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Factors Influencing Readmission Rates in Stroke Patients: A Review

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Abstract

Stroke represents one of the leading causes of mortality and morbidity globally. Although advancements in medical technology have improved survival rates among stroke patients, readmission rates remain notably high, imposing substantial economic and psychological burdens on patients and their families. This study aims to investigate the primary factors influencing readmission rates among stroke patients, including clinical characteristics, socioeconomic factors, quality of medical services, and post-discharge care, thereby providing a reference basis for improving stroke patient management.

Full Text

Current Status of Factors Influencing Readmission Rates in Stroke Patients

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Abstract

Stroke is one of the leading causes of death and disability worldwide. Although advances in medical technology have improved survival rates among stroke patients, readmission rates remain high, imposing substantial economic and psychological burdens on patients and their families. This paper aims to explore the primary factors affecting stroke patient readmission rates, including clinical characteristics, socioeconomic factors, healthcare quality, and follow-up care, to provide a reference for improving stroke patient management.

Keywords: stroke; readmission rate; influencing factors; current status

Introduction

Stroke represents a major global health challenge with high rates of disability and mortality, profoundly impacting patients' physical health, psychological well-being, social functioning, and economic status. Its incidence continues to rise annually, emerging as a significant threat to human health. Many patients experience readmission after discharge for various reasons. According to relevant studies, stroke readmission rates range from 30% to 50%, with risk particularly elevated in the first few months post-discharge [1]. In China, for example, stroke patients face a 6.8% readmission rate within 30 days of discharge, increasing to 12.7%, 18.9%, 27.8%, and 39.9% at 90, 180, 360, and 720 days, respectively [2]. These statistics not only reflect the high recurrence risk following initial treatment but also underscore the substantial economic and emotional burdens on patients and families. Consequently, identifying factors influencing readmission rates is crucial for developing effective interventions, and accurately predicting readmission risk has become a focal point in medical research.

1. Risk Factor Analysis

1.1 Controllable Risk Factors

The primary controllable risk factors for stroke readmission include chronic diseases and unhealthy lifestyle habits such as hypertension, diabetes, hyperlipidemia, atrial fibrillation, smoking, and alcohol abuse. While most of these factors can be managed through standardized treatment and care, patients often lack self-management capacity or neglect medical advice, leading to disease progression and increased readmission risk.

1.2 Uncontrollable Risk Factors

Uncontrollable risk factors mainly comprise age, gender, ethnicity, and genetic predisposition. The risk of stroke recurrence increases progressively with age, and genetic factors also influence recurrence to some extent. Clinical features including patient age, gender, stroke type, and disease course represent important determinants of readmission rates.

1.3 Disease-Specific Causes

1.3.1 Stroke Type Based on pathological classification, stroke can be divided into ischemic and hemorrhagic types, which exhibit different readmission risks. Ischemic stroke patients typically have higher readmission rates than hemorrhagic stroke patients, attributable to subsequent complications and rehabilitation needs [3]. Hemorrhagic stroke is particularly dangerous within the first month after the acute phase, while cardioembolic stroke carries high long-term readmission risk due to its high recurrence rate.

1.3.2 Complications and Sequelae Stroke patients frequently experience multiple complications and sequelae, such as pulmonary infections, heart failure, and cardiovascular events, which further increase readmission risk. Neurological sequelae, including limb paralysis and language dysfunction, severely impact quality of life and elevate readmission risk during rehabilitation. Additional studies have explored how other health indicators affect readmission rates. For instance, Liu Zuting investigated the association between the Systemic Inflammatory Response Index (SIRI) and one-year recurrence in ischemic stroke patients [4]; Zhang Pingshu examined sleep status changes and prognostic factors in acute posterior circulation ischemic stroke patients [5]; and Xue Chao's systematic review analyzed the prevalence and trends of post-stroke fatigue in China, identifying fatigue as an important factor affecting both quality of life and readmission rates, thereby informing prevention and treatment strategies [6]. Similarly, Wang Xiaowen's 2023 study explored the relationship between homocysteine (Hcy) levels and acute kidney injury (AKI) in acute ischemic stroke (AIS) patients, offering new insights into stroke complications and their impact on readmission [7].

1.4 Time Factors

1.4.1 Short-term (Within 30 Days) The first 30 days following discharge represent the highest-risk period for stroke readmission. This is primarily because patients' conditions remain unstable after acute-phase treatment, and their limited self-management capacity makes them vulnerable to disease recurrence from various causes.

1.4.2 Long-term Although readmission rates continue to rise over time, risk factors differ across periods. During the first year post-stroke, recurrence and readmission risks are particularly prominent. While overall risk may decrease over longer periods, patients still require ongoing attention and management of various controllable risk factors.

1.5 Socio-demographic Factors

Socio-demographic factors such as age, gender, and economic status also influence stroke readmission rates. Elderly patients exhibit significantly higher readmission rates than younger patients due to declining physiological function and increased comorbidities [8]. Additionally, patients with poorer economic status may delay or forgo treatment because they cannot afford high medical costs, thereby increasing readmission risk. Socioeconomic status—including education level, income, and social support—significantly impacts readmission rates. Research shows that patients with low income and education levels are more likely to be readmitted due to lack of necessary medical knowledge and resources [9]. Insufficient social support, particularly in family caregiving, also increases readmission risk. Chen Zhipeng's study demonstrated that low Geriatric Nutritional Risk Index (GNRI) is significantly associated with unplanned

readmission within 30 days in elderly stroke patients, highlighting the importance of nutritional management in preventing readmission [10].

1.6 Medical Compliance

Medical compliance represents a critical factor affecting stroke readmission rates. Whether patients adhere to medication regimens, attend regular follow-ups, and modify their lifestyles directly impacts disease control and readmission risk. However, many patients fail to maintain treatment and management protocols for various reasons, leading to disease recurrence and readmission.

1.7 Rehabilitation and Psychological Status

Rehabilitation therapy and psychological status significantly influence stroke readmission rates. Effective rehabilitation can help patients recover or compensate for functional deficits and improve quality of life, while good psychological status promotes active treatment participation and reduces disease recurrence risk. Geng Qingwen's research found that psychological nursing can significantly improve rehabilitation outcomes and emotional states in elderly stroke patients, potentially indirectly reducing readmission rates [11]. However, many patients fail to achieve optimal rehabilitation outcomes due to lack of professional knowledge and guidance during recovery, consequently increasing readmission risk.

1.8 Healthcare System and Services

Healthcare system quality and service delivery also constitute important factors influencing stroke readmission rates. A comprehensive healthcare system can provide integrated prevention, treatment, rehabilitation, and management services. High-quality medical care includes timely diagnosis, effective treatment protocols, and robust discharge planning [12], while excellent service quality can enhance patient satisfaction and compliance, further reducing readmission rates. Studies have found that hospitals lacking systematic discharge planning and follow-up services have significantly higher patient readmission rates than those with comprehensive management programs [13]. Huang Zhongxiao explored nurse-led discharge planning and found it significantly improved discharge readiness and reduced readmission rates [14]. Therefore, medical institutions should continuously improve service processes and quality control systems to enhance service levels and patient satisfaction.

1.9 Follow-up Care

Post-discharge care quality critically impacts stroke readmission rates. Appropriate follow-up measures—including rehabilitation training, nutritional support, and psychological counseling—can effectively reduce readmission risk [15]. Additionally, patients' and families' understanding of and engagement in disease management affect readmission rates. Jun O Connell, Adalia H H's research demonstrated that stroke nurse navigator utilization can effectively manage

transitional care and reduce unplanned 30-day readmission after thrombolytic therapy [16]. Honghong Feng's evaluation of comorbidity effects on readmission rates and hospitalization costs in Chinese ischemic stroke patients suggested that comorbidity management is key to reducing readmission [17].

2. Interventions and Strategies

2.1 Constructing Risk Prediction Models

Research indicates that factors including age, gender, medical history, and initial stroke severity may influence post-discharge readmission risk, as do lifestyle and rehabilitation implementation. Based on these factors, researchers have developed various stroke readmission risk prediction models that enable clinicians to more accurately assess individual patient risk levels and develop personalized treatment and follow-up plans, thereby significantly reducing readmission rates. Some models incorporate machine learning technology to improve prediction accuracy through large-scale data analysis. Gao Xiumei studied recurrence and readmission in elderly ischemic stroke patients, identified high-risk factors, and constructed a risk prediction model providing important clinical reference [18].

2.2 Improving Daily Care and Treatment

Liu Shixia explored the relationship between healthy lifestyle and readmission in diabetic patients with first-time stroke, finding that HPLP-II scores affect readmission risk and emphasizing the importance of lifestyle intervention [19]. Zheng Siting evaluated best evidence for self-management in stroke patients with motor dysfunction, noting the current lack of scientific and standardized protocols and recommending enhanced self-management training to reduce readmission [20]. Other studies have addressed daily care essentials and traditional Chinese medicine nursing methods for stroke patients. Jiang Chunjing emphasized the importance of daily care, highlighting the need for special attention to the profound impacts of acute neurological dysfunction [21]. Li Li analyzed research status on constipation factors and traditional Chinese nursing improvements in elderly stroke patients, providing a basis for further research [22]. Gao Ya's study examined intradermal needle therapy for post-stroke insomnia, finding it improved sleep quality and thereby indirectly affected overall health status and readmission rates [23].

2.3 Rehabilitation Nursing

Tian Annie's systematic review analyzed the effects of rehabilitation robot-assisted training on hand motor function recovery in stroke patients at different stages, finding this technology significantly promotes rehabilitation progress [24]. Yu Hua's research indicated that community rehabilitation nursing helps improve quality of life and rehabilitation confidence in stroke patients, thereby reducing readmission rates [25]. Finally, Liu Jie's study reviewed intervention strategies for unplanned readmission in elderly ischemic stroke patients, aiming

to improve quality of life and reduce system burden through optimized treatment and management protocols [26][44].

3. Summary and Outlook

In summary, stroke patient readmission rates are influenced by multiple factors, including controllable and uncontrollable risk factors, disease-specific causes, time factors, socio-demographic factors, medical compliance, rehabilitation and psychological status, and healthcare systems and services. To reduce stroke readmission rates, comprehensive strategies addressing multiple dimensions are needed. Medical institutions should strengthen discharge management, provide personalized rehabilitation plans, and actively promote patient and family engagement, as integrated management of psychological health and medical needs is crucial for reducing readmission. Simultaneously, establishing and improving social support systems is essential. Future research should further explore interaction mechanisms among different factors and develop more precise and effective intervention strategies. Additionally, as medical technology and nursing models continue advancing, how to apply these emerging technologies in clinical practice to reduce readmission rates represents a noteworthy direction.

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