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REVIEW

Gaps in the physical therapy approach to functioning and disability after stroke: a scoping review

Lacunas na abordagem fisioterapêutica da funcionalidade e incapacidade após acidente vascular cerebral: uma revisão de escopo

Brechas en el enfoque fisioterapéutico de la funcionalidad y la discapacidad posaccidente cerebrovascular: una revisión del alcance

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ABSTRACT | Investigating the use of the biopsychosocial model in healthcare can point to shortcomings in the approach to health domains that make care less comprehensive. There are gaps of information on how this model is employed by physical therapists in the care of stroke survivors. These data could contribute to health decision-making and targeting of resources across various intervention settings. This scoping review analyzed clinical trials conducted by physical therapists that had functioning/disability in post-stroke adults as an outcome, with the aim of investigating the biopsychosocial model approach. Articles in which the intervention was applied by other professionals and/or published only in languages not mastered by the authors were excluded. Screening by two blinded reviewers returned 25 articles across eight databases (Medline, PEDro, Embase, Scopus, LILACS, CINAHL, Web of Science, and the Cochrane CENTRAL database). The content of the functioning/disability assessment measures was linked to the domains of the International Classification of Functioning, Disability, and Health (ICF). With the ICF categories, a more detailed content analysis was conducted, enabling a precise comparison across intervention settings. We found that the functioning/disability approach mostly focuses on covering the activity elements of the biopsychosocial model, mainly mobility and self-care, regardless of the intervention setting. The results of this study may be useful for guiding the practice of physical therapists, providing data for health managers to officially adopt the model as a decision-making guide and clarifying to patients some of the objectives of physical therapy after stroke.

Keywords | Stroke; Physical Therapy Modalities; International Classification of Functioning, Disability and Health; Health Services.

RESUMO | Este estudo buscou investigar se o uso do modelo biopsicossocial na prestação de saúde pode apontar carências na abordagem dos domínios de saúde que tornem o cuidado menos abrangente. Não há informações sobre como o modelo é utilizado por fisioterapeutas no cuidado às pessoas que sofreram Acidente Vascular Cerebral (AVC). Esses dados podem contribuir para as decisões em saúde e para o direcionamento de recursos nos diferentes cenários de intervenção. Esta revisão de escopo analisou ensaios clínicos conduzidos por fisioterapeutas que tiveram a funcionalidade/incapacidade em adultos pós-AVC como desfecho, com o objetivo de investigar a abordagem do modelo biopsicossocial. Foram excluídos deste estudo artigos em que a intervenção foi aplicada por outros profissionais e que foram publicados somente em idiomas não dominados pelos autores. A triagem por dois revisores cegos retornou 25 artigos em oito bases de dados (Medline, PEDro, Embase, Scopus, Lilacs, CINAHL e Web of Science, e base de registros Cochrane Central). O conteúdo das medidas de avaliação da funcionalidade/incapacidade foi vinculado aos domínios da Classificação Internacional de Funcionalidade, Incapacidade e Saúde (CIF). Com as categorias da CIF, foi conduzida uma análise de conteúdo mais detalhada que permitiu uma comparação precisa entre os cenários de intervenção.

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A abordagem da funcionalidade/incapacidade concentra-se em cobrir os elementos de atividade do modelo biopsicossocial, principalmente mobilidade e autocuidado, independentemente do ambiente. Os resultados deste estudo podem ser úteis para guiar a prática de fisioterapeutas, oferecer dados para gestores de saúde adotarem oficialmente o modelo como orientador de decisões e esclarecer aos pacientes alguns objetivos do cuidado fisioterapêutico.

Descritores | Acidente Vascular Cerebral; Modalidades de Fisioterapia; Classificação Internacional de Funcionalidade, Incapacidade e Saúde; Serviços de Saúde.

RESUMEN | Este estudio pretendió investigar si el uso del modelo biopsicosocial en la atención médica puede apuntar a deficiencias en el enfoque de los dominios de salud que hacen que la atención sea menos integral. No hay información sobre cómo los fisioterapeutas utilizan el modelo en la atención a personas que hayan sufrido un accidente cerebrovascular (ACV). Estos datos pueden contribuir a las decisiones sanitarias y a la asignación de recursos en diferentes escenarios de intervención. Esta revisión del alcance analizó los ensayos clínicos realizados por fisioterapeutas que se enfrentaron a la funcionalidad/discapacidad en adultos pos-ACV como resultado, con el objetivo de investigar el enfoque del modelo biopsicosocial. Se excluyeron de este estudio los artículos en que la intervención fue aplicada por otros profesionales y aquellos que fueron publicados únicamente en idiomas no dominados por los autores. La selección realizada por dos revisores ciegos arrojó 25 artículos en ocho bases de datos (Medline, PEDro, Embase, Scopus, Lilacs, CINAHL y Web of Science, y en Cochrane Central). El contenido de las medidas para evaluar la funcionalidad/discapacidad se vinculó a los dominios de la Clasificación Internacional del Funcionamiento, la Discapacidad y la Salud (CIF). Con las categorías CIF, se realizó un análisis de contenido más detallado que permitió una comparación precisa entre los escenarios de intervención. El enfoque de funcionalidad/discapacidad se centra en cubrir los elementos de actividad del modelo biopsicosocial, principalmente la movilidad y el autocuidado, independientemente del entorno. Los resultados de este estudio pueden ser útiles para orientar la práctica de los fisioterapeutas, al ofrecer datos para que los gestores sanitarios adopten oficialmente el modelo como guía de decisión, y para aclarar algunos objetivos de la atención fisioterapéutica a los pacientes.

Palabras clave | Accidente Cerebrovascular; Modalidades de Fisioterapia; Clasificación Internacional del Funcionamiento, la Discapacidad y la Salud; Servicios de Salud.

INTRODUCTION

Since 1990, stroke has remained among the top five leading causes of disability worldwide[1]. Post-stroke complications can last for days or become permanent, ranging from localized effects such as pain and reduced muscle strength to social impacts, including dependence on others for self-care, delayed return to work, and social restrictions[2-5]. The burden extends to caregivers, families, the healthcare system, and the economy, influencing decisions made by health managers[6-8].

Admission to a rehabilitation program depends on factors such as injury severity, individual progress, patient preferences and support network, presence of a caregiver, and availability of services[9]. Hospitals and wards are generally intended for intensive care, as they contain equipment and routines suited to reduce complications and stabilize the clinical condition[10]. Upon discharge, the individual may be referred to home care services, outpatient clinics, rehabilitation centers, specialized clinics, long-term care institutions, or primary care services[10].

Given the broad range of stroke consequences, the use of the biopsychosocial model in clinical practice has been recommended to ensure better quality of care[10]. The model was introduced in the International Classification of Functioning, Disability, and Health (ICF) and prevents care from being reduced to a single aspect of health, whether biological, personal, social, or related to the health condition[11]. The positive dynamic interaction between these elements is referred to as functioning. The negative experience of this interaction is called disability[11,12]. The ICF framework has stood out as a guide for analyzing outcomes in the context of rehabilitation and as a model for assessing functioning in health conditions such as stroke[13]. In physical therapy, studies focus on investigating the alignment of assessment instruments with the domains of health[14-18]. The results of this investigation highlighted gaps in addressing health domains in the management of orthoses for post-stroke patients. Additionally, they provided data to guide the choice between generic and condition-specific quality of life assessment measures, with the potential to inform decisions on functional health and support the development of public health policies[16-18].

The study of functionality and disability from the perspective of the biopsychosocial model provides crucial data to identify the population's health needs and allocate resources across various rehabilitation settings[8,13]. Information on how physical therapists apply the model in the management of functioning and disability post-stroke is still lacking. Seeking this information may reveal gaps in the biopsychosocial approach, thus providing a more comprehensive understanding of the health condition, offering insights for planning patient-centered interventions, and facilitating collaborative intervention planning between professionals, the patient, and their support network. For healthcare services, the information may enable standardized language among physical therapists, facilitating communication during transitions between healthcare services; prompt reflection on the need for professional training in the biopsychosocial approach; and encourage the development of health policies based not only on mortality and morbidity indicators.

This scoping review aimed to study the use of the biopsychosocial model in addressing functioning/disability in post-stroke care provided by physical therapy across different intervention settings. Other objectives included: (1) Identify the most frequent primary outcomes and measurement instruments in each intervention setting; (2) Examine the alignment of the content of functioning/disability assessment tools with the ICF; and (3) Compare the content and coverage of the ICF across intervention settings.

METHODOLOGY

This scoping review followed the Joanna Briggs Institute guidelines[19]. The eligibility criteria included clinical trials with an adult population that suffered a stroke and received some form of physical therapy intervention, compared to another intervention or no intervention. The assessment of functioning or disability is considered the primary or secondary outcome of the study. Studies in which the intervention was applied by professionals other than the physical therapist and studies not found in Brazilian Portuguese, English, or Spanish were excluded. The search was conducted in September 2022 across the Medline, PEDro, Embase, Scopus, LILACS, CINAHL, Web of Science, and the Cochrane Central Register of Controlled Trials databases. DECS, MESH, EMTREE terms, free terms, and their synonyms were used, including but not limited to: stroke, rehabilitation, physical therapy modalities, functioning, and disability.

After removing duplicates, two blinded reviewers screened the studies in two stages. Before each screening, a pilot test was conducted with a random sample to ensure an agreement of ≥75%. After selection, if the disagreements could not be resolved by consensus, a third reviewer was consulted.

The functioning/disability approach was examined based on the ICF framework. With the categories generated by linking the assessment instruments, a content analysis was conducted and compared across the intervention settings.

ANALYSES

Process of identifying and linking significant concepts

The linking process followed the one proposed by Cieza[14]. The significant concepts were identified and then blind-coded by two authors, who received training from an experienced coder, also responsible for resolving any discrepancies. Data were only extracted when agreement was ≥74% in each instrument[20]. Concepts not included in the ICF that were not personal factors were represented as not covered (NC) and were assigned a specific code when related to diagnosis or health condition (NC-HC) and quality of life (NC-QL). Concepts with insufficient information for linking were represented as not defined (ND) and were assigned specific codes when related to general health (ND-GH), quality of life (ND-QL), and disability (ND-DIS).

Agreement analyses

Inter-reviewer agreement was assessed at the following moments: (1) two pilot tests before screening; (2) data extraction from the retrieved studies; and (3) linking process of the assessment instruments to the ICF.

Content analysis

In total, three main estimations were found: content density, content diversity, and bandwidth of content coverage[16]. Content density identifies the number of significant concepts per item in an assessment instrument. Values equal to one indicate one concept per item. It follows the Formula (1):

Content density = total significant concepts in the x instrument (1) total x instrument items

The content diversity reflects the range of ICF categories by significant concept in each assessment instrument. The closer to zero, the lower the diversity, as more concepts correspond to the same category. It is estimated by Formula (2):

Content diversity = total categories linked to the ICF in the x instrument (2)

total significant concepts in the x instrument

To estimate the weight of the ICF categories/domains, bandwidthof content coverage was considered, which measures the frequency of categories and domains of the assessment instrument by employing the Formulas (3) and (4). In both, higher values indicate better coverage of the ICF by the instrument.

Total number of categories linked to the ICF in x instrument × 100 (3)

total ICF categories

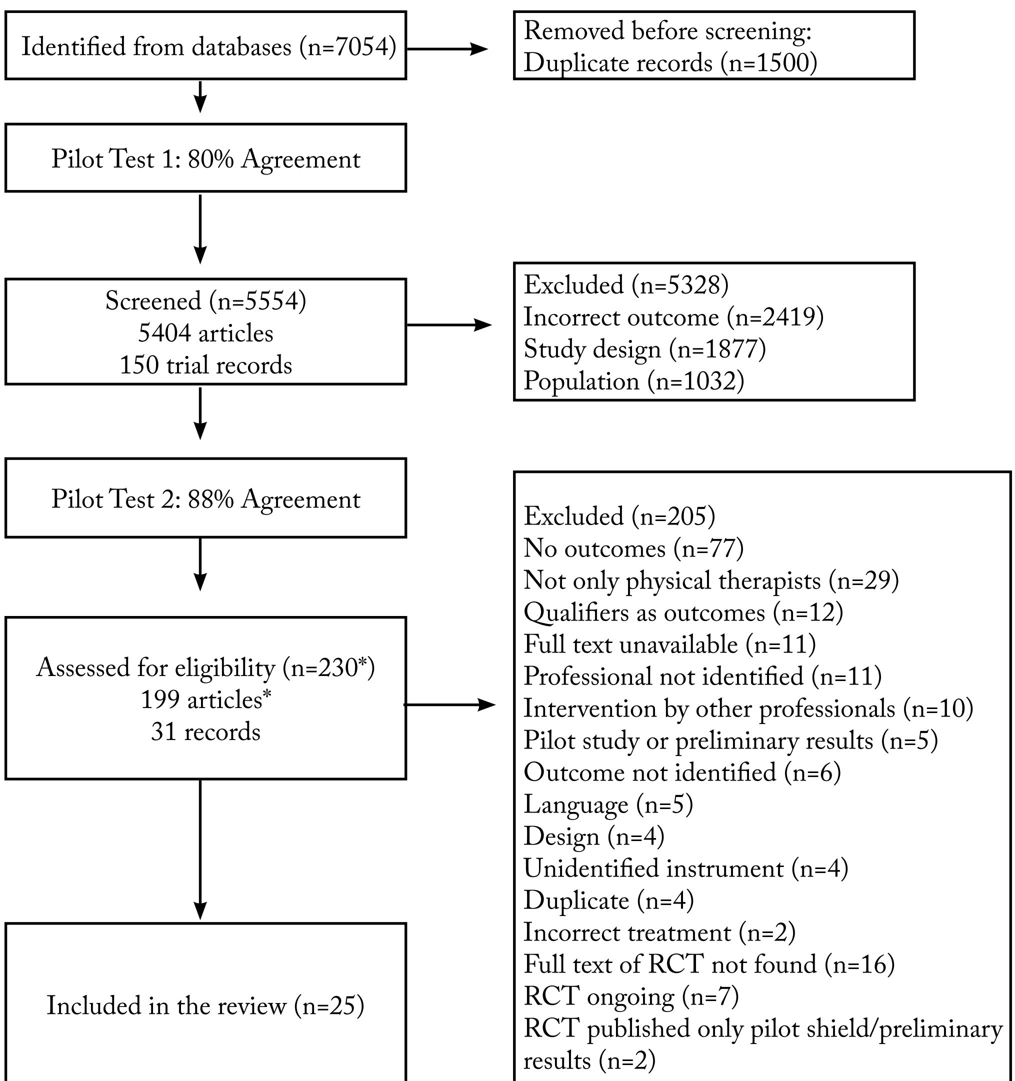
Total number of categories in y domain in x instrument × 100 (4)

Total number of categories in y domain in the ICF

A total of 1,548 categories were found on the official World Health Organization website in November 2023, of which 522 are covered in the domain of body functions; 309 in body structures; 456 in activity and participation; and 261 in environmental factors[21].

RESULTS

The search retrieved 7,054 articles, of which 5,554 remained after duplicates were excluded. The selection and screening process is detailed in Figure 1 and was completed with 25 articles.



*: 1 of the clinical trial records generated four articles>

Figure 1. Selection and screening process

Chart 1 summarizes the included articles. The assessment of disability was predominant (n=23, 92%) compared to functioning (n=3, 12%). In total, 11 instruments were found: Action Research Arm Test (ARAT), Index of Extended Activities of Daily Living (IEADL), Motor Assessment Scale (MAS), Stroke Impact Scale (SIS), Timed Up and Go Test (TUG), 10-Meter Walk Test (10MWT), Six-Minute Walk Test (6MWT), Functional Independence Measure (FIM), Rankin Scale (RS), Barthel Index (BI), Berg Balance Scale (BBS). BI and RS were the most commonly used to assess disability, regardless of the setting. The functionality assessment was covered in three articles: two from the same group of authors, who applied a combination of measures, and one that used the SIS to evaluate both self-perceived functionality and disability[22].

Chart 1. Summary of the articles included in the review.

Author/Year/ Journal	Objective	Primary outcome/ Measure	Sample characteristics	Intervention	Setting
Ada et al.[23]	To evaluate the effectiveness of a treadmill and overground walking program in reducing the disability and handicap associated with poor walking performance after stroke.	Disability. 10-Meter Walk Test (10MWT - Walking speed) Six-Minute Walk Test (6MWT - Walking capacity)	27 (13 experimental, 14 control) Mean age: 66 7-72 months post-stroke	Experimental: 30–45 minutes walk. 1st week: 80% time on the treadmill, 20% overground on different surfaces. Control: stretching, strengthening, balance and coordination).	Community
Andersen et al.[24]	To evaluate two models of follow-up intervention after discharge	Disability. IEADL	155 (54 Group 1, 52 Group 2, 48 control) Min-max age: 56-85 years Acute stroke	Group 1: medications, reference to other services, liaison between the patient and stroke services, and counseling. Group 2: instructions and reeducation on mobility and ADL. Control: outpatient rehabilitation on ordination by a hospital physician .	Groups 1 and 2: Home visit
Askim et al.[25]	To evaluate the effect of a 4-week community-based intensive motor training (IMT) program combined with early supported discharge after initial treatment in a comprehensive stroke unit on balance and other functional outcome measures.	Disability. Barthel Index (BI)	62 (30 IMT, 32 control) Min-max age: 67-87 Time after stroke 4-14 days	IMT: 3 additional sessions of motor training for functional tasks, 30-50 minutes each. Control: Conventional treatment by the comprehensive stroke unit.	IMT: Provided by physical therapists in the primary health care system (also administered in the patients' home, at a rehabilitation clinic, or at an outpatient clinic). Control: Administered as inpatient rehabilitation, outpatient rehabilitation, or as rehabilitation in the patients' home
Cabanas-Valdés et al.[26]	To evaluate the effectiveness of core stability exercises (CSE) in subacute stroke (<1 month) in addition to conventional physical therapy (CP).	Disability. RS 2005	87 (45 control, 42 CSE) Min-max age: 54-84 Time after stroke: <1 month	Control: 30 minutes of conventional physical therapy (mobilization, stretching, strengthening, balance, and gait). CSE: Core stability exercises, 30 minutes each.	Hospital

Chart 1. Continuation

Author/Year/ Journal	Objective	Primary outcome/ Measure	Sample characteristics	Intervention	Setting
Chaiyawat et al.[27]	To develop and examine the effectiveness of individual 6-month home rehabilitation program in ischemic stroke patients upon disability and quality of life (QoL) at two years	Disability. RS 2005	60 (30 experimental, 30 control) Min-max age: 55-77 Time after stroke: about three days	Experimental: 60 minutes of supervised exercises and counseling, supported by videos that included mobilization, resistance, and ADL. Control: Instruction to seek rehabilitation services after discharge.	Experimental: Place of residence Control: Other services
Chaiyawat et al.[28]	To evaluate the long-term effectiveness of a home rehabilitation program for patients with middle cerebral artery infarction.	Disability. Barthel Index (BI)	60 (30 control, 30 intervention) Min-max age: 55-77 Time after stroke: about three days	Experimental: 60 minutes of supervised exercises and counseling, supported by videos that included mobilization, resistance, and ADL. Control: received instructions for home rehabilitation.	Experimental: Place of residence Control: Other services
Chen et al.[29]	To compare the effects of neuromuscular electrical stimulation (NMES), noxious thermal stimulation (NTS), and the hybrid of NMES and NTS ("Hybrid") on motor recovery of upper extremity for patients with stroke.	Disability. Barthel Index (BI)	43 (13 NMES, 13 NTS, 17 Hybrid) Min-max age: 39-73 Time after stroke: >6 months	NMES: 30 min of NMES in 2 sessions. NTS: 30 min of NTS in 2 sessions. Hybrid: 15 min of NTS and 15 min of NMES. All groups were also subjected to traditional rehabilitation.	Outpatient clinic of the Rehabilitation Department
Ertekin et al.[30]	To compare the outcomes of a supervised physical therapy program versus home-based physical therapy in individuals with unilateral visual neglect post-stroke.	Disability. Barthel Index (BI)	20 (10 supervised at a rehabilitation clinic. 10 at home) Min-max age: 48-82 Time after stroke 3-24 months	45-60 minutes of warm-up, strengthening, and stretching. Supervised: 3 times/week. Performed in front of a mirror, with feedback provided. At home: Encouragement by phone 1 time/week.	Supervised: Rehabilitation clinic
Feys et al.[31]	To evaluate the effect of additional sensorimotor stimulation on motor and functional recovery of the hemiplegic arm in post-stroke individuals.	Disability. Action Research Arm Test (ARAT) 1981 (upper limb function) Barthel Index (BI) and ADL	100 (50 control, 50 experimental) Min-max age: 36-88 Time after stroke 14-35 days	Experimental: 30 minutes of stimulation in hemiplegic arm movements. Additional to standard rehabilitation. Control: same procedures, no stimulation.	Hospital
Hanger et al.[32]	To determine whether strapping the shoulder in hemiplegic stroke patients: (1) prevents the development, or reduces the severity of shoulder pain. (2) preserves range of movement in the shoulder, and (3) improves the functional outcomes for the arm and patient overall outcomes	Disability. Functional Independence Measure (FIM) Rankin scale (RS) 1957	98 (49 control, 49 strapped) Min-max age: 70-87. Acute stroke	Experimental: Bandaging of the affected shoulder for 6 weeks, or until active movements are possible, or until discharge. Reapplication every 2-3 days. Control: follow-up without bandaging.	Hospital ward.

(continues)

Chart 1. Continuation

Author/Year/ Journal	Objective	Primary outcome/ Measure	Sample characteristics	Intervention	Setting
Hopwood et al.[33]	Investigate the effectiveness of acupuncture in stroke recovery compared to placebo.	Disability. Barthel Index (BI)	105 (57 acupuncture, 48 sham) Min-max age: 42-93 Time after stroke 4-10 days	Acupuncture: 30 minutes. Started in the hospital and continued at home if necessary. Control: sham/placebo.	Hospital. At home (if discharged within 4 weeks)
Jonsdottir et al.[34]	To investigate the effect of continuous functional electrical stimulation control (CFES) combined with task-oriented therapy (TOT) to assist arm movements, induce recovery of body functions, and address disability.	Disability. Action Research Arm Test (ARAT) 2002	82 (38 M-TOT, 44 C-TOT) Min-max age: 36-88 Time after stroke: >1 months	M-TOT: Active upper limb movements oriented toward tasks and associated with the use of MeCFES. C-TOT: Active upper limb movements oriented toward tasks.	Rehabilitation center
Langhammer et al.[35]	To evaluate the impact of two physical therapy regimens on self-reported quality of life (QoL) in acute stroke and investigate their impact on QoL.	Functioning: Barthel Index (BI) Motor Assessment Scale (MAS) Berg Balance Scale (BBS)	75 (35 intensive, 40 regular) Min-max age: 70-76 Acute-chronic phase	Intensive: Approximately 80 hours of physical therapy focused on endurance, strength, and balance. Standard: physical therapy if needed.	Home, private physical therapy, or hospital ward treatment.
Langhammer et al.[36]	Investigate how motor function, balance, mobility, walking capacity, and activity patterns differ between two groups with varying functional capacities.	Functioning: Motor Assessment Scale (MAS) Berg Balance Scale (BBS) Timed Up and Go (TUG) and Six-Minute Walk Test (6MWT) Barthel Index (BI) and ADL	75 (37 MAS<35, 38 MAS>35) Min-max age: 57-90 Acute-chronic phase	Intensive: physical therapy 2-3 times per week, focusing on endurance, strength, and balance over four periods during the first year post-stroke. Total: about 80 hours. Standard: physical therapy if needed.	Home, private physical therapy, or hospital ward treatment.
Marándola et al.[37]	To evaluate whether modified constraint-induced movement therapy (mCIMT) is more beneficial than conventional therapy for hemispatial neglect, as well as its effects on autonomy and disability.	Disability. Modified Rankin Scale (mRS) 1988	30 (15 mCIMT, 15 control) Min-max age: 53-86 Time after stroke: <30 days	60min. mCIMT: for upper and lower limbs. Control: Upper and lower limb exercises.	Home visit
Morone et al.[38]	To investigate the effectiveness of balance training using video games on functional balance and disability in individuals with hemiparesis after stroke.	Disability. Barthel Index (BI)	50 (25 Wii Group, 25 control) Min-max age: 36-76 Time after stroke: <3 months	12 sessions of 20 minutes, 3 times per week. Wii Group: Balance, coordination, and endurance training using Wii Fit video games. Control: Balance training	Hospital rehabilitation unit
Morreale et al.[39]	Compare Proprioceptive Neuromuscular Facilitation (PNF) techniques with Cognitive Therapeutic Exercise (CTE) at two different times after stroke.	Disability. Modified Rankin Scale (mRS) 1988 Barthel Index (BI)	340 (110 early PNF, 110 early CTE, 60 late PNF, 60 late CTE) Min-max age: 48-78 Time after stroke 6-24 hours	Early PNF and CTE (24 hours post-stroke): 1-2 hours of daily mobilization with PNF or CTE. Late PNF and CTE (72 hours post-stroke): Posture and positioning in bed during the first 72 hours. Afterward, they followed early PNF or CTE intervention.	Hospital, Intensive Rehabilitation Unit

(continues)

Chart 1. Continuation

Author/Year/ Journal	Objective	Primary outcome/ Measure	Sample characteristics	Intervention	Setting
Nilsson et al.[40]	To compare the impact between treadmill walking training with weight support and floor training in the early rehabilitation stage of patients with hemiparesis post-stroke.	Disability. Functional Independence Measure (FIM)	73 (36 experimental, 37 control) Min-max age: 24-67 Time after stroke: <8 weeks	Experimental: 30 minutes of treadmill walking with weight support. Control: 30 minutes of overground walking.	Rehabilitation Department of the University Hospital
Pandian et al.[41]	Explore the effectiveness of Mirror Therapy (MT) in treating unilateral neglect in stroke patients.	Disability. Modified Rankin Scale (mRS) 1988	48 (27 MT, 21 control) Min-max age: 52-76 Time after stroke: >48	MT: 1-2 hours, exercises with affected upper limb. Control: TM-like exercises, without a mirror.	Conducted in the hospital or at home (if >4 weeks)
Sritipsukho et al.[42]	To compare the costs and effects between a home rehabilitation program and conventional hospital care for patients with ischemic stroke in a healthcare service in Thailand.	Disability. RS 2005 Barthel Index (BI)	60 (30 experimental, 30 control) Min-max age: 55-77 Time after stroke: >3 days - 3 months	Experimental: 1 visit of 1 hour per month for 3 months, exercise in exercise physiology, and motor learning with the help of DVD video recordings. Control: conventional hospital care and rehabilitation prescribed by a physician.	Home visit
Tollár et al.[43]	To compare the impacts of high-intensity and frequent exergaming mobility rehabilitation on symptoms of blood pressure, mobility, and stroke.	Disability. Modified Rankin Scale (mRS) 1988	580 (290 Exergaming 2×, 290 Exergaming 1×, 100 control) Min-max age: 58-70 Time after stroke 2-4 weeks	Exergaming: 1 hour, of which 25 minutes were spent on exergaming. Group 1: 1 time/day. Group 2: 2 times/day. Control: standard care with low intensity.	Groups 1 and 2: Physical therapy gym in the hospital outpatient clinic.
Volpe et al.[44]	To determine, in patients with upper limb disability post-stroke, whether robotic movement therapy or therapist-delivered therapy using an intensive training protocol is superior.	Disability. Stroke Impact Scale (SIS) Action Research Arm Test (ARAT) 1981	21 (11 experimental, 10 control) Min-max age: 57-65 Time after stroke: >6 months	1 hour. Control: adapted exercises using Bobath. Experimental: robot-assisted exercises.	Outpatient clinic
Wall et al.[22]	Compare self-perceived functioning, disability, and recovery after Electromechanical-Assisted Gait Training (EAGT) and conventional training.	Self-perceived functioning and disability: Stroke Impact Scale (SIS)	28 (15 EAGT, 13 control) Min-max age: 48-64 Subacute phase	EAGT: conventional physical therapy using the assistive device. Control: conventional program.	Rehabilitation Department of the University Hospital
Wright et al.[45]	Evaluate the effect of home-based robot-assisted gait training (O-RAGT) using the AlterG Bionic Leg orthosis on functional clinical outcomes in individuals with chronic stroke.	Disability. RS 2005	34 (16 O-RAGT, 18 control) Min-max age: 49-79 Time after stroke: >3 months - 5 years	O-RAGT: robot-assisted gait training, as well as conventional physical therapy. Control: conventional physical therapy (stretching, strengthening, and activity training).	Conducted at home or in a stroke outpatient clinic.
Young et al.[46]	To compare outpatient hospital care and home physical therapy for stroke patients discharged from the hospital to determine which service shows greater functional and social improvement.	Disability. Barthel Index (BI)	124 (61 control, 63 experimental) Min-max age: 60-89 Intervals: <4 weeks / 4-7 weeks / 8-11 weeks / >12 weeks	Experimental: home physical therapy at 15 visits. Control: physical therapy in the outpatient hospital.	Home visit

ADL: Activity of Daily Living; QoL: Quality of Life

Regarding intervention settings, the studies were conducted in: community or primary care (C - n=2; 8%), home (H - n=12; 48%), outpatient clinics (OC - n=7; 28%), as well as hospital and wards (HW - n=11; 44%). We found that lower levels of care showed less diverse instruments. There was no assessment of functioning in the community setting. Chart 2 presents the assessment instruments used by intervention setting. For frequency, see Table 1.

Chart 2 – Assessment instruments and intervention settings by article.

													Location			
		RS	ARAT	Barthel Index (BI)	IEADL	Motor Assessment Scale (MAS)	Stroke Impact Scale (SIS)	Berg Balance Scale (BBS)	TUG	10-Meter Walk Test	6MWT	Functional Independence Measure (FIM)	C	H	OC	HW
1	Ada et al.[23]									X	X		·			
2	Andersen et al.[24]				X									·		
3	Askim et al.[25]			X									·			
4	Cabanas-Valdés et al.[26]	X														·
5	Chaiyawat et al.[27]	X												·		
6	Chaiyawat et al.[28]			X										·		
7	Chen et al.[29]			X											·	
8	Ertekin et al.[30]			X										·		
9	Feys et al.[31]		X	X												·
10	Hanger et al.[32]	X										X				·
11	Hopwood et al.[33]			X										·		·
12	Jonsdottir et al.[34]		X												·	
13	Langhammer et al.[35]			X		X		X						·	·	·
14	Langhammer et al.[36]			X		X		X	X		X			·	·	·
15	Marándola et al.[37]	X												·		
16	Morone et al.[38]			X												·
17	Morreale et al.[39]	X		X												·
18	Nilsson et al.[40]											X				·
19	Pandian et al.[41]	X												·		·
20	Sritipsukho et al.[42]	X		X										·		
21	Tollár et al.[43]	X													·	
22	Volpe et al.[44]		X				X								·	
23	Wall et al.[22]						X									·
24	Wright et al.[45]	X												·	·	
25	Young et al.[46]			X										·		

*Outcome assessed: functioning
**Outcomes assessed: functioning and disability

Table 1. Frequency of assessment tools by intervention setting

	Community/ Primary care	Home	Outpatient clinic	Hospital/ Ward
RS		20% (5)	8% (2)	16% (4)
ARAT			8% (2)	4% (1)
Barthel Index (BI)	4% (1)	20% (5) 8% (2)*	4% (1) 8% (2)*	12% (3) 8% (2)*
IEADL		4% (1)		
Motor Assessment Scale (MAS)		8% (2)*	8% (2)*	8% (2)*
Stroke Impact Scale (SIS)			4% (1)	4% (1)
				4% (1)*
Berg Balance Scale (BBS)		8% (2)*	8% (2)*	8% (2)*
TUG		4% (1)*	4% (1)*	4% (1)*
10-Meter Walk Test	4% (1)			
6MWT	4% (1)	4% (1)*	4% (1)*	4% (1)*
Functional Independence Measure (FIM)				8% (2)

*Outcome assessed: functioning

In total, two rounds of blind linkage were necessary to achieve the desired agreement (≥74%) among reviewers across all instruments. No version of the IEADL was found, even after attempts to contact the authors. Thus, the measure was not linked to the ICF, nor included in the content analysis (Table 2). The Barthel Index (BI) was the only instrument to cover all four ICF domains and the one that included the highest concentration of categories related to environmental factors. Despite the activity and participation domain being the most covered, only the Stroke Impact Scale (SIS) and the Functional Independence Measure (FIM) included their own categories of participation, considered in this article as d7-d9. However, the FIM only covered aspects of interpersonal interaction and relationships, whereas SIS also covered work and community, social, and civic life. The SIS showed the highest percentage of ICF coverage, whereas the 6MWT and TUG presented the lowest. Coding of environmental factors was generally associated with dependence.

Table 2 – Content analysis

	TOTAL	ARAT	Barthel Index (BI)	Berg Balance Scale (BBS)	Functional Independence Measure (FIM)	Motor Assessment Scale (MAS)	RS	Stroke Impact Scale (SIS)	6MWT	TUG	10-Meter Walk Test
No. of Items	307	23	40	84	25		7	69	1	1	1
No. of Concepts	458	23	62	138	26	101	19	84	1	3	1
No. of Concepts linked to the ICF	445	23	62	138	26	101	11	79	1	3	1
Content density	1.49	1	1.55	1.64	1.04	1.80	2.71	1.21	1	3	1
No. of Categories linked to the ICF and not repeated (of different levels)	178	7	31	15	21	32	6	61	1	3	1
Content diversity	0.38	0.3	0.5	0.1	0.8	0.31	0.31	0.72	1	1	1
Bandwidth of content coverage (%)	11.49	0.45	2	0.96	1.35	2.06	0.38	3.94	0.06	0.19	0.06
Function	38	--	2	3	4	9	1	16	1	1	1
Structure	2	--	2	--	--	--	--	--	--	--	--
Activity and participation	131	7	24	11	17	22	3	45	--	2	--
Environmental factors	7	--	3	1	--	1	2	--	--	--	--
Bandwidth of content coverage of each domain (%)											
Function (%)	7.27	--	0.38	0.57	0.76	1.72	0.19	3.06	0.19	0.19	0.19
Structure (%)	0.64	--	0.64	--	--	--	--	--	--	--	--
Activity and participation (%)	28.72	1.53	5.26	2.41	3.72	4.82	0.65	9.86	--	0.43	--
Environmental factors (%)	2.68	--	1.14	0.38	--	0.38	0.76	--	--	--	--

DISCUSSION

The approach to functioning and disability shows low variation across the intervention settings of physical therapy in post-stroke patients. Most instruments showed greater coverage of the activity and participation domain but low diversity of participation categories. We found more diversity and combination of instruments as the level of care increased. Notably, of the three studies that assessed functioning, none were conducted in a community setting. For both outcomes, environmental factors were identified only when related to dependence.

Most instruments employed to assess disability and functioning (BI, RS, ARAT, 6MWT, MAS, FIM, BBS, and TUG) were recommended to assess activity and participation, highlighting the importance of this domain for rehabilitation[10,47]. However, caution is advised when employing these measures alone, or in combination with each other alone, as these measures would be insufficient to cover the scope of disability/functioning when they are the outcome of interest[47]. The expression "disability" had already been employed to describe activity limitations before the ICF publication; thus, it is possible that the preference of this term by these instruments is reflecting a confusion in the use of the term for more specific purposes[47].

The bandwidth of content coverage followed the weight given to categories in the Brief Core Set of stroke, namely, activities and participation, body functions, environmental factors, and body structures[9]. This highlights that the choice of instruments may not be arbitrary, but the combination can still be refined to cover all relevant areas. For example, considering the similarity between the content of BI and RS and that both assess from the perspective of dependence, the combination between them would generate repeated information. It is possible to replace one of them with the FIM, which, despite the similarities, adds categories such as memory and communication. Another possibility, not found in this research, would be the World Health Organization Disability Assessment Schedule (WHODAS 2.0). The instrument was constructed to assess health and disability based on the ICF framework, covering all health domains. It has already been validated for the post-stroke population and can be administered in various versions[48-50].

We found a low coverage of participation in interventions on functioning and disability. However, participation restrictions are associated with patients with a poorer quality of life, becoming an important element for care[51]. Some instruments that include elements of participation (general aspects of health, quality of life, and social isolation) and that can guide the intervention include the SIS, the Nottingham Health Profile, and the Medical Outcomes Study Short Form 36[47,52]. Participation is also impacted by potentially modifiable contextual factors, such as motivation, acceptance of health condition, self-esteem, support network, assistive equipment in the community, adjustments to the home environment, and accessibility to social and healthcare services[53].

We highlight the importance of assessing participation and environmental factors from the hospital environment. Strong communication between cross-sector teams can lead to benefits for a smoother transition after discharge[54]. However, this assessment is more evidently needed in the community and home environments, as they tend to show a greater focus on independence in daily activities and social insertion[10]. Physical therapists must fully utilize the available resources in the environment to identify and address treatment barriers and facilitators, while also developing strategies to enable the individual and/or their support network to do the same[3]. It is also essential to ensure access to rehabilitation services, whether in the identification of services, transportation, or acquisition of information[3].

In cases of low recovery potential, it is necessary to remember that functioning continues to exist in the presence of disability[14]. A patient who has moved past the spontaneous recovery phase and experiences minimal gains during rehabilitation can still achieve improvements in activity and participation at any time, particularly in an enriched environment and with investment in adaptive and compensatory strategies for activities[9,55].

Wade has discussed the need to include the biopsychosocial model in healthcare planning, especially due to the demand for indices that contemplate the impacts generated by the increase in chronic diseases in the population[56]. The results of this study may contribute, initially, to guide decisions of health managers. Some actions are suggested, including ongoing education for physical therapists on the application of the model, emphasizing and illustrating interventions targeting environmental factors and participation; establishment of functioning and disability indicators in rehabilitation services, such as health literacy levels, presence of an active caregiver, and availability of transportation for rehabilitation appointments; and monitoring these indicators across various intervention settings to allocate resources according to specific needs.

There is a tendency for future trials to show more specific primary outcomes for each health domain[3]. To prevent readers from interpreting this decision as a fragmentation of care and to facilitate the application of results in health services and policies, we suggest that future trials clearly present the correlation between health components and the implications of the results for functioning and disability.

Limitations

This review shows some limitations. Including only three languages may have restricted the final number of articles. The review protocol was not published as required by the Joanna Briggs Institute. Moreover, the selected studies were not assessed for quality and risk of bias. However, as this research investigated the theoretical approach to functioning and disability, the methodological quality of the studies and the impacts of the interventions did not interfere in the results. Finally, we highlight that clinical trials cannot exactly reproduce the daily routines of physical therapists, who face various situations that cannot be predicted.

CONCLUSION

The approach to functioning and disability by physical therapists in post-stroke patients focuses on covering the elements of the biopsychosocial model related to activity, mainly mobility and self-care, regardless of the intervention setting. The hospital setting showed the greatest diversity of categories related to participation and environmental factors. Conducting a more comprehensive assessment solely in the hospital setting may hinder the patient's overall progress. We highlight that these assessments must be integrated into the daily routine, as they are also targets for intervention, particularly in the home and community settings, and for individuals with limited potential for spontaneous recovery gains. As there is a limit to professional performance on disability, further trials that adopt functioning as an outcome are suggested.

BI and RS were the most frequent instruments for assessing disability, whereas BI, MAS, and BBS had the highest frequency for functioning. To ensure the coverage of the biopsychosocial model using the instruments found in this research, it is necessary to combine them by observing their diversity of content and bandwidth of content coverage. We underscore that the Stroke Brief Core Set is a useful tool to support the selection of instruments. We also highlight the importance of standardizing health terms as presented in the ICF to facilitate understanding in future research and to standardize language among physical therapists.

The results of this study may facilitate the choice of instruments for assessing post-stroke disability and functioning among physical therapists across various intervention settings. They can also be useful for health managers who plan to consider these outcomes for decision-making. There is no justification for ignoring the use of the concepts set forth in the ICF and the biopsychosocial model, which is based on it, as health indicators. Reading this text is also encouraged for individuals who have had a stroke and wish to understand more about physical therapy, as it provides important information for collaborative treatment planning and contributes to self-management of health.

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