Which intervention design factors influence performance of community health workers in low- and middle-income countries? A systematic review. Health Policy Plan. 2015;30(9):1207–27.
18. McGuire M, Ben Farhat J, Pedrono G, Szumilin E, Heinzelmann A, Chinyumba YN, et al. Task-Sharing of HIV Care and ART Initiation: Evaluation of a Mixed-Care Non-Physician Provider Model for ART Delivery in Rural Malawi. Vermund SH, editor. PLoS ONE. 2013 Sept 16;8(9):e74090.
19. Celletti F, Wright A, Palen J, Frehywot S, Markus A, Greenberg A, et al. Can the deployment of community health workers for the delivery of HIV services represent an effective and sustainable response to health workforce shortages? Results of a multicountry study AIDS. 2010;24(Suppl 1):S45-57.
20. Chang LW, Alamo S, Guma S, Christopher J, Suntoke T, Omasete R, et al. Two-year virologic outcomes of an alternative AIDS care model: evaluation of a peer health worker and nurse-staffed community-based program in Uganda. JAIDS J Acquir Immune Defic Syndr. 2009;50(3):276–82.

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

21. Sekiziyivu BA, Bancroft E, Rodriguez EM, Sendagala S, Nasirumbi MP, Najjengo MS, et al. Task Shifting for Initiation and Monitoring of Antiretroviral Therapy for HIV-Infected Adults in Uganda: The SHARE Trial. JAIDS J Acquir Immune Defic Syndr. 2021;86(3):e71–9.
22. Chang LW, Kagaayi J, Nakigozi G, Ssempijja V, Packer AH, Serwadda D, et al. Effect of Peer Health Workers on AIDS Care in Rakai, Uganda: A Cluster-Randomized Trial. Kissinger P, editor. PLoS ONE. 2010 June 2;5(6):e10923.
23. Ministry of Health. Village health team: Strategy and operational guidelines. Kampala Uganda Uganda Minist Health. 2010;46.
24. Mwai GW, Mburu G, Torpey K, Frost P, Ford N, Seeley J. Role and outcomes of community health workers in HIV care in sub-Saharan Africa: a systematic review. J Int AIDS Soc. 2013;16(1):18586.
25. Lofgren SM, Tsui S, Atuyambe L, Ankunda L, Komuhendo R, Wamala N, et al. Barriers to HIV care in Uganda and implications for universal test-and-treat: a qualitative study. AIDS Care. 2022;34(5):597–605.
26. Mayer CM, Owaraganise A, Kabami J, Kwarisiima D, Koss CA, Charlebois ED, et al. Distance to clinic is a barrier to PrEP uptake and visit attendance in a community in rural Uganda. J Int AIDS Soc. 2019;22(4):e25276.
27. Holtzman CW, Shea JA, Glanz K, Jacobs LM, Gross R, Hines J, et al. Mapping patient-identified barriers and facilitators to retention in HIV care and antiretroviral therapy adherence to Andersen's Behavioral Model. AIDS Care. 2015;27(7):817–28.
28. Opio M, Akello F, Twongyeirwe DK, Opio D, Aceng J, Namagga JK, et al. Perspectives on linkage to care for patients diagnosed with HIV: a qualitative study at a rural health center in South Western Uganda. PLoS ONE. 2022;17(3):e0263864.
29. Siedner MJ, Lankowski A, Tsai AC, Muzoora C, Martin JN, Hunt PW, et al. GPS-measured distance to clinic, but not self-reported transportation factors, are associated with missed HIV clinic visits in rural Uganda. AIDS Lond Engl. 2013;27(9):1503–8.
30. Sundararajan R, Mwanga-Amumpaire J, King R, Ware NC. Conceptual model for pluralistic healthcare behaviour: results from a qualitative study in southwestern Uganda. BMJ Open. 2020;10(4):e033410.
31. Lambert VJ, Kisigo GA, Nzali A, Laizer E, Paul N, Walshe L, et al. Religious Leaders as Trusted Messengers in Combatting Hypertension in Rural Tanzanian Communities. Am J Hypertens. 2021;34(10):1042–8.
32. Mwakisole AH, Lambert VJ, Nzali A, Aristide C, Laizer E, Cordeiro AA, et al. Partnerships with religious leaders to promote family planning in rural Tanzania: an open-label, cluster randomised trial. Lancet Glob Health. 2023;11(12):e1943–54.
33. Damschroder LJ, Aron DC, Keith RE, Kirsh SR, Alexander JA, Lowery JC. Fostering implementation of health services research findings into practice: a consolidated framework for advancing implementation science. Implement Sci. 2009;4(1):50.
34. World Health Organization. WHO traditional medicine strategy: 2014–2023. Geneva: World Health Organization; 2013. 76 p. Available from: https://iris.who.int/handle/10665/92455. Cited 2023 Dec 30.
35. Audet CM, Sidat M, Blevins M, Moon TD, Vergara A, Vermund SH. HIV knowledge and health-seeking behavior in Zambézia Province, Mozambique. SAHARA-J: Journal of Social Aspects of HIV/AIDS. 2012;9(1):41–6.
36. King R, Balaba D, Kaboru B, Kabatesi D, Pharris A, Homsy J. The Role of Traditional Healers in Comprehensive HIV/AIDS Prevention and Care in Africa: Untapped Opportunities. In: From the Ground Up: Building Comprehensive HIV/AIDS Care Programs in Resource-Limited Settings. Elizabeth Glaser Pediatric AIDS Foundation; 2009.
37. Audet CM, Clemens EM, Ngobeni S, Mkansi M, Sack DE, Wagner RG. Throwing the bones to diagnose HIV: Views of rural South African traditional healers on undertaking HIV counselling and testing. AIDS Care. 2021;33(10):1316–20.
38. Moshabela M, Bukenya D, Darong G, Wamoyi J, McLean E, Skovdal M, et al. Traditional healers, faith healers and medical practitioners: the contribution of medical pluralism to bottlenecks along the cascade of care for HIV/AIDS in Eastern and Southern Africa. Sex Transm Infect. 2017;93(Suppl 3):e052974.
39. Bodeker G, Carter G, Burford G, Dvorak-Little M. HIV/AIDS: traditional systems of health care in the management of a global epidemic. J Altern Complement Med. 2006;12(6):563–76.
40. Hughes GD, Aboyade OM, Clark BL, Puoane TR. The prevalence of traditional herbal medicine use among hypertensives living in South African communities. BMC Complement Altern Med. 2013;13(1):38.
41. Sundararajan R, Hooda M, Lai Y, Nansera D, Audet C, Downs J, et al. Traditional healer support to improve HIV viral suppression in rural Uganda (Omuyambi): study protocol for a cluster randomized hybrid effectiveness-implementation trial. Trials. 2024;25(1):430.
42. Sundararajan R, Langa PV, Morshed T, Manuel S. Traditional healers as client advocates in the HIV-endemic region of Maputo, Mozambique: results from a qualitative study. SAHARA-J J Soc Asp HIVAIDS. 2021;18(1):77–85.
43. Sundararajan R, Ponticiello M, Birch G, Nuwagaba G, Alaiku R, Nansera D, et al. Adaption and pilot testing of a lay HIV supporter program for traditional healers: a mixed methods study in rural Uganda. Implement Sci Commun. 2023;4(1):87.
44. Audet CM, Pettapiece-Phillips M, Tian Y, Shepherd BE, Vermund SH, Salato J. If it weren't for my traditional healer, I would be dead": engaging traditional healers to support people living with HIV in rural Mozambique. PLoS ONE. 2022;17(6):e0270565.
45. Audet CM, Salato J, Vermund SH, Amico KR. Adapting an adherence support workers intervention: engaging traditional healers as adherence partners for persons enrolled in HIV care and treatment in rural Mozambique. Implement Sci IS. 2017;12(1):50.
46. Mbindyo P, Gilson L, Blaauw D, English M. Contextual influences on health worker motivation in district hospitals in Kenya. Implement Sci IS. 2009;23(4):43.
47. Proctor E, Silmere H, Raghavan R, Hovmand P, Aarons G, Bunger A, et al. Outcomes for implementation research: conceptual distinctions, measurement challenges, and research agenda. Adm Policy Ment Health. 2011;38(2):65–76.
48. Franco LM, Bennett S, Kanfer R. Health sector reform and public sector health worker motivation: a conceptual framework. Soc Sci Med. 2002;54(8):1255–66.
49. Brunie A, Wamala-Mucheri P, Otterness C, Akol A, Chen M, Bufumbo L, et al. Keeping community health workers in Uganda motivated: key challenges, facilitators, and preferred program inputs. Glob Health Sci Pract. 2014;2(1):103–16.
50. Dewi A, Supriyatiningsih S, Sundari S, Sugiyo D, Dewi DTK. Community health worker empowerment through collaborative models with community midwifery. Int J Public Health Sci IJPHS. 2023;12(2):510.
51. Musoke D, Atusingwize E, Ndejjo R, Ssemugabo C, Siebert P, Gibson L. Enhancing performance and sustainability of community health worker programs in Uganda: lessons and experiences from stakeholders. Glob Health Sci Pract. 2021;9(4):855–68.
52. Shahmalak U, Blakemore A, Waheed MW, Waheed W. The experiences of lay health workers trained in task-shifting psychological interventions: a qualitative systematic review. Int J Ment Health Syst. 2019;13(1):64.
53. Keith RE, Crosson JC, O'Malley AS, Cromp D, Taylor EF. Using the Consolidated Framework for Implementation Research (CFIR) to produce actionable findings: a rapid-cycle evaluation approach to improving implementation. Implement Sci IS. 2017;12(1):15.
54. Lee M, Koh J. Is empowerment really a new concept? Int J Hum Resour Manage. 2001;12(4):684–95.
55. Kane S, Kok M, Ormel H, Otiso L, Sidat M, Namakhoma I, et al. Limits and opportunities to community health worker empowerment: a multi-country comparative study. Soc Sci Med. 2016;164:27–34.
56. Proctor EK, Bunger AC, Lengnick-Hall R, Gerke DR, Martin JK, Phillips RJ, et al. Ten years of implementation outcomes research: a scoping review. Implement Sci IS. 2023;18(1):31.
57. Lewis CC, Klasnja P, Powell BJ, Lyon AR, Tuzzio L, Jones S, et al. From classification to causality: advancing understanding of mechanisms of change in implementation science. Front Public Health. 2018;6:136.
58. Tyler TR. Psychological perspectives on legitimacy and legitimation. Annu Rev Psychol. 2006;57(1):375–400.
59. Akol A, Moland KM, Babirye JN, Engebretsen IMS. "We are like co-wives": Traditional healers' views on collaborating with the formal Child and Adolescent Mental Health System in Uganda. BMC Health Serv Res. 2018;18(1):258.
60. Abbo C. Profiles and outcome of traditional healing practices for severe mental illnesses in two districts of Eastern Uganda. Glob Health Action. 2011. https://doi.org/10.3402/gha.v4i0.7117.

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

61. Boyd L. Irrational acts: Maternal death, women's agency, and the obligation to care in Uganda. Med Anthropol Q. 2024 Oct 21;
62. World Health Organization. Declaration of Alma Ata (International Conference on Primary Health Care). WHO Europe; 1978.
63. World Health Organization. Ottawa Charter for Health Promotion. 1986. Available from: https://www.healthpromotion.org.au/images/ottawa_charter_hp.pdf. Cited 2024 Nov 22.
64. Lindacher V, Curbach J, Warrelmann B, Brandstetter S, Loss J. Evaluation of empowerment in health promotion interventions: a systematic review. Eval Health Prof. 2018;41(3):351–92.
65. Scott K, Beckham SW, Gross M, Pariyo G, Rao KD, Cometto G, et al. What do we know about community-based health worker programs? A systematic review of existing reviews on community health workers. Hum Resour Health. 2018;16(1):39.
66. Nilsen P. Making sense of implementation theories, models and frameworks. Implement Sci. 2015;10(1):53.
67. Lewis CC, Fischer S, Weiner BJ, Stanick C, Kim M, Martinez RG. Outcomes for implementation science: an enhanced systematic review of instruments using evidence-based rating criteria. Implement Sci. 2015;10(1):155.
68. Weiner BJ, Lewis CC, Stanick C, Powell BJ, Dorsey CN, Clary AS, et al. Psychometric assessment of three newly developed implementation outcome measures. Implement Sci. 2017;12(1):108.
69. Michie S, van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci IS. 2011;23(6):42.
70. Pfadenhauer LM, Gerhardus A, Mozygemba K, Lysdahl KB, Booth A, Hofmann B, et al. Making sense of complexity in context and implementation: the context and implementation of complex interventions (CICI) framework. Implement Sci. 2017;12(1):21.
71. May CR, Johnson M, Finch T. Implementation, context and complexity. Implement Sci. 2016;11(1):141.
72. Sekhon M, Cartwright M, Francis JJ. Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework. BMC Health Serv Res. 2017;17(1):88.

Publisher's Note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

Content courtesy of Springer Nature, terms of use apply. Rights reserved.

Terms and Conditions

Springer Nature journal content, brought to you courtesy of Springer Nature Customer Service Center GmbH (“Springer Nature”).
Springer Nature supports a reasonable amount of sharing of research papers by authors, subscribers and authorised users (“Users”), for small-scale personal, non-commercial use provided that all copyright, trade and service marks and other proprietary notices are maintained. By accessing, sharing, receiving or otherwise using the Springer Nature journal content you agree to these terms of use (“Terms”). For these purposes, Springer Nature considers academic use (by researchers and students) to be non-commercial.
These Terms are supplementary and will apply in addition to any applicable website terms and conditions, a relevant site licence or a personal subscription. These Terms will prevail over any conflict or ambiguity with regards to the relevant terms, a site licence or a personal subscription (to the extent of the conflict or ambiguity only). For Creative Commons-licensed articles, the terms of the Creative Commons license used will apply.
We collect and use personal data to provide access to the Springer Nature journal content. We may also use these personal data internally within ResearchGate and Springer Nature and as agreed share it, in an anonymised way, for purposes of tracking, analysis and reporting. We will not otherwise disclose your personal data outside the ResearchGate or the Springer Nature group of companies unless we have your permission as detailed in the Privacy Policy.
While Users may use the Springer Nature journal content for small scale, personal non-commercial use, it is important to note that Users may not:

1. use such content for the purpose of providing other users with access on a regular or large scale basis or as a means to circumvent access control;
2. use such content where to do so would be considered a criminal or statutory offence in any jurisdiction, or gives rise to civil liability, or is otherwise unlawful;
3. falsely or misleadingly imply or suggest endorsement, approval , sponsorship, or association unless explicitly agreed to by Springer Nature in writing;
4. use bots or other automated methods to access the content or redirect messages
5. override any security feature or exclusionary protocol; or
6. share the content in order to create substitute for Springer Nature products or services or a systematic database of Springer Nature journal content.

In line with the restriction against commercial use, Springer Nature does not permit the creation of a product or service that creates revenue, royalties, rent or income from our content or its inclusion as part of a paid for service or for other commercial gain. Springer Nature journal content cannot be used for inter-library loans and librarians may not upload Springer Nature journal content on a large scale into their, or any other, institutional repository.
These terms of use are reviewed regularly and may be amended at any time. Springer Nature is not obligated to publish any information or content on this website and may remove it or features or functionality at our sole discretion, at any time with or without notice. Springer Nature may revoke this licence to you at any time and remove access to any copies of the Springer Nature journal content which have been saved.
To the fullest extent permitted by law, Springer Nature makes no warranties, representations or guarantees to Users, either express or implied with respect to the Springer nature journal content and all parties disclaim and waive any implied warranties or warranties imposed by law, including merchantability or fitness for any particular purpose.
Please note that these rights do not automatically extend to content, data or other material published by Springer Nature that may be licensed from third parties.
If you would like to use or distribute our Springer Nature journal content to a wider audience or on a regular basis or in any other manner not expressly permitted by these Terms, please contact Springer Nature at

onlineservice@springernature.com