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REHABILITATION INTERVENTIONS IN NURSING: GAINS IN FUNCTIONALITY IN THE SELF-CARE OF PEOPLE WITH NEUROLOGICAL DISORDERS

INTERVENÇÕES DE REABILITAÇÃO EM ENFERMAGEM: GANHOS EM FUNCIONALIDADE NO
AUTOCUIDADO DA PESSOA COM ALTERAÇÕES NEUROLÓGICAS

INTERVENCIONES DE REHABILITACIÓN EN ENFERMERÍA: GANANCIAS DE FUNCIONALIDAD
EN EL AUTOCUIDADO DE PERSONAS CON TRASTORNOS NEUROLÓGICOS

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RESUMO

Introdução: A mortalidade por acidente vascular cerebral tem diminuído, mas a morbilidade continua a ser um desafio, tornando abordagens integradas essenciais para a readaptação e reintegração dos indivíduos. Os enfermeiros de reabilitação desempenham um papel central ao capacitar a pessoa e a família, visando maximizar a funcionalidade.

Objetivo: Identificar as intervenções de Enfermagem de Reabilitação que resultam em ganhos em funcionalidade no autocuidado da pessoa com alterações neurológicas decorrentes de acidente vascular cerebral.

Metodologia: Foi realizada uma revisão sistemática da literatura, nomeadamente uma *rapid review*, seguindo as diretrizes Instituto Joanna Briggs e a mnemónica PICO, com pesquisa na EBSCO nas bases de dados CINAHL, MEDLINE, MedicLatina e Psychology and Behavioral Sciences Collection, abrangendo artigos publicados entre janeiro de 2019 e agosto de 2024, uma vez que o ano de 2019 marcou mudanças significativas no domínio da reabilitação devido à pandemia de COVID-19.

Resultados: Foram incluídos 5 estudos de caráter quantitativo: 2 estudos observacionais prospectivos e 3 experimentais, realizados em países europeus e sul americanos. Todos apresentam qualidade metodológica conforme as diretrizes do Instituto Joanna Briggs. Foram identificadas intervenções de Enfermagem de Reabilitação eficazes em três domínios principais: reabilitação motora, respiratória e cognitiva. Estas intervenções demonstraram melhorias significativas na saúde de utentes com alterações neurológicas decorrentes de AVC. Na reabilitação motora, registaram-se avanços em mobilidade, força muscular, amplitude articular, postura e equilíbrio. Já na reabilitação cognitiva, os ganhos foram evidentes na funcionalidade e na qualidade dos movimentos das extremidades superiores.

Discussão: A reabilitação é essencial no acidente vascular cerebral, com a maior parte da recuperação a ocorrer nas primeiras 12 semanas após o evento. Intervenções neurológicas aumentam a independência funcional e a qualidade de vida física. Treinos diários podem fortalecer os membros inferiores, enquanto abordagens restaurativas e compensatórias melhoram a função neuropsicológica para apraxia dos membros superiores.

Conclusões: Verificaram-se em funcionalidade no autocuidado da pessoa com alterações neurológicas decorrentes de acidente vascular cerebral resultantes de intervenções de enfermagem de reabilitação física e cognitiva, alinhadas com diretrizes profissionais.

Descritores: Enfermagem de Reabilitação; Cuidados de Enfermagem; Acidente Vascular Cerebral; Ganhos em Saúde; Revisão da Literatura.

ABSTRACT

Introduction: Mortality from stroke has decreased, but morbidity remains a challenge, making integrated approaches essential for the readaptation and reintegration of individuals. Rehabilitation nurses play a central role in empowering the person and their family to maximise functionality.

Objective: To identify the rehabilitation nursing interventions that result in gains in self-care functionality for people with neurological impairments resulting from stroke.

Methodology: A systematic literature review was carried out, namely a rapid review, following the Joanna Briggs Institute guidelines and the PICO mnemonic, with a search on Ebsco in the CINAHL, MEDLINE, MedicLatina and Psychology and Behavioural Sciences Collection databases, covering articles published between January 2019 and August 2024, since 2019 marked significant changes in the field of rehabilitation due to the COVID-19 pandemic.

Results: 5 quantitative studies were included: 2 prospective observational studies and 3 experimental studies, carried out in European and South American countries. All had methodological quality in line with the Joanna Briggs Institute guidelines. Effective rehabilitation nursing interventions were identified in three main areas: motor, respiratory and cognitive rehabilitation. These interventions demonstrated significant improvements in the health of patients with neurological alterations resulting from a stroke. In motor rehabilitation, there were advances in mobility, muscle strength, joint range, posture and balance. In cognitive rehabilitation, gains were evident in functionality and the quality of movements of the upper extremities.

Discussion: Rehabilitation is essential in stroke, with most recovery occurring in the first 12 weeks after the event. Neurological interventions increase functional independence and physical quality of life. Daily training can strengthen the lower limbs, while restorative and compensatory approaches improve neuropsychological function for upper limb apraxia.

Conclusions: Functional improvements in the self-care of people with stroke-related neurological disorders were found as a result of physical and cognitive rehabilitation nursing interventions in line with professional guidelines.

Descriptors: Rehabilitation Nursing; Nursing Care; Stroke; Health Gains; Literature Review.

RESUMEN

Introducción: La mortalidad por ictus ha disminuido, pero la morbilidad sigue siendo un reto, por lo que los enfoques integrados son esenciales para la readaptación y reintegración de las personas. Las enfermeras de rehabilitación desempeñan un papel central en la capacitación de la persona y su familia para maximizar la funcionalidad.

Objetivo: Identificar las intervenciones de enfermería de rehabilitación que producen ganancias en la funcionalidad del autocuidado de las personas con alteraciones neurológicas derivadas de un ictus.

Metodología: Se realizó una revisión sistemática de la literatura, concretamente una revisión rápida, siguiendo las directrices del Instituto Joanna Briggs y la mnemotecnia PICO, con una búsqueda en Ebsco en las bases de datos CINAHL, MEDLINE, MedicLatina y Psychology and Behavioural Sciences Collection, abarcando los artículos publicados entre enero de 2019 y agosto de 2024, ya que 2019 marcó cambios significativos en el campo de la rehabilitación debido a la pandemia del COVID-19.

Resultados: Se incluyeron 5 estudios cuantitativos: 2 estudios observacionales prospectivos y 3 estudios experimentales, realizados en países europeos y sudamericanos. Todos tenían una calidad metodológica acorde con las directrices del Instituto Joanna Briggs. Se identificaron intervenciones eficaces de enfermería de rehabilitación en tres áreas principales: rehabilitación motora, respiratoria y cognitiva. Estas intervenciones demostraron mejoras significativas en la salud de los pacientes con alteraciones neurológicas derivadas de un ictus. En la rehabilitación motora se observaron avances en la movilidad, la fuerza muscular, la amplitud articular, la postura y el equilibrio. En la rehabilitación cognitiva, los avances fueron evidentes en la funcionalidad y la calidad de los movimientos de las extremidades superiores.

Discusión: La rehabilitación es esencial en el ictus, y la mayor parte de la recuperación se produce en las primeras 12 semanas tras el suceso. Las intervenciones neurológicas aumentan la independencia funcional y la calidad de vida física. El entrenamiento diario puede fortalecer las extremidades inferiores, mientras que los enfoques restaurativos y compensatorios mejoran la función neuropsicológica para la apraxia de las extremidades superiores.

Conclusiones: Se encontraron mejoras funcionales en el autocuidado de las personas con trastornos neurológicos relacionados con el ictus como resultado de las intervenciones de enfermería de rehabilitación física y cognitiva en línea con las directrices profesionales.

Descriptores: Enfermería de Rehabilitación; Cuidados de Enfermería; Ictus; Ganancias en Salud; Revisión de la Literatura.

INTRODUCTION

In Portugal, the trend – common to developed countries – of rising average life expectancy continues. This phenomenon reflects the overall improvement in living conditions, the implementation of effective health policies and greater access to medical and technological advances ^(1,4,19).

Currently, Portugal has a progressively ageing population with a low fertility rate, facing emerging health challenges, particularly the increasing prevalence of chronic diseases^(1,4). This situation highlights the need to adapt public health policies to meet the needs of an ageing population^(1,4,19). Furthermore, current lifestyles reveal behavioural patterns associated with key health risk factors that cannot be overlooked ^(1,6).

Over the last three decades, the reversal of the age pyramids in Portugal has become increasingly evident, with an exponential increase in the elderly population relative to the number of births. The current number of elderly people in Portugal is around 2.2 million, but projections indicate this will rise to 3 million by 2080. Furthermore, the ageing index will rise from 159 to 300 elderly people for every 100 young people, meaning it will almost double⁽²⁾. According to data from 2021, this situation is set to worsen, with 78,800 births recorded in Portugal – 5,017 fewer than in 2020⁽³⁾.

The ageing of the Portuguese population and the increase in average life expectancy are leading to a higher prevalence of chronic diseases. This results in an increase in the number of people with physical, emotional and cognitive limitations, which inevitably leads to a greater degree of dependency ⁽⁴⁾. The increase in life expectancy has not been accompanied by a corresponding increase in healthy life years, and is characterised by greater frailty, dependency and the prevalence of diseases. Chronic conditions and reduced levels of physical activity contribute to the elderly population being a vulnerable group with functional impairments, a phenomenon recognised as an important indicator of mortality⁽⁴⁾.

In 2020, in Portugal, according to the National Statistics Institute's 2023 publication, diseases of the circulatory system – which include stroke – and malignant tumours were the two leading causes of death. Taken together, these two groups of diseases accounted for almost 51 per cent of deaths in the country, with diseases of the circulatory system accounting for 28 per cent of total deaths⁽³⁾.

Cerebrovascular diseases represent a major public health challenge in Portugal, remaining the leading cause of death and disability in recent years⁽⁵⁾. These conditions often result in severe personal and family consequences⁽⁵⁾. Despite a downward trend in stroke-related mortality rates, morbidity continues to have a substantial impact on society⁽⁵⁾. It is therefore imperative to implement integrated strategies that facilitate the effective reintegration of affected individuals into society⁽⁵⁾. The consequences of stroke can be varied: difficulty moving a limb, speech impairment with difficulty in expressing oneself or understanding others, and changes in vision, swallowing, balance and sensation, amongst others⁽⁶⁾. Around a third of people may be left with cognitive impairments

and chronic pain; therefore, a plan tailored to their needs is essential ⁽⁶⁾.

An ageing population, the rise in chronic diseases and lifestyle-related habits have presented challenges for health services, both in terms of care itself and in terms of health promotion and the prevention of disease. Public health and rehabilitation in Portugal face new challenges and aim to expand their remit as crucial sectors in responding to the significant demographic and epidemiological changes the country is undergoing. In this context, it is essential to develop innovative approaches and interventions in healthcare, which take the form of priority programmes whose results are recognised and validated at an international level.

According to Dorothea Orem⁽⁷⁾, individuals have the capacity to meet their self-care needs. However, throughout life, for various reasons, self-care needs exceed this capacity, leading to a self-care deficit. In this context, nursing intervention becomes necessary⁽⁷⁾.

Consequently, self-care is regarded as the central focus of the Specialised Rehabilitation Nursing Care process, and it is crucial for the Specialist Rehabilitation Nurse (SRN) to functionally empower the individual to perform activities of daily living and instrumental activities of daily living⁽⁸⁾. To this end, personalised rehabilitation programmes are implemented in accordance with the individual's specific circumstances, with the aim of making them active and involved in their self-care empowerment plan ⁽⁸⁾.

The SRN patients assesses the deficit in self-care and sets objectives in order to tailor interventions to the individual's needs. It is therefore essential to actively involve the individual in their rehabilitation and empowerment plan, promoting their independence and taking into account their potential to acquire adaptive skills, as well as to develop or resume self-care effectively ⁽⁸⁾. The person-centred intervention, which focuses on promoting self-care, is systematic and intentional, aimed at maximising the individual's potential and capacity to perform self-care, with a view to maximising their autonomy and quality of life ^(9,10).

The aim of this systematic literature review is to identify rehabilitation nursing interventions that result in gains in self-care functionality among individuals with neurological impairments resulting from stroke.

In this context, the following central question was formulated: "Which rehabilitation nursing interventions influence gains in self-care capacity in individuals with neurological impairments who are dependent on care?"

METHODOLOGY

This systematic review of the literature is in line with the guidelines of the Joanna Briggs Institute (JBI) ⁽¹¹⁾, using the PICO method (P – Participants; I – Intervention; C – Comparison of Interventions; O – Outcomes) (Table 1).

Table 1 – PICO research question

P	Population	People with neurological conditions who are dependent on others for self-care	Keywords: "Rehabilitation or therapy; rehabilitation nursing; rehabilitation programmes; health benefits; functionality; stroke
I	Intervention	Effective rehabilitation interventions	
C	Comparison of interventions	Not applicable	
O	Outcomes	Gains attributable to rehabilitation care in improving the individual's functional ability	

The search was conducted on the EBSCOHost – *Research Databases* platform on 25 August 2024. Through this platform, it was possible to access the following databases: CINAHL Plus with full text, MEDLINE with Full Text, MedicLatina and Psychology and Behavioural Sciences Collection. The search formula was “rehabilitation OR therapy OR treatment” OR “rehabilitation nursing” OR “rehabilitation programmes” AND “health gains” OR “functionality” AND “stroke”. All subject headings were validated in MeSH (Medical Subject Headings) and CINAHL Subject Headings. The results obtained were filtered using the following inclusion criteria: full text, English and Portuguese languages and articles published between 1 January 2019 and 25 August 2024. Studies from 2019 onwards were considered, as that year saw a significant shift in health and rehabilitation needs due to the COVID-19 pandemic.

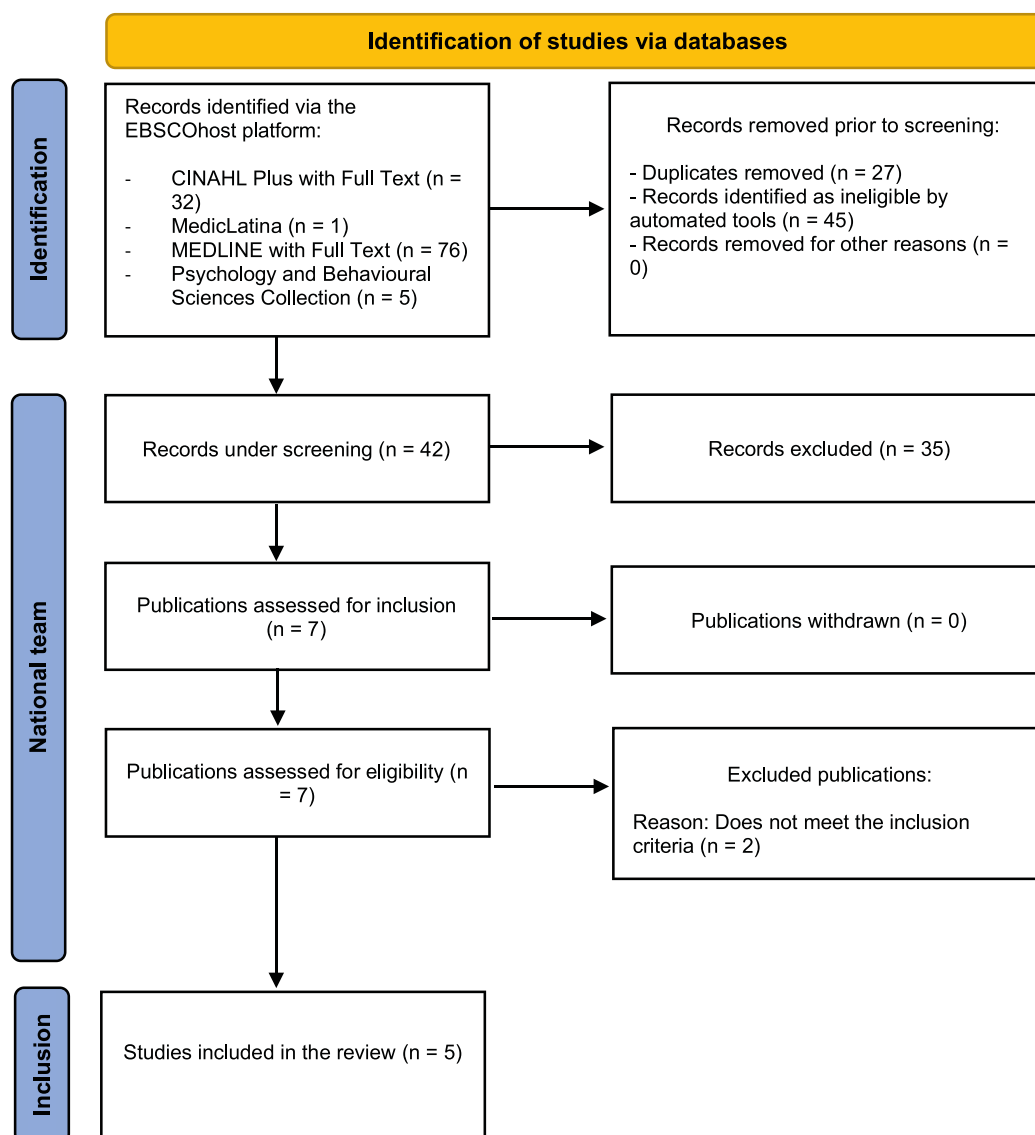
The inclusion criteria defined for this study were as follows: (1) a target population aged 18 years or over; (2) observational and randomised

controlled trials published between 2019 and 2024; and (3) studies addressing rehabilitation nursing interventions. The exclusion criteria were as follows: (1) non-original studies (reviews, meta-analyses, study protocols, commentaries, editorials, journal articles, conference proceedings and abstracts, reports, guidelines and grey literature, and scale validations); (2) studies focusing on people under the age of 18 and/or without a need for long-term care ; and (3) articles written in languages other than English and Portuguese.

The selection of studies for analysis was carried out independently by two researchers , who chose not to include those that did not meet the established criteria after reading the title, abstract and full text . The exclusion of studies following a full review was recorded and shared between the researchers; in cases of uncertainty, a third researcher was consulted.

The search and screening process for this review is presented in detail in the PRISMA⁽¹²⁾ flow-chart below (Figure 1).

Figure 1 – PRISMA flowchart for study selection



The search yielded a total of 114 articles. Following analysis of the results, it was observed that 27 of these articles were duplicates. After reviewing the titles and abstracts, 72 articles that did not fit the scope of the study were excluded, leaving only 42 articles for full-text review.

Following the reading and analysis of the full text, and taking into account the previously defined inclusion and exclusion criteria, five articles were selected for inclusion in this systematic literature review. The flowchart presents, in a clear and organised manner, the steps followed in the article selection process. This includes the number of articles identified in the databases, the articles excluded after reading the titles and abstracts, the articles assessed in full, and those included in the final analysis. The flowchart ensures transparency in the review process and provides an overview of the inclusion and exclusion criteria applied.

The articles were assessed using the JBI methodological quality assessment, meeting more than 50 per cent of the proposed JBI quality criteria⁽¹³⁾. Levels of evidence were classified according to the JBI classification tables⁽¹³⁾.

The article was registered in the PROSPERO International Prospective Register of Systematic Reviews on 31 January 2024, with identification number: CRD42024503884.

RESULTS

A sample of five studies conducted in various countries, namely Mexico, Portugal, Brazil, Spain and Turkey. Of these, two were observational studies and three were experimental studies. The characteristics and main results obtained from the analysis of the selected articles are summarised in Table 2.

Table 2 – Summary of the articles analysed

Authors / Year / Title	Participants/ Methodology/Level of Evidence	Objectives	Results/Conclusions
Herrera-Hernández et al (2023); "Effect of rehabilitation on functionality and quality of life in stroke patients with COVID-19" ⁽¹⁴⁾	21 participants, with a mean age of 53.57 years; 66.7 per cent were male.	To assess the functionality and quality of life of patients with ischaemic stroke due to COVID-19, undergoing a neurological rehabilitation programme, over a period of 3 months.	After three months of rehabilitation, there was a significant increase in patients' independence in daily and functional activities, as evidenced by the Barthel Index ($p < 0.01$) and the modified Rankin Scale ($p < 0.01$). An improvement in quality of life was also observed, particularly in the physical component ($p = 0.02$) and in the general health ($p = 0.01$) and mental health ($p = 0.04$) dimensions. Patients who had suffered a stroke due to COVID-19 and who participated in the neurological rehabilitation programme demonstrated greater functional independence and an improvement in physical quality of life after three months on the programme.
	Prospective, longitudinal observational study. The Barthel Index, the Modified Rankin Scale and the SF-12 were used to monitor functionality and quality of life.		
	Level of Evidence: 1.c		

Authors / Year / Title	Participants/ Methodology/Level of Evidence	Objectives	Results/Conclusions
Branco et al (2019); "Assessing functional recovery in the first six months after acute ischaemic stroke: a prospective, observational study" ⁽¹⁵⁾	131 patients with acute stroke involving the middle cerebral artery, aged between 18 and 85 years.	To assess the progression of functional recovery, during the first 24 weeks following acute ischaemic stroke, to determine the timeframes for motor, cognitive and overall recovery.	During the study period (24 weeks), patients' functional ability improved significantly ($p < 0.001$), as measured by all assessment tools. Assessment scores improved significantly from 48 hours to 3 weeks across all instruments; the same was true from 3 weeks to 12 weeks, except for the cognitive domain of the Functional Independence Measure (FIM). In comparative terms, cognitive impairment was less severe than motor impairment in the acute phase. Scores for the cognitive domain of the MIF at 48 hours were significantly higher than scores for the motor domain of the MIF and the Modified Rankin Scale. Participants showed statistically significant functional improvements between the first 3 and 12 weeks, followed by non-significant improvements of lesser magnitude between 12 and 24 weeks.
	Prospective observational study. The Modified Rankin Scale (mRS), the Functional Independence Measure (FIM) and the Stroke Upper Limb Capacity Scale (SULCS) were applied.		
	Level of Evidence: 1.c		

Authors / Year / Title	Participants/ Methodology/Level of Evidence	Objectives	Results/Conclusions
Pinheiro et al (2021); "Effects of aerobic cycling training on mobility and functionality of acute stroke subjects: A randomised clinical trial" ⁽¹⁶⁾	20 participants, 10 in the control group (CG) and 10 in the intervention group (IG)	To assess the effects of cycle ergometer training on stroke patients in terms of: muscle strength in the limbs, walking speed, balance, mobility and functionality.	Lower limb muscle strength increased in the intervention group (IG) compared with the control group (CG). The within-group analysis was also positive for the CG in terms of mobility and functionality. Rehabilitation combined with cycle ergometer training yielded better results in lower limb muscle strength, mobility and functionality.
	Randomised controlled trial. The CG underwent conventional rehabilitation twice a day, whilst the IG underwent conventional rehabilitation and one cycle ergometer session for 5 consecutive days. Assessments: muscle strength using a dynamometer; walking speed using the 10-metre walk test; balance using the <i>Berg Balance Scale</i> ; mobility using the <i>UTI Mobility Scale</i> ; and functionality using the <i>Perme Score</i> .		
	Level of Evidence: 1.c		
Aguilar et al (2021); "Effectiveness of a Functional Rehabilitation Programme for Upper Limb Apraxia in Post-stroke Patients: A Randomised Controlled Trial" ⁽¹⁷⁾	38 participants aged between 25 and 95 years.	To analyse the effectiveness of a home-based restorative and compensatory rehabilitation programme for upper limb apraxia.	The assessment tools were administered at three time points. Differences were observed between the groups regarding ideomotor apraxia, gesture imitation, global gesture recognition, intransitive gestures, and understanding of gesture production ($p < 0.05$), with the experimental group performing better. The functional rehabilitation programme yielded superior results to the traditional health education programme. The experimental group showed improvements in post-stroke neuropsychological function. Conventional education demonstrated an insufficient effect on the recovery from apraxia.
	Randomised controlled trial. Participants were randomly assigned to a combined functional rehabilitation group (intervention group, n=19) and a group following the traditional healthcare education protocol (control group, n=19). Instruments: Barthel Index, Lawton Index, Brody Index and <i>De Renzi</i> tests		
	Level of Evidence: 1.c		

Authors / Year / Title	Participants/ Methodology/Level of Evidence	Objectives	Results/Conclusions
Ocal et al (2020); “Does Upper Extremity Proprioceptive Training Have an Impact on Functional Outcomes in Chronic Stroke Patients?” ⁽¹⁸⁾	30 participants diagnosed with chronic post-stroke hemiplegia, aged between 50 and 75 (mean age 66 years).	To investigate the effect of upper limb proprioceptive training on spasticity and functional motor skills in patients with chronic hemiplegia following a stroke.	Proprioceptive training of the upper limbs yielded better results in patients with chronic hemiplegia following a stroke than conventional therapy, in terms of increasing the frequency and quality of movement in the upper limbs. These results demonstrated that proprioceptive training programmes should be incorporated into stroke rehabilitation methods.
	A prospective, randomised, controlled trial. Participants were divided into two groups. The control group received a conventional rehabilitation programme, whilst the experimental group received the conventional programme plus proprioceptive training five days a week. Participants were assessed before treatment and at the end of the study (6 weeks) using the following scales: Modified Ashworth Scale (MAS), Fugl-Meyer Upper Limb Motor Assessment Scale (FMA), Action Search Arm Test (ARAT) and Motor Activity Log-28 (MAL-28).		
	Level of Evidence: 1.c		

Rehabilitation nursing interventions were identified that resulted in significant improvements in patients' health, particularly in rehabilitation care across three main areas: functional motor rehabilitation [n=5], respiratory rehabilitation [n=1], and cognitive rehabilitation [n=3]. These interventions proved effective in improving the condition of patients with neurological impairments resulting from stroke. In the area of motor rehabilitation, improvements were observed in mobility, muscle strength, range of joint motion, body posture and balance. In cognitive rehabilitation, significant gains were recorded in functionality and the quality of movements in the upper limbs (Table 3).

Table 3 – Nursing Interventions According to the Documentary Standard for Rehabilitation Nursing Care ⁽²⁸⁾, in accordance with the CIPE classification ⁽³⁰⁾.

	Functional Motor Rehabilitation	Cognitive Rehabilitation	Respiratory Functional Rehabilitation
Instruct	- Instruct on passive, active and resistance muscle and joint exercise techniques. ^(14, 15, 16, 17, 18) - Teach muscle and joint exercise techniques: Squat exercise ⁽¹⁶⁾ - Instruct/train in muscle and joint exercise techniques; muscle-strengthening exercises – isometric exercises ⁽¹⁸⁾		
Train	- Train techniques for muscle and joint exercises (passive, active and resistance exercises) ^(14, 15, 16, 17, 18) - Train in the use of self-care devices ⁽¹⁴⁾ - Train walking adaptation techniques ^(15, 16) - Train stretching techniques ^(15, 16) - Training in relaxation techniques ^(15, 18) - Training in muscle-strengthening exercise techniques ⁽¹⁶⁾ - Training in muscle and joint exercise techniques; muscle-strengthening exercises – isometric exercises ⁽¹⁸⁾ - Practise muscle and joint exercise techniques: Squat exercise ⁽¹⁶⁾		
Perform	- Perform muscle and joint exercise techniques (passive, active and resistance) ^(14, 15, 16, 17, 18) - Perform massage techniques ⁽¹⁸⁾ - Perform balance training techniques ^(15, 16) - Perform movement coordination exercise techniques ⁽¹⁵⁾	- Perform sensory stimulation ^(14, 17, 18)	- Perform respiratory kinesitherapy ⁽¹⁶⁾ - Perform breathing techniques ⁽¹⁶⁾
Stimulate	- Encourage the maintenance of body balance: postural correction ^(15, 16)	Stimulate sensory perception ^(14, 17, 18)	
Teach	- Teach adaptation techniques for transfers ^(14, 15) - Teach carers about home adaptations to support self-care ⁽¹⁷⁾		

	Functional Motor Rehabilitation	Cognitive Rehabilitation	Respiratory Functional Rehabilitation
Provide		- Provide educational materials ⁽¹⁴⁾	
Monitor	- Monitor spasticity ⁽¹⁸⁾		

DISCUSSION

In this systematic review, various rehabilitation interventions and strategies were carried out in the different healthcare settings analysed.

In the study conducted by Herrera-Hernández et al.⁽¹⁴⁾, 21 patients diagnosed with ischaemic stroke participated; they were admitted to a rehabilitation programme at a tertiary care unit. The aim of this study was to assess the effect of neurological rehabilitation on functionality and quality of life. The following techniques were used: proprioceptive neuromuscular facilitation; techniques based on the Brunnstrom methodology aimed at reducing spasticity; transfer training; mobilisation of all four limbs; gait training; and activities of daily living. In addition to these interventions, one component of the programme focused on the involvement of the primary carer, who was instructed on the techniques and the objectives to be achieved, with a view to the patient's subsequent reintegration into their activities of daily living. Throughout the sessions, emphasis was placed on active listening and emotional support, as well as the inclusion of occupational activities. It was concluded that, following the intervention, the participants showed an increase in functional independence and an improvement in the physical aspect of their quality of life.

This study highlighted the importance of informal carers, who play a central role in the home care model. Indeed, the absence of these carers makes it impossible to provide care in any situation where the service user is dependent. A carer is someone who, outside the informal sphere, looks after a person suffering from a chronic illness, a disability, or partial or total dependency – whether temporary or permanent – or in any other condition of vulnerability requiring care ⁽¹⁹⁾.

In the study conducted by Branco et al. ⁽¹⁵⁾, participants underwent an inpatient rehabilitation programme and were instructed to continue the programme at home thereafter. The rehabilitation programme included neurological rehabilitation,

speech and language therapy, and rehabilitation focused on occupational therapy. The neurological rehabilitation exercises included: balance exercises, coordination training, hand rehabilitation, stretching and relaxation exercises, and gait and posture training. The exercises focused primarily on the use of the affected limb, symmetrical weight-bearing and weight-shifting, activities on a mat, or gait training. The study concluded that functional recovery continues for at least 24 weeks following an acute stroke, but the majority of gains occur within the first 12 weeks, coinciding with a period of increased neuroplasticity. Cognitive function tends to improve earlier than motor function, with substantial gains in the first 3 weeks. During this period, rehabilitation is essential, as the central nervous system undergoes continuous and dynamic adaptation, taking into account intrinsic and extrinsic responses, as well as the level of activity and stimulation received⁽²⁹⁾.

Hong et al.⁽²⁰⁾ highlight the importance of assessing stroke patients' potential for recovery, with a view to deciding on rehabilitation strategies, as intensive rehabilitation during hospitalisation may be beneficial. The study also suggests that rehabilitation started as early as possible yields better results in terms of the patient's independence. In this study, the authors note that gains in functionality continue to occur between 12 and 24 weeks, which highlights the importance of continuing the rehabilitation programme in a home setting ⁽¹⁵⁾. This study proved to be a useful tool for supporting the development and optimisation of rehabilitation programmes, with the potential to improve patients' outcomes.

Pinheiro et al.⁽¹⁶⁾ conducted a randomised controlled clinical trial to assess the effects of cycle ergometer training on lower limb muscle strength, walking speed, balance, mobility and functionality in patients with acute stroke. Patients in the control group underwent conventional rehabilitation, based on kinesiotherapy, stretching, balance training and gait training. The intervention group

underwent conventional rehabilitation, supplemented by a daily cycle ergometer session comprising passive, active and resistance exercises. The authors concluded that conventional rehabilitation combined with daily cycle ergometer training was effective, leading to an increase in lower limb muscle strength in the intervention group compared with the control group, with the same trend observed in the other assessments. Similarly, other authors report that rehabilitation combined with cycle ergometer training significantly improves motor function in post-stroke patients ⁽²¹⁰⁾ with a reduction in spasticity, increased functionality of the affected limb and improved ability to participate in activities of daily living ⁽²²⁾. Similarly, other authors note that the introduction of new health technologies helps to improve motor function of the upper limbs, learning and memory, and the mechanisms involved in facilitating neuroplasticity ⁽²³⁾. These innovative resources should be widely applied in clinical practice worldwide to empower stroke patients ⁽²³⁾.

Praxia plays an important role in functionality, and improving it can lead to greater ability to perform activities of daily living ⁽¹⁷⁾. In this regard, Aguilar-Ferrández and colleagues ⁽¹⁷⁾ conducted a study aimed at analysing the effectiveness of a home-based restorative and compensatory rehabilitation programme for upper limb apraxia. The restorative approach consisted of sessions involving the learning and understanding of gestures, with a view to re-establishing upper limb praxia. With the aim of improving independence, training was provided in compensatory skills and strategies to enhance adaptation to the environment. The complementary nature of the restorative and compensatory approaches led to improvements in post-stroke neuropsychological function.

According to the studies by Herrera-Hernández et al. ⁽¹⁴⁾ and Aguilar-Ferrández et al. ⁽¹⁷⁾, functional motor rehabilitation yields significant health benefits; however, both authors refer to improvements in the neuropsychological and mental health domains, respectively, in the final assessment of their studies. Similarly, other authors note that in the post-stroke period, therapeutic, psychological, cognitive and motivational aspects are important. At this stage, patients sometimes suffer from depression and other neuropsychiatric complications, such as apathy, reduced motivation, lack of initiative, emotional numbness and anxiety. Patients often require antidepressant treatment. Depression can hinder rehabilitation and the restoration of quality of life ⁽²⁴⁾. During rehabilitation, various strategies are used to motivate the patient, depending on their physical and mental health, level of cognitive function, personality, activities and participation, age, social environment and the type of rehabilitation service where the patient is receiving treatment ⁽²⁵⁾.

Chronic haemiplegic patients exhibit a loss of functional motor abilities with implications for activities of daily living. Ocal and colleagues⁽¹⁸⁾ conducted a study aimed at investigating the effect of proprioceptive training of the upper limbs on spasticity and functional motor skills. The control group performed passive/active range-of-motion exercises, strengthening of antispastic muscles and compensatory techniques, in order to prevent the development of complications, as well as electrical stimulation of the triceps and wrist extensor muscles and strengthening of antispastic muscles through contraction and relaxation. In the intervention group, a proprioceptive training programme was implemented following conventional treatment involving isometric contractions with light resistance, imitation of the unaffected limb with eyes open and closed, and passive and active mobilisations with eyes open and closed. The addition of proprioceptive training of the upper limbs led to improvements in functionality, frequency and quality of movement in the upper limbs; this method should therefore be used as a complement to conventional rehabilitation ⁽¹⁸⁾.

According to the studies analysed and as shown in Table 3, significant benefits were observed from rehabilitation nursing care. These interventions are in line with the Documentary Standard for Rehabilitation Nursing Care of the Portuguese Nurses' Association ⁽²⁸⁾ and according to the CIPE classification ⁽³⁰⁾. With regard to physical motor rehabilitation, the following interventions were observed: Providing instruction on muscle and joint exercise techniques (passive, active and resistance-based), squatting exercises and isometric exercises; Performing muscle and joint exercise techniques, massage techniques, balance training techniques and movement coordination exercise techniques; Training in muscle and joint exercise techniques, training in the use of self-care aids, walking adaptation techniques, stretching/relaxation techniques, muscle and joint exercise techniques/isometric exercises/squat exercises; Encourage the maintenance of body balance and postural correction; teach transfer adaptation techniques and instruct carers on home adaptations for self-care; monitor spasticity. With regard to respiratory physical rehabilitation: To carry out respiratory kinesiotherapy/breathing techniques. Cognitive rehabilitation interventions were also identified: To carry out sensory stimulation; To stimulate sensory perception; To provide educational materials.

CONCLUSIONS

From the studies analysed, several interventions were identified that influence the gains achieved through rehabilitation care in enabling dependent individuals to look after themselves. The interventions identified relate to functional

motor rehabilitation, including improved mobility, increased muscle strength and range of joint motion, body posture, coordination, balance, sitting, walking, exercise on a cycle ergometer and training in activities of daily living. In all studies, the following interventions were identified: instructing, performing and training muscle and joint exercise techniques (passive, active and resistance-based). Interventions aimed at cognitive rehabilitation and neuroplasticity were also identified, including proprioceptive training and motor skill learning, with an emphasis on the paretic limb. The following interventions were identified: performing sensory stimulation and enhancing sensory perception. Group rehabilitation sessions were provided, involving the carer, with the following intervention observed: teaching carers about home adaptations to facilitate self-care, resulting in benefits in terms of mental health and the person's integration into the community. In this regard, rehabilitation care should take these interventions into account with a view to improving functionality and independence.

Due to the ageing population, which goes hand in hand with improved quality of life and access to healthcare, the emergence of chronic conditions is inevitable, accompanied by functional decline and dependence on self-care. In the face of these challenges, and in order to provide tailored and effective responses, the involvement of the specialist rehabilitation nurse is crucial, given the nature of their specific and highly specialised professional skills ⁽²⁶⁾.

Person-centred nursing care is a systematic process involving the multidisciplinary team, as well as the carer. A person who is dependent on others for self-care, upon returning home, requires a carer with the necessary skills to prevent risks and readmissions to hospital. It is therefore essential that, during the patient's hospital stay, the rehabilitation nurse assesses the carer's knowledge and provides them with the training required to deliver appropriate care to the person dependent on care from others. At the time of discharge, coordination with primary healthcare services, as well as with the National Network for Integrated Continuing Care (RNCCI), is imperative in order to achieve positive outcomes. In this regard, healthcare professionals must possess the knowledge and skills to support carers and families ⁽²⁶⁾.

The role of the rehabilitation nurse is particularly important in the person's process of adapting to their new condition following functional decline. Rehabilitating abilities, as well as promoting adaptive strategies with the aim of making the person as independent as possible, presents a complex challenge. However, the rehabilitation nurse is the healthcare professional best equipped to manage and achieve the highest level of independence, thereby promoting self-care ^(26,27).

With scientific and technological knowledge constantly evolving, rehabilitation nurses must base

their practice on the latest scientific evidence in order to provide nursing care of the highest standard, with internationally recognised outcomes. It is therefore essential to invest in research, and it is proposed that further studies be carried out on this topic, focusing on rehabilitation nursing interventions that influence the outcomes of rehabilitation care in empowering people with neurological conditions who are dependent on others for self-care.

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