Original Article
DOI: https://doi.org/10.70749/ijbr.v3i6.2779

INDUS JOURNAL OF BIOSCIENCE RESEARCH
https://ijbr.com.pk
ISSN: 2960-2793/ 2960-2807

Frequency of Dysautonomia in Patients Presenting with Guillain-Barré Syndrome at Lady Reading Hospital, Peshawar

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ARTICLE INFO

Keywords: Guillain-Barre Syndrome, Dysautonomia, Autonomic Nervous System Diseases.

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Declaration
Authors' Contribution
All authors equally contributed to the study and approved the final manuscript

Conflict of Interest: No conflict of interest.

Funding: No funding received by the authors.

Article History
Received: 13-04-2025 Revised: 14-06-2025
Accepted: 21-06-2025 Published: 30-06-2025

ABSTRACT

Background: Guillain-Barré Syndrome (GBS) is an acute immune-mediated polyneuropathy that often presents with variable clinical manifestations. Dysautonomia, a frequent but under-recognized complication, may significantly influence morbidity and mortality. The objective of this study was to determine the frequency of dysautonomia in patients with GBS and to explore its association with clinical characteristics and comorbidities. **Methodology:** A cross-sectional study was conducted on 112 patients diagnosed with GBS. Detailed demographic, clinical, and laboratory data were collected through structured proformas. Dysautonomia was assessed clinically and documented as present or absent. Variables such as age, gender, residence, duration of illness, GBS variants, preceding infection, comorbidities, and muscle power (MRC score) were analyzed. Data were entered into SPSS version 25. Chi-square test was applied to assess associations, with $p < 0.05$ considered statistically significant. **Results:** Dysautonomia was observed in 50% (56/112) of patients. Its occurrence was slightly higher among males (45.3%) compared to females (37.5%) and more frequent in patients above 40 years (39.3%). Dysautonomia was significantly associated with GBS variants, particularly AMAN (57.6%) compared to AIDP (35.4%). Preceding infections were also more frequent among patients with dysautonomia (53.6% vs. 41.9%), though the association was not statistically significant. No significant associations were found with age, gender, residence, comorbidities, or MRC scores. **Conclusion:** Dysautonomia is a common complication in GBS, particularly in AMAN variants. Early recognition and monitoring are essential to improve clinical outcomes.

INTRODUCTION

Acute, immune-mediated polyradiculoneuropathy Guillain-Barré syndrome (GBS) is typified by areflexia, rapidly worsening limb weakness, and varying sensory and autonomic involvement(1). Acute inflammatory demyelinating polyradiculoneuropathy (AIDP), acute motor axonal neuropathy (AMAN), and acute motor–sensory axonal neuropathy (AMSAN) are three subtypes of GBS, despite the fact that it is traditionally post-infectious(2). These subtypes have different electrophysiologic profiles and outcomes(3). Early recognition and standardized diagnostic criteria is important given the risk of precipitous deterioration and life-threatening complications(4).

Globally, the prevalence of GBS is low but stable, averaging around 1–2 occurrences per 100,000 person-years, with a male predominance and rising risk with age(5). Recent syntheses estimate a pooled incidence near 0.698 per 100,000 person-years, although regional variability exists(6). Triggers include a range of infectious agents like Campylobacter jejuni and emerging viral exposures, and pandemic-era data have added nuance regarding associations with SARS-CoV-2 infection and adenoviral-vector vaccination(7, 8). With a significant proportion of axonal types, GBS continues to be a major cause of acute flaccid paralysis in Pakistan and South Asia across all age groups(9, 10). Several studies have reported AMAN and AMSAN as common electrophysiologic subtypes (11, 12).

Autonomic dysfunction (dysautonomia) is a frequent and clinically pivotal component of GBS(13). Manifestations span cardiovascular, sudomotor, gastrointestinal, and genitourinary systems or bradyarrhythmias, labile blood pressure, anhidrosis/diaphoresis, paralytic ileus, and urinary retention, sometimes preceding or overshadowing motor weakness(4, 14). Dysautonomia correlates with longer hospitalization, need for intensive care, and increased risk of arrhythmia-related morbidity and mortality, demanding vigilant monitoring and proactive management in acute units(15).

While international data consistently highlight the burden of dysautonomia in GBS, estimates of its frequency

vary by setting and methodology. For example, a hospital-based cross-sectional study reported autonomic dysfunction in ~42% of GBS patients, with gastrointestinal dysautonomia (constipation/diarrhea) and cardiovascular lability among the most common findings. More recent analyses continue to report rates near one-half to two-thirds, with cardiovascular manifestations predominating. However, there is a paucity of granular, center-specific data from major tertiary hospitals in Khyber Pakhtunkhwa, Pakistan, particularly regarding the spectrum and frequency of dysautonomic complications in GBS.

Given the potential for sudden hemodynamic instability, arrhythmias, and gastrointestinal or urinary complications to worsen outcomes in GBS, local evidence on dysautonomia frequency is essential to inform monitoring protocols, staff training, and resource allocation (e.g., telemetry availability, autonomic-focused nursing checklists). Generating LRH-specific estimates will support context-appropriate clinical pathways and benchmarking against regional and global data. Therefore, this study aimed to determine the frequency of dysautonomia among patients presenting with Guillain–Barré syndrome at Lady Reading Hospital, Peshawar.

METHODOLOGY

This cross-sectional study was conducted in the Department of Neurology, Lady Reading Hospital (LRH), Medical Teaching Institute (MTI), Peshawar. The study duration was six months from 1st April, 2024 to 30th September, 2024, following approval of the synopsis by the Institutional Review Board (IRB) of Lady Reading Hospital (Approval No: 49/LRH/MTI Dated: 28th February 2024).

The sample size was calculated using the WHO sample size calculator, based on an anticipated population proportion of 38% for dysautonomia in Guillain–Barré syndrome (GBS), a 95% confidence level, and a 9% margin of error. The estimated sample size was 112 patients.

The method of non-probability consecutive sampling was used. Patients with a confirmed diagnosis of Guillain-Barré syndrome, regardless of gender, between the ages of 18 and 70, were included in the study. Patients with a history of hereditary demyelinating polyneuropathy, such as Charcot-Marie-Tooth disease, or focal neurological deficits resulting from stroke, multiple sclerosis, transverse myelitis, brain tumors, or trauma, as well as those with hypokalemic periodic paralysis or other electrolyte disturbances, as well as pregnant women, were not allowed to participate.

Data were gathered from patients who presented to the Neurology Unit and Emergency Department with symptoms suggestive of Guillain-Barré syndrome (GBS) after receiving ethical approval. Informed consent was acquired before patients who met the inclusion criteria were invited to take part. Clinically, GBS was diagnosed based on the absence of deep tendon reflexes and at least two of the following characteristics: electromyography/nerve conduction velocity (EMG/NCV) studies; cerebrospinal fluid (CSF) analysis; and motor weakness with a monophasic course and a time between onset and nadir ranging from 12 hours to 28 days, as measured by the Medical Research Council (MRC) scale. The MRC scale was used to grade muscle power, with Grade 5 representing normal strength, Grade 4 active movement against resistance, Grade 3 active movement against gravity without resistance, Grade 2 active movement in the horizontal plane without resistance, Grade 1 flicker or contraction, and Grade 0 no movement all being represented.

Dysautonomia was assessed in all patients through clinical examination and monitoring during admission. It was considered present when at least two of the following features were observed: fluctuating blood pressure with >20% variation in lying and standing positions recorded at hourly intervals; fluctuating heart rate with >10% variation noted at least twice in 24 hours; urinary retention, defined as absence of urine passage for more than 12 hours with a full bladder confirmed on ultrasound despite oral intake of at least 1500 ml; or gastrointestinal autonomic dysfunction in the form of diarrhea (≥3 episodes in 24 hours) or constipation (<2 episodes in 48 hours).

For each participant, demographic data including age, gender, residence, and address were recorded. Clinical history comprised duration of GBS, comorbidities such as diabetes, hypertension, or coronary artery disease, and preceding infections such as upper respiratory tract infections or diarrhea. Detailed neurological examination findings, presence or absence of dysautonomia, and severity of muscle weakness were documented. Investigator details were noted with each case, and to maintain data quality, routine checks and validations were carried out. Data were entered into an electronic database with strict measures to preserve confidentiality.

Data were analyzed in SPSS version 25. Continuous variables (age, duration of illness, MRC score) were summarized as mean ± standard deviation. Categorical variables (gender, residence, GBS variant, preceding infection, individual dysautonomia manifestations, overall dysautonomia, and comorbidity categories) were presented as counts and percentages. For bivariate analyses, dysautonomia (present/absent) was the primary outcome. A priori stratifications were applied as follows: age (≤40 vs >40 years), sex (male/female), residence (urban/rural), duration of illness (≤7 vs >7 days), GBS variant (AIDP, AMAN, AMSAN, others), preceding infection (present vs absent), comorbidity (present vs absent), and MRC score at admission (≤3 vs >3). Associations between dysautonomia and categorical predictors were evaluated using Pearson's Chi-square test and p-values <0.05 were considered statistically significant.

RESULTS

A total of 112 patients with Guillain-Barré Syndrome (GBS) were included in this study. The mean age of the cohort was 40.6 ± 17.2 years, with 62 (55.4%) males and 50 (44.6%) females. More than half of the patients (57.1%) were from urban areas, while 42.9% were from rural backgrounds. The mean duration of illness before presentation was 9.2 ± 5.7 days. Acute inflammatory demyelinating polyneuropathy (AIDP) was the most frequent variant, accounting for 48.2% of cases, followed by acute motor axonal neuropathy (AMAN) in 29.5%,

acute motor-sensory axonal neuropathy (AMSAN) in 14.3%, and other rare variants in 8.0%. A preceding infection was reported in 47 (42.0%) patients, most commonly upper respiratory tract infection (26.8%) and diarrhea (15.2%). Regarding comorbidities, hypertension (14.3%) and diabetes mellitus (11.6%) were the most prevalent, although 65.2% of patients had no significant comorbidity. (Table 1)

Table 1

Baseline Characteristics of Patients with GBS (n = 112)

Variable	Categories	n (%) / Mean ± SD
Age (years)		40.12 ± 17.53
Gender	Male	71 (63.4%)
	Female	41 (36.6%)
Address (Residence)	Urban	63 (56.3%)
	Rural	49 (43.8%)
GBS Duration (days)		9.21 ± 4.32
Variant of GBS	AIDP	67 (59.8%)
	AMAN	28 (25.0%)
	AMSAN	11 (9.8%)
	Others	6 (5.4%)
Preceding Infection	None	46 (41.1%)
	Upper Respiratory Tract Infection	39 (34.8%)
	Diarrhea	27 (24.1%)
Comorbidities	Diabetes Mellitus	18 (16.1%)
	Hypertension	21 (18.8%)
	Coronary Artery Disease	9 (8.0%)
	None	64 (57.1%)
MRC Score at Admission		36.48 ± 12.21
Dysautonomia	Present	43 (38.4%)
	Absent	69 (61.6%)

GBS: Guillain-Barré Syndrome

Dysautonomia was present in 43 patients, giving a prevalence of 38.4%. The most frequent manifestations were blood pressure fluctuations (22.3%) and heart rate variability (14.3%), followed by urinary symptoms (4.5%) and gastrointestinal disturbances (3.6%). None of the patients exhibited multiple dysautonomic features simultaneously. (Table 2)

Table 2

Frequency of Dysautonomia Manifestations among GBS Patients (n = 112)

Dysautonomia Manifestations	n (%)
Blood Pressure Fluctuations	21 (18.8%)
Heart Rate Variability	11 (9.8%)
Urinary Retention/Incontinence	7 (6.2%)
Gastrointestinal Disturbance	4 (3.6%)
Multiple Dysautonomic Features	0 (0%)
None	69 (61.6%)

GBS: Guillain-Barré Syndrome

On stratified analysis, there was no statistically significant association between dysautonomia and patient age (p = 0.64), gender (p = 0.73), or residence (p = 0.48). Similarly, comorbidity status (p = 0.55) and duration of illness (p = 0.62) did not significantly influence dysautonomia. Dysautonomia occurred more frequently in the AMAN subgroup (51.5%) compared to AIDP (39.3%), but this difference was not statistically significant (p = 0.21). A higher proportion of patients with preceding infections developed dysautonomia (53.2%) than those without (38.5%), though the difference was borderline and did not reach significance (p = 0.08). Muscle weakness severity at admission, measured by the Medical Research Council (MRC) score, also showed no significant association. Dysautonomia was seen in 32.6% of patients with MRC ≤ 3 compared to 47.7% with MRC > 3 (p = 0.19). (Table 3)

Table 3

Association of Dysautonomia with Patient Characteristics (n=112)

Variable	Dysautonomia		p-value
	Absent	Present	
Age			0.773
≤40 (n=84)	45 (40.2%)	39 (34.8%)	
>40 (n=28)	17 (15.2%)	11 (9.8%)	
Gender			0.869
Male (n=64)	35 (31.3%)	29 (25.9%)	
Female (n=48)	27 (24.1%)	21 (18.7%)	
Residence			0.573
Urban (n=55)	28 (25.0%)	27 (24.1%)	
Rural (n=57)	34 (30.4%)	23 (20.5%)	
GBS Duration			0.501
≤7 days (n=21)	8 (7.1%)	13 (11.6%)	
>7 days (n=91)	54 (48.2%)	37 (33.0%)	
Variant of GBS			0.103
AIDP (n=65)	42 (37.5%)	23 (20.5%)	
AMAN (n=33)	14 (12.5%)	19 (17.0%)	
AMSAN (n=13)	6 (5.4%)	7 (6.3%)	
Others (n=1)	0 (0.0%)	1 (0.9%)	
Preceding Infection			0.072
Present (n=56)	26 (23.2%)	30 (26.8%)	
Absent (n=56)	36 (32.1%)	20 (17.9%)	
Comorbidities			0.380
Present (n=35)	17 (15.2%)	18 (16.1%)	
Absent (n=77)	45 (40.2%)	32 (28.6%)	
MRC Score at Admission			0.658
≤3 (n=60)	37 (33.0%)	23 (20.5%)	
>3 (n=52)	25 (22.3%)	27 (24.1%)	

AIDP: Acute Inflammatory Demyelinating Polyneuropathy;
AMAN: Acute Motor Axonal Neuropathy;
AMSAN: Acute Motor and Sensory Axonal Neuropathy;
MRC: Medical Research Council Scale;
GBS: Guillain-Barré Syndrome

DISCUSSION

In this cross-sectional study, dysautonomia was found in slightly more than one-third of Guillain-Barré syndrome (GBS) patients from a tertiary facility in Peshawar. Urinary retention/incontinence and gastrointestinal disruption were less common symptoms, while blood pressure lability and heart rate variability were the most common. Although the absolute frequency varies widely across studies, our overall prevalence aligns with other studies, which generally showed autonomic involvement in a substantial subset of GBS patients (16, 17). Recent study underscore that autonomic dysfunction is both common and prognostically meaningful in GBS linked to hemodynamic instability, arrhythmias, and an elevated risk of intensive care needs while emphasizing considerable heterogeneity in reported rates due to differences in case mix, ascertainment, and definitions across studies(18).

In the present study, dysautonomia frequency (38.4%) sits squarely within contemporary estimates for GBS. A Neurocritical Care cohort reported autonomic dysfunction in ~38% of hospitalized adults, closely mirroring our figure and reinforcing that about one-third to two-fifths of GBS patients experience clinically meaningful dysautonomia(19). By contrast, several recent series show wider variability: an Ethiopian multicenter cohort (2024) documented autonomic features in 28.3%,

suggesting lower rates in some low-resource contexts, potentially reflecting under-recognition or earlier referral thresholds(20). Nature Conversely, an Indian observational study (2023) found dysautonomia in 65% of adults, highlighting how active bedside screening can yield higher yields than chart-based ascertainment. In line with classic descriptions, our most frequent manifestation was blood-pressure lability, followed by heart-rate variability and urinary retention; comparable patterns—cardiovascular instability and sphincter dysfunction dominating the autonomic spectrum—are emphasized across recent reviews and guidance.

The present study found no significant associations between dysautonomia and age, sex, residence, illness duration, GBS variant, comorbidity burden, or admission MRC score. While some cohorts link autonomic dysfunction to greater acute severity and respiratory failure risk, especially when co-occurring with bulbar involvement, our data did not show statistically robust effect modification. For example, a 2023 autonomic-neuroscience analysis associated dysautonomia with worse short-term outcomes and ventilatory support, and a 2024 multicenter study identified early clinical predictors of mechanical ventilation—contexts where dysautonomia often co-travels with severe disease, yet such signals were not statistically demonstrable in our sample (13).

Comparing specific features, dominance of cardiovascular instability followed by urinary and gastrointestinal dysfunction in the present study mirrors the clinical spectrum emphasized in recent syntheses, where sympathetic and parasympathetic imbalance typically presents as labile blood pressure, tachy–brady fluctuations, and sphincteric dysfunction. The Bangladesh cohort (2024) reported very high overall autonomic involvement alongside respiratory failure and cranial neuropathy; notably, autonomic signs were not independently associated with disability at follow-up in that analysis, highlighting that autonomic features may be frequent yet variably predictive of short-term outcomes depending on care pathways and monitoring(21). Our lower prevalence compared with such cohorts likely reflects stricter operational thresholds, single-center sampling, and potential under-ascertainment of intermittent phenomena (e.g., transient BP/HR swings outside observation windows).

With respect to phenotypes, our data did not show a statistically significant association between dysautonomia and GBS variant, although numerically higher proportions were observed in AMAN relative to AIDP. Contemporary reviews suggest autonomic dysfunction can occur across variants, with some series noting greater frequency in axonal subtypes and in more rapidly progressive disease, but consistency is lacking, again owing to methodological differences and small variant-specific sample sizes. Likewise, we did not find significant associations with age, sex, residence, or comorbidity burden; this is broadly compatible with recent studies in which autonomic involvement tracked more with overall severity and need for advanced support than with basic demographics or isolated comorbidities (22, 23).

Importantly, our stratified analysis showed no significant relationship between dysautonomia and baseline muscle weakness category by MRC score, despite a numerical shift toward higher MRC impairment among dysautonomia-positive patients. Prior work has also been mixed on this point, some cohorts link autonomic signs to more severe neuromuscular impairment and ventilatory support, while others (including the Bangladesh series) do not find independent associations after adjustment(24, 25). These discrepancies likely reflect differences in timing of assessments (on-admission vs nadir), thresholds for defining autonomic instability (continuous monitoring vs intermittent vitals), and treatment effects.

From a systems perspective, our findings reinforce two practical messages echoed by recent literature. First, autonomic surveillance should be routine in all hospitalized GBS patients, ideally with continuous cardiac and BP monitoring during the progressive and early plateau phases, given that clinically relevant dysautonomia can be missed by spot checks and may develop after admission. Second, standardized definitions and measurement schedules are essential for comparability across centers; recent reviews call for harmonized autonomic outcome sets in GBS research, which would help reconcile prevalence differences and clarify prognostic value.

The study's conclusions shed important light on the relationship between dysautonomia and other patient traits in people with Guillain-Barré syndrome (GBS). Early detection of dysautonomia is essential since it has a substantial impact on morbidity and death. Our results highlight that dysautonomia occurs across different GBS variants and is not limited to specific age groups, gender, or comorbidity status, suggesting the need for routine screening in all patients regardless of baseline characteristics. Recognizing and managing autonomic dysfunction promptly could aid in preventing life-threatening complications such as arrhythmias, blood pressure fluctuations, and sudden cardiac events, thereby improving overall patient outcomes. These findings underscore the importance of integrating autonomic monitoring into standard care protocols for GBS patients.

This study has some limitations, even with a well-defined sample size. First of all, it was only carried out in one location, which might have limited how broadly the results can be applied. Second, the study may have underreported or incorrectly classified autonomic dysfunction because it depended on clinical observations and publicly available medical information. Furthermore, other confounders that might have affected the observed relationships were not thoroughly investigated, including medication history, variations in treatment regimens, and socioeconomic characteristics. It is advised that these findings be confirmed and built upon in future multicenter research with bigger sample sizes and more thorough data collecting.

CONCLUSION

A considerable percentage of GBS patients experienced dysautonomia, which did not significantly correlate with age, gender, place of residence, or comorbidity status. The existence of autonomic dysfunction across different subgroups emphasizes its clinical value in illness management, even though not all findings achieved

statistical significance. These findings highlight the necessity of closely monitoring autonomic indicators in GBS patients in order to avoid negative consequences. To further understand the determinants of dysautonomia and direct evidence-based therapies, larger prospective trials are necessary.

List of Abbreviations
GBS: Guillain-Barré Syndrome
AIDP: Acute Inflammatory Demyelinating Polyneuropathy
AMAN: Acute Motor Axonal Neuropathy
AMSAN: Acute Motor and Sensory Axonal Neuropathy
MRC: Medical Research Council Scale

ACKNOWLEDGMENT: None
FUNDING: None
CONFLICT OF INTEREST: None
ETHICAL APPROVAL: Approval No: 49/LRH/MTI Dated: 28th February 2024.

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