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CLINICAL SPECTRUM OF GUILLAIN BARRE SYNDROME AT TERTIARY CARE HOSPITAL

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Abstract

BACKGROUND: *Guillain-Barre Syndrome (GBS) is a prevalent cause of acute immune-mediated polyradiculoneuropathy and ranks among the main triggers of acute flaccid paralysis seen in emergency rooms.*

OBJECTIVE: *To determine the frequency of various clinical features in patients with Guillain-Barre syndrome (GBS) presented at tertiary care hospital Hyderabad.*

Study design: *Cross sectional descriptive study*

Duration of study: *23rd-Nov-2024 to 22nd-Jan-2025*

Setting: *Department of Neurology & Medicine, Liaquat University Hospital, Hyderabad*

Sample Size: *Total 89 patients with GBS were taken*

Sample technique: *Non probability consecutive sampling.*

SUBJECT AND METHODS: *The cases of GBS, of 18-70 years of age and either gender were recruited and explored for clinic-demographical profile and spectrum of the disease. The data was collected on predesigned proforma while frequency (percentage) and mean ± SD was calculated for qualitative and quantitative variables.*

RESULTS: *Total 89 individuals with GBS were studied with mean age ± SD was 46.56 ± 8.76 with male predominance 58 (65.2%) and belonged to rural population 46 (51.7%). The proportion for smoking, hypertension, diabetes and obesity were 40 (44.9%), 58 (65.1%), 60 (67.4%) and 62 (69.6%). The antecedent event was present in 50 (56.2%) while the weakness (23.6%), imbalance (19.1%) and respiratory distress (14.6%). The common variants observed were AIDP (46.1%) and AMAN (40.4%) while regarding severity and outcomes the early progression was seen among 58.4% individuals while improvement, deterioration and mortality was observed among 87.6%, 9.0% and 3.4% patients respectively. In relation to gender, the antecedent event, clinical features, variants of GBS, progression and outcomes were found to be statistically non-significant.*

CONCLUSION: *AIDP was the predominant variation exhibiting favourable clinical outcomes.*

INTRODUCTION: Guillain-Barré Syndrome (GBS) is an immune-mediated polyradiculoneuropathy resulting from acute demyelination or axonal injury in the spinal roots and peripheral nerves. Population-specific research indicates that the global incidence of GBS ranges from 0.6 to 4 per 100,000 individuals.[1] It is marked by prevalent sensory, motor, and autonomic complaints, often accompanied with rapidly advancing symmetrical weakening of the limbs and a reduction in deep tendon reflexes.[2]

GBS is considered an autoimmune disorder characterised by the generation of antibodies targeting antigenic molecules of peripheral nerves, leading to T cell activation. Antibody production may be induced by infectious pathogens such as Epstein-Barr virus, Cytomegalovirus, Mycoplasma pneumoniae, and Campylobacter jejuni, as well as by immunisations or surgical procedures.[3] On average, forty to seventy of GBS patients manifest the condition roughly three weeks after severe gastroenteritis or pulmonary infection.[4] The particular type and intensity of the syndrome are somewhat influenced by the characteristics of the prior infection and the specificity of the antibodies involved.[5]

Multiple clinical subgroups of the illness have been identified. GBS has undergone reclassification in recent decades based on clinical and electrophysiological characteristics. The wide range includes axonal variations, such as acute motor and sensory axonal neuropathy (AMSAN), acute inflammatory demyelinating polyneuropathy (AIDP) and acute motor axonal neuropathy (AMAN), along with many atypical forms.[6]

An electrophysiological manifestation of the disorder is axonal loss with diminished complex muscular action potentials, acute motor conduction block with or without later reversible conduction failure, or the lack of F-waves in isolation. Even in the same patient, several nerves could exhibit a mix of these characteristics.[6,7] Although immunoglobulin injections and plasma exchange are well-established helpful therapies, the evidence of their efficacy is mostly based on motor improvement in people with normal and severe types of GBS.[8]

Recent research has produced compelling statistics that are pertinent to the results of Guillain-Barré Syndrome. These statistics may assist in contextualizing our research at the tertiary care level. As an illustration, a meta-analysis revealed that respiratory distress or autonomic dysfunction necessitate intensive care for about 20 percent of GBS patients during their illness.[9] Additionally long-term follow-up data suggests that 60-80% of GBS patients achieve a near-full recovery, while approximately 5-10% are permanently disabled and 3-7% succumb to consequences associated with the syndrome.[10] This study endeavors to address the necessity for improved diagnostic and treatment approaches by examining clinical characteristics in a geographically specific patient population, as highlighted by these statistics.

In light of the specific demographic and healthcare issues that this area faces, the researchers set out to quantify the prevalence of certain clinical symptoms in Guillain-Barré Syndrome patients who sought treatment at a tertiary care hospital in Hyderabad. There may be some variation in the onset and development of GBS among individuals because to differences in genetic composition and environmental factors, such as patterns of infectious. The development of efficient, region-specific treatment regimens is further impeded by the absence of localized data on the clinical manifestations of GBS in Sindh. The research sought to enhance neurological treatment in the area by filling a key knowledge vacuum by analyzing the features of GBS in this local environment. In line with national health goals to improve medical treatment in Pakistan, this study is crucial for developing methods to improve patient outcomes and decrease the occurrence of long-term disability caused by GBS.

PATIENTS AND METHODS: The cross-sectional research (23rd-Nov-2024 to 22nd-Jan-2025) was conducted in the Department of Neurology and Medicine at Liaquat University of Medical and Health Sciences, Hyderabad. The criteria for inclusion encompassed patients who are between the ages of 18 and 70 of either gender who provided explicit permission to take part in the study. The criteria for exclusion comprised patients exhibiting chronic weakness (defined as progressive weakness lasting over 8 weeks), cerebrospinal fluid (CSF)

anomalies (indicated by a CSF cell count of ≥50 cells/µl, suggesting potential alternative diagnoses), post-surgical Guillain-Barré syndrome (GBS) cases (patients whose symptoms commenced following bariatric surgery due to specific pathophysiological factors), and individuals whose symptoms could be entirely attributed to diagnoses other than GBS. The sample size was 89, derived from the research by Alanazy MH et al., using a sensory symptom prevalence of 64.1% with a 10% margin of error, employing a non-probability sequential sampling approach. Following the acquisition of ethical permission from the review board of the institution and participant agreement, suitable patients coming to the tertiary care hospital were evaluated for inclusion. Patients suspected of or exhibiting Guillain-Barre Syndrome, as determined by preliminary clinical evaluations emphasizing clinical manifestations such as progressive symmetric motor weakness, diminished or absent deep tendon reflexes, sensory disturbances (numbness, tingling), cranial nerve involvement (facial weakness and ophthalmoplegia), respiratory weakness (evaluated through vital capacity and forced vital capacity measurements), neuropathic pain, and loss of ambulation, were incorporated into the study. Data was gathered by a systematic questionnaire, intended to get complete bio-data, socio-demographic information, and extensive clinical results. The lead researcher, supervised by a consultant neurologist with substantial competence in neurology, conducted all physical exams and data recording. Anonymity and confidentiality were preserved using dataset coding, and all electronic records were safeguarded with password security.

Guillain-Barre Syndrome (GBS): Encompasses bilateral and somewhat symmetric limb weakness, diminished or absent deep tendon reflexes in affected limbs, a monophasic illness trajectory, and duration from commencement to weakness ranging from 12 hours to 28 days.

Clinical Features of GBS: Refers to the sensory symptoms, motor weakness, autonomic dysfunction, and cranial nerve involvement. Each feature was assessed through patient history, physical examinations, and necessary electrophysiological tests as outlined:

Respiratory Weakness: significant reduction in respiratory muscle strength leading to breathing difficulties and potentially requiring respiratory support.

Neuropathic Pain: Describes pain caused by nerve damage within the peripheral nervous system is characterized by a shooting, burning, or stabbing sensation, often worsening at night.

The mRS (modified Ranking Scale 0-6) were used to assess the functional outcome.

The diagnosis of Guillain-Barré Syndrome (GBS) was confirmed through a combination of detailed clinical assessment and supportive findings from cerebrospinal fluid (CSF) analysis and nerve conduction studies (NCS).

The data was analyzed using the statistical program SPSS version 21.0. The first data investigation used descriptive statistics to summarize demographic and clinical factors. Quantitative data were reported as means and standard deviations (SD), whilst qualitative variables were presented as frequencies and proportions. On categorical variables, the post-stratification chi-square test with a 95% confidence interval was used, and p-values less than 0.05 were deemed statistically significant.

RESULTS: During a study period period, a total of 89 people with Guillain-Barré Syndrome, aged 18 to 70 years and of either gender, presented at Liaquat University Hospital in Hyderabad. The demographic and clinical features of the study group are shown in Table 01, whereas the mean ± SD for quantitative variables is provided in Table 02. The table 03 presents the gender distribution with statistical data related to antecedent illnesses, clinical characteristics, variations of GBS on NCS, progression, and outcomes.

TABLE 1: THE DEMOGRAPHICAL AND CLINICAL PARAMETERS OF STUDY POPULATION

PARAMETER	FREQUENCY (n=89)	PERCENTAGE (%)
AGE (yrs)		
18-29	17	19.1
30-39	16	18.0
40-49	21	23.6
50-59	19	21.3
60-70	16	18.0
GENDER		
Male	58	65.2
Female	31	34.8
DURATION OF ILLNESS (days)		
4-6	45	50.5
7-9	24	26.9
≥10	20	22.4
RESIDENCE		
Urban	43	48.3
Rural	46	51.7
SMOKING		
Yes	40	44.9
No	28	31.4
Ex-smoker	21	23.5
HYPERTENSION		
Yes	58	65.1
No	31	34.8
DIABETES MELLITUS		
Yes	60	67.4
No	29	32.5
OBESITY		
Yes	62	69.6
No	27	30.3
ANTECEDENT EVENT		
Present	50	56.2
Absent	39	43.8
CLINICAL FEATURES		

Weakness (arms/legs)	21	23.6
Imbalance	17	19.1
Numbness (sensory symptoms)	09	10.1
Diplopia	08	9.0
Facial weakness (7th cranial nerve)	09	10.1
Neuropathic pain	07	7.9
Respiratory distress	13	14.6
Autonomic dysfunction	05	5.6
VARIANTS OF GBS ON NCS		
Acute inflammatory demyelinating polyradiculoneuropathy (AIDP)	41	46.1
Acute motor axonal neuropathy (AMAN)	36	40.4
Acute motor-sensory axonal neuropathy (AMSAN)	12	13.5
PROGRESSION (days)		
≤7	52	58.4
>7	37	41.6
OUTCOMES		
Improved	78	87.6
Deteriorate / Static	08	9.0
Death	03	3.4

TABLE 2: THE MEAN ±SD FOR QUANTITATIVE VARIABLES OF THE STUDY POPULATION

Quantitative variables	Mean ± SD
Age (yrs)	46.56 ± 8.76
Duration of Illness (days)	7.64 ± 2.92
CSF protein (mg/dl)	125.75 ± 20.96
Hemoglobin (g/dl)	11.52 ± 1.95
Hospital stay (days)	24.85 ± 6.63
Forced vital capacity at admission (liter)	3.11 ± 0.92
Body mass index (kg/m^2)	31.12 ± 5.75
Hemoglobin A1c (%)	8.21 ± 1.96

TABLE 3: THE GENDER DISTRIBUTION ACCORDING TO VARIABLES OF THE STUDY POPULATION

PARAMETER	FREQUENCY (n=89)		TOTAL (%)	P-VALUE
ANTECEDENT EVENT	GENDER			
	MALE	FEMALE		
Present	32 (55.2%)	18 (58.1%)	50 (56.2%)	0.79*
Absent	26 (44.8%)	13 (41.9%)	39 (43.8%)	
CLINICAL FEATURES				
Weakness (arms/legs)	13 (22.4%)	08 (25.8%)	21 (23.6%)	

Imbalance	11 (19.0%)	06 (19.4%)	17 (19.1%)	0.86*
Numbness (sensory symptoms)	05 (8.6%)	04 (12.9%)	09 (10.1%)	
Diplopia	04 (6.9%)	04 (12.9%)	08 9.0%)	
Facial weakness (7th cranial nerve)	06 (10.3%)	03 (9.7%)	09 (10.1%)	
Neuropathic pain	06 (10.3%)	01(3.2%)	07 (7.9%)	
Respiratory distress	09 (15.5%)	04 (12.9%)	13 (14.6%)	
Autonomic dysfunction	04 (6.9%)	01 (3.2%)	05 (5.6%)	
VARIANTS OF GBS ON NCS				
Acute inflammatory demyelinating polyradiculoneuropathy (AIDP)	24 (41.4%)	17 (54.8%)	41 (46.1%)	0.45*
Acute motor axonal neuropathy (AMAN)	25 (43.1%)	11 (35.5%)	36 (40.4%)	
Acute motor-sensory axonal neuropathy (AMSAN)	09 (15.5%)	03 (9.7%)	12 (13.5%)	
PROGRESSION (days)				
≤7	35 (60.3%)	17 (54.8%)	52 (58.4%)	0.61*
>7	23 (39.7%)	14 (45.2%)	37 (41.6%)	
OUTCOMES				
Improved	50 (86.2%)	28 (90.3%)	78 (87.6%)	0.20*
Deterioate / Static	07 (12.1%)	01 (3.2%)	08 (9.0%)	
Death	01 (1.7%)	02 (6.5%)	03 (3.4%)	

*p-value statistically non-significant

DISCUSSION: Guillain-Barré syndrome (GBS) is an autoimmune condition that affects the peripheral nerve system, resulting in muscular weakness and, in rare cases, paralysis. It is recognised to impact individuals of all ages; however the average age of onset is often about 40 years. The mean age of GBS patients in this study was 46.56 ± 8.76 years, aligning with other research findings.[11]

The current investigation revealed a male predominance, with 58 individuals (65.2%), aligning with some prior studies that indicated a greater frequency of GBS in men,[12] while others found no significant gender disparity.[13] It is important to acknowledge that the number of participants in this study is comparatively limited, and more research with bigger numbers of participants may be necessary to validate this gender distribution.

A previous research assessed 187 individuals with Guillain-Barré syndrome (GBS) and revealed a male-to-female ratio of 1.3:1, with a mean age of onset of 51 years,[14] which is greater than that seen in the present study. The incidence, male-to-female ratio, and mean age of GBS onset might vary based on the investigated population and regional differences.

Limb fragility was the predominant characteristic observed in patients of this study (23.6%), consistent with other studies,[15,16]subsequently followed by imbalance (19.1%) and respiratory distress (14.6%), with 6 individuals necessitating invasive mechanical ventilation. Willison HJ et al. characterized respiratory distress as the most severe, generalized manifestation of GBS, occurring in 20%-30% of cases.[17]This research demonstrated autonomic nervous system (ANS) impairment in 5 (5.6%) of patients, consistent with the frequency reported by others.[18, 19] It presented as blood pressure instability, sinus tachycardia, and abnormalities in pupillary response or sweating.

Sensory impairment was seen in 09 cases (10.1%) in this investigation, yielding findings consistent with those of Meganathan A, et al.[20] However, the study by Areeyapinan P, et al revealed a greater prevalence

of sensory dysfunction than that found in the present series.[21]

The research further investigated the various variations of GBS within the patient cohort. Acute inflammatory demyelinating polyradiculoneuropathy was the predominant type, with 41 cases (46.1%), followed by acute motor axonal neuropathy with 36 cases (40.4%) and acute motor sensory axonal neuropathy with 12 cases (13.5%). This distribution aligns with other research, which have shown AIDP as the predominant variation in many locations.[22]

Consistent with earlier studies showing that pathogens are a prevalent cause for GBS, and GI illnesses continue to rank highest among the preceding events, this study determined that infections of the gut were the most common.[23]

Additionally, the research discovered that various GBS types manifest symptoms differently. Walking difficulties and symmetrical ascending weakness were more common in individuals with AMAN, but respiratory discomfort and fever were more common in patients with AIDP. Tingling and numbness were more common in AMSAN patients.

Previous study has also shown that various GBS variants might present with varied symptoms, therefore our results are in line with that. [24, 25]Additionally, GBS varies with the seasons; our research showed that 60% of the cases, mostly the AIDP variety, clustered in the fall and winter. The seasonal increase in viral and respiratory tract infections is probably to blame for this. This new information lines up with what was previously published.[26] Since patients sought opinions in various tertiary care facilities, the seasonal variance remain parallel to lifestyle, eating habits, and hygiene conditions.

The mortality rate among study participants was three (3.4%), which is comparatively lower than that reported in similar studies conducted in Asian and American populations.[27,28] The most frequently observed variant of GBS in this study was AIDP, affecting 41 participants (46.1%), which aligns with the findings of Parveen A et al., who reported AIDP as the most common variant with a frequency of 13 (43.3%).[29] Additionally, the association between mortality and GBS variants is consistent with findings from Bayu HT et al.[30]

The functional outcome and mortality were influenced by the GBS variant. The mortality rate in this study is comparable to findings by Bhagat SK et al.[31] Similarly, research by Akbayram S et al.[32] demonstrated increased morbidity and mortality among individuals with an axonal variant, a trend also observed in this study.

A positive correlation was found between mortality and the rapid progression of the disease within seven days. Previous studies have reported similar findings, indicating a higher mortality rate.[33] Rapid disease progression within seven days is recognized as an independent risk factor for worse GBS outcomes.[34]

The mean length of hospital stay was 24.85 ± 6.63 days, with the longest stay being 35 days in a patient with AMAN. A prolonged hospital stay of more than 10 days was observed in 25 (28%) patients, primarily due to severe disability and respiratory distress.

The statistical association between various clinical characteristics and GBS variants was also analyzed, though no variable demonstrated a significant p-value. A study conducted in India that examined the clinical profiles of GBS reported similar findings.[35] The p-values obtained in that study were insignificant, and researchers assessed GBS variations, cranial, autonomic, and sensory nerve involvement, as well as muscular discomfort. Additionally, respiratory complications and consequently, the necessity for mechanical ventilation appear to be predicted by several factors, including progressive muscle weakness, an ineffective cough, bulbar involvement, and a rapid decline in vital capacity.

Studies have demonstrated that both plasma exchange and intravenous immunoglobulin (IVIG) are effective treatments for GBS; however, IVIG is preferred due to its ease of administration.[36] Nevertheless, the most critical aspect of management remains the provision of continuous supportive care.[37]To further assess the functional outcomes, complications, and treatment options for GBS, large-scale multicenter prospective studies with extensive patient participation are necessary.

CONCLUSION: Acute inflammatory demyelinating polyneuropathy was the most prevalent variant of Guillain-Barré syndrome, with a higher occurrence in males. Disease progression within less than seven

days is a risk factor for mortality, while respiratory muscle paralysis increases the likelihood of requiring mechanical ventilation, regardless of the GBS variant. Therefore, patients presenting with these conditions should be closely monitored and referred for early intervention.

LIMITATION OF THE STUDY: This is a single-center, cross-sectional descriptive research with a small sample size, including in-hospital (short-term) follow-up, and restricted to the length of the hospital stay. Multi-center studies with higher sample sizes and prospective designs are necessary, since follow-up after discharge may provide a more comprehensive understanding of the consequences of different forms of GBS.

AUTHOR'S CONTRIBUTION:

Collection and acquisition of data & grammatical corrections	Dr. Mahwish Mehmood
Concept & design of study & proof read	Dr. Samahir Akram Nizamani
Drafting the article and finalizing the manuscript	Dr. Rabail Baloch
Revising critically and make it suitable for final format	Dr. Fatima Shahzad
Acquisition of data and grammatical review	Dr. Muhammad Kaleem
Analysis of data and drafting	Dr. Syed Zulfiquar Ali Shah
Final Approval of version	By All Authors

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