Hudna. A. S., et al, Yemeni J Med Sci. 2026; 20(4):17 -23
https://doi.org/10.20428/yjms.v20i4.3659
https://journals.ust.edu/index.php/yjms

OPEN ACCESS Original Article

Risk Factors, Presentation, Diagnosis and Management of Guillain Barré Syndrome in Sana'a City, Yemen: A Ten Years Retrospective Study

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ABSTRACT

Background: Guillain-Barré Syndrome (GBS) is a rare neurological disorder that affects the peripheral nervous system and presents with an ascending flaccid paralysis. With undetermined etiology, it seems that GBS had an immune process following either a respiratory or gastrointestinal infection.
Objective: This study aimed to determine the total number, clinical features, and associated risk factors of Guillain-Barré syndrome among patients at the University of Science and Technology Hospital.
Methods: A retrospective medical record-based study was conducted at the University of Science and Technology Hospital for ten years (2014-2023) in Sana'a city. Data were collected using a predesigned data sheet containing sociodemographic, risk factors, clinical presentation, diagnostic, and therapeutic tools. Data was analyzed by SPSS v. 24.0.
Results: Two hundred fifty-six files recorded as Guillain-Barré Syndrome were analyzed; the mean age was 38.65 ± 19.8 years. Age ranged between 2 and 85 years. There was a male predominance (69.9%), with the most prevalent presentation being bilateral ascending paralysis (47.7%). The majority of patients received physiotherapy alone (43.0%), while IVIG was used in 40.6% of cases.
Conclusion: GBS is a peripheral neuropathy disease with the common presentation of ascending flaccid paralysis, but uncommon presentations are not rare, which recommends a high clinical suspicion, especially for the wide range of ages and the occurrence in an area of poliomyelitis infection spread.

Keywords: Guillain-Barré Syndrome, Paralysis, Areflexia, University of Science and Technology Hospital.

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https://doi.org/10.20428/yjms.v20i4.3659
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INTRODUCTION

Guillain-Barré Syndrome (GBS) is the most common cause of acute flaccid paralysis in adults worldwide and represents a neurological emergency that demands rapid recognition and early intervention [1]. The syndrome encompasses a group of disorders that share a common immunopathogenic mechanism directed against peripheral nerve components [2, 3].

The underlying mechanism of GBS involves immune-mediated injury to peripheral nerves, typically triggered by a preceding infection. The process of molecular mimicry plays a central role, leading to cross-reactive immune responses. This autoimmune attack can target either the myelin sheath or the axonal membrane, resulting in conduction block and secondary axonal degeneration [4]. *Campylobacter jejuni* remains the most commonly identified infectious antecedent, but other agents—including Cytomegalovirus, Epstein–Barr virus, *Mycoplasma pneumoniae*, *Haemophilus influenzae*, Zika virus, and SARS-CoV-2—have all been implicated [5]. The presence of antiganglioside antibodies such as anti-GM1, anti-GD1a, and anti-GQ1b provides further evidence of autoimmune pathogenesis and correlates with particular clinical subtypes [3, 4].

Globally, the annual incidence of GBS is estimated at 1–2 cases per 100,000 population [6], but rates can vary. The disease affects both sexes but shows a slight male predominance, and the risk increases with advancing age [5]. In Western countries, Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP) is the predominant form, whereas in Asia and Latin America, Acute Motor Axonal Neuropathy (AMAN) and Acute Motor-Sensory Axonal Neuropathy (AMSAN) are more frequent [5].

The clinical course of GBS is monophasic and rapidly evolving, reaching its nadir within four weeks in most cases [5]. The illness typically begins with distal paresthesia or limb weakness that ascends symmetrically [1]. Reflexes are reduced or absent early in the disease [7]. In severe cases, progression may involve respiratory muscles, leading to respiratory failure requiring ventilatory support in up to 30 percent of patients [7, 8]. Autonomic disturbances such as tachyarrhythmia, bradycardia, labile blood pressure, urinary retention, or paralytic ileus can complicate management [1]. The Miller Fisher variant is associated with anti-GQ1b antibodies and accounts for 5–10 percent of all cases [3].

Diagnosis rests on clinical suspicion supported by characteristic laboratory and electrophysiological findings [8]. Cerebrospinal-fluid (CSF) analysis typically demonstrates albuminocytologic dissociation [8]. Nerve-conduction studies confirm demyelination or axonal injury and are essential for distinguishing subtypes [1]. MRI may reveal enhancement of spinal roots but is mainly used to exclude other causes [9].

The two established disease-modifying treatments are intravenous immunoglobulin (IVIG) [10] and plasma exchange (PE) [11], both equally effective in hastening recovery if administered within 14 days of symptom onset [5, 12]. Corticosteroids alone are not beneficial [12]. Because autonomic dysfunction can lead to sudden death, continuous cardiac monitoring is recommended [1]. The mortality rate is 3–7 percent [13], while 20–30 percent of survivors have residual motor deficits.

In low- and middle-income countries, including Yemen, the burden of GBS is under-recognized. Limited access to neurophysiological testing and immunotherapy contributes to worse outcomes [14, 15]. Therefore, this study aimed to determine the total recorded number, clinical features, and associated risk factors of Guillain-Barré syndrome among patients at the University of Science and Technology Hospital, Sana'a, Yemen.

METHODS

Study Design and Setting

A retrospective record-based descriptive study was conducted at the University of Science and Technology Hospital (USTH) in Sana'a, Yemen, from January 2014 to December 2023. The total number was 256 patients.

Sample Size

All medical records labeled as GBS were used during the period from January 2014 to December 2023, and it was 256.

Data Collection

A predesigned checklist was used to collect data from the patient medical records. The checklist questions were categorized into four main parts: Socio-demographic characteristics, clinical features of GBS (including risk factors and presentation), investigations

https://doi.org/10.20428/yjms.v20i4.3659
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(EMG, LP, and MRI), and management (IVIG, plasmapheresis, and physiotherapy).

Inclusion and Exclusion Criteria

All patients officially recorded with a diagnosis of GBS at USTH during the specified period were included. Files with missed or incomplete critical data were excluded.

Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows, version 24.0. Continuous variables were described using the mean and standard deviation (SD), while categorical variables were presented as frequencies and percentages.

Ethical Considerations

This study was ethically approved by the Medical Research Ethics Committee of the Faculty of Medicine and Health Sciences at the University of Science and Technology, Aden, Yemen (MEC/AD0143), and administrative permission was obtained from the USTH. All patients' information was handled confidentially.

RESULTS

Frequency of GBS Patients

A total number of 256 patients were diagnosed with GBS over ten years, with an increased prevalence during the last three years (Table 1).

Table 1: Frequency of GBS Patients Over the Years (2014–2023), (n= 256)

Year	Frequency	Percentage (%)
2014	10	(3.9)
2015	15	(5.9)
2016	20	(7.8)
2017	25	(9.8)
2020	35	(13.7)
2021	50	(19.5)
2022	56	(21.8)
2023	45	(17.6)
Total	**256**	**(100%)**

Socio-Demographic Characteristics of the Patients

The mean age of patients was 38.65±19.8 years. The most common age group affected was 21–60 years (61.8%) (Table 2). In addition, there was a distinct male predominance (69.9%).

Table 2: Socio-demographic characteristics of GBS Patients, (n=256).

Age Group (years)		**Frequency**	**(%)**
	0–20	57	(22.4)
	21–40	79	(30.9)
	41–60	79	(30.9)
	61–85	41	(16.1)
	Mean (SD)	38.65 (19.8)	
Gender	Male	179	(69.9)
	Female	77	(30.1)
Marital Status	Unmarried	116	(45.3)
	Married	140	(54.7)
Total		**256**	**(100)**

Chronic Diseases and Antecedent Events

The majority of patients (74.2%) had no chronic diseases. Diabetes mellitus was the most common comorbidity. Among those with an identified antecedent, respiratory tract infection (29.7%) was the most frequent, followed by gastroenteritis (13.3%) (Table 3).

https://doi.org/10.20428/yjms.v20i4.3659
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Table 3: Chronic Diseases and Antecedent Events among GBS Patients, (n=256).

		Frequency	(%)
Chronic Disease	No chronic disease	190	(74.2)
	Chronic Disease	66	(25.8)
	Diabetes mellitus	32	(48.5)
	Hypertension	11	(16.7)
	Hypertension + Diabetes mellitus	10	(15.2)
	Bronchial asthma	5	(7.6)
	Chronic liver disease	5	(7.6)
	Rheumatic heart disease	2	(3.0)
	Hypothyroidism	1	(1.5)
Antecedent Event	No known risk	124	(48.4)
	Respiratory tract infection	76	(29.7)
	Gastroenteritis	34	(13.3)
	Both	22	(8.6)
Total		**256**	**(100)**

Clinical Features of GBS Patients

The most common presentation was bilateral ascending paralysis (47.7%). Bulbar palsy (29.2%) and facial palsy (23%) were the most common cranial nerve involvement. Most patients were without autonomic dysfunction (87.2%) and without respiratory involvement (93.75%). Areflexia (33.5%) and hyporeflexia (18.8%) were reported in over half of the

Table 4: Clinical Features of GBS Patients, (n=256)

Clinical Features of GBS		Frequency	(%)
Limb involvement	Bilateral ascending paralysis	122	(47.7)
	Both paralysis with paresthesia	99	(38.7)
	Back and limb	31	(12.1)
	Without limb involvement	4	(1.6)
Neuropathic pain	Back and limb	31	(12.1)
	Without neuropathic pain	225	(87.9)
Cranial nerve involvement	Bulbar palsy	75	(29.2)
	Dysphagia	52	(20.3)
	Difficult speaking	20	(7.8)
	Drooling	3	(1.17)
	Facial palsy	59	(23)
	Ophthalmoplegia	11	(4.3)
	Vestibulocochlear palsy	2	(0.8)
	Without cranial nerve involvement	34	(13.5)
Autonomic dysfunction	Urine dysfunction	22	(8.6)
	Stool dysfunction	11	(4.2)
	Without	223	(87.2)
Respiratory involvement	Respiratory distress	16	(6.25)
	Without	240	(93.75)
Deep tendon reflex	Areflexia	86	(33.5)
	Hyporeflexia	48	(18.8)
	Normal	116	(45.3)
	Hyperreflexia	6	(2.3)
Total		**256**	**(100)**

https://doi.org/10.20428/yjms.v20i4.3659
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Diagnostic Methods

Table 5 shows that EMG/NCV (33.7%) was the most common specialized investigation. Notably, 32% of GBS patients were diagnosed without any of the major investigations. LP was performed in only 4.7% of cases as a standalone test.

Table 5: Diagnostic Methods of GBS, (n=256)

Diagnostic Methods of GBS	Frequency	(%)
EMG/NCV[1]	86	(33.7)
Spinal MRI[2]	36	(14.1)
LP[3]	12	(4.7)
EMG + MRI	28	(11)
EMG + LP	9	(3.5)
LP + MRI	2	(0.8)
EMG + LP + MRI	1	(0.4)
No investigation	82	(32)
Total	**256**	**(100)**

1= Electromyography, Nerf Conduction Velocity, 2= spinal Magnetic Resonance Imaging, 3= Lumber Puncture

Management of GBS Patients

The most common management approach was physiotherapy only (43.0%). IVIG was included in the regimen of 40.6% of patients. Plasmapheresis (PE) was the least used treatment, involved in only 11.7% of cases. 9% of patients received no management at all (Table 6).

Table 6: Management of GBS Patients (n=256)

Management Type	Frequency	(%)
Physiotherapy	110	(43)
IVIG[1] + Physiotherapy	71	(27.7)
No management	23	(9)
IVIG	22	(8.6)
Plasmapheresis + Physiotherapy	17	(6.6)
IVIG + Plasmapheresis + Physiotherapy	9	(3.5)
Plasmapheresis	2	(0.8)
IVIG + Plasmapheresis	2	(0.8)
Total	**256**	**(100)**

1= IVIG: intravenous immunoglobulin

DISCUSSION

This was, to the best of our knowledge, the first retrospective study that studied GBS patients in Sana'a City. The current study showed that males were the most affected gender (69.9%), consistent with findings in Jordan by Al-Hayk [15] and in Iran by Ansari [16]. Diabetes mellitus was the most reported comorbidity; a similar finding was seen in Saudi Arabia by Alanazy [17]. The association of GBS with other diseases that disturb the immune system should be more examined.

Respiratory tract infection (29.7%) was the most frequently reported trigger, followed by gastroenteritis (13.3%). This aligns with the findings of Sudulagunta [18] and Shrivastava in India [19], supporting the role of infectious agents in triggering the immune response as it was discussed by Willson [2] and Yuki [3]. A more specific study of types of infection is recommended to establish more advanced preventive measures and guidelines.

The hallmark presentation was bilateral ascending paralysis and high rates of areflexia/hyporeflexia, consistent with results found by Shrivastava [19] and Bölükbaşi [20], with bulbar palsy being the most common cranial nerve involvement.

The reliance on clinical diagnosis, with 32% of patients receiving no major investigative workup, highlights resource limitations. While EMG/NCV was the most common specialized test, LP was performed infrequently (4.7%), contrasting sharply with its importance as a diagnostic tool, which was mentioned by Ropper [9] and Almalki [21].

Physiotherapy was the primary intervention. The utilization of GBS-specific therapy, IVIG (40.6%) and plasmapheresis (11.7%) of cases, reflects the low economic status in our country; this differs significantly from other studies where these treatments are near-universal [15, 17, 22]. This disparity likely reflects challenges in accessing and affording disease-modifying therapies according to the local setting.

Limitations

This study's limitations include its retrospective nature and limited sources for diagnosis, treatment, and long-term follow-up, which limited the ability to subtype GBS and determine accurate outcomes.

CONCLUSION

GBS is a peripheral neuropathy disease and seems to affect all age groups, with a male preponderance at USTH. The number of cases has shown a noticeable increase over the last three years, which emphasizes

more research on this area. The most common antecedent event and presenting feature were respiratory tract infection and gastroenteritis manifestation, respectively. The clinical presentation is typical, characterized by bilateral ascending paralysis, paresthesia, areflexia, and sphincter dysfunction.

Recommendations

- Prospective studies and comprehensive investigation with long-term follow-up of GBS patients are needed to get more accurate results regarding predisposing factors, causes, and outcomes of GBS.
- Establish a national policy for the registration, diagnosis, and management of GBS.

Acknowledgment

The authors thank the staff of the Faculty of Medicine and Health Sciences Hospital for their cooperation.

Authors' Contributions

AS, ESA, ASA, RDM, and MSA designed the study; ESA, ASA, RDM, KMD, OFW, and BAA contributed to data collection; ESA, ASA, and RDM contributed to data analysis and interpretation of results. AS, ESA, ASA, RDM, KMD, OFW, BAA, AYK, KWY, NAA, MSA, and ASH drafted and revised the manuscript. All authors read and approved the final manuscript.

Data Availability

All data are available upon reasonable request.

Funding

This study did not receive a special fund.

Conflict of Interest

The authors declare that they have no conflict of interest associated with this article.

REFERENCES

1. Nguyen TP. Guillain-Barre syndrome. U.S. National Library of Medicine; 2023 [Internet]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK532254/
2. Willison HJ, Jacobs BC, van Doorn PA. Guillain-Barré Syndrome. *Lancet*. 2016;388(10045):717–27.
3. Yuki N, Hartung H-P. Guillain-Barré Syndrome. *N Engl J Med*. 2012;366(24):2294–304.
4. Kuwabara S, Yuki N. Axonal Guillain-Barré syndrome: concepts and controversies. *Lancet Neurol*. 2013;12(12):1180–8.
5. Leonhard SE, van der Eijk AA, van Doorn PA, Jacobs BC. Diagnosis and management of Guillain-Barré syndrome in ten steps. *Nat Rev Neurol*. 2019;15(11):671–83.
6. Sejvar JJ, Baughman AL, Wise M, Morgan OW. Population incidence of Guillain-Barré syndrome: a systematic review and meta-analysis. *Neuroepidemiology*. 2011;36(2):123–33.
7. Alshekhlee A, Hameed NA, Nelson KR. Guillain-Barré syndrome: incidence and mortality rates in US hospitals. *Neurology*. 2008;70(18):1608–13.
8. Fokke C, van Doorn PA, Jacobs BC. Diagnosis of Guillain-Barré syndrome and validation of Brighton criteria. *Brain*. 2014;137(1):33–43.
9. Ropper AH, Samuels MA, Klein JP. *Adams and Victor's Principles of Neurology*. 12th ed. New York: McGraw-Hill; 2023.
10. Hughes RA, Swan AV, van Doorn PA. Intravenous immunoglobulin for Guillain-Barré syndrome. *Cochrane Database Syst Rev*. 2014;9:CD002063.
11. Raphael JC, Chevret S, Hughes RA, Annane D. Plasma exchange for Guillain-Barré syndrome. *Cochrane Database Syst Rev*. 2012;7:CD001798.
12. Hughes RA, Cornblath DR. Guillain-Barré syndrome. *Lancet*. 2005;366(9497):1653–66.
13. Ralston SH, Penman ID, Strachan MWJ, Hobson RP. *Davidson's Principles and Practice of Medicine*. 23rd ed. London: Elsevier; 2023. p. 1417–9.
14. Khedr EM, Ahmed MA, Alattar AM. Epidemiological, clinical, and electrophysiological study of Guillain-Barré syndrome in Egypt. *J Clin Neuromuscul Dis*. 2018;19(4):194–200.
15. Al-Hayk K, Aqaileh S, Smadi MM, Abuzant M, Al-Adwan S, Al-Quraishi F, et al. Clinical characteristics and management outcomes of Guillain-Barré syndrome: eight-year experience at a tertiary center in Jordan - a retrospective cohort study. *Ann Med Surg (Lond)*. 2023;85(7):3298-3302.

16. Ansari B, Basiri K, Derakhshan Y, et al. Epidemiology and Clinical Features of Guillain-Barre Syndrome in Isfahan, Iran. *Adv Biomed Res*. 2018; 7:87.

17. Alanazy MH, Bakry SS, Alqahtani A, et al. Clinical features and outcome of Guillain-Barre syndrome in Saudi Arabia: a multicenter, retrospective study. *BMC Neurol*. 2021;21(1):275.

18. Sudulagunta SR, Sodalagunta MB, Sepehrar M, Al-Asmi A, Al-Futaisi A, Al-Hussaini A. Guillain-Barré syndrome: clinical profile and management. *Ger Med Sci*. 2015;13:Doc16.

19. Shrivastava M, Nehal S, Seema N. Guillain-Barre syndrome: Demographics, clinical profile & seasonal variation in a tertiary care centre of central India. *Indian J Med Res*. 2017;145(2):203-8.

20. Bölükbaşi F, Ersen G, Gündüz A, et al. Guillain-Barré Syndrome and Its Variants: Clinical Course and Prognostic Factors. *Noro Psikiyatr Ars*. 2019;56(1):71-4.

21. Almalki S, Alghamdi L, Khayyat J, et al. Characteristics of Patients Diagnosed with Guillain-Barré Syndrome at King Abdulaziz University Hospital, Jeddah, Saudi Arabia, From 2000 to 2018. *Cureus*. 2023;15(11):e48703.

22. Al Maawali SM, Al Shibani AY, Nadeem AS, Al-Salti AM. Guillain-Barre syndrome: demographics, clinical features, and outcome in a single tertiary care hospital, Oman. *Neurosciences (Riyadh)*. 2020;25(5):369-74.