THE ROLE OF COORDINATED REHABILITATION IN IMPROVING PATIENTS' LIVES

Abstract. Stroke represents a significant healthcare challenge globally, with rising costs and increasing prevalence necessitating effective rehabilitation strategies. Aim: This study aims to investigate the impact of coordinated rehabilitation on stroke patients, focusing on the integration of care before, during, and after hospital discharge. The goal is to assess the effectiveness of coordinated rehabilitation in improving functional outcomes and quality of life for stroke survivors. Materials and Methods: A mixed-methods approach was employed, combining qualitative interviews and quantitative assessments using the Functional Independence Measure (FIM). Semi-structured interviews were conducted with 25 stroke patients undergoing coordinated rehabilitation at two hospitals in the Czech Republic. Data were analyzed using ATLAS.ti software for qualitative insights and descriptive statistics for FIM scores. Results: Participants showed significant improvements in functional independence as measured by the FIM across admission, discharge, and three months post-discharge. Qualitative data highlighted positive patient perceptions of rehabilitation services and the crucial role of interprofessional teams in providing comprehensive care. Challenges identified included the need for ongoing rehabilitation at home and better communication between healthcare providers and patients/families post-discharge. Conclusions: Coordinated rehabilitation plays a pivotal role in enhancing post-stroke recovery outcomes through interdisciplinary collaboration and patient-centered care. However, gaps in service availability and awareness persist, hindering optimal continuity of care. Recommendations include developing integrated care models, increasing awareness
of rehabilitation resources, enhancing family support, and expanding home-based rehabilitation services to improve patient outcomes and quality of life.

**Keywords:** Stroke, coordinated rehabilitation, interdisciplinary care, functional independence, patient-centered care

Шуранова Леся MD, MBA Асистент факультету здоров'я та соціальних наук, Південночеський університет Чеське Будейовіце, Інститут соціальних та спеціально-педагогічних наук, https://orcid.org/0000-0002-5611-0490

Їтка Вацкова магістр, доктор філософії доцент, факультету здоров'я та соціальних наук, Південночеський університет Чеське Будейовіце, Інститут соціальних та спеціально-педагогічних наук, https://orcid.org/0000-0002-0241-1052

Грищук Андрій доктор філософії, доцент, Навчально-науковий інститут природничих та аграрних наук, кафедра анатомії та фізіології людини і тварин, Луганський національний університет імені Тараса Шевченка, https://orcid.org/0000-0002-4608-337X

**РОЛЬ КООРДИНОВАНОЇ РЕАБІЛІТАЦІЇ У ПОКРАЩЕННІ ЖИТТЯ ПАЦІЄНТІВ**

**Анотація.** Інсульт є значною проблемою охорони здоров'я в усьому світі, оскільки зростаючи витрати та поширеність інсульту вимагають ефективних стратегій реабілітації. **Мета:** Це дослідження спрямоване на вивчення впливу координованої реабілітації на пацієнтів, які перенесли інсульт, з акцентом на інтеграцію допомоги до, під час та після виписки з лікарні. Мета - оцінити ефективність координованої реабілітації у покращенні функціональних результатів та якості життя пацієнтів, які пережили інсульт.

**Матеріали і методи:** Застосовано змішаний підхід, що поєднує якісні інтерв'ю та кількісні оцінки з використанням шкали функціональної незалежності (FIM). Напівструктуровані інтерв'ю були проведені з 25 пацієнтами з інсультом, які проходили координовану реабілітацію в двох лікарнях в Чеській Республіці. Дані були проаналізовані за допомогою програмного забезпечення ATLAS.ti для якісного аналізу та описової статистики для оцінок за FIM. **Результати:** Учасники продемонстрували значне покращення функціональної незалежності за шкалою FIM під час госпіталізації, виписки та через три місяці після виписки. Якісні дані підкресли позитивне сприйняття пацієнтами реабілітаційних послуг і вирішальну роль міжпрофесійних команд у наданні комплексної допомоги. Виявлені виклики включали необхідність продовження реабілітації вдома та кращої комунікації між медичними працівниками та пацієнтами/сім'ями після виписки. **Висновки:** Координована реабілітація відіграє ключову роль у покращенні
Introductions. An acute cerebrovascular accident (CVA)/stroke represents a significant economic burden on healthcare systems. The average cost of treating one patient after a stroke in the Czech Republic is more than 40,000 CZK (ČPZP, 2022). The average cost of hospitalization is 114,489 crowns, with immobile patients incurring 2.4 times higher costs than self-sufficient patients (Angerova et al., 2020). The rising costs are mainly driven by nursing costs, with the VZP spending 2,190,275 crowns on stroke treatment in 2020 (VZP, 2021).

Dunbar et al. (2018) expect direct medical costs associated with stroke to more than double from $36.7 billion to $94.3 billion between 2015 and 2035. Thrift et al. (2017) report that stroke cases and survivor prevalence are increasing even as mortality rates are decreasing. Kim et al. (2020) highlight differences in CVA incidence and mortality between countries with different income levels, with lower – and middle-income countries accounting for most of the burden.

Goal setting in rehabilitation is done in collaboration between the team, the patient, and sometimes the family, focusing on patient involvement in care planning (Rafsten & Sunnerhagen, 2023). The quality of rehabilitation services is guided by Evidence-Based Practice (Wade, 2020), which benefits individuals with long-term disabilities regardless of cause, stage of illness, age, or setting (Wade, 2020). This rehabilitation requires the collaboration of an interprofessional team within a biopsychosocial model and includes various interventions such as exercise, task training, education, patient self-regulation, and psychosocial support (Wade, 2020).

Coordinated rehabilitation is an integral part of neurorehabilitation that facilitates rehabilitating people with neurological sequelae that limit their functional abilities (Vacková et al., 2020). This process emphasizes the importance of organizing and coordinating interventions for clients with disabilities, based on the UN Convention on the Rights of Persons with Disabilities (2007) (Vacková et al., 2020). Critical characteristics of coordinated rehabilitation include timeliness, comprehensiveness, continuity, coordination, and synergy (Švestková, 2020).

Rehabilitation after stroke supports patients in achieving optimal physical, emotional, behavioral, and cognitive functioning (Hebert et al., 2016) and includes therapeutic, educational, occupational, and social components (Pfeiffer et al., 2014; Sohn et al., 2011). In the Czech Republic, the term complex rehabilitation or
comprehensive rehabilitation is often used (Kolář, 2009), unlike abroad, where this term is not used (Krhutová, 2021). Kovářová et al. (2018) summarise that rehabilitation enables patients to return quickly to their home environment, achieve maximum self-sufficiency, and ideally return to work. The importance of increasing awareness of available services, ensuring the safety of the home environment, and accessibility of needed services is essential, as summarised in the "Set of Recommendations for Patients and their Families" (Kovářová et al., 2018).

The arm.

This study investigated how coordinated care and rehabilitation for stroke patients can be implemented before, during, and after hospital discharge. It explored the components of coordinated rehabilitation, namely, the patient/client, their family, and treatment specialists. This study focuses primarily on the patient/client. It was conducted as part of the GAJU 066/2022/S project, approved by the ethics under 6/2022.

Material and methods

Research Strategy

This study employed a qualitative research approach, with a predominant focus on qualitative methods to investigate the rehabilitation outcomes for patients after a cerebrovascular accident (CVA)/stroke. The primary data collection method involved semi-structured interviews with patients to gather detailed insights into their rehabilitation experiences and perceptions. Additionally, quantitative measures, specifically the Functional Independence Measure (FIM), were used to assess the functional progress of patients at different stages of rehabilitation—admission, discharge, and three months post-discharge. The qualitative data were analyzed using ATLAS.ti software, employing open, axial, and selective coding techniques to identify recurring themes and patterns in patient narratives. This integrated approach aimed to comprehensively understand rehabilitation outcomes from both qualitative and quantitative perspectives, enhancing the study's depth and reliability.

Participants

Participants included a broad spectrum of patients/clients who underwent rehabilitation at two hospitals. The selection criteria focused on individuals who had experienced a stroke and were receiving coordinated rehabilitation services. The initial cohort consisted of 32 patients, but due to various factors, only 25 continued throughout the study. The remaining 25 participants were selected based on specific criteria, including the presence of hemiparesis with varying severity levels combined with other neurological symptoms.

Data Collection

The semi-structured interviews were designed to gather two types of information: a) Information about the patient/client, including mobility disorders, sensory and cognitive functions, and pain, as well as the course of the disease. b) Provide information regarding providing rehabilitation services focusing on therapeutic and potentially other coordinated rehabilitation components.
Functional Independence Measure (FIM) was used to assess patients' functional status and independence at three different intervals: upon admission to the rehabilitation department, before discharge, and three months post-discharge.

**Data Analysis**

The qualitative data obtained through the semi-structured interviews were analyzed using ATLAS.ti software. This analysis incorporated open, axial, and selective coding to identify themes and patterns in the data. Data from the FIM were processed using descriptive statistics for 25 patients, highlighting the extent of improvement or deterioration according to objective measures.

**Research Risks**

Acknowledging the limitations inherent in qualitative research is essential. The findings could be more generalizable due to the qualitative nature of the study. Additionally, the focus on caregiver experiences introduces subjectivity in data interpretation. To minimize bias, the coding process was collaboratively reviewed by multiple experts in the field.

**Results**

Of the 32 patients who have suffered a stroke and joined the project in 2021, 25 patients have gone on to participate in the research. Seven patients discontinued their participation: one due to a recurrent cerebrovascular event, three declined to continue for various reasons, two were transferred to Aftercare Unit, and one continued with spa therapy.

Patients were stratified by age and gender. The oldest patient was 85 years old, and the youngest was 34 years old. There were more men than women in the study. The patients' residences included villages, small towns, medium-sized towns, and large cities. The patient's level of education and original occupation was varied. Some were retired, others were employed full-time. Housing was divided between single-family homes and apartments with wheelchair access.


During their stay in the rehabilitation ward, patients emphasized that most of their needs were met. Aids needed an overball, trapeze, mat, canes, and walker. After discharge, continued rehabilitation, home modifications, and family support were needed.

Patients appreciated the interprofessional team (physicians, physiotherapists, occupational therapists, psychologists) that provided their care. Collaboration was rated as good to excellent. After discharge, some patients continued their rehabilitation at home with the help of physiotherapists and caregivers. Cooperation with GPs was rated as very good.

The FIM test results, which assess patients' independence after stroke, showed improvement in all categories. For example, the first patient improved from 105
points at admission to 114 points before discharge and 111 points after three months, and the second patient had 110 points at admission, 112 points before discharge, and 112 points after three months. All patients' scores improved from entry assessment to three-month follow-up, confirming the importance of personalized rehabilitation and continued care after discharge.

In particular, patients needed further rehabilitation, home modifications, and family support after discharge. Many emphasized the need for physiotherapy and rehabilitation aids.

Patients are advised to promptly call the emergency services at signs of stroke, listen to doctors' advice, adhere to a healthy lifestyle and psychological well-being, and believe in recovery. Emphasis was placed on exercise and continued rehabilitation.

**Diskurse**

Discharging patients after a stroke is a critical moment that requires careful planning and coordination. Gonçalves-Bradley et al. (2022) highlight the need for a personalized discharge plan that should include specialist interventions, rehabilitation, and family support. A personalized approach considers the patient's specific needs and ensures a smooth transition from the hospital to the home environment, thus optimizing the quality of care. However, gaps in information transfer, access to specialists, and psychological support can negatively affect treatment outcomes.

Creasy et al. (2015) highlight that providers have to prepare family caregivers for their role after the patient is discharged. This research also shows that quality inpatient and outpatient rehabilitation, long-term rehabilitation, and compensatory aids are crucial to patient recovery. Yan et al. (2016) add that rehabilitation care after a stroke is increasingly essential.

Barriers to discharge include environmental factors such as time pressures, staff shortages, staff turnover, lack of space and equipment, and organizational constraints (Hadely et al., 2014). Team factors can help overcome these barriers and improve patient functional abilities (Strasser et al., 2008; Schouten et al., 2008). Hospitals should develop patient monitoring programs to effectively monitor patients after discharge and expand transportation options and partnerships with social and health services. A standardized approach may facilitate addressing barriers identified during patient admission (Meo et al., 2020).

Davoody et al. (2016) highlight patients' changing understanding of their illness, increasing the need for flexible support during care and rehabilitation. The main challenges in monitoring patients post-discharge include the lack of carers, the episodic nature of monitoring, and the inability to provide and manage rehabilitation in the home environment. Mobile technologies, including telerehabilitation, can support patients during rehabilitation, and telephone monitoring can be an effective tool for monitoring patients' functional status (Segal et al., 1996).

Lack of communication and collaboration between the different actors negatively affects patients and their families (Aquino et al., 2016). The most
significant difficulties occur after discharge from the ward, particularly in the collaboration between the patient, their family, and GPs. Cooperation between professionals is implemented through consultations, referrals, or face-to-face meetings. Workload, pressure, and time constraints are the main barriers to daily practice (Terry & Kayes, 2020).

Rehabilitation after stroke is an active process that begins during acute hospitalization and continues after the individual returns to the community (Mahak et al., 2019). Lack of continuity of interventions after discharge from rehabilitation services is a common problem (Lewinter & Mikkelsen, 2009; Zwygart-Stauffacher et al., 2000). Community-based rehabilitation (CBR) provides social integration and equal opportunities for people with disabilities (Nugraha et al., 2021). Expanded service delivery increases patient satisfaction and hope for recovery (Lamontagne et al., 2019).

After discharge, patients valued the interprofessional team that provided their care, and collaboration was rated as good to excellent. After discharge, some patients continued rehabilitation at home with the help of physiotherapists and nurses, and collaboration with GPs was rated as very good. The results of the FIM tests showed improved patients' independence due to intensive rehabilitation and comprehensive care. The family and home environment play a crucial role in recovery, providing support and motivation for recovery (Davoody et al., 2016).

Conclusions
Based on the data obtained, the following conclusions can be drawn:

1. The coordinating role of rehabilitation is essential for the effective recovery of patients after stroke: an interprofessional approach involving a wide range of specialists ensures comprehensive care and optimal rehabilitation outcomes.

2. The unavailability of rehabilitation services, especially at home, and the lack of awareness of available resources and programs among patients and their families are a severe problem: it is essential to address these issues immediately to ensure continuity and effectiveness of care after hospital discharge.

3. Improving interdisciplinary collaboration and communication between all participants in the rehabilitation process, including health professionals, patients, and their families, is crucial for coordinated and effective patient-centered care. This collaboration is essential for optimal rehabilitation outcomes.

Based on these findings, the following recommendations can be made to improve coordinated rehabilitation of patients after stroke:

1. Develop and implement integrated care models that engage interprofessional teams to provide comprehensive support to patients and their families.

2. Increase awareness of available rehabilitation resources and programs among patients and their families through awareness campaigns and digital platforms.

3. Strengthen the family's role in rehabilitation through education and support programs that provide tools for active participation in helping relatives.
4. Ensure the availability of rehabilitation services at home by expanding the network of service providers and optimizing funding mechanisms. These measures can significantly improve the quality of life of stroke patients and facilitate their rapid return to daily life at home and in the community.

**Funding**

Funding was based on complete financial support from the Grant Agency of the University of Jihočeské Budějovice (project number GAJU 066/2022/S, duration 1.2.2022 to 31.12.2023).

**Conflict of interest**

The authors of this study confirm that the research and publication of the results were not associated with any conflicts regarding commercial or financial relationships, relationships with organizations and/or individuals who may have been related to the study, and interrelationships of the article’s co-authors.

**References:**


Литература:


