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What Shapes Patient Satisfaction with Outpatient Stroke Care? Evidence from a Tertiary Referral Hospital in Ethiopia

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Abstract

Background

As the number of stroke survivors increases, ensuring high-quality, patient-centred outpatient care is an important healthcare priority. Patient satisfaction provides insight into patients' perceptions of healthcare quality, yet evidence on satisfaction with outpatient stroke services in low-resource settings remains limited. This study assessed patient satisfaction with outpatient stroke care and factors associated with overall satisfaction at a tertiary referral hospital in Addis Ababa, Ethiopia.

Methods

A facility-based cross-sectional study was conducted from December 1, 2025, to March 27, 2026, among 384 stroke survivors attending a specialised neurology outpatient clinic at a tertiary teaching hospital. Data were collected using a pretested questionnaire covering interpersonal care, communication, accessibility, waiting time, rehabilitation services, and facility-related factors. Bivariable and multivariable logistic regression analyses were performed to identify factors associated with overall satisfaction.

Results

All 384 eligible participants completed the study (100% response rate). The mean satisfaction score was 3.70 (SD 0.67) on a five-point Likert scale, and 54.3% of participants were classified as satisfied with overall care. Ratings were highest for provider communication and respectful care, while waiting time, service organisation, and facility infrastructure received lower ratings. In multivariable analysis, satisfaction with waiting time and service flow (adjusted odds ratio [AOR] 4.30; 95% confidence interval [CI] 1.13–14.50) and satisfaction with physiotherapy and speech therapy services (AOR 14.20; 95% CI 1.60–125.00) were independently associated with overall satisfaction.

Conclusion

Patient satisfaction with outpatient stroke care was suboptimal, with only just over half of participants reporting satisfaction. The findings highlight waiting time and service flow, alongside physiotherapy and speech therapy services, as potentially important targets for improving patients' experiences of care. Strengthening outpatient service organisation and integrating accessible rehabilitation into stroke follow-up may offer practical opportunities to improve patient-centred care in Ethiopia and similar resource-constrained settings.

Introduction

Stroke is a rapidly developing neurological syndrome caused by vascular disturbance and is classified into ischemic and hemorrhagic types (1). Transient ischemic attack (TIA) represents temporary neurological dysfunction without infarction and serves as an important warning sign for future stroke (2). Globally, stroke remains the second leading cause of death and a major contributor to disability and disability-adjusted life years (DALYs), with a disproportionately rising burden in low- and middle-income countries (LMICs)(3). This growing burden is driven by population aging, rapid urbanization, and a rising prevalence of modifiable cardiovascular risk factors, particularly hypertension, diabetes, smoking, and sedentary lifestyles(4). In Sub-Saharan Africa, stroke has emerged as a premier public health crisis, frequently affecting younger, working-age populations and causing severe socioeconomic consequences(5). In this region, post-stroke mortality and long-term disability remain high, largely due to systemic bottlenecks in acute care, scarce rehabilitative infrastructure, and fragmented long-term follow-up services(6).

In Ethiopia, stroke is an important cause of neurological morbidity and mortality, and hypertension remains a major modifiable risk factor (7). Although stroke services are available at major tertiary hospitals, the extent to which outpatient services meet stroke survivors' needs requires assessment (7, 8). Outpatient follow-up is an essential component of stroke management, supporting ongoing clinical assessment, vascular risk-factor management, secondary stroke prevention, and rehabilitation (9, 10)..

However, the quality of outpatient care extends beyond the clinical services provided. Patients' experiences of provider communication, respectful treatment, waiting times, service organisation, accessibility, and rehabilitation services offer important perspectives on how care is delivered. Patient satisfaction is therefore a useful patient-reported measure of perceived healthcare quality and can help identify aspects of service delivery that may require improvement (11,). Previous research on outpatient neurology services in Ethiopia provides relevant background, but stroke-specific evidence may offer additional insight into patients' assessments of follow-up care, particularly regarding service organisation and rehabilitation. Establishing how stroke survivors rate different aspects of outpatient care and which factors are associated with overall satisfaction can help healthcare managers identify locally relevant service-improvement priorities (12, 14).

This study assessed patient satisfaction with outpatient stroke care and examined factors associated with overall satisfaction among stroke survivors attending a specialised neurology outpatient clinic at a tertiary referral and teaching hospital in Addis Ababa, Ethiopia. By examining multiple dimensions of care, including interpersonal interactions, communication, accessibility, waiting time, rehabilitation services, and facility-related factors, the study sought to identify priorities for improving service delivery at the study hospital and generate context-specific evidence that may inform efforts to strengthen patient-centred outpatient stroke care in comparable healthcare settings elsewhere in Ethiopia and other resource-constrained settings.

Material and Methods

Study design and setting

A facility-based, quantitative, cross-sectional study was conducted from December 1, 2025, to March 27, 2026, at Tikur Anbessa Specialized Hospital (TASH) in Addis Ababa, Ethiopia. It is the nation's largest tertiary referral and academic teaching hospital, operating with a capacity of over 700 beds. It serves as the primary training hub for undergraduate and postgraduate health science programs in Ethiopia, hosting the country's first and largest neurology residency and fellowship training programs.

In September 2022, TASH established a dedicated multidisciplinary acute stroke unit consisting of four specialized beds staffed by stroke subspecialists, neurologists, resident physicians, and dedicated stroke care nurses. Following acute stabilization, stroke survivors receive long-term care at the weekly outpatient stroke clinic. This specialized outpatient service accommodates an average of 40 to 50 patients per clinic day, focusing on secondary prevention, clinical monitoring, and neurorehabilitation coordination.

Study population and eligibility criteria

The source population comprised all stroke survivors attending the neurology outpatient stroke clinic at TASH during the study period. Eligible participants were adults (≥ 18 years) with a clinically and/or radiological confirmed diagnosis of stroke who had attended at least one previous outpatient follow-up visit and provided written informed consent.

Patients with acute neurological deterioration (Glasgow Coma Scale score < 15), severe global or expressive aphasia that precluded effective communication, or critical illness preventing participation were excluded.

Sample size and sampling procedure

The sample size was calculated using the single population proportion formula, assuming a patient satisfaction proportion of 50%, a 95% confidence level, and a 5% margin of error, yielding a required sample of 384 participants. Consecutive sampling was used to recruit all eligible patients attending the weekly stroke clinic until the target sample size was reached.

The primary outcome was overall patient satisfaction with outpatient stroke care, categorized as satisfied or dissatisfied.

Data on independent variables were collected using a pre-tested structured questionnaire that assessed socio-demographic characteristics, clinical characteristics, and health system factors, including provider–patient communication, patient education, shared decision-making, waiting time, access to physiotherapy and speech therapy, clinic accessibility, facility infrastructure, availability of medications

and diagnostic services, service costs, and provider empathy. The questionnaire also included an open-ended question that invited participants to suggest improvements to the outpatient stroke service.

Data collection and measurement of patient satisfaction

Data were collected by five trained nurses using face-to-face interviews conducted in a private setting following standardized training. The principal investigator supervised data collection throughout the study. Completed questionnaires were reviewed daily for completeness, consistency, and accuracy before data entry.

Patient satisfaction was assessed using a structured interviewer-administered tool adapted from World Health Organization patient satisfaction and health system performance assessment instruments (15).The tool evaluated multiple domains of outpatient care ranging from interpersonal care, communication, accessibility, waiting time, rehabilitation services, and facility-related factors, using a five-point Likert scale (the tool is attached as supplementary file).

Prior to data collection, the tool was translated from English into Amharic (widely spoken national/local language) and independently back-translated to ensure conceptual equivalence. A pilot test involving 5% of the calculated sample size was conducted at a comparable tertiary hospital to assess clarity, feasibility, and acceptability. The internal consistency of the final questionnaire was satisfactory (Cronbach's $\alpha = 0.7$).

Overall satisfaction was calculated by summing the individual item scores. Participants with total scores greater than or equal to the overall mean satisfaction score were classified as satisfied, whereas those scoring below the mean were classified as dissatisfied.

Statistical analysis

Data were coded and analyzed using IBM SPSS Statistics version 27.0 (IBM Corp., Armonk, NY, USA). Continuous variables are presented as means with standard deviations (SD), whereas categorical variables are summarized as frequencies and percentages.

Bivariable logistic regression was performed to identify variables associated with overall patient satisfaction. Variables with $p < 0.20$ were entered into a multivariable logistic regression model to identify independent predictors while controlling for potential confounding factors. Multicollinearity was assessed using the variance inflation factor, and model calibration was evaluated using the Hosmer–Lemeshow goodness-of-fit test ($p = 0.552$). Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were reported. Statistical significance was defined as a two-sided $p < 0.05$.

Data completeness was verified before analysis. As there were no missing observations for the variables included in the final analysis, no imputation procedures were required.

Ethical Considerations

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines. All procedures involving human subjects were approved by the Ethics Committee of the Department of Neurology Research Review Committee of Addis Ababa University (Reference No. NEURO/19/18; November 17, 2025). Written informed consent was obtained from all participants or their legally authorized representatives before enrollment. The study was conducted in accordance with the Declaration of Helsinki, and participant confidentiality was maintained by de-identifying all data.

Results

Sociodemographic Characteristics and Clinical Profile and Health System Engagement of the Cohort

As displayed in Table 1, the study enrolled 384 stroke survivors, achieving a 100% response rate. The demographic composition of the cohort was characterized by a slight female predominance (n = 209, 54.4%) and a high concentration of middle-aged adults, with 52.5% (n = 201) of participants falling within the 45–64 age bracket. The vast majority of the study population resided in urban areas (n = 342, 89.1%). Most participants were married (n = 288, 75.6%). Educational attainment was distributed across the cohort, with 26.5% (n = 101) having completed high school and 26.2% (n = 100) holding a college degree or higher qualification. Regarding occupational status, housewives constituted the largest single group (27.9%, n = 107), followed by non-governmental organization (NGO) employees (23.7%, n = 91). Economically, 49.0% (n = 188) of the sample reported a monthly household income of less than 5,000 Ethiopian Birr (ETB).

In terms of clinical characteristics of the cohort, the majority had ischemic stroke (80.8%, n = 303). Regarding temporal proximity to the index vascular event, 37.0% (n = 142) of patients were within 6 months to 3 years post-stroke, 30.2% (n = 116) were between 3 and 6 years, and 29.9% (n = 115) had survived more than 6 years. Almost all participants (98.7%, n = 376) were attending repeat follow-up visits, with only five individuals presenting for an initial consultation. Among those undergoing follow-ups, 78.4% (n = 301) had completed between three and five previous outpatient visits. Nearly half of the healthcare expenses, 49.2% (n = 188) of patients relied entirely on out-of-pocket payments, while 47.1% (n = 180) utilized Community-Based Health Insurance (CBHI).

Table 1
Socio-demographic and Clinical Characteristics of Stroke Survivors (N = 384)

Variable	Category	Frequency (n)	Percentage (%)
Age	< 45	77	20.1
	45–64	201	52.5
	>=65	105	27.4
Sex	Male	174	45.4
	Female	209	54.4
Residency	Urban	342	89.1
	Rural	42	10.9
In marital union	Yes	288	75.6
	No	93	24.4
Educational Status	Can’t read and write	41	10.8
	Can only read and write	52	13.6
	Primary Education	87	22.8
	High School	101	26.5
	College +	100	26.2
Occupation	Student	3	0.8
	Government Employee	57	14.8
	NGO employee	91	23.7
	Self employed	22	5.7
	Housewife	107	27.9
	Not Employed	47	12.2
	Retired	57	14.8
Income	< 5000	188	49
	≥ 5000	196	51
Stroke Type	Ischemic	303	80.8
	Hemorrhagic	72	19.2

Note: ETB = Ethiopian Birr; NGO = Non-Governmental Organization; OPD = Outpatient Department; CBHI = Community-Based Health Insurance. Discrepancies in sub-totals are due to missing values in specific fields.

Variable	Category	Frequency (n)	Percentage (%)
Post stroke duration	< 1 month	11	2.9
	6 month-3 years	142	37
	3 years – 6 years	116	30.2
	> 6 years	115	29.9
Type of Outpatient visit	First visit	5	1.3
	Follow up	376	98.7
Frequency of OPD visits	1–2	68	17.7
	3–5	301	78.4
	> 5	15	3.9
Payment Method	Free/exempt	14	3.7
	Out of pocket	188	49.2
	CBHI	180	47.1

Note: ETB = Ethiopian Birr; NGO = Non-Governmental Organization; OPD = Outpatient Department; CBHI = Community-Based Health Insurance. Discrepancies in sub-totals are due to missing values in specific fields.

Overall Level of Patient Satisfaction

Overall outpatient stroke care satisfaction was treated as a binary variable derived from five global validation items. The mean satisfaction score of the cohort was 3.70 ± 0.67 on a 5-point Likert scale, with a median of 3.80 (IQR: 3.40–4.20). Utilizing the cohort's mean score as a predefined cutoff, 54.3% (n = 208) of patients were classified as satisfied with the specialized stroke services, while 45.7% (n = 175) were categorized as dissatisfied (Fig. 1).

Satisfaction Trends across Specific Service Domains

As depicted in Table 2, the evaluation of twelve distinct clinical and administrative service domains revealed mean satisfaction scores ranging from a low of 3.33 to a high of 3.91 suggesting moderate level of satisfaction across all services. The highest levels of satisfaction in domains directly reflecting clinical professionalism and ethical care that includes Respect, Privacy, and Confidentiality (Mean = 3.91 ± 0.66), followed closely by Communication and Information domain (Mean = 3.87 ± 0.62), and Financial Aspects domain (Mean = 3.84 ± 0.65). In contrast, the lowest satisfaction scores were reported for accessibility and appointment services (mean = 3.33 ± 0.74), followed by waiting time (mean = 3.45 ± 0.79), indicating key system-level service gaps.

Table 2
Bivariate Analysis of Service Domains Associated with Overall Patient Satisfaction

Rank	Service Domain	Dissatisfied Median(IQR)	Satisfied Median(IQR)	P-Value
1	Respect, Privacy, and Confidentiality	3.75(3.1–4.25)	4.25 (4.0-4.5)	< 0.001
2	Communication and Information	3.8 (3-4.1)	4.17 (3.8–4.4)	0
3	Financial Aspects	3.6(2.4-4)	4.2 (3.8–4.2)	0
4	Healthcare Provider empathy & compassion	3.7 (3.1–3.9)	4.14 (4-4.42)	< 0.001
5	Quality of Care	3.6 (3–4)	4.2 (3.8–4.4)	< 0.001
6	Nurses / Other Health Professionals	3.7(3-4.3)	4.0(3.6–4.3)	< 0.001
7	Availability of Services and Resources	3.6(3-4.2)	4.2(3.8–4.2)	< 0.001
8	Physiotherapy and speech therapy	3.5 (2.96–3.83)	4.0 (3.7–4.3)	< 0.001
9	Patient satisfaction with care giver	3.5 (2.75–3.75)	4.0 (3.75–4.25)	0
10	Physical Environment and Cleanliness	3.16(2.7–3.7)	4.0 (3.3–4.3)	< 0.001
11	Waiting Time and Flow of Services	3.2 (2.6–3.5)	3.8 (3.0-4.4)	0
12	Accessibility & Appointment	3.0 (2.6–3.5)	3.6 (3.2–3.8)	0

When prompted for open-ended feedback regarding strengths and deficiencies, patients painted a highly contrasting picture of clinical competence versus severe material resource constraints. The data outlines patient feedback regarding their Outpatient Department (OPD) visits, categorized into four key domains: positive aspects, equipment/service problems, infrastructure/ environmental challenges, and administrative processes.

Strength of the outpatient stroke service mentioned

The findings reveal a striking contrast: while patients highly value the clinical expertise available, they are severely hindered by critical equipment shortages and facility constraints. The availability of specialized medical professionals was the most frequently reported strength of the stroke outpatient department (OPD), with 194 (50.4%) of respondents highlighting the presence of neurologists and specialized clinicians as a key positive aspect. This was followed by the availability of investigations and medications (17.8%) and compassionate staff behavior (7.8%).

Challenges mentioned

On the other hand, material and equipment shortages represented the most pervasive clinical deficit, affecting 81.0% of the sample. Notably, 73.4% of patients reported an acute unavailability of fundamental blood pressure (BP) cuffs during their visits. Furthermore, 44.1% experienced restricted access to advanced neuroimaging, specifically MRI services. Physical environmental concerns were raised by 19.6% of patients, primarily focusing on overcrowded waiting areas and long waiting times. Administrative issues like slow computer network systems (3.9%) and card activation delays (2.6%) affected a minor subset (7.3%) of participants (Table 4).

Patients' suggestions towards the improvement

In response to an open-ended question on service improvement, consistent with these reported barriers, 71.8% of patients recommended immediate procurement of essential medical equipment. Simpler administrative pathways for medical card activation were suggested by 6.5% and 5.7% recommended expanding the physical waiting areas and clinic rooms.

Univariable and Bivariable Predictors of Satisfaction

Bivariable analysis revealed that only two sociodemographic parameters significantly influenced overall patient satisfaction **(**Table 3**)**. Educational attainment and employment status were significantly associated with patient satisfaction. The rate was significantly ($p = 0.01$) higher among college-educated individuals (66.0%) and lowest among those with a primary education (41.9%).

Similarly, retired participants expressing the highest ($p = 0.004$) satisfaction rates (66.7%) and student participants the lowest (33.3%). Age, biological sex, residency, and income did not demonstrate any significant association with overall satisfaction ($p > 0.05$).

Notably, none of the evaluated clinical factors showed a statistically significant relationship with patient satisfaction ($p > 0.05$). Satisfaction rates were statistically comparable between ischemic stroke (53.0%) and hemorrhagic stroke (58.3%) survivors ($p = 0.413$). Similarly, stroke duration ($p = 0.667$), frequency of OPD visits ($p = 0.958$), previous follow-up history ($p = 0.065$), and payment structures ($p = 0.424$) did not significantly alter satisfaction rates.

When analyzing continuous service domains, the Shapiro-Wilk test indicated a non-normal distribution across multiple scales ($p < 0.05$). Consequently, Mann-Whitney U testing was applied, revealing that all twelve specialized service domains were strongly associated with overall satisfaction ($p < 0.001$). The largest median disparities between the satisfied and dissatisfied cohorts were observed in the physical environment domain (median of 4.0 vs. 3.16) and the waiting time and flow domain (median of 3.8 vs. 3.20).

In contrast, professional conduct, ethics, and specialized clinical care were identified as strengths, receiving higher scores across both cohorts. Respect, Privacy, and Confidentiality achieved the highest satisfaction median of 4.25 (IQR: 4.0–4.5), while Provider Empathy followed closely with satisfied patients scoring it at 4.14 (IQR: 4.0–4.42) compared to 3.7 (IQR: 3.1–3.9) in the dissatisfied group.

Specialized services also showed significant differences, with Physiotherapy and Speech Therapy reporting medians of 4.0 vs. 3.5, and Resource Availability showing 4.2 vs. 3.6.

Table 3
Bivariate Analysis of Factors Associated with Overall Stroke Patient Satisfaction

Domain /variable	Category	Dissatisfied (%) / Median (IQR)	Satisfied (%) / Median (IQR)	P value
Age	< 45	46.8	53.2	0.594
	45–64	43.5	56.5	
	≥ 65	49.5	50.5	
Sex	Male	43.1	56.9	0.380
	Female	47.6	52.4	
Residence	Urban	46.9	53.1	0.169
	Rural	35.7	64.3	
	Traditional	52.9	47.1	
Marital status	Single	44.0	56.0	0.674
	Married	44.6	55.4	
	Widowed	47.3	52.7	
	Divorced	61.5	38.5	
Education	None	46.3	53.7	0.018
	Read & write	51.9	48.1	
	Primary	58.1	41.9	
	High school	43.6	56.4	
	College+	34.0	66.0	
Occupation	Student	66.7	33.3	0.004
	Govt employee	36.8	63.2	
	NGO employee	52.7	47.3	
	Self-employed	36.4	63.6	
	Housewife	58.5	41.5	
	Unemployed	31.9	68.1	
	Retired	33.3	66.7	
Income	< 5000	51.3	48.7	0.142
	5000–9999	44.4	55.6	

Domain /variable	Category	Dissatisfied (%) / Median (IQR)	Satisfied (%) / Median (IQR)	P value
	10000–14999	36.2	63.8	
	15000–19999	32.3	67.7	
	20000–24999	50.0	50.0	
Stroke type	Ischemic	47.0	53.0	0.413
	Hemorrhagic	41.7	58.3	
Duration of stroke	< 1 month	27.3	72.7	0.667
	6 months–3 years	46.5	53.5	
	3–6 years	45.7	54.3	
	> 6 years	46.5	53.5	
Visit type	First visit	0.0	100.0	0.065
	Follow-up	46.7	53.3	
OPD visits	1–2	44.1	55.9	0.958
	3–5	46.0	54.0	
	> 5	46.7	53.3	
Payment method	Free	28.6	71.4	0.424
	Out-of-pocket	45.5	54.5	
	CBHI	46.7	53.3	

Values are presented as percentages for categorical variables and median (interquartile range) for service domain scores. P values were obtained using Pearson's χ^2 test for categorical variables and the Mann–Whitney U test for service domain scores. Significant associations ($P < 0.05$) are shown **in** bold.

Multivariable Determinants of Patient Satisfaction

To preserve the degrees of freedom and optimize model stability, the variables for occupation, education, and household income were collapsed into broader categorical domains. The resulting multivariable binary logistic regression model demonstrated high goodness-of-fit, as verified by the Omnibus test of model coefficients ($p < 0.001$), a Nagelkerke R^2 of 0.669, and a Hosmer-Lemeshow test demonstrating no significant difference between observed and predicted values ($p = 0.552$). After adjusting for all confounding variables, none of the sociodemographic parameters (educational

background, occupational group, residency, or income) remained independent predictors of satisfaction ($p > 0.05$). Urban residency showed a minor, non-significant statistical trend toward lower satisfaction odds (AOR = 0.017; 95%CI: 0.001-.35; p = 0.068).

Among the service domains, Waiting Time and Service Flow and Physiotherapy, and Speech Therapy emerged as significant independent predictors of overall patient satisfaction. Patients who were satisfied with the waiting time and the flow of services were 4.3 times more likely to report overall satisfaction (AOR = 4.30, 95% CI: 1.13–1.16, P = 0.032). Satisfaction with rehabilitation services like Physiotherapy and Speech Therapy was the strongest predictor of overall satisfaction. Stroke survivors who were satisfied with these therapeutic services exhibited a 14.2-fold increase in their odds of overall satisfaction (AOR = 14.20; 95%CI; 1.60–125.00; p = 0.017). Although perceptions of respect, privacy, and confidentiality showed a positive directional trend, it did not cross the formal threshold for statistical significance in this model (AOR = 4.0, P = 0.065) **(Table 4)**.

Table 4: Multivariable Logistic Regression Analysis of Factors Associated with Overall Patient Satisfaction among Stroke Survivors

Variable	Category	Adjusted OR (95% CI)	P value
Occupation	Employed	1.39 (0.04–51.08)	0.850
	Unemployed	Ref.	—
Educational status	Up to high school	3.02 (0.68–13.45)	0.150
	College and above	Ref.	—
Residence	Urban	0.02 (0.00–1.35)	0.068
	Rural	Ref.	—
Monthly income	<5,000 ETB	0.54 (0.01–20.80)	0.738
	≥5,000	Ref.	—
Service domains	Accessibility and appointment	0.49 (0.11–2.16)	0.350
	Waiting time and flow of services	4.30 (1.13–14.5)	0.032
	Physical environment and cleanliness	1.74 (0.43–7.09)	0.441
	Healthcare provider empathy and compassion	2.48 (0.42–14.80)	0.320
	Communication and information	0.72 (0.08–6.50)	0.770
	Nurses and other health professionals	0.39 (0.08–1.85)	0.270
	Quality of care	0.88 (0.13–5.95)	0.890
	Availability of services and resources	0.33 (0.07–1.54)	0.160
	Financial aspects	3.81 (0.56–25.80)	0.170
	Respect, privacy, and confidentiality	4.00 (0.92–17.50)	0.065
	Patient satisfaction with caregiver	2.60 (0.90–7.53)	0.077
	Physiotherapy and speech therapy	14.20 (1.60–125.00)	0.017

Abbreviations: AOR, adjusted odds ratio; CI, confidence interval; Ref., reference category; ETB= ETHIOPIAN Birr (1 USD= 150 ETB at the time of the study) .

Significant associations (P < 0.05) are shown in bold.

Discussion

Overall patient satisfaction

Patient satisfaction is a fundamental indicator of the quality of outpatient stroke care and an important determinant of adherence to secondary prevention, continuity of follow-up, and engagement in rehabilitation. However, evidence on patient satisfaction and its determinants in specialized stroke services remains scarce in sub-Saharan Africa. This study provides novel evidence from Ethiopia by identifying the health system factors that shape patient satisfaction among stroke survivors attending a high-volume tertiary neurology outpatient clinic. These findings highlight actionable service-level priorities that can inform targeted, low-cost quality improvement strategies to strengthen patient-centered stroke care in resource-constrained settings (16, 17).

Overall, 54.3% of patients were satisfied with the outpatient services they received. Although this indicates that more than half of stroke survivors perceived the quality of care positively, it also demonstrates considerable room for improvement. The satisfaction level observed in this study was lower than that reported in another study conducted in Addis Ababa (66.2%), which may reflect differences in institutional capacity, infrastructure, patient volume, and organization of outpatient services (12). Conversely, our findings were higher than those reported from other Ethiopian health facilities (46.2%), where limited resources, workforce shortages, and infrastructural constraints contributed to poorer patient experiences (18). Patient satisfaction is increasingly recognized as an important quality indicator in stroke care because it reflects patients' perceptions of healthcare delivery while influencing treatment adherence, continuity of care, utilization of rehabilitation services, and clinical outcomes(19,20). As stroke has become a chronic condition requiring long-term multidisciplinary management, optimizing patient experience has become an essential component of comprehensive stroke services (21).

Patient satisfaction across service domains

An important finding of this study was the marked variation in patient satisfaction across different dimensions of outpatient care. The highest satisfaction scores were observed for interpersonal aspects of care, including respect for privacy and confidentiality, communication and information, provider empathy and compassion, and overall quality of care. These findings suggest that despite considerable resource limitations, healthcare professionals at TASH consistently deliver respectful, patient-centered care. Similar findings have been reported in previous studies demonstrating that effective communication, empathy, and respectful provider-patient relationships are among the strongest determinants of patient satisfaction in neurological and general outpatient settings (12).

Conversely, the lowest satisfaction scores were observed for healthcare system-related domains, particularly accessibility and appointment services, waiting time and patient flow, and the physical environment. These findings indicate that administrative and infrastructural barriers remain major obstacles to delivering optimal outpatient stroke care. Similar challenges have been reported in Ethiopia and other low- and middle-income countries, where overcrowding, prolonged waiting times, inefficient appointment systems, and limited infrastructure substantially reduce patient satisfaction (6, 11). Patient feedback further highlighted shortages of essential equipment, including blood pressure monitoring devices and limited access to advanced diagnostic investigations such as MRI. These observations reflect broader structural limitations affecting specialized neurological services in Ethiopia and emphasize the need for investment in both infrastructure and service organization.

Determinants of overall patient satisfaction

Although educational status and occupation were significantly associated with patient satisfaction in the bivariate analysis, neither remained independently associated after adjustment for potential confounders. This finding suggests that patients' experiences are influenced more strongly by healthcare delivery processes than by their sociodemographic characteristics, consistent with previous reports indicating that organizational quality and healthcare processes are the principal drivers of patient satisfaction.

Importantly, all service domains demonstrated significant associations with overall satisfaction during bivariate analysis, emphasizing that patient experience is inherently multidimensional. However, only waiting time and flow of services and satisfaction with physiotherapy and speech therapy remained independent predictors in the multivariable model.

Patients who were satisfied with waiting time and service flow were more than four times as likely to report overall satisfaction. This finding underscores the importance of efficient clinic organization, as delays in care consistently reduce patient confidence, increase dissatisfaction, and may negatively affect adherence to scheduled follow-up and secondary prevention. The strongest predictor of overall satisfaction was satisfaction with physiotherapy and speech therapy services. Patients reporting satisfaction with rehabilitation services were more than fourteen times more likely to be satisfied overall. This finding reinforces the pivotal role of multidisciplinary rehabilitation in modern stroke care. Early and continuous rehabilitation improves functional recovery, promotes independence, reduces disability, and enhances quality of life following stroke (13, 22). In resource-limited settings where rehabilitation services remain insufficient, expanding access to physiotherapy and speech therapy could substantially improve both patient experience and long-term clinical outcomes (10, 22).

Clinical and health system implications

The findings of this study have important implications for improving outpatient stroke services in Ethiopia and similar resource-constrained settings. Although interpersonal aspects of care appear to be a major strength of the neurology clinic, organizational deficiencies continue to undermine patient

experience (23,24). Many of the challenges identified by participants—including prolonged waiting times, overcrowded waiting areas, shortages of essential equipment, and administrative inefficiencies are potentially modifiable through quality improvement initiatives.

Strengthening appointment systems, optimizing patient flow, expanding rehabilitation services, improving clinic infrastructure, and ensuring the availability of essential diagnostic and monitoring equipment could substantially enhance patient satisfaction. Importantly, many of these interventions require organizational improvements rather than expensive technological investments, making them feasible even in low-resource healthcare systems. Improving patient satisfaction may also contribute indirectly to better adherence to secondary prevention strategies, continuity of rehabilitation, and ultimately improved functional outcomes after stroke.

Strengths and limitations

This study has several strengths. To our knowledge, it is the first study to comprehensively evaluate patient satisfaction among stroke survivors attending a specialized neurology outpatient clinic in Ethiopia using a multidimensional assessment covering interpersonal care, service delivery, rehabilitation, accessibility, and healthcare infrastructure. Furthermore, the study identified independent predictors of satisfaction through multivariable analysis, providing evidence that can inform quality improvement initiatives in tertiary neurological care.

Nonetheless, our study has some limitations that warrant consideration due to the design employed which may preclude establishing causal relationships between the identified factors and patient satisfaction. In addition, conducting the study at a single tertiary referral center may limit the generalizability of these findings to other healthcare settings. Furthermore, assessing patient satisfaction via self-reporting introduces potential social desirability and recall biases. Since our data collection occurred during outpatient visits, patient responses may heavily reflect their most immediate clinical encounter rather than their long-term care experience are among some of the limitations.

Conclusions

Overall patient satisfaction among stroke survivors attending the neurology outpatient clinic at TASH was moderate, with just over half of participants reporting satisfaction. While interpersonal aspects of care such as communication, respect, and provider empathy were highly rated, deficiencies in service efficiency, accessibility, waiting time, and rehabilitation services substantially influenced patients' overall experience. Waiting time and physiotherapy and speech therapy services emerged as the strongest independent predictors of satisfaction. These findings highlight important opportunities to strengthen patient-centered stroke care through organizational improvements, expansion of multidisciplinary rehabilitation services, and targeted investments in healthcare infrastructure. Such interventions have the potential not only to improve patient experience but also to enhance adherence to long-term stroke management and rehabilitation.

Abbreviations

AAU
Addis Ababa University
AHA
American Heart Association
CHS
College of Health Sciences
CT
Computerized tomographic scan
CVA
Cerebrovascular accident
DALY
disability -adjusted life years lost
GBD
Global burden of disease
HRQOL
Health related quality of life
LMICs
Low- and middle-income countries
MRI
Magnetic resonance imaging
NIHSS
National institutes of health stroke scale
SPSS
Statistical package for the social science
SASC
Patient Satisfaction-With-Stroke-Care
TASH
Tikur Anbessa Specialized Hospital
TIA
Transient ischemic attack
WHO
World Health Organization

Declarations

Ethics statement

This study was conducted according to the guidelines laid down in the Declaration of Helsinki and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology

(STROBE) guidelines. All procedures involving human subjects were approved by the Ethics Committee of the Department of Neurology Research Review Committee of Addis Ababa University (Reference No. NEURO/19/18; November 17, 2025). Written informed consent was obtained from all participants or their legally authorized representatives before enrollment. The study was conducted in accordance with the Declaration of Helsinki, and participant confidentiality was maintained by de-identifying all data.

Author contributions

WA conceived and designed the study, collected the data, performed the statistical analyses, and drafted the manuscript. A.A; H.D; S.K and JH contributed to study design, interpretation of the findings, critical revision of the manuscript, and supervision. All authors read and approved the final manuscript.

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No changes needed.

Declaration of competing interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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Declaration of generative AI use

During the preparation of this manuscript, we used Gemini AI to improve grammar and language. We reviewed and edited the output as necessary and take full responsibility for the content of the publication.

Data availability

The de-identified datasets generated and analyzed during the current study are available from the corresponding author on reasonable request.

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Figures

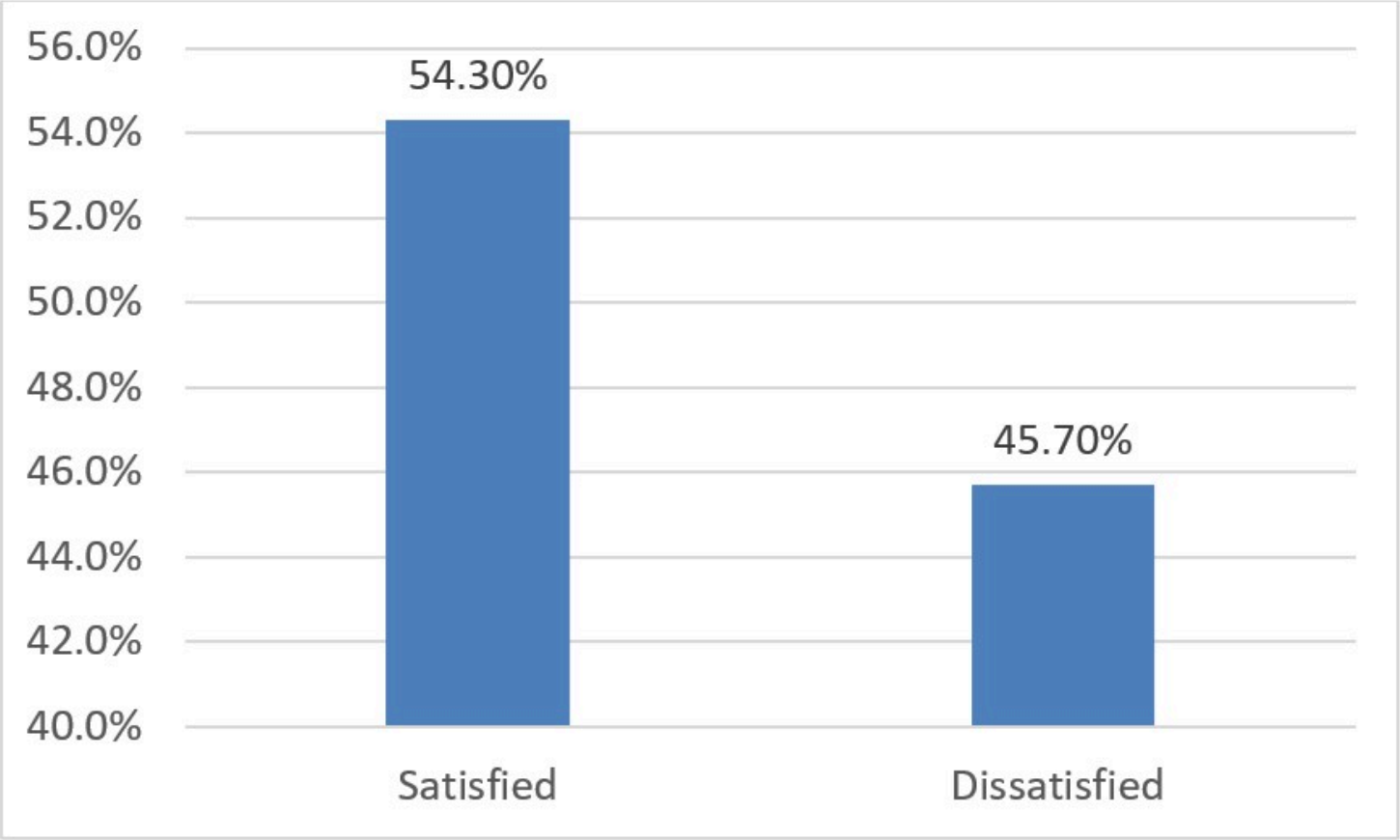


Figure 1

Level of stroke survivors attending an outpatient neurology service satisfaction

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