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Feasibility, Effectiveness, and Scalability of a Digital Case Management Tool for a Community-Based Inclusive Development (CBID) Program in Laos



ReLAB-HS

*Learning, Acting & Building
for Rehabilitation in Health Systems*

Evaluation Report

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Cover Photo: CBID facilitator interviewing clients in Laos. Photo courtesy of USAID Okard, Laos

Table of Contents

Abbreviations.....	4
List of Figures.....	4
List of Tables	4
Executive Summary	5
Background	5
Methods	6
Key findings and lessons.....	6
Conclusions.....	8
1. Background	11
1.1 Learning from innovations in ReLAB-HS.....	11
1.2 CBID Modular Tool	12
2. Evaluation Questions.....	16
3. Methods.....	16
3.1 Conceptual framework	16
3.2 Quantitative component	18
3.3 Qualitative data collection and analysis	19
3.4 Ethics	19
4. Key Findings.....	20
4.1 Modular Tool data outputs	20
4.2 Comparison of action plans with the Modular Tool data	22
4.3 Feasibility of CBID Tool implementation	23
4.3.1 Quantitative survey	23
4.3.2 Qualitative findings.....	26
4.4 Effectiveness of the CBID Modular Tool	33
4.5 Environmental factors: Cultural factors and ethical considerations	35
4.6 Scalability of the CBID Modular Tool	37
5. Discussion	40

Abbreviations

AP	Assistive Product
AT	Assistive Technology
CBID	Community Based Inclusive Development
FGD	Focus Group Discussion
FITTE	Fit between Individuals, Task, Technology and Environment Framework
MHPSS	Mental Health and Psychological Support Services
PHC	Primary Health Care
ReLAB-HS	Learning, Acting, and Building for Rehabilitation in Health Systems
USAID	United States Agency for International Development

List of Figures

Figure 1 CBID Modular Tool Process	13
Figure 2. Steps in the case management process in the CBID program in Laos.....	13
Figure 3. Modular Tool structure and question sets by age groups	13
Figure 4. Sample decision trees for mobility (top), upper arm use (middle), and self-care (bottom) domains	15
Figure 5. Fit between Individuals, Task, Technology, and Environment (FITTE) framework ...	18
Figure 6. Percentage of the sample reporting difficulties in Module 2 (functioning) (n=257) ...	21
Figure 7. Modular Tool red flags and service discrepancies	23
Figure 8. CBID team self-assessment (n=11).....	24
Figure 9. CBID Modular Tool assessment by the CBID team after implementation (n=11)	25
Figure 10. Additional training required in CBID Modular Tool by CBID workers after implementation (n=11)	26

List of Tables

Table 1. Summary of key findings and lessons.....	7
Table 2. Example suggested interventions based on responses to the CBID Modular Tool unmet needs.....	15
Table 3. Demographic characteristics of individuals at baseline from Module 1	20
Table 4. Red flags/needs identified for physical functioning.....	22
Table 5. Working status	22
Table 6 Characteristics of survey participants (n=11)	24

Executive Summary

Background

Learning, Acting, and Building for Rehabilitation in Health Systems (ReLAB-HS), a United States Agency for International Development (USAID) funded global activity, supports the integration of rehabilitation services into health systems, particularly in primary health care (PHC) and community settings in ReLAB-HS learning countries, Burma, Pakistan, and Uganda. ReLAB-HS plans to co-create contextually relevant tools and resources to support this integration. Learnings from other programs provide an opportunity for ReLAB-HS to adapt and implement innovative technologies in its programs.

Technologies such as tablet-based assessment tools, centralized databases, and tools for supported decision-making are playing an important role in many community interventions, including health, rehabilitation, and inclusive development. The use of technological innovations for physical rehabilitation in low-resource settings is an under-researched area. One encouraging example is the use of an innovative digital technology to support the case management process—namely, the community-based inclusive development (CBID) Modular Tool developed and implemented in the USAID Okard project¹ in Laos.

The USAID Okard (ໂອກາດ) activity, managed and implemented by World Education, Inc. and Humanity & Inclusion, aims to improve and sustain the independent living and functional ability of persons with disabilities and their families by improving access to rehabilitation in Laos. As part of the Okard activity, a CBID demonstration model is being implemented in the Xayphouthong district in Savannakhet province and Kham district in Xieng Khouang province. The CBID approach encompasses individual case management and community mobilization utilizing innovative and effective interventions that directly address the health, livelihoods, and social needs of persons with disabilities, with a focus on individuals, families, and communities. Community engagement is carried out by CBID facilitators, who are lay social workers directly supporting persons with disabilities to identify their needs and working with families, communities, local authorities, and relevant service providers to meet these needs.

The Okard team developed and implemented the CBID Modular Tool, which is a comprehensive assessment, planning, case management, and reporting system. The CBID Modular Tool comprises i) a tablet-based data collection application and ii) a customized database for case management. After data on a client's needs is collected using the digital application, it is automatically analyzed by the database, which is then used to generate recommended CBID interventions. The recommended action plans are then discussed with the families and individuals to prioritize the interventions needed for an individualized action plan. The database is then updated with the final action plan. The baseline data collected at the time of the needs assessment will then be compared with client data collected at the time of discharge to measure the progress following the interventions provided. Data from the Modular Tool is also used by the program managers to monitor the CBID program and the team remotely, and for generating reports for USAID and other stakeholders.

The development and testing of the CBID Modular Tool in Laos has important parallels with the ReLAB-HS activity's use of telerehabilitation to support decision-making for rehabilitation interventions, and can provide potential lessons for integrating rehabilitation into local health systems in low-resource settings.

¹ Marella M, Koolmees D, Vongvilay C, Frank B, Pryor W, Smith F. Development of a Digital Case Management Tool for Community Based Inclusive Development Program. *Int. J. Environ. Res. Public Health* 2021, 18 (20), 11000. <https://doi.org/10.3390/ijerph182011000>

This report describes key implementation factors for a digital technology in a CBID program in Laos and documents lessons learned.

The objectives of this evaluation were:

- To investigate the feasibility and effectiveness of the CBID Modular Tool to assess unmet needs and develop an individualized action plan.
- To document implementation challenges and experiences of CBID facilitators using the CBID Modular Tool technology.
- To identify challenges and opportunities around scale up the tool.

Methods

This evaluation used both qualitative and quantitative methods. We used the “Fit between Individuals, Task, Technology, and Environment” (FITTE) framework as a conceptual model for this evaluation. The attributes of each FITTE framework dimension—the CBID team² (Individual), the Modular Tool (Technology), the CBID case management process (Task), and the cultural and political factors that influence the implementation of CBID and digital technology (Environment) — were assessed, and then the relationship between each two dimensions was evaluated.

De-identified data of adults (18 years and older, n=233) captured by the Modular Tool database was analyzed to assess the time spent by the CBID facilitators using the technology, the service user’s health and functioning needs identified by the tool, and final interventions included in the action plan. Discrepancies between the needs identified by the Modular Tool and the finalized action plans were investigated to measure the effectiveness of the technology.

The qualitative component used focus group discussions (FGDs) with CBID team members (n=15) and managers (n=8), and relevant stakeholders (n=12) from the local rehabilitation system, including service providers and representatives from government and civil society organizations who play a key role in the physical rehabilitation sector in Laos. In-depth interviews were also conducted with individual participants of the CBID program (n=16) to understand their involvement in the process of conducting needs assessments and finalizing action plans as part of the intended person-centered/family-centered care for the CBID program.

Key findings and lessons

- **Overall, the CBID Modular Tool for CBID needs assessments, planning, and data management was found to be feasible, effective, and mostly user-friendly.**
- **Stakeholders report optimism about the potential to scale up the use of digital technology in local systems.**

As a digital case management tool with an automated data analysis function, it is feasible for the Modular Tool to be implemented by lay CBID facilitators in Laos to assess individual functioning needs and family needs for economic participation and to develop intervention plans.

Uptake and maintenance of the Modular Tool in local CBID and rehabilitation systems depend on building awareness of CBID generally and the tool specifically among rehabilitation professionals, aligning data acquisition and management between different systems (health, rehabilitation, and CBID), and identifying financial and human resources to implement and maintain the tool and the CBID program for which it being used.

² The CBID team includes facilitators, team leaders, and income generation activity coordinators who are in the field.

This report describes opportunities to improve the fit of the tool to CBID worker competencies, the suitability of the tool for CBID programming, and the need to align the CBID tool with local norms and practices in rehabilitation and CBID management.

Lessons learned for the development, introduction, maintenance, and sustainability of digital approaches in CBID and rehabilitation are summarized here and described in more detail in the report that follows.

Table 1. Summary of key findings and lessons

Key Findings and Lessons Learned	
Feasibility	
User-friendliness	<ul style="list-style-type: none"> • The tool involved a complex development process, requiring skilled personnel in CBID, questionnaire development, and digitization. • The technology was easy to use with an automated data analysis system and a program to generate an intervention plan. • The translations of the Modular Tool questions and response options into the local language were complex. Cognitive testing of the tool was inadequate in ensuring questions could be easily understood. • At the outset, there were a few “bugs” and internet-related challenges. Allowing extra time for error checking during pilot testing and early implementation would be helpful. • Ongoing technical support was needed for troubleshooting, refinement, and error-fixing, which are critical implementation factors. • The needs assessment component of the tool was time-consuming. Another version with a reduced number of questions is required. • Photos, videos, and notes are not captured in the Modular Tool technology and require additional applications.
Learnability	<ul style="list-style-type: none"> • The tool and its implementation were complex; more time practicing and iterating the tool during pilot testing would have been useful. • Comprehensive and ongoing support to CBID facilitators was needed. • Staff turnover was unexpected and required new staff to be trained with minimal handover support.
Acceptability	<ul style="list-style-type: none"> • Digital technology is preferred over paper-based systems by the CBID team and the health and rehabilitation stakeholders for efficient data management.
Effectiveness	
	<ul style="list-style-type: none"> • Action plans promoted family-centered care. • The tool was a conversation starter for functional needs assessment but was sometimes misunderstood as a diagnostic tool. • Discrepancies between Modular Tool needs assessments and finalized action plans were minimal. However, there were instances where further discussion with families was necessary to understand their priorities, taking into account their unique social circumstances.

Key Findings and Lessons Learned	
Scalability	
	<ul style="list-style-type: none"> • The Modular Tool requires additional features to capture additional data such as photos and videos that are currently collected by other applications for sharing with service providers. • Tailor reports to link the tool with data required for other providers to improve providers' understanding of individuals' functional needs and other health care needs. • Consider how digital approaches are feasible within the local health and rehabilitation sectors that primarily use paper-based technology. • Government workers have little time to participate in innovations or change practices. • Ongoing iteration, refinement, and adaptation is necessary.
Environmental factors	
Cultural factors	<ul style="list-style-type: none"> • Take into consideration local cultural and power dynamics when discussing needs and prioritizing interventions for action plans. • Rapport-building with families is essential before asking needs assessment questions.
The local rehabilitation situation	<ul style="list-style-type: none"> • Consider the discrepancies between paper-based systems at the local health and rehabilitation systems when sharing reports from this digital tool. • Government workers have little time to participate in innovations or change practice.
Normative factors	<ul style="list-style-type: none"> • Ensure local stakeholders understand the benefits of the tool to maximize buy-in. • Build a shared vision for CBID, CBID tools, and collaboration between government ministries and local stakeholders. • Improve trust in the CBID team's competencies and knowledge in collecting data on functioning needs. • Prioritize follow-up for rehabilitation and AT services at rehabilitation and health facilities to ensure needs are being met as situations can change.

Conclusions

This evaluation identified that managing and handling the CBID Modular Tool was feasible and efficient for minimally trained personnel to identify functioning and family support needs, develop individualized action plans, and promote family-centered care. We investigated the key factors that influenced the implementation of the Modular Tool in the CBID management process in Laos and documented the lessons learned. These lessons can be applied to future iterations or in the use of the tool in other contexts.

The development of the CBID Modular Tool required an iterative and complex process and was resource-intensive. The tool was specifically designed to meet the comprehensive CBID program objectives and interventions. Entities that wish to adopt this tool can customize content according to their objectives. Based on the experience during the pilot of the demonstration model of the CBID project, the Okard Technical Committee may consider reducing the amount of content of the tool for the next implementation phase of the project.

Despite the complexity of the system being developed, program managers were able to use the data collected to track the progress of clients and remotely monitor the CBID teams. The CBID Modular Tool advances the field of CBID and bridges the gap between researchers who are usually external to program development and personnel who run those programs.

Several environmental and cultural factors appear to influence the use of this technology, the data produced from the needs assessment, and the development of appropriate interventions. Local cultural factors influenced how clients shared their needs and experiences with the CBID teams and how the clients prioritized the interventions offered to them. Documentation of discussions with the individuals and their families during the finalization of their action plans would add value to the Modular Tool data for monitoring the outcomes.

While the tool was determined to be feasible and efficient within the CBID program context, challenges related to data-sharing with the referral facilities for health and rehabilitation were identified. Health and rehabilitation systems in Laos still use paper-based formats, and therefore, CBID teams used different methods of sharing information on clients in need of referral services, such as communicating and sharing client photos through WhatsApp and Google Drive. Data-sharing is an essential component for integrating rehabilitation into health systems. The CBID Modular Tool was not designed for data sharing with external stakeholders, and this feature was not incorporated in the current version. Additional features to incorporate documentation of photos could be included within the Modular Tool and automated analysis to meet the requirements for sharing data with rehabilitation service providers.

Misunderstandings among government stakeholders that the Modular Tool is for diagnostic purposes needs to be clarified. The tool does not include any medical or impairment-specific questions; it is expected that these assessments are to be conducted by qualified medical and rehabilitation professionals in hospital and rehabilitation settings. Future iterations of the Modular Tool and its training for CBID facilitators could engage rehabilitation professionals at the referral facilities to ensure a shared vision between CBID and rehabilitation teams.

Multiple government stakeholders identified the potential of using the Modular Tool to compile a dataset on the disability needs of the population and management pathways, which can be used to inform government planning of rehabilitation services. Stakeholders also expressed the need to digitize their systems to align with the CBID Modular Tool data and for improved client management. However, ensuring the tool is compatible with the local systems will depend upon the resources available among health facilities and their capacity for adopting new technologies.

Key recommendations that could address some of these challenges include the following:

- **Simplify and shorten the questions.** The Modular Tool currently identifies a large spectrum of unmet needs, but the content can be further refined to narrow the focus and simplify the language.
- **Modify the training program.** Providing additional resources and longer practice sessions in the field along with mentoring might assist with the steep learning curve for using such a novel technology.
- **Address the impairment-focused expectations of health and rehabilitation providers.** Clarifying the purpose of the Modular Tool might encourage buy-in and increase the value of the functional approaches from the local rehabilitation facilities.
- **Support adaptation of the current version of the tool based on the specific needs of the program.** The USAID Okard CBID program is very comprehensive with interventions covering several areas, including general health, rehabilitation, mental health, caregiver

support, and income generation activities. Other projects that do not include a similar range of activities should be able to adapt the tool from the comprehensive content that is already available.

- **Consider data sharing requirements when developing the tool's content and its automated data analysis systems.** Data sharing between different service providers and stakeholders can support the provision of services at referral facilities and inform decision-making around future policies and program design. Ethical protocols should be followed.
- **Build a shared vision between the CBID team and rehabilitation stakeholders.** Engaging rehabilitation stakeholders in the development and implementation of the tool and its training will promote a clear understanding of its function and applicability.

In summary, the CBID Modular Tool is an innovative technology that has the potential to advance evidence-based and family-centered care practices in the CBID and rehabilitation sectors. Using such technological innovations could drastically improve who is involved in data collection by promoting better collaboration between researchers who are external to development programs and the staff who run those programs. More reliable and comparable data will also give more agency to persons with disabilities in advocating for their rights and inform appropriate programming.

However, the adoption of such technologies is influenced by environmental factors such as the buy-in from all stakeholders involved, availability of resources, and local socio-political and cultural context.

Lessons learned from this evaluation are valuable for future adoption and implementation of digital case management technologies within health and rehabilitation in other low-resource settings.

1. Background

1.1 Learning from innovations in ReLAB-HS

Unmet needs for physical rehabilitation are high and increasing. It is estimated that 2.4 billion people worldwide have conditions that would benefit from physical rehabilitation to improve functioning. Health systems have not prioritized these services and are not responding adequately to growing needs despite obligations to do so, as highlighted in the Sustainable Development Goals and the Convention on the Rights of Persons with Disabilities. As populations grow and age, the gap between need for and availability of long-term, multidisciplinary, and person-centered care provided by physical rehabilitation services is widening.

A lack of quality evidence on the effectiveness and impact of rehabilitation services in low-resource settings is a barrier to the provision of evidence-based rehabilitation. This is a result of limitations in capacity for undertaking research and collecting data on disability assessments over time to measure outcomes.

The USAID-funded Learning, Acting, and Building for Rehabilitation in Health Systems (ReLAB-HS) activity supports the integration of rehabilitation services into health systems, particularly in primary health care (PHC) and community settings in its learning countries, Burma, Uganda, and Pakistan. ReLAB-HS plans to co-create contextually relevant tools and resources to support this integration. Learning from existing programs that are currently implementing digital technology for evidence-based rehabilitation practices will inform ReLAB-HS programming.

The use of technological innovations for physical rehabilitation in low-resource settings is an under-researched area. One encouraging example is the use of an innovative digital technology to support the case management process—namely, the community-based inclusive development (CBID) Modular Tool developed and implemented in the USAID Okard project³ in Laos.

The USAID Okard (ໂອກາດ) activity, managed and implemented by World Education, Inc. and Humanity and Inclusion, aims to improve and sustain the independent living and functional ability of persons with disabilities and their families by improving access to rehabilitation in Laos. The Okard activity comprises three main components: i) health, ii) economic empowerment, and iii) stakeholder engagement. These components are facilitated by a CBID demonstration model implemented in the Xayphouthong district in Savannakhet province and Kham district in Xiang Khouang province.

The CBID approach encompasses individual case management and community mobilization utilizing innovative and effective interventions that directly address the health, livelihoods, and social needs of persons with disabilities, with a focus on individuals, families, and communities. The CBID facilitators are lay social workers, directly supporting persons with disabilities to identify their needs and work with families, communities, local authorities, and relevant service providers to meet these needs. The Okard team developed and implemented the CBID Modular Tool to support the CBID facilitators to assess the needs of persons with disabilities and their families, to identify individualized intervention plans, to manage their interventions and discharge processes, as well as to support monitoring and evaluation by the CBID team managers. The Nossal Institute for Global Health (Nossal Institute) at the University of Melbourne supported the development of the content for the Modular Tool and its digitization. The development and testing of the tool underwent a rigorous process of selection and development of items and decision trees for each module, translation, pre-testing, and digitization.

³ Marella M, Koolmees D, Vongvilay C, Frank B, Pryor W, Smith F. Development of a Digital Case Management Tool for Community Based Inclusive Development Program. *Int. J. Environ. Res. Public Health* 2021, 18 (20), 11000. <https://doi.org/10.3390/ijerph182011000>

- **The CBID Modular Tool is unique within the disability-inclusive development and rehabilitation sectors for its ability to support needs assessments based on internationally and regionally validated tools, as well as its automated data analysis function.**

Data collected from the Modular Tool accompanied by digitized action plans using a cloud-based platform simplifies the monitoring and evaluation process for lay CBID facilitators and other stakeholders with limited technical skills for data collection and analysis. One of the objectives of the Modular Tool is to facilitate the coordination of care between CBID programs and PHC and rehabilitation services, which is essential to ReLAB-HS.

This evaluation of the CBID Modular tool provides a unique and important opportunity to understand how innovations in rehabilitation work (whether they are effective) and the experience of implementing them in context (how the innovations are introduced and maintained).

1.2 CBID Modular Tool

The CBID Modular Tool comprises a digital data collection application built using the free, open-source KoboToolbox⁴ and a customized database for automated data analysis and the case management process (Figure 1). The CBID case management process has seven steps starting from the baseline needs assessment to the online assessment for discharge (Figure 2). In this evaluation, we only focused on needs assessment (step 2), prioritization of needs assessment (step 3), and development of an action plan (step 4) of the case management process undertaken in both target districts.

The Modular Tool technology was designed to:

1. identify and prioritize unmet needs of persons with disabilities and their households;
2. develop individual action plans on support requirements by CBID teams with minimal support in collaboration with persons with disabilities and their main caregiver/family; and
3. measure changes in the level of individuals' functioning, well-being, economic participation, and utilization of health services, including rehabilitation and mental health and psychosocial support services (MHPSS), and participation of persons with disabilities and their households who have received the CBID interventions.

The Modular Tool has seven modules that collect information on different needs (Figure 3):

1. Demographics, Education, and Economic Participation
2. Function and Assistive Products
3. Health Conditions
4. Mental Health
5. Caregiver
6. Access and Utilization of Health Care
7. Well-being

For this evaluation, we specifically analyzed data from Modules 1 and 2 to investigate the action plans made for those with mobility, upper-arm use, and self-care related difficulties. We analyzed the needs for rehabilitation and AT services and income generation activities.

⁴ <https://www.kobotoolbox.org/>

Figure 1. CBID Modular Tool Process

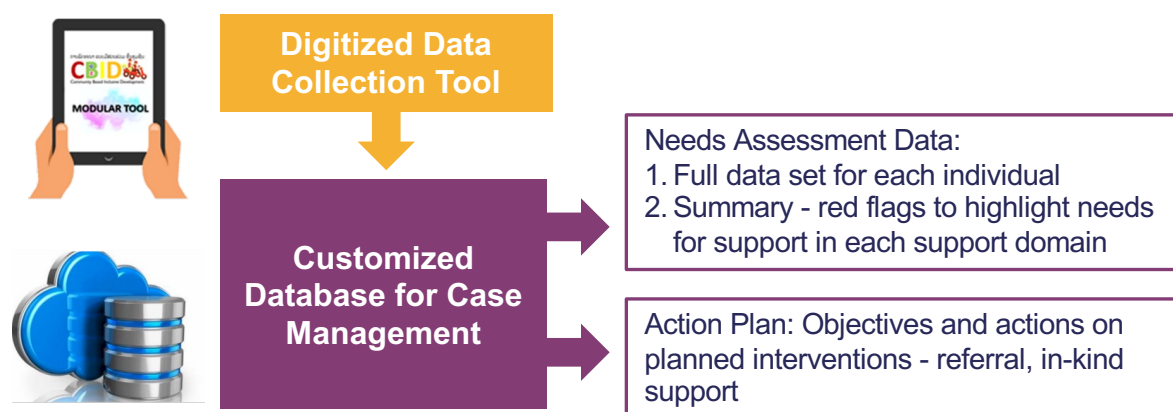
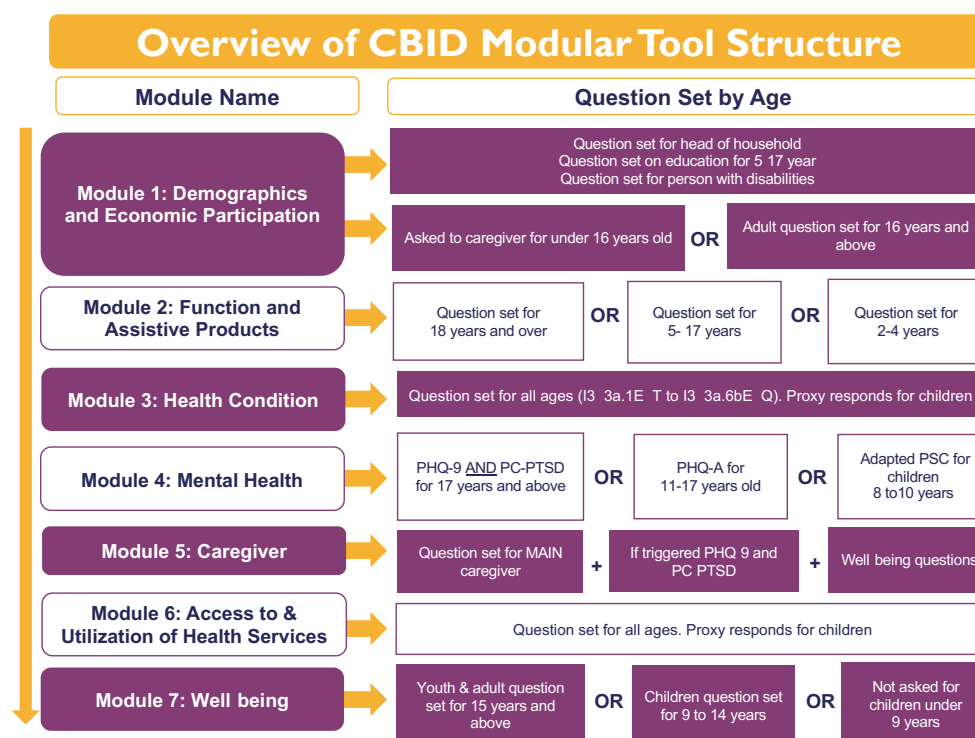


Figure 2. Steps in the case management process in the CBID program in Laos



Figure 3. Modular Tool structure and question sets by age groups



For example, within the functioning module (Figure 4), the domain on “mobility” lists a series of questions on walking, climbing, standing, sitting, transferring from bed/chair/toilet, and moving in different environments. If a response of “a lot of difficulty/cannot do at all” is recorded on 1 or more items, a skip logic in the Modular Tool application triggers a subsequent set of questions related to assistive product (AP) use and whether the assistive product is helpful. If a response is either i) not using an assistive product or ii) the current product is not helpful, the CBID Modular Tool triggers a “red flag” (unmet need) for the CBID facilitator to develop an action plan for required interventions (Table 2).

```

graph TD
    If[If] --> Mobility[1 or more items on mobility]
    Mobility --> Difficulty[A lot of difficulty/cannot do at all]
    Difficulty --> AP[Assistive Product]
    AP --> Yes((Yes))
    AP --> No((No))
    Yes --> APType[AP Type]
    APType --> Helpful[Helpful]
    Helpful --> YesMostly((Yes/ Mostly))
    Helpful --> PartlyNo((Partly/ No))
    No --> ActionPlan{Action Plan  
Function and AP Interventions}
  
```

Module 2: Function and AP (2.4 Mobility)

If → **1 or more items on mobility** → **A lot of difficulty/cannot do at all** → **Assistive Product**

Assistive Product branches into:

- Yes** → **AP Type** → **Helpful** → **Yes/ Mostly** or **Partly/ No**
- No** → **Action Plan** (Function and AP Interventions)

Activities:

- Climbing steps
- Walking short distance
- Walking long distance
- Moving inside the house
- Moving outside the house
- Moving in the village
- Standing up from sitting down
- Standing for longer periods
- Sitting in a chair/bed
- Sitting on floor
- Transferring from bed/chair/toilet



Module 2: Function and AP (2.6 Self care)

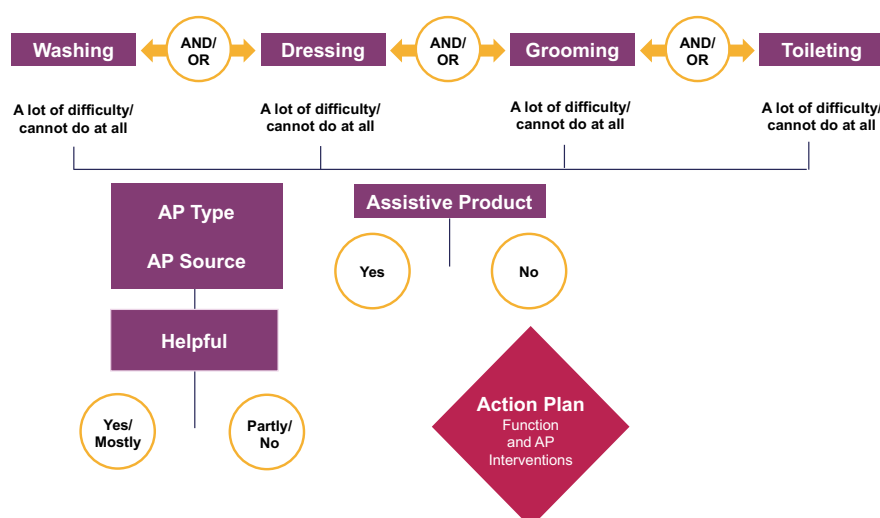


Table 2. Examples of suggested interventions based on responses to the CBID Modular Tool Unmet Needs

Module	Objective	Intervention	Actions
Economic Participation	Improve economic participation and income generation	Discussing and planning with the family implications of animal raising	<ul style="list-style-type: none"> • Build animal housing • Build animal fencing • Build animal feed/water trough • Obtain training in animal husbandry
Functioning and Assistive Products	Increase mobility independence	Using assistive products for mobility	<ul style="list-style-type: none"> • Organize a referral to a provincial rehabilitation facility and get a letter from the head of the village • Support client to get a wheeled assistive product from another supplier (pharmacy/locally made), if needed • Confirm provision of a wheeled assistive product by rehabilitation staff • Support repairs of assistive products, if needed • Encourage the use of mobility/positioning assistive product

2. Evaluation Questions

Overall question:

How feasible and effective is the Modular Tool in facilitating case management in USAID Okard's CBID program in Laos?

Specific questions:

1. What is the experience of CBID facilitators in using the Modular Tool technology for the needs assessment of an individual in the community?
2. How effective is the digital platform in identifying an individual's needs through the automated data analysis system, facilitating discussions with individuals/families, and creating an action plan?
3. What are the opportunities and challenges around scaling up the Modular Tool to facilitate coordination of care between the CBID program and primary health care/rehabilitation centers?
4. What are the opportunities and challenges around integrating the Modular Tool into the local rehabilitation systems beyond the CBID program?

3. Methods

We undertook a mixed methods study design using both quantitative and qualitative approaches. The quantitative component reviewed the data collected by the Modular Tool and the action plans generated using the database. The qualitative component included focus group discussions (FGD) with key stakeholders and the CBID team members and key informant interviews with the service users and their primary caregivers.

3.1 Conceptual framework

We used the “Fit between Individuals, Task, Technology, and Environment” (FITTE) framework, which considers relationships between individuals, tasks, technology, and the environment. As seen in Figure 5, the FITTE framework was developed on the basis that adoption of information technology depends on the fit between the attributes of the individual user (e.g., training, motivation, computer literacy), the technology (e.g., user-friendliness, performance), the task (e.g., complexity, organization) and the environment (e.g., setting of the program, socio-political aspects, cultural norms, and practices).

Ammenwerth E et al. introduced the original FITT framework hypothesizing that the use of technology is dependent on the fit between the attributes of the individuals, tasks, and technology and how they interact with each other. The FITT framework was later expanded by Prgomet et al.,⁵ by including the environmental component (FITTE) in which the individuals, tasks, and technology operate. The FITTE framework hypothesizes that the overarching environment where the three dimensions operate will influence the use of the technology because a technology that is successful in one setting may not work in another setting.

⁵ Prgomet, M., Georgiou, A., Callen, J., & Westbrook, J. (2019). Fit between individuals, tasks, technology, and environment (FITTE) framework: a proposed extension of FITT to evaluate and optimise health information technology use. In *MEDINFO 2019: Health and Wellbeing e-Networks for All* (pp. 744-748). IOS Press.

In this evaluation, attributes of each FITTE framework dimension—the CBID team (Individual), the Modular Tool (Technology), the CBID case management process (Task), and the cultural and political factors that influence the implementation of CBID and digital technology (Environment)—were assessed. The relationship dimensions studied were the Task-Technology fit, Individual-Task fit, Individual-Technology fit, and the interactions with the overarching Environment where individuals, tasks, and technology operate.

The attributes of the CBID team (the user of the technology) that were studied included educational background, experience in CBID, project role and responsibilities, computer literacy, and reasons/motivation behind working in the sector. The attributes of the Modular Tool included the process of design and development of the modules and the digital application, user-friendliness, and performance. The attributes of the CBID case management process included the organizational management processes, the complexity of each workflow step, and the resources required. The environmental factors examined relate to the socio-political environment of program target areas, relationships between the CBID program and the local health and rehabilitation systems, and the cultural norms around power dynamics between the service users and service providers.

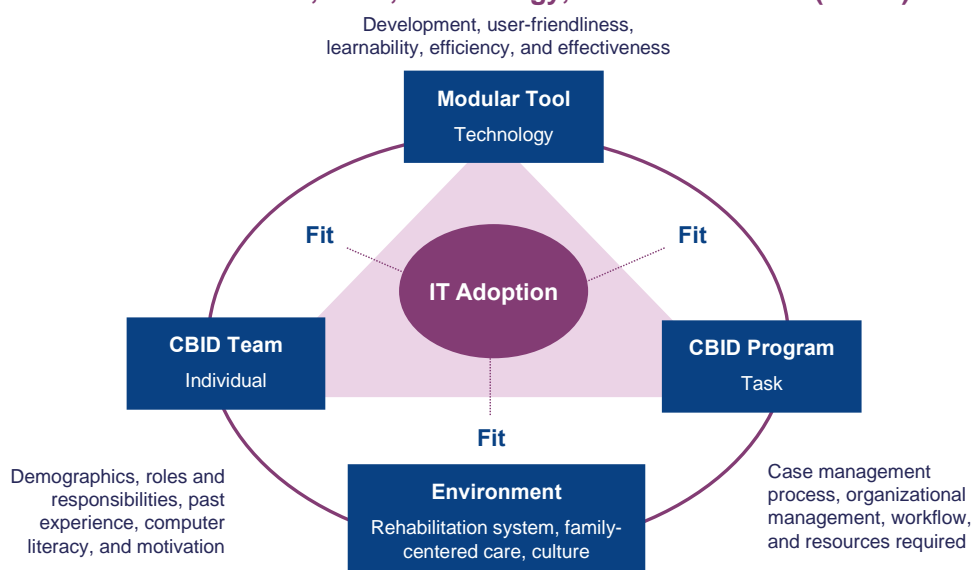
The Task-Technology fit dimension assessed efficiency and effectiveness. Efficiency was measured based on the time taken to assess the needs (through the Modular Tool as an app and database), resources required to create an action plan, and reported ease of use of the tool in the CBID facilitators' routines. Effectiveness was determined by the ability of the Modular Tool to generate an action plan accurately. It was measured by comparing the red flags displayed by the database and the action plan/interventions provided and based on the reported errors with the process. The Individual-Task fit assessed the learnability of the CBID case management process and the acceptability of the Modular Tool by the CBID team members. Learnability was measured by the extent of training required on the tool and the CBID implementation process, perceived ease to learn and use the automated scores to generate action plans using the cloud-based system, and clarity of instructions provided to use the technology. Acceptability of the Modular Tool was assessed based on the CBID team's perceptions of the relevance of the Modular Tool for the case management process, their motivation to commit to using technology for the case management documentation, and the extent to which they reference the Modular Tool data for continuous monitoring of individuals' needs.

The Individual-Technology fit was assessed based on the reported user-friendliness of the tool, potential for adoption beyond the CBID program, sustainability, and user satisfaction. These components were qualitatively assessed with a range of stakeholders in addition to the CBID team, exploring the use of the Modular Tool technology for rehabilitation case management and what could be improved to ensure sustainability and scale-up of this tool and adoption in other settings.

Evaluating the effectiveness of the Modular Tool to support facilitated interactions/discussions between CBID facilitators and service users requires speaking to service users themselves and people who may be providing informal support throughout the case management process. Interviews with service users, family members, and caregivers were used to assess the effectiveness of the Modular Tool to meet the expectations of service users and provide opportunities for autonomous and informed decision-making. The concepts of "person-centered rehabilitation," "family-centered care," and "acceptability" were used to evaluate the appropriateness of the Modular Tool and case management process from the service user perspective.

Quantitative and qualitative data were triangulated to describe the performance and adoption of the Modular Tool, using ideal relationships, or conditions, between the user, the technology, and the task as metrics for assessing the feasibility and effectiveness of using this digital technology within the CBID project. This analysis formed the basis for assessing the potential for scale-up of the Modular Tool beyond the CBID program in Laos.

Figure 5. Fit between Individuals, Task, Technology, and Environment (FITTE) framework



(Adapted from Prgomet et al, 2019)⁶

3.2 Quantitative component

3.2a. Secondary data analysis of Modular Tool data

We undertook quantitative secondary data analysis of de-identified needs assessment baseline data for adults (18 years and older) from both districts. Data was collected and collated by the USAID Okard technical team between 2019-2021. Manual verification of the scoring system of the CBID Modular Tool for identifying the unmet needs was undertaken using the decision tree logic shown in Figure 4. Each decision tree was based on scoring criteria agreed upon by local stakeholders and in line with the USAID Okard Activity Intervention Plan and Results Framework. The automated scoring system to identify needs within each module and develop individualized action plans for intervention was verified using Stata version 17.0 and Microsoft Excel.

We analyzed data from 257 adult individuals at baseline from Module 1 (Demographics and Economic Participation) and Module 2 (Functioning and Assistive Product Use). Upon verification, we consulted with the USAID Okard local Laos technical team to discuss data queries related to translation and to discuss discrepancies between modules and action plans.

Descriptive statistics were performed on the complete dataset (N=260) for age, sex, ethnicity, household condition, employment, monthly income, food consumption, livestock ownership and functioning, and assistive product (AP) use. All data were analyzed using median (age), counts, and percentages.

Economic participation data were analyzed assessing baseline data based on responses to household level income, livestock owned, household condition, and food consumption. Within each response, specific thresholds developed by the USAID Okard team determined whether the criteria would be met for an unmet need. A minimum of two unmet needs from the categories of household level income, livestock owned, household condition, and food consumption were needed for an overall unmet need for economic participation, requiring an intervention for income generation activities.

⁶ Prgomet, M., Georgiou, A., Callen, J., & Westbrook, J. (2019). Fit between individuals, tasks, technology, and environment (FITTE) framework: a proposed extension of FITT to evaluate and optimise health information technology use. In *MEDINFO 2019: Health and Wellbeing e-Networks for All* (pp. 744-748). IOS Press.

Eighteen action plans were purposively reviewed for Modules 1 and 2 to systematically examine the effectiveness of key modules to identify unmet needs, inform relevant plans, and assess the fidelity or match between plans and the CBID services provided. Physical rehabilitation was assessed by analyzing the domains of mobility, self-care, and hand/arm use. Action plans were selected randomly based on an equal ratio of females to males across three categories of age: 18-39 years, 40-59 years, and 60 years and above. The age categories were determined in consultation with the USAID Okard Laos technical team based on the population demographics for age in Laos. The action plans were then analyzed to assess whether recommendations for domain-specific needs were met or not met. This was performed by analyzing each action plan for suggested interventions related to the domain of mobility, self-care, hand/arm use, and economic participation. If an action plan was found to not have any intervention associated with the domains listed previously, this was labeled as a discrepancy. A list of discrepancies was discussed with the USAID Okard local Laos team. Further qualitative information regarding discrepancies assessed whether needs were met or not and recorded.

3.2b CBID team survey

All available CBID facilitators and team leaders (n=11) were invited to participate in a quantitative survey examining their experience using the CBID Modular Tool. Following consent to participate, demographic information related to qualification and experience was collected. Survey questions investigated experience in the use of technology before the Modular Tool, workload, training in the use of the tool, ease of use, and work processes relevant to the use of the tool. Data on barriers and facilitators for service provision and providers' opinions on coordinating with the health system were also collected. The survey took between 20-30 minutes to complete.

Survey data was analyzed using Statistical Package for the Social Sciences (IBM SPSS Statistics v.26, Armonk, NY), and results are presented using a descriptive approach.

3.3 Qualitative data collection and analysis

The qualitative component used focus group discussions (FGDs) with CBID team members (n=15) and managers (n=8) and relevant stakeholders (n=12) from the local rehabilitation system, including service providers and representatives from government and civil society organizations who play a key role in the physical rehabilitation sector in Laos.

In-depth interviews were also conducted with individual participants of the CBID program (n=16) to understand their involvement in the process of conducting needs assessments and finalizing action plans as part of the intended person-centered/family-centered care for the CBID program.

Interviews and FGDs were audio recorded, transcribed, and translated into English for thematic analysis. Interviews were conducted in Lao with an average duration of one hour. Interviews and FGDs were digitally audio recorded, transcribed verbatim, and content coded and analyzed using NVivo (QSR International, Melbourne). Transcripts were anonymized by omitting identifying information. Codes were derived based on the FITTE framework and compiled into categories. Representative quotations were selected to highlight the key findings.

3.4 Ethics

Ethics approval was obtained from the Johns Hopkins Bloomberg School of Public Health Institutional Review Board [IRB ID: IRB00020535], and the University of Melbourne [Ethics ID: 24892]. Approvals were also obtained from the National Committee for Disabled People and the Elderly (NCDE) of Laos and relevant district and provincial authorities to undertake this evaluation.

4. Key Findings

4.1 Modular Tool data outputs

To characterize the unmet needs of persons with disabilities and their families at baseline using the CBID Modular Tool data for functioning, assistive products use, and economic participation, baseline characteristics were analyzed (Table 3). The median age of individuals was 49 years (interquartile range - IQR⁷: 38-61), female (47.9%), of Lao ethnicity (88.3%). Individuals were mostly currently married (53.3%) or never married (31.9%) (Table 3).

There were 231 (89.9%) individuals requiring interventions in Module 2, Functional and Assistive Products (Figure 6). Notably, at baseline, 163 (63.4%) individuals reported difficulty with participation in domestic, community, and social life, followed by mobility (111, 43.2%) difficulties. Physical rehabilitation was assessed specifically for the domains of mobility, hand/arm use (43, 16.7%), and self-care (53, 20.6%) (Table 4). A little over one-third of the individuals (92, 35.8%) reported being unable to work due to their chronic health condition, and most of the individuals (205, 81.9%) reported not being able to access work as much as they needed (Table 5). Based on data available for 207 clients for additional criteria on monthly household income, housing conditions, and the ownership of livestock, economic support needs were identified for 85 (41%) clients.

Table 3. Demographic characteristics of individuals at baseline from Module 1

Characteristics	Kham district (n 137)	Xayphouthong district (n=120)	Total (n=257)
Age (y)			
Median (range)	53.0 (18-100)	45.0 (18-88)	49.0y (18-100)
Sex (n,%)			
Male	70 (51.1%)	54 (44.2%)	124 (51.8%)
Female	67 (48.9%)	66 (55.0%)	133 (47.9%)
Ethnicity (n,%)			
Lao	108 (78.8%)	119 (99.2%)	227 (88.3%)
Others	29 (21.2%)	1 (0.8%)	30 (11.7%)
Marital status			
Currently married	79 (57.7%)	58 (48.3%)	137 (53.3%)
Divorced	3 (2.2%)	9 (7.5%)	12 (4.7%)
Never Married	44 (32.1%)	38 (31.7%)	82 (31.9%)
Separated	1 (0.7%)	1 (0.8%)	2 (0.8%)
Widowed	6 (4.4%)	12 (10.0%)	18 (7.0%)

⁷ The interquartile range, or IQR is the 'middle half'. It means 'half of all people were in this range'.

Figure 6. Percentage of the sample reporting difficulties in Module 2 (functioning) (n=257)

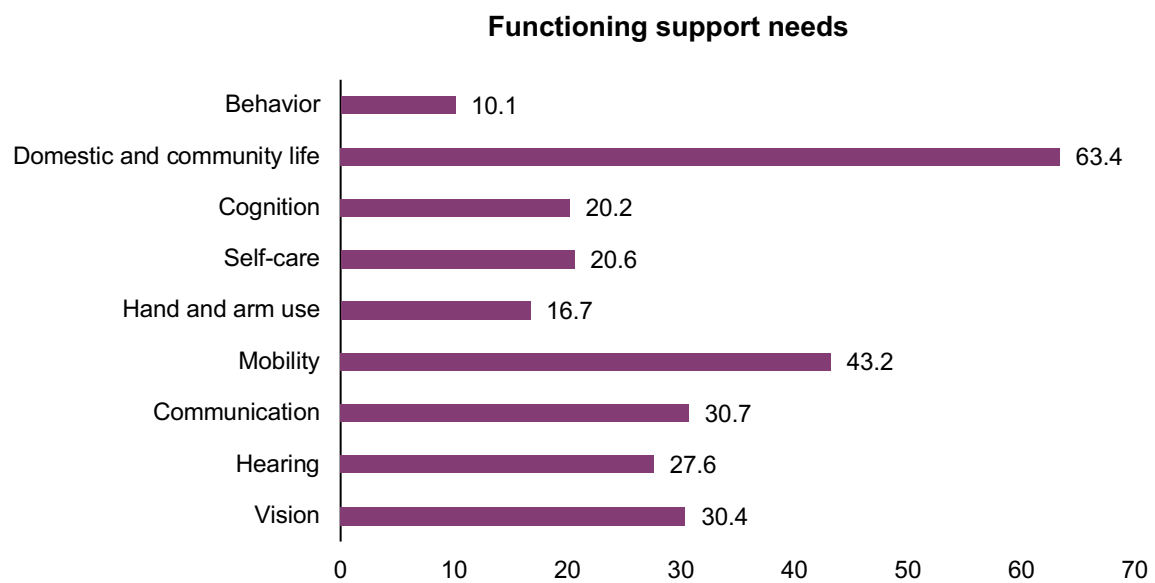


Table 4. Red flags/needs identified for physical functioning

Domain	Red flags	Question	n	%
Mobility	111	Difficulty walking	91	35.4
		Difficulty climbing steps	55	48.3
		Difficulty walking 100 meters on the ground level	58	50.8
		Difficulty walking 1 km on the ground level	77	67.6
Hand/Arm use	43	Difficulty using hands and fingers to pick up small objects	37	14.4
		Difficulty raising a 2-liter bottle of water from waist height to eye level	31	12.1
Self-care	53	Difficulty grooming (brushing hair, shaving, cleaning teeth, etc.)	34	13.2
		Difficulty using the toilet	44	17.1

Table 5. Working status

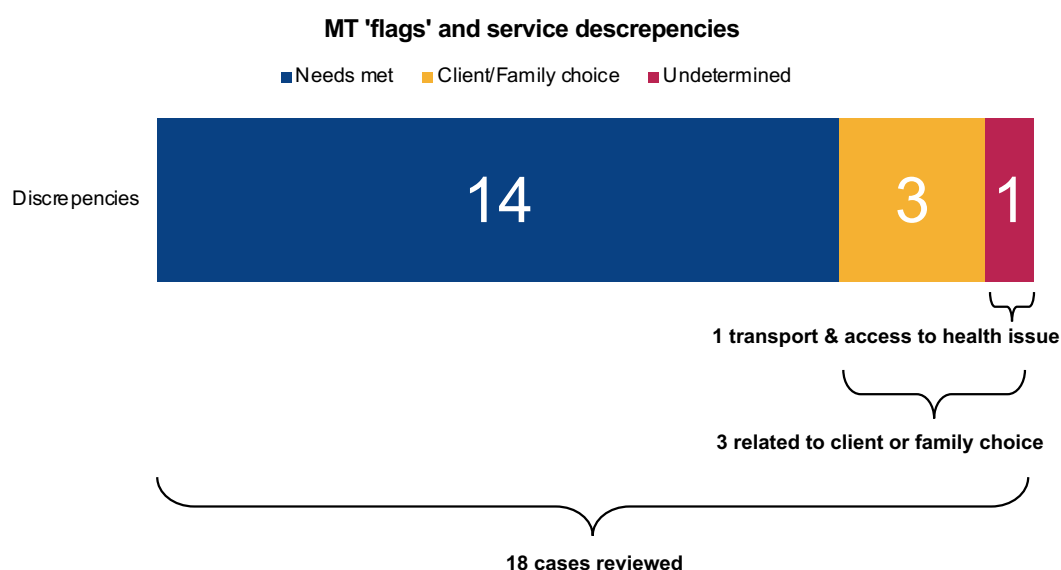
Variable	n (N=257)	%
Working status		
Self-employed	68	26.5
Working as an unpaid family member contributing to household responsibilities	36	14.0
Unable to work due to chronic health condition	92	35.8
Not working and not looking for work	31	12.1
Other	30	11.6
Extent of ability to work		
As much as needed	34	13.5
Most times	53	20.6
Sometimes	78	30.4
Not at all	74	28.8
Have not needed to work	7	2.7
Don't know	5	1.9

4.2 Comparison of action plans with the Modular Tool data

Of the 18 action plans selected through purposive sampling, 14 provided a record of needs identified at baseline assessment across domains of mobility, self-care, hand/arm use, and economic participation (Figure 7) having been met. A “need met” was determined if an intervention on the action plan related to an unmet need from the mobility, hand/arm use, self-care, or economic participation domain. Four (22%) action plans did not have all needs met and were determined to have discrepancies with the baseline assessment. Understanding action plan discrepancies is an important part of evaluating the CBID Modular Tool at both individual and

family levels. Possible reasons for discrepancies were explored further with the USAID Okard technical team in Laos.

Figure 7. Modular Tool red flags and service discrepancies



The discrepancies identified in the purposive sampling analysis highlight the importance of family-centered discussions for determining priorities and objectives for persons with disabilities and their families when planning and implementing appropriate interventions.

Family and individual priorities were the main reason for the discrepancies identified. Among three out of four cases with discrepancies, all families prioritized income-generation activities over rehabilitation and assistive product-related services. One case had needs for self-care and mental health-related difficulties. However, this family prioritized mental health services over rehabilitation services.

The Modular Tool data and action plans do not document reasons for discrepancies. We discussed reasons for discrepancies with the Okard Technical Committee about these specific cases. It was identified that this discrepancy is common among CBID participants who are from lower-income socioeconomic backgrounds. For example, CBID participants may not agree to visiting the rehabilitation facilities even when offered financial support to travel because it still requires a lot of effort for clients to arrange for travel due to the distance. Clients also refuse using AP because of the stigma associated with using AP in the community.

The “fit” between needs identified and services provided suggests the Modular Tool effectively identified needs in at least 14 of 18 cases reviewed (~80%). Among the four cases with discrepancies, they were related to family and consumer choice, which underscores the importance of detailed client and family consultations in addition to the Modular Tool alone.

4.3 Feasibility of CBID Tool implementation

4.3.1 Quantitative survey

Table 6 shows the demographics of the CBID team. The majority were female and had at least three years of experience in the CBID program.

Seven women and four men were surveyed: six from Xayphouthong, and five from Kham. The average length of CBID training was 28 months and ranged from 3-48 months. Seven had five to seven days of training on the Modular Tool, while four reported no formal training on the CBID tool and were trained on the job.

Overall, the results of the quantitative survey suggest the CBID team had a high self-rating of technical capabilities and confidence in technology to support their decision-making before their involvement (Figure 8). All agreed (agreed or strongly agreed) they were comfortable with mobile technology. Most (9 of 11) were aware of mobile technology in health care.

Table 6 Characteristics of survey participants (n=11)

Variable	n	%
Sex		
Female	7	64%
Male	4	36%
Location		
Xayphouthong district	6	55%
Kham district	5	45%
Days of training		
5-7	7	64%
0	4	36%
Years of experience working in CBID		
3 months or less	3	27%
4 - 12 months	1	9%
3 years or more	7	64%

Figure 8. CBID team self-assessment (n=11)

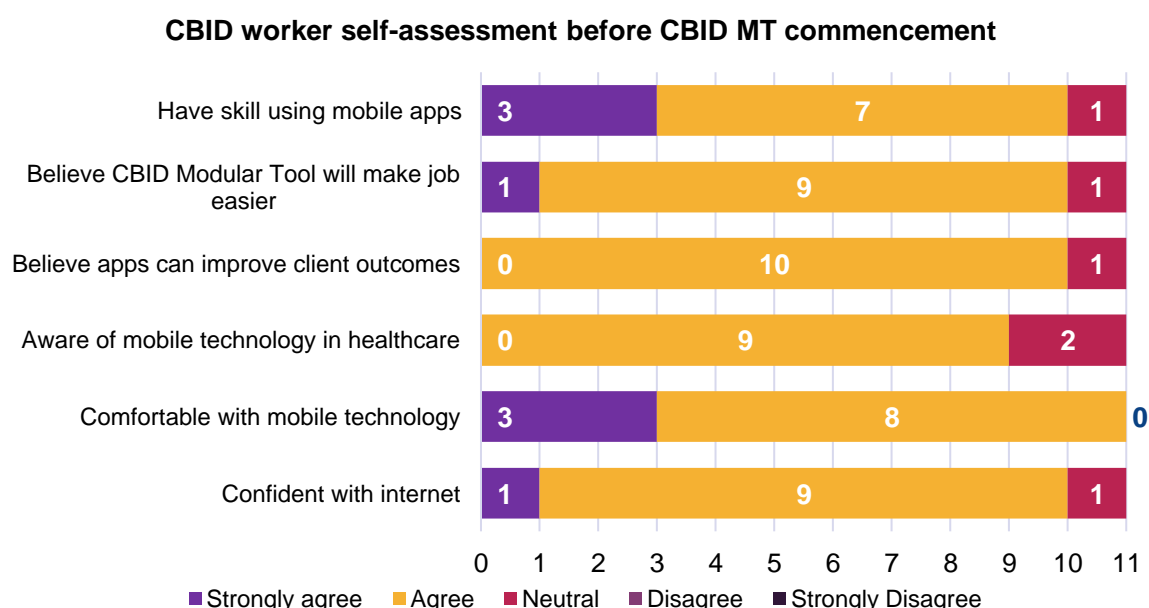
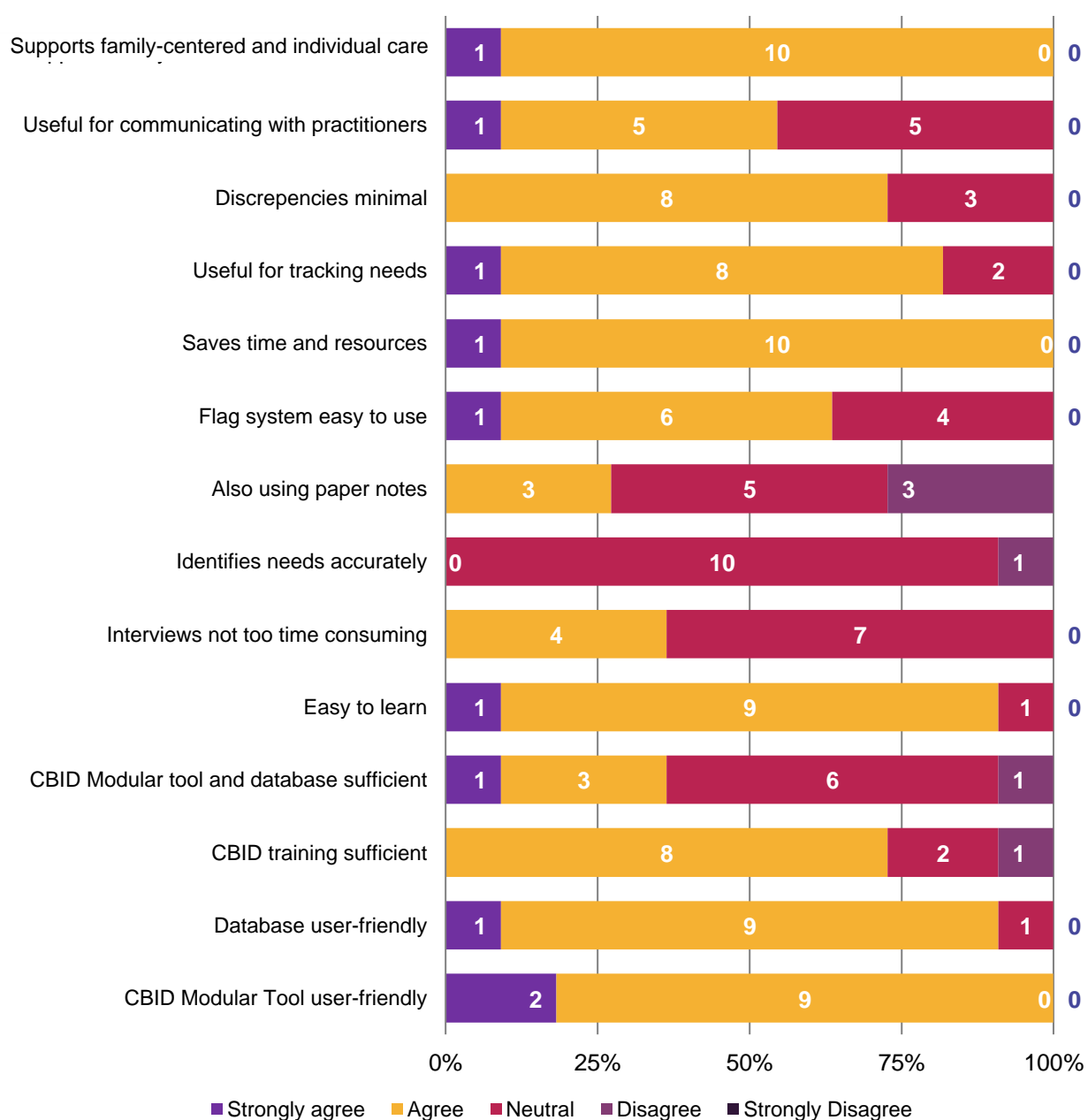


Figure 9. CBID Modular Tool assessment by the CBID team after implementation (n=11)

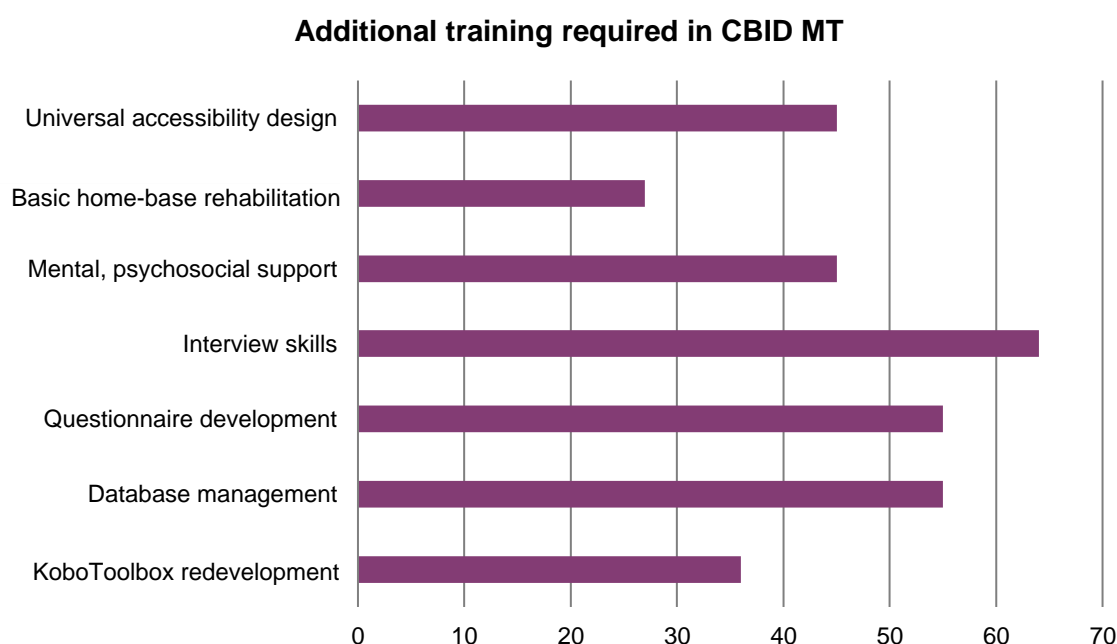
CBID Modular Tool assessment by CBID workers after implementation



The CBID team found the Modular Tool and database easy to use, and valuable in terms of client management and practitioner communications, with minor questions about discrepancies and ease of the flag system (Figure 9). Responses seem to suggest using the tool itself is time-consuming or at least not a time-saver, but overall, it seems to save time and resources.

A more concerning finding is the strong suggestion the CBID Modular Tool is not asking the right questions to identify the needs accurately. These findings are explored further in the qualitative findings that identified what was identified in the discrepancies detailed above around the family/individual-level priorities that may be different from the identified needs.

Figure 10. Additional training recommended for CBID Modular Tool by CBID facilitators after implementation (n=11)



Recommendations for additional training were similar across the different possible areas (Figure 10). Interview skills, improving the questionnaire and the database were noted by at least half of the respondents, while skills in basic home-based rehabilitation and developing the KoboToolbox application were recommended by fewer than five participants.

4.3.2 Qualitative findings

To determine the feasibility and adoption of the Modular Tool by the CBID team, three main themes were explored: user-friendliness, learnability, and acceptability. An additional thematic area related to the development process is also reported.

Development of the tool was an iterative process comprising several stages: content development, translations, face validation, digitization, testing, and implementation. Developing a comprehensive tool was complex and required an expert group comprised of:

1. program managers who have a thorough knowledge of the program objectives and expected outcomes,
2. academics experienced with tool development and validation,
3. monitoring and evaluation experts who understand the key indicators to be measured and the type of data required, and
4. information and technology experts.

As this tool was developed for the first time in this sector, it required a steep learning curve for all members involved to ensure the content of the tool was appropriate, comprehensive, easy to administer, efficient for needs assessments, and generated data for the case management process and reporting for monitoring and evaluation of the overall project.

“A lot of learning, by doing, because we also had the idea of a database and that the functionality and design of the Modular Tool worked with the database complementing each other.... We needed a simple way to use the information from participants that could inform case management.”

(FGD, CBID program managers)

“It was tough to learn at first... Very hard but very handy to use... There was a lot of thinking process to come out with the tool today.”

(FGD, CBID program managers)

The initial testing and implementation period identified several challenges that required troubleshooting and regular consultations with experts. Technological challenges were reported with the KoboToolbox when there was a new version available, or an update was required. For example, a loss of data was reported when a software update was required.

The key lesson learned was that the development and implementation of a similar tool is resource-intensive and requires ongoing support to troubleshoot technological issues, including managing regular software updates without losing the data collected. However, an adaptation of this tool for another setting or revision of the current tool may not be so resource-intensive as the basic package is already available.

User-friendliness

There was an overwhelming agreement that after an initial, steep learning phase, the Modular Tool was easy to use, with huge potential for the data acquired to be compiled and shared with government actors for a range of uses. Despite this overall assessment, many felt that overly formal language was not appropriate for the context. CBID facilitators were instructed not to rephrase or elaborate on questions during the initial implementation period to avoid misrepresentation of questions. However, clients and their families sometimes misunderstood questions as they were not always phrased in colloquial terms, leading to incomplete or inaccurate interviews. These issues were later resolved when some questions were rephrased and CBID facilitators were allowed to provide explanations to clarify the questions.

“Some questions I cannot answer because the project people use formal words to communicate with us which were different from words we speak in daily life.”

(Client 02)

“According to the project regulations, we could not explain questions to respondents. Some people gave the wrong answers to interviewers. The problem was there are many technical and formal words in the questions ... I think doctors should help in translating questions on health care from English to the Lao language for the project.”

(FGD, CBID teams)

The duration of interviews ranged between 30 minutes and up to three hours, and several respondents discussed how there were many questions being asked. Similar concerns were raised by government stakeholders. CBID facilitators that had not undergone formal training were not as familiar with the questions, and when they visited families, they often had to re-interview to gather missing information.

Other challenges raised by CBID facilitators related to skipping functions, wherein information between the modules was not linked, and the inputting errors associated with re-entering demographic information. Most of these technical problems were resolved with an update in 2021. There were also some difficulties in uploading information into the tool without the internet at the client's home.

Lessons learned

During pilot testing

- **Simplify translations** in the local language through cognitive testing and more user testing and feedback.
- **Include data error checks** during pilot testing.
- **Expect “bugs.”** Invest in additional testing and revision time during early implementation and before full deployment.

Ongoing

- **Expect internet issues.** Even simple data depends on steady internet connections, so plan alternatives.
- **Ongoing technical support is needed.** Troubleshooting, refinement, and error-fixing are critical implementation factors.

Learnability

Most of the CBID team were familiar and comfortable with digital devices but had never used digital health tools previously, so there was a steep learning curve. The training was offered through a one-week workshop followed by a week of practical training in the field.

Overall, CBID facilitators felt the training time and support offered throughout the training period were adequate but preferred additional training in the field. Although the majority of CBID facilitators had been working in their current role for several years, they felt the training could be enhanced by practicing their interview skills with persons with disabilities and through mentorship on the interpretation of answers they received in the context of the recipient's needs.

“For me, I think one week of training is not enough because the Modular Tool is a new technology. We have problems with submitting respondents’ information. I think CBID facilitators should spend one-week learning theory on the Modular Tool and then one more week practicing doing interviews with real clients.”

(FGD, CBID facilitators)

Additionally, they requested more training to ensure they were more familiar with disability aids and assistive technology, as well as training in compassionate communication and empathy.

CBID teams also reported some challenges when new staff were employed in the program and only offered on-the-job training, as the formal training on the tool was no longer available.

“We did not provide training on using the Modular Tool to them because if they attend the informal Modular Tool training because the training takes many days and now the project is nearly finished.”

(FGD, CBID team managers)

Lack of formal training created challenges for new CBID facilitators because they were not familiar with the modular questions, and when they visited families, they often had to re-interview to gather missing information.

“This problem happened with new CBID Facilitators who were not familiar with the Modular Tool’s questions. We solved this problem by providing interviewing skill lessons to the newcomers and assigned other case managers to coach them closely.”

(FGD, CBID team managers)

Lessons learned

During pilot testing

- **Practical training and troubleshooting is needed.** During pilot testing of the tool, spend additional time practicing and iterating the tool with persons with disabilities in the community.

Ongoing

- **Provide ongoing support.** Regular mentoring in the field and continued support during on-the-job training for new staff members is important and necessary to maintaining and improving quality.
- **Account for staff turnover.** Predict and plan for handover and train new staff when there is staff turnover.

Acceptability

The CBID teams generally agreed that the Modular Tool is a useful tool for its intended purpose of data collection, intervention planning, and monitoring and evaluation. They valued the use of technology that supports efficient methods of storing and sharing data. Key stakeholders also valued the use of digital technology and agreed that the local health and rehabilitation systems should soon adopt similar methods for managing data at the facility level.

While the CBID team greatly appreciated the usefulness of the Modular Tool for minimally qualified CBID facilitators to screen for functioning difficulties and conduct needs assessments, the health and rehabilitation stakeholders misunderstood the purpose of the tool for impairment assessments and diagnosis. Key stakeholders expressed concerns about the type of assessment being done by CBID facilitators and that it was—in their view—inadequate to make a treatment plan. Some stakeholders suggested that doctors or qualified health professionals should be carrying out the interviews to assist them in their treatment plans, suggesting a possible misunderstanding or varied perceptions about the purpose of the Modular Tool. These misunderstandings of the purpose of the tool and CBID team capabilities should be addressed, and a shared vision between the CBID team and rehabilitation stakeholders should be established.

“We do not know exactly the difficulty of clients [from the information we receive]; we do not know a client has difficulty on his left or right leg.”

(FGD, stakeholders)

The CBID team reported challenges working with some modules in the Modular Tool that include questions that are culturally sensitive to ask in the communities, even with simplification. These questions were related to mental health, particularly questions that ask about individuals' emotional status. Participants reported that these questions triggered distress among some participants. However, the team agreed that further training on managing distress among participants supported the CBID facilitators when facing such challenges. Also, the team reported that CBID participants often valued having discussions on their mental health status even if it was distressing because they were never asked before. Other questions discussed abstract ideas, such as well-being questions, which relied on the person's health literacy, and were misunderstood.

“If you restart your life again, would you want it the same way?’
People in the community don't understand what we're asking for. So, the CBID facilitators find it hard to simplify it as well.”

(FGD, CBID team managers)

“It's about the training on compassionate communication and empathy that comes with those questions that the CBID facilitator is trained on. If indeed you ask these questions, like 'Do you have an idea of ending your life?' and you don't know that the person asking this question is ready for a positive answer, then you prefer not to ask the question. I think it's because it was probably not in the full context of the questionnaire used by the CBID Facilitator trained for that that the reaction was quite negative in the beginning.”

(FGD, CBID team managers)

The role of the CBID facilitators in using the Modular Tool data appears to be influencing their acceptance of an extensive tool and some question sets, such as the mental health questions for case management. However, they may not fully understand the overall benefit of the tool as they do not have access to the back-end data that auto-analyzes the data from the Modular Tool questions to generate scores for creating red flags. The back-end data is valuable to the CBID managers, who use it for monitoring and reporting purposes, unlike the CBID facilitators who do not work with the back-end data.

“Maybe they [CBID Facilitators] don't see that same value as us [Program managers], because they fill it in and I don't know how they go back and look at individual answers to give them clues on about how to support the person.”

(FGD, CBID team managers)

Lessons learned

During development and pilot testing

- **A digital tool does not directly solve inter-professional issues.** Concerns among health professionals about the capabilities of the CBID facilitators and strained relationships between CBID and health professionals are ongoing and not directly solved by technology.
- **Engage health and rehabilitation stakeholders.** To establish a shared vision between rehabilitation personnel and CBID team, supporting coordination between these stakeholder groups is necessary during the development of the tool and its testing and training.
- **Train on the purpose of the question sets.** Orienting CBID facilitators to the purpose of the question sets included in the Modular Tool and addressing sensitive questions can better prepare them to create a comfortable interview environment. Set up distress protocols.
- **Revise questions to simplify phrasing.** Phrasing questions in colloquial terminology after pilot testing will support better understanding among clients and yield accurate responses.

Ongoing support during implementation

- **Solicit routine feedback.** Facilitate discussions with the CBID teams for troubleshooting.

Efficiency

The digital tool was extremely valuable to CBID teams as it collected and stored data more efficiently and securely compared with the previous paper-based system. CBID team managers described the benefit of the tool in monitoring action plans, ensuring they were being carried out accordingly, and allowing tracking of numbers of clients receiving support for comparability. According to CBID teams and stakeholders, the tool was fit for purpose in providing support for people in a productive and structured way, which encouraged families to be involved in the decision-making process. The modules were set up in a way to gather information through conversations between CBID facilitators, clients, and their families, and to encourage and support shared decision-making.

“The benefit of using the Modular Tool is that doing an interview is easy for me because we ask questions in order, and it is good to have the skip functions for us. In addition, using tablets for collected information instead of paper is comfortable for us as we are not afraid to lose the papers.”

(FGD, CBID facilitators)

“Families of clients always take part in the project. They help to answer the questions, especially for most clients who cannot communicate.”

(FGD, stakeholders)

Several technology limitations were raised by CBID teams. Notepads and other digital technologies are still being used due to fear of data loss or to gather additional information not collected by the tool. For example, more specific information on the type and degree of disability was recorded.

“To ensure that we have this information, we collect extra information on difficulties/disabilities and then save them in an Excel file. This is because we have none of these questions or a place to save them in our Modular Tool.”

(FGD, CBID facilitator)

Some concerns were raised about the risk of damaging the equipment while working and traveling in the field, and whether equipment failure would stop the program from running or lead to consequences affecting their job security.

The use of other databases and technologies raised some ethical issues in the sharing of data with external partners outside the CBID program. For example, there were concerns around

whether clients had been provided with an opportunity to provide consent for their health information to be shared with external agencies, such as health and rehabilitation facilities.

Some CBID facilitators suggested the need for more pictures or examples of disabilities to assist in management recommendations.

“We do not have enough pictures of all types of disabilities in the project's target areas. Therefore, our collected data may not be fully accurate.”

(FGD, CBID teams)

Staff from district hospitals believe they should triage all cases and therefore want to receive all data from the CBID program to help them make informed decisions as to where and how clients should be managed, rather than CBID facilitators directly referring clients to the provincial hospital and provincial rehabilitation center. This step of triaging at the district hospital is needed to avoid unnecessary referrals and to ensure engagement and ownership of case management at the district level.

Lessons learned

Referral pathways

- **Explore options for sharing CBID data with health and rehabilitation staff.** Data sharing can support further assessment and referral and strengthen triage/service plan decisions. Some of the outputs from the Modular Tool could be shared with the referral centers. Consider ethical protocols when data sharing.

Tool design and features

- CBID staff would value more information about functioning, impairment, and health conditions. Explore whether pictures, information about impairment types, and other key information for CBID staff can be embedded in the tool.
- Plan for communication between CBID and health staff. Communications need to happen. Avoid privacy concerns with using personal devices, accounts, and apps.

4.4 Effectiveness of the CBID Modular Tool

The Modular Tool was designed to support lay CBID facilitators in carrying out functional needs assessments. It was on this basis that the program employed community-level workers (non-professionals) to obtain data based on interviews and observation, with no intention that the tool would be used for measuring or assessing the level of disability.

“It's crucial that we don't just make an action plan based on a robot and informatic system, but we use this as a starting point to engage in conversation ... [the Modular Tool] has the potential to change the behavior of health professionals when they go to someone's house to figure out 'What help do you need?' It forces them at the beginning to ask them questions - What do you think? What are your difficulties? Rather than looking at their body.”

(FGD - CBID team managers)

As described above in section 4.2, some discrepancies were observed between the needs identified based on the Modular Tool data and the final action plans following the discussions with the individuals and families. CBID facilitators reported that action plans were generally completed in consultation with families present and that action plans promoted family-centered care. As the individual's situation changed, the plans could be adapted and supported in different ways. Team managers also described the benefit of using data to ensure they could track action plans, check on missing information, and provide additional support if required.

Several CBID clients interviewed reported their functional needs were met with realistic action plans being formed.

“The orthotic shoes are good because I can walk anywhere by myself. Before, I was dependent on my daughter for traveling. I thought the help of the project benefits my daughter too because I can walk by myself due to these new orthotic shoes.”

(Client 8)

One of the key design elements of the tool is that it supports a person's independence as it enables self-assessment, which promotes patient-centeredness. However, some clients felt their needs were not fully understood by CBID facilitators, particularly regarding the types of income generation activities they wanted. Although some clients reported dissatisfaction with the assistive product services offered, clients noted they did not report these concerns to the CBID facilitators because they were hesitant to share negative information. Some clients also reported not reporting all their needs in the initial assessment as they were hesitant and did not fully understand the nature of the CBID support. More of these challenges are described under environmental factors.

“I thought the project cannot help me with mental health because I still feel that I am different from others.”

(Client 6)

Another issue highlighted was that the tool was designed to be completed over several visits, but families would prefer to complete the entire interview in one sitting. This may have impacted rapport-building where participants may not have had time to consider their answers and freely share their needs.

“I talked with the CBID facilitators for 1 hour, but I couldn't answer all questions about the project during the interviews. I had some information to tell them, but they did not ask me. However, I forgot what I needed to tell them... The CBID facilitators should inform me about the questions before interviewing so that I would have no problem answering their questions. If they had told me, I would have prepared and have told them everything.”

(Client 10)

There were some comments and concerns raised by the CBID team around the phrasing of the mental health questions, and the appropriateness of them when interviewing the clients. However, the team and the managers agreed that these questions are important to ask to offer timely emotional support despite the fact that they often resulted in clients becoming upset when sharing their experiences. Developing strategies for asking these questions requires some further thought.

Lessons learned

- **The Modular Tool data is only a starting point for family-centered care.** Further discussions are required to finalize an individualized action plan.
- **Space should be created in the database to document discrepancies.** When needs prioritized by the individuals and families are different from those identified based on the Modular Tool data, having the context will support understanding.
- **Consider environmental factors.** The specific context might influence the effective case management process.

4.5 Environmental factors: Cultural factors and ethical considerations

Power dynamics

Some clients expressed that they were hesitant to share all their needs freely during assessments because they were fearful of sharing personal information and did not feel empowered to have discussions with the CBID facilitators on an equal level. It was also reported that the clients misunderstood the purpose of the project, and this contributed to their hesitation to share their needs when asked questions from the Modular Tool.

“When the project people visited my family, we never asked them back. We just listened and followed their activities. However, the project people encouraged us to let them know if we had any questions.”

(Client 9)

“Sometimes, I was worried about my answers that it may have a negative effect on me later. If I knew that I could answer their question freely I would tell them everything.”

(Client 10)

“I just followed what the case managers told me to do. I was afraid to share my ideas when I talked with the case managers although they tried to encourage me to talk about all of my needs. I did not tell case managers all my needs because I was hesitant to tell them.”

(Client 11)

Some clients were worried about the repercussions if their income-generating activities had failed. For example, if their chickens died, would they be required to repay the program? Others were apprehensive to approach the CBID facilitator with queries, appearing to be passive in the situation and accepting whatever the program had to offer. Clients also reported not sharing information about their changing needs, such as an assistive product not being useful for their needs, or a changing family situation affecting income generation activities. They were concerned it would be considered rude to report issues or raise requests when had already received services from the CBID program.

To mitigate perceived power dynamics and promote open dialogue, CBID facilitators could spend more time building rapport during the initial contact. The Modular Tool questions for needs assessments could then be asked during subsequent discussions or visits.

The local rehabilitation situation

Rehabilitation professionals did not appear to fully understand the aim of the Modular Tool to identify unmet needs, as opposed to a comprehensive functional assessment. This is likely a reflection of the emphasis on “disease” and a curative approach to rehabilitation adopted by rehabilitation staff, compared with CBID’s aims of understanding individual inclusion, participation, and addressing holistic barriers and needs.

Concerns were also raised by rehabilitation professionals and government stakeholders that qualified health professionals should be conducting the interviews. They understood the value of the tool, but not the value of the community workers who were carrying out the interviews. CBID

teams, however, expressed the belief that the tool can encourage rehabilitation providers to see the importance of their role in improving the quality of life of their clients beyond impairments. Understanding and appreciating the value of CBID facilitators by the stakeholders at the rehabilitation facilities should be addressed to ensure a greater acceptance of the CBID program and supporting better integration of rehabilitation at different levels of care.

Additionally, existing data management in the rehabilitation (and wider health systems) is mismatched with the CBID tool and overall program. Rehabilitation facilities, for example, have limited resources and equipment to provide adequate services and use paper-based systems. This could limit how the CBID data systems align with rehabilitation services, and therefore the adoption and scalability. In many ways, the CBID program is further ahead technologically than other system level strengthening activities in Laos.

Expectations about review and follow-up of rehabilitation and assistive technology services appear to be poorly understood. There are no review or follow-up expectations for assistive products users, and there is limited monitoring of how devices are used. Clients were also confused as to whether they could ask about their devices, particularly if they had some concerns about the suitability of the product.

Other technologies are used to communicate with external agencies and to store information (e.g., WhatsApp or Google Drive). Using messaging platforms and other kinds of alternative communication to share confidential patient information with external stakeholders has ethical implications that need to be considered.

Lessons learned

- **The value of CBID, and the CBID tool, is sometimes misunderstood.** Ensuring local stakeholders understand the benefits of the tool is necessary to maximize buy-in.
- **Digital tools do not directly improve inter-agency linkages.** In the case of CBID, a shared vision for CBID generally, and collaboration between different government ministries (e.g., social welfare and the health system), is necessary.
- **CBID workers and their knowledge are still important.** Situations can change—CBID teams should follow up with clients, especially if they are at risk of a worsening impairment or functioning difficulties.
- **Government systems lack resources to collect data on disability.** Consider how digital approaches might surpass the performance of other sectors and whether that affects acceptability (positively or negatively).
- **Government workers have little time to participate in innovations or change practices.** This could negatively affect buy-in or understanding of the innovation and its aims, or have practical consequences, such as getting timely approvals or high-level support.

4.6 Scalability of the CBID Modular Tool

The overall scalability of the CBID Modular tool was explored in two main ways. First, by understanding the fit of the tool with the CBID team, CBID program, and the overall implementing environment. Secondly, stakeholders were asked directly about the tool's potential.

Overall, most stakeholders described large potential in scaling up the program in general, and the tool specifically. The Modular Tool data was seen as having great potential in collecting a complete dataset on the disability needs of the population and management pathways, including access to assistive products, that can be used to inform government planning of rehabilitation

services. The program increased community awareness of rehabilitation and the services accessible. Most stakeholders believed the tool could be successfully used beyond the program.

“... we all say that it was a pilot with great potential. We need to scale up this potential in a holistic way.”

(FGD, CBID team managers)

Government stakeholders expressed a strong willingness to adopt digital technology similar to the Modular Tool in their own systems to manage patient data and monitor their clients. They believed even when the Okard CBID project ends, the data collected so far would benefit the government in supporting persons with disabilities and sharing information with new projects.

“If we have a system like the Modular Tool, we just put the ID of the patient, then we will see all the information of that patient. For example, the past treatment. Finding previous patient papers in files in cabinets is hard and takes a long time.”

(FGD, CBID stakeholders)

“I agree that the Modular Tool’s data is very helpful because the government sectors have no budget for collecting client’s information by ourselves. We can use this data for the future support....In future, we can give this data to new projects about disability and it would be directly beneficial to clients because the new project will know personal details of clients.”

(FGD, CBID stakeholders)

Stakeholders expressed that information sharing between CBID teams and rehabilitation facilities had been useful to continue monitoring clients at their home. For example, CBID teams send updates on the client’s condition following interventions at the rehabilitation facilities using photos and other communication methods. These updates were reported to be helpful by the rehabilitation stakeholders to monitor client’s progress remotely. Some stakeholders were hopeful the Modular Tool technology could be expanded into a telerehabilitation program where rehabilitation staff could remotely interact with the clients through phones and videos. However, concerns were expressed about resources currently available in Laos for such scalability. They discussed challenges around the training needed for using such a system.

“To do this we need human resources and equipment. However, at the local hospital, one doctor has to respond to many things such as vaccinating villagers too. We do not have enough human resources. I think this system may not fit Laos today... We may use it in Laos, if we have equipment and are trained how to use the system like the Modular Tool.”

(FGD, CBID stakeholders)

Challenges within government processes and policies were discussed as it relates to adopting digital technology for data sharing between different government departments at district and provincial levels for managing referrals. Stakeholders emphasized that permissions from different government departments are crucial for such a system to be adopted.

“We need to get permission from the central government first which includes the Ministry of Health, and the Lao Statistics Bureau. Additionally, the government will consider who will get the benefits, and whether it is sustainable development. Getting the permission would take a long time.”

(FGD, CBID stakeholders)

Lessons learned

- **Optimize the value of additional data by engaging government/other partners to use the data.** Understanding how to use the data in an effective way in government decision-making processes could generate additional interest in digital approaches relative to conventional approaches and optimize the potential of digital tools.
- **Link the tool with the needs of other providers.** The outputs generated by the Modular Tool could be tailored according to the data needs required by the health and rehabilitation stakeholders at the referral facilities.
- **Ongoing iteration, refinement, and adaptation is necessary.** Investment of time, expertise, and resources is important for the tool, but also for the overall program it depends on.
- **Digitizing paper-based systems at government facilities is complex.** While there is buy-in for the use of digital technology at health and rehabilitation facilities, the Laos health system is complex. Changing the current systems will require a significant investment of resources.

5. Discussion

This evaluation found that the CBID Modular Tool is feasible and efficient to be managed and handled by minimally trained personnel to identify physical rehabilitation and family support needs, develop individualized actions plans, promote family-centered care, and propose priority interventions. We investigated success factors for implementing the Modular Tool in the CBID management process in Laos and documented the lessons learned. Findings can be applied to the CBID tool in Laos and in other contexts and provide useful general information about using technologies in community services in low- and middle-income countries, in particular for persons with disability and those who require rehabilitation.

Developing the CBID Modular Tool required a significant investment of time and resources to meet the needs of the USAID Okard CBID program, which has a comprehensive range of interventions. Further, the tool required maintenance and updates to ensure it continued to function as intended. In other contexts, CBID programs may not have the same infrastructure or technical expertise. Resources for training and capacity building are required to consider an integrated model within the health system, ensuring staff and collaborating partners within referral networks are familiar with the tool, and have the skills and knowledge to effectively use the data from the tool. However, other projects that do not provide a similar range of services and may not be working in complex system as in Laos can adapt the tool accordingly from the comprehensive content that is already available.

Despite the complexity of the Modular Tool technology, data collected was used effectively by CBID teams to track the client progress, and CBID program managers valued the tool to monitor the team remotely. The CBID Modular Tool advances the field of CBID and bridges the gap between researchers who are usually external to program development and personnel who run those programs.

Several environmental and cultural factors appear to influence the use of this technology, the data produced from the needs assessment, and the development of appropriate interventions. One key limitation identified is not including space for documenting the decision-making process for prioritizing interventions for individualized action plans. The finalized individualized action plans were influenced by family situations and local cultural factors. Information on why a family or individual prioritized some needs over others will be valuable for monitoring progress on unmet needs that were initially identified and measuring the effectiveness of the interventions offered.

The evaluation also provides a real-time example of adapting and implementing this tool in a complex environment such as in Laos, where multiple actors are engaged in the provision of physical rehabilitation services, including different government ministries, international nongovernmental and civil society organizations, and local communities. While the tool was found to be feasible and efficient within the CBID program context, challenges related to data sharing with the referral facilities for health and rehabilitation were identified. Health and rehabilitation systems in Laos are still using paper-based formats, and therefore, CBID teams used different methods of sharing information on clients in need of referral services such as communicating and sharing client photos through WhatsApp or Google drive. Data sharing is an essential component for integrating rehabilitation into health systems. The CBID Modular Tool was not designed for data sharing with external stakeholders and this feature was not incorporated in the current version. Additional features to incorporate documentation of photos could be included within the Modular Tool and automated analysis to meet the requirements for sharing data with rehabilitation service providers.

One key lesson learned from this evaluation is to consider features for aligning systems and data requirements for different stakeholders when designing data collection and case management systems. The CBID Modular Tool content development involved local stakeholders, but ongoing consultations to address the data sharing requirements should be considered.

This evaluation identified potential for scaling up the Modular Tool beyond the CBID program. Multiple government stakeholders identified the potential for the Modular Tool data to compile a dataset on the disability needs of the population and management pathways, which can be used to inform government planning of rehabilitation services. Stakeholders also expressed the need for digitizing their own systems to align with the CBID Modular Tool data and for their own client management. However, ensuring the tool is compatible with the local systems will depend upon the resources available among health facilities and their capacity for adopting new technologies.

Key recommendations that could address some of the challenges include the following:

- **Simplify and shorten the questions.** The Modular Tool currently identifies a large spectrum of unmet needs, but the content can be further refined to narrow the focus and simplify the language.
- **Modify the training program.** Providing additional resources and longer practice sessions in the field along with mentoring might assist with the steep learning curve for using such a novel technology.
- **Address the impairment-focused expectations of health and rehabilitation providers.** Clarifying the purpose of the Modular Tool might encourage buy-in and increase the value of the functional approaches from the local rehabilitation facilities.
- **Support adaptation of the current version of the tool based on the specific needs of the program.** The Okard USAID CBID program is very comprehensive with interventions covering several areas, including general health, rehabilitation, mental health, caregiver support, and income generation activities. Other projects that do not include a similar range of activities should be able to adapt the tool from the comprehensive content that is already available.
- **Consider data sharing requirements when developing the tool's content and its automated data analysis systems.** Data sharing between different service providers and stakeholders can support the provision of services at referral facilities and inform decision-making around future policies and program design. Ethical protocols should be followed.
- **Build a shared vision between the CBID team and rehabilitation stakeholders.** Engaging rehabilitation stakeholders in the development and implementation of the tool and its training will promote a clear understanding of its function and applicability. Supporting collaboration between these stakeholder groups will promote mutual respect for each other's roles and responsibilities.

As rehabilitation system strengthening is gaining momentum in Laos, there will be further opportunities in the next phase of the CBID program to begin addressing the mismatch between the functional needs assessments undertaken by the CBID program and the diagnostics and interventions offered at rehabilitation centers. There are some opportunities through the Laos government initiatives around the Disability Information Management System, which is currently being tested and implemented to align with the data that was collected by the Modular Tool and the automated analysis that was implemented for the case management process. The Modular Tool may be tailored to link other providers to improve their understanding of the functional approaches to rehabilitation, facilitating communication and collaboration among providers, and ultimately leading to improved outcomes.

The World Health Organization is currently developing and testing Basic Rehabilitation Packages aimed at introducing simple, safe, and appropriate rehabilitation interventions, identification, and referral skills among primary health workers. The tools include criterion-based steps that are compatible with the algorithms used in the CBID Modular tool evaluated here. Findings suggest similar approaches could be feasible and useful in the primary health context.

The key limitations of this evaluation are that we did not review data from all modules of the tool and only reported outputs that can be generated from Modules 1 and 2. We did not explore how other Modules are performing for the case management process and the discrepancies with the action plans. Also, we did not compare the baseline data with the data collected at the time of discharge to evaluate the potential of the tool in measuring the effectiveness of the CBID program.

In summary, the CBID Modular Tool is an innovative technology that has the potential to advance evidence-based and family-centered care practices in the CBID and rehabilitation sectors. Using such technological innovations could drastically improve who is involved in data collection by bridging the gap between researchers who are external to development programs and the staff who run those programs. More reliable and comparable data will also give more agency to persons with disabilities in advocating for their rights and inform appropriate programming. However, the adoption of such technologies is influenced by environmental factors, such as the buy-in from all stakeholders involved, availability of resources, and the local socio-political and cultural context. Lessons learned from this evaluation are valuable for the future adoption and implementation of case management technologies within health and rehabilitation in other low-resource settings.

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