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ORIGINAL ARTICLE

DEMOGRAPHIC, CLINICAL PROFILE, AND OUTCOME OF GUILLAIN-BARRÉ SYNDROME PATIENTS IN ICU: A SINGLE CENTER, RETROSPECTIVE STUDY

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ABSTRACT

Introduction: *Guillain-Barré Syndrome (GBS) is an acute, immune-mediated peripheral neuropathy causing progressive muscle weakness and, in severe cases, respiratory failure requiring intensive care unit (ICU) admission. The study was conducted with the aim to analyze the demographic profile, clinical presentation, treatment modalities, and outcomes of GBS patients admitted to a tertiary-level ICU in Nepal.*

Materials and Methods: *A retrospective study was conducted over five years (January 2020 to December 2024). The data were obtained through the National Intensive Care Registry Foundation (NICRF) platform.*

Results: *A total of 30 patients were included. Males constituted the majority of the study population (83.4%, n=25), with a mean age of 52.97 years (SD=22.36), mostly in the age group of 61–80 years. Clinically, 83.3% (n=25) presented with progressive limb weakness, while 23% (n=7) had sensory deficits or other symptoms. Acute inflammatory demyelinating polyradiculoneuropathy (AIDP) was present in 50% (n=15) of patients, followed by acute motor axonal neuropathy (AMAN) 26.7% (n=8), acute motor and sensory axonal neuropathy (AMSAN) 13.3% (n=4), and Miller Fisher Syndrome 10% (n=3). Respiratory tract infections 23.3% (n=7) and diarrhea 16.67% (n=5) were the most common antecedent events. Treatment primarily involved intravenous immunoglobulin (IVIg) 66.67% (n=20), while 33.33% (n=10) required mechanical ventilation (mean duration 8.5 days). Mortality rate was 6.7% (n=2).*

Conclusion: *This study shows a male predominance, with AIDP as the primary GBS subtype. The most common type of treatment administered was intravenous immunoglobulin (IVIG).*

Keywords: *AIDP, Guillain-Barré Syndrome, Immunoglobulin, Intensive Care Unit*

INTRODUCTION

Guillain-Barré Syndrome (GBS) is an immune-mediated peripheral neuropathy that affects multiple nerve roots through a symmetric progression. It usually starts in the distal legs before reaching the arms and facial muscles.[1] GBS may sometimes lead to rapid respiratory muscle weakness and potentially fatal respiratory failure requiring intensive care unit (ICU) admission with mechanical ventilation.[2] It is estimated that about two-thirds of GBS patients develop symptoms after experiencing an infection during the preceding days or weeks.[3] Respiratory tract infection is a well-established predisposing event in developing GBS.[4] Many antecedent events associated with GBS have been identified, including Campylobacter jejuni gastroenteritis and vaccination.[5]

The diagnosis of GBS depends on clinical symptoms, nerve conduction studies, and cerebrospinal fluid analysis, which use specific diagnostic criteria for confirmation. The first formalized criteria were developed in the late 1970s following post-swine flu vaccination outbreak of GBS. In 2009, the Brighton Collaboration revised diagnostic criteria, focusing on research applications, though challenges remain due to GBS's diverse clinical presentations.[2,6,7]

The most common underlying subtype is acute inflammatory demyelinating polyradiculoneuropathy (AIDP), which is common in Western countries.[8] Another subtype, where the neurological deficit is purely motor, has been termed acute motor axonal neuropathy (AMAN), which is common in Asia and Latin America.[9] When sensory fibers are also involved, this axonal subtype is referred to as acute motor and sensory axonal neuropathy (AMSAN).[10] Miller Fisher Syndrome (MFS) variant is less common and involves the facial nerve and

lower cranial nerve. MFS presents with ataxia, areflexia, and acute ophthalmoplegia.[5]

GBS has an incidence of 1-2 cases per 100000 people worldwide, with overall male predominance in all age groups.[11] GBS can occur in any season, although seasonality may reflect peaks in seasonal predisposing factors like infections.[12] GBS incidence is increased by approximately 14% during winter months, likely due to the increase in respiratory infections during winter months.[13] Intravenous immunoglobulin (IVIG) and Therapeutic plasma exchange (TPE) are potent therapies for adult and pediatric patients with GBS if given within the first few weeks of disease.[14,15] The overall mortality ranges from 4%-15%, with up to 20% of patients remaining disabled after a year despite the treatment.[16] In a study conducted in Nepal, patients hospitalized with GBS from 2013 to 2017 were retrospectively analyzed. The most common presentation of GBS was ascending paralysis and the hospital mortality rate was 6.45%.[17]

The purpose of this study was to analyze the demographic characteristics, clinical presentation, management profile, and outcomes of GBS patients admitted to the ICU in a single tertiary care center through a retrospective analysis.

MATERIALS & METHODS

Study Design and Setting

This is a retrospective study conducted in a 33-bedded ICU in Nepal Mediciti Hospital. We analyzed medical records of all patients diagnosed with GBS and admitted to the ICU between January 2020 and December 2024. Diagnosis of GBS was confirmed based on clinical features, nerve conduction study, and cerebrospinal fluid (CSF) analysis. Inclusion criteria encompassed all patients admitted to the neuro intensive care unit diagnosed and treated as GBS. Patients with missing and incomplete data were excluded. The study was approved by the Institutional Review Board (ID: IRC-RP-2081/82-17).

Data Collection

Data were retrieved through the registry maintained by Nepal Intensive Care Registry Foundation (NICRF) platform by two trained clinicians to ensure consistency and to confirm GBS diagnosis using Brighton Criteria (Level I/II). Discrepancies were resolved by consensus. Collected variables included patient demographics, clinical presentation, antecedent events, lab values, diagnostic findings, treatment modalities, mechanical ventilation (MV), duration, ICU stay, and outcomes. Missing data were handled by excluding cases with incomplete variables (e.g., diagnosis or outcome).

Statistical analysis

Descriptive statistics were used to analyze the frequency, percentage, mean, median, and standard deviation. Socio-demographic characteristics were presented in tabular format. Quantitative variables, such as age and duration of mechanical ventilation, were reported as mean [± standard deviation (SD)] and median (interquartile range). Categorical variables (e.g., gender, treatment, outcomes) were presented as frequencies and percentages. The analysis was carried out using SPSS 27.0 (SPSS Inc., Chicago, IL, USA).

RESULTS

Study Population

Between January 2020 and December 2024, a total of 42 patients diagnosed with GBS were carefully examined. Out of 42 patients, 12 patients had incomplete data. A total of 30 patients were analyzed and incorporated for the study (Figure 1).

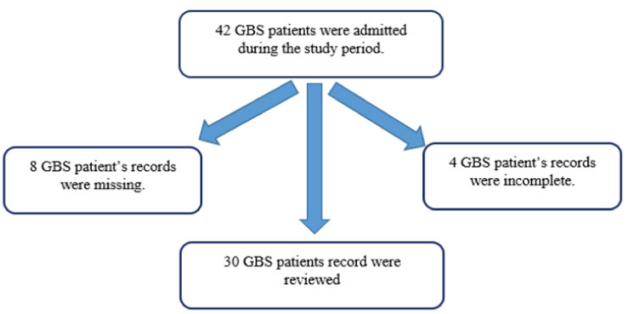

Figure 1: Flowchart depicting review of GBS patient's records.

Demographic Characteristics

Out of 30 patients included in the study, 83.4% (n=25) were male and 16.6% (n=5) were female (Figure 2), revealing a male predominance across all age groups. The majority of patients (46.70 %) were aged 61-80 years. In contrast, only 16.70 % of cases were in the younger age groups (0-18 and 19-40 years). Patients above 80 years of age constituted only 3.3% of the total patient population. The mean age was 52.97 years (SD=22.36) (Figure 2).

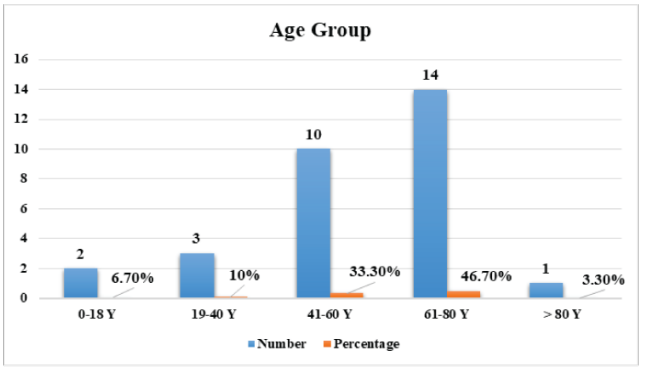

Figure 2: Age group distribution of GBS patients.

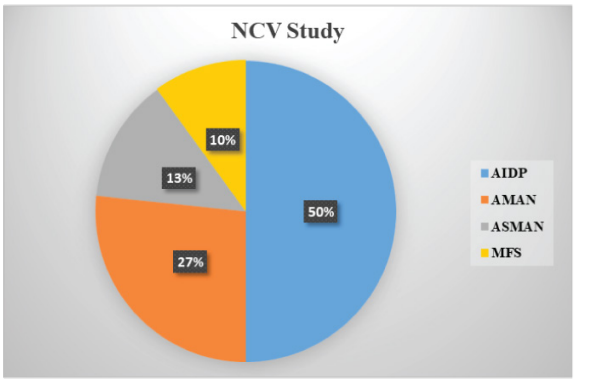

Figure 3: Distribution of GBS variants.

Clinical Profile and Diagnostic Testing

The most prevalent clinical presentation was progressive limb weakness involving all four limbs, observed in 83.3% (n=25) of patients. Other symptoms included sensory deficits, ataxia, oropharyngeal weakness, ophthalmoplegia, and autonomic dysfunction, which were present in 23% (n=7) of patients. In addition, dysphagia and respiratory failure were reported in 10% (n=3) and 6.67% (n=2) of cases, respectively.

Nerve conduction velocity (NCV) testing was performed for all patients as part of the diagnostic criteria. The findings specify that the AIDP variant was present in 50% (n=15), AMAN in 26.7% (n=8), and AMSAN and MFS in 13.3% (n=4) and 10% (n=3) of cases, respectively. CSF analysis, performed in 76.7% (n=23) of patients, of whom 78.2% (n=18) had an elevated CSF protein level (Table 1, Figure 3).

Table 1: Distribution of clinical profiles and diagnostic test results in GBS patients

Variables		Frequency (%)
Clinical Profile	Limb weakness	25 (83.3)
	Dysphagia	3 (10)
	Respiratory failure	2 (6.67)
	Other symptoms	7 (23)
NCV	AIDP	15 (50)
	AMAN	8 (26.7)
	ASMAN	4 (13.3)
	MFS	3 (10)
CSF Analysis	Performed	23 (76.7)
	Elevated protein	18 (78.2)
	Normal protein	5 (21.7)

Value: CSF protein: 15-60 mg/dl, CSF TLC: 0-5 cells/µl

Antecedent Events and Comorbidities

The most frequently reported antecedent event was respiratory tract infection (23.3%, n=7), followed by diarrhea (16.67%, n=5). Vaccination was a rare cause, reported in only (6.67%, n=2) of cases. Notably, 60% of cases (n=18) had no identifiable preceding event. The most common comorbidities were hypertension (66.67%, n=20) and diabetes mellitus (40%, n=12), while 16.66% (n=5) of the patients had no comorbidities (Table 2).

Table 2: Distribution of antecedent events and co-morbidities in GBS patients.

Variables		Frequency (%)
Antecedent events	Respiratory infection	7 (23.3)
	Diarrhea	5 (16.67)
	Vaccination	2 (6.67)
	Not identifiable	18 (60)
Co-morbidities	Hypertension	20 (66.67)
	Diabetes mellitus	12 (40)
	None	5 (16.66)

Treatment and Management

Intravenous immunoglobulin (IVIG) was administered to 66.67% (n=20) of patients. Supportive medical management was provided to 26.67% (n=8), while plasmapheresis was used in 6.66% (n=2) of cases. The majority of the patients (66.67%, n=20) did not require mechanical ventilation, whereas 33.33% (n=10) did. Among those requiring MV, 70% (n=7) received it for more than one week, while 30% (n=3) were weaned within a week. The mean duration of ventilation was 8.5 days. Furthermore, 60% (n=6) of ventilated patients required tracheostomy. All tracheostomies were performed in patients who had received ventilation for over one week (Table 3).

Table 3: Treatment modalities and mechanical ventilation in GBS patients.

Variables		Frequency (%)
Mode of treatment	Immunoglobulin (IVIG)	20 (66.67)
	Supportive medical management	8 (26.67)
	Plasmapheresis	2 (6.66)
Mechanical Ventilation	Required	10 (33.33)
	Not required	20 (66.67)
Tracheostomy	Required	6 (60)
	Not required	4 (40)

Outcomes and ICU Stay

The mean ICU stay duration was 7.17 days (SD=4.47). Of the patients, 66.67% (n=20) had an ICU stay of ≤7 days, while the remaining 33.33% (n=10) had stay >7 days. A majority of the patients (83.3%, n=25) recovered and were discharged from the ICU, whereas 10% (n=3) were transferred to other hospitals due to financial circumstances, and 6.7% (n=2) did not survive (Table 4, Figure 4).

Table 4: Distribution of ICU stay duration in GBS patients.

Variables		Frequency (%)
ICU stay	1-7 days	20 (66.67)
	>7 days	10 (33.33)

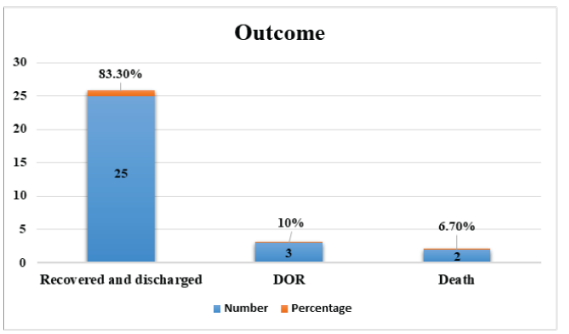

Figure 4: Distribution of outcomes in GBS patients.

Seasonal Distribution

Autumn is a common season for symptom onset (40%, n=12), followed by winter (23.3%, n=7), summer (20%, n=6), and spring (16.7%, n=5) (Figure 5).

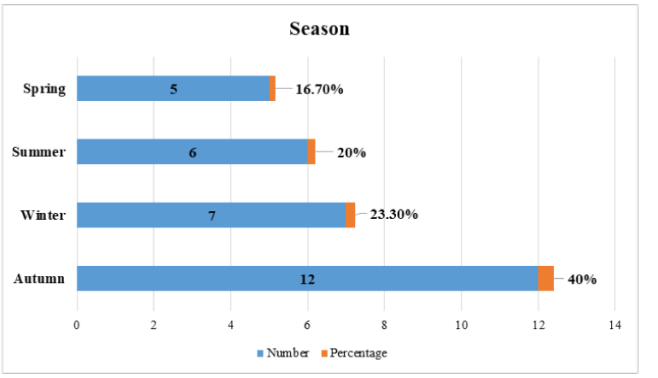

Figure 5: Distribution of the season of GBS patients.

DISCUSSION

This retrospective study analyzed 30 GBS patients admitted to a tertiary ICU in Nepal from 2020 to 2024. The primary objective was to assess their demographic profile, clinical presentation, management, and outcomes.

The demographic analysis revealed a significant male predominance, with 83.4% of the patients being male (male-to-female ratio ≈ 5:1). This finding is consistent with previous studies, including Blanco-Ruiz et al. (63.9% male, ratio 2.1:1)[18], and Al Maawali SM et al. (63.6% male, ratio 1.75:1)[19], and Shrivastava M et al. (72.1% male, ratio 2.4:1).[20] The mean age of our patients was 52.97 years (SD=22.36), with the majority falling within the 61-80 years group, indicating that the elderly patients are more likely to develop severe GBS requiring ICU admissions. The age group is concordant with Blanco-Ruiz et al., who reported highest incidence in patients aged 70-79 years (average age 53.2 years)[18], and Shrivastava M et al., where the average age was 40.69 years (SD=18.8), with most patients aged ≥60 years.[20]

Progressive limb weakness (83.3%) was the primary presentation, followed by sensory deficits, ataxia, oropharyngeal palsy, ophthalmoplegia, and autonomic dysfunction (23%). Dysphagia and respiratory failure were encountered in 10% and 6.67% of the patients, respectively. These findings are comparable to those of Al Maawali SM et al. and Shrivastava M et al., where quadriparesis was the predominant symptom (61.3% and 74.2%, respectively).[19,20]

Nerve conduction velocity (NCV) testing shows AIDP as the most common variant followed by AMAN, AMSAN, and MFS. This distribution aligns with global trends, where AIDP is the most prevalent subtype. Similar patterns were reported by Bhagat SK et al. (19.4% AIDP), Al Maawali SM et al. (52% AIDP), and Shrivastava M et

al. (50% AIDP) reflected AIDP prevalence in Western and some Asian populations.[17, 19, 20]

Cerebrospinal fluid (CSF) analysis showed albuminocytologic dissociation in 76.7% of patients, with elevated protein levels in 78.2%. These findings are consistent with Blanco-Ruiz M et al. (87.5% by the second week)[18] and Al Maawali SM et al. (81.8%).[19]

The most common antecedent events were respiratory tract infections (23.3%) and diarrhea (16.67%). Bhagat SK et al. similarly reported respiratory tract infections as the leading trigger (29%), though diarrhea was less frequent (3.2%).[17] Comorbid illnesses were also prevalent, with hypertension (66.67%) and diabetes mellitus (40%) being the most common, both of which may exacerbate GBS severity and make management more difficult.

The noteworthy observation was the seasonal pattern of GBS onset, with the peak in autumn (40%), possibly due to increased respiratory infections during this season. In contrast, Shrivastava M et al. and Sharma G et al. reported a higher incidence in summer (60%), [20, 21] suggesting geographical and climatic influences.

Intravenous immunoglobulin (IVIG) was the primary therapy (66.67%), reflecting its accessibility compared to plasmapheresis (6.66%), as noted by Al Maawali SM et al.[19] Mechanical ventilation was required in 33.33% patients, higher than van den Berg et al. (28%) and Zhang B et.al (13.9%),[22,23] but tracheostomy rate (60%) was lower than Shrivastava M et al.'s tracheostomy rate (81.48%).[20]

The mean ICU stay was 7.17 days (SD=4.47), with 66.67% of patients discharged within one week. Outcomes were favorable, with 83.3% recovered and discharged, comparable to Rees JH et al. (88%).[16] The 6.7% mortality rate aligns with Bhagat et al. (6.45%).[17] However, 10% of patients were transferred to other hospitals due to financial constraints, which highlights economic barriers in low-resource settings.

In resource-limited ICUs, early detection of GBS and access to IVIg therapy are necessary. The high burden of comorbidities supports an integrated approach to controlling hypertension and diabetes to improve GBS outcomes. The costs associated with IVIg and prolonged ICU admission consider alternate cost-effective options such as subsidization of immunotherapy or outpatient follow up.

CONCLUSION

This study highlights the male predominance and AIDP variant dominance in GBS ICU admissions in Nepal, emphasizing the need for early diagnosis and resource allocation for immunotherapy.

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CONFLICT OF INTEREST: None.

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