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Empowering Primary Care with the World Health Organization's Basic Package of Interventions for Rehabilitation: Developing a List of Interventions and a Clinical Resource

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Title Page

Empowering Primary Care with the World Health Organization's Basic Package of Interventions for Rehabilitation: Developing a List of Interventions and a Clinical Resource

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Abstract

Background

Primary health care (PHC) is crucial for achieving universal health coverage (UHC) and meeting health-related sustainable development goals, particularly in low resource settings. Rehabilitation, defined by the World Health Organization (WHO) as interventions designed to optimize functioning in individuals with health conditions in interaction with their environment, is a critical component of UHC that targets functioning needs. Despite its importance, access to rehabilitation services remains limited, particularly in primary care (PC) and low resource settings. To address this gap, the WHO developed the Basic Package of Interventions for Rehabilitation (Basic PIR), a toolkit designed to empower PC non-rehabilitation workers to deliver a prioritized set of easy, safe and effective interventions for rehabilitation through task-sharing. The objective of this article is to describe the participatory development process of the WHO's Basic PIR, with a focus on the list of interventions and the clinical resource.

Methods

The development of the Basic PIR followed a three-phase methodology. Phase 1 identified the interventions for rehabilitation in PC settings. Phase 2 defined the core structure and content of the Basic PIR clinical resource. Phase 3 included preliminary field tests in selected countries, followed by reviews to evaluate and refine the prototype Basic PIR clinical resource. This participatory process, overseen by the WHO Rehabilitation Programme ensured the Basic PIR was tailored for use in PC and low-resource settings.

Results

In Phase 1, thirteen functioning domains related to health conditions were identified, leading to the preselection of 188 out of 297 interventions for rehabilitation from the WHO's Package of Interventions for Rehabilitation (PIR), with 71 interventions ultimately included in the Basic PIR. Phase 2 involved creating the prototype, detailing the functioning domains with targets and corresponding interventions. In Phase 3, feedback from preliminary field tests in Ghana and Fiji, along with reviews, led to modifications, including revising rehabilitation steps and developing patient handouts.

Conclusion

By prioritizing patient-centered care and emphasizing functioning, the Basic PIR aims to improve access to rehabilitation services in PC and low resource settings, contributing to the achievement of UHC. Future pilot studies will evaluate its feasibility and acceptability, guiding its broader implementation.

Keywords: Primary care, rehabilitation, functioning, task-sharing

Background

Primary health care (PHC) is a whole-of-society approach to effectively organize and strengthen national health systems to bring services for health and wellbeing closer to communities [1]. PHC is essential for achieving universal health coverage (UHC) and meeting health-related sustainable development goals (SDGs), especially in resource-limited areas [2, 3]. It can provide 90% of the necessary interventions for UHC to deliver comprehensive health services directly to communities [4]. Five essential health services—health promotion, prevention, treatment, rehabilitation, and palliative care—have been recognized by the Alma-Ata and Astana declarations as key components of PHC, the cornerstone of national health systems [5, 6]. Primary care (PC), a key component of PHC, is a model of care that supports first-contact, accessible, continuous, comprehensive, and coordinated person-focused care [7]. Access to rehabilitation is therefore vital in the health care continuum and is equally important in PC settings as it is in secondary or tertiary care [8, 9].

The World Health Organization (WHO) defines rehabilitation as “a set of interventions designed to optimize functioning in individuals with health conditions in interaction with their environment” [10]. Therefore, rehabilitation plays a vital role in optimizing patient functioning in daily life, enhancing well-being [11] and contributing to improving the effectiveness of other health services, such as palliative care [12, 13]. As stressed in a recently passed World Health Assembly (WHA) resolution requesting that rehabilitation be strengthened in health systems, rehabilitation is relevant for individuals of all age groups, with various acute or chronic illnesses, and at all stages and levels of care [14].

The need for rehabilitation is increasing globally. Current estimates suggest that approximately 2.6 billion individuals could benefit from rehabilitation for diverse health

conditions at some point of their lives [15]. The increase is driven by aging populations, an increase in injuries, and the high prevalence of noncommunicable diseases (NCDs), such as heart disease, diabetes, cancer and musculoskeletal conditions[16, 17] [18, 19] Despite the global need, rehabilitation services are often inadequately integrated into PC settings, particularly in low- to middle-income countries (LMICs), making access to rehabilitation services a significant challenge [18, 20–22],[23]. Low access rates can have a detrimental effect on health outcomes for individuals with rehabilitation needs [20, 24]. Key barriers to access rehabilitation services include a lack of clear evidence-based guidance on interventions and service models specifically tailored for PC settings [25]. Other barriers include poor governance and leadership, insufficient funding and resources, ineffective referral networks, urban-centric service concentration, and a shortage of skilled personnel [18, 26, 27]. This shortage is particularly acute in PC and low-resource settings, with fewer than 10 skilled rehabilitation practitioners per million people[28, 29]. To expand the coverage and accessibility of rehabilitation services in these situations, innovative approaches are necessary.

Several models can support the integration of rehabilitation services into PC settings, including clinic-based, outreach, tele-rehabilitation, self-management support, shared care, community-based and case management [25, 30–32]. These models underscore the importance of a collaborative multidisciplinary team approach, interprofessional trust, leadership, communication, and clearly defined roles for successful integration [30, 32]. Common rehabilitation interventions in PC settings, such as functioning assessments, therapeutic exercises, psychological interventions, and self-management education, as well as their coordination, are essential components of all models [33[31].

A key strategy for integrating rehabilitation in PC settings, especially where there are few or no trained rehabilitation professionals, is task sharing [33] [34]. Task sharing expands the delivery of health services to lay and mid-level healthcare professionals rather than taking tasks away from higher-level providers, which helps address provider shortages in many settings [35][35]. There is, however, the need to outline the role of PC non-rehabilitation workers (defined as those not trained in rehabilitation), such as doctors and nurses, in the provision of rehabilitation through task sharing with the establishment of good referral systems [34][36]. Indeed, recent work has stressed the key role of nurses in delivering rehabilitation interventions via PC settings [37]. Sharing rehabilitation tasks with nonprofessional community workers or informal caregivers could be another strategy in low-resource settings. However, evidence on the effectiveness of this approach is inconclusive [38][38].

To improve access to rehabilitation in PC with low to no availability of rehabilitation specialists such as physical and rehabilitation physicians, physical therapists, occupational therapists, rehabilitation nurses and speech and language therapists, the WHO has developed the Basic Package of Interventions for Rehabilitation (Basic PIR), a toolkit for primary care non-rehabilitation workers. The Basic PIR comprises three components - a list of interventions, a clinical resource, and an implementation guide - and is designed to empower PC non-rehabilitation workers to provide essential, basic rehabilitation services. It enables the delivery of a carefully selected set of prioritized, safe, and easy-to-learn evidence-based interventions, with guidance on integrating them into PC settings [39]. In the Basic PIR, clinical decision-making is facilitated through a user-friendly decision-tree structure, similar to existing WHO resources such as the WHO Integrated Care for Older People (ICOPE) [40] and the WHO Mental Health Gap Action Programme for mental, neurological and substance use disorders

144 in nonspecialist health settings (MH-GAP) [41]. Trust in and uptake of any new tool is
145 conditional on a sound and participatory development process. The objective of this
146 article is therefore to describe in detail the participatory development process of the
147 WHO's Basic PIR, with a focus on the list of interventions and the clinical resource.

148

149 **Methods**

150 The development of the Basic PIR list of interventions and clinical resource employed
151 a three-phase methodology (Fig. 1). The initial phase focused on identifying
152 interventions for rehabilitation in PC settings and laid the groundwork for Phase 2,
153 where the core structure and content of the Basic PIR clinical resource were defined.
154 Phase 3 involved conducting preliminary field tests in selected countries to test the
155 content of the prototype Basic PIR clinical resource and to inform corresponding
156 revisions. This process ensured that the Basic PIR was well suited for use in PC
157 settings, particularly in low-resource environments. Throughout the process, a highly
158 participatory approach was adopted and overseen by a core group of five WHO
159 Rehabilitation Programme (WHO RP) staff members.

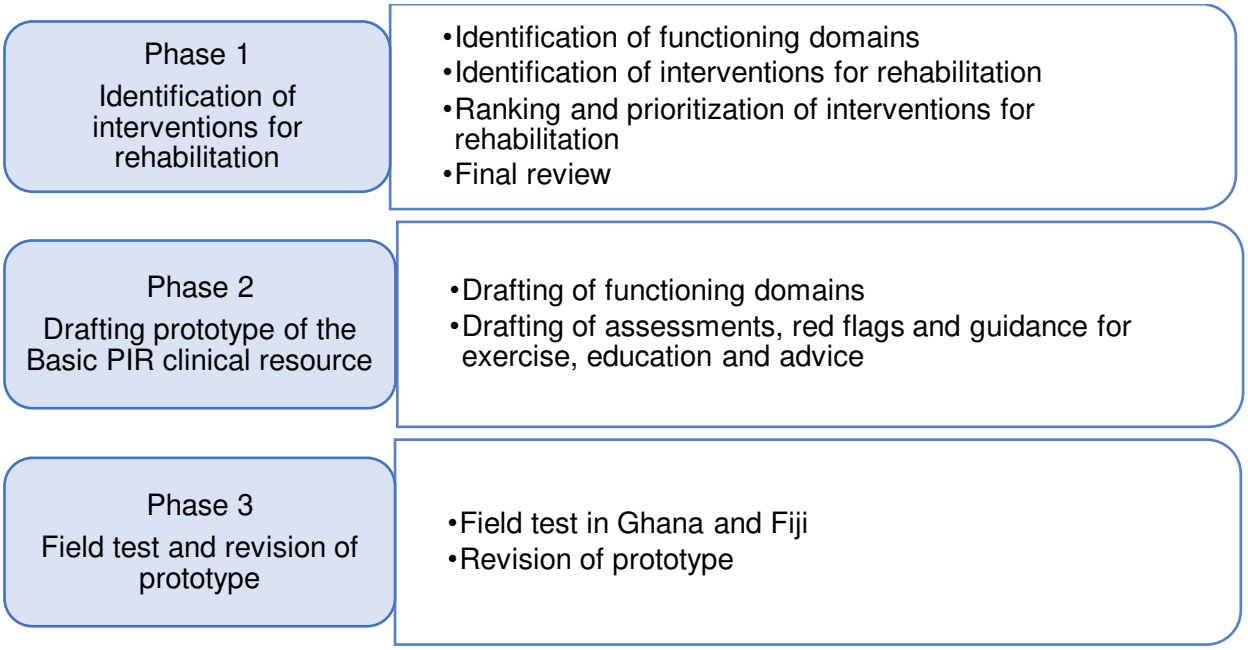


Fig 1. Three-phase methodology used in the development of the Basic Package of Interventions for Rehabilitation (list of interventions and clinical resource)

Phase 1: Identification of interventions for rehabilitation

Identification of functioning domains

The selection of the Basic PIR's list of interventions began with identifying functioning domains associated with health conditions most commonly managed in PC and low resource settings. The 20 health conditions included in the WHO's Package of Interventions for Rehabilitation (PIR) (Box 1) [42][42] served as the starting point.

Box 1. A summary of the WHO's Package of Interventions for Rehabilitation (WHO PIR)

WHO's Package of interventions for rehabilitation (PIR)

- **Main purpose:** Promote access to evidence-based rehabilitation interventions at all service delivery platforms
- **Key Components:** Essential interventions for 20 health conditions under seven disease areas
- **Necessary Resources: Assistive products, equipment, consumables, and workforce**
- **Uses:** Planning and budgeting of rehabilitation services, developing curricula and training materials, and identifying research gaps for defining research agendas
- **Target Audience:** Ministries of health and other target users, such as service planners, service providers, academics and researchers

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The WHO RP reviewed each disease area addressed in the PIR, aiming to select health conditions on the basis of the following criteria:

- high prevalence in PC settings.
- coverage of different disease areas (e.g., musculoskeletal, cardiovascular, and neurological conditions).
- Higher global burden of disease (GBD) disability weights, i.e., more years lived with disability (YLD), should be preferred.

- A higher global prevalence should be preferred if the disability weights are similar.
- link with a high number of affected aspects of functioning should be preferred.

Once the health conditions were selected, 13 corresponding functioning domains from the PIR were identified by the WHO RP considering broad areas of functioning impacted by these conditions. This approach allows for the application of the Basic PIR to further health conditions beyond the initial selection, as long as there is a significant impact on an individual's functioning.

The WHO International Classification of Functioning, Disability, and Health (ICF) [43] served as a reference framework for categorizing the selected functioning domains into eight overarching areas: (1) mental functions; (2) hearing, speech and communication; (3) vision; (4) swallowing; (5) respiratory and cardiovascular; (6) motor functions and mobility; (7) pain; and (8) self-care and participation.

Identification of interventions for rehabilitation

A list of interventions related to the selected functioning domains was extracted from the PIR and reviewed by the WHO RP via an online survey to identify interventions suitable for matching the selected functioning domains, using the following predetermined criteria. A suitable intervention:

- can be delivered safely and effectively by PC non-rehabilitation workers based on a protocol and after short online training.
- is easy to identify by PC non-rehabilitation workers.
- has a duration that is feasible for the non-rehabilitation workers to deliver in PC settings alongside their usual clinical role.
- can be delivered using low-cost or locally available equipment or consumables.

Interventions (n=59) for which at least 50% of the WHO RP participants indicated 'yes' were included in a list of preselected interventions. In the next step, a technical working group (TWG) was formed to identify effective rehabilitation interventions for PC settings from this list: an online survey assessing TWG candidates' professional background, relevant rehabilitation and PC skills and country experience was used to narrow down the initial pool of candidates, selecting those with specific knowledge and experience in at least one of the eight functioning domains. The final TWG consisted of 17 rehabilitation specialists and 9 non-rehabilitation healthcare professionals with PC experience across the six WHO regions. The TWG participated in a two-stage modified Delphi process led by the WHO RP. The list of preselected interventions, along with descriptions of their components for delivery in a PC setting, was presented to the TWG, and their selection process followed the same criteria used by the WHO RP. During the selection, TWG members raised the issue that certain interventions that were absent from the list were suitable for task sharing and recommended incorporating these interventions into the Basic PIR.

Ranking and prioritization of interventions for rehabilitation

The WHO RP compiled the interventions selected by the TWG and presented the list of interventions to them again for ranking and prioritization. The TWG members were first asked to indicate for each intervention to what degree it met the following criteria, allocating a score between 0 (lowest ranking) and 5 (highest ranking) for each of them:

1. **The benefit achieved through the provision of the intervention in PC settings.** The larger the benefit for the person is, the higher the ranking should be. Benefit was defined as either the effect of the intervention on everyday

functioning or the reduction in the risk of developing complications and requiring further health interventions.

2. **The need for intervention in the PC population.** The higher the need is, the higher the ranking should be. Need is defined by the number of people with health conditions who use PC frequently and could benefit from the intervention.
3. **The resource requirements for providing interventions in PCs.** The lower the requirements are, the higher the ranking. Resource requirements include both the time of the PC non-rehabilitation worker required to deliver the intervention effectively (considering common dosage) and the equipment and materials needed to deliver the intervention.
4. **The ease with which PC non-rehabilitation workers can deliver the intervention safely and effectively.** The easier the intervention is to deliver, the higher the ranking should be. The ease of providing an intervention correlates with its features, that is, how simple it is, either being of low complexity or containing few components. It also refers to how little individual adaptation and tailoring an intervention requires and to low levels of contraindications.

Second, TWG members were asked to prioritize interventions by selecting the 10 interventions that would have the greatest impact on the health and functioning of their populations.

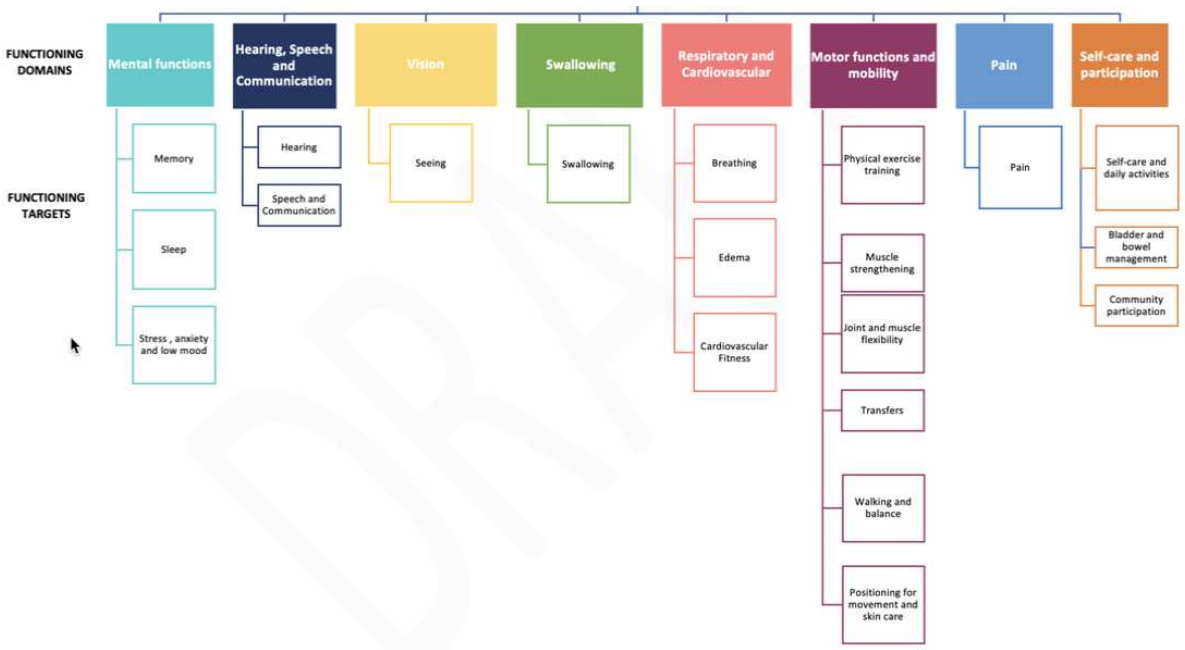
Final review

Following the ranking and prioritization process, the WHO RP used two criteria for the final selection of interventions: (1) each rehabilitation domain in the Basic PIR should

be represented by at least one intervention, and (2) interventions prioritized by five or more TWG members should be included. Following these criteria, the WHO RP reviewed the list of interventions, with the following modifications: the use of compression garments for edema and of a urinary catheter for bladder management were considered important for PC and included; group conversation therapy and soft tissue techniques, including massage, were considered not feasible because of the time required to provide them and were therefore excluded; and modified sports were combined with recreation and leisure activities. These modifications were presented to the TWG members for discussion and approval before being eventually implemented in the finalized list.

Phase 2: Drafting the prototype of the Basic PIR clinical resource

The structure (Fig. 2) of the Basic PIR clinical resource is composed of functioning domains and functioning targets. Broad functioning domains are broken down into specific functioning targets, each with corresponding interventions. The structure of the clinical resource uses two existing WHO resources promoting task sharing in PC settings as templates: the WHO MH-GAP [42] and the WHO ICOPE [41].



271

272 *Fig. 2 Overview of the eight functioning domains and the corresponding functioning*
273 *targets for the Basic Package of Interventions for Rehabilitation.*

274

275 For each functioning target, three components were developed via the Clinical
276 Practice Guidelines and Cochrane Systematic Reviews already utilized in the PIR's
277 development[44]: (1) clinical assessments to evaluate the patient's problems and
278 needs; (2) red flags, i.e., criteria for severe symptoms that require specialist
279 management and referral; and (3) exercise, education, and advice or guidance for the
280 patient. These components were developed as follows and allowed for the
281 implementation of targeted interventions tailored to the specific needs of individuals
282 within each functioning target.

283 *Component 1: Identification of assessment recommendations*

284 The WHO RP initially identified, mapped and reviewed relevant assessment
285 recommendations from the PIR that aligned with the Basic PIR functioning domains

and targets and used this information to inform the selection of assessments, ensuring that there was alignment with similar assessments in ICOPE and mhGAP.

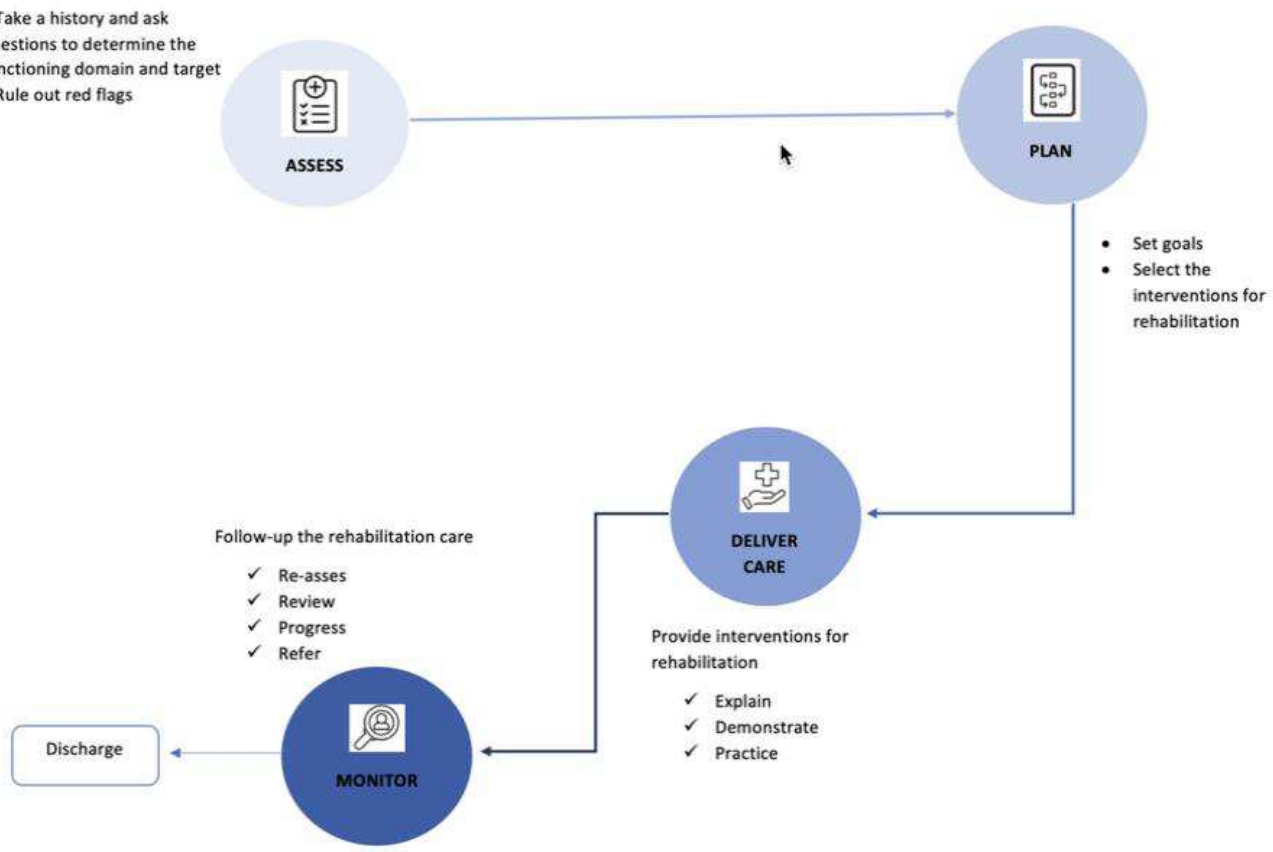
Component 2: Definition of red flags

To ensure safety in PC settings, criteria for situations where interventions should be contraindicated were identified by the lead author, forming the basis for the "red flags", which were reassessed and confirmed by the WHO RP to guarantee that they were comprehensive enough to safeguard patient well-being.

Component 3: Exercise, education and advice guidance

The interventions for each functioning target were grouped into two components: either exercise or education and advice for patients and their caregivers.

The above components were compiled into a user-friendly clinical resource for PC non-rehabilitation workers with guidance on the provision of interventions through a 4-step process (Figure 4).



299

300 *Fig. 3 Four-step process for providing interventions for rehabilitation*

301

302

303 **Phase 3: Field test and review of the prototype**

304 Two field tests were conducted to evaluate the prototype of the Basic PIR clinical
305 resource.

306 *First field tests and revision*

307 The first field tests focused on two out of the eight functioning domains: motor functions
308 and mobility; and self-care and participation. These studies were carried out in Ghana
309 and Fiji in 2021 and 2022, respectively. The field tests comprised (1) in-country
310 preparation, (2) in-country field test implementation, and (3) evaluation. The in-country
311 preparation (1) involved stakeholder meetings to plan the field tests, whereas the

implementation (2) entailed training PC non-rehabilitation workers through face-to-face lectures, practical sessions, and role-playing over a period of 5 days. The evaluation involved gathering feedback from the participants. After the 5-day training, a group discussion was held with the participants, during which their confidence in providing rehabilitation interventions on the basis of their training and the support needed in PC settings to enable them to provide rehabilitation was assessed. The participants' feedback regarding the Basic PIR clinical resource structure and content was obtained by asking three questions (see supplementary file 1).

Notes were taken during the discussion after the participants provided oral informed consent and the data were reviewed and analyzed immediately afterward. Key themes and patterns were identified, categorized and used to revise the Basic PIR clinical resource.

The revised clinical resource was then shared with the WHO RP to obtain feedback about its structure and content in a two-step process. First, the WHO RP members provided feedback through an online survey. After an initial consolidation of the feedback, a web conference was used to discuss comments and suggestions, leading to further revisions of the Basic PIR clinical resource. The clinical resource for the remaining functioning domains of the Basic PIR were then developed on the basis of this review and the field-testing experiences.

The rehabilitation professionals in the TWG were then assigned to groups on the basis of their functioning domain expertise, and the three components of their functioning targets were reviewed via an online survey. The TWG members received guidance to consider clarity, errors, and omissions. This review process spanned two weeks, and insights were consolidated and analyzed for overall trends and trends specific to each domain. Finally, a web conference was held with the TWG to discuss and agree on

337 the submitted comments and suggestions. Feedback was integrated into a final
338 revision of the Basic PIR clinical resource for pilot testing.

339

340 **Results**

341 **Phase 1: Identification of priority interventions for rehabilitation**

342 The health conditions selected for the Basic PIR are shown in Table 2 (boldened rows).

343

344 **Table 2:** Health conditions selected for the Basic Package of Interventions for
345 Rehabilitation (Basic PIR) on the basis of global prevalence, disability weights and
346 years lived with disability (YLD) data. The selected health conditions are boldened.

347

348 A total of 13 functioning domains linked to these health conditions were defined (Table
349 3).

350

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356 **Table 3:** Comparison of the selected health conditions against the 13 functioning
357 domains selected from the Package of Interventions for Rehabilitation (PIR) for the
358 Basic PIR.

Functioning Domain	Stroke	CP	LBP	OA	Fractures	COPD	IHD	Depression	Vision	Hearing
Mental and Cognitive functions	✓	✓				✓	✓	✓		
Vision	✓	✓							✓	
Speech, Language and Communication	✓	✓								
Hearing and Vestibular functions		✓								✓
Dysphagia management	✓	✓								
Nutrition	✓	✓				✓				
Pain management	✓	✓	✓	✓	✓					
Bowel and bladder management	✓	✓								
Respiration functions		✓			✓	✓	✓			
Cardiovascular and immunological functions	✓	✓			✓		✓			
Motor functions and Mobility	✓	✓	✓	✓	✓	✓	✓			
Activities of Daily Living	✓	✓		✓	✓					
Community and social life	✓	✓		✓		✓	✓			

359 *CP=cerebral palsy; LBP=low back pain; OA=osteoarthritis; COPD=chronic obstructive*

360 *pulmonary disease; IHD=ischemic heart disease.*

A total of 188 out of 297 rehabilitation interventions from the PIR were preselected by the WHO RP, and 71 interventions were included in the Basic PIR. The selection process is summarized in Fig. 4.

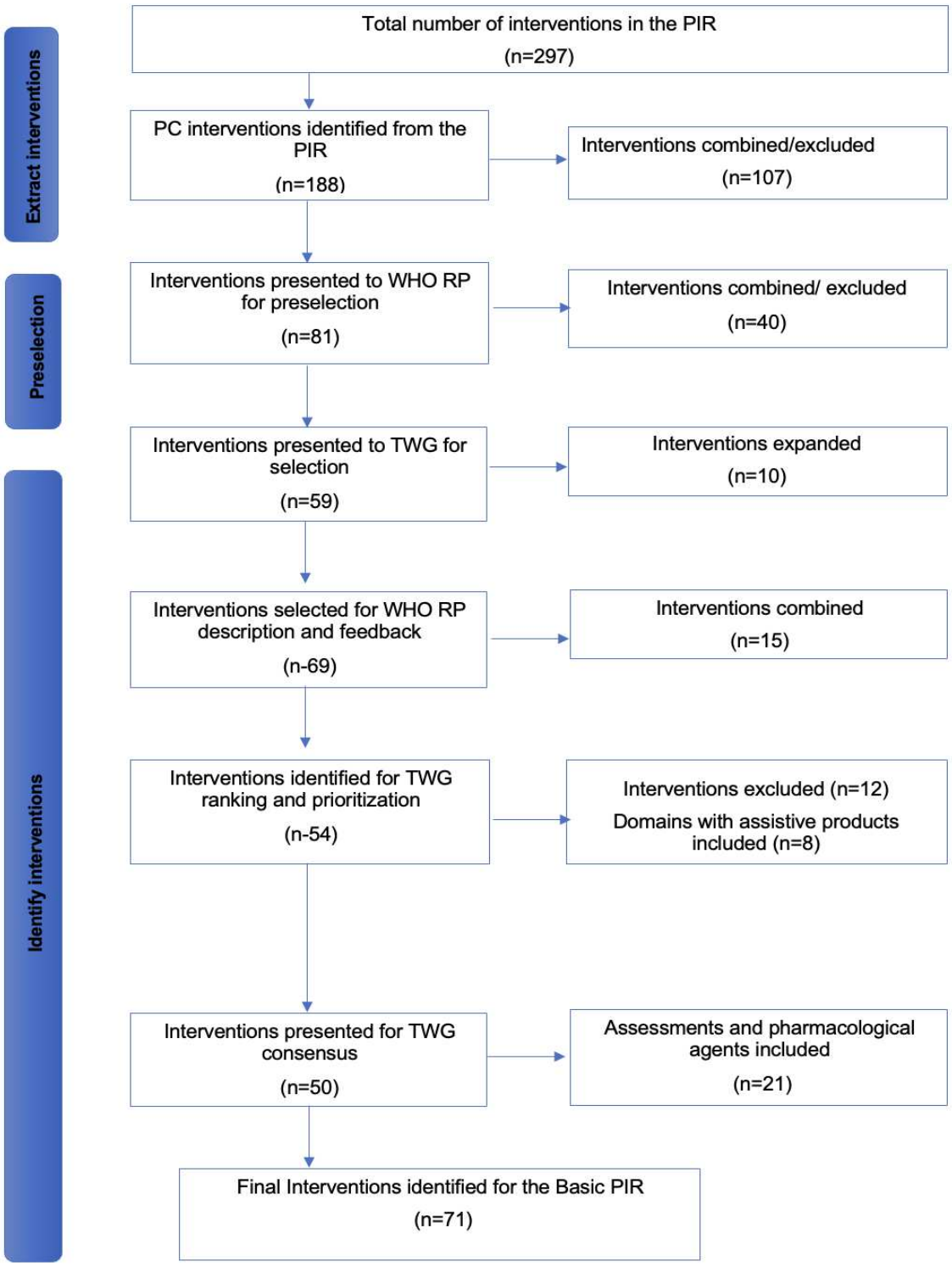


Fig. 4 Flow chart of the selection of interventions for the Basic PIR

Phase 2: Drafting the prototype

The PIR functioning domains, the Basic PIR functioning domains, the functioning targets and the corresponding interventions are described in Table 4.

Table 4: Package of Interventions for Rehabilitation (PIR) functioning domains, the Basic PIR functioning domains, functioning targets and their corresponding interventions**.**

Phase 3: Field test and review of the prototype

The field test involved 19 health workers in Ghana and 17 in Fiji from various PHC settings nationwide. Table 5 summarizes all the feedback received and the corresponding modifications.

Table 5: Group feedback and modifications of the Basic PIR.

Discussion

This article aimed to describe the participatory development process of the list of interventions and clinical resource of the Basic PIR, a tool for integrating rehabilitation in PC settings through task sharing. The Basic PIR was developed on the basis of the WHO's PIR [44], a comprehensive list of interventions designed to support countries in integrating rehabilitation into their health systems. Field tests of the prototype conducted in Ghana and Fiji provided valuable insights into the content of the Basic PIR clinical resource and informed its revision, including the simplification of the

assessment process and the development of user-friendly tools, such as patient handouts. These modifications are expected to enhance the usability of the Basic PIR and its effectiveness in improving patient outcomes. The Basic PIR aims to empower existing PC non-rehabilitation workers, such as doctors and nurses, to deliver basic rehabilitation interventions via a carefully selected set of prioritized and evidence-based interventions chosen for their safety, effectiveness, and ease of learning. The acceptability, appropriateness and feasibility of the Basic PIR will be evaluated in a series of pilot studies across multiple countries.

The Basic PIR is a key tool for realizing WHA resolution to strengthen rehabilitation in health systems [45] and to improve the availability and accessibility of rehabilitation services, especially through PC.

The Basic PIR has been designed to complement existing PC tools and whole-sector rehabilitation strengthening approaches. One of the key features of the Basic PIR is the identification and prioritization of rehabilitation interventions that can be safely and effectively delivered by a non-rehabilitation workforce in PC settings through task sharing. A similar approach has been used in the development of two WHO-established resources: ICOPE [40] and mhGAP [41]. The WHO's mhGAP, for example, employs a task-sharing approach to address the substantial gap between the need for and availability of mental, neurological, and substance use services. A systematic review, however, identified several challenges in implementing mhGAP, including a shortage of specialist staff for supervision, negative cultural attitudes toward mental health, and competing demands on primary care workers' time [46]. Similarly, the ICOPE initiative provides guidance for delivering person-centered care to older adults in primary care settings. While ICOPE has demonstrated significant benefits, it has encountered challenges such as mhGAP, including workforce capacity issues [46][47].

Additionally, PC providers have reported difficulties conducting the necessary assessments and interventions after initial screening [46][47]. These experiences already informed the development and will inform the planned pilot testing of the Basic PIR.

The Basic PIR underwent a rigorous development process involving multiple stages. The participatory approach applied via a modified Delphi process with input from a diverse group of rehabilitation and non-rehabilitation healthcare experts ensured that the selected interventions were not only evidence-based but also feasible for implementation in PC and resource-limited settings. The emphasis on cost-effective, high-impact interventions that are easy to learn and integrate into existing workflows is particularly noteworthy, as they comply with global recommendations and guidelines for task sharing [48]. This approach addresses workforce capacity challenges encountered by previous WHO initiatives such as the WHO's mhGAP and ICOPE described above, ultimately aiming to increase the accessibility and quality of rehabilitation services in PC settings.

Person-centered care is crucial in primary care. Rehabilitation is inherently person-centered, focusing on individuals' abilities and limitations. The Basic PIR further emphasizes this approach by prioritizing functioning, defined as the human experience related to body functions, structures, activities, and participation [49]. It is viewed in terms of its dynamic interaction between a health condition and personal and environmental factors [49]. Indeed, a recent stakeholder survey revealed that while inpatient and outpatient rehabilitation models were most frequently reported as disease-centered, rehabilitation provided at home, in the community, and in eldercare was more functioning-centered [50]. PC workers in most low resource rural or remote settings also support a functioning-based approach, recognizing that in these settings,

individuals with functioning needs may not have a formal diagnosis owing to limited access to trained health professionals[51, 52]. A sound and brief functioning assessment, which is relatively straightforward and can be conducted by PC non-rehabilitation workers, can therefore guide the provision of interventions for rehabilitation[51]. This approach aligns with current healthcare trends that prioritize the capacity of a person to perform daily activities as a central aspect of health and well-being [53]. In this sense, the Basic PIR concentrates on enhancing functioning within the PC context. Healthcare workers accustomed to a condition-focused approach to rehabilitation, especially those working in low resource settings without access to formal diagnosis, may however need to adopt a new mindset when using the function-focused Basic PIR.

The Basic PIR also encourages rehabilitation specialists to prioritize patient-centered care. Integrating primary care interventions into professional development can be beneficial for rehabilitation specialists at all levels of healthcare [54]. By emphasizing functioning and the impact of functioning difficulties on daily life, the Basic PIR enhances the focus on the patient's perspective, functional outcomes, and collaboration with patients and caregivers. This approach shifts the focus away from the traditional, facility-based medical model of rehabilitation, which often prioritizes healthcare professionals' perspectives over those of individuals with functioning needs, their caregivers, and communities. Additionally, the Basic PIR can aid rehabilitation specialists in understanding the interventions used in task sharing within PC based rehabilitation, enabling them to provide better support through supervision and mentorship, and facilitating integration into broader health systems. However, a potential risk of the Basic PIR is that individuals with conditions requiring specialized care may remain in PC. To mitigate this risk, the Basic PIR clinical resource includes

clear referral pathways and a "red flags" section to guide PC non-rehabilitation workers in identifying when and how to refer patients to specialists. Additionally, involving rehabilitation specialists as mentors can facilitate collaboration between PC providers and specialists for consultations and joint management of complex cases.

Finally, the Basic PIR is a highly relevant tool for policymakers. At the macro-level, evidence suggests that the inclusion of rehabilitation interventions in essential health benefits packages and standard treatment guidelines can enhance service delivery and increase referrals [55, 56]. Governments and policymakers can therefore leverage the Basic PIR's carefully selected interventions to develop comprehensive essential rehabilitation health benefits packages. By integrating evidence-based practices into policy decisions, these stakeholders may create environments that are responsive to individuals with functioning needs. Furthermore, the Basic PIR's focus on functioning provides a framework for establishing robust data collection systems to monitor and evaluate rehabilitation service delivery and outcomes, which can facilitate data-driven policy refinement [51] [57]. This underscores the potential of the Basic PIR to trigger significant advancements in addressing the global need for rehabilitation services, particularly in LMICs.

The development of the Basic PIR has several limitations. The initial selection of health conditions may have limited the study's scope, potentially overlooking some relevant functioning domains. However, its focus on functioning allows for applications to a broader range of health conditions beyond the initially selected conditions. The two field tests concentrated on only two of the eight functioning domains, which may not fully reflect the tool's complexities or provide insights into the other domains. Additionally, the tests involved a small number of health workers who may not represent all primary care settings, and feedback was collected through note-taking.

Nevertheless, this step was strengthened by reviews by the WHO RP and TWG and was essential to ensure that a mature tool went into time- and financial resource-intensive pilot studies. The major strength of the Basic PIR relies on its participatory and iterative development process using the PIR, an established tool, as the starting point.

Conclusion

The development of the Basic PIR is a promising step toward improving access to rehabilitation services in PC and low-resource settings. By leveraging task-sharing and focusing on high-impact, cost-effective interventions, the Basic PIR has the potential to bridge the gap in rehabilitation services and contribute to the achievement of UHC. Future pilot studies will use implementation research to evaluate the feasibility, acceptability and appropriateness of the Basic PIR, informing measures to further enhance its large-scale implementation in PC and low-resource settings.

List of abbreviations

Basic PIR – Basic Package of Interventions for Rehabilitation

COPD - Chronic obstructive pulmonary disease

CP - Cerebral palsy

GBD - Global Burden of Disease

ICF - International Classification of Functioning, Disability, and Health

ICOPE - Integrated Care for Older People

IHD - Ischemic heart disease

LBP - low back pain

mhGAP – Mental Health Gap Action Programme for mental, neurological and substance use disorders in non-specialist health settings

NCDs – Noncommunicable diseases

OA – Osteoarthritis

PC – Primary Care

PHC – Primary Health Care

PIR – Package of Interventions for Rehabilitation

SDGs – Sustainable Development Goals

TWG – Technical Working Group

UHC – Universal Health Coverage

WHA – World Health Assembly

WHO – World Health Organization

WHO RP – WHO Rehabilitation Programme

YLD - Years Lived with Disability

Declarations

Ethics approval and consent to participate

This preliminary field test involved gathering initial insights to guide the development of the Basic Package of Interventions for Rehabilitation. As it did not involve any procedures or data collection that posed significant ethical risks, it did not necessitate formal ethical review. For the formal pilot tests, which will be published separately, an ethical approval from the World Health Organization has been obtained. This has now been clearly stated in the manuscript.

Consent for publication

Oral informed consent was obtained from all the participants in the study prior to the group discussion. This has now been clearly stated in the manuscript.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

AT, AC, PK, EM and CS designed the study. AT, PK and EM led the data collection, analysis and interpretation of data. AT drafted the manuscript. CS and DT guided the writing and revision of the manuscript and initially reviewed the manuscript. AD, AR, AC, PK, DT and CS reviewed the manuscript. All authors approved this manuscript.

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Clinical trial number

Not applicable

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Table 2: Health conditions selected for the Basic Package of Interventions for Rehabilitation (Basic PIR) on the basis of global prevalence, disability weights and years lived with disability (YLD) data. The selected health conditions are boldened.

Disease area	Health conditions included in the PIR[1]	Global prevalence (in thousands)	Disability weights[2]	YLD (in thousands)	Health conditions included in the Basic PIR (Y/N)
Mental health disorders	**(Major) Depressive disorders**	**163044**	**0.145-0.658**	**32846**	**Y**
	Schizophrenia	19776	0.588-0.778	12657	N
	Idiopathic developmental intellectual disability	100572	0.043-0.2	4046	N
	Autistic spectrum	31179	n.a.	4731	N
Musculoskeletal conditions	**Low back pain (LBP)**	**576980**	**0.02-0.372**	**64946**	**Y**
	Osteoarthritis (OA)	**303096**	**0.023-0.165**	**9604**	**Y**
	Sarcopenia[3]	*n.a.*	*n.a.*	*n.a.*	N

[1] PIR: Package of Interventions for Rehabilitation

[2] Disability weights sourced from IHME 2017 data resources: GBD 2017 Disability weights. Accessed here: http://ghdx.healthdata.org/gbd-2017

[3] No data was available for this health condition in GBD 2016 or 2017. This health condition were selected by rehabilitation experts during the PIR development process, as they were deemed highly relevant for rehabilitation in low- and middle-income countries.

[4] YLD: Years Lived with Disability

	Rheumatoid arthritis	19965	0.117-0.581	2626	N
	Fracture	**360136**	**n.a.**	**19793**	**Y**
	Amputation	371422	n.a.	640	N
Neurological conditions	**Cerebrovascular disease (Stroke)**	**104178**	**0.019-0.588**	**18695**	**Y**
	Traumatic brain injury	n.a.	n.a.	n.a.	N
	Spinal cord injury (GBD 'Spinal injuries')	22489	0.296 (Paraplegic)	6633	N
	Alzheimer's disease and other dementias	44988	0.069-0.449	6570	N
	Parkinson's disease	8525	0.01-0.575	1219	N
Cardiovascular conditions	**Ischemic heart disease (IHD)**	**126451**	**0.033-0.179**	**5291.0**	**Y**
Respiratory conditions	**Chronic obstructive pulmonary disease (COPD)**	**299398**	**0.019-0.408**	**30611**	**Y**
Child health	**Neonatal encephalopathy due to birth**	**53823**	**n.a.**	**9703**	**Y**

	asphyxia and trauma including Cerebral Palsy (CP)				
Sensory conditions	**Hearing impairment**	**1428450**	**0.01-0.215**	**39454**	**Y**
	Vision impairment	**1339970**	**0.003-0.187**	**34125**	**Y**
Neoplasm	Breast cancer (Cancer)	16697	Diagnosis & primary therapy phase: 0.288 Controlled phase: 0.049 metastatic phase: 0.451 Terminal phase: 0.54	1307	N

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716 **Table 4:** Package of Interventions for Rehabilitation (PIR) functioning domains, the
717 Basic PIR functioning domains, functioning targets and their corresponding
718 interventions**.**

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PIR Functioning domains	**Basic PIR Functioning domains**	**Basic PIR Functioning targets**	**Basic PIR Interventions**
1. Mental and Cognitive functions	1. Mental functions	1. Memory	1. Assessment of memory functions 2. Basic memory training 3. Provision and training in the use of assistive products for memory functions (simple memory supports, pill organizers)
		2. Sleep	4. Assessment of sleep functions 5. Education and advice on self-management of sleep disturbances
		3. Stress, anxiety and low mood	6. Assessment of stress, anxiety and low mood 7. Providing psychological support 8. Education and advice on self-management of anxiety and low mood

			9. Education and advice on self-management of stress
2. Vision	2. Seeing	4. Seeing functions	10. Assessment of seeing functions 11. Education and advice on modification of the home environment 12. Education and advice on self-management of vision impairment 13. Provision and training in the use of assistive products for vision (eg. spectacles, magnifiers and telescopes) 14. Provision and training in the use of assistive products for reading and writing (eg. braille books, communication boards) 15. Provision and training in the use of assistive products for mobility (eg. white canes)
3. Hearing and Vestibular functions	3. Hearing, Speech, and Communication	5. Hearing	16. Assessment of hearing functions 17. Education and advice on self-management of hearing impairment

4. Speech, language and Communication			18. Provision and training in the use of assistive products for hearing (alarm signallers, hearing aids, personal microphone systems)
		6. Speech and Communication	19. Assessment of speech functions, language and communication 20. Basic speech therapy 21. Basic language therapy 22. Basic communication skills training 23. Education and advice on self-management of speech, language and communication difficulties 24. Provision and training in the use of assistive products for communication (communication boards, books and software, simplified mobile phones)
5. Nutrition **6. Dysphagia management**	4. Swallowing	7. Swallowing	25. Assessment of swallowing 26. Basic swallowing therapy

			27. Education and advice on self-management of swallowing difficulties 28. Provision of Proton pump inhibitor, botulinum toxin A 29. Basic nutritional management training
7. Respiration functions **8. Cardiovascular and Immunological functions**	5. Respiratory and Cardiovascular	8. Breathing	30. Assessment of breathing functions 31. Training in basic breathing control techniques 32. Education and advice on self-management of breathlessness 33. Training in basic energy conservation techniques
		9. Edema	34. Assessment of edema 35. Training in basic retrograde massage techniques 36. Training in positioning for oedema control 37. Basic range of motion exercises for oedema control

			38. Provision and training in the use of assistive products for compression therapy
		10. Cardiovascular fitness	39. Assessment of heart and blood pressure functions 40. Education and advice on self-management of cardiovascular diseases
9. Motor functions and Mobility	6. Motor functions and Mobility	11. Physical exercise training	41. Assessment of exercise capacity 42. Basic physical exercise training
		12.Muscle strengthening	43. Assessment of muscle functions 44. Basic muscle strengthening training
		13. Joint and muscle flexibility	45. Assessment of muscle and joint flexibility 46. Basic range of motion exercises

		14. Gait (Walking) and Balance	47. Assessment of walking and balance 48. Basic gait (walking) and balance training 49. Provision and training in the use of assistive products for mobility-walking and balance (eg. crutches, walkers)
		15.Positioning for movement and skin care	50. Assessment of positioning 51.Training in positioning for the prevention of contracture 52. Training in positioning for pressure relief 53. Provision and training in the use of assistive products for pressure relief (eg. pressure relief cushions)
		16. Mobility (Transfers)	54. Assessment of mobility (transfers) 55. Basic mobility (transfers) training

			56. Provision and training in the use of assistive products for mobility-transfers (eg. transfer boards)
10. Pain management	7. Pain	17.Pain	57. Assessment of pain 58. Basic thermotherapy 59. Basic range of motion exercises for pain management 60. Education and advice on self-management of pain 61. Provision of pharmacological agents for pain management (eg. Analgesics)
11. Activities of Daily Living **12. Bowel and bladder management** **13. Community and Social life**	8. Self-care and Participation	18. Self-care and daily activities	62. Assessment of activities of daily living and self-care 63. Education and advice on self-care and management of activities of daily living 64. Provision and training in the use of assistive products for self-care (eg. Toilet and shower chairs)

		19. Bladder and bowel management	65. Assessment of urination and defecation functions 66. Education and advice on self-management of bowel and bladder functions 67. Basic pelvic floor exercises 68. Provision of pharmacological agents for bladder and bowel management (eg. Laxatives) 69. Provision and training in the use of incontinence products
		20. Community and social participation	70. Assessment of participation in community and social life 71. Education and advice on self-management of participation in community and social life

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727 **Table 5:** Group feedback and modifications of the Basic PIR.

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Group	Feedback solicited	Feedback obtained	Modifications made
Ghana **Primary Care Workers**	Structure and content of the Basic PIR clinical resource - Steps to providing rehabilitation (Assess, Plan, Deliver Care, Monitor) -Components of functioning targets (assessments, red flags,	• Difficulty with making a distinction between 'Plan' and 'Deliver care' aspect of the 4-step process • Difficulty remembering all the questions to ask a client	• The 4-step process was simplified to a 3-step process with 'Plan' stage merged into the 'Deliver phase'. • An assessment form developed to easily guide the 'Assess' stage
Fiji **Primary Care Workers**		• It would help to be able to grade the level of functioning difficulty to compare with levels during subsequent visits • Having a handout to guide the provision of interventions could be a	• Grading of level of difficulty for each functioning domain was developed with a grading system of '0-10' • Patient rehabilitation handouts with illustrations and simple instructions for

	exercise, education, and advice interventions).	helpful tool for prompting memory and consistency.	each functioning domain developed. Patients could take a photo, photocopy or print it out to use at home.
WHO Rehabilitation Programme		• Including a form for easy identifications of clinical presentations that could benefit from rehabilitation will shorten the time required to provide rehabilitation interventions in PC • Red flags are an important component and should be stressed upon • In situations where there is a confirmation of the health condition, information on how to manage the health condition should be provided	• Consolidation of common clinical presentations for each rehabilitation domain into one form for easy reference. • Red flags for each rehabilitation domain consolidated on one form for easy reference and use • Patient rehabilitation handouts were developed for the 10 health conditions that were used to guide the initial selection of interventions from the PIR.

Technical Working Group	Content of the Basic PIR clinical resource -Components of functioning targets (assessments, red flags, exercise, education, and advice interventions). Questions guiding the provision of feedback - Are the instructions easy to understand?	• Red flags – add: -sudden onset hearing loss accompanied by vertigo for hearing -red eye for vision -choking and coughing for swallowing • Assessments – add: - Hearing difficulty that affects ability to converse in different environment to common clinical presentations for hearing • Interventions a. Add - Education on the impact of improved hearing being ability to communicate with family, coworkers, and friends (social impact of improved hearing)	All suggested modifications were accepted during the web conference following which modifications were made to the Basic PIR clinical resource.

	- Are there any errors? - Is there anything missing? - Are there any other comments?	- Use of a sign or gestures can improve communication -Advice on reviewing the environmental modifications and suggesting any changes if needed to vision interventions b. Modify -'Adopt a good posture' in pain interventions to 'Frequently changing positions can result in pain relief to pain' - The sequence of swallowing interventions to begin with neck strengthening exercises and end with advice on eating the appropriate food texture	

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730 **Supplementary file 1: Discussion questions for primary care non-rehabilitation**
731 **worker feedback**

732 1. Are there any features you find confusing or difficult to use?

2. Is anything missing?
3. Are the instructions practical and easy to implement?

Supplementary Files

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

- Supplementaryfile1.pdf