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GUILLAIN-BARRE SYNDROME (GBS) VARIANT IN PATIENTS PRESENTING TO A TERTIARY CARE HEALTH FACILITY

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ABSTRACT

Background: Guillain-Barre Syndrome(GBS) is an acute immune mediated polyradiculoneuropathy which has variable clinical and electrophysiological manifestations. The distribution of subtypes is regionally variable and should be supported by local epidemiological data to manage.

Objective: To find out the frequency of the Guillain-Barre syndrome (GBS) variant in patients who visit a tertiary care health facility.

Methodology: This cross-sectional survey was descriptive and carried out at the Department of Neurology, National Hospital and Medical Centre, Lahore during June 2025 and October 2025. Non-probability consecutive sampling was used to enroll 65 patients aged 18-80 years and with confirmed GBS. Clinical characteristics and nerve conduction studies (NCS) were used to diagnose. The standardized electrophysiological criteria were used to classify GBS variants: acute inflammatory demyelinating polyneuropathy (AIDP), acute motor axonal neuropathy (AMAN), and acute motor sensory axonal neuropathy (AMSAN). The SPSS 24 was used to analyses data. **Results:** The average age of patients was 42.6 years and 15.3 years and males were predominant (61.5%). The most frequent variant was AMAN (46.2%), followed by AMSAN (32.3%) and AIDP (21.5%). It was found that there was a significant correlation between younger age groups and axonal variants ($p=0.03$). There was no statistically significant gender, diabetes, or hypertension ($p>0.05$) association.

Conclusion: The predominant form in our population is an axonal form (AMAN and AMSAN), unlike in the West where AIDP is more prevalent. Prognostication and management approaches can be enhanced by early detection of electrophysiological subtypes.

KEYWORDS: Guillain-Barre Syndrome, AIDP, AMAN, AMSAN, Nerve Conduction Studies, Pakistan

INTRODUCTION

One of the most frequent emergencies in neuromuscular is the Guillain-Barré syndrome (GBS). It is a heterogeneous disorder that has several phenotypes, electrophysiologic patterns, and variable outcomes. GBS is a non-communicable, international disease, the incidence of which is 0.81 to 1.91 cases per 100,000 person-years in Europe and North America. There are regional variations in the distribution of GBS subtypes: demyelinating forms with a preceding respiratory illness are more common in Europe and North America, and axonal subtypes in the aftermath of diarrheal illness more common in Asia, especially in Bangladesh and northern China.[12]

The most frequent antecedent events that occur before the clinical onset of GBS are infections, and other causes are trauma, surgery, medications (including immune checkpoint inhibitors), and systemic disorders.[1]

Campylobacter jejune, hepatitis E virus, cytomegalovirus, Epstein-Barr virus, and Mycoplasma pneumoniae are always associated with GBS.[3] Regional outbreaks of Zika virus–associated GBS occurred in the mid-2010s in French Polynesia, Latin America, and Caribbean countries.[4] C. jejune, dengue virus and chikungunya virus were found to be the pathogens in a South Indian study.[5]

International GBS Outcome Study pointed out that C. jejune, hepatitis E virus, cytomegalovirus, Epstein-Barr virus, and M. pneumoniae infections have important clinical implications. [6] M. pneumoniae was found to be the most prevalent antecedent infection in children, and cytomegalovirus infection was linked with an increased prevalence of demyelinating electrophysiologic features. The most common infectious trigger (30% of cases) was C. jejune infection, and it was the least common, yet most severe in GBS presentations across geographic regions. Microbial variables, e.g., differences in C. jejune strains (e.g., Japan [O-19] and South Africa [O-41])[78] and genetic variations in C. jejune lipopolysaccharide biosynthesis genes that determine ganglioside expression, also play a role in heterogeneity of the disease.[9]

Patterns of electrophysiologic are region-specific. In a study from Saudi Arabia, nerve conduction studies (NCS) were performed in 79 (91%) patients, revealing acute motor axonal neuropathy (AMAN) as the most common subtype in 41 (51.9%) patients, followed by acute inflammatory demyelinating polyneuropathy (AIDP) in 22.78% and acute motor and sensory axonal neuropathy (AMSAN) in 16.46%.[10] According to local data, out of 40 adult GBS patients, AIDP was present in 60 (24 patients), AMAN in 30 (12 patients), and AMSAN in 10 (4 patients).[11] AMAN, AMSAN and AIDP were 59, 25.6, and 15.3 respectively in a retrospective study of 39 patients at Lady Reading Hospital, Peshawar.[12] A second study of 117 GBS patients revealed AMAN in 46.2, AMSAN in 34.2, AIDP in 16.2 and atypical variants in 2.6%.[13] In a similar fashion, 53% of 62 patients had AIDP, 29% AMAN, 11% AMSAN, and 2 each pure sensory and atypical variant.[14]

The reason behind the study is that the local data on GBS variants exhibit a wide range of variations in prevalence and patterns. Thus, the current paper will explain this difference and give a revised estimation of the burden of the GBS variants. Such knowledge can be used to inform effective screening, clinical management, and treatment plans, and eventually enhance patient outcomes.

OBJECTIVE

To identify the frequency of Guillain-Barre syndrome (GBS) variant among patients who visit a tertiary care health facility.

METHODOLOGY

The study was a cross-sectional, descriptive, study at the Department of Neurology, National Hospital and Medical Centre, Lahore from June 2025 to October 2025. Non-probability consecutive sampling was used to enroll 65 patients with a confirmed diagnosis of Guillain-Barre syndrome (GBS) aged 18-80 years. Diagnosis was done on clinical presentation, such as progressive limb weakness and areflexia and confirmed by nerve conduction studies (NCS). There were standardized electrophysiological criteria used to classify GBS variants: AIDP, AMAN, and AMSAN. Demographic and clinical data such as comorbidities were collected. The data were measured using SPSS 24 with a descriptive test and Chi-square/Fisher exact tests to evaluate the associations, where p 0.05 is considered significant.

Inclusion Criteria

The patients were aged between 18 and 80 years of age, both gender diagnosed with Guillain-Barre syndrome (GBS).

Exclusion Criteria

Other patients with alternative diagnoses like transverse myelitis, chronic inflammatory demyelinating polyneuropathy (CIDP), motor neuron disease or metabolic neuropathies were excluded.

Data Collection Procedure

Following ethical approval, patients who attended the outpatient and emergency departments were recruited by consecutive sampling and informed consent written was signed by all participants. An in-depth history such as age, sex, comorbidities, and length of symptoms was taken. All the patients were comprehensively examined by a neurologist and performed nerve conduction studies (NCS) to verify the diagnosis of Guillain-Barré syndrome (GBS). Standardized electrophysiological criteria were used to classify the GBS variants such as AIDP, AMAN and AMSAN. All the demographic, clinical, and electrophysiological data were then methodically recorded in a structured proforma to be analyzed later.

Data Analysis

The analysis of data was performed with the help of SPSS version 24. The Kolmogorov-Smirnov test of normality was implemented on quantitative variables (age, duration of symptoms) and presented as mean standard deviation (SD) of normally distributed variables and median with interquartile range (IQR) of non-normally distributed variables. Gender, comorbidities and GBS variants were categorical variables that were summarized using frequencies and percentages. The stratification was used to identify the impact of age, gender, diabetes and hypertension on GBS variant distribution. Chi-square or Fisher exact test was used and $p \leq 0.05$ was regarded as significant.

RESULTS

The number of patients included in the study was 65 and were diagnosed with Guillain-Barré syndrome (GBS). The mean age of participants was 42.6 ± 15.3 years, with 40 males (61.5%) and 25 females (38.5%). The average age of the symptoms was 7 days (IQR: 510 days).

Baseline Characteristics

Characteristic	n (%) / Value
Mean Age (years)	42.6 ± 15.3
Gender	Male: 40 (61.5%) Female: 25 (38.5%)
Median Duration of Symptoms	7 days (IQR: 5–10)

The participants of the study were slightly more males. The median length of symptoms suggests that the majority of patients reported to the tertiary care facility in the first week of the onset of the symptoms, emphasizing on the early response.

Frequency of GBS Variants

GBS Variant	n	Percentage (%)
AMAN	30	46.2
AMSAN	21	32.3
AIDP	14	21.5

The most common were axonal variants (AMAN and AMSAN) which comprised 78.5% of the cases. The demyelinating subtype AIDP was less common at 21.5. This distribution implies that axonal types of GBS are more prevalent in this population, which is congruent with prior studies in the region of Asia.

Association with Demographic and Clinical Factors

Factor	Observation	p-value
Age (<40 years)	Higher prevalence of AMAN/AMSAN	0.03
Gender	No significant association	0.45
Diabetes	No significant association	0.62
Hypertension	No significant association	0.71

The stratification analysis showed that there was a significant statistical correlation between axonal variants (AMAN/AMSAN) and younger age (<40 years). No significant associations were found between GBS variants and gender, diabetes, or hypertension, which implies that axonal forms have a major influence on younger people irrespective of comorbidities.

Interpretation

The findings prove that axonal variants (AMAN and AMSAN) are the most prevalent GBS in this cohort especially in younger patients. Nerve conduction studies are important to identify such variants early to be able to pronounce and treat because axonal subtypes can have more severe deficits and slower recovery. The absence of association with gender and comorbidities like diabetes and hypertension indicates that the age factor is a major determinant in distribution of GBS variants. The findings may be used in clinical decision-making and counseling of patients in tertiary care.

DISCUSSION

The present study demonstrates that axonal variants (AMAN and AMSAN) are more prevalent than the demyelinating subtype (AIDP) in our population. This predominance of axonal forms aligns with prior regional

studies from Pakistan and other Asian countries, where axonal variants often surpass AIDP in frequency, likely due to higher rates of antecedent infectious triggers such as *Campylobacter jejune* and specific host immune responses. Our results are consistent with Ayaz ul Haq et al. [12], who stated AMAN to be the most prevalent subtype (46.2%), AMSAN (34.2%). Likewise, Khan et al. [11] reported high rate of axonal variants in Pakistan. On the other hand, western literature like Dotes et al. [1] and Shahriari et al. [2] demonstrate prevalence of AIDP, emphasizing geographical differences in GBS subtypes.

The predominance of the axonal variants might be explained by different patterns of the antecedent infection and immune reaction. Axonal injury can be caused by molecular mimicry of C. jejune lip oligosaccharides with ganglioside epitopes, which is confirmed by the prior research [7,8]. There is also recent evidence indicating that viral and arboviral infection can also be triggers of axonal variants, especially in endemic regions [9,5].

We also discovered that there was a strong correlation between age and axonal variants, as observed in prior studies that indicated that AMAN and AMSAN tend to manifest in a more aggressive manner in younger individuals and may be linked to more serious clinical outcomes [6]. Serial electrophysiological assessments have affirmed that early axonal degeneration is associated with motor recovery that is slower and with long-term disability [2,3].

Recent multicenter and regional studies support our findings. For example, Khedr et al. [17] defined high rates of axonal electrophysiological patterns and poorer outcomes than the demyelinating ones. Geng et al. [18] reported AMSAN variant presentations after vaccination against COVID 19 infection and emphasize the continued importance of viral triggers. Shuo Yang et al. [19] validated the importance of early electrophysiological alterations in distinguishing between axonal and demyelinating types and prognosis. Xiaoyu Cao et al. [20] also found that phenotype multifactorial determinants were linked to comorbid autoimmune conditions and further stressed the role of axonal variants.

Liu et al. [21] performed a massive retrospective study through the whole Southern China area; it confirmed that axonal subtypes are prevalent in LMIC environments, and they are associated with greater sensory-motor impairment. Likewise, Maini et al. [22] reported that AMAN was more dominant in Delhi, and associated with younger age, acute onset and worse functional outcomes. Chen et al. [23] provided evidence that the early detection of the axonal involvement through serial electrophysiology may lead to the prognosis and rehabilitation planning.

Together, these results affirm the heterogeneity of GBS electrophysiological subtypes, whereby there is distinct geographic, infectious, and age-related distributions that distinguish between axonal and demyelinating forms. Although AIDP is still prevalent among Western populations, our research and local literature indicate the clinical significance of axonal variants in South Asian and other endemic populations, and the necessity to develop specific diagnostic and treatment approaches.

CONCLUSION

This paper concludes that axonal forms of Guillain-Barré Syndrome, especially AMAN and AMSAN, are more common in our local population than the demyelinating form AIDP. These results contrast with Western literature where AIDP is very common, which makes the difference in the patterns of disease significant. The predominance of axonal forms may be related to infectious triggers and environmental factors common in developing countries. Nerve conduction studies are crucial in the early detection of GBS subtypes to ensure proper diagnosis, prognostication, and timely management. Even though demographic variables (gender and comorbidities) did not significantly relate to the distribution of subtypes, younger age was significantly correlated with axonal variants. This is supported by the results that highlighted the importance of region-specific data to inform clinical decision-making. To confirm these results and enhance the knowledge of GBS epidemiology and consequences in Pakistan, further large-scale, multicenter studies are suggested.

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