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Review Article

The utilization of robotic technology as a support for rehabilitative nursing care in stroke patients with impaired physical mobility: A scoping review

Indra Frana Jaya KK[1,2*], Aris Citra Wisuda[1,3], M Agung Akbar[4], Afrida Pratiwi[3], Agusdiman Saputra[3], Ahmad Zulfikri[3], Arif Billah Pangestu Idil Adha[3], Ayu Andira[3], Ayu Safitriyana[3]

[1] Program Studi Spesialis Keperawatan Medikal Bedah, Fakultas Keperawatan, Universitas Padjadjaran, Bandung, Indonesia
[2] Program Studi Keperawatan, Sekolah Tinggi Ilmu Kesehatan Hesti Wira Sriwijaya, Palembang, Sumatera Selatan, Indonesia
[3] Sekolah Tinggi Ilmu Kesehatan Bina Husada, Palembang, Indonesia
[4] Departemen Keperawatan Komunitas, Fakultas Ilmu Keperawatan, Universitas Indonesia, Depok, Indonesia

***Corresponding Author:**
Indra Frana Jaya KK
Program Studi Spesialis Keperawatan Medikal Bedah, Fakultas Keperawatan, Universitas Padjadjaran, Bandung, Indonesia; Program Studi Keperawatan, Sekolah Tinggi Ilmu Kesehatan Hesti Wira Sriwijaya, Palembang, Sumatera Selatan, Indonesia
Email: indrafranajayakk48@gmail.com

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Abstract

Background: Stroke frequently causes persistent mobility impairment and dependence. Robotic rehabilitation offers intensive, repetitive, and measurable practice, but its integration with rehabilitative nursing care remains insufficiently mapped.
Objective: To map robotic technologies used for adult stroke survivors with impaired physical mobility, summarize functional outcomes, and identify implications and evidence gaps for rehabilitative nursing care.
Methods: A scoping review guided by PRISMA-ScR was conducted. PubMed, Scopus, ScienceDirect, ProQuest, CINAHL, Google Scholar, and Wiley Online Library were searched for peer-reviewed primary studies published in English from January 2019 to May 2026. Eligible studies involved adult stroke survivors, evaluated a robotic rehabilitation technology, and reported mobility- or function-related outcomes. Data were charted and synthesized descriptively.
Results: Twenty-seven studies were charted. Technologies included robot-assisted gait-training systems, lower-limb exoskeletons, end-effector devices, upper-limb robotic systems, robotic hand devices, soft robotic gloves, and socially assistive robots. Reported benefits primarily concerned gait, balance, limb motor function, coordination, activities of daily living, and independence. Findings were heterogeneous, and robotic interventions were not consistently superior to intensive conventional rehabilitation. Nursing relevance centered on readiness and mobility assessment, fall-risk management, monitoring of physiological and activity tolerance, education, motivation, and evaluation of nursing-sensitive functional outcomes. Few studies explicitly evaluated nurses' roles or integration with the nursing process.
Conclusion: Robotic technology is a promising adjunct to interdisciplinary stroke rehabilitation but should not replace conventional therapy or therapeutic human interaction. Nursing-led implementation research is needed to establish safety protocols, competency requirements, workflow models, patient-selection criteria, and nursing-sensitive outcomes.

Background

Stroke is a major neurological condition that frequently results in physical functional limitations and loss of independence. Stroke survivors may experience limb weakness, impaired balance and coordination, difficulty walking, and restrictions in activities of daily living. Approximately two-thirds of patients have mobility impairment during the early phase of stroke, particularly in balance, walking speed, and walking endurance (Stephan et al., 2021). These impairments increase the risks of falls, contractures, pressure injuries, muscle weakness, dependency, and reduced quality of life. From a rehabilitative nursing perspective, patients require systematic mobility assessment, graded mobilization, prevention of immobility-related complications, safety monitoring, patient and family education, and continuous evaluation of functional independence (Bai & Chen, 2025).

Advances in health technology have encouraged the use of robotic devices in stroke rehabilitation, including robot-assisted gait training, robotic exoskeletons, end-effector devices, upper-limb robotic therapy, robotic hand rehabilitation, and soft robotic gloves. These technologies enable repetitive, structured, intensive, and quantifiable movement practice, with assistance adjusted to the patient's functional capacity (Doğan, 2024; Hu et al., 2024; Lee et al., 2025). Their use may improve motor function, walking ability, balance, limb function, and activities of daily living.

However, outcomes may vary according to stroke phase, impairment severity, device type, training intensity, and patient characteristics.

Although research on robot-assisted rehabilitation is expanding, most studies emphasize clinical effectiveness from the perspectives of physical therapy or rehabilitation medicine. Improvements in walking, balance, limb function, and activities of daily living do not necessarily demonstrate that the technology has been integrated into the nursing process (Lo et al., 2017; Calabrò et al., 2021). Evidence explicitly describing nurses' involvement in patient selection, preparation, monitoring of tolerance and safety, fall prevention, education, motivation, documentation, and evaluation of independence remains limited. Robotic technology should therefore be positioned as a supportive tool within interdisciplinary rehabilitation rather than as a substitute for nurses or other rehabilitation professionals.

Differences in device types, stroke phases, care settings, intervention duration and intensity, and outcome measures have produced a fragmented evidence base that has not been comprehensively mapped from a nursing perspective. This scoping review therefore aimed to map the types and characteristics of robotic technologies used for adult stroke survivors with impaired physical mobility, summarize reported functional outcomes, and identify their relevance to rehabilitative nursing care.

Methods

Study Design

This scoping review comprehensively mapped evidence on robotic technology as a support for rehabilitative nursing care among stroke survivors with impaired physical mobility. A scoping review was selected to identify the breadth, characteristics, intervention types, outcomes, and research gaps in this evolving and heterogeneous field. Reporting was guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR) to promote transparency in study identification, selection, data charting, and synthesis.

Research Question

The review addressed the following question: How is robotic technology used to support rehabilitative nursing care for stroke survivors with impaired physical mobility?

The question was formulated using the Population-Concept-Context framework. The population comprised adult stroke survivors with impaired physical mobility, including limb weakness, balance or gait impairment, difficulty transferring, and reduced ability to perform activities of daily living. The concept encompassed robotic technologies used in stroke rehabilitation, including robot-assisted gait training, robotic exoskeletons, end-effector devices, upper-limb robotic therapy, robotic hand rehabilitation, and soft robotic gloves. The context comprised rehabilitative nursing care in hospitals, stroke units, rehabilitation units, outpatient services, community settings, and home-based rehabilitation.

The review focused on the types of robotic technology, intervention characteristics, physical mobility outcomes, and their relationship to nursing responsibilities in mobility assessment, exercise assistance, prevention of immobility-related complications, patient safety monitoring, patient and family education, and evaluation of independence.

Eligibility Criteria

Studies were eligible if they were original investigations of robotic technology involving adult stroke survivors with impaired physical mobility; used a primary study design, such as a randomized controlled trial, quasi-experimental study, clinical trial, pilot or feasibility study, cohort study, or implementation study; and reported outcomes related to physical mobility or rehabilitation. Relevant outcomes included gait, balance, limb strength, upper- or lower-limb function, motor coordination, transfers, activities of daily living, independence, fall risk, activity tolerance, and quality of life.

Eligible technologies included robot-assisted gait training, robotic exoskeletons, end-effector devices, upper-limb robotic therapy, robotic hand rehabilitation, soft robotic gloves, and other robotic devices designed to support motor and mobility rehabilitation after stroke. Only peer-reviewed journal articles available in full text, published in English between January 2019 and May 2026, were considered.

Studies were excluded if they did not involve stroke survivors, did not evaluate robotic technology, were unrelated to physical mobility impairment, or examined conventional rehabilitation without a robotic component. Studies involving neurological conditions other than stroke, including Parkinson's disease, spinal cord injury, cerebral palsy, or multiple sclerosis, were excluded unless data for stroke participants were reported separately.

Systematic reviews, meta-analyses, scoping reviews, narrative reviews, bibliometric reviews, editorials, commentaries, letters, study protocols, conference abstracts without full text, and reports with incomplete or unverifiable data were excluded from the primary charting. This restriction ensured that the evidence map was based on primary studies directly evaluating robotic rehabilitation in stroke survivors with impaired mobility.

Search Strategy

A systematic literature search was conducted in PubMed, Scopus, ScienceDirect, ProQuest, CINAHL, Google Scholar, and Wiley Online Library. The search targeted studies of robotic technology in the rehabilitation of stroke survivors with impaired physical mobility. Publication dates were limited to January 2019 through May 2026 to capture contemporary developments in robotic rehabilitation.

The strategy combined keywords with the Boolean operators AND and OR and was adapted to the indexing conventions of each database. Search terms included stroke, post-stroke, stroke survivors, robotic rehabilitation, robot-assisted therapy, robot-assisted gait training, robotic exoskeleton, rehabilitation robot, upper-limb robotic therapy, soft robotic glove, nursing care, rehabilitation nursing, physical mobility, mobility impairment, functional mobility, gait, walking ability, and activities of daily living.

The core search string was: ("stroke" OR "post-stroke" OR "stroke survivors") AND ("robotic rehabilitation" OR "robot-assisted therapy" OR "robot-assisted gait training" OR "robotic exoskeleton" OR "rehabilitation robot" OR "upper-limb robotic therapy" OR "soft robotic glove") AND ("physical mobility" OR "mobility impairment" OR "functional mobility" OR "gait" OR "walking ability" OR "activities of daily living") AND ("nursing care" OR "rehabilitation nursing" OR "nursing") (See Figure 1).

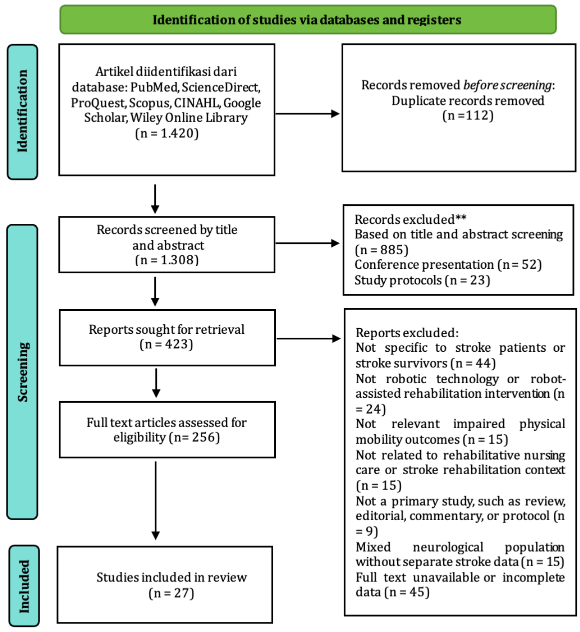

Figure 1. PRISMA-ScR flow diagram of study identification, screening, eligibility assessment, and inclusion.

Data Charting

Eligible studies were charted independently by the reviewers using a structured data-charting form. Extracted information included authors, year, country, design, participant characteristics, sample size, stroke phase, robotic technology, intervention format, session frequency and duration, total intervention period, comparator, physical mobility outcomes, measurement instruments, principal findings, and relevance to rehabilitative nursing care (Hirano et al., 2024; Lin et al., 2022).

Data charting focused on gait, balance, upper- and lower-limb function, muscle strength, motor coordination, transfers, activities of daily living, independence, fall risk, activity tolerance, and quality of life. Nursing-related data included mobility assessment, exercise assistance, patient safety monitoring, prevention of immobility-related complications, patient and family education, and evaluation of mobilization capacity (Kim et al., 2019; Ranzani et al., 2020).

Data Synthesis

Included studies were synthesized descriptively according to methodological characteristics, robotic technology, stroke phase, patient characteristics, intervention frequency and duration, comparator, and reported physical mobility outcomes. The synthesis identified patterns of use, intervention heterogeneity, consistency of findings, and potential contributions to rehabilitative nursing care for stroke survivors with impaired physical mobility (Hirano et al., 2024; Lin et al., 2022).

Results

This section presents the findings of the scoping review in four main areas: study selection, characteristics of the included studies, types and applications of robotic technologies, and reported functional outcomes. The results also describe the relevance of these technologies to rehabilitative nursing care, particularly in relation to mobility assessment, patient safety, activity-tolerance monitoring, education, motivation, and the evaluation of functional independence. The study-selection process is summarized in the PRISMA-ScR flow diagram, while the characteristics and key findings of the 27 included studies are presented in Table 1.

Table 1. Characteristics and Findings of the Included Studies

Author, Year	Study Design	Sample	Robotic Technology	Outcomes	Main Findings	Nursing Relevance
Hirano et al., 2024	Multicenter RCT	Patients with subacute hemiparetic stroke	Welwalk WW-1000	Gait independence	Welwalk-based RAGT was evaluated for improving gait independence in subacute stroke.	Supports mobility monitoring, fall-risk management, and assessment of exercise tolerance.
Lin et al., 2022	Single-blind RCT	Non-ambulatory patients with subacute stroke	Hybrid RAGT	Motor function, balance, and gait	Hybrid RAGT added to routine rehabilitation was evaluated for motor recovery.	Supports graded mobilization and evaluation of walking capacity.
Kim et al., 2019	RCT	Patients with infratentorial stroke	Robot-assisted gait training	Balance and lower-limb function	RAGT improved balance and lower-limb function.	Relevant to fall prevention and safe ambulation.
Aprile et al., 2022	RCT single-blind	Patients with subacute stroke	Robotic gait + trunk rehabilitation	Balance, activity, and participation	Combined robotic gait and trunk rehabilitation was compared with robotic gait training alone.	Relates to balance, activity, and participation outcomes.
Lee et al., 2023	Pilot study	Patients with subacute stroke	End-effector lower limb robot	Gait and lower-limb function	Lower-limb robotic training showed potential to improve gait rehabilitation.	Supports mobility practice and monitoring of functional progress.
Xie et al., 2023	Clinical trial	Stroke survivors	Soft robotic exoskeleton	Walking speed, endurance, and motor recovery	A soft robotic exoskeleton improved walking speed, endurance, and motor recovery.	Supports assessment of activity tolerance and mobility progression.
Li et al., 2025	Clinical study	Patients with chronic stroke	Unilateral lower limb exoskeleton robot	Gait function	The study evaluated unilateral exoskeleton-assisted gait training in chronic stroke.	Relevant to long-term nursing support for persistent gait impairment.
Neves et al., 2023	Retrospective cohort	Community-dwelling stroke survivors	End-effector vs exoskeleton RAGT	Walking function	End-effector and exoskeleton RAGT approaches were compared.	May inform selection of mobility support according to patient needs.
Meng et al., 2022	Clinical study	Stroke survivors	Early integrated RAGT	Motor function, TUG, and quality of life	Early integrated RAGT was evaluated for motor function and quality of life.	Addresses nursing-sensitive outcomes, including mobility, independence, and quality of life.
Ogino et al., 2020	Clinical trial	Patients with chronic stroke	Gait Exercise Assist Robot/GEAR	Gait ability	GEAR outperformed treadmill training for gait in a small sample.	Supports walking practice and prevention of immobility-related complications.

Author, Year	Study Design	Sample	Robotic Technology	Outcomes	Main Findings	Nursing Relevance
Lee et al., 2022	Clinical study	Stroke survivors	Healbot T lower limb robot	Gait and lower-limb function	Healbot T training modes were associated with potential functional benefits.	Supports lower-limb assessment, balance monitoring, and ambulation readiness.
Zhang et al., 2024	Pilot RCT	Patients with subacute stroke	Exoskeleton rehabilitation robot	Balance and lower-limb function	Exoskeleton training was evaluated for balance and lower-limb recovery.	Relevant to fall prevention, transfers, and safe mobilization.
Kato et al., 2025	Cohort/propensity score analysis	Patients with acute stroke	Early RAGT	Gait independence	Very early RAGT was evaluated for gait independence.	Supports early mobilization and monitoring of patient response.
Zhang et al., 2025	Clinical study	Patients with chronic stroke	RAGT + transcranial direct current stimulation	Motor recovery	RAGT combined with transcranial direct-current stimulation was evaluated for motor recovery.	Requires monitoring of safety, tolerance, and response to combined therapies.
Liu et al., 2024	Clinical trial	Post-stroke patients	Robot-assisted upper limb therapy	FMA-UE and MBI	Upper-limb robotic therapy accelerated motor recovery, particularly at Brunnstrom stage III.	Relevant to self-care, ADL, and upper-limb retraining.
Qian et al., 2025	Pilot randomized study	Patients with post-stroke hemiplegia	Robot-assisted glove + mirror therapy	Upper-limb function	Robotic glove training combined with mirror therapy was evaluated over four weeks.	Supports hand-function practice, self-care, and independence.
Wang et al., 2025	Pilot RCT	Young and middle-aged stroke survivors	Upper-limb robot + pneumatic glove	FMA-UE, ARAT, COPM, and MBI	Combined upper-limb robotics and a pneumatic glove were evaluated for motor and activity outcomes.	Relevant to ADL evaluation, hand function, and everyday performance.
Ahn et al., 2024	Comparative clinical study	Stroke survivors	InMotion 2.0 upper-limb robot	Upper-limb function and ADL	Robotic therapy produced upper-limb and ADL gains comparable to conventional occupational therapy.	ADL and independence are directly relevant nursing-sensitive outcomes.
Ko et al., 2023	Clinical study	Post-stroke patients	Soft robotic glove	Motor recovery and functional ability	A soft robotic glove was evaluated for hand motor recovery and functional ability.	Supports grasping, eating, dressing, and independent activity.
Thimabut et al., 2022	Feasibility/clinical study	Stroke survivors with a paretic hand	Soft robotic glove	Grasp, grip, and pinch	The glove assisted grasping, pinching, and holding with the paretic hand.	Supports nursing interventions intended to improve self-care capacity.
Lim et al., 2023	Device evaluation/clinical study	Patients with chronic stroke	Fabric-based soft robotic glove	Hand function	A fabric-based soft robotic glove was feasible for assisting hand function.	Supports hand exercise and assistive-device use in daily activities.
Bressi et al., 2023	Pilot study	Patients with chronic stroke	iCONE home-based robot	Upper-limb function	Home-based robotic rehabilitation was feasible without continuous in-person therapist supervision.	Relevant to discharge planning, family education, and home-based nursing.
Pavan et al., 2024	Implementation/clinical study	Stroke survivors	Robot-mediated upper limb rehabilitation	Upper-limb motor function and strength	An individualized robotic protocol showed gains in motor function and strength.	Supports monitoring of the rehabilitation plan and evaluation of progress.
Tay et al., 2024	Feasibility study	Patients with chronic stroke	Optimo Regen robotic device	ADL, FMA-UE, ARAT, and FIM	The device supported impairment-oriented	Highly relevant because ADL and FIM reflect

Author, Year	Study Design	Sample	Robotic Technology	Outcomes	Main Findings	Nursing Relevance
					and task-specific training.	functional independence.
Ranzani et al., 2020	RCT	Patients with subacute stroke	Neurocognitive robot-assisted hand rehabilitation	Motor recovery and hand function	Neurocognitive robot-assisted hand rehabilitation was evaluated for motor recovery.	Supports hand training, coordination, and daily independence.
Rodgers et al., 2019/2020	Multicenter RCT/RATULS trial	Patients with moderate-to-severe upper-limb impairment after stroke	Robot-assisted upper limb training	Upper-limb function and ADL	Robotic training did not provide additional benefit over enhanced upper-limb therapy or usual care.	Provides critical evidence that robotics cannot replace conventional care and therapy.
Feingold-Polak et al., 2024	Pilot randomized study	Post-stroke patients	Socially Assistive Robot/SAR	Upper-limb motor ability and quality of life	The socially assistive robot was feasible and showed potential clinical benefit.	Relevant to motivation, adherence, quality of life, and psychosocial support.

Across the 27 charted studies, robotic technologies were primarily associated with outcomes in gait, balance, lower- and upper-limb function, motor coordination, activities of daily living, and independence. Several randomized controlled trials indicated that robot-assisted gait training could improve walking and balance, particularly when combined with conventional rehabilitation. Hirano et al. reported that Welwalk supported the assessment and progression of gait independence in individuals with subacute hemiparetic stroke. Findings from Lin et al. and Kim et al. likewise suggested improvements in motor function, balance, and lower-limb performance (Hirano et al., 2024; Kim et al., 2019; Lin et al., 2022).

The included evidence covered diverse devices and intervention targets. Robot-assisted gait training, robotic exoskeletons, and end-effector devices were mainly used to improve walking, postural stability, balance, and lower-limb function. Upper-limb robotic therapy, robotic hand rehabilitation, and soft robotic gloves targeted reaching, grasping, hand coordination, and daily activities such as eating, dressing, and personal care. Ranzani et al. reported that robot-assisted hand rehabilitation supported motor recovery in subacute stroke, whereas the RATULS trial showed that robotic training was not consistently superior to other intensive therapies. Robotic devices should therefore be viewed as adjuncts to, rather than replacements for, conventional rehabilitation (Ranzani et al., 2020; Rodgers et al., 2019).

From a nursing perspective, robotic rehabilitation intersects directly with mobility assessment, fall-risk evaluation, monitoring of exercise tolerance, observation for fatigue or discomfort, patient and family education, and evaluation of independence. Robotic devices can therefore support nursing interventions aimed at improving mobility, preventing complications of immobility, and enhancing activities of daily living (Aprile et al., 2022; Bressi et al., 2023).

Despite generally favorable findings, results varied across studies because of differences in robotic platforms, stroke phase, motor impairment severity, intervention duration, session frequency and intensity, and outcome measures. Some studies demonstrated meaningful improvements in gait, balance, and limb function, whereas others found no clear advantage over conventional therapy. Effectiveness therefore appears contingent on patient selection, device-task matching, integration with conventional rehabilitation, and professional support during training (Hirano et al., 2024; Rodgers et al., 2019).

Overall, robotic technology represents a promising adjunct to rehabilitative nursing care by enabling repetitive, goal-directed, and measurable practice. Its safe and meaningful use nevertheless requires nurses' involvement in education, motivation, response monitoring, safety surveillance, and evaluation of functional outcomes. A central evidence gap is the limited explicit examination of nursing roles. Future studies should develop and test models for integrating robotics into rehabilitative nursing care, including safety protocols, readiness assessment, family education, and nursing-sensitive outcome indicators.

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Discussion

This scoping review found that robotic technologies support post-stroke rehabilitation through training directed at gait, balance, limb function, motor coordination, and activities of daily living. Lower-limb recovery was addressed with robot-assisted gait training, exoskeletons, and end-effector devices, whereas upper-limb robotic systems, hand rehabilitation devices, and soft robotic gloves targeted hand function and independence. These systems provide repetitive, structured, intensive, and measurable practice tailored to motor capacity. Nurses have potentially important roles in mobility assessment, safety monitoring, education, motivational support, and evaluation of independence. Nevertheless, most studies framed robotics as a physical rehabilitation intervention and did not explicitly examine its integration into the nursing process.

For lower-limb recovery, robot-assisted gait training enables consistent walking practice in a controlled environment (Doğan, 2024). Welwalk provides adjustable movement assistance intended to advance gait independence in subacute hemiparetic stroke (Hirano et al., 2024). Hybrid approaches combine robotic assistance with routine rehabilitation to improve motor function, balance, and walking ability (Lin et al., 2022), while lower-limb devices facilitate more standardized gait repetitions than unsupported conventional practice (Kim et al., 2019). Programs initiated early after stroke may facilitate early mobilization when exercise intensity is aligned with clinical status (Meng et al., 2022; Kato et al., 2025). Integration with conventional rehabilitation is therefore important for optimizing mobility recovery (Hu et al., 2024; Lee et al., 2025).

Upper-limb robotic technologies similarly support hand functions required for daily living (Loro et al., 2023). Upper-limb robot-assisted therapy provides repetitive, goal-directed movement to train strength, coordination, and motor control (Liu et al., 2024). Soft robotic gloves provide mechanical assistance for grasping, holding, and pinching (Ko et al., 2023; Thimabut et al., 2022), while combining a robotic glove with mirror therapy may augment visual and motor stimulation (Qian et al., 2025). Improvements in upper-limb function may translate into greater independence in eating, dressing, hygiene, and other self-care activities (Ahn et al., 2024; Wang et al., 2025). However, changes in motor scores should be interpreted alongside meaningful changes in activity and participation (Rodgers et al., 2019; Su et al., 2024).

The connection between motor function and daily activity places nurses in a strategic position when robotic technologies are integrated into rehabilitation (Bai & Chen, 2025). Before training, nurses can assess mobility, limb strength, dependency, fall risk, and readiness (Bai & Chen, 2025; Calabrò et al., 2021). During training, they can monitor vital signs, fatigue, pain, discomfort, and activity tolerance (Calabrò et al., 2021; Molteni et al., 2021). After training, nursing evaluation can address transfers, walking, self-care, and balance (Akbar & Ferdi, 2022; Mehrholz et al., 2020). Nurses can also educate patients and families about device use, training schedules, warning signs, and safe home practice (Bressi et al., 2023). Robotics should thus strengthen nursing care and interdisciplinary rehabilitation without replacing therapeutic human interaction (Rodgers et al., 2019; Bai & Chen, 2025).

Nursing oversight is particularly important because responses to robotic rehabilitation vary by stroke phase and clinical condition (Morone et al., 2020). Patients in the acute or subacute phase may require closer surveillance because neurological and physiological status can change during training (Kato et al., 2025; Lin et al., 2022). Patients in the chronic phase may need longer programs focused on repeated functional tasks to preserve and extend gains (Bressi et al., 2023; Ogino et al., 2020). Device type, assistance level, frequency, duration, and intensity should be individualized to motor capacity (Doğan, 2024; Morone et al., 2020). Adequate clinical monitoring can reduce excessive fatigue, pain, blood-pressure instability, discomfort, and fall risk (Calabrò et al., 2021; Molteni et al., 2021). Services should therefore implement safety protocols covering patient selection, pre-session assessment, intra-session monitoring, and post-session evaluation (Lo et al., 2017; Loro et al., 2023).

Robotic rehabilitation must also sustain motivation and participation throughout recovery (Morone et al., 2020). Interactive practice and real-time performance feedback may increase engagement by making progress visible (Feingold-Polak et al., 2024; Bertani et al., 2017). Nurses can reinforce engagement through therapeutic communication, realistic goal setting, positive reinforcement, and family involvement (Bai & Chen, 2025; Akbar & Ferdi, 2022). Home-based robotic programs may extend continuity of rehabilitation when supported by education, discharge planning, and periodic adherence monitoring (Bressi et al., 2023). Implementation decisions should nevertheless account for device cost, space, maintenance, workforce competence, and patient readiness (Lo et al., 2017; Loro et al., 2023).

These clinical and organizational considerations indicate the need for a systematic nursing model for robotic rehabilitation (Bai & Chen, 2025). Such a model should specify assessment, device selection, goal setting, response monitoring, family education, documentation, and evaluation of nursing-sensitive outcomes (Calabrò et al., 2021; Loro et al., 2023). Future studies should quantify nursing contributions to safety, adherence, independence, activities of daily living, quality of life, and patient experience. Implementation research should also examine nurses' competence, technology acceptance, cost-effectiveness, organizational feasibility, and continuity of care across rehabilitation settings (Lo et al., 2017; Loro et al., 2023). Collaboration among nurses, rehabilitation physicians, physical therapists, occupational therapists, technicians, patients, and families is essential for safe, person-centered use (Mehrholz et al., 2020; Molteni et al., 2021).

Conclusion and Recommendation

Robotic technologies have been used across post-stroke rehabilitation and show potential to support gait, balance, limb function, and activities of daily living. However, most evidence comes from rehabilitation studies that did not explicitly evaluate nursing roles; consequently, nursing implications remain largely inferential. Robotics should be implemented as an adjunct within interdisciplinary, person-centered rehabilitation, supported by individualized assessment and robust safety monitoring. Implementation studies are needed to evaluate nurses' competencies, workflow integration, patient acceptance, cost-effectiveness, safety, and nursing-sensitive outcomes.

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The authors declare no competing interests.

Declaration on the Use of AI
The authors declare that artificial intelligence (AI) tools were used only to assist in language editing and improving the clarity of the manuscript. All intellectual content, data analysis, and interpretation remain the responsibility of the authors.

Data Availability Statement
Data sharing is not applicable to this article.

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