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Applying TIDieR-Rehab in Rehabilitation Intervention Literature Reviews: A Seven-Phase Framework for Evidence Synthesis

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ABSTRACT

Background and Purpose: Rehabilitation interventions are inherently complex, typically comprising multiple interacting components tailored to individuals' needs, goals, and contexts. While this complexity is central to delivering effective, person-centred rehabilitation, it poses challenges for evidence synthesis, particularly in identifying, describing, extracting, and analysing intervention components from primary research. This can limit the rigour and impact of rehabilitation literature reviews. The TIDieR-Rehab checklist is an extension of the Template for Intervention Description and Replication (TIDieR), designed to support comprehensive and systematic examination of rehabilitation interventions across a range of disciplines. Building on existing methodological review guidance, this paper presents a seven-phase framework and accompanying resources for integrating TIDieR-Rehab within diverse rehabilitation literature review types, including narrative, scoping, systematic +/− meta-analyses, and intervention reporting quality reviews.

Methods: This seven-phase framework was developed using an iterative, collaborative approach, integrating established literature review methodologies with insights from the authors' application of the TIDieR-Rehab checklist across multiple published reviews. Key methodological processes were identified, compared, and synthesised to inform guidance applicable across diverse review types.

Results: The TIDieR-Rehab Seven-Phase Literature Review Framework is presented to enhance the review process across seven key phases: (1) familiarisation, (2) defining the review question, (3) developing the review protocol and materials, (4) piloting the review protocol and materials, (5) data extraction, (6) data analysis, and (7) interpretation. Practical resources, including templates for a table of reference, data extraction, and consensus decision diary, are also provided to support application of the framework.

Discussion: Integrating the TIDieR-Rehab Seven-Phase Literature Review Framework within rehabilitation intervention literature reviews has potential to strengthen review quality, facilitate better understanding of intervention components and research gaps, and in turn, contribute to the advancement of future rehabilitation research and clinical practice.

Abbreviations: TIDieR, Template for Intervention Description and Replication; TIDieR-Rehab, Template for Intervention Description and Replication Extension for Rehabilitation Interventions.

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1 | Introduction

Literature reviews are central to advancing rehabilitation science, providing a means to evaluate existing evidence, optimise interventions, and inform clinical guidelines (Stratton 2019; Khan et al. 2003; Dijkers et al. 2012; Kayes et al. 2019). However, synthesising rehabilitation research is often difficult due to the inherent complexity of rehabilitation interventions which typically comprise multiple interacting components, ranging from targeted activities and environmental modifications, to patient and family education, and psychosocial support (Signal, Gomes, et al. 2024; Kayes et al. 2019; Levack et al. 2024). Within these intervention components, some are considered active ingredients or essential elements as they are proposed to drive the mechanism of effect (Signal, Gomes, et al. 2024; Kayes et al. 2019; Hoffmann et al. 2014; Van Stan et al. 2019). These may include specific tasks or techniques employed, and are influenced by the amount and challenge level at which these are delivered (Signal, Gomes, et al. 2024; Hayward et al. 2021). Furthermore, these components are often adapted in response to the patient's needs and goals, the clinician's skillset, and the broader context of care, resulting in diverse and dynamic implementation (Levack et al. 2024; Van Stan et al. 2019). While these layers of complexity are vital to effective, person-centred rehabilitation, they present substantial difficulties for researchers seeking to synthesise rehabilitation intervention research within a literature review (Levack et al. 2024; Stockley and Graham 2023). These difficulties are further exacerbated by inconsistent terminology, limited conceptual clarity, and incomplete reporting in rehabilitation literature (Signal, Olsen, et al. 2024; Dijkers 2015).

Across health science research, an array of guidelines exist to support review methodologies, including frameworks such as PRISMA (Preferred Reporting Items for Systematic reviews and Meta-Analyses), MOOSE (Meta-analyses Of Observational Studies in Epidemiology), ENTREQ (Enhancing Transparency in REporting the synthesis of Qualitative research), and those from the JBI (Joanna Briggs Institute) and Cochrane (Higgins et al. 2024; M. J. Page et al. 2021; Stroup et al. 2000; Tong et al. 2012; Joanna Briggs Institute n.d.). Frameworks such as PRISMA, MOOSE and ENTREQ have strengthened the reporting of different review types, while JBI and Cochrane provide broader methodological guidance for conducting evidence syntheses. In particular, Cochrane (Higgins et al. 2024) provides guidance on the importance of considering intervention complexity, including mechanisms of action, intervention components, and interactions between components, context, implementation, and tailoring. While such guidance provides important conceptual foundations, it offers limited operational guidance for how reviewers should systematically identify, extract, categorise, analyse, and interpret intervention information at the proposed level of detail across a review. This limitation is particularly relevant to rehabilitation research, given the complex nature of rehabilitation interventions described above (Signal, Gomes, et al. 2024; Levack et al. 2024; Van Stan et al. 2019). Consequently, rehabilitation reviewers are currently left to independently determine how to handle the breadth of rehabilitation intervention information throughout a review, potentially contributing to variability in review processes and findings.

Variability in rehabilitation intervention review processes has important implications across different review types. For example, in narrative, scoping, and mapping reviews, this may lead to incomplete accounts of how interventions were implemented, adapted, and experienced (Datta and Petticrew 2013; Prill et al. 2024; Erlik et al. 2024; Colquhoun et al. 2020). In systematic reviews and meta-analyses, differences in how intervention components are conceptualised, extracted, and categorised may impede downstream analyses of how specific components influence outcomes (Boardsworth et al. 2025; Dijkers 2015; Lazzarini et al. 2023). In intervention reporting quality reviews, variability in how intervention descriptions are assessed may compromise the comprehensiveness and consistency of evaluations (Dijkers 2015; Signal, Olsen, et al. 2024; Innocenti et al. 2022). These challenges have been recognised across a wide range of rehabilitation-related disciplines, including physiotherapy, psychology, occupational therapy, speech-language therapy, social work, and counselling (Gerber et al. 2016; Proctor 2017; Marshall et al. 2011; Signal, Olsen, et al. 2024). Ultimately, such variability may limit the rigour and impact of review findings for informing rehabilitation research and practice.

Recognising the need for a rehabilitation-specific tool to systematically unpack intervention components, the TIDieR-Rehab checklist (Signal, Gomes, et al. 2024) was recently developed. The TIDieR-Rehab checklist is an extension of the Template for Intervention Description and Replication (TIDieR) (Hoffmann et al. 2014) that provides comprehensive guidance to support the planning and reporting of rehabilitation interventions within primary research (Signal, Gomes, et al. 2024). Several other frameworks also support the description and specification of rehabilitation interventions, including the CERT (Consensus on Exercise Reporting Template; Slade et al. 2016), the CReDECI 2 (Criteria for Reporting the Development and Evaluation of Complex Interventions in healthcare 2; Möhler et al. 2015), the RTSS (Rehabilitation Treatment Specification System; Van Stan et al. 2019), and the BCTT (Behaviour Change Technique Taxonomy; Michie et al. 2013). However, these were also largely developed to guide the design and reporting of selected types of rehabilitation interventions in primary research (Michie et al. 2013; Möhler et al. 2015; Slade et al. 2016; Van Stan et al. 2019). While some have been used to categorise interventions within reviews, they offer limited guidance for how rehabilitation intervention information should be handled across a review. Although also developed for primary research, the TIDieR-Rehab was more recently developed to address ongoing limitations of existing intervention reporting tools and provides greater specificity around a range of key rehabilitation concepts, including amount, challenge, regression and progression, personalisation, and harms (a more detailed comparison with existing tools is provided in Signal, Gomes, et al. 2024; Signal, Olsen, et al. 2024). This greater specificity may make TIDieR-Rehab particularly useful for addressing challenges associated with variability in the conduct of rehabilitation intervention literature reviews. However, methodological guidance for operationalising TIDieR-Rehab within these reviews is currently lacking. Such guidance could support more systematic and detailed consideration of rehabilitation interventions throughout the review process. For example, more structured synthesis of intervention components—such as time spent in

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active practice, the challenge level, and criteria for progressing these—could support clearer interpretation of optimal intervention components and facilitate their effective implementation in clinical practice (Burgess et al. 2021; McCambridge et al. 2021; P. Page et al. 2017; Signal, Olsen, et al. 2024).

To help address this gap, this paper builds on existing evidence synthesis guidance by operationalising the TIDieR-Rehab checklist through the proposed TIDieR-Rehab Seven-Phase Literature Review Framework. In turn, this framework may enhance the impact of review findings on future research and clinical practice across the rehabilitation field.

2 | Overview of the TIDieR-Rehab Checklist

The TIDieR-Rehab was developed through a modified Delphi process in which international, multidisciplinary rehabilitation experts reached consensus on the intervention components most critical for reporting, synthesising, and implementing rehabilitation intervention research (Signal, Gomes, et al. 2024; Signal, Olsen, et al. 2024). The TIDieR-Rehab checklist (Signal, Gomes, et al. 2024) is provided in Table 1 to support interpretation of the framework presented in this manuscript. It comprises 22 items grouped into 15 sections, each addressing a specific aspect of rehabilitation intervention characteristics, delivery, or monitoring. Further details about the development of the TIDieR-Rehab checklist and its accompanying supplementary manual have been published elsewhere (Signal, Gomes, et al. 2024; Signal, Olsen, et al. 2024).

3 | Development of the TIDieR-Rehab Seven-Phase Literature Review Framework [Methods]

This methodological guidance was developed using an iterative, collaborative approach involving the multidisciplinary authorship team. The team included extensive expertise in physiotherapy (NS, SO, GA, EG), complemented by expertise in social work (MK) and vocational rehabilitation practice (JF), as well as methodological expertise in primary research and literature reviews. To provide methodological guidance for integrating the TIDieR-Rehab within literature reviews, the TIDieR-Rehab Seven-Phase Literature Review Framework was developed around three common review purposes and types.

1. Describing rehabilitation interventions, including their components, participant and provider characteristics, and delivery patterns, as commonly undertaken in narrative, scoping, and mapping reviews;
2. Investigating the relationship between interventions and outcomes, supported by systematic extraction and analysis of intervention components, including their essential elements and/or dosage parameters, as commonly undertaken in systematic reviews +/− meta-analyses and rapid reviews; and
3. Critiquing the reporting quality (e.g., completeness) of interventions in research, as commonly undertaken in intervention reporting quality reviews.

Key review phases were identified based on established methodological guidance (Ferrari 2015; Khan et al. 2003; Kolaski et al. 2023; Mak and Thomas 2022; Furlan and Irvin 2022; Booth et al. 2016; Higgins et al. 2024; Peters et al. 2020) and the authors' prior application of the TIDieR-Rehab within four literature reviews (Tracey et al. 2025; Gomes et al. 2025; Olsen et al. 2023; Khoronzhevych and Fadyl 2025) (refer to Table 2 for a summary of phases). Specifically, these phases were developed into the TIDieR-Rehab Seven-Phase Literature Review Framework in three steps. First, key methodological processes were identified, drawing on established methodological guidance, as well as the authors' collective experience, comparison of review workflows and materials, and methodological reflections from prior reviews (illustrated through worked examples throughout this manuscript and in Table 3). Recurring methodological processes that were supported by the use of the TIDieR-Rehab were identified through approximately five team meetings held between July and December 2025, supplemented by four rounds of written feedback on successive drafts of the framework, figure, tables, and resources, and iteratively synthesised into candidate framework phases. For example, several processes were conducted similarly, including familiarisation with intervention terminology and concepts using the TIDieR-Rehab, the development and piloting of TIDieR-Rehab informed extraction materials, and reviewer consensus processes that were supported by the TIDieR-Rehab. Collectively, this process ensured candidate phases aligned with established review workflows while identifying where intervention-specific guidance provided by the TIDieR-Rehab checklist could add value. Second, these insights informed the development of seven distinct but interrelated phases, refined to capture the practical considerations required to ensure comprehensive, accurate, and adaptable application of the TIDieR-Rehab checklist across various rehabilitation disciplines and review contexts. Finally, the seven phases were iteratively refined through collaborative discussion among the authors. Where disagreements arose, these were resolved through further collaborative discussion, supported by reference to established methodological guidance, the authors' prior reviews, and the TIDieR-Rehab checklist and supplementary manual (Signal, Gomes, et al. 2024). Where relevant, insights from feedback received on previous related work from prior co-authors and external reviewers also informed refinement of the framework. A formal consensus methodology was not used; agreement was instead reached through informal consensus, with all authors reviewing and endorsing the final framework. This process ensured clarity, sequencing, usability, and credibility of the final seven-phase framework.

4 | TIDieR-Rehab Seven-Phase Literature Review Framework [Results]

The proposed TIDieR-Rehab Seven-Phase Literature Review Framework aims to support researchers across rehabilitation disciplines and levels of expertise to integrate the TIDieR-Rehab checklist across key phases of the literature review process. These seven phases span from familiarisation to interpretation (see Figure 1 for an overview), aligning with existing review workflows (Ferrari 2015; Khan et al. 2003; Kolaski et al. 2023; Mak and Thomas 2022; Furlan and Irvin 2022; Booth et al. 2016; Higgins et al. 2024; Peters et al. 2020), while providing additional guidance to support application of the TIDieR-Rehab to strengthen review depth and rigour. Specifically, each phase outlines its purpose, potential methodological actions and

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TABLE 1 | The TIDieR-Rehab checklist.

Section 1. Brief name	
Item 1	Provide the name or a phrase that describes the intervention.
Section 2. Why	
Item 2	Describe any rationale, theory or goal of the elements essential to the intervention. *Essential elements, also known as 'active ingredients', are the core components of the intervention that are expected to be linked to effects or outcomes of interest.*
Section 3. Who	
Item 3	Describe who the intervention is intended for.
Section 4. When	
Item 4	Describe when the intervention commenced in relation to the onset or stage of the condition and/or other relevant events.
Section 5. What	
Item 5A	Materials: describe any physical or informational materials used in the intervention, including those provided to participants or used in intervention delivery or in training of intervention providers. Provide information on where the materials can be accessed (e.g., online appendix, URL).
Item 5B	Procedures: describe each of the procedures, activities and/or processes used in the intervention, including any enabling or support activities.
Section 6. Who provided	
Item 6	For each category of intervention provider (e.g., psychologist, nursing assistant), describe their expertise, background and any specific training given.
Section 7. How	
Item 7	Describe the modes of delivery (such as face to face or by some other mechanism, such as internet or telephone) of the intervention and whether it was provided individually or in a group.
Section 8. Where	
Item 8	Describe the type(s) of environment(s) where the intervention occurred, including any necessary infrastructure or relevant features. *Environments and their features may include the relevant physical, social, cultural, economic, political and/or systemic context(s) of the intervention.*
Section 9. How much	
Item 9A	Session(s) duration: specify the planned session(s) duration of the intervention.
Item 9B	Essential elements amount: specify the planned session(s) duration and/or repetitions of the essential elements of the intervention. *Essential elements amount refers to the time and/or repetitions, within the total duration of a single session, that is spent "actively" participating in the core components of the intervention.*
Item 9C	Frequency: specify the planned frequency of the intervention.
Item 9D	Intervention length: specify the planned overall length of the intervention.
Section 10. How challenging	
Item 10	Describe the approach(es) used to set and monitor the intervention/task challenge level. *Challenge may include the nominal, functional or perceived level of difficulty, effort, physiological intensity or cognitive load of an intervention/task at a given time and may be evaluated using subjective or objective measures.*
Section 11. Regression/Progression	
Item 11	Describe the planned regression and/or progression of dosage parameter(s), including when and how. *Dosage parameters refer to the amount (Section 9. How much) and challenge (Section 10. How challenging) of the intervention.*

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TABLE 1 | (Continued)

Section 12. Personalisation	
Item 12A	Needs: if supplementary strategies were planned to enable the delivery of the essential elements of the intervention in response to specific individual or group needs, then describe what, why, when and how. *Supplementary strategies refer to intervention adjuncts (e.g., physical assistance, verbal cueing, props) that must be used by some individuals or groups to facilitate effective participation in the essential elements.*
Item 12B	Preferences: if the intervention was planned to be adapted for personal preferences, then describe what, why, when and how.
Section 13. Protocol deviations	
Item 13	If there were deviations in the intervention protocol during the course of the study, describe the changes (what, why, when and how).
Section 14. How well	
Item 14A	Plan: if intervention adherence or fidelity was assessed, describe how and by whom, and if any strategies were used to maintain or improve fidelity, describe them.
Item 14B	Actual: if intervention adherence or fidelity was assessed, describe the extent to which the intervention was delivered as planned.
Section 15. Harms	
Item 15A	Plan: describe the monitoring of adverse consequences. *Adverse consequences include any negative, undesired effects related to the intervention, including physical, mental, social and/or spiritual effects.*
Item 15B	Actual: describe any adverse consequences, including the number, seriousness and relatedness to the intervention.

Note: Reproduced from Signal, Gomes, et al. (2024) (refer to the original article and its supplementary manual for further explanations and reporting examples of the TIDieR-Rehab checklist items).
Abbreviation: TIDieR-Rehab, Template for Intervention Description and Replication Extension for Rehabilitation Interventions.

outputs, and illustrative examples. Although presented sequentially, these phases often occur iteratively and may be adapted according to the review aims, reviewer expertise, intervention complexity, available resources, and methodological requirements. Table 2 summarises different applications of the TIDieR-Rehab Seven-Phase Literature Review Framework for three common review purposes, and Table 3 presents corresponding working examples.

4.1 | Phase 1: Familiarisation

The familiarisation phase supports review planning activities by using the TIDieR-Rehab to explore how specific rehabilitation concepts, intervention components, and terminology are defined, operationalised, and reported within the broader literature (including the completeness of reporting). It is essential to ensuring researchers design a review capable of capturing the richness and variety of rehabilitation intervention(s), while minimising risk of misinterpretation (Booth et al. 2016). It also supports researchers to purposefully and accurately connect conceptual foundations with evolving understandings of the rehabilitation intervention under investigation. This is particularly important, given the inconsistent terminology, conceptual ambiguity, and poor reporting of intervention components in many bodies of rehabilitation intervention literature (Signal, Olsen, et al. 2024).

First, researchers should familiarise with core concepts and terminology underpinning rehabilitation interventions relevant to their review field—such as learning and feedback mechanisms, behaviour-change principles, communication and interaction techniques, environmental and participation frameworks, person-centred care, and interdisciplinary co-ordination models—and understand how these are broadly described in the literature, including any theoretical or practical nuances. Researchers should also familiarise themselves with the TIDieR-Rehab checklist and supplementary manual to help guide this process (Signal, Gomes, et al. 2024). For example, if reviewing literature within the field of exercise rehabilitation, researchers may examine how TIDieR-Rehab items such as *How much* and *How challenging* are conceptualised, given related terms such as 'intensity' may refer to a variety of concepts, including total minutes of exercise, number of repetitions and sets, *and/or* level of objective or subjective challenge (S. J. Page et al. 2012; Ekkekakis et al. 2024; Faggian et al. 2024).

Subsequently, researchers should draw on this knowledge and use the TIDieR-Rehab (Signal, Gomes, et al. 2024) to clarify considerations for subsequent review phases. For example, using the TIDieR-Rehab to familiarise with the literature of the specific intervention(s) of interest may reveal that interventions named similarly (*Brief name*)—such as 'graded activity' and 'graded exposure'—have different goals (*Why*) and/or use different equipment (*What—Materials*) (Macedo et al. 2010), requiring

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TABLE 2 | Overview of how the TIDieR-Rehab Seven-Phase Literature Review Framework can be applied in each of the three common review purposes.

	Describing rehabilitation interventions	Investigating intervention-outcome relationships	Critiquing intervention reporting quality
Common review types	Narrative, scoping, mapping	Systematic +/− meta-analyses, rapid, umbrella	Intervention reporting quality reviews
Familiarisation	[a] Familiarise with how intervention theories, components, and practices are described across TIDieR-Rehab items	[a] Familiarise with how intervention components, essential elements, and dosage parameters are defined, operationalised, and linked to outcomes across TIDieR-Rehab items	[a] Familiarise with how interventions are conceptualised and reported across all TIDieR-Rehab items
Defining the review question	Use TIDieR-Rehab to define the breadth and depth of interventions included in an exploratory question	Use TIDieR-Rehab to specify the intervention components included in an investigative question (e.g., comparing the effect of specific intervention components on outcomes). This is often supported by the PICOS framework	Use TIDieR-Rehab to delineate which items will be included in an intervention reporting appraisal question
Developing the review protocol and materials	Use TIDieR-Rehab to develop broad, semi-structured review materials (table of reference, data extraction template) supporting comprehensive extraction across diverse intervention data and study designs	Use TIDieR-Rehab to develop detailed, prescriptive materials (table of reference, data extraction template) defining categories and codes for intervention components and outcomes	Use TIDieR-Rehab to develop review materials with clear item reporting criteria and rating examples
Piloting the review protocol and materials	Pilot TIDieR-Rehab informed review materials on a diverse sample of studies. One or more reviewers independently extract data, compare outputs, and refine templates and definitions	Pilot TIDieR-Rehab informed review materials on a diverse sample of studies. Two reviewers independently extract and code intervention components and outcomes, compare results, and refine coding rules	Pilot TIDieR-Rehab informed review materials on a diverse sample of studies. Two reviewers independently rate reporting across TIDieR-Rehab items, compare ratings, and refine guidance
Data extraction	One or two reviewers code intervention characteristics and components using TIDieR-Rehab, capturing commonalities, differences, and gaps	Two reviewers extract granular intervention and outcome data using TIDieR-Rehab, often in conjunction with quality appraisal assessments (e.g., risk of bias, GRADE, intervention reporting quality), with an emphasis on reviewer consensus	Two reviewers evaluate reporting quality across TIDieR-Rehab items, with an emphasis on reviewer consensus
Data analysis	Summarise intervention characteristic frequencies, distributions, and patterns across TIDieR-Rehab items via counts, percentages, and/or narrative synthesis	Analyse relationships between intervention components (as defined by TIDieR-Rehab) and outcomes via meta-analysis, subgroup analysis, narrative synthesis, and/or qualitative meta-synthesis	Summarise reporting quality and trends within and across TIDieR-Rehab items, intervention groups, studies, journals, and/or over time via counts, percentages, and/or narrative synthesis
Interpretation	Describe intervention patterns and gaps to inform future research, using the TIDieR-Rehab to support structure	Examine how specific intervention components, essential elements, and/or dosage parameters influence outcomes, using the TIDieR-Rehab to draw comparisons	Identify patterns and gaps in intervention reporting, using the TIDieR-Rehab to guide future research recommendations

Note: All phases draw on the TIDieR-Rehab checklist and supplementary manual (Signal, Gomes, et al. 2024) and the TIDieR-Rehab informed materials developed in Phase 3.

Abbreviations: PICOS, Population, Intervention, Comparator, Outcomes, Study design; TIDieR-Rehab, Template for Intervention Description and Replication Extension for Rehabilitation Interventions.

[a]In addition to familiarisation with core rehabilitation concepts and TIDieR-Rehab items (refer to Signal, Gomes, et al. 2024).

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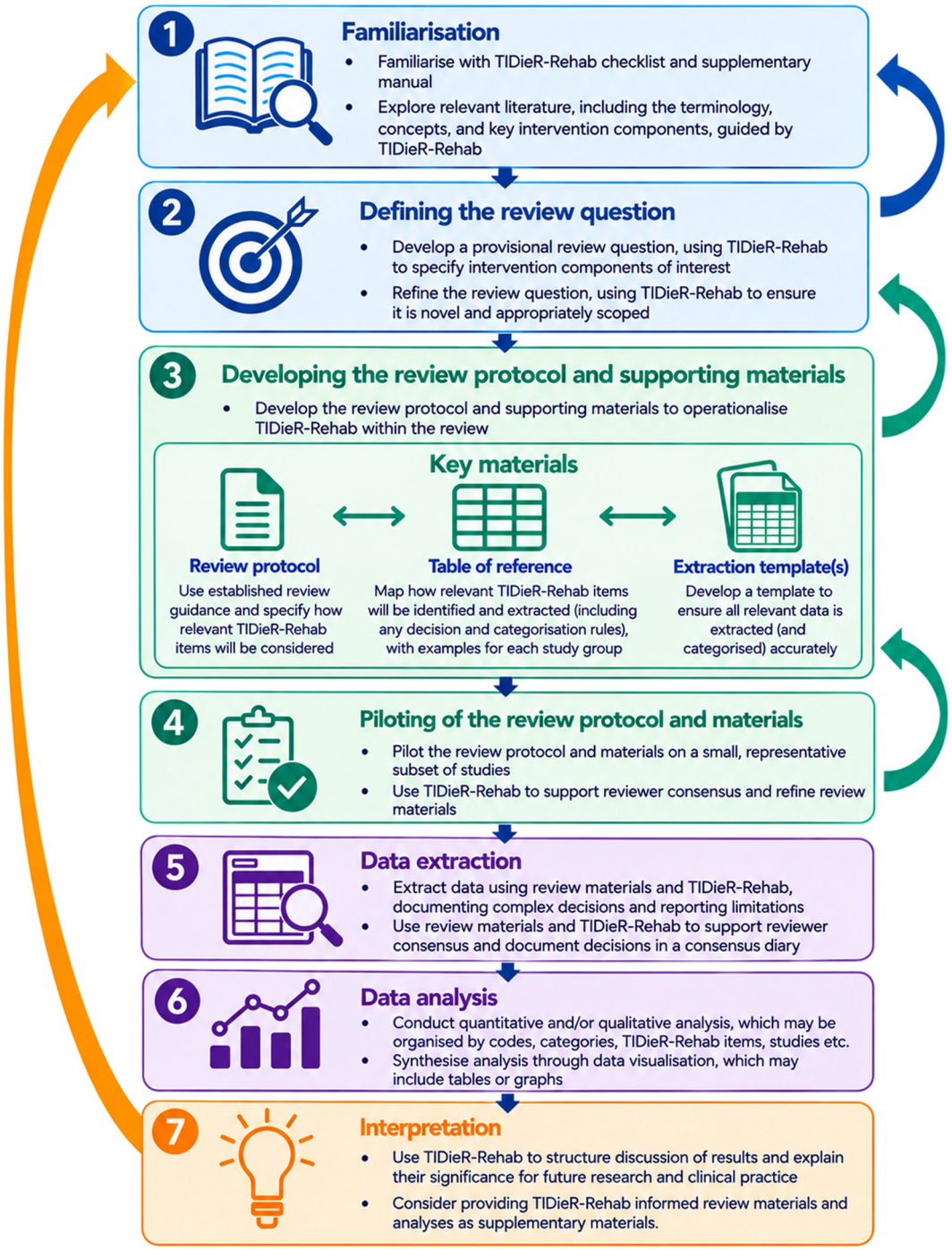


FIGURE 1 | Key actions across the TIDieR-Rehab Seven-Phase Literature Review Framework for rehabilitation intervention literature reviews. The application of phases are often iterative and should be adapted according to the requirements of the review. Templates for the table of reference, data extraction sheet, and consensus decision diary are provided in the supplementary files. Figure generated using Microsoft PowerPoint and Open AI GPT-5.6 Sol complied from data inputs provided by the authors.

researchers to consider whether these interventions are conceptually comparable enough to be reviewed together or should be distinguished when defining the review question (Phase 2) and developing coding rules (Phase 3).

4.2 | Phase 2: Defining the Review Question

Drawing on the familiarisation phase, researchers should use the TIDieR-Rehab to identify and prioritise the intervention(s) and intervention components that are most relevant to their research question. While frameworks such as PICOS (Population, Intervention, Comparator, Outcomes, Study design) support definition of broad review questions, the TIDieR-Rehab can support more detailed examination of the intervention by helping reviewers identify which specific intervention components, dosage parameters, contextual influences, or personalisation strategies will be investigated. These priorities can then inform a provisional research question.

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TABLE 3 | Working examples of the TIDieR-Rehab Seven-Phase Literature Review Framework for each of the three common review purposes.

	Describing rehabilitation interventions	Investigating intervention-outcome relationships	Critiquing intervention reporting quality
Article	Khoronzhevych and Fadyl (2025)	Boardsworth et al. (2025)	Tracey et al. (2025)
Review type	Scoping review	Systematic review and meta-analysis	Intervention reporting quality review
Familiarisation	[a] Identified trauma-informed counselling as an emerging intervention but poorly described intervention within vocational rehabilitation, with diversity in population (*Who, When)*, rationale (*Why*), intervention components (*What, How, How much, Personalisation*) and context (*Who provided, Where*)	[a] Identified the need to synthesise evidence on robotic interventions after stroke, including how participant characteristics (*Who, When*), device features (*What*) and programme parameters (*Who provided, How, Where, How much, How challenging, Regression/ Progression, Personalisation*) influence activity-based outcomes	[a] Identified the need to highlight gaps in reporting of aerobic exercise after mTBI, including of potential mechanisms of effect (*Why),* intervention components that may influence these effects (*When, How much, How challenging, Regression/ Progression*), and additional factors important for optimisation and replication (*Who, Who provided, Personalisation, Harms*)
Defining the review question	Aimed to (1) scope how work-oriented counselling services recognise and respond to the impact of trauma on job seekers and (2) use TIDieR-Rehab to map trauma-informed strategies used to support individuals in obtaining, retaining, or returning to employment	Aimed to (1) determine the efficacy of upper limb robotic rehabilitation on activity level outcomes compared with dose-matched conventional rehabilitation and (2) use TIDieR-Rehab to support analysis of the robotic device features and programme parameters which may contribute to outcomes	Aimed to use the TIDieR-Rehab to determine the intervention reporting quality within RCTs investigating aerobic exercise following mTBI
Developing the review protocol and materials	Used TIDieR-Rehab checklist as the data extraction template and the supplementary manual as the table of reference	Used TIDieR-Rehab to develop a data extraction template with definitions and examples of categories and subcategories of intervention components	Used existing intervention literature and TIDieR-Rehab to develop a data extraction template and table of reference with definitions, examples, and potential nuances for rating intervention reporting as 'complete', 'incomplete', or 'absent'
	For example, *What—Procedures* guided identification of specific intervention strategies integrated to improve employment outcomes for people experiencing trauma-related effects and challenges (e.g., *Why, Who*)	For example, *What* and *How challenging* informed extraction and coding of the robotic device feature of 'assistance' ('full', 'partial', or 'both'); similarly, *Where* informed coding of the programme parameter of 'setting' ('inpatient', 'outpatient', or 'home')	For example, *When* could be defined as time or symptom duration since mTBI (days, weeks, months, or years), with an example of 'complete' reporting being "this study compared the effects of aerobic exercise in concussion patients within 14–25 days post-injury"
Piloting the review protocol and materials	Pilot-tested on a subset of studies with diverse designs and contexts. Two reviewers independently extracted data, compared interpretations, and refined definitions and analytical codes	Pilot-tested on representative but excluded studies. Two reviewers independently extracted and coded intervention components and outcomes, compared results, and refined coding frameworks, definitions, and category boundaries for consistency and suitability for subgroup and meta-analyses	Pilot-tested on representative but excluded studies. Two reviewers independently applied reporting criteria, compared ratings, and refined definitions and examples to improve agreement and clarity of 'complete', 'incomplete', and 'absent' classifications

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TABLE 3 | (Continued)

	Describing rehabilitation interventions	Investigating intervention-outcome relationships	Critiquing intervention reporting quality
Data extraction	Two reviewers extracted intervention descriptions from 12 studies (and their referenced intervention articles where required) according to each TIDieR-Rehab item	Two reviewers extracted intervention descriptions and outcomes from 54 RCTs, including participant characteristics, device features, programme parameters, and comparison intervention components in the TIDieR-Rehab, as well as activity-based outcomes; device manuals and authors were contacted for incomplete or absent data This was conducted alongside the risk of bias 2	Two reviewers extracted intervention descriptions from all intervention groups across 13 studies and evaluated intervention reporting completeness across TIDieR-Rehab items using the table of reference; authors were contacted for 'incomplete' or 'absent' reporting
Data analysis	Reviewers independently conducted content analysis to map intervention strategies, using TIDieR-Rehab to guide initial impressions of intervention components, followed by open coding, and the comparison, merging, and refinement of codes to inductively establish overarching categories	Meta-analyses and subgroup analyses investigated the effect of TIDieR-Rehab defined device and programme categories and subcategories on activity-based outcomes at post-interventions and follow-up	Descriptive analysis of reporting completeness (supported by percentages, tables, figures) summarised 'complete', 'incomplete', and 'absent' reporting within and across TIDieR-Rehab items and intervention groups, including any changes after author contact; Cohen's kappa assessed inter-rater agreement
Interpretation	Identified recommendations for trauma-informed approaches in work-oriented counselling research and practice, including how trauma was conceptualised and its effects on work-ability and vocational planning, and using TIDieR-Rehab as a framework to unpack how trauma-informed approaches were implemented and the specific strategies to support people with trauma in this context	Identified specific device features and programme parameters linked to improved activity-based outcomes (e.g., *What—Materials and Procedures:* single device, fewer degrees of freedom, distal joints; and *How challenging:* partial assistance) and those poorly described, limiting subgroup analysis (e.g., *Who provided, How much—Essential elements amount, How challenging, Regression/Progression, Personalisation*). This informed recommendations for intervention design, personalisation, reporting, and clinical translation	Identified patterns of complete reporting (e.g., *How much—Frequency, Intervention length*) and critical reporting gaps that may limit optimisation (e.g., *How much—Session duration, Essential elements amount, How challenging, Regression/Progression, Personalisation*), informing recommendations for future research and clinical practice

Note: Examples presented in this table draw on methodological reflections from the authors' prior reviews using TIDieR-Rehab and illustrate application of the Seven-Phase Literature Review Framework. To support interpretation of TIDieR-Rehab items, refer to the TIDieR-Rehab checklist and supplementary manual paper (Signal, Gomes, et al. 2024). For further methodological detail, refer to the cited articles and their supplementary files.

Abbreviations: mTBI, mild traumatic brain injury; RCTs, randomised controlled trials; TIDieR-Rehab, Template for Intervention Description and Replication Extension for Rehabilitation Interventions.

[a]In addition to familiarisation with core rehabilitation concepts and TIDieR-Rehab items.

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Researchers should subsequently consider how consistently and comprehensively the specified intervention components are reported across the literature in accordance with relevant TIDieR-Rehab items. This process can support refinement of the review question in light of factors such as intervention reporting gaps, anticipated heterogeneity, or the volume of available evidence for specific participant characteristics, intervention components, or outcomes of interest (Booth et al. 2016; Greener and Langhorne 2002). For example, rather than asking a broad question about overall intervention effectiveness (e.g., is upper limb rehabilitation effective after stroke?), researchers may narrow their focus to a specific activity or technique identified within the TIDieR-Rehab section *What—Procedures* (e.g., does the use of augmented feedback during upper limb rehabilitation improve outcomes after stroke?). Alternatively, the review may focus on particular items within the TIDieR-Rehab section *How much* (e.g., does greater active practice time during upper limb rehabilitation improve outcomes after stroke?). Together, this iterative process can help ensure the review is novel, appropriately scoped, and has greater potential for impact. Notably, the final review question will also inform the review type and design, and therefore, the number and expertise of reviewers required (Mak and Thomas 2022; Greener and Langhorne 2002; Gomes et al. 2025; Khoronzhevych and Fadyl 2025). For most reviews, at least two reviewers are recommended to support reliability and reduce bias (Higgins et al. 2024; Peters et al. 2020).

4.3 | Phase 3: Developing the Review Protocol and Materials

Once the review question has been defined, researchers should iteratively: (i) develop the review protocol and (ii) develop the review materials, to support operationalisation of the review. While the specific protocol and materials will vary according to the review, they should support researchers to engage with the intervention evidence base and TIDieR-Rehab in a structured and comprehensive way. Once developed, these materials should be iteratively piloted and refined (as described in Phase 4).

4.3.1 | Developing the Review Protocol

Researchers should consider TIDieR-Rehab items when developing the review protocol. In addition to following general review guidelines (Ferrari 2015; Khan et al. 2003; Kolaski et al. 2023; Mak and Thomas 2022; Furlan and Irvin 2022; Booth et al. 2016), the TIDieR-Rehab items can assist researchers with specifying and structuring the intervention(s) search terms (e.g., *Brief name*), the review rationale (e.g., *Why*), eligibility criteria (e.g., *Who*, *When*, *What*, *How much*), any specific intervention components of interest (e.g., *What*, *How much*, *Personalisation*), and relevant outcomes (e.g., *Harms—Actual)* in greater detail.

4.3.2 | Developing the Review Materials

No matter the purpose of using TIDieR-Rehab within a literature review, it should be applied consistently to ensure the review findings are reproducible. To facilitate this, it is recommended that researchers use the TIDieR-Rehab to develop two key review materials: (a) a table of reference and (b) data extraction templates.

4.3.2.1 | TIDieR-Rehab Table of Reference. A table of reference provides structured guidance for operationalising the use of the TIDieR-Rehab checklist within the literature review, including how researchers should use TIDieR-Rehab items to identify, extract, and analyse a range of review data (e.g., study and participant characteristics, intervention components, outcomes) (Tracey et al. 2025; Gomes et al. 2025; Khoronzhevych and Fadyl 2025) (refer to Supporting Information S1 for a table of reference template). These data will differ according to the review question but common examples that can be mapped against relevant TIDieR-Rehab items include participant characteristics (*Who*, e.g., age range), intervention provider characteristics (*Who provided*, e.g., disciplinary background), intervention procedures (*What—Procedures*, e.g., type of exercise), mode of delivery (*How*, e.g., in-person), intervention setting (*Where*, e.g., outpatient clinic), dosage parameters (*How much—Essential elements duration*, e.g., repetitions and active time; *Regression/Progression*, e.g., challenge progressed according to patient-reported difficulty), and tailoring (*Personalisation—Preferences*, e.g., goal-specific tasks), and rating of TIDieR-Rehab items (e.g., determining complete, incomplete, or absent intervention reporting). For studies in which there is more than one intervention group of interest (e.g., intervention and control groups), the table of reference should provide specific guidance for each intervention.

When developing the table of reference, the research team's expertise, along with the TIDieR-Rehab checklist and supplementary manual, can be used to define each data entry, determine how it will be identified and extracted, and illustrate its application with examples from the literature. For example, when applying the *Personalisation—Needs* item, the table of reference may state that reviewers should extract how the intervention was tailored to individual participants' needs, such as specialised equipment, facilitation techniques, adapted procedures, or if it was absent. It may further provide pre-defined categories for coding whether the personalisation approaches used were rule-based, clinician-led, or participant-led, with examples of each, to ensure variations in personalisation approach are captured consistently across studies for subsequent analysis (Harnas et al. 2024). In the authors' prior reviews, having a research team with a diversity of expertise in the intervention of interest, TIDieR-Rehab, and clinical practice, enriched the development and applicability of the table of reference (Tracey et al. 2025; Gomes et al. 2025; Olsen et al. 2023; Khoronzhevych and Fadyl 2025).

4.3.2.2 | TIDieR-Rehab Data Extraction Templates. While the TIDieR-Rehab checklist itself may be used for data extraction, it is recommended that the table of reference is used to develop a corresponding data extraction template (refer to Supporting Information S2 for a data extraction template). In either case, the TIDieR-Rehab can be used to delineate clear fields to ensure consistent and accurate extraction, coding, and/or categorisation of relevant review

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data, as well as recording of relevant reviewer comments. For example, for the item *Personalisation—Preferences*, the format and content of the data extraction template may prompt researchers to (i) identify and code whether preferences were reported (e.g., yes/no), (ii) if it was reported, to extract the relevant data into the appropriate field(s), (iii) categorise the data based on the table of reference, including the strategy or type of personalisation to preferences (e.g., goal setting, shared decision-making, exercise mode, intervention timing, other) and who led this process (e.g., participant, therapist, researcher), and (iv) code how comprehensively this was reported in accordance with TIDieR-Rehab standards (e.g., complete, incomplete, absent). These templates may take a variety of formats, including Microsoft Word tables, Microsoft Excel spreadsheets, or via specialised software (e.g., Covidence, NVivo, REDCap).

4.4 | Phase 4: Piloting the Review Protocol and Materials

Piloting and refining the review protocol and materials is critical for enhancing shared understanding of the review data, and addressing inconsistencies and errors in data extraction (Peters et al. 2020; Higgins et al. 2024; Mak and Thomas 2022). Researchers should identify a small but representative subset of studies (often found during Phase 1 and/or 3) that captures the breadth and complexity of the intervention literature, and use these to iteratively pilot and refine both the table of reference and data extraction templates. Piloting may be completed by more than one reviewer to: ensure consistent and correct review processes, compare and enhance agreement, consider different interpretations of data, and/or divide the workload for efficiency (Peters et al. 2020; Higgins et al. 2024). In all cases, piloting should simulate the actual review: (1) reviewer(s) independently extract data into the template, guided by the review protocol, table of reference, TIDieR-Rehab checklist and supplementary manual; (2) reviewer(s) compare pilot extractions for alignment with review materials, resolving discrepancies through discussion, and refine materials as required; (3) unresolved discrepancies should be discussed with an additional reviewer or external expert as required. Notably, there is no established recommendation for the number of studies or agreement threshold required for piloting. However, in the context of rehabilitation intervention reviews, a larger and more diverse sample may be warranted for complex, multicomponent interventions or heterogeneous or poorly reported literature. Additionally, reviewer disagreements should be examined for their underlying cause (e.g., ambiguous reporting, unclear coding rules, reviewer error) and guide refinement of the materials, with formal agreement statistics calculated where useful (Higgins et al. 2024). Piloting may reasonably be concluded once a round produces no further substantive changes to the review materials, reflecting sufficient shared understanding of the extraction processes.

While piloting is a common component of many review methodologies, this phase encourages reviewers to test and refine the TIDieR-Rehab informed table of reference, extraction templates, and associated decision rules developed across earlier phases to support consistent interpretation of rehabilitation intervention components. For example, when pilot extracting details related to the TIDieR-Rehab item *When*, if a reviewer found ambiguous reporting within a study such as reporting it was an 'early intervention' without specifying whether this related to number of days post-injury, weeks into treatment, or a particular stage of care, reviewers could collaboratively discuss and reach consensus on how such data should be coded and/or categorised (Tracey et al. 2025; Gomes et al. 2025). In the authors' prior reviews, although piloting required an initial investment of reviewer time, this collaborative preparation improved consistency and efficiency during full data extraction (Tracey et al. 2025; Gomes et al. 2025; Khoronzhevych and Fadyl 2025).

Once the review protocols and materials have been finalised, it is best practice to register the protocol (e.g., in Open Science Framework, PROSPERO) and/or publish it in an appropriate journal to enhance transparency, reduce bias, and prevent duplication (Higgins et al. 2024; Kolaski et al. 2023). Reviewers should then refer to other established guidance specific to their review purpose and type (Booth et al. 2016; Peters et al. 2020; Higgins et al. 2024) for recommendations on how to proceed with the full search and screening process, and confirm the studies to be included in the review.

4.5 | Phase 5: Data Extraction

The TIDieR-Rehab informed review protocol and materials can now be used to begin data extraction from all the studies included in the review (Signal, Gomes, et al. 2024).

In the authors' prior reviews, this process was conducted independently by multiple reviewers, typically working on dual monitors or split screens—one displaying the study article PDF in Adobe Acrobat and the other displaying the TIDieR-Rehab data extraction template in Microsoft Excel—for seamless extraction (Tracey et al. 2025; Olsen et al. 2023; Gomes et al. 2025). The table of reference and TIDieR-Rehab checklist and supplementary manual should also be kept accessible (online or printed) and consulted continuously to support operationalisation. When intervention descriptions are absent or incompletely reported, reviewers should consult review materials to confirm and document this, ensuring transparent and consistent handling of reporting limitations. For example, rehabilitation literature may not clearly report the TIDieR-Rehab item *Why*, including which intervention components are considered essential and the rationale for how these are expected to contribute to intervention effects. Where a rationale is not explicitly reported but appears inferable from the intervention description, reviewers could document both the reporting limitation and their interpretation or rationale in reviewer comments, rather than coding the inferred rationale as reported data. Similarly, where extraction decisions are complex and could not be easily resolved by consulting the TIDieR-Rehab and associated materials, reviewers could document their thoughts and rationale in comments to create a transparent audit trail (Tracey et al. 2025; Gomes et al. 2025).

Depending on the purpose and process of having multiple reviewers, independent extractions should be compared to synthesise extractions, gain consensus on extractions, or both (Higgins et al. 2024; Peters et al. 2020). As done during piloting (Phase 4), data extraction comparisons should be facilitated

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through discussion between reviewers, with consultation of the original text, table of reference, TIDieR-Rehab checklist and supplementary manual, and reviewer comments. In the authors' prior reviews, a consensus decision diary tracked how disagreements were resolved during data extraction to ensure consistency in resolution across extractions (Tracey et al. 2025; Gomes et al. 2025) (refer to Supporting Information S3 for a consensus diary template).

4.6 | Phase 6: Data Analysis

Once the review data has been extracted and evaluated, data analysis examines trends and relationships to address the review question (Peters et al. 2020; Mak and Thomas 2022; Higgins et al. 2024). The table of reference, extraction templates, and TIDieR-Rehab provide a structure through which review data can be examined and presented. In doing so, these materials can also enable researchers to further understand the quality of intervention reporting, which may influence the types and depth of analyses that can be undertaken. Analyses may be organised within and across codes, categories, TIDieR-Rehab items or sections, interventions or intervention components, and/or studies. Analysis approaches may be quantitative (e.g., descriptive or statistical analyses) and/or qualitative (e.g., thematic or narrative synthesis) (a more detailed list is provided in Table 2) (Stratton 2019; Mak and Thomas 2022; Booth et al. 2016). For example, quantitative analysis of the TIDieR-Rehab item *Who provided* could compare the proportion of interventions delivered by physiotherapists, occupational therapists, psychologists, or mixed teams, and explore potential associations with reported outcomes, whereas qualitative analysis may develop a narrative summary of how provider roles and training are described in the literature. Where multiple reviewers are involved, analysis may also include assessing inter-rater reliability of extractions and conducting sensitivity analyses to examine the stability of reviewer agreement across piloting and full review phases (Higgins et al. 2024; Peters et al. 2020).

Data visualisation, such as through tables or graphs, should further support analysis and synthesis by making such trends, relationships, and gaps visible (Peters et al. 2020; Mak and Thomas 2022; Higgins et al. 2024). Across the authors' prior reviews, a range of visualisation methods were used to enhance clarity, comparability, and dissemination. This included summary tables presenting key characteristics of each intervention mapped to the most relevant TIDieR-Rehab items, as well as heatmaps and bar charts to depict the completeness and consistency of reporting within and across intervention groups by TIDieR-Rehab item (Tracey et al. 2025; Olsen et al. 2023; Gomes et al. 2025).

4.7 | Phase 7: Interpretation

Finally, findings from data analysis should be interpreted to maximise the impact of the review on future rehabilitation research, practice, and guidelines (Greener and Langhorne 2002; Kayes et al. 2019; Dijkers et al. 2012). Researchers can use the TIDieR-Rehab items and associated review materials as a structure for interpreting and reporting findings across rehabilitation intervention components. This provides a basis for moving beyond summarising evidence towards explaining its significance and making interpretations explicit, relevant, and replicable in the context of key rehabilitation concepts (Signal, Gomes, et al. 2024; Signal, Olsen, et al. 2024). In the authors' prior reviews, it also supported exploration of potential explanations for the results (e.g., in the Discussion), including the influence of participant, intervention, and contextual factors, and of intervention reporting quality (Gomes et al. 2025; Olsen et al. 2023). For example, if analysis of the item *Where* revealed the intervention occurred in a variety of clinical, home, or virtual environments, this could prompt examination of how rehabilitation settings and accessibility relate to intervention delivery and reported outcomes, and guide targeted comparisons with the wider body of literature. Similarly, if analysis of the TIDieR-Rehab item *How challenging* indicated that an exercise intervention was delivered across a range of challenge levels, based on physiological intensity or perceived effort, this could prompt examination of whether particular challenge levels or types of challenge were associated with greater improvements in outcomes (Olsen et al. 2023) or different patient experiences.

Such interpretations can be integrated with study and evidence quality appraisals, including the CASP (Critical Appraisal Skills Programme), JBI, risk of bias, or GRADE tools, to support judgements about study findings and their impact (Critical Appraisal Skills Programme, n.d.; Joanna Briggs Institute, n.d.; Sterne et al. 2019; Guyatt et al. 2011). Similarly, where poor intervention reporting (identified via the TIDieR-Rehab and related review materials) limited interpretation, this should be explicitly acknowledged as a limitation of the evidence base and may itself identify priorities for improving rehabilitation intervention reporting. Together, these interpretations can inform practical recommendations for future research and clinical practice, such as addressing specific evidence gaps, improving intervention reporting practices for specific TIDieR-Rehab items, enhancing aspects of intervention design and delivery, and providing instructions and recommendations for intervention implementation. In the authors' prior reviews, this included providing the TIDieR-Rehab informed table of reference (as developed in Phase 3 of this framework) as supplementary materials to support future researchers with intervention data extraction and reporting, and future clinicians with intervention planning and translation. Crucially, these should be communicated in ways that are actionable and meaningful for researchers, clinicians, and policymakers (Levack et al. 2024; Kayes et al. 2019; Dijkers et al. 2012). For example, if analysis of the item *Harms—Plan* revealed that most studies did not report how adverse consequences were monitored, this could signal an important gap in study design, intervention monitoring, and outcome reporting. A practical recommendation could then be to encourage researchers to explicitly report harms monitoring procedures, alongside providing intervention-specific examples of harms criteria, common harms, and protocols for prevention, monitoring, response, and reporting, to support future studies in capturing this data.

5 | Discussion

This paper presents the TIDieR-Rehab Seven-Phase Literature Review Framework, which extends existing evidence synthesis approaches by integrating TIDieR-Rehab across the rehabilitation literature review process. Rather than simply applying the

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TIDieR-Rehab checklist within existing review methodologies, this framework provides guidance and supporting materials for systematically identifying, extracting, analysing, and interpreting rehabilitation intervention components throughout the review. Specifically, the framework supports targeted familiarisation with rehabilitation concepts and intervention components, refinement of review questions, the development of supporting materials to guide consistent application of the TIDieR-Rehab checklist and extraction of data, and structured analysis and in-depth interpretation of findings. Utilising this framework may strengthen the quality and impact of evidence synthesis, and support the provision of specific and relevant insights for rehabilitation research, clinical practice, guidelines, and policy. Where adequate intervention and outcome reporting are available, this framework also has potential to contribute to improved understanding of specific intervention components associated with outcomes and to highlight priorities for improving rehabilitation intervention design, reporting, and implementation.

5.1 | Limitations and Future Research

The TIDieR-Rehab Seven-Phase Literature Review Framework has several potential limitations. First, it was developed through an iterative, collaborative process informed by established literature review methodology and the authors' prior experience applying the TIDieR-Rehab across several published rehabilitation intervention reviews. While the authors' experience strengthened the relevance and applicability of the framework, it may have also influenced the methodological emphasis, illustrative examples, and recommendations presented. Furthermore, the framework has not yet undergone formal validation. Further research and external application of the framework across diverse rehabilitation disciplines, review contexts, and research settings are needed to evaluate its content, usability, and feasibility, and to identify opportunities for refinement. Second, the practicality of applying the framework is inherently influenced by the evidence base under review. Incomplete or inconsistent intervention reporting in the included primary studies may limit the depth of analysis in some review contexts. Likewise, reviews of complex rehabilitation interventions or large bodies of evidence remain resource-intensive, often requiring substantial reviewer expertise and time. Although the proposed framework cannot eliminate these challenges inherent to literature reviews, it provides a structured approach and supporting materials to document intervention reporting limitations in the primary studies included and enhance the rigour of the review process.

6 | Implications for Physiotherapy Practice

Applying the TIDieR-Rehab Seven-Phase Literature Review Framework may support rehabilitation researchers and clinicians to more clearly identify, interpret, and compare key components of rehabilitation interventions, including exercise elements, procedures, dosage, and personalisation. This may advance understanding of rehabilitation interventions, including across physiotherapy, occupational, speech-language therapy, exercise science, and other disciplines, by providing insights into potential relationships between reported intervention components, their delivery, participant characteristics, contextual factors, and review findings, including reported outcomes where relevant. Additionally, by systematically identifying and synthesising intervention components, TIDieR-Rehab informed reviews may provide clinicians with more detailed information about how interventions were delivered, while highlighting where gaps in intervention reporting may limit translation into practice. This may strengthen evidence-informed clinical decision-making when selecting, adapting, and implementing interventions for individual patients. Collectively, these contributions may support the advancement of rehabilitation intervention research and enhance translation of evidence into rehabilitation practice.

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The authors have nothing to report.

Consent

The authors have nothing to report.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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