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Health Systems Strengthening for Rehabilitation Service Delivery at the Primary Care Level: Process Evaluation Findings from Pakistan

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Abstract

Background

Rehabilitation, including assistive technology (AT), is an essential health service, yet access remains limited in low- and middle-income countries (LMICs), including Pakistan. To address gaps in rehabilitation service delivery, the Learning, Acting, and Building for Rehabilitation in Health Systems (ReLAB-HS) piloted a Networks of Care (NoC) model in Thatta and Swat districts to integrate rehabilitation into primary health care (PHC).

Methods

A qualitative process evaluation was conducted between May–September 2024, guided by the implementation outcomes framework. Data was collected through 61 in-depth interviews with stakeholders, including lady health workers (LHWs) and supervisors (n = 31), PHC providers (n = 12), rehabilitation professionals (n = 9), and technical working group (TWG) members (n = 9). Framework analysis was used to explore acceptability, appropriateness, feasibility, fidelity, adaptations, sustainability, and scalability.

Results

The NoC interventions were widely acceptable among the respondents, recognizing their relevance to community needs. The model aligned with PHC goals, though cultural barriers and bureaucratic inefficiencies limited appropriateness. Fidelity was generally high, supported by co-design, training, and digital coordination tools (eg WhatsApp), but constrained by workforce shortages and inconsistent availability of AT. Adaptations included designating rehabilitation days, flexible follow-ups, and community awareness activities. Staff shortages, patient load, and transport barriers challenged the feasibility of the interventions. Sustainability and scalability were seen as contingent on government ownership, integration into health information systems, and dedicated financing, with strong stakeholder demand for district-wide expansion and refresher trainings.

Conclusions

Integrating rehabilitation into PHC through a locally adapted NoC model is feasible, acceptable, and contextually appropriate in Pakistan, but requires systemic investment, supply chain strengthening, and policy-level integration for sustainability. Embedding rehabilitation into national and provincial health programs, health information systems, and financing mechanisms is critical to advancing equity and achieving universal health coverage.

INTRODUCTION

One in three individuals across the globe has a condition that could benefit from rehabilitation (1). Rehabilitation, inclusive of assistive technology (AT) is a core component of essential health services, alongside prevention, health promotion, treatment, and palliative care (2). Most individuals with rehabilitation needs live in low- and middle-income countries (LMICs) where they have limited access to affordable and quality rehabilitation services. Limited political will, a lack of sufficient financial resources, equipment, and a scarcity of trained professionals across various levels of the healthcare system further limit the availability of these services when and where they are needed. When available, both rehabilitation and AT services and trained rehabilitation professionals are concentrated in urban tertiary care centers. This results in inequitable access to services. This vacuum is often filled by private providers, resulting in service fragmentation and raising concerns about affordability and equity.(3)

Primary health care (PHC) is usually the first point of contact for individuals within healthcare systems; therefore, it is a critical entry point for improving access to rehabilitation services (4). As PHC systems evolve in many LMICs, they present a sustainable platform for addressing many of the challenges listed above. On the supply side, addressing rehabilitation within PHC brings services to where individuals are. This could support coordination among various cadres of providers, generate referrals when needed, and reduce the burden on the rehabilitation professionals in the tertiary centers. On the demand side, it addresses issues related to access and affordability of services, reducing inequities, and empowering communities.

Pakistan is no exception. One in four or 56 million people in Pakistan could benefit from rehabilitation (1). Integration of rehabilitation into Pakistan's health system is both a pressing need and a strategic opportunity. Pakistan's decentralized healthcare system includes public and private service delivery. Public sector services are organized in a tiered structure, with Basic Health Units (BHUs) and Rural Health Centers (RHCs) forming the PHC level, supported by Lady Health Workers (LHWs) who provide community outreach. Secondary and tertiary care are offered through district hospitals and specialized urban facilities. However, the system faces challenges such as workforce shortages, limited resources, and weak referral linkages, particularly for emerging services like rehabilitation (5).

Learning, Acting, and Building for Rehabilitation in Health Systems (ReLAB-HS) (6), a United States Agency for International Development (USAID) investment, focused on addressing the rehabilitation needs of the population by making quality rehabilitation services available and accessible at the PHC level. ReLAB-HS focused on achieving local impact and generating evidence from implementing interventions and documenting learnings for use in other regions of Pakistan, and in other LMICs. ReLAB-HS was implemented at the national and sub-national levels in Pakistan.

Based on a formative evaluation (7), the delivery of rehabilitation services in Pakistan is hindered by several systemic gaps that limit access, continuity, and quality of care. A key barrier is the lack of a coordinated approach to rehabilitation service delivery across levels of the health system. PHC providers and LHWs often operate in isolation, with limited knowledge of what rehabilitation and AT services exist beyond their facilities and where or how to refer patients appropriately. This fragmented referral system is compounded by the absence of formal training in rehabilitation and AT for frontline health workers, leaving them ill-equipped to identify needs, initiate basic interventions, or guide patients through the care pathway. To address these gaps, a service delivery model using the Networks of Care (NoCs) (8) approach was established in the Swat and Thatta districts, to enhance the quality and integration of rehabilitation services at the PHC level. (Fig. 1).

To understand how the NoC health systems strengthening interventions for rehabilitation were implemented and how stakeholders experienced them, a process evaluation was conducted to identify and explore ReLAB-HS implementation successes and challenges.

METHODS

Components of Health Systems Strengthening (HSS) Intervention

The ReLAB-HS interventions were delivered using a locally adapted NoC model. The key components of the model included:

a. **Establishment of Technical Working Groups (TWGs):** TWGs were embedded within the district management team and aimed to guide the implementation of health systems strengthening interventions in their respective NoC. Comprised of 12-15 members, TWGs provided a local accountability structure for ReLAB-HS. The function of the TWG was to determine and monitor the progress of the interventions, relevant goals, actions, and changes in the NoC performance. Each TWG met approximately quarterly. During each meeting, priorities were assessed, and actions were identified for TWG and ReLAB-HS to strengthen the service delivery model in the NoC collaboratively.

b. **Identification and prioritization of quality and integration goals and actions:** Using a consolidated framework developed by ReLAB-HS, TWG members and other representatives assessed the baseline status of rehabilitation in their NoC and identified priorities for local action. The Rehabilitation Framework for Integration was then used as the basis for quarterly TWG action planning and reviews

c. **Co-designing a service delivery model for rehabilitation:** Each NoC co-designed a service delivery model for rehabilitation. Each NoC identified specific PHC facilities and rehabilitation facilities to be part of the NoC model, supporting the coordination of rehabilitation care and establishing a referral system to serve the population in their catchment area. PHC and rehabilitation facilities were strategically selected to optimize referral pathways, and a minimum basic AT stock was procured to support service delivery and test procurement mechanisms.

d. **Workforce capacity development**: PHC providers and LHWs affiliated with the selected PHC facilities were engaged to strengthen their capacity to deliver rehabilitation care. LHWs were trained on early identification of rehabilitation needs in the community and to make referrals to the PHC facility. PHC providers received training on the World Health Organization's Basic Package of Intervention for Rehabilitation (9) and Training in Assistive Products (10), adapted to the local context. These training developed their capacity to assess rehabilitation and AT need, provide basic rehabilitation care at the PHC level, and make referrals for advanced rehabilitation care. The rehabilitation professionals were engaged for supportive supervision and mentorship for the PHC providers.

e. **Care coordination**: To enhance coordinated care, LHWs and PHC providers used referral slips and mobile communication platforms like WhatsApp. Facility staff were trained in documentation and patient record keeping to support planning and continuity of care. Routine data collection processes were enhanced, with LHWs and PHC providers capturing referral, patient, and service data using both facility registers and intake forms.

This integrated, multilevel intervention aimed to embed sustainable rehabilitation services into district health systems in Pakistan. The NoC focused implementation was accompanied by provincial and national policy, planning, and leadership development support, which is not covered within the process evaluation.

Study Setting

The evaluation was conducted in Thatta, a semi-urban to rural coastal district in Sindh, and Swat, a mountainous district in Khyber Pakhtunkhwa (KP) in the north of Pakistan. Both districts represent geographically and socio-culturally diverse populations, with varying levels of access to rehabilitation services, human resources, and health system infrastructure. The health system is governed at the provincial level in the KP province by its Department of Health, and through a public-private partnership in the Sindh province.

Study Design

This study employed a qualitative process evaluation design to assess the implementation of NoCs in Swat and Thatta. The implementation outcomes framework guided the evaluation (11). Accordingly, we focused on exploring the acceptability, appropriateness, fidelity, feasibility, adaptations, sustainability, and scalability of the ReLAB-HS NoC model.

Interview Guides

Four separate interview guides were developed, each geared towards one of the four specific stakeholder groups: the technical working group, lady health workers, primary healthcare providers, and rehabilitation professionals, based on the implementation outcomes framework. These interview guides were comprised of broader themes mentioned in table 1. The interviews were conducted in the local languages (Sindhi, Pashto, or Urdu), audio-recorded with consent, and transcribed verbatim.

Table 1: Broad themes covered based on the implementation outcomes framework

Respondents	Broader Themes
Technical working group members	• Roles and responsibilities within TWG and ReLAB-HS • Past and current initiatives in rehabilitation/AT service delivery • Experience with implementation of the model and its relevance • Capacity strengthening interventions and application by health workers • Referral and coordination of care processes • Adaptations and unintended consequences during implementation • Sustainability and future role of TWG in supporting rehabilitation/AT services • Reflections and recommendations for scale-up and improvement
Lady health workers and supervisors	• Roles, responsibilities, and referral practices • Training exposure and application in practice • Coordination and communication with providers • Challenges and facilitators in referrals and data collection • Support/resources and sustainability of services • Key lessons and unintended consequences
Primary healthcare providers	• Service delivery and referral practices • Coordination with CHWs and rehabilitation professionals • Training and integration of skills into practice • Data collection and use • Support and supervision structures • Sustainability, resources, and system integration.
Rehabilitation professionals	• Clinical and referral responsibilities • Engagement in initiatives and training/mentorship • Coordination with PHC and other providers • Data collection and supervision support • Sustainability and resource considerations • Reflections on patient support and system improvements.

Data Collection and participant requirement

Data were collected between May 2024 – September 2024. A total of 61 interviews were conducted with purposively selected stakeholders involved in the design, planning, and implementation of the NoC model. Participants included LHWs and their supervisors (n=31), PHC providers (n=12), rehabilitation professionals (n=9) and TWG members (n=9). Recruitment was carried out using purposive sampling strategies. Potential participants who had received the training or were part of the ReLAB-HS study were approached by the study team, and those who were available and willing to participate were interviewed. All participants provided informed consent and voluntarily took part in the study. Each interview lasted approximately 40–60 minutes.

Data Analysis

Qualitative data were analyzed using a framework analysis approach. Transcripts were coded by four data coders deductively based on predefined themes aligned with the implementation outcomes (acceptability, appropriateness, feasibility, fidelity, adaptation, sustainability, and scalability), as well as inductively based on emergent sub-themes. The coding framework was developed iteratively by the study team after reading approximately 25% of the translated transcripts across the four respondent types. The data were analyzed using Atlas.ti.24 software. Regular team discussions ensured consistency of coding, resolved discrepancies, and facilitated interpretation. Triangulation of perspectives from different stakeholders enabled a rich, contextualized understanding of how the intervention was delivered, received, and sustained.

Ethical Considerations

The study protocol was reviewed and approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) and the Aga Khan University (AKU) Ethics Review Committee (ERC#: 2024-10065-29717). Oral informed consent was obtained from all participants before data collection. All data were anonymized and securely stored to a password-protected system to ensure participant confidentiality.

RESULTS

A total of 61 participants were included in the study, with slightly more participants from Thatta (52.5%) than Swat (47.5%). Most study participants were female (59.0%). The LHWs comprised the largest group (34.4%), followed by PHC providers (19.7%), LHW supervisors (16.4%), rehabilitation professionals (14.7%), and members of the TWGs (14.8%). (Table 2).

Table 2
Frequency and percentage distribution of study participants (n = 61)

	n (%)
Study site	
Thatta	32 (52.5%)
Swat	29 (47.5%)
Gender	
Men	25 (41%)
Women	36 (59%)
Participant designation	
Lady health worker	21 (34.4%)
Lady health supervisor	10 (16.4%)
PHC provider	12 (19.7%)
Rehabilitation professionals	9 (14.7%)
TWG member	9 (14.8%)
Type of facility	
Primary	43 (70.5%)
Secondary	2 (3.3%)
Tertiary	11 (18%)
Administrators	5 (8.2%)

The findings from the analysis are organized according to six core implementation outcomes: acceptability, appropriateness, fidelity, feasibility, adaptations, and sustainability and scalability. Table 3 provides a summary of the implementation outcomes.

Table 3
Overview of Implementation Outcomes and Key Findings

Implementation Outcome	Definition	Summary of Findings
Acceptability	Perception among stakeholders that the intervention is satisfactory or agreeable	High satisfaction with the intervention among LHWs, PHC providers, and rehabilitation professionals; some concerns about unmet expectations
Appropriateness	Perceived fit or relevance of the intervention within the system and culture	Strong alignment with PHC goals; concerns about bureaucratic inefficiency; cultural barriers to AT use, and gendered access to care
Fidelity	Degree to which the intervention was implemented as intended	High adherence to core tasks (screening, referral, follow-up); some inconsistencies in follow-up and communication
Feasibility	Extent to which the intervention could be carried out within the system	Human resource shortages, lack of ATs, and transport barriers were key constraints; high patient load noted in PHCs
Adaptations	Modifications made to improve fit or address challenges	Scheduled rehabilitation days, flexible follow-ups by LHWs, coordination via WhatsApp, and community awareness efforts
Sustainability & Scalability	Potential for long-term continuation and expansion	Sustainability hinges on government buy-in, financing, and District Health Information System (DHIS) inclusion; strong demand for district-wide scale-up

Acceptability

Health workers and community members widely welcomed the integration of rehabilitation into primary healthcare. Respondents described the intervention as timely, much needed, and aligned with the lived realities of communities burdened by road traffic crashes, chronic diseases, disability, and aging. LHWs, PHC providers, and rehabilitation professionals recognized the opportunity to extend care beyond acute and curative models, aiming to improve function and quality of life.

"*The initial process is good; it started at a primary care level, and screening is also taking place. If a patient needs any products, that is being addressed as well. It's just the beginning, so the initial process may take some time*." *— PHC provider, Thatta*

There was high intrinsic motivation among LHWs who saw value in being able to offer more comprehensive care and follow-up, including basic rehabilitation guidance.

"*Initially, we didn't know how to help [people with rehabilitation needs], but now, with what we learned, we can identify those in need, refer them to doctors, and help them access resources. Some are receiving assistive products and others are benefiting from prescribed exercises*." *— LHS, Thatta*

A PHC provider shared.

" *The fact that initially patients were not aware, but now those who come for rehabilitation specifically know about these facilities provided by the Center. They come specifically, having learned by LHWs or one patient went and told another, so in this way, patients are coming. So, there is increasing awareness among these people." — PHC provider, Thatta*

The response to LHW engagement at the community level was overwhelmingly positive, particularly when referrals were made and rehabilitation services were accessed. Several LHWs shared stories of hope and recovery, resulting from the trusting relationship with their community members.

"*There are individuals who had lost all hope in life, but thank God, with this rehabilitation, they have found hope to live again*." *— LHS, Swat*

However, some participants shared frustration related to unmet expectations or system delays. For example, some LHWs had referred clients to PHC facilities but did not receive assistive products (APs) or timely care, resulting in reported dissatisfaction, highlighting how gaps in downstream services could undercut trust in frontline workers.

"*People's expectations are very high, which creates challenges for us in managing their expectations. They expect immediate solutions and often say, "You told us this would happen, but it didn't." The government's system is weak, so convincing people that things will improve is difficult*." *— LHW, Swat*

Appropriateness

The ReLAB-HS interventions were largely seen as compatible with the structure and intent of the primary healthcare system. Stakeholders compared the integration of rehabilitation with successful programs such as immunization and nutrition.

"*Just like other projects, this can also be integrated—like the vaccination program and the one where weak children are referred to the center*." *— LHW, Thatta*

Another participant shared.

"*It cannot be implemented in the district alone. It requires cooperation from the provincial government*." *— LHW, Swat*

Yet, concerns were raised about bureaucratic delays and inefficiencies that might arise with full integration into government systems. A few respondents preferred that rehabilitation services retain the flexibility of vertical programming to ensure operational agility and targeted resource use.

"*It can work very well. But only if it remains a separate vertical program like other programs*." *— PHC provider, Thatta*

Cultural and gender norms strongly influenced the appropriateness of care delivery. Restrictions on women's mobility, stigma around functional limitation, and societal discomfort with the use of assistive products, especially among older adults and women, were repeatedly cited.

"*Older patients feel embarrassed or resist using assistive devices. They refuse to use sticks and glasses, so these kinds of scenarios come up in the community. LHWs need to convince them of these [benefits of using assistive products], but it's still a challenge to overcome certain cultural barriers. There's a reluctance due to the stigma regarding the use of assistive products*." *— TWG, Thatta*

Providers also noted that some rehabilitation exercises needed to be adapted to be culturally relevant and gender sensitive in conservative settings. This highlights the need to understand socio-cultural norms encompassing gender sensitivity, for example, the availability of female providers for women patients, and ensuring privacy while demonstrating exercises to clients.

"*Exercises need to be simple and culturally sensitive. In our community, people, especially elders, are hesitant to do exercises in front of others due to modesty. Exercises should be adjusted to make them comfortable and suitable for our local environment*." *— Rehabilitation professional, Swat*

Fidelity

Most core components of the intervention were implemented as intended. LHWs actively screened for functional difficulties during household visits, provided referral slips, and followed up on cases. PHC providers received and managed these referrals, often consulting with rehabilitation professionals. Communication between cadres was maintained via WhatsApp groups and informal check-ins, which helped preserve continuity and accountability.

"*Whenever there's a patient, we directly call the doctors. For instance, I might get a call from doctors. When they refer a patient, they also call me and provide the basics about the patient and let me know they're sending the patient over… They also give the patient my number to call if there's any issue. Even when I see the patient and they need to go back, I inform the doctors who referred the patient that I've completed the assessment, this is the situation, and follow-up will be in a certain number of days. We don't leave any loose ends*." *— Rehabilitation professional, Thatta*

Fidelity varied by workload, availability of supplies, and individual initiative. Where commitment was high, adherence to protocols was strong. In other settings, gaps in follow-up, partial implementation of exercise plans, or inconsistency in referral practices emerged, often due to time constraints or stock-outs.

"*We teach exercises, using a training booklet for reference when needed. For advanced physiotherapy or rehabilitation, patients are referred with a referral slip, informed of the physiotherapist's schedule, and their details are shared in a WhatsApp group. All referrals are documented using the OPD slip and a proforma*." *— PHC provider, Thatta*

Socio-economic barriers at the community level also influenced fidelity. Poverty, transportation costs, and gender norms often hindered patients' ability to complete referrals or access facility-based services, despite the frontline workers' efforts. An LHW from Swat highlighted:

"*What are the reasons they don't go? They face difficulties because, often, the patient's location is far away, and it's hard for them to get there. They have issues with money and transportation costs. There are always some challenges for them. Sometimes, the men don't let the women go alone, and they [men] have little time. They might miss work if they go to the hospital. These are poor people*." *— LHW, Sindh*

Feasibility

Despite broad support, several systemic and structural challenges hampered day-to-day feasibility. Foremost among them was the unavailability of APs. Stakeholders expressed frustration over demand outstripping supply, with many patients returning home empty-handed.

"*AT products that haven't been provided yet [to the district], so the community says, you were telling us that people would receive this [assistive products], has your stuff not arrived yet?*" *— LHS, Thatta*

Overburdened providers and staff shortages further limited how the intervention could be carried out, especially in high-volume PHC centers. The absence of dedicated physiotherapists at many facilities was repeatedly highlighted as a bottleneck.

"*The challenge is that we have a large crowd. The challenge is that we can't give them proper time. Ideally, each center should have a physiotherapist who looks after these things as well. Maybe the government doesn't have enough resources and has never paid attention to this. Just that we are overburdened, no other challenges really! If we weren't so overwhelmed, if the number of patients coming in was limited, then there wouldn't be an issue*." — *PHC provider, Thatta*

A TWG member shared.

"While there is activity at the ground level [PHC level], the work that a physiotherapist can do is something these doctors cannot. So, my recommendation would be that if permitted, they should hire a physiotherapist as well. Because we have one physiotherapist at our district headquarters hospital, but he works on alternate duty. He comes for 3 days a week, so who will handle the other 3 days? This gap needs to be filled." — TWG, Thatta

Adaptations

To overcome systemic constraints and enhance service delivery, several operational-level adaptations were implemented. PHC providers designated specific days for rehabilitation to manage caseloads without affecting other services.

"*I have specifically designated one day [a week] so that it [rehabilitation] can be attended to carefully and doesn't affect my other work because there is an overburdening, a huge OPD*." — *PHC provider, Thatta*

Some LHWs modified their plans for home visits to follow up on rehabilitation patients they referred and sometimes made additional visits even outside scheduled visits.

"*We make a tour plan to visit seven houses. But I also need to check on a patient who has a rehabilitation issue, even if today isn't my day to visit them*." — *LHW, Thatta*

WhatsApp groups were widely used to discuss referrals, coordinate care, and seek guidance for patients being seen at the PHC level.

"*The LHW can't send an email, but she can use WhatsApp. Yes, we even allowed them that if they have trouble typing, they can send a picture or a voice note*." — *TWG, Thatta*

While not part of the intervention, LHWs conducted community sessions to raise awareness and increase understanding of rehabilitation and assistive technologies.

Sustainability and Scalability

Stakeholders consistently emphasized that the future success of the intervention depends on systemic investment, multisectoral collaboration, and government ownership. Training more LHWs and PHC providers was viewed as critical for maintaining and expanding service coverage.

"*The district health officer (DHO) and other leaders have been pushing to expand the [rehabilitation] program to cover the entire district. We currently have around 50% of LHWs involved, and the DHO wants to increase that to 100% so that all areas are covered. Our goal is for Thatta to have comprehensive rehabilitation coverage. They will now approach other uncovered areas with the help of PPHI*." — *TWG, Thatta*

A dedicated rehabilitation budget, performance monitoring, and inclusion in the District Health Information System (DHIS) were frequently cited as necessary for institutionalizing the model.

"*If the DHIS tool is incorporated for weekly and monthly reporting, it will show the patient burden, including the need for assistive products and rehabilitation, catching policy makers' attention. Proper reporting can sustain the program; otherwise, it risks failing like many short-term projects. Support is crucial in human resource and assistive products, whether from NGOs, organizations, or the government*." — *PHC provider, Thatta*

There was recognition that while NGOs provided catalytic support, long-term sustainability required integration into public financing, with the Sehat Card or government budget lines seen as potential avenues.

"*Sustainability will only be possible if the government steps in… While we deeply appreciate donors, it's ultimately the government's responsibility*." — *TWG, Thatta*

DISCUSSION

The ReLAB-HS initiative offered a compelling model for integrating rehabilitation into PHC by leveraging existing health system processes and resources to identify, refer, and support people in need of rehabilitation services (12). The NoC model helped strengthen relationships between different professionals, enhancing their understanding of each other's roles in rehabilitation and AT, communication, and coordination.

The process evaluation of the early-stage implementation of the NoC provided useful insights on acceptability, appropriateness, feasibility, fidelity, adaptations, sustainability, and scalability. This evaluation sheds light on the enablers, barriers, and contextual factors that shape the success of rehabilitation service delivery in a resource-constrained and culturally nuanced setting (13).

The health system strengthening interventions implemented in the NoCs were well accepted, driven mainly by a shared recognition of the growing unmet need for rehabilitation services. Leveraging existing workforce structures and implementing capacity building activities were a cornerstone of the intervention (14, 15), enhancing the ability of LHWs and the PHC providers to deliver rehabilitation services, whilst establishing a clear supervisory and mentoring role for rehabilitation professionals. For LHWs, who serve as the first point of contact in their communities, relevant, appropriate, high-quality training not only builds their technical skills in screening and referral but also empowers them to advise the communities on the benefits of rehabilitation. These contributions translated into visible improvements in the number of clients assessed and managed at the PHC level, outcomes that all respondents acknowledged.

However, despite these gains, concerns emerged regarding workload pressures, particularly for PHC doctors who are already overburdened with curative services. In the absence of additional staff or financial incentives, many providers found it challenging to integrate rehabilitation responsibilities into their daily routines. Furthermore, community trust was sometimes strained when referrals led to facilities lacking the promised services or assistive products, underscoring the need for managing expectations and ensuring consistency in service availability.

Fidelity to the intervention design was generally high, because, instead of a predefined model, the co-design and adaptive approach sought to determine priorities and adapt the intervention with local leadership. Stakeholders carried out core activities such as identification, assessment, referral, and follow-up care as intended, supported by job aids, training materials, and ongoing supervision. LHWs proved to help bridge the gap between communities and facility-based care. However, fidelity was compromised when key resources—such as assistive products or trained staff—were unavailable. These gaps resulted in missed opportunities for care and diminished community confidence. To ensure fidelity on scale, local ownership, robust supply chains, clear staffing plans, and structured supervisory mechanisms are essential (14, 16).

The intervention was also widely viewed as appropriate within the broader PHC context. Stakeholders noted existing vertical programs—such as immunization, nutrition, and maternal health—as potential entry points for integrating rehabilitation within Pakistan's ongoing PHC reforms and Universal Health Coverage (UHC) agenda. However, perspectives varied on whether rehabilitation should be horizontally integrated into existing services or maintained as a distinct program to avoid dilution. This may be a result of respondents' familiarity with vertical programs. However, given the global momentum and emphasis on integrating rehabilitation as an essential service (17), it requires a critical shift in approach and thinking about what integration may look like in practice to ensure the sustainability of such interventions and programs.

Several contextual adaptations enhanced the feasibility of the model. These included designating specific days for rehabilitation services, modifying home visits for outreach workers, and leveraging low-cost digital tools such as WhatsApp for coordination and referrals. Such adaptations improved efficiency and responsiveness in a system characterized by limited infrastructure and fragmented communication. However, cultural and gender norms played a critical role in shaping service access. In conservative areas, *purdah* restrictions (whereby men outside their immediate family cannot see women), gender preferences for providers, and stigma around functional limitation and assistive product use limited uptake—particularly among women and girls. These findings highlight the need for gender-sensitive strategies, community education, and locally tailored delivery approaches to promote inclusion and reduce stigma.

The feasibility of delivering rehabilitation through PHC was confirmed in principle, but significant systemic constraints remain. Most BHUs and RHCs lacked human resources, with only one doctor per facility, and functional referral links to specialized care. Transportation barriers and geographic inaccessibility further limited the utilization of services, particularly for women and individuals with mobility impairments. These challenges reflect broader inequities and chronic underinvestment in semi-urban and rural health systems and underscore the urgent need for operational planning and financial commitment to embed rehabilitation into routine PHC service delivery.

Sustainability emerged as a central concern among stakeholders. While the NoC model showed promise in building capacity and generating community demand, its long-term success depends on clear government ownership, institutionalization of rehabilitation within the health system, and dedicated funding mechanisms. Integration into the DHIS, inclusion in essential service packages, and consistent monitoring of rehabilitation indicators were identified as critical enablers. Additionally, formal recognition of LHWs and PHC providers as part of the rehabilitation workforce—along with appropriate incentives and career development pathways—will be necessary to maintain motivation and ensure accountability. Stakeholders suggested drawing on lessons from tuberculosis and maternal health programs that have successfully incorporated LHWs into national service delivery frameworks.

There was strong consensus that the model be scaled beyond the pilot districts to meet growing demand. Stakeholders emphasized that scale-up must be deliberate and evidence-informed—incorporating lessons learned from early implementation, addressing supply and infrastructure gaps, and standardizing training across all cadres. Most importantly, rehabilitation must be recognized as an essential health service and formally integrated into national health programs such as the Sehat Sahulat Program (SSP)(18) and the Essential Package of Health Services (EPHS) (19) under universal health care. Without institutional commitment and policy level support, efforts to integrate and sustain rehabilitation risk remaining fragmented and dependent on short-term donor support.

Strengths and Limitations

This process evaluation offers valuable insights into the implementation of health systems strengthening interventions for rehabilitation within PHC in Pakistan—a context where such services are traditionally under-prioritized. A major strength of the study lies in its use of a structured implementation research framework, which enabled a systematic assessment of early outcomes. The inclusion of diverse stakeholders—from LHWs and PHC providers to district officials and rehabilitation professionals—enabled a comprehensive, multi-level understanding of how the intervention was delivered, adapted, and received. Furthermore, the study captures real-time learning during the early implementation phase, which is critical for informing scale-up and policy integration.

The study also has several limitations. First, as a qualitative evaluation focused on two pilot districts, the findings are not intended to be generalizable to all regions of Pakistan or other low-resource settings. Second, data collection relied on self-reported perceptions, which may be subject to social desirability or recall bias. Third, the evaluation did not include quantitative measurement of service coverage, patient outcomes, or cost-effectiveness, which would be useful for triangulating findings and informing broader health system planning. Lastly, given the evolving nature of the intervention, some aspects—such as long-term sustainability or institutional uptake—could not be fully assessed within the current timeframe and will require follow-up evaluation.

IMPLICATIONS FOR PRACTICE AND POLICY

This study highlights the potential of co-designing and adapting the NoC approach based on local needs and priorities, and cultural context, to transform rehabilitation delivery in Pakistan. This approach has the potential for sustainability only if embedded within a functioning and accountable health system, with local ownership. At the practice level, targeted training, low-cost digital coordination tools, and designated delivery days can improve efficiency and uptake of rehabilitation services at the PHC level. At the policy level, structured financing, integration into health information systems, and gender-sensitive adaptations are essential for scale and equity.

WAY FORWARD

Future research should investigate the cost-effectiveness, patient-level outcomes over time, and comparative models of task-shifting in rehabilitation, particularly in low-resource and gender-constrained environments. Importantly, implementation science approaches must remain central to monitoring scale-up and identifying context-specific bottlenecks.

CONCLUSION

Integrating rehabilitation into Pakistan's health system aligns closely with national commitments to Universal Health Coverage and the Sustainable Development Goals, particularly those related to health equity, disability inclusion, and strengthening service delivery. However, for this integration to be meaningful and sustainable, rehabilitation must be institutionalized within national and provincial health policies, included in essential service packages, and supported by dedicated financing and workforce planning. Embedding rehabilitation into existing platforms—such as the SSP, maternal and child health initiatives, and digital health systems—can enhance access, reduce fragmentation, and ensure continuity of care across the life course. As Pakistan embarks on broader PHC reforms, rehabilitation must be recognized not as a specialized or optional service, but as a core component of an integrated and comprehensive, people-centered service delivery system.

Abbreviations

ReLAB-HS: Learning, Acting, and building for rehabilitation

PHC: Primary Health Care

LHWs: Lady Health Workers

TWG: Technical Working Group

NoC: Network of Care

AT: Assistive Technology

BHU: Basic Health Units

RHC: Rural Health Center

UHC: Universal Health Coverage

DHIS: District Health Information System

SSP: Sehat Sahulat Program

EPHS: Essential Package of Health Services

Declarations

Ethical Considerations

The study protocol was reviewed and approved by the Johns Hopkins Bloomberg School of Public Health Institutional Review Board (IRB) and the Aga Khan University (AKU) Ethics Review Committee (ERC: 2024-10065-29717). The study was conducted in accordance with the Declaration of Helsinki. Oral informed consent was obtained from all participants before data collection. All data were anonymized and securely stored in a password-protected system to ensure participant confidentiality.

Consent for Publication: Not Applicable

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Availability of data and materials:
The qualitative interview transcripts generated during the current study are not publicly available due to confidentiality and ethical considerations.

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Figures

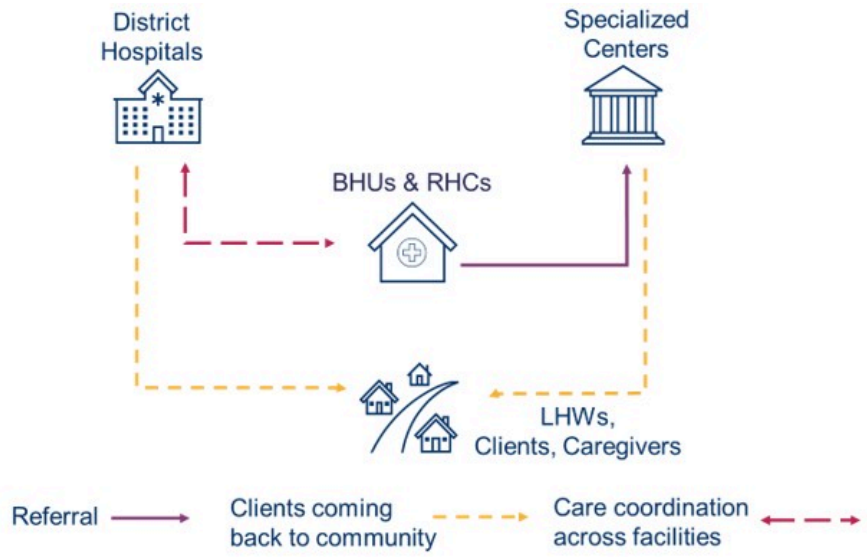


Figure 1

Structure and Functions of Network of Care Model in Thatta and Swat, Pakistan