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## Characteristics Of Non-Hemorrhagic Stroke Patients In The Medical Rehabilitation Clinic Of Datu Sanggul Regional Hospital in 2024 : A Retrospective Study

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### Abstract

Stroke is a leading cause of disability and the second leading cause of death worldwide. Medical rehabilitation plays a vital role in post-stroke recovery. In Indonesia, the prevalence of stroke shows a continuing increasing case. Data from the 2018 Basic Health Research (Riskesdas) recorded a stroke prevalence of 10.9 per 1,000 population. To describe the characteristics of stroke patients undergoing medical rehabilitation at Datu Sanggul Regional Hospital. This study used a retrospective descriptive design with a cross-sectional approach. Secondary data were obtained from electronic medical records of stroke patients who underwent medical rehabilitation in 2024. A total of 80 patients with non-hemorrhagic stroke were included. The largest age group was 50–59 years (35%). Male patients predominated compared to females (53.75% vs 46.25%). The most common comorbidity was hypertension (65%), followed by diabetes mellitus (35%), dyslipidemia (31.25%), heart disease (25%), obesity (12.5%), chronic kidney disease (10%), and previous stroke (15%). Most patients had more than one comorbidity. The therapeutic modalities were predominantly centered on core interventions, including NMES and exercise (100%), IRR (93.7%), IF (90%) and other adjuvant therapies. Non-hemorrhagic stroke patients at Datu Sanggul Regional Hospital were predominantly in the late productive age group and had significant vascular risk factors. These findings highlight the urgent need for comprehensive medical rehabilitation services and the presence of physical medicine and rehabilitation specialists can significantly accelerate the functional recovery process in stroke patients.

**Keywords:** Stroke, Patient Characteristics, Medical Rehabilitation, Comorbidities.

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## INTRODUCTION

Stroke is one of the major non-communicable diseases that places a significant burden on public health worldwide. It is the second leading cause of death and a leading cause of long-term disability in adults (Feigin, 2021). The impact of stroke includes not only impaired motor and sensoric function but also a significant reduction in quality of life for both patients and their families.

In Indonesia, the prevalence of stroke shows a continuing increasing case. Data from the 2018 Basic Health Research (Riskesdas) recorded a stroke prevalence of 10.9 per 1,000 population (Kementerian Kesehatan Republik Indonesia, 2019). The high incidence of stroke in Indonesia is closely related to the high prevalence of risk factors, such as hypertension, diabetes mellitus, dyslipidemia, and unhealthy lifestyles (Rahayu, 2023). This makes stroke a top priority in Indonesia's non-communicable disease control program.

Rehabilitation is a crucial component in post-stroke patient management. Unlike pharmacological therapy, which focuses on medical stabilization and recurrence prevention, medical rehabilitation aims to restore function lost due to neurological damage. The therapy provided is comprehensive, encompassing physiotherapy, occupational therapy, speech therapy, and psychosocial counseling, with the ultimate goal of increasing patient independence in daily activities (Winstein et al., 2016). A multidisciplinary approach to rehabilitation has been shown to accelerate the recovery process and reduce patient dependency. This relates to the theory of neuroplasticity also known as neural plasticity or brain plasticity, is a process that involves adaptive structural and functional changes to the brain. It is defined as the ability of the nervous system to change its activity in response to intrinsic or extrinsic stimuli by reorganizing its structure, functions, or connections after injuries, such as a stroke or traumatic brain injury. This principle forms the basis of neurorehabilitation, which promotes recovery by harnessing the brain's adaptive capabilities through targeted exercise and therapy (Puderbaugh & Emmady, 2023).

However, access to stroke rehabilitation services in Indonesia remains challenging. Some regional hospitals lack resident physical medicine and rehabilitation specialists, so rehabilitation services often rely on physiotherapists or visits from specialists from outside the region (Bantolo et al., 2022). This situation has the potential to impact the quality of care and the continuity of patient rehabilitation programs.

Tapin Regency is a region in South Kalimantan Province with an area of 2,174.95 km (Kementerian Kesehatan Republik Indonesia, 2019), divided into 12 sub-districts and 126 villages. According to 2024 statistics, the population of Tapin Regency reached 202,061 (Badan Pusat Statistik Kabupaten Tapin, 2024). As a region with a relatively large population, the need for healthcare services, including stroke rehabilitation, is crucial. Datu Sanggul Regional General Hospital is the primary referral hospital in Tapin Regency, providing medical rehabilitation services for post-stroke patients.

However, Datu Sanggul Regional Hospital currently lacks a resident specialist in physical medicine and rehabilitation. This situation presents challenges in providing optimal rehabilitation services, given that stroke patients require comprehensive and continuous care (Bantolo et al., 2022). This shortage of specialists makes evaluating the characteristics of stroke patients presenting to the medical rehabilitation clinic increasingly important. This data not only provides a snapshot of the patient profile served but can also serve as a basis for designing strategies for developing medical rehabilitation services at the regional hospital (Bantolo et al., 2022).

Furthermore, research on the characteristics of stroke patients at the regional hospital level is still limited. Most stroke research in Indonesia is conducted in teaching hospitals or neurology centers, so local data from district-level referral hospitals is relatively under-documented. However, patient characteristics in regional areas can differ from those in larger centers, including age, gender, stroke type, and comorbidities. Therefore, this study is expected to contribute to understanding the profile of stroke patients in Tapin Regency and serve as a reference for policymakers in improving healthcare services, particularly stroke rehabilitation in this region.

## RESEARCH METHODS

The type of research used in this study is a retrospective descriptive study with a cross-sectional approach that provides an overview of the characteristics of stroke patients who received medical rehabilitation therapy based on secondary data obtained from the RME (Electronic Medical Record) at Datu Sanggul Regional Hospital in 2024.

## RESULTS AND DISCUSSION

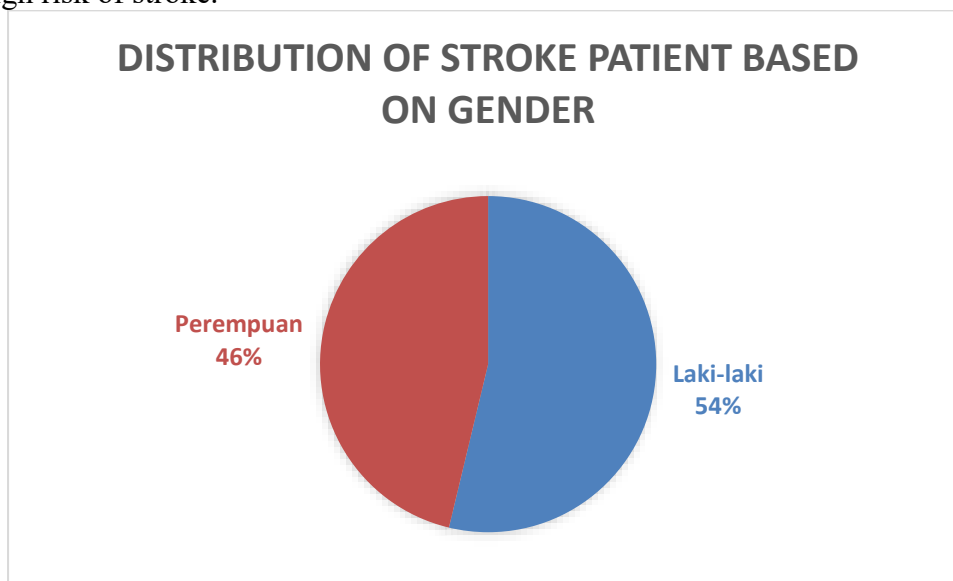
Based on the data listed in the RME (Electronic Medical Record) at the Medical Rehabilitation Clinic of Datu Sanggul Regional Hospital in 2024, there were 80 patients, with the diagnosis being all non-hemorrhagic stroke (ischemic stroke) (100%).

**Table 1. Distribution Of Stroke Patients At The Medical Rehabilitation Clinic Of Datu Sanggul Regional Hospital Based On Age**

Age Group	Number of samples (n)	Percentage (%)
30-39 years	9	11.25%
40-49 years	20	25.0%
50-59 years	28	35.0%
60-69 years	15	18.75%
70-79 years	7	8.75%
80-89 years	2	2.5%
<b>Total</b>	<b>80</b>	<b>100%</b>

Based on age group, the majority of stroke patients undergoing rehabilitation were in the 50–59 age group, amounting to 28 people (35%). The next most dominant age group was 40–49 years

old, with 20 people (25%), followed by the 60–69 age group, with 15 people (18.75%). These data indicate that stroke patients at the Datu Sanggul Regional Hospital medical rehabilitation clinic were predominantly from the late productive age group to the early elderly (40–59 years), which is clinically a group at high risk of stroke.



**Figure 1. Distribution Of Stroke Patients At The Medical Rehabilitation Clinic At Datu Sanggul Regional Hospital Based On Gender**

Of the 80 stroke patients recorded in this study, 43 (53.75%) were male, while 37 (46.25%) were female. This proportion indicates that males dominate the stroke patient population receiving services at the Medical Rehabilitation Clinic of Datu Sanggul Regional Hospital, with a difference of 7.5% compared to females.

**Table 2. Distribution Of Comorbidities In Stroke Patients At The Medical Rehabilitation Clinic At Datu Sanggul Regional Hospital**

Comorbidities	Number of Patients (n)	Percentage (%)
Hypertension	52	65.0%
Diabetes mellitus	28	35.0%
Dyslipidemia	25	31.25%
Heart disease	20	25.0%
Chronic kidney disease	8	10.0%
Obesity	10	12.5%
Previous history of stroke	12	15.0%

**One patient can have more than one comorbidity**

Based on Table 2, it can be seen that the majority of non-hemorrhagic stroke patients undergoing medical rehabilitation at the Medical Rehabilitation Clinic of Datu Sanggul Regional Hospital had comorbidities related to vascular risk factors. Hypertension was the most prevalent comorbidity, recorded in 52 patients (65%). This was followed by diabetes mellitus in 28 patients (35%) and dyslipidemia in 25 patients (31.25%).

Additionally, heart disease was found in 20 patients (25%), while chronic kidney disease was found in 8 patients (10%). Other comorbidities that emerged were obesity in 10 patients (12.5%) and a history of previous stroke in 12 patients (15%).

This distribution indicates that most non-hemorrhagic stroke patients had classic vascular risk factors, with hypertension, diabetes mellitus, and dyslipidemia as the main comorbidities. The finding that the majority of patients had more than one comorbidity increased the risk of recurrent stroke.

**Table 3. Distribution Of Rehabilitation Treatment Modalities In Stroke Patients At The Medical Rehabilitation Clinic At Datu Sanggul Regional Hospital**

Treatment Modality	Number of Patients (n)	Percentage (%)
NMES	80/80	100,0 %
EXC	80/80	100,0 %
IRR	75/80	93,7 %
IF	72/80	90,0 %
TENS	5/80	6,25 %
SWD	1/80	1,25 %
MWD	3/80	3,75 %

NMES: *Neuromuscular Electrical Stimulation*; EXC: *exercise*; IRR: *Infra-Red Ray*; IF: *Functional Intervention*; TENS: *Transcutaneous Nerve Stimulation*; SWD: *Short Wave Diathermy*; MWD: *Micro Wave Diathermy*.

### One patient can have more than one treatment

Based on the distribution of rehabilitation modalities, all stroke patients (100%) received Neuromuscular Electrical Stimulation (NMES) and physical exercise (EXC) as the fundamental interventions in the medical rehabilitation program. Additional therapies were used to a more limited extent, including Transcutaneous Electrical Nerve Stimulation (TENS), Microwave Diathermy (MWD), and Shortwave Diathermy (SWD) (Table 3). This indicates that NMES, exercise, as well as Infra-Red Ray (IRR) and Functional Intervention (FI) were the most commonly employed components in the management of stroke patients at Datu Sanggul Regional Hospital, whereas other modalities such as TENS, MWD, and SWD were only administered to a small proportion of patients. (Table 3)

### Discussion

This study found that the majority of non-haemorrhagic stroke patients were in the 50–59 year age group (35%). This finding is consistent with global epidemiological evidence showing an increase in stroke incidence in the fifth decade of life and beyond (Feigin, 2021; Johnson et al., 2016). Another study in Indonesia that examined 50 medical records found that the most common age range for ischemic stroke patients was 46–55 years, with 18 people (36%) (Familah et al., 2024). Other epidemiological studies also found that stroke case trends in Southeast Asia, South Asia, and Africa were also dominated by the age group 56.6–59.6 years (O’Donnell et al., 2016). The increase in stroke frequency tends to occur in older age groups. With increasing age, there is a process of blood vessel degeneration, increased arterial rigidity, and an accumulation of vascular risk factors such as hypertension, diabetes mellitus, and dyslipidaemia that contribute to the occurrence of ischemic stroke (O’Donnell et al., 2016). This condition emphasizes the importance of screening and risk factor management from middle age to prevent primary and secondary stroke.

In terms of gender, the proportion of male patients was higher than female (53.75% vs. 46.25%). This distribution is consistent with the Interestroke study report, which showed that men have a greater risk of stroke during their productive years, primarily due to behavioral factors such as smoking, alcohol consumption, and lack of physical activity (O’Donnell et al., 2016; Reeves et al., 2008). However, the risk of stroke in women increases after menopause due to the reduced protective effect of estrogen on the cardiovascular system. In addition, post-stroke women experience a more severe decline in activity of daily living (ADL) and have a higher mortality rate than stroke cases in men (Comer et al., 2024). These differences imply the need for a gender-based approach in stroke prevention and management, including in rehabilitation program planning.

Based on research in Indonesia, such as at Santa Elisabeth Hospital in Batam, which found that the majority of ischemic stroke patients were aged 46–55 years and predominantly male (Purwati et al., 2022). This phenomenon suggests that stroke in Indonesia tends to occur at a younger age than in developed countries. This is likely caused by an unhealthy lifestyle and less than optimal control of vascular risk factors in the productive age population.

From a comorbidity perspective, this study shows that hypertension is the most dominant comorbidity (65%), followed by diabetes mellitus (35%) and dyslipidemia (31.25%). Hypertension is

the most common risk factor for stroke. Optimal hypertension management is crucial for significantly reducing stroke risk and achieving successful treatment in stroke patients (Wajngarten & Silva, 2019). Previous studies have also confirmed that hypertension is a major risk factor for ischemic stroke in various populations, and lowering blood pressure has been shown to significantly reduce stroke risk (Arima et al., 2010). Riskesdas also consistently shows a high prevalence of hypertension and diabetes in stroke patients (Kementerian Kesehatan Republik Indonesia, 2019). The combination of hypertension with diabetes and dyslipidemia worsens atherosclerosis, increases arterial stiffness, and increases the likelihood of recurrent stroke (Prakoso et al., 2025). Heart disease, obesity, chronic kidney disease, and a history of previous stroke were also found, illustrating the multimorbidity that often accompanies stroke patients. This implies increased complexity of care, the need for simultaneous risk factor control, and more integrated rehabilitation strategies.

The finding of a high prevalence of comorbidities emphasizes that stroke patients face not only neurological problems but also systemic cardiovascular disease. Therefore, post-stroke rehabilitation should not be viewed solely as a restoration of motor function, but encompassing physical therapy, occupational therapy, speech therapy, psychosocial counseling, and education on vascular risk factor management which aims to accelerate healing and prevent more serious complications (Langhorne et al., 2011). Research confirms that comprehensive rehabilitation significantly improves functional ability, reduces dependency rates, and improves the quality of life of stroke patients (Li et al., 2024).

The analysis of therapy distribution in the Medical Rehabilitation Clinic of Datu Sanggul Regional Hospital showed that Neuromuscular Electrical Stimulation (NMES) and exercise were administered to all patients (100%), while Infra-Red Ray (IRR) and Functional Intervention (FI) were applied to almost all patients (93–90%). This pattern aligns with contemporary post-stroke rehabilitation approaches that emphasize structured exercise and peripheral stimulation as restorative pillars to optimize motor recovery and functional independence.

Recent evidence supports the role of peripheral electrical stimulation (including NMES/FES) as an effective adjuvant in post-stroke motor rehabilitation. Several systematic reviews and meta-analyses over the past five years have demonstrated positive effects of NMES on activities of daily living (ADL), gait-related outcomes (e.g., ankle dorsiflexion), and kinematic walking parameters when combined with conventional training, although its effects on gait speed remain inconsistent across studies. These findings corroborate the practice in Datu Sanggul Regional Hospital, where NMES is universally employed as a core intervention (Kristensen et al., 2021; Chen et al., 2024).

Structured exercise and task-specific functional interventions represent the cornerstone of rehabilitation strategies oriented toward functional outcomes. Recent trials and reviews consistently highlight that intensive, repetitive, and task-oriented training improves functional capacity, including strength, endurance, and walking ability, compared with non-structured care (Van Vliet et al., 2023; Kuipers et al., 2024). Likewise, the near-universal use of IRR/photobiomodulation reflects the adoption of physical modalities aimed at enhancing perfusion, modulating inflammation, and supporting tissue recovery. Emerging literature has reported promising neuroprotective and pro-recovery effects of photobiomodulation in both experimental and early clinical studies; however, standardized treatment parameters (wavelength, dose, duration) are still lacking, which contributes to variability in clinical outcomes (Mokienko, 2025).

Electrotherapy modalities such as Transcutaneous Electrical Nerve Stimulation (TENS) were applied to a smaller proportion of patients (6.25%), consistent with the heterogeneous evidence base. Recent reviews suggest that TENS may reduce post-stroke spasticity and pain, and potentially improve function when combined with active therapy, although outcomes vary according to stimulation parameters and patient characteristics (Jung et al., 2024; Eslami et al., 2024). Similarly, diathermy modalities (SWD, MWD) were used only in a minority of patients, which reflects current evidence indicating their role in pain reduction, improving soft tissue elasticity, and enhancing local circulation (Fei et al., 2021). Nevertheless, robust evidence for their long-term functional benefits in stroke remains limited, supporting their use primarily as adjunctive rather than primary interventions. Taken

together, the observed combination of NMES and exercise with FI as the core therapies, IRR as an adjuvant modality, and TENS/diathermy as supportive treatments reflects a multimodal rehabilitation framework that is consistent with current guidelines and recent evidence.

Medical rehabilitation plays a crucial role in improving the quality of life for post-stroke patients. Scientific evidence shows that early initiation of rehabilitation interventions can increase functional independence and reduce disability rates (Winstein et al., 2016; Langhorne et al., 2011). Research in Batam shows that an average rehabilitation period of around four months significantly improves patient independence (Purwati et al., 2022).

In Datu Sanggul Regional Hospital, the need for medical rehabilitation services is extremely high, given Tapin Regency's population of over 200,000 and demographic characteristics that are prone to vascular disease. However, the hospital currently lacks a resident specialist in physical medicine and rehabilitation, making continuity of care a challenge. This situation has the potential to delay or suboptimal recovery for stroke patients, even though early rehabilitation has been shown to yield better results than late initiation. The presence of a permanent medical rehabilitation specialist is essential to ensure that the selection of therapeutic modalities, determination of dosage, monitoring of effects, and multidisciplinary coordination can be carried out in a structured and sustainable manner, thereby optimizing patient outcomes (Purwati et al., 2022; Syamsu et al., 2021).

Thus, the results of this study emphasize the urgency of increasing the capacity of medical rehabilitation services in the regions, both through strengthening human resources and providing infrastructure. Comprehensive and sustainable rehabilitation services not only impact patient functional recovery but can also reduce disability rates, increase independence, and lessen the socioeconomic burden on families and communities.

This study has several limitations. First, the sample size was relatively limited and came from only one healthcare center, so generalizing the results to a broader population still requires caution. Second, data on comorbidities and rehabilitation needs were obtained from medical records without a more in-depth functional assessment, so the picture of patient needs may not be fully comprehensive. Third, this study was cross-sectional, so it cannot describe the long-term journey of post-stroke patients. Nevertheless, these findings still emphasize the urgency of the existence of permanent medical rehabilitation services, given the high prevalence of comorbidities and their implications for the functional recovery needs of ischemic stroke patients.

## CONCLUSION

The majority of non-hemorrhagic stroke patients at Datu Sanggul Regional Hospital are aged 50–59 years, with the most common comorbidities being hypertension and diabetes mellitus. This figure confirms that most patients are in the productive age group with significant vascular risk factors, thus having a high need for medical rehabilitation services to restore function and improve quality of life. The therapeutic modalities were predominantly centered on core interventions, while the utilization of other adjuvant therapies remained limited and has not yet been fully optimized. The absence of a resident physical medicine and rehabilitation specialist at Datu Sanggul Regional Hospital is a serious obstacle to the provision of comprehensive, continuous, and evidence-based services. Therefore, the results of this study emphasize the importance of having a permanent medical rehabilitation specialist and a complete range of therapists and modalities at the regional hospital. This not only ensures stroke patients' access to optimal therapy but also serves as a strategic step in reducing the burden of disability due to stroke in the Tapin Regency community.

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