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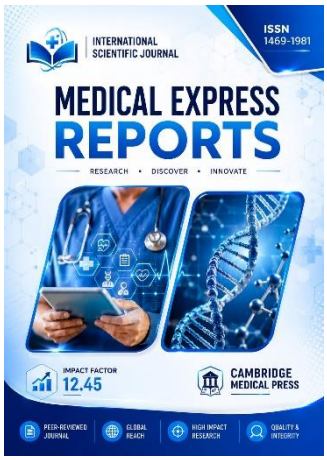

THE IMPORTANCE OF NURSING CARE AND PHYSIOTHERAPY IN THE POST-STROKE PERIOD

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ABSTRACT

Stroke remains one of the leading causes of death and long-term disability worldwide. In 2021 it was the third most common cause of death and was responsible for about 7.3 million deaths and 160.5 million disability-adjusted life-years. Survival after stroke has improved, so the number of people living with motor, cognitive, swallowing and emotional impairments keeps growing. Recovery depends heavily on what happens after the acute medical phase, and nurses and physiotherapists are the professionals who spend the most time with patients during this period.

1. Introduction

Stroke is an acute disturbance of cerebral circulation caused by occlusion (ischaemic stroke) or rupture (haemorrhagic stroke) of a cerebral vessel. It is a major medical and social problem. According to the Global Burden of Disease Study 2021, there were 11.9 million new strokes and 93.8 million people living after stroke in 2021; stroke caused 7.3 million deaths (10.7% of all deaths) and was the fourth leading cause of disability-adjusted life-years worldwide [1]. The burden has increased since 1990, and the growth of risk factors such as high blood pressure, high body-mass index, high fasting glucose and low physical activity suggests that it will continue to increase [1]. Central Asian countries, including Uzbekistan, are among the regions with a high stroke burden, which makes the organisation of effective post-stroke care a national public health priority.

Modern acute treatment (thrombolysis, thrombectomy, stroke units) has reduced mortality, but most survivors leave hospital with some degree of impairment: hemiparesis, disturbed balance

and gait, spasticity, aphasia, dysphagia, cognitive deficits, depression and fatigue. One year after stroke, a substantial proportion of survivors remain dependent on others in daily activities [2]. These consequences affect not only the patient but the whole family, and they create large costs for the health system.

Recovery after stroke is based on neuroplasticity — the ability of the brain to reorganise its networks in response to experience and training. The most intensive spontaneous recovery occurs in the first weeks and months, and this period is described as a "window of opportunity" for rehabilitation [2, 3]. What a patient does during these weeks — how often he or she sits, stands, walks, uses the affected hand, swallows safely and is protected from complications — depends largely on two groups of professionals: nurses, who are present 24 hours a day, and physiotherapists, who plan and deliver targeted motor training.

In many countries, including in parts of the Uzbek health system, nursing care after stroke is still understood mainly as basic custodial care (hygiene, feeding, giving medicines), while physiotherapy is often delivered as isolated sessions without continuity on the ward. Such a division wastes the rehabilitation potential of the 24-hour day. Medical technical schools, which train nurses and rehabilitation specialists, therefore have an important task: to prepare graduates who understand the role of the other profession and can work as one team.

The aim of this article is to analyse the evidence on the importance of nursing care and physiotherapy in the post-stroke period and to propose an integrated, phase-based model of joint work of nurses and physiotherapists that can be applied in clinical practice and in the professional education of students.

The article addresses three questions:

1. Which nursing interventions after stroke have evidence of benefit for survival, complications and functional outcome?
2. Which physiotherapy approaches improve motor function, mobility and independence, and what is known about their timing and dose?
3. How can nursing care and physiotherapy be combined into one continuous rehabilitation process?

2. Materials and Methods

2.1. Study design

The study was designed as a narrative (non-systematic) review of the literature with thematic synthesis. This design was chosen because the topic covers a wide range of interventions, professions and recovery phases that cannot be combined in a single quantitative meta-analysis.

2.2. Sources and search strategy

The search was performed in PubMed/MEDLINE, the Cochrane Library, the Physiotherapy Evidence Database (PEDro) and Google Scholar. The following keywords and their combinations were used: *stroke*, *post-stroke*, *rehabilitation*, *nursing care*, *nurse-led*, *physiotherapy*, *physical therapy*, *early mobilisation*, *dysphagia screening*, *activities of daily living*, *Barthel index*,

caregiver training, *stroke unit*. Reference lists of key reviews and clinical guidelines were also examined.

2.3. Inclusion and exclusion criteria

Included were: (a) systematic reviews and meta-analyses; (b) randomised controlled trials; (c) international clinical practice guidelines and consensus documents; (d) publications in English, published from 2000 to 2025, concerning adult patients after ischaemic or haemorrhagic stroke. Excluded were single case reports, opinion pieces without data, studies on paediatric stroke, and studies focused only on pharmacological or surgical treatment.

2.4. Data analysis

The selected sources were read in full. For each source, the intervention, the professional responsible for it, the recovery phase, the outcomes measured (mortality, dependency, modified Rankin Scale, Barthel Index, gait, balance, complications, quality of life) and the main result were extracted. The findings were then grouped into two thematic blocks — nursing care and physiotherapy — and organised according to the recovery phases defined by the Stroke Recovery and Rehabilitation Roundtable: hyperacute (0–24 hours), acute (1–7 days), early subacute (7 days–3 months), late subacute (3–6 months) and chronic (more than 6 months) [4]. On this basis an integrated model of joint nurse–physiotherapist work was constructed.

3. Results

3.1. Organised interdisciplinary care as the foundation

The strongest evidence concerns not a single procedure but the organisation of care. The Cochrane review of organised inpatient (stroke-unit) care showed that patients treated in a stroke unit by a coordinated multidisciplinary team — physicians, nurses, physiotherapists, occupational and speech therapists — are more likely to be alive, independent and living at home one year after stroke than patients treated in general wards [5]. The benefit was observed regardless of age, sex and stroke severity. The key features of effective units were regular team meetings, early mobilisation, structured nursing care and involvement of the family [5, 6]. This result shows that the combination of nursing care and therapy is itself a therapeutic factor.

3.2. Nursing care in the post-stroke period

Prevention of early complications. Most deaths and much of the disability in the first weeks after stroke are caused not by the brain lesion itself but by complications: aspiration pneumonia, urinary tract infection, deep vein thrombosis, pressure ulcers, falls and dehydration. Their prevention is primarily a nursing task. In the QASC cluster-randomised trial, nurse-implemented protocols to manage fever, hyperglycaemia and swallowing dysfunction in the first 72 hours reduced death and dependency at 90 days (modified Rankin Scale ≥2) by about 16% in absolute terms compared with usual care [7]. This trial is one of the clearest proofs that standardised nursing actions directly change the outcome of stroke.

Dysphagia screening. Swallowing disorders occur in a large proportion of patients after acute stroke and are the main cause of aspiration pneumonia. A multicentre study showed that hospitals

using a formal dysphagia screening protocol had a markedly lower rate of pneumonia than hospitals without such a protocol [8]. Bedside water-swallow screening before the first oral intake of food, fluids or medicines is therefore a standard nursing responsibility.

Positioning, skin and continence care. Correct positioning of the hemiplegic patient (support of the affected shoulder, neutral position of the limbs, regular turning) prevents pressure ulcers, shoulder pain and the formation of pathological postures. Bladder and bowel programmes, avoidance of unnecessary urinary catheters and early nutritional assessment are part of evidence-based nursing practice [6, 9].

The nurse as a rehabilitation agent on the ward. Nurses are with the patient during washing, dressing, eating and toileting — exactly the activities that rehabilitation aims to restore. When nurses encourage the patient to perform these tasks independently, using the affected side, instead of doing them for the patient, the ward day becomes a continuation of therapy [9, 10]. Reviews describe this "24-hour rehabilitation" role as one of the most important and least used resources of stroke care [10].

Psychological support and education. Post-stroke depression, anxiety and fear of falling slow down recovery. Nurse-led interventions that include education, emotional support and self-care training have been shown to improve quality of life after stroke [11]. Training of family caregivers before discharge in basic skills of lifting, transfers, positioning and help with daily activities reduced the burden on carers and the costs of care while preserving patient outcomes [12].

Transition to home. The transition from hospital to home is a critical point at which many patients lose the progress achieved in hospital. Nurse-led transition care (discharge planning, telephone follow-up, home visits, medication management) improves post-discharge outcomes of stroke survivors [13].

3.3. Physiotherapy in the post-stroke period

General effectiveness. A Cochrane review of physical rehabilitation approaches concluded that physiotherapy using a mix of components from different approaches is significantly more effective than no treatment or attention control for recovery of function and mobility after stroke, and that no single named approach (for example, Bobath or motor relearning) is clearly superior to the others [14]. A large meta-analysis of 467 trials confirmed positive effects of a wide range of physiotherapy interventions on motor function, gait, balance and activities of daily living, particularly when therapy is task-oriented and of sufficient intensity [15].

Early mobilisation. Getting the patient out of bed early prevents immobility complications (thrombosis, pneumonia, muscle atrophy, orthostatic intolerance). In a randomised trial, very early mobilisation started within 24 hours, for short sessions at least twice a day for seven days, produced a greater improvement in Barthel Index at three months than standard care [16]. A pilot trial in a public hospital in Brazil confirmed that early mobilisation after ischaemic stroke is safe and feasible in a resource-limited setting [17]. At the same time, the large AVERT trial (2104

patients, 56 stroke units) found that a protocol of higher-dose, very early out-of-bed activity within 24 hours was associated with lower odds of a favourable outcome at three months than usual care [18]. The Cochrane review on this question concluded that the effect of very early mobilisation remains uncertain [19]. The practical conclusion is that mobilisation should begin early, once the patient is medically stable, but in short and frequent sessions rather than long and intensive ones in the first day.

Task-specific and repetitive training. Repetitive practice of whole functional tasks (sit-to-stand, walking, reaching and grasping) improves arm and leg function and walking ability [20]. Constraint-induced movement therapy, in which the unaffected hand is restricted and the affected hand is trained intensively, improves arm motor function and use in selected patients with some preserved wrist and finger extension [21].

Balance, gait and fitness training. Balance exercises, treadmill or over-ground walking training and cardiorespiratory fitness training improve walking speed, walking endurance and balance; fitness training is also important for secondary prevention because many survivors become physically inactive [15, 22].

Management of spasticity and shoulder pain. Physiotherapists use stretching, positioning, orthoses and functional electrical stimulation to reduce spasticity and prevent contractures. Correct handling of the hemiplegic shoulder by both nurses and therapists is necessary to prevent post-stroke shoulder pain [6].

3.4. Synthesis: complementary roles of the nurse and the physiotherapist

The analysis shows that the most effective outcomes are achieved when the two professions work on the same goals. Table 1 summarises the main interventions by recovery phase and the responsibility of each profession.

Table 1. Integrated nurse–physiotherapist care model by recovery phase

Phase (time after stroke)	Main goals	Nursing care	Physiotherapy	Joint actions
Hyperacute and acute (0–7 days)	Survival, prevention of complications, safe start of mobility	Monitoring of vital signs, temperature and glucose; dysphagia screening before oral intake; positioning and turning; skin, bladder and bowel care; DVT prevention	Assessment of motor function and respiratory status; passive and active-assisted movements; short, frequent sessions of sitting and standing once stable	Shared positioning plan; agreed mobilisation schedule; daily communication on patient tolerance

Phase (time after stroke)	Main goals	Nursing care	Physiotherapy	Joint actions
Early subacute (7 days–3 months)	Maximal use of neuroplasticity, restoration of mobility and self-care	Encouraging independent washing, dressing and eating with the affected side; fall prevention; nutrition and hydration; screening for depression	Task-specific training (transfers, sit-to-stand, gait, upper-limb tasks); balance training; spasticity management; orthoses if needed	Weekly team meeting; common functional goals (e.g. Barthel Index, walking distance); practising therapy tasks on the ward between sessions
Late subacute (3–6 months)	Preparation for discharge and life at home	Caregiver training; medication education; discharge planning; home safety advice	Progression of walking and endurance; stair training; home exercise programme	Joint caregiver training session; home visit or tele-follow-up plan
Chronic (more than 6 months)	Maintenance of function, secondary prevention, social participation	Control of blood pressure, glucose and lifestyle risk factors; follow-up of adherence and mood	Fitness and strength training; community walking; prevention of deconditioning	Long-term follow-up in primary care; support of patient self-management

Note: compiled by the authors on the basis of sources [4–22].

Table 2 summarises the key evidence on which the model is based.

Table 2. Key evidence on nursing and physiotherapy interventions after stroke

Intervention	Responsible professional	Type of evidence	Main result
Organised stroke-unit care	Whole team	Cochrane systematic review [5]	Fewer deaths and less dependency; more patients living at home
Fever, glucose and swallowing protocols (QASC)	Nurse	Cluster RCT [7]	Reduced death and dependency at 90 days
Formal dysphagia screening	Nurse	Multicentre study [8]	Lower rate of aspiration pneumonia
Nurse-led education and support	Nurse	Systematic reviews [11, 13]	Better quality of life and post-discharge outcomes

Intervention	Responsible professional	Type of evidence	Main result
Caregiver training before discharge	Nurse, physiotherapist	RCT [12]	Lower caregiver burden and costs of care
Mixed-approach physical rehabilitation	Physiotherapist	Cochrane review [14]; meta-analysis [15]	Better function, mobility and ADL
Early, short and frequent mobilisation	Physiotherapist, nurse	RCTs [16, 17]	Safe; improved Barthel Index at 3 months
High-dose very early mobilisation within 24 h	Physiotherapist, nurse	Large RCT (AVERT) [18]	Lower odds of favourable outcome — dose must be moderated
Repetitive task training; CIMT	Physiotherapist	Cochrane review [20]; review [21]	Improved arm and leg function and walking
Fitness training	Physiotherapist	Cochrane review [22]	Better walking speed and endurance

4. Discussion

The results of this review support the view that recovery after stroke is not produced by a single treatment but by a continuous, coordinated process in which nursing care and physiotherapy play complementary roles. The physiotherapist brings specialised knowledge of motor control, assessment and progressive training, but a typical therapy session takes only a small part of the patient's day. The nurse, in contrast, is present throughout the 24 hours and can turn every daily activity into an opportunity for practice, or, if care is purely custodial, into a lost opportunity. The stroke-unit evidence [5] and the QASC trial [7] show that when nursing actions are standardised and integrated into the team, they change hard outcomes such as death and dependency.

The question of timing and dose of mobilisation deserves special attention. Earlier studies and clinical experience encouraged mobilising patients as early as possible, and small trials showed benefit [16, 17]. However, the AVERT trial demonstrated that more is not always better: a high dose of out-of-bed activity in the first 24 hours led to worse outcomes than usual care [18]. Further analyses suggested that short, frequent sessions were associated with better results than long sessions. For practice, this means that nurses and physiotherapists must agree on a gradual mobilisation plan, monitor the patient's blood pressure, consciousness and fatigue, and avoid both prolonged bed rest and excessive early loading. This is a clear example of a decision that cannot be made by one profession alone.

The findings also emphasise the importance of the period after discharge. Many patients in Uzbekistan return home to the care of family members who have not been prepared for this role. Caregiver training [12] and nurse-led transition care [13] are relatively low-cost interventions that can protect the progress achieved in hospital. In the context of primary health care in Uzbekistan,

family polyclinics and rural medical points, where patronage nurses already conduct home visits, could serve as a base for continued post-stroke follow-up and home exercise supervision in cooperation with rehabilitation specialists.

Implications for professional education. Medical technical schools train the nurses and rehabilitation specialists who will deliver post-stroke care. On the basis of this review, the following measures are recommended for the educational process:

- to include in the nursing curriculum practical training in dysphagia screening, positioning of the hemiplegic patient, safe transfers and fall prevention;
- to include in the rehabilitation and physiotherapy curriculum the principles of task-specific training, dosing of early mobilisation and work with caregivers;
- to organise joint (interprofessional) practical classes in which nursing and physiotherapy students solve clinical cases of stroke patients together, set common goals and use common assessment scales (Barthel Index, modified Rankin Scale, Berg Balance Scale);
- to use simulation and role-play for training communication with patients who have aphasia and with their families.

Limitations. This study is a narrative review and does not include a formal quality assessment or meta-analysis; the selection of sources may therefore be subject to bias. Most of the included trials were conducted in high-income countries, and their results may not transfer directly to settings with fewer staff and resources. The proposed integrated model has not yet been tested empirically; its effectiveness should be evaluated in future prospective studies in Uzbek hospitals and primary care.

5. Conclusion

1. Stroke is a leading cause of death and disability, and the number of people living with its consequences is growing; effective post-stroke care is therefore a public health priority.
2. Nursing care after stroke is a therapeutic intervention in its own right: standardised monitoring of temperature and glucose, dysphagia screening, positioning, prevention of complications, psychological support and caregiver education reduce death, dependency and complications.
3. Physiotherapy that is task-oriented, repetitive and progressively intensive improves motor function, walking, balance and independence in daily activities. Mobilisation should start early, once the patient is stable, in short and frequent sessions.
4. The best results are achieved when nurses and physiotherapists work as one team with shared goals, a common mobilisation plan and continuity from the stroke unit to the patient's home.
5. Training of future nurses and rehabilitation specialists in medical technical schools should include interprofessional practical classes on post-stroke care, so that graduates are ready for joint work from the first day of practice.

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