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ORIGINAL ARTICLE

Clinical profile and outcome of Guillian Barre Syndrome in children.

Huma Mehmood[1], Murtaza Ali Gowa[2], Hira Nawaz[3], Ghazala Jamal[4], Bakhtawar Chandio[5], Anmol[6]

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ABSTRACT… Objective: To evaluate the clinical profile and outcome of Guillian Barre Syndrome (GBS) in children admitted in a tertiary care hospital. **Study Design:** Cross-sectional study. **Setting:** Department of Pediatrics of National Institute of Child Health, Karachi, Pakistan. **Period:** July 2024 to December 2024. **Methods:** A total of 45 children aged between 1 month up to 16 years, presenting and admitted with GBS were analyzed. Demographical and clinical characteristics of children were noted. Children were treated as per standard institutional protocols. Final outcome was recorded as survived or expired. Effect modifiers were controlled through stratification, and post-stratification chi-square/fisher's exact test was applied taking $p<0.05$ as significant. **Results:** In a total of 45 children, 27 (60.0%) were males. The mean age was 6.27±2.49 years. The mean duration of symptoms was 3.6±2.7 days. The most common presentations were weakness of limbs, and fever, documented in 38 (84.4%), and 24 (53.3%) patients, respectively. Nerve conduction velocity evaluation revealed AMSAN as the most common GBS subset, found in 32 (71.1%) patients. Mortality was observed among 10 (22.2%) children, while the remaining 35 (67.8%) children improved and discharged successfully. Mortality was significantly associated with admission in PICU at the time of enrollment ($p<0.001$), need for ventilatory support ($p<0.001$), and inotropic support ($p<0.001$). **Conclusion:** Lower limb weakness and fever emerged as the most common initial symptoms, with AMSAN being the predominant subtype. Mortality was significantly associated with PICU admission, need for ventilatory support, and inotropic support.

Key words: Guillian Barre Syndrome, Inotropes, Intensive Care Unit, Limb, Ventilatory Support, Weakness.

INTRODUCTION

Acute flaccid paralysis (AFP) encompasses a wide range of clinical conditions characterized by the sudden onset of muscle weakness with reduced muscle tone. The global implementation of vaccination programs, coupled with coordinated international efforts, has significantly decreased the occurrence of poliomyelitis, historically a leading cause of AFP.[1] Guillain-Barré Syndrome (GBS) has emerged as the predominant cause, accounting for approximately 25% to 50% of AFP cases worldwide.[2] GBS is an immune-mediated neurological disorder that manifests acutely or subacutely. It typically presents with progressive muscle weakness affecting both upper and lower limbs, associated sensory disturbances such as paresthesia, and markedly reduced or absent reflexes.[3] The underlying mechanism involves an autoimmune response that often follows antecedent infections, notably respiratory tract infections, and gastrointestinal infections.[4,5]

GBS can be categorized into distinct subtypes, notably acute inflammatory demyelinating polyneuropathy (AIDP), acute motor axonal neuropathy (AMAN), acute motor and sensory axonal neuropathy (AMSAN), and Miller Fisher Syndrome (MFS).[6] The condition occurs globally with an annual incidence rate ranging from 0.34-1.34 cases per 100,000 individuals aged 18 years or younger, with males being approximately 1.5 times more frequently affected than females.[7,8]

The diagnosis of GBS primarily depends on cerebrospinal fluid (CSF) analysis and electrophysiological assessments. Typical CSF findings include elevated protein levels in the presence of normal white cell counts, a characteristic known as albuminocytologic dissociation.

1. MBBS, Post-graduate Traniee Paediatric Medicine, National Institute of Child Health, Karachi, Pakistan.
2. MBBS, FCPS (Pediatric Medicine), MRCPCH (London), MRCPS (Glasgow), PCCM, CHPE, Post Fellowship (Padiatric Critical Care Medicine), Associate Professor and Head Pediatrics Intensive care Unit, National Institute of Child Health, Karachi, Pakistan.
3. FCPS (Pediatric Medicine), Post-Fellow Trainee Pediatric Intensive Care Unit, National Institute of Child Health, Karachi, Pakistan.
4. MBBS, MCPS, Medical Officer Pediatric Intensive Care Unit, National Institute of Child Health, Karachi, Pakistan.
5. MBBS, Women Medical Officer Pediatric Intensive Care Unit, National Institute of Child Health, Karachi, Pakistan.
6. MBBS, Post-graduate Trainee Pediatrics, National Institute of Child Health, Karachi, Pakistan.

Correspondence Address:
Dr. Huma Mehmood
Department of Paediatric Medicine
National Institute of Child Health, Karachi, Pakistan.
humamehmood666@gmail.com

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Additionally, nerve conduction velocity (NCV) studies usually demonstrate distinctive abnormalities that aid in confirming the diagnosis. Despite advancements in diagnosis and management, GBS remains a significant cause of pediatric acute flaccid paralysis, often associated with substantial morbidity, prolonged hospitalization, and considerable healthcare resource utilization. By providing a detailed understanding of disease presentation, progression, and factors influencing prognosis, the study aims to enhance early recognition, timely intervention, and evidence-based management practices. This study was through to contribute toward reducing morbidity, minimizing long-term disability, and lowering mortality rates among pediatric patients affected by GBS. This study was planned to evaluate the clinical profile and outcome of GBS in children admitted in a tertiary care hospital.

METHODS

The cross-sectional study was conducted at the department of pediatrics of National Institute of Child Health, Karachi, Pakistan from July 2024 to December 2024. Approval from Institutional Ethical Review Board was obtained (IERB-15/2022, dated: 12-08-2022). A sample size of 45 was calculated taking the reported mortality among children admitted with GBS as 3%[9], with 95% confidence level, and 5% margin of error. The inclusion criteria were children aged between 1 month up to 16 years, who presented and admitted with signs and symptoms of GBS. The exclusion criteria were children having history of any kinds of neuropathy, polio, poisons, or spinal deformity. Patients who left against medical advice within 24 hours of admission, were also excluded. GBS was labeled as the child presenting with acute onset of lower limb weakness following history of any non-specific infection. Non–probability, consecutive sampling technique was used. Informed and written consent were taken from parents/guardians.

Children fulfilling the eligibility criteria were included. Demographic details of each child such as gender, age, and height of the child were obtained. Each child was assessed for complaints like fever, diarrhea, lower limb weakness or other nonspecific symptoms. All children were treated as per standard institutional protocols. Use of IVIG was documented. Final outcome was recorded as survived/improved or expired. Data were analyzed using "IBM-SPSS Statistics, version 26.0". Mean and standard deviation were calculated for quantitative variables, while frequency and percentages were computed for qualitative variables. Effect modifiers were controlled through stratification, and post-stratification chi-square/fisher's exact test was applied taking $p<0.05$ as significant.

RESULTS

In a total of 45 children, 27 (60.0%) were males. The mean age, weight, height, and BMI were 6.27±2.49 years, 19.58±5.45 kg, 110.4±16.5 cm, and 16.0±2.6 kg/m^2, respectively. The mean duration of symptoms was 3.6±2.7 days. The most common presentations were weakness of limbs, and fever, documented in 38 (84.4%), and 24 (53.3%) patients, respectively. Nerve conduction velocity evaluation revealed AMSAN as the most common GBS subset, found in 32 (71.1%) patients. Table-I is showing baseline demographical and clinical characteristics of patients.

IVIG administration was observed among all 45 (100%) cases. Need for plasma exchange, ventilatory support, and inotropic support were documented among 15 (33.3%), 14 (31.1%), and 9 (20.0%) children, respectively (Figure-1).

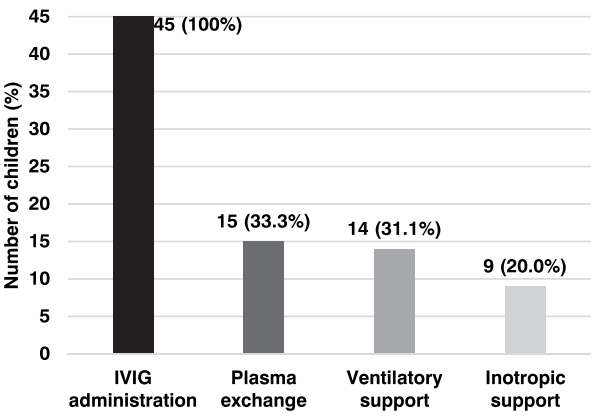

Figure-1. IVIG administration, ventilatory and inotropic support (n=45)

Characteristics		Frequency (%)
Gender	Male	27 (60.0%)
	Female	18 (40.0%)
Age	1 month to 5 years	15 (33.3%)
	5 to 16 years	30 (66.6%)
Duration of symptoms (days)	≤3	25 (62.5%)
	>3	20 (37.5%)
Frequency of presenting complaints	Weakness of limbs	38 (84.4%)
	Fever	24 (53.3%)
	Unable to walk	22 (48.9%)
	Cough	10 (22.2%)
	Abdominal pain	8 (17.8%)
	Pain in limbs	3 (6.7%)
	Vomiting	3 (6.7%)
Nerve conduction velocity findings	AMSAN	32 (71.1%)
	AMAN	10 (22.2%)
	AIDP	3 (6.7%)
Place of admission	Ward	26 (57.8%)
	PICU	19 (42.2%

Table-I. Characteristics of children with GBS (n=45)

Mortality was observed among 10 (22.2%) children, while the remaining 35 (67.8%) children improved and discharged successfully. Mortality was significantly associated with admission in PICU at the time of enrollment ($p<0.001$), need for ventilatory support ($p<0.001$), and inotropic support ($p<0.001$) (Table-II).

DISCUSSION

The mean age in this cohort was 6.27±2.49 years, aligning with findings from Nasiri et al., who reported a mean age of 5.9 years in their cohort from Iran.[10] Dang et al.[11], from Vietnam reported a comparable mean age of 7.2±4.9 years. These similarities suggest that the age distribution of GBS in children remains relatively consistent across different regions. However, our male-to-female ratio of 1.5:1 is slightly higher than that reported in Nasiri et al. (1.05:1)[10], and Adhikari et al.[12] (1.64:1), indicating a potential gender-based predisposition in our population.

Characteristics		Survived (n=35)	Mortality (n=10)	P- Value
Gender	Male	21 (60.0%)	6 (60.0%)	1
	Female	14 (40.0%)	4 (40.0%)	
Age	1 month to 5 years	11 (31.4%)	3 (30.0%)	0.931
	5 to 16 years	24 (68.6%)	7 (70.0%)	
Duration of symptoms (days)	≤3	22 (62.9%)	3 (30.0%)	0.065
	>3	13 (37.1%)	7 (70.0%)	
Frequency of presenting complaints	Weakness of limbs	29 (82.9%)	9 (90.0%)	0.583
	Fever	18 (51.4%)	6 (60.0%)	0.632
	Unable to walk	21 (60.0%)	1 (10.0%)	0.005
	Cough	7 (20.0%)	3 (30.0%)	0.502
	Abdominal pain	5 (14.3%)	3 (30.0%)	0.252
	Pain in limbs	3 (8.6%)	-	0.338
	Vomiting	3 (8.6%)	-	0.338
Nerve conduction velocity findings	AMSAN	23 (65.7%)	9 (90.0%)	0.306
	AMAN	9 (25.7%)	1 (10.0%)	
	AIDP	3 (8.6%)	-	
Place of admission at enrollment	Ward	26 (74.3%)	-	<0.001
	PICU	9 (25.7%)	10 (100%)	
IVIG administration		35 (100%)	10 (100%)	-
Plasma exchange		10 (28.6%)	5 (50.0%)	0.205
Need for Inotropic support		-	9 (90.0%)	<0.001
Need for ventilation support		4 (11.4%)	10 (100%)	<0.001

Table-II. Association of characteristics of children with final outcome (N=45)

In terms of clinical presentation, weakness of the lower limbs was the most common symptom, seen in 84.4% of our patients. This finding aligns with

Luo et al.[13], (61.3%) and Adhikari et al.[12], (100%). Fever as an antecedent symptom was present in over half of our cohort, consistent with findings from Asiri et al.[14], and Adhikari et al.[12] Cranial nerve involvement, although not extensively explored in our study, has been reported by Ashrafi et al. in 46.7% of cases.[15]

This study found high prevalence of AMSAN subtype, detected in 71.1% of cases. This subtype predominance contrasts with studies from Western populations, where AIDP is more frequently observed.[16] Adhikari et al.[12], reported AIDP as the most common variant (46.7%) in their study from Nepal, while AMSAN accounted for only 6.7%. The disparity might be attributed to regional variations in antecedent infections and genetic predispositions. The variation in GBS subtype distribution across studies might be explained by genetic, environmental, and microbial factors. Exposure to Campylobacter jejuni, Epstein-Barr virus, or cytomegalovirus has been implicated in triggering specific GBS subtypes.[4] Chukwuka et al. in a recent review emphasized the role of regional microbial profiles in determining the dominant GBS variant.[17]

Intravenous immunoglobulin was administered to all children, a protocol consistent with international guidelines.[18] However, the mortality rate despite universal IVIG use suggests that late presentation, severe disease variants, and autonomic dysfunction might have contributed significantly to poor outcomes. Ashrafi et al.[15], reported significant functional improvement in children who received IVIG, with 62.2% regaining unaided walking.

Respiratory distress requiring ventilatory support was observed in 31.1% children, which is notably higher than the 12.3% reported by Luo et al.[13] This difference might stem from delayed presentation, limited access to early intervention, or differences in clinical management protocols. In this study, fever was documented in 53.3% of cases, which is consistent with findings from Ashrafi et al., who reported antecedent infections in 53.3% of their patients.[15]

The overall mortality rate in this study was 22.2%, significantly higher than the 3% reported in previous global studies.[9] This discrepancy might reflect differences in healthcare infrastructure, timely access to immunotherapy, and supportive care facilities. Luo et al.[13], reported a much lower mortality rate, with only 12.3% of patients requiring mechanical ventilation. Studies from low-resource settings have also demonstrated higher mortality rates, indicating that resource availability remains a critical determinant of outcomes.[19,20] The need for ICU admission and inotropic support was significantly associated with increased mortality ($p<0.001$). Similar associations have been documented by Srinivasa et al.[21], who found that autonomic dysfunction predicted higher mortality. These observations highlight the need for robust monitoring and timely intervention in high-risk patients. The high mortality rate observed among patients requiring ventilatory and inotropic support highlights the need for improved ICU facilities, better monitoring systems, and access to early immunotherapy. In resource-limited settings, targeted interventions focusing on early diagnosis, standardized care protocols, and timely referral to specialized centers can significantly reduce morbidity and mortality.

The strengths of this study include standardized treatment protocols, and inclusion of a well-defined cohort of pediatric GBS patients. The use of robust statistical methods, including stratification and post-stratification chi-square analysis, ensured the reliability of the present findings. However, the study is not without limitations. The small sample size ($n=45$) limits the generalizability. The role of antecedent infections and specific microbial triggers was not explored in depth.

CONCLUSION

Lower limb weakness and fever emerged as the most common initial symptoms, with AMSAN being the predominant subtype. Mortality was significantly associated with PICU admission, need for ventilatory support, and inotropic support. The findings emphasize the need for early diagnosis, standardized treatment, and enhanced supportive care facilities to improve

outcomes in pediatric GBS.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION	
1	**Huma Mehmood:** Data collection, data analysis, drafting, responsible for data's integrity, approved for publication.
2	**Murtaza Ali Gowa:** Conception, design, proof reading, critical revisions, approved for publication.
3	**Hira Nawaz:** Data analysis, methodology, proof reading, critical revision, approved for publication.
4	**Ghazala Jamal:** Data collection, literature review, proof reading, approved for publication.
5	**Bakhtawar Chandio:** Data collection, literature review, proof reading, approved for publication.
6	**Anmol:** Data collection, literature review, proof reading, approved for publication.