

## Original Research

## Rural-urban disparities in stroke outcomes: unveiling quality of life, self-efficacy and healthcare utilization patterns of stroke patients in Türkiye

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## Abstract

**Introduction:** Stroke is a leading cause of disability globally, significantly impacting patients' quality of life and self-efficacy. Research from various countries indicates that rural stroke patients face challenges such as reduced access to healthcare services and lower quality of life than their urban counterparts. The aim of the study was to examine how the residential location in Türkiye affects the quality of life and self-efficacy levels of stroke patients.

**Methods:** A cross-sectional study was carried out among stroke patients in Türkiye, examining the differences between individuals living in rural and urban areas. Information regarding population

characteristics, use of healthcare services, and self-reported evaluations, including the stroke-specific quality-of-life scale (SSQoL) and stroke self-efficacy questionnaire (SSEQ), was collected.

**Results:** There was no difference in demographic and disease-related characteristics between the two groups. Patients from urban areas had notably fewer emergency department visits ( $p < 0.001$ ) as well as fewer appointments at physical medicine and rehabilitation clinics ( $p < 0.001$ ) and family practitioner clinics ( $p < 0.001$ ) in the previous year. Additionally, rural patients

demonstrated lower SSEQ scores ( $p=0.036$ ) and poorer SSQoL scores ( $p<0.001$ ) than urban patients, while also having significantly greater access to rehabilitation services ( $p=0.027$ ).

**Conclusion:** The results of this study show that people living in rural areas experience reduced quality of life and confidence in managing their stroke compared to those residing in urban areas. Rural individuals with strokes often depend more on family

## Keywords

healthcare utilization, quality of life, self-efficacy, stroke, Türkiye, urban–rural disparities.

## Introduction

Stroke is characterized by the sudden onset of clinical symptoms indicating a focal or global impairment of cerebral function. These symptoms persist for at least 24 hours or lead to death and have no discernible cause other than being related to blood vessels<sup>1</sup>. Globally, stroke stands as the primary contributor to disability, significantly reducing patients' quality of life and placing a substantial burden on healthcare systems<sup>2</sup>.

Quality of life is crucial for stroke patients because it encompasses their perceptions of life within the cultural and value systems they exist in, along with their aspirations, standards, expectations, and concerns<sup>3</sup>. Self-efficacy refers to an individual's confidence in carrying out a specific task or behavior. For stroke patients, high self-efficacy correlates positively with mobility and activities of daily living while also improving overall quality of life<sup>4</sup>. The examination of the factors that impact quality of life and self-efficacy is a crucial element for chronic diseases such as stroke, given their significance and influence<sup>5,6</sup>.

Residing in a rural locality is widely acknowledged to be an obstacle to obtaining healthcare services because of the distance, limited transportation, unfavorable weather conditions, a scarcity of health professionals, and inadequate healthcare coverage<sup>7</sup>. Living in rural areas often means longer travel distances, making it more challenging for individuals to access medical care. Consequently, people in these areas tend to see physicians less often and receive fewer referrals to specialists<sup>8</sup>. Evidence suggests that individuals from rural areas have lower odds of accessing stroke unit care, brain imaging within 24 hours, carotid imaging, and consultations from neurologists, physiotherapists, occupational therapists, and speech language pathologists. Additionally, they are less likely to be transferred to inpatient rehabilitation facilities<sup>9</sup>. Therefore, a patient's place of residence could potentially influence their quality of life and self-efficacy.

Türkiye's urban–rural profile is characterized by a combination of rural and transitional areas. While well-developed western regions boast deep rural characteristics, there are also scattered 'prosperity spots' in less-developed eastern regions<sup>10</sup>. The country has a significant rural population, with 26% of the total population residing in rural areas<sup>11</sup>. To the best of our knowledge, there has been no research on the disparities in quality of life and self-efficacy among stroke patients residing in rural and urban areas within Türkiye, despite available information about other countries<sup>12,13</sup>. In light of this background, this study aims to bridge this gap by examining the impact of residential location on the quality of life and self-efficacy levels of stroke patients in Türkiye.

physicians, urgent care facilities, and rehabilitation services for medical support. To improve the wellbeing and outcomes of stroke patients in rural regions, it is essential to address the limited access to rehabilitation services, healthcare infrastructure, resources, and medical professionals through policy changes and innovative strategies such as telerehabilitation.

## Methods

### Design

In this cross-sectional study, patients with stroke who were admitted to the physical medicine and rehabilitation outpatient clinic of Üsküdar State Hospital between 1 June 2023 and 1 September 2023 were evaluated. Patients aged 18 years and above with a confirmed stroke diagnosis of at least 1 year were eligible for inclusion. Patients experiencing mental or communication difficulties that prevented them from completing the questionnaire were excluded from the study.

### Sample

Sample size was determined using the following formula:

$$n = \frac{z_{\alpha}^2 x C^2}{k D^2} \{1 + (k - 1) \rho\}$$

$k$  represents the number of items on the Likert scale, specifically  $k=5$  for the stroke-specific quality-of-life scale (SSQoL).

The pairwise correlation coefficient ( $\rho$ ) was assumed to be 0.5, and the coefficient of variation ( $C$ ) for each Likert-item scale was assumed to be 0.5. Additionally,  $D$  was set at 0.10, which represented a 10% relative tolerable error, where  $D=B/\mu$ ,  $B$  signified the bound of error, and  $\mu$  was the sample mean. The value corresponded to the  $100(1-\alpha/2)$ th percentile of the standard normal distribution, and for a 95% confidence interval was assumed to be 1.96<sup>14</sup>. Consequently, the necessary sample size was determined to be 58 for each group. Allowing for a 10% dropout rate, the total number of participants aimed for was set at 64 for each group, totaling 128 patients in the study.

### Setting and participants

According to Village Law No. 442 of the Turkish Republic, settlements with a population less than 2000 are classified as villages, those between 2000 and 20,000 are designated as towns, and those exceeding 20,000 inhabitants are termed cities. The areas identified as villages by this law were categorized as rural, while towns and cities were considered urban. Patients were segregated into two groups based on their places of residence<sup>7</sup>. During the study period, stroke patients admitted to the Üsküdar State Hospital were initially categorized according to their residence in either rural or urban areas. A combined total of 353 individuals from urban regions and 276 individuals from rural areas underwent screening to determine their eligibility. Among them, 92 patients residing in rural areas and 88 patients living in urban locations met the inclusion criteria and were subsequently admitted. As a result, 180 participants ultimately took part in the study.

Outcome measures and data collection

Data encompassing sociodemographic factors such as age, gender, marital status, and education level, along with details about where they lived and worked, and comorbid diseases, and specific questions regarding the individual’s disease (years since stroke, affected artery, affected side, whether the patient had rehabilitation) were gathered through interview. All participants took part in personal assessments using both the SSQoL and the stroke self-efficacy questionnaire (SSEQ). The hospital database was used to ascertain the frequency of visits to the emergency department, physical medicine and rehabilitation outpatient clinic, and general practitioner clinic with primary reason for visit being post-stroke related complaints and complications in the past year. Brunnstrom staging was performed by a physical medicine and rehabilitation specialist with 10 years of experience in staging.

The SSQoL scale is a tool designed to measure the health-related quality of life in individuals who have had a stroke. It consists of 49 items covering the 12 domains of mobility, energy, upper extremity function, work/productivity, mood, self-care, social roles, family roles, vision, language, thinking, and personality. Patients are asked to rate each item using a 5-point Likert scale based on their experiences during the past week. This allows for an up-to-date reflection of the patient’s wellbeing<sup>15</sup>. Yönt et al carried out the Turkish study to establish the reliability and validity of this scale<sup>16</sup>.

The SSEQ consists of 13 items and is a self-report scale designed to assess individuals’ confidence in their ability to function effectively after a stroke. Participants indicate their level of belief in achieving each item using a 3-point scale, where 0 represents ‘not at all confident’ and 3 represents ‘very confident’<sup>17</sup>. Topçu et al carried out the validation and reliability study for this questionnaire in a Turkish context<sup>18</sup>.

Motor recovery assessment in stroke patients was performed by using the Brunnstrom stages. In stage 1, patients demonstrate flaccidity and an inability to initiate limb movements. Stage 2 involves the emergence of basic limb synergies or their components, along with minimal voluntary movements and the onset of spasticity. During stage 3, there is voluntary control over movement synergies; however, not all components may develop fully, and spasticity becomes severe. At stage 4, non-synergistic movement combinations are mastered, leading to a decrease in spasticity. As patients progress to stage 5, more complex movement combinations are executed as basic limb synergies become less dominant. Finally, at stage 6, spasticity decreases, allowing for individual joint movements. This ordered framework offers a valuable clinical depiction of motor recovery post-stroke by highlighting the evolving interaction between spasticity and voluntary movements<sup>19</sup>. A physical medicine and rehabilitation specialist with a decade of expertise in the field conducted the Brunnstrom assessment.

Data analysis

Data analysis was conducted using Statistical Package for the Social Sciences v27 (IBBM Corp; <https://www.ibm.com/products/spss-statistics>). The categorical variables were presented as numbers and percentages, while the numerical variables were represented with mean and standard deviation values. Categorical variables were compared using the  $\chi^2$  test, and numeric variables in independent groups were assessed through the student’s *t*-test for normally distributed data or Mann–Whitney *U*-test when normality assumptions were violated. The significance level was 0.05, with a confidence interval of 95%.

Ethics approval

This research was granted ethics approval by the local Clinical Research Ethics Committee on 10 May 2023. The research followed the guidelines outlined in the Declaration of Helsinki and was registered with [clinicaltrials.gov](https://clinicaltrials.gov) for transparency and accountability.

Results

The flowchart of the study is presented in Figure 1. Overall, the distribution of gender, age, and BMI was comparable between the two groups, with no statistically significant differences observed. Notably, rural participants had a slightly higher average BMI, although this was not statistically significant. The general demographic profile suggests a relatively balanced sample in terms of key baseline characteristics across rural and urban settings. Table 1 outlines the demographic and health characteristics of patients from rural and urban areas. There was a tendency for patients in urban areas to have experienced strokes a longer time ago (average 3.9 years) than those in rural areas (average 2.72 years), but this contrast did not show statistical significance ( $p=0.107$ ). Urban patients had significantly fewer visits to an emergency department in the past year than rural patients ( $p<0.001$ ); similarly, urban patients made fewer trips to physical medicine and rehabilitation clinics and family practitioner clinics over the last year than rural patients ( $p<0.001$  and  $p<0.001$ , respectively).

Rural patients demonstrated lower SSEQ scores ( $20.31\pm9.38$ ) in comparison to urban patients ( $23.17\pm8.71$ ) ( $p=0.036$ ). Furthermore, rural patients reported lower SSQoL scores ( $119.79\pm35.66$ ) than urban patients ( $138.91\pm31.72$ ) ( $p<0.001$ ).

The analysis revealed a statistically significant difference in the utilization of physical medicine and rehabilitation services between patients residing in urban areas and those living in rural areas ( $p=0.027$ ) (Fig2).

Analyses did not show any notable difference in the affected side, type of stroke, and affected artery ( $p=0.126$ ,  $p=0.780$  and  $p=0.527$ , respectively) (Figs3,4).

Statistical analysis revealed that there was no significant statistical difference in Brunnstrom stages among stroke patients residing in rural and urban areas (Table 2).

Table 1: Comparison of demographic and health characteristics between patients in rural and urban areas

Variable	Characteristic	Patients living in rural areas (mean±SD)	Patients living in urban areas (mean±SD)	<i>p</i> -value
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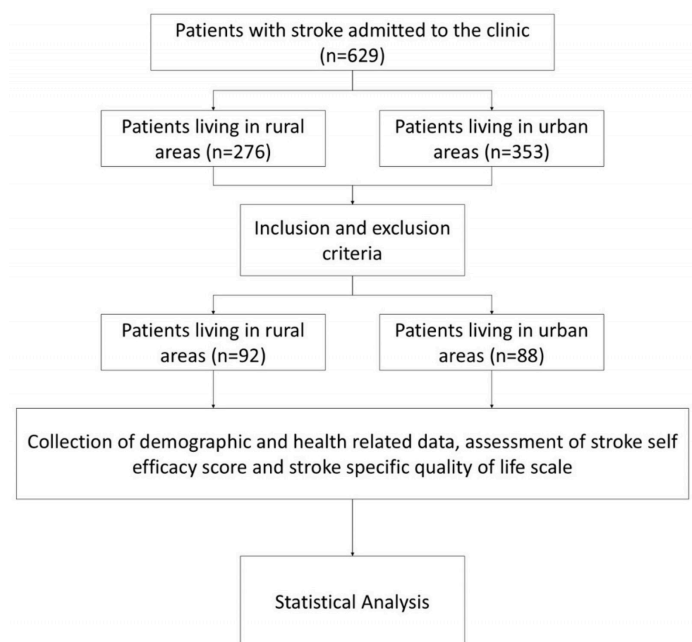
Gender	Male	50	44	0.654
	Female	42	44	
Age (years)		65.19±9.6	63.95±10.55	0.291
BMI		28.53±5.19	28.17±5.19	0.459
Years since stroke		2.72±3.66	3.9±5.89	0.107
Emergency department visits in last year		4.15±3.93	2.15±1	<0.001*
PM&R polyclinic visits in last year		5.10±2.41	1.7±0.91	<0.001*
Family practitioner visits in last year		8.65±5.41	2.59±1.9	<0.001*
Stroke self-efficacy score		20.31±9.38	23.17±8.71	0.036*
Stroke-specific quality-of-life scale		119.79±35.66	138.91±31.72	<0.001*

\* Independent samples *t*-test.

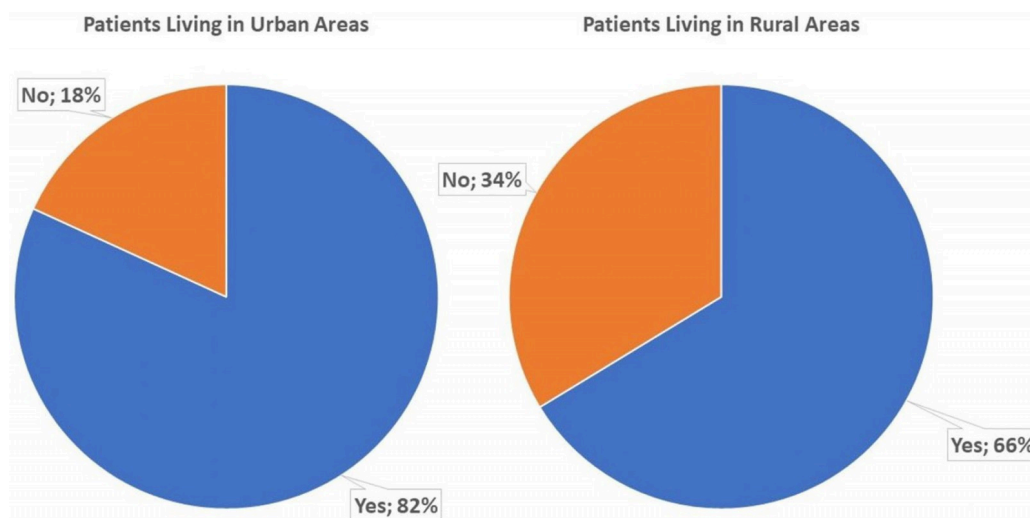
BMI, body mass index. PM&R, physical medicine and rehabilitation. SD, standard deviation.

**Table 2: Brunnstrom stages of patients living in urban and rural areas**

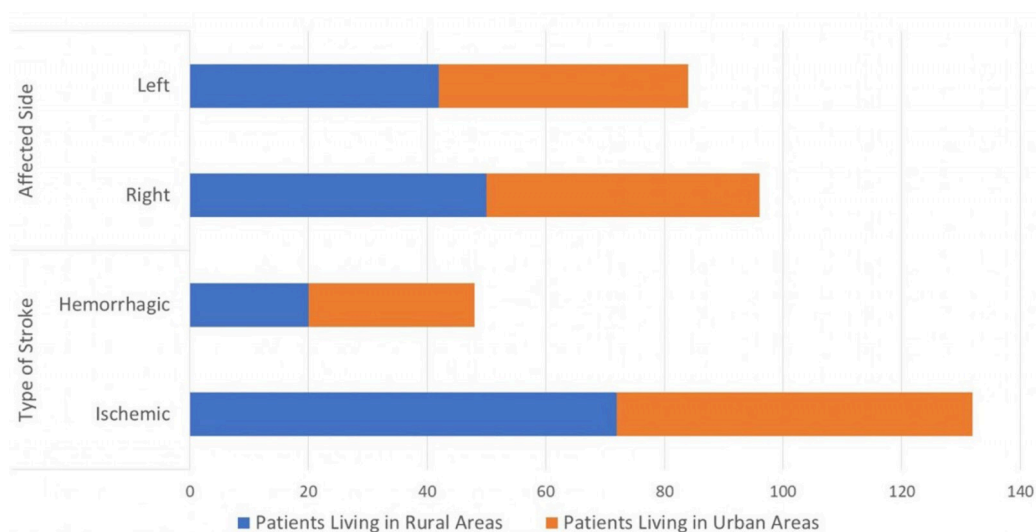
Variable	Characteristic	Brunnstrom stage						<i>p</i> -value
		1	2	3	4	5	6	
Patients living in rural areas (%)	Hand	10.9	16.3	19.6	25	28.3	0	0.823
Patients living in urban areas (%)		13.6	20.5	18.2	13.6	18.2	15.9	
Patients living in rural areas (%)	Upper extremity	4.3	10.9	29.3	29.3	23.9	2.2	0.977
Patients living in urban areas (%)		9.1	29.5	13.6	9.1	6.8	31.8	
Patients living in rural areas (%)	Lower extremity	6.5	10.9	32.6	20.7	29.3	0	0.849
Patients living in urban areas (%)		6.8	13.6	29.5	22.7	13.6	13.6	



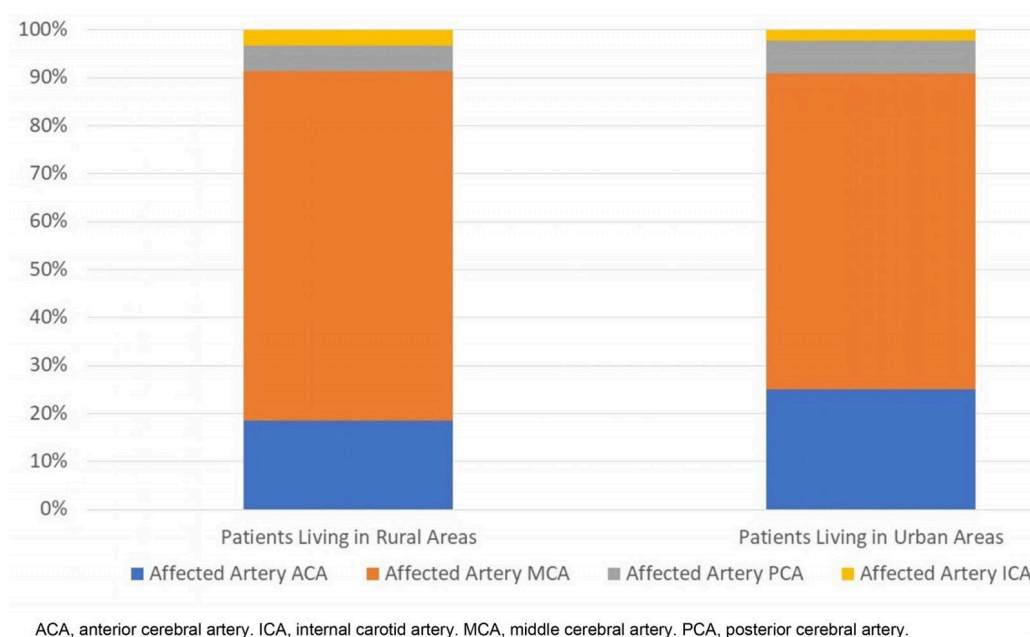
**Figure 1: Flowchart of the study.**



**Figure 2: Whether a patient had prior rehabilitation compared to patient's region of residence.**



**Figure 3: Affected side and type of stroke of patients living in rural and urban areas.**



**Figure 4: Comparison of the affected arteries between patients living in rural and urban areas.**

## Discussion

As a result of this study, it was observed that stroke patients residing in rural areas exhibited significantly lower stroke-specific quality of life and self-efficacy than those living in urban areas, despite no significant difference being observed in Brunnstrom stages. Furthermore, it was noted that individuals from rural communities had significantly lower attendance at rehabilitation and were more inclined to seek medical advice from family physicians, physical medicine and rehabilitation specialists, and emergency clinics. This research represents the initial comparative study of stroke patient recovery outcomes, quality of life, self-efficacy, and healthcare utilization between rural and urban regions in Türkiye.

The study found that stroke patients in rural areas tended to seek medical assistance from family physicians, emergency physicians, and physical medicine and rehabilitation clinics more often than those in urban areas. Contrary to our findings, Jeyakumar et al's research on ambulatory care for secondary prevention of stroke in rural versus urban areas in Ontario, Canada, indicated that individuals from rural areas who had previously suffered a stroke had fewer visits to physicians, received less screening for hyperlipidemia, and faced a slightly higher risk of experiencing another stroke<sup>20</sup>. Koifman et al determined in their research on the outcomes of stroke among rural residents that there is a lower likelihood of these individuals receiving critical interventions for stroke care following an episode<sup>9</sup>. The findings of our research could be connected to the challenges faced by rural hospitals, including limited staffing and infrastructure, resulting in suboptimal treatments and thus increased hospital visits. When this suboptimal treatment is combined with reduced quality of life and lower self-efficacy, rural stroke patients may tend to seek more advice and follow-up from a healthcare professional, regardless of subspecialty<sup>21</sup>.

Our research revealed that patients in rural areas tend to receive less rehabilitation than their urban counterparts, which aligns with previous studies. For instance, Merchant et al found that Australian rural stroke patients had lower access to rehabilitation than those living in metropolitan areas<sup>22</sup>. Similarly, Yan et al's study on stroke patients in Chinese rural regions highlighted the insufficient availability of secondary prevention and rehabilitation services, often falling below evidence-based standards<sup>23</sup>. Additionally, Quigley et al reported that rural and remote stroke survivors face limited opportunities to achieve their full rehabilitation potential after being discharged from hospitals<sup>24</sup>. Personnel deficits, uneven distribution of healthcare staff, and challenges in recruiting and retaining personnel may be responsible for this gap in rural areas. To bridge this divide, telerehabilitation methods could be explored to overcome the challenges of providing rehabilitation in rural areas. It is also essential to advocate for policy reforms, enhanced funding, and revised reimbursement policies to drive positive changes.

Self-efficacy is a crucial factor for the wellbeing of stroke patients and plays a significant role in accurately assessing their functional abilities. It has been observed that individuals with high self-efficacy tend to perform better in their daily activities than those with low self-efficacy<sup>25</sup>. Our study revealed lower self-efficacy scores among stroke patients residing in rural areas, aligning with Ferri et al's findings that reported greater dependency on others

among stroke patients living in rural regions within Latin America, China, and India during their investigation into the burden of stroke<sup>26</sup>. This difference in self-efficacy levels in rural areas might be influenced by limited knowledge and education about the illness, insufficient self-care skills, and substandard disease control<sup>27</sup>. To enhance the self-efficacy of patients in rural areas, it may be advantageous to prioritize providing access to rehabilitation services, establishing realistic goals, delivering educational information, and promoting transparent communication within healthcare settings.

Quality of life is vital for stroke patients because it allows for the evaluation of their overall wellbeing and their responsiveness to changes in clinical status over time<sup>28</sup>. Studies conducted on the quality of life of stroke patients living in rural areas have indicated that they experience lower levels of quality of life. For example, Howitt et al reported that stroke patients in rural Tanzania had lower quality of life than controls<sup>29</sup>. Similarly, Mei et al found that stroke patients in rural China also experienced poor quality of life<sup>30</sup>. Jun et al's investigation into a Korean community yielded similar findings to our research, showing that residents in rural areas reported a lower quality of life than those living in urban areas<sup>31</sup>. This difference may stem from restrictions in medical care and resources for people living in rural regions, higher occurrence of anxiety and depression among stroke patients residing in rural areas, as well as decreased social connections<sup>30,32</sup>. Enhancing the quality of life of stroke patients in rural areas may entail introducing telehealth services for distant appointments, local rehabilitation and assistance initiatives, caregiver support and education, as well as establishing community centers and support groups within the area.

As a result of the research, it was discovered that while patients residing in rural areas had notably lower quality of life and self-efficacy than those in urban areas, there were no significant differences observed in Brunnstrom stages. This could be attributed to insufficient access to treatment of stroke-related complications, decreased likelihood of receiving essential psychological and social support as opposed to urban settings, and potential challenges with treatment adherence among patients living in rural areas<sup>33-35</sup>. In addressing the acknowledged disparities, it may be advantageous to ensure accessibility of stroke treatments and rehabilitation services. Additionally, introducing community-based initiatives that enhance awareness, offer education, and establish tailored social support systems for the specific needs of rural stroke survivors could enhance their overall quality of life and dedication to treatment plans.

## Strengths and limitations

This study has several limitations that should be considered when interpreting the results. First, as the research was conducted exclusively among stroke patients in Türkiye, the findings may not be generalizable to populations in other countries with different healthcare systems, socioeconomic conditions, and cultural contexts. Second, the study does not explore specific socioeconomic determinants such as income, education, or social support, which are likely to influence healthcare-seeking behavior and health outcomes, particularly in rural areas. The cross-sectional design limits the ability to assess changes over time, and future longitudinal studies would provide deeper insights into evolving factors affecting stroke recovery. Additionally, there is a potential



selection bias due to the underrepresentation of patients with severe impairments or those who did not seek medical care, which may have influenced the observed levels of self-efficacy and quality of life. A further methodological limitation relates to the sample size calculation, which was based on a 5-point Likert scale item rather than a clinically meaningful difference in standardized stroke scale scores, potentially affecting statistical power. Finally, while the study references several relevant works, some are outdated, highlighting the persistent gap in up-to-date, high-quality research on rural–urban disparities in stroke care and outcomes.

## Conclusion

This research emphasized the challenges faced by individuals living in rural areas, who experienced lower quality of life and self-efficacy in managing their stroke than those residing in urban areas. It was also found that rural stroke patients tended to seek medical assistance more frequently from family physicians,

## References

- 1 Nwachukwu K, Ibanga A, Etim B, Philip-Ephraim E. Types and frequency of ocular abnormalities in stroke patients in university of Calabar teaching hospital, Calabar, Nigeria. *Journal of Neurology and Stroke* 2019; **9(2)**: 61-67. DOI link
- 2 Khoshnam SE, Winlow W, Farzaneh M, Farbood Y, Moghaddam HF. Pathogenic mechanisms following ischemic stroke. *Neurological Sciences* 2017; **38(7)**: 1167-1186. DOI link, PMID:28417216
- 3 Sahu RK, Kumar S, Yadav P. A study on the quality of life among stroke survivors: a cross-sectional study. *Journal of Medical Research and Innovation* 2021; **5(1)**: e000244. DOI link
- 4 Korpershoek C, Van der Bijl J, Hafsteinsdottir TB. Self-efficacy and its influence on recovery of patients with stroke: a systematic review. *Journal of Advanced Nursing* 2011; **67(9)**: 1876-1894. DOI link, PMID:21645040
- 5 Zhao H, Tsiatis AA. Efficient estimation of the distribution of quality-adjusted survival time. *Biometrics* 1999; **55(4)**: 1101-1107. DOI link, PMID:11315054
- 6 Ritter PL, Lorig K. The English and Spanish self-efficacy to manage chronic disease scale measures were validated using multiple studies. *Journal of Clinical Epidemiology* 2014; **67(11)**: 1265-1273. DOI link, PMID:25091546
- 7 Atacan Yaşgüçlülük M, Ünlütürk Z. What is the price of residence in rural areas for patients with epilepsy? *Neurological Research* 2023; **45(7)**: 695-700. DOI link, PMID:36919513
- 8 Chan L, Hart LG, Goodman DC. Geographic access to health care for rural Medicare beneficiaries. *The Journal of Rural Health* 2006; **22(2)**: 140-146. DOI link, PMID:16606425
- 9 Koifman J, Hall R, Li S, Fang J, Saltman AP, Kapral MK, et al. The association between rural residence and stroke care and outcomes. *Journal of the Neurological Sciences* 2016; **363**: 16-20. DOI link, PMID:27000213
- 10 Ögdül HG. Urban and rural definitions in regional context: a case study on Turkey. *European Planning Studies* 2010; **18(9)**: 1519-1541. DOI link
- 11 Oğuz C. Importance of rural women as part of the population in Turkey. *European Countryside* 2015; **7(2)**: 101-110. DOI link
- 12 Manimmanakorn N, Vichiansiri R, Nuntharuksa C, Permsirivanich W, Kuptniratsaikul V. Quality of life after stroke rehabilitation among urban vs. rural patients in Thailand. *Journal of the Medical Association of Thailand* 2008; **91(3)**: 394-399.
- 13 Phipps MS, Jia H, Chumbler NR, Xinli L, Castro JG, Myers J et al. Rural–urban differences in inpatient quality of care in US veterans with ischemic stroke. *The Journal of Rural Health* 2014; **30(1)**: 1-6. DOI link, PMID:24383479
- 14 Park J-W, Jung M-S. A note on determination of sample size for a Likert scale. *Communications for Statistical Applications and Methods* 2009; **16(4)**: 669-673. DOI link
- 15 Williams LS, Weinberger M, Harris LE, Clark DO, Biller J. Development of a stroke-specific quality of life scale. *Stroke* 1999; **30(7)**: 1362-1369. DOI link, PMID:10390308
- 16 Hakverdioğlu Yönt G, Khorshid L. Turkish version of the stroke-specific quality of life scale. *International Nursing Review* 2012; **59(2)**: 274-280. DOI link, PMID:22591101
- 17 Riaz A, Aspden T, Jones F. Stroke Self-efficacy Questionnaire: a Rasch-refined measure of confidence post stroke. *Journal of Rehabilitation Medicine* 2014; **46(5)**: 406-412. DOI link, PMID:24658341
- 18 Topçu S, Oğuz S. Translation and validation study for the stroke self-efficacy questionnaire in stroke survivors. *International Journal of Nursing Practice* 2018; **24(4)**: e12646. DOI link, PMID:29575417
- 19 Naghdi S, Ansari NN, Mansouri K, Hasson S. A neurophysiological and clinical study of Brunnstrom recovery stages in the upper limb following stroke. *Brain Injury* 2010; **24(11)**: 1372-1378. DOI link, PMID:20715900
- 20 Jeyakumar G, Tu JV, Austin PC, Hall R, Chu A, Khan AM et al. Abstract WMP58: Ambulatory care for secondary prevention of stroke in rural versus urban areas in Ontario, Canada. *Stroke* 2018; **49(Suppl. 1)**: AWMP58. DOI link
- 21 Chu K, Maine R, Duvenage R. We asked the experts: the role of rural hospitals in achieving equitable surgical access in low-resourced settings. *World Journal of Surgery* 2021; **45(10)**: 3016-3018. DOI link, PMID:34338826

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## Conflicts of interest

The authors declare no conflict of interest in the writing and/or publication of this article.

- 22** Merchant J, Kitsos G, Ashby S, Kitsos A, Hubbard IJ. Occupational therapy and physiotherapy in acute stroke: do rural patients receive less therapy? *Stroke Research and Treatment* 2016; **2016**: 1582706. DOI link, PMid:27752389
- 23** Yan LL, Chen S, Zhou B, Zhang J, Xie B, Luo R et al. A randomized controlled trial on rehabilitation through caregiver-delivered nurse-organized service programs for disabled stroke patients in rural China (the RECOVER trial): design and rationale. *International Journal of Stroke* 2016; **11(7)**: 823-830. DOI link, PMid:27462096
- 24** Quigley R, Mann J, Robertson J, Bonython-Ericson S. Are we there yet? Exploring the journey to quality stroke care for Aboriginal and Torres Strait Islander peoples in rural and remote Queensland. *Rural and Remote Health* 2019; **19(3)**: 4850. DOI link, PMid:31487467
- 25** Dixon G, Thornton EW, Young CA. Perceptions of self-efficacy and rehabilitation among neurologically disabled adults. *Clinical Rehabilitation* 2007; **21(3)**: 230-240. DOI link, PMid:17329280
- 26** Ferri CP, Schoenborn C, Kalra L, Acosta D, Guerra M, Huang Y et al. Prevalence of stroke and related burden among older people living in Latin America, India and China. *Journal of Neurology, Neurosurgery & Psychiatry* 2011; **82(10)**: 1074-1082. DOI link, PMid:21402745
- 27** Gedik-Bakkal S, Kocoglu-Tanyer D. Self-efficacy level among patients with type 2 diabetes living in rural areas. *Rural and Remote Health* 2018; **18(1)**: 4262. DOI link, PMid:29406767
- 28** de Haan Rd, Aaronson N, Limburg M, Hewer RL, van Crevel H. Measuring quality of life in stroke. *Stroke* 1993; **24(2)**: 320-327. DOI link, PMid:8421836
- 29** Howitt SC, Jones MP, Jusabani A, Gray WK, Aris E, Mugusi F et al. A cross-sectional study of quality of life in incident stroke survivors in rural northern Tanzania. *Journal of Neurology* 2011; **258(8)**: 1422-1430. DOI link, PMid:21336782
- 30** Mei Y-x, Zhang Z-x, Wu H, Hou J, Liu X-t, Sang S-x et al. Health-related quality of life and its related factors in survivors of stroke in rural China: a large-scale cross-sectional study. *Frontiers in Public Health* 2022; **10**: 810185. DOI link, PMid:35450122
- 31** Jun H-J, Kim K-J, Chun I-A, Moon O-K. The relationship between stroke patients' socio-economic conditions and their quality of life: the 2010 Korean community health survey. *Journal of Physical Therapy Science* 2015; **27(3)**: 781-784. DOI link, PMid:25931730
- 32** Chandran P, Shenoy D, Thavody J, Lilabi MP. Assessment of quality of life of stroke survivors in a rural area of North Kerala, India. *International Journal of Community Medicine and Public Health* 2017; **4(3)**: 841-846. DOI link
- 33** Handschu R, Garling A, Heuschmann PU, Kolominsky-Rabas PL, Erbguth F, Neundörfer B. Acute stroke management in the local general hospital. *Stroke* 2001; **32(4)**: 866-870. DOI link, PMid:11283384
- 34** Smalley KB, Yancey CT, Warren JC, Naufel K, Ryan R, Pugh JL. Rural mental health and psychological treatment: a review for practitioners. *Journal of Clinical Psychology* 2010; **66(5)**: 479-489. DOI link, PMid:20222125
- 35** Leira EC, Phipps MS, Jasne AS, Kleindorfer DO. Time to treat stroke patients in rural locations as an underserved minority. *Neurology* 2017; **88(5)**: 422-423. DOI link, PMid:28053007

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