

FREQUENCY OF NON-MOTOR SYMPTOMS IN POST-STROKE PATIENTS
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Dr Zafar Ali**Abstract****Background:** Stroke is a major public health problem worldwide, contributing to significant morbidity and mortality. While motor deficits have traditionally been the focus of post-stroke care, non-motor symptoms (NMS) such as sleep disturbances, mood disorders, urinary dysfunction, and cognitive decline are also highly prevalent and negatively impact recovery and quality of life.**Objective:** To determine the frequency of non-motor symptoms in post-stroke patients at Lady Reading Hospital, Peshawar.**Methods:** This cross-sectional study was conducted in the Department of Medicine, Lady Reading Hospital, from November 2024 to April 2025. A total of 170 post-stroke patients aged 20–80 years were enrolled using non-probability consecutive sampling. Patients with pre-existing neurological or psychiatric conditions were excluded. Data were collected through structured face-to-face interviews using a standardized questionnaire covering nine domains of NMS, including cardiovascular, sleep, gastrointestinal, urinary, sexual, cognitive, mood, perceptual, and miscellaneous symptoms.**Results:** The mean age of participants was 59.2 ± 10.8 years, with 57.6% males and 69.4% ischemic strokes. The most prevalent NMS were urinary dysfunction (81.2%), sleep disturbances (71.8%), mood disorders (60.0%), fatigue and musculoskeletal pain (64.7%), and cognitive symptoms (54.1%). Sexual dysfunction was present in 51.8%, while gastrointestinal problems occurred in 43.5%. Females reported significantly higher rates of sleep disturbances (80.6% vs. 65.3%, $p = 0.03$) and urinary dysfunction (88.9% vs. 75.5%, $p = 0.02$), whereas males had higher sexual dysfunction (63.3% vs. 36.1%, $p = 0.001$). Mood symptoms decreased with longer stroke duration ($p = 0.04$). Patients with hypertension and diabetes showed significantly higher rates of NMS compared to those without comorbidities.**Conclusion:** It is concluded that non-motor symptoms are highly prevalent among post-stroke patients in Peshawar, with sleep disturbances, urinary

dysfunction, and mood changes being the most frequent. These findings emphasize the need for comprehensive, multidisciplinary rehabilitation strategies that address both motor and non-motor symptoms to improve recovery and quality of life in stroke survivors.

INTRODUCTION

Stroke is one of the leading causes of mortality and long-term disability worldwide. According to the Global Burden of Disease (GBD) study, approximately 25.7 million individuals were living with the consequences of stroke in 2013, with 6.5 million deaths and 113 million disability-adjusted life years (DALYs) lost globally [1]. It is currently estimated that LMICs experience almost 75 percent of stroke-related deaths and more than 80 percent of DALYs [2]. In Asia, where over 6 out of 10 of the world population have been found to live, the incidence and the mortality associated with strokes have been identified to be higher than the incidence and mortality in Western Europe, the Americas and the Australasia regions [3]. This is particularly in South Asia whose rapid demographic changes and a rising prevalence of risk factors like hypertension, diabetes, obesity, and smoking have also come to contribute to the burgeoning epidemic of stroke [4]. Stroke is an important health issue in Pakistan and moreover the burden of stroke is on increase in association with the escalation burden of vascular risk factors [5]. Although acute stroke treatment has improved, most patients continue to suffer long term complications that go beyond motor impairment. All these complications can be classified into motors and non-motors symptoms (NMS). Although hemiparesis, dysarthria and sensory impairments tend to be diagnosed and treated, NMS are still underdiagnosed and under managed though they have a great impact on patient well being [6]. NMS cover a broad range of issues, including mood disturbance, sleep disturbance, sexual dysfunction and cognitive impairment, gastrointestinal and urinary symptoms, change in perceptions and autonomic insufficiency [7]. They tend to extend the long term disability, reduced quality of life, and poor rehabilitation performance [8]. The load of NMS is great. Poststroke depression, e.g., is a problematic condition that occurs in about

one-third of patients and is often characterized by anxiety, irritability, and apathy, making rehabilitation less successful and predisposing to mortality [9]. Sleep disturbances, such as insomnia, sleep apnea and restless legs, are reported in trials in up to 78 % of survivors and associated with stroke recurrences and reduced recovery [10]. Nocturia and urinary urgency can be seen in more than 90% of the patients and lead to social withdrawal, infections, besides poor sleep quality [11]. Dysphagia is a gastrointestinal complication and it has been shown to prepare about one-third to half of stroke patients and is also an increasing cause of aspiration pneumonia, malnutrition and death [12]. The problem of sexual dysfunction, which is observed in more than half of patients with post-stroke diseases, introduces a certain psychosocial component into the disability [13]. Moreover, autonomic cardiovascular abnormalities may be presented by the unstable blood pressure dynamics, arrhythmic disorders, or even cardiac insufficiency, which increases morbidity and mortality [14]. Evidence on these NMS is well documented internationally, yet, is under dearth in Pakistan. Researches have conducted isolated symptoms of NMS, i.e. depression, pain, or dysphagia, but no study has really extensively measured the frequency of the total NMS burden on the local populations [15]. Cultural barriers, lack of awareness, communication hindrances as a result of aphasia, and resource constraints may be some of the factors contributing to underreporting and underdiagnosis [16]. Therefore, in most cases, rehabilitation is not highly performed to treat psychomotor disabilities but is still encompassed in hidden non-motor problems rapidly impacting the disabilities of patients in terms of their independence, mental health, and fitting back to the community. With such inconsistencies, it is important to determine the incidence and epidemiology of NMS in Pakistani stroke survivors.

As LRH is one of the largest tertiary care institutions in Khyber Pakhtunkhwa, with a high number of stroke patients of varied backgrounds attending it, it can be considered as an ideal place to conduct such a study.

Objective:

To determine the frequency of non-motor symptoms in post-stroke patients at Lady Reading Hospital, Peshawar.

Methodology

This was a hospital-based cross-sectional study conducted at Department of Medicine, Lady Reading Hospital (LRH), Peshawar, from November 2024 to April 2025. Sample size was calculated using the WHO sample size calculator version 2.0, taking:

- Anticipated population proportion (least common NMS, dysphagia): 31.5% [12]
- Confidence level: 95%
- Margin of error: 7%

The required sample size was 170 patients. A non-probability consecutive sampling technique was employed.

Inclusion Criteria

1. Patients aged 20–80 years.
2. Both male and female patients.
3. Patients with a confirmed diagnosis of stroke (ischemic or hemorrhagic) based on clinical evaluation and CT brain findings.
4. Duration of stroke more than one month (post-stroke period).
5. Patients able to provide informed consent.

Exclusion Criteria

1. Patients with pre-existing neurological diseases such as Parkinson's disease, epilepsy, multiple sclerosis, or dementia.
2. Patients with a prior history of psychiatric illness or those currently on antipsychotic, antidepressant, or anticholinergic medications.
3. Patients with hyper-acute or acute stroke (duration <1 month).

Data Collection

Ethical approval was obtained from the Institutional Review Board of Lady Reading Hospital, Peshawar, before the commencement of the study. Eligible patients were recruited consecutively from the inpatient and outpatient departments of the Medicine unit. Written informed consent was obtained after explaining the study's objectives, procedures, and assurance of confidentiality. Data were collected through face-to-face interviews using a structured questionnaire administered by trained research assistants. The questionnaire gathered demographic details, stroke history, comorbid conditions, and the presence of non-motor symptoms across nine domains. Clinical records and CT brain findings were reviewed to confirm the diagnosis and type of stroke. Completed questionnaires were checked daily for accuracy and completeness, and the information was entered into a secure computerized database to maintain confidentiality.

Statistical Analysis

Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 22. Continuous variables such as age and duration of stroke were summarized as mean $\pm$ standard deviation, whereas categorical variables including gender, type of stroke, comorbidities, and the presence of non-motor symptoms were expressed as frequencies and percentages. Non-motor symptoms were further stratified according to age, gender, type of stroke, comorbidities, and stroke duration to evaluate potential effect modification. Following stratification, chi-square tests were applied to determine associations, with a p-value of less than 0.05 considered statistically significant.

Results

The study included 170 post-stroke patients with a mean age of 59.2 ± 10.8 years. Almost half of the participants (47.0%) were between 61–80 years of age, while 42.4% were 41–60 years old, and only 10.6% fell in the 20–40 age group. Males constituted a slightly higher proportion (57.6%) compared to females (42.4%). Ischemic stroke was more common (69.4%) than hemorrhagic stroke (30.6%). Regarding duration since stroke, 37.6% of patients had experienced stroke within 1–6 months, 31.8%

within 7–12 months, and 30.6% for more than a year. Hypertension was the most prevalent comorbidity (62.4%), followed by diabetes mellitus

(42.4%), smoking history (31.8%), and dyslipidemia (23.5%).

Table 1. Demographic and Clinical Characteristics of Post-Stroke Patients (n = 170)

Variable	Category	n	%
Age (years)	Mean ± SD	59.2 ± 10.8	—
Age groups	20–40	18	10.6
	41–60	72	42.4
	61–80	80	47.0
Gender	Male	98	57.6
	Female	72	42.4
Type of Stroke	Ischemic	118	69.4
	Hemorrhagic	52	30.6
Duration since Stroke	1–6 months	64	37.6
	7–12 months	54	31.8
	>12 months	52	30.6
Comorbidities	Hypertension	106	62.4
	Diabetes mellitus	72	42.4
	Smoking history	54	31.8
	Dyslipidemia	40	23.5

Non-motor symptoms were widely prevalent among the patients. Sleep disturbances were the most frequently reported, affecting 71.8% of participants, followed by urinary dysfunction in 81.2% and fatigue or musculoskeletal pain in 64.7%. Mood disturbances such as depression or anxiety were observed in 60% of patients, and cognitive issues like forgetfulness or poor concentration in 54.1%.

Sexual dysfunction was present in 51.8%, while gastrointestinal problems such as dysphagia or constipation occurred in 43.5%. Cardiovascular autonomic symptoms were noted in 37.6%, perceptual problems like tinnitus or visual issues in 27.1%, and miscellaneous complaints including skin or joint problems in 64.7%.

Table 2. Frequency of Non-Motor Symptoms in Post-Stroke Patients (n = 170)

Symptom Domain	Present n (%)	Absent n (%)
Cardiovascular	64 (37.6)	106 (62.4)
Sleep disorders	122 (71.8)	48 (28.2)
Gastrointestinal	74 (43.5)	96 (56.5)
Urinary dysfunction	138 (81.2)	32 (18.8)
Sexual dysfunction	88 (51.8)	82 (48.2)
Cognitive symptoms	92 (54.1)	78 (45.9)
Mood disturbances	102 (60.0)	68 (40.0)
Perceptual problems	46 (27.1)	124 (72.9)
Miscellaneous (fatigue, pain)	110 (64.7)	60 (35.3)

When stratified by gender, several differences emerged. Sleep disorders were more common in females (80.6%) compared to males (65.3%), and urinary dysfunction was also higher among females

(88.9% vs. 75.5%), both statistically significant. In contrast, sexual dysfunction was much more prevalent among males (63.3%) compared to females (36.1%), with a highly significant association. Mood

disturbances were reported by 69.4% of females and 53.1% of males, also significant.

Symptom Domain	Male (n=98) n (%)	Female (n=72) n (%)	p-value
Cardiovascular	34 (34.7)	30 (41.7)	0.36
Sleep disorders	64 (65.3)	58 (80.6)	0.03*
Gastrointestinal	40 (40.8)	34 (47.2)	0.42
Urinary dysfunction	74 (75.5)	64 (88.9)	0.02*
Sexual dysfunction	62 (63.3)	26 (36.1)	0.001*
Cognitive symptoms	48 (49.0)	44 (61.1)	0.12
Mood disturbances	52 (53.1)	50 (69.4)	0.04*
Perceptual problems	24 (24.5)	22 (30.6)	0.39
Miscellaneous	58 (59.2)	52 (72.2)	0.08

Sleep disturbances were slightly more common in hemorrhagic stroke patients (80.8%) compared to ischemic stroke patients (67.8%). Similarly, cognitive symptoms and mood disturbances were somewhat more frequent in hemorrhagic stroke, at 61.5% and

65.4% respectively, compared to 50.8% and 57.6% in ischemic stroke. Urinary dysfunction was almost equally distributed, seen in 79.7% of ischemic and 84.6% of hemorrhagic cases.

Table 4. Distribution of Non-Motor Symptoms by Stroke Type

Symptom Domain	Ischemic (n=118) n (%)	Hemorrhagic (n=52) n (%)	p-value
Cardiovascular	46 (39.0)	18 (34.6)	0.61
Sleep disorders	80 (67.8)	42 (80.8)	0.09
Gastrointestinal	54 (45.8)	20 (38.5)	0.37
Urinary dysfunction	94 (79.7)	44 (84.6)	0.47
Sexual dysfunction	66 (55.9)	22 (42.3)	0.11
Cognitive symptoms	60 (50.8)	32 (61.5)	0.20
Mood disturbances	68 (57.6)	34 (65.4)	0.34
Perceptual problems	30 (25.4)	16 (30.8)	0.46
Miscellaneous	74 (62.7)	36 (69.2)	0.41

Patients with more recent strokes (1–6 months) had the highest prevalence of cardiovascular symptoms (43.8%) and mood disturbances (68.8%). Sleep disorders remained consistently high across all groups, ranging from 66.7% to 75%. Gastrointestinal, urinary, sexual, and cognitive

symptoms were observed across all durations without major variation. However, mood symptoms showed a significant decline over time, dropping from 68.8% in the early group to only 46.2% in patients with stroke.

Table 5. Distribution of Non-Motor Symptoms by Stroke Duration

Symptom Domain	1–6 months (n=64) n (%)	7–12 months (n=54) n (%)	>12 months (n=52) n (%)	p-value
Cardiovascular	28 (43.8)	20 (37.0)	16 (30.8)	0.28
Sleep disorders	48 (75.0)	36 (66.7)	38 (73.1)	0.59
Gastrointestinal	32 (50.0)	22 (40.7)	20 (38.5)	0.38
Urinary dysfunction	54 (84.4)	44 (81.5)	40 (76.9)	0.55
Sexual dysfunction	38 (59.4)	26 (48.1)	24 (46.2)	0.28
Cognitive symptoms	38 (59.4)	28 (51.9)	26 (50.0)	0.46
Mood disturbances	44 (68.8)	34 (63.0)	24 (46.2)	0.04*

Perceptual problems	18 (28.1)	14 (25.9)	14 (26.9)	0.96
Miscellaneous	44 (68.8)	36 (66.7)	30 (57.7)	0.43

Sleep disturbances were present in over 75% of patients with comorbidities but only 37.5% of those without. Urinary dysfunction was found in 84–89% of hypertensive and diabetic patients compared to just 43.8% in those with no comorbidity. Sexual dysfunction and mood disturbances were also

significantly more common in comorbid groups (over 50–70%) versus only 18.8% and 25% in patients without comorbidities. Cognitive symptoms followed a similar trend, being present in 50–59% of comorbid patients but only 31.3% in those without.

Table 6. Association of Non-Motor Symptoms with Comorbidities

Symptom Domain	Hypertension (n=106) n (%)	Diabetes (n=72) n (%)	Both HTN + DM (n=54) n (%)	No Comorbidity (n=32) n (%)	p-value
Cardiovascular	44 (41.5)	28 (38.9)	24 (44.4)	8 (25.0)	0.21
Sleep disorders	80 (75.5)	58 (80.6)	44 (81.5)	12 (37.5)	0.001*
Gastrointestinal	52 (49.1)	36 (50.0)	30 (55.6)	8 (25.0)	0.01*
Urinary dysfunction	90 (84.9)	62 (86.1)	48 (88.9)	14 (43.8)	<0.001*
Sexual dysfunction	58 (54.7)	34 (47.2)	32 (59.3)	6 (18.8)	<0.001*
Cognitive symptoms	60 (56.6)	38 (52.8)	32 (59.3)	10 (31.3)	0.04*
Mood disturbances	70 (66.0)	46 (63.9)	38 (70.4)	8 (25.0)	<0.001*
Perceptual problems	30 (28.3)	20 (27.8)	16 (29.6)	4 (12.5)	0.21
Miscellaneous	74 (69.8)	44 (61.1)	36 (66.7)	12 (37.5)	0.01*

Discussion

This study aimed to evaluate the frequency of non-motor symptoms (NMS) among post-stroke patients at Lady Reading Hospital, Peshawar. The results indicate that NMS are extremely common in the studied population, as sleep disturbances, urinary dysfunction, mood disorders, and fatigues are the most common complaints. These demographic data are also comparable to the existing literature, which invariably demonstrated that stroke affects older members of the population primarily with ischemic strokes being the most common ones [18]. The vascular comorbidities like hypertension and diabetes are very prevalent in this study, like noticed before that indicates robust relationship between vascular risk factors and close association with occurrence of a stroke. Sleep disturbances are the most frequent NMS in the given study and were reported in 71.8 percent of patients. This is similar

to prior studies, which have reported sleep difficulties in 70-80 percent of stroke patients, of which are frequently related to unsatisfactory neurological recovery and the likelihood of recurrence. Urinary dysfunction was the second most common NMS affecting 81.2% of patients, which is also comparable with prior literature that found urinary problems in 70-90% of post-stroke patients [19]. Such symptoms could be product of abnormal cortical and subcortical modulation of the bladder and can lead to secondary problems of infection and withdrawal.

Depression and anxiety phenomena were noted in 60 percent of the patients. This percentage falls in the range dictated by existing literature, which has always indicated that two-thirds to one-third of stroke patients develop depression after stroke [20]. The prevalence in our study was high given that there is a strong need to include psychological

screening in stroke rehabilitation programs. On the same note, the forgetfulness and poor concentration were noted in 54.1% of patients, in line with similar research conducted earlier when cognitive decline was identified in almost half of stroke survivors and thus a leading cause of long-term disability among them [21]. Gender analysis shows that sleep disturbances and difficulties related to urinary problems were significantly more frequent in women, and problems with sexual dysfunction were more frequent in males. Similar gender differences have been reported in prior studies, with women more likely to suffer mood and sleep disturbances, with men more likely to develop sexual dysfunction [22]. These results are suggestive of a synergy between biological and psychosocial mechanisms collective in determining the symptom presentation of post stroke patients. NMS were frequent in both ischemic and hemorrhagic stroke with sleep disorders and cognitive symptoms a little more frequent in the hemorrhagic cases when stratified by stroke type. In previous studies, it has also been found that whereas there is not much variation in overall burden of NMS between the different types of strokes, hemorrhagic strokes tend to cause more severe cognitive and emotional disturbances because of the larger involvement of the cortex [23]. The length of stroke also seemed to determine the occurrence of some symptoms especially that related to mood as it is indicated that mood disturbances decreased over time with 68.8 percent in the first six months and 46.2 percent after a year. Such a tendency coincides with the results of previous studies indicating possible psychological adaptation and acquisition of better coping strategies during a particular period of time, but the persistence of the mood disorder is also a question of many [24]. Comprehensively, the results of this research further support the claim that NMS not only are prevalent, but also multi-factorial, and dependant on demographic, clinical, and comorbidity-related factors. The coexistence of these symptoms with motor disability evokes a doubly-wounded burden that is difficult to detect in practice.

Conclusion

It is concluded that non-motor symptoms are highly prevalent among post-stroke patients presenting to

Lady Reading Hospital, Peshawar. The most frequent symptoms identified were sleep disturbances, urinary dysfunction, mood changes, fatigue, and cognitive impairment, while sexual dysfunction, gastrointestinal issues, cardiovascular complaints, and perceptual problems were also commonly observed. These findings highlight that the burden of stroke extends far beyond motor deficits and encompasses a wide range of hidden disabilities that significantly affect quality of life and hinder recovery.

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