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# Clinico-epidemiological profile and prediction of outcome in children with Guillain-Barre syndrome

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## Abstract

**Background** Guillain-Barré Syndrome (GBS) is a rare but serious immune-mediated neuropathy characterized by acute-onset motor weakness and potential respiratory failure. Its pathogenesis often involves molecular mimicry triggered by antecedent infections, leading to autoimmune targeting of peripheral nerves. Epidemiological data suggest a correlation between infectious outbreaks and increased GBS incidence, as exemplified by the 2025 surge in cases associated with *Campylobacter jejuni* enteritis in Pune, India.

**Methods** This prospective observational study was conducted over 24 months in the Pediatric Intensive Care Unit (PICU) of a tertiary care hospital. Ethical approval was obtained. Consecutive enrolment included children aged 2–14 years diagnosed with GBS who presented within two weeks of symptom onset. Comprehensive clinical, electrophysiological, and treatment data were collected. Patients were prospectively followed for six months, and outcomes were assessed using the GBS Disability Score. The modified Erasmus GBS outcome Score (mEGOS) and Erasmus GBS Respiratory Insufficiency Score (EGRIS) were applied for prognostic evaluation.

**Results** The study cohort comprised 27 children, with males aged 5–9 years being the most commonly affected. The mean (± SD) age was 6.56 (± 3.00) years. All participants reported antecedent illnesses, predominantly gastroenteritis. Clinically, symmetric motor weakness was observed in 81.5%, and 77.8% exhibited sensory involvement. Respiratory compromise requiring mechanical ventilation occurred in 11.1% of patients. Electrophysiological studies identified acute motor axonal neuropathy (AMAN) as the predominant variant, with acute motor sensory axonal neuropathy (AMSAN) demonstrating more severe clinical courses, including higher ventilation requirements and poorer functional outcomes. Prognostic assessment revealed median (IQR) mEGOS scores of 5 (4,6) at admission and 4 (3,6) at 1-week post-admission. These scores significantly predicted outcomes at 4 weeks, 3 months, and 6 months, with higher scores correlating with greater disability. The cohort's mean EGRIS score was 5.67, with higher scores predictive of increased mechanical ventilation requirements.Notably, all patients achieved favourable outcomes with no mortality, highlighting the effectiveness of the implemented management protocol.

**Conclusion** Our findings demonstrate that mEGOS and EGRIS are effective prognostic tools in pediatric GBS. The mEGOS reliably predicts functional outcomes at multiple recovery stages, while the EGRIS is particularly useful in early identification of patients at risk for respiratory failure requiring mechanical ventilation.

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**Keywords** Prognostic model, mEGOS, EGRIS, Guillain-Barre syndrome

## Background

Guillain-Barré syndrome (GBS), historically known as Landry's ascending paralysis, is an immune-mediated polyradiculoneuropathy characterized by the acute to subacute onset of flaccid paralysis [1]. With an estimated incidence of 0.6-4.0 cases per 100,000 person-years [2, 3], this heterogeneous disorder is the most common cause of acute flaccid paralysis in the post-polio eradication era, affecting all age groups across the globe.

GBS presents as rapidly progressive, ascending, areflexic flaccid paralysis, often accompanied by sensory disturbances. Current first-line treatments include intravenous immunoglobulin (IVIg) and therapeutic plasma exchange (TPE), with most patients achieving functional recovery within six months [4, 5]. Western clinical trials report mortality rates of 3–7% and persistent ambulatory impairment in 15–20% of previously non-ambulatory patients at six-month follow-up [4, 6]. Paediatric populations generally exhibit more favourable outcomes, including faster recovery and lower mortality (3–5%), largely due to a risk of respiratory failure resulting from neuromuscular weakness and autonomic dysfunction [7]. The clinical heterogeneity and low incidence of GBS pose significant challenges to conducting robust randomized controlled trials. This highlights the urgent need for accurate early prognostic stratification, particularly for identifying children who may benefit from escalated immunotherapy. Early intervention is critical, as therapeutic efficacy diminishes with disease progression.

The Dutch Erasmus GBS Research Group developed two validated prognostic tools: the Erasmus GBS Outcome Score (EGOS) and its modified version (mEGOS), which predict the probability of independent ambulation at 6 months. The Erasmus GBS Respiratory Insufficiency Score (EGRIS) predicts the risk of requiring mechanical ventilation within the first week of illness [5]. However, these scoring systems were initially validated in multicentre studies involving Dutch and Asian cohorts, primarily in adult populations [8]. Evidence supporting their accuracy and clinical utility in paediatric GBS patients remains limited, revealing a critical knowledge gap in childhood-onset disease management.

The study aims to evaluate the prognostic accuracy of EGOS/mEGOS and EGRIS in predicting functional recovery trajectories, mechanical ventilation requirements, and long-term disability outcomes in children with GBS.

## Methods

The prospective study was conducted over a 24-month period in the pediatric intensive care unit of a tertiary care referral center in Eastern India. Treatment-naïve children aged between 2 and 14 years who met the standardized Brighton criteria for GBS [5, 9] and presented within 14 days of symptom onset, with poliovirus infection systematically excluded per national surveillance protocols, were enrolled. Following immediate stabilization, all participants underwent a comprehensive clinical evaluation, including detailed neurological examination and nerve conduction studies. Patients received protocolized management with IVIg (2 g/kg over 5 days), with mechanical ventilation initiated when indicated. Using standardized case report forms, the demographic characteristics, clinical presentation patterns, treatment responses, and serial outcome measures, including the GBS Disability Score (GDS) were prospectively collected. mEGOS and EGRIS were calculated at admission and on day 7 to assess their predictive validity for short-term and long-term outcomes.

EGOS incorporates three key prognostic variables: patient age, presence of preceding diarrheal illness, and GDS at day 14 of hospitalization. mEGOS allows for earlier prognostic assessment, applicable at admission and day 7 of hospitalization. The mEGOS score is calculated based on age, history of diarrheal illness, and the Medical Research Council (MRC) sum score, with total scores ranging from 0 to 9 at admission and 0–12 by day 7 [8]. In contrast, EGRIS is calculated using three admission parameters: duration of weakness before hospitalization, presence of facial and/or bulbar weakness, and the MRC sum score at presentation [10].

Patients were prospectively followed for six months, with serial outcome assessments using the GDS at 4 weeks, 3 months, and 6 months post-admission. Poor functional outcomes were identified as GDS ≥ 3 (indicating significant disability) and favorable outcomes as GDS < 3 (indicating minimal or no disability). The predictive validity of mEGOS scores was evaluated through correlation analysis with GDS outcomes at each time point. The study protocol received formal approval from the Institutional Scientific Advisory Committee and Ethics Review Board (Reference No IEC/IMS.SH/SOA/2023/484), with written informed consent obtained from all participants' legal guardians before enrollment.

All analyses were performed using SPSS (version 26.0; IBM Corp.) and R software. Categorical variables are presented as frequencies and proportions, while continuous variables are shown as mean ± standard deviation for normally distributed data or median (interquartile range

**Table 1** Baseline characteristics of the study population

| Variable | Summary statistics (*n* = 27) |
|---|---|
| **Mean (± SD) age in years** | 6.56 (± 3.00) |
| **Age group, *n* (%)** | |
| < 5 years | 8 (29.63%) |
| 5–9 years | 12(44.44%) |
| >=10 years | 7(25.93%) |
| **Gender distribution, *n* (%)** | |
| Female | 13(48.1%) |
| Male | 14(51.9%) |
| **Seasonal distribution, *n* (%)** | |
| Autumn | 5(18.5%) |
| Spring | 10(37%) |
| Summer | 6(22.2%) |
| Winter | 6(22.2%) |
| **Antecedent illness, *n* (%)** | |
| Diarrhea | 19(70.4%) |
| Respiratory illness | 8(29.6%) |
| **Median (IQR) day of illness at presentation** | 3(3,5) |
| **Salient clinical features, *n* (%)** | |
| Loss of ambulation | 22(81.5%) |
| Symmetric motor involvement | 27(100%) |
| Neuropathic pain | 21(77.8%) |
| Areflexia | 27(100%) |
| Bulbar involvement | 1(3.7%) |
| Facial nerve involvement | 2(7.4%) |
| Autonomic dysfunction | 2(7.4%) |
| Respiratory weakness | 7(25.9%) |
| **Requirement for artificial ventilation** | 3(11.1%) |
| **Median (IQR) number of days of ventilation** | 4(1, 7) |
| **Median (IQR) number of days of hospitalization** | 10(8, 12) |
| **CSF Study (Albumino-cytological dissociation)** | 5(18.5%) |
| **Electrophysiological types** | |
| Acute inflammatory demyelinating polyneuropathy | 1(3.7%) |
| Acute motor axonal neuropathy | 16(59.3%) |
| Sensory motor mixed (demyelinating + axonal) | 10(37%) |
| **Median (IQR) mEGOS at admission** | 5(4,6) |
| **Median(IQR) mEGOS at 1-weekpost-admission** | 4(3,6) |
| **Treatment-related, *n* (%)** | |
| IVIg alone | 18(66.6%) |
| IVIg plus MP pulse | 5(18.5%) |
| IVIg, MP pulse & PP | 4(14.9%) |
| Improvement after treatment | 27(100%) |

[IQR]) for non-parametric distributions. The Cochran Q test for nominal paired data was used for longitudinal comparisons across three time points, with post-hoc pairwise comparisons using the adjusted McNemar test. The Wilcoxon signed-rank test compared the median (IQR) values between two paired time points. Predictive accuracy of mEGOS and EGRIS scores was evaluated through receiver operating characteristic (ROC) curve analysis, with optimal cut-off points determined using Youden's index. Model performance was quantified by the area under the curve (AUC), where values range from 0.5 (no discrimination) to 1.0 (perfect discrimination). Positive predictive value (PPV), negative predictive value (NPV), sensitivity, and specificity for each prognostic model were calculated. Between-group comparisons were performed using the chi-square test for categorical variables, independent t-test for normally distributed continuous variables (reported as mean ± SD), and Mann-Whitney U test for non-parametric continuous variables (reported as median [IQR]). Correlation analyses between continuous variables were conducted using Pearson's correlation coefficient and visualized with scatter plots. A two-tailed $p$-value < 0.05 was considered statistically significant for all analyses.

**Table 2** Comparison of the median duration of presentation with outcome at different time points

| Outcome | | Duration from onset to admission (Median (IQR)) | *p*-value |
|---|---|---|---|
| At 1 month | Disability | 5 (4, 6) | **0.002** |
| | No disability | 3 (2, 3.5) | |
| At 3 months | Disability | 6 (6, 6) | **0.004** |
| | No disability | 3 (2, 4) | |
| At 6 months | Disability | 6 (6, 6) | **0.047** |
| | No disability | 3 (3, 4) | |

## Results

The cohort comprised 27 pediatric patients who met all inclusion criteria for GBS. Demographic analysis revealed a mean age of 6.56 ± 3.00 years, with age distribution as follows: 29.6% ($n$ = 8) were preschool-aged (< 5 years), 44.4% ($n$ = 12) school-aged (5–9 years), and 25.9% ($n$ = 7) pre-adolescent (> 9 years). The cohort showed nearly equal gender distribution, 51.9% and 48.1% for males and females, respectively. Analysis of seasonal variation demonstrated a peak incidence during spring months (37%). All participants reported antecedent infections within 4 weeks prior to symptom onset, with gastrointestinal illness predominating (70.4%), followed by respiratory infections (29.6%) (Table 1).

Patients presented at a median (IQR) of 3 days (IQR: 3–5) after symptom onset, with delayed presentation significantly correlating with worse disability outcomes ($p$ < 0.05) (Table 2). At admission, 81.5% had lost ambulation, while symmetric motor weakness and areflexia were universally present. Sensory symptoms (predominantly neuropathic pain) were observed in 77.8% of cases, with 25.9% showing respiratory weakness, 7.4% presenting with facial nerve palsy or autonomic dysfunction, and 3.7% demonstrating bulbar involvement. A total of 11% ($n$ = 3) required mechanical ventilation for a median duration of 4 days (IQR: 1–7) (Table 1). Cerebrospinal

**Table 3** Comparison of seasonal distribution, outcomes, and requirement for artificial ventilation with electrophysiological types

| Ti | | NCV | | | *p*-value |
|---|---|---|---|---|---|
| | | AIDP(*n* = 1) | AMAN (*n* = 16) | AMSAN (*n* = 10) | |
| Season | Autumn | 0 (0.0%) | 0 (0.0%) | 5 (50.0%) | 0.002 |
| | Spring | 0 (0.0%) | 9 (56.25%) | 1 (10.0%) | |
| | Summer | 0 (0.0%) | 5 (31.25%) | 1 (10.0%) | |
| | Winter | 1 (100.0%) | 2 (12.5%) | 3 (30.0%) | |
| Outcome at 1 month | Disability | 0 (0.0%) | 5 (31.25%) | 6 (60.0%) | 0.220 |
| | No disability | 1 (100.0%) | 11 (68.75%) | 4 (40.0%) | |
| Outcome at 3 months | Disability | 0 (0.0%) | 1 (6.25%) | 4 (40.0%) | 0.167 |
| | No disability | 1 (100.0%) | 15 (93.75%) | 6 (60.0%) | |
| Outcome at 6 months | Disability | 0 (0.0%) | 0 (0.0%) | 2 (20.0%) | 0.198 |
| | No disability | 1 (100.0%) | 16 (100.0%) | 8 (80.0%) | |
| Requirement for artificial ventilation | Yes | 0 (0.0%) | 1 (6.25%) | 2 (20.0%) | 0.593 |
| | No | 1 (100.0%) | 15 (93.75%) | 8 (80.0%) | |

fluid (CSF) analysis revealed albumino-cytological dissociation in 18.5% of patients.

Nerve conduction studies showed acute motor axonal neuropathy (AMAN) as the predominant electrophysiological subtype (59.3%), followed by acute motor-sensory axonal neuropathy (AMSAN) (37%) and acute inflammatory demyelinating polyneuropathy (AIDP) (3.7%). A statistically significant seasonal association was observed, with AMAN cases predominantly occurring in spring ($p < 0.05$), while AMSAN cases showed a predilection for autumn. Comparative analysis revealed that patients with AMSAN consistently exhibited poorer functional outcomes (i.e., higher GDS scores at all follow-up intervals (1, 3, and 6 months) and more frequently required mechanical ventilation than other subtypes. Although these clinical observations suggested worse prognosis in AMSAN cases, the differences did not reach statistical significance in our sample (Tables 1 and 3).

The therapeutic response was favorable across the cohort, with all patients demonstrating clinical improvement (≥ 1-point reduction in GDS). Treatment modalities included IVIg monotherapy (66.7%, $n = 18$), IVIg plus methylprednisolone pulse therapy (18.5%, $n = 5$), and triple therapy with IVIg, methylprednisolone, and plasma exchange (14.8%, $n = 4$). Notably, no patients experienced treatment-related complications, including IVIg adverse effects, requirement for retreatment, clinical fluctuations, therapeutic failure, or mortality. The median duration of hospital stay was 10 days (IQR: 12–13), reflecting a consistent pattern of recovery trajectory across the cohort (Table 1).

EGRIS demonstrated significant discriminative capacity, with ventilated patients exhibiting markedly higher scores (5.67 ± 0.58) compared to non-ventilated cases (3.38 ± 0.71; $p < 0.001$). ROC analysis identified EGRIS ≥ 6 as the optimal threshold for predicting 6-month disability, based on Youden's index. This cut off yielded perfect diagnostic performances with 100% sensitivity, 100% specificity, 100% PPV, and 100% NPV) corresponding to a maximal diagnostic accuracy (AUC = 1.0). These findings confirm EGRIS is a highly reliable predictor of both the need for mechanical ventilation and long-term functional outcomes in pediatric GBS (Table 4; Fig. 1).

**Table 4** EGRIS score according to the requirement for artificial ventilation

| EGRIS score (Mean ± SD) | Requirement for artificial ventilation | *p*-value |
|---|---|---|
| 5.67 ± 0.58 | Yes | < 0.001 |
| 3.38 ± 0.71 | No | |

The proportion of patients with significant disability (GDS ≥ 3) demonstrated a progressive decline, from 40.7% at 1 month to 18.5% at 3 months and 7.4% at 6 months of follow-up ($p < 0.05$ for overall trend). Post-hoc analysis using adjusted McNemar tests confirmed significant functional improvement between the 1-month and 6-month assessments ($p < 0.05$), while pairwise comparisons of intermediate timepoints (1 vs. 3 months and 3 vs. 6 months) did not reach statistical significance ($p > 0.05$ for both). This temporal pattern suggests that most functional recovery occurs within the first three months, with continued gradual improvement through six months post-onset (Table 5).

The cohort demonstrated median mEGOS scores of 5 (IQR 4,6) at admission and 4 (IQR 3,6) at 1-week post-admission (Table 1). ROC analysis identified optimal predictive thresholds for 1-month disability: mEGOS ≥ 5 at admission showed moderate predictive value (sensitivity 90.9%, specificity 56.3%, AUC 0.79), while mEGOS ≥ 6 at 1 week exhibited excellent prognostic accuracy (sensitivity 81.8%, specificity 100%, AUC 0.95). The 1-week assessment demonstrated superior test characteristics (PPV 100%, NPV 88.9%, overall accuracy 92.6%) with a Youden's index of 0.82, suggesting greater clinical utility for monitoring disease progression (Fig. 2).

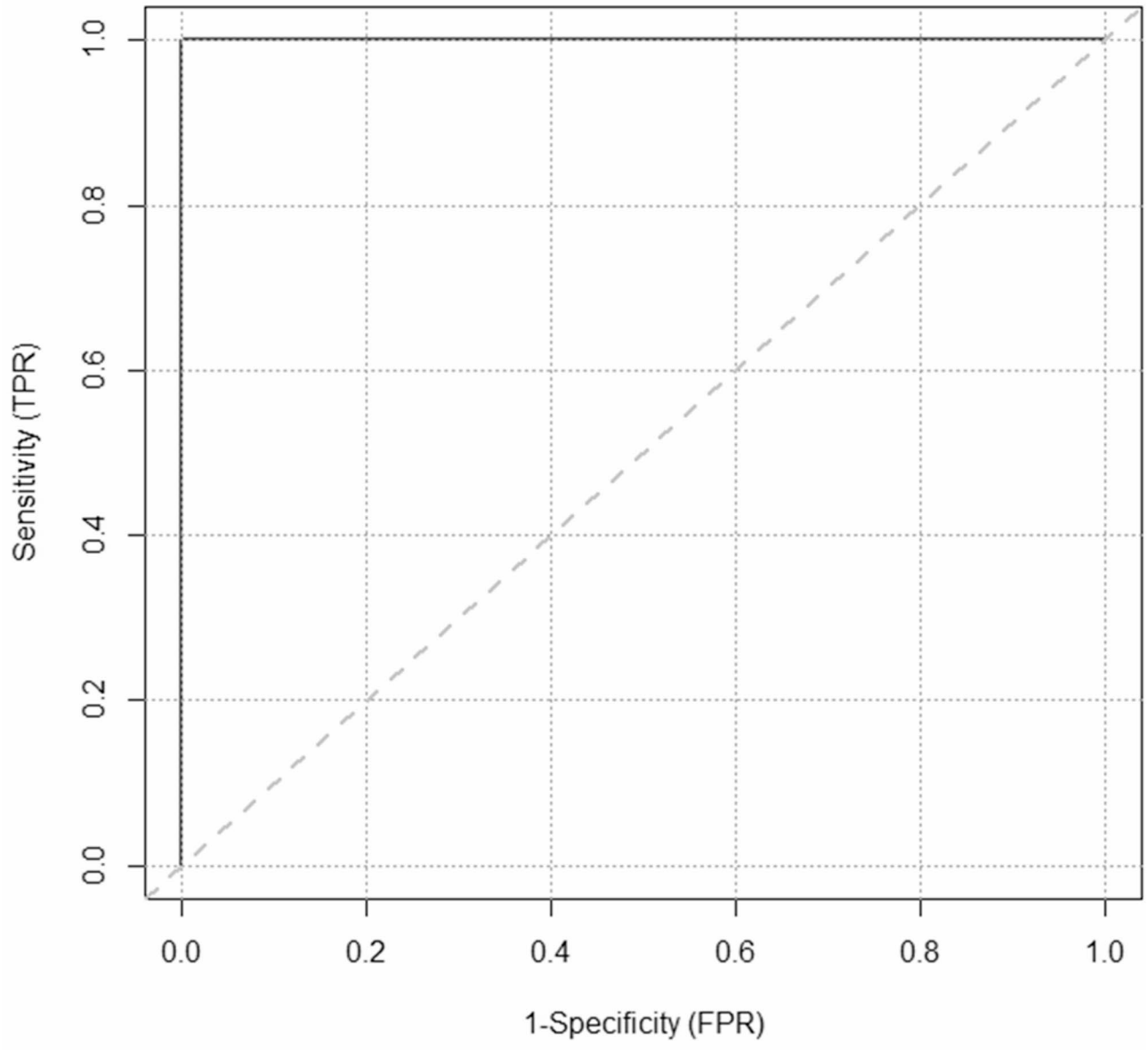


**Fig. 1** Receiver Operating Characteristic (ROC) curve of EGRIS in determining disability at 6 months

**Table 5** GBS disability score at different time points

| Time | GBS disability score | | *p*-value |
|---|---|---|---|
| | ≥ 3 | < 3 | |
| At 1 month ($n=27$) | 11 (40.7%) | 16 (59.3%) | 0.001 |
| At 3 months ($n=27$) | 5 (18.5%) | 22 (81.5%) | |
| At 6 months ($n=27$) | 2 (7.4%) | 25 (92.6%) | |

The mEGOS demonstrated a strong predictive accuracy for 3-month disability outcomes, with optimal thresholds varying by assessment timing. At admission, mEGOS ≥ 7 provided moderate predictive accuracy (AUC 0.79, sensitivity 60%, specificity 86.4%, NPV 90.5%), whereas the same threshold at 1 week showed perfect discrimination (AUC 1.0, all test characteristics 100%). The substantial increase in Youden's index from 0.46 at admission to 1.0 at 1 week underscores the critical values of serial mEGOS assessments in prognostication, with 1-week scores providing definitive prediction of 3-month disability status (Fig. 3).

For 6-month disability prediction, the mEGOS thresholds demonstrated exceptional prognostic values, exhibiting time-dependent improvements in performance. An admission mEGOS score ≥ 7 provided outstanding rule-out capacity (NPV 100%, sensitivity 100%) with strong overall accuracy (AUC 0.96, specificity 84%), while a 1-week mEGOS ≥ 10 achieved perfect prediction (AUC 1.0, all metrics 100%). The increase in Youden's index from 0.84 at admission to 1.0 at 1 week ($p < 0.001$)

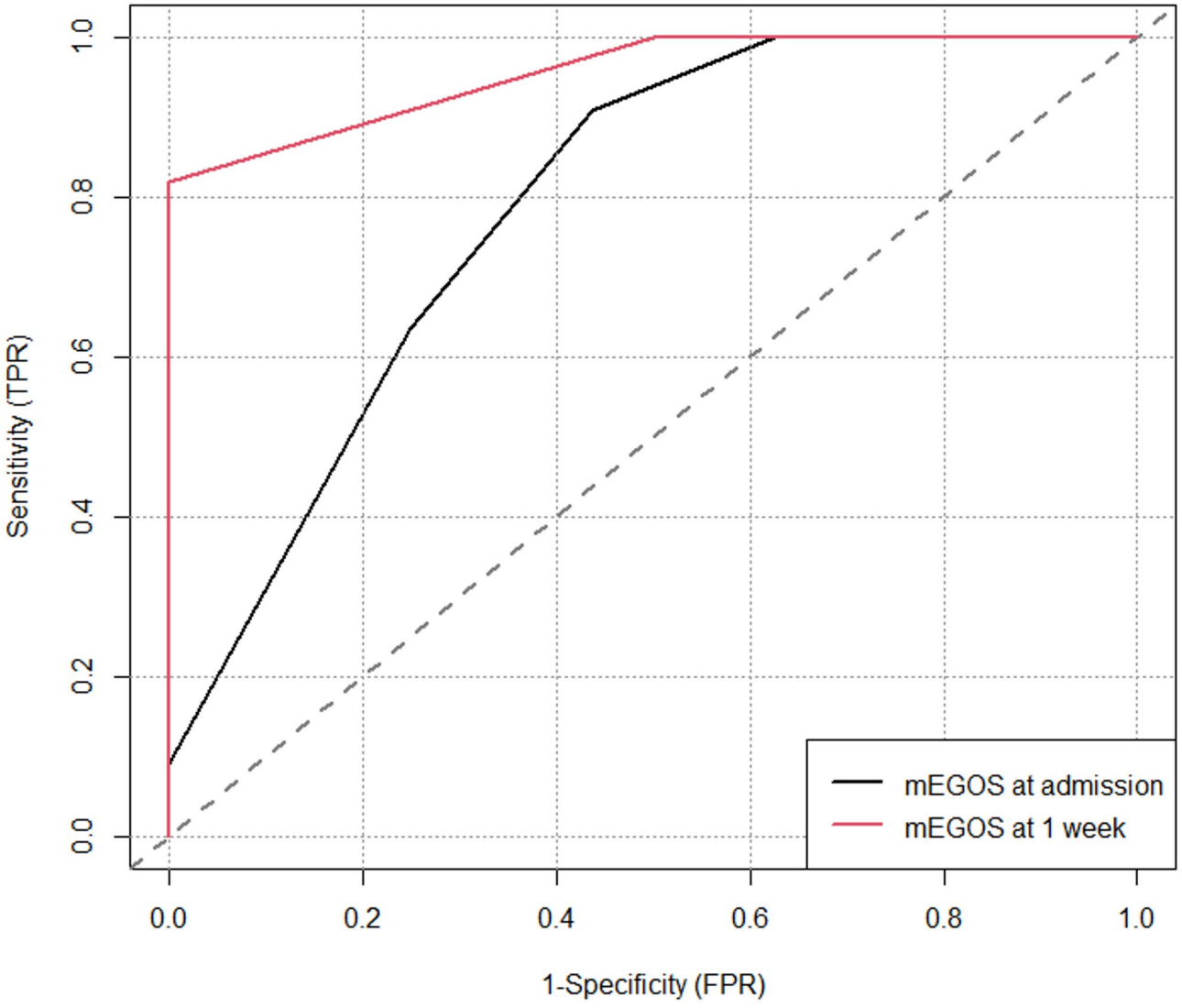


**Fig. 2** Receiver Operating Characteristic (ROC) curve of mEGOS at admission and 1 week in determining disability at 1 month

confirms that serial assessment offers prognostic insights, with 1-week evaluation enabling precise identification of patients at risk for poor 6-month outcomes (Fig. 4).

Longitudinal analysis revealed strong associations between mEGOS scores and disability outcomes across all timepoints. Both admission and 1-week mEGOS showed significant correlations with GDS at 1, 3, and 6 months ($p < 0.001$), with higher scores consistently predicting worse functional outcomes. The 1-week assessment demonstrated superior predictive value ($p < 0.001$) compared to admission scores, as evidenced by a high positive correlation with 6-month GDS (Fig. 5). In contrast to the moderate correlation observed with admission scores (Fig. 6), regression models have a more robust statistical significance (Tables 6 and 7). These findings underscore the critical importance of serial mEGOS assessments, with 1-week scores providing exceptionally reliable prognostic information for long-term recovery trajectories.

## Discussion

Guillain-Barré syndrome affects individuals across all age groups; however, our study demonstrated a predilection for male children aged 5–9 years, which is consistent with previous epidemiological reports [11, 12]. This demographic trends may be attributed to increased environmental exposure to neurotropic pathogens and age-specific vulnerabilities in peripheral nerve myelination. Current evidence indicates that approximately 70% of GBS cases are preceded by acute infections, typically occurring 1–4 weeks before symptom onset, with *Campylobacter jejuni*, *Mycoplasma pneumoniae*, Cytomegalovirus, Influenza virus, and Epstein-Barr virus representing the most commonly implicated pathogens

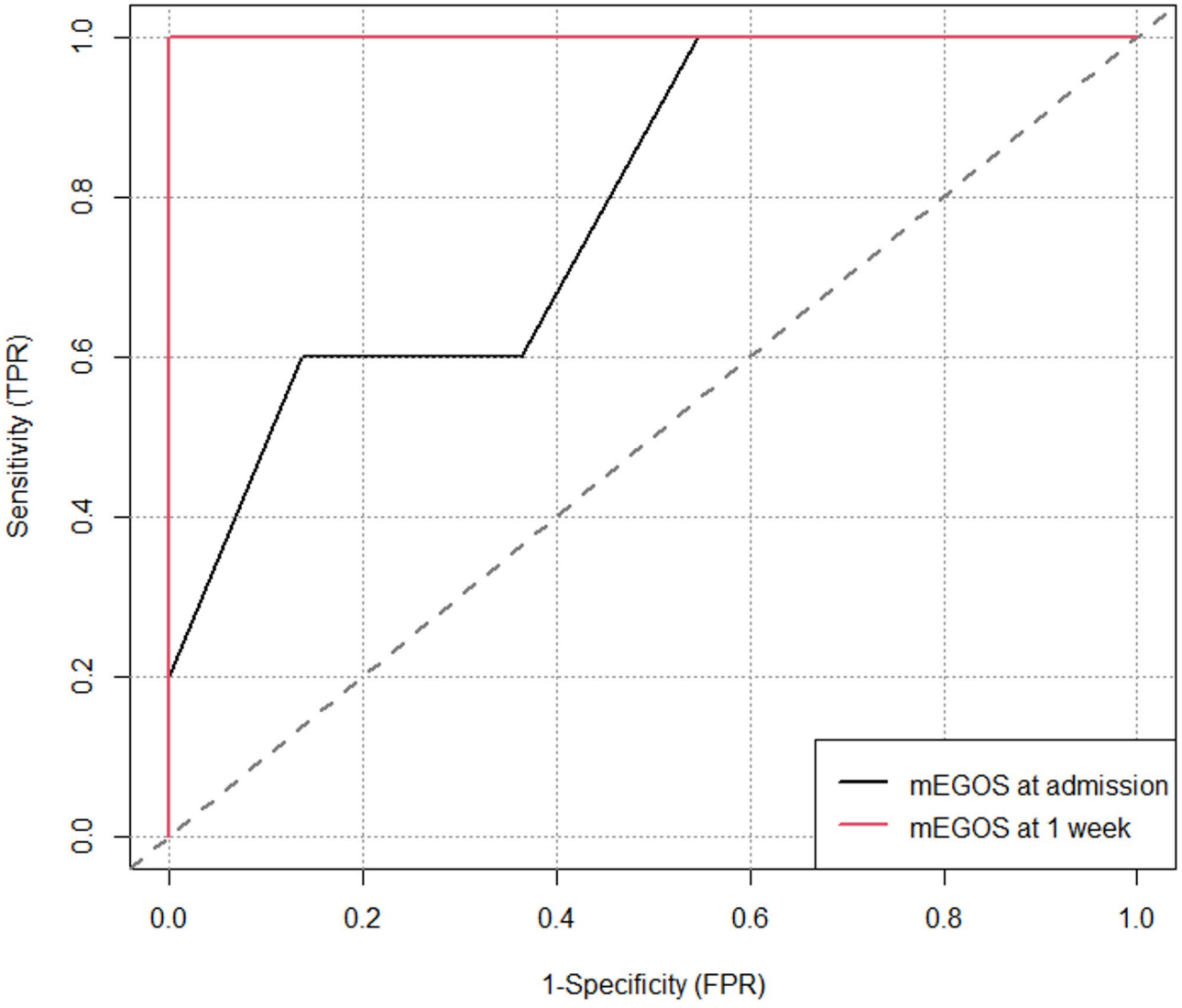


**Fig. 3** Receiver Operating Characteristic (ROC) curve of mEGOS at admission and 1 week in determining disability at 3 months

[12–14]. In our cohort, gastroenteritis was the predominant antecedent illness, aligning with global data that highlight enteric infections as a major trigger for immune-mediated neuropathies.

Although GBS occurs throughout the year, seasonal variations may reflect fluctuations in predisposing infections. Our study identified spring as the peak season, contrasting with summer/autumn predominance reported in other Asian populations [15]. Notably, we observed a significant seasonal association with electrophysiological subtype: AMAN (59.3% of cases) was the most prevalent in spring. This finding warrants further investigation into potential region-specific environmental or infectious triggers. This AMAN predominance aligns with Indian [16] and Chinese [17] studies but differs from Western reports, where AIDP is more common [18]. These geographical differences may reflect varying distributions of specific pathogens, particularly *Campylobacter jejuni*, a known AMAN trigger, and potential genetic or environmental modifiers of disease phenotype.

Our study identified the AMSAN variant as having particularly severe clinical manifestations, characterized by higher GDS at all follow-up intervals (1, 3, and 6 months) and greater dependence on mechanical ventilation compared to other electrophysiological subtypes. These findings differ from the report by Sen et al. [19], of poorer outcomes in pure axonal variants, and Durand et al.'s observation [20] of AIDP being most frequently associated with mechanical ventilation. While AMAN was the predominant subtype in our cohort (consistent with regional epidemiological patterns), AMSAN cases exhibited the worst prognosis, potentially attributable to the compounded neurological impairment from combined motor-sensory involvement, leading to more persistent

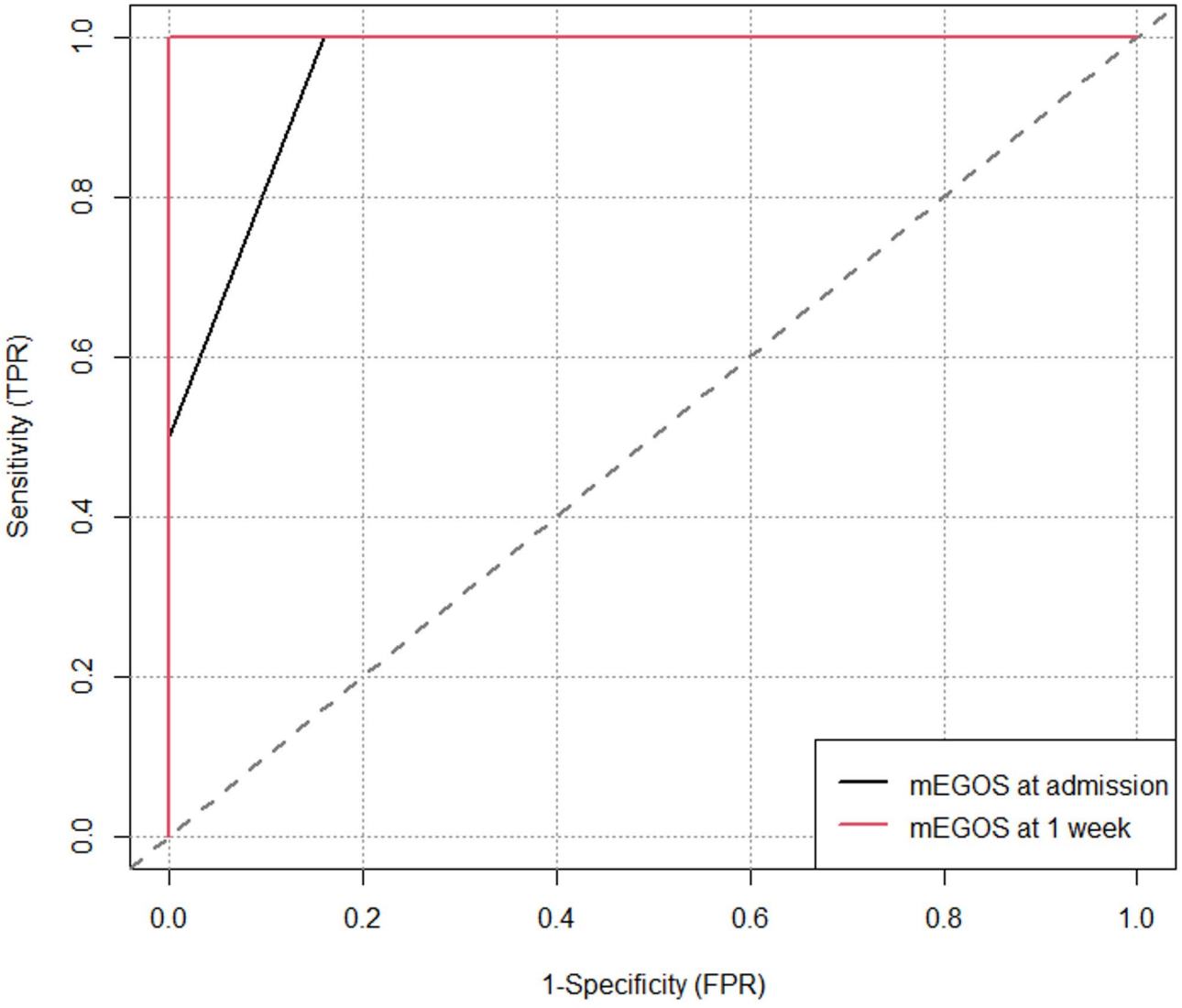


**Fig. 4** Receiver Operating Characteristic (ROC) curve of mEGOS at admission and 1 week in determining disability at 6 months

muscle weakness. This discrepancy highlights the need for subtype-specific prognostic approaches and suggests that regional differences in GBS pathophysiology may significantly influence clinical outcomes.

In our cohort study, 11.1% of patients required mechanical ventilation and exhibited significantly higher baseline EGRIS scores (5.67 ± 0.58) compared to non-ventilated cases. These results are consistent with established international studies by Qinrong et al. [21] and Yamagishi et al. [22], which confirm that an EGRIS threshold ≥ 5 is a reliable predictor of respiratory failure in pediatric GBS. The reproducibility of the association across diverse populations strengthen the clinical value of EGRIS for early identification of high-risk patients who may require intensive respiratory monitoring.

Our study further demonstrated that elevated mEGOS and EGRIS scores are strongly associated with poorer functional outcomes (GDS), as measured by mEGOS ≥ 7 at admission and ≥ 10 at 1 week, demonstrating excellent discrimination for 6-month disability (AUC 0.96 and 1.0, respectively). The superior prognostic performance of 1-week mEGOS reflects the enhanced predictive accuracy of day-7 MRC sum scores, which more accurately capture disease progression. Similarly, EGRIS ≥ 6 showed a robust correlation with adverse outcomes. While our mEGOS performance exceeded Bangladeshi reports (admission AUC 0.67 vs. 0.96; week-1 AUC 0.70 vs. 1.0) [23], such disparities may reflect regional differences in pathogen exposure, healthcare access, or genetic susceptibility, highlighting the need for population-specific validation of these prognostic tools.

The cohort demonstrated favorable long-term outcomes, with 92.7% achieving minimal disability (GDS < 3) at the 6-month follow-up - a finding consistent with

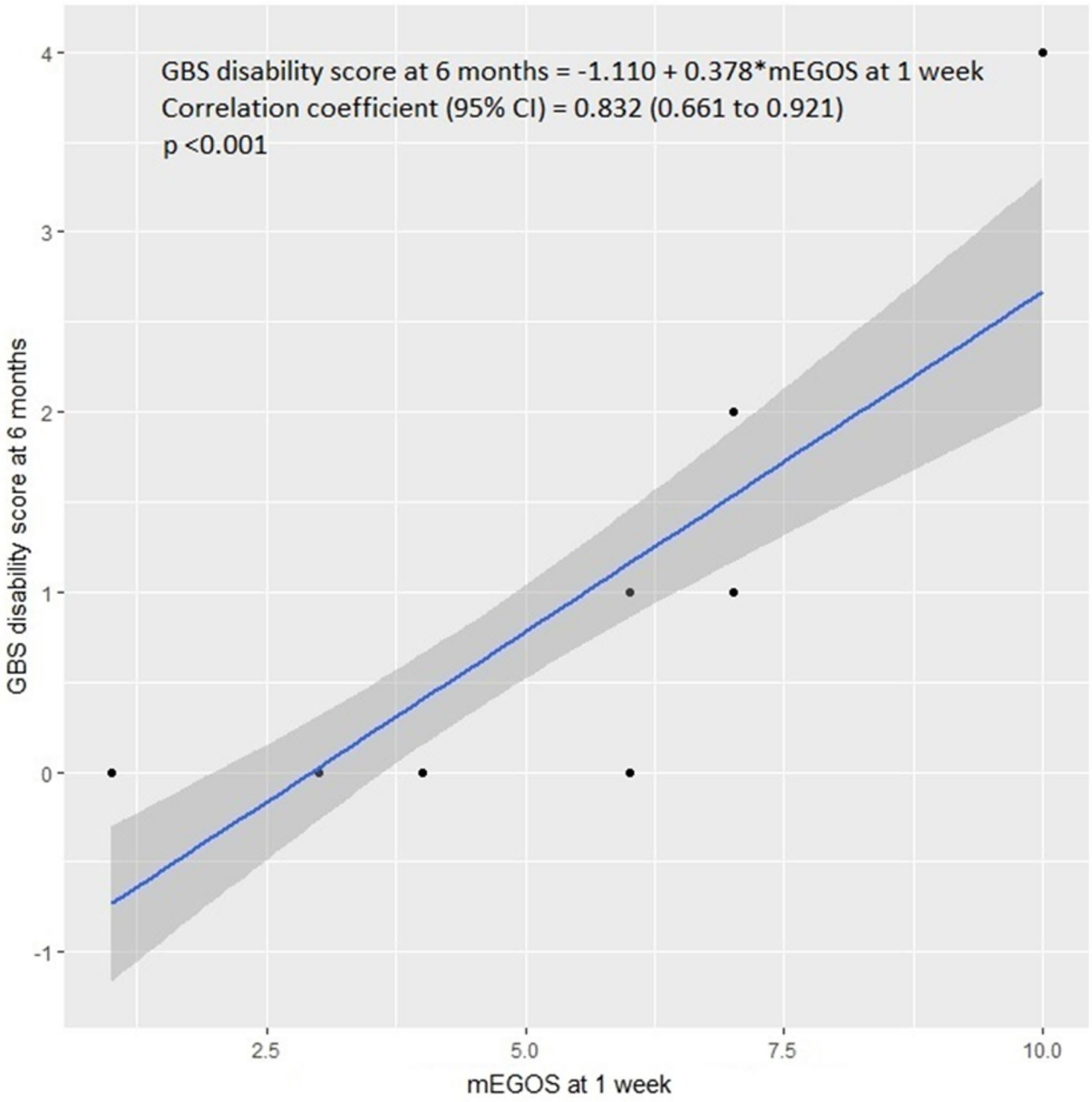


**Fig. 5** Correlation between mEGOS at 1 week and GBS disability score at 6 months

Asian populations, which report a 94.4% favorable recovery rate in Chinese cohorts [21], as well as a comparable outcome in Indian studies [16]. These findings reinforce that early recognition and protocol-driven management of pediatric GBS lead to excellent functional recovery, emphasizing the critical importance of timely intervention in optimizing neurological prognosis.

The phenotypic overlap between Guillain-Barré syndrome (GBS) and other acute pediatric neurological conditions, such as post-infectious ataxias, cerebellar syndromes, and early acute demyelinating events, necessitates the establishment of robust diagnostic frameworks. As highlighted by Garone et al. (2019) in their multicenter study [24], this diagnostic complexity is particularly challenging in resource-limited settings where delayed access to neurophysiological studies can hinder prompt differentiation. In this context, our findings on early prognostic tools (mEGOS/EGRIS) gain additional clinical relevance, as they may serve as a valuable adjunctive tool for risk stratification before confirmatory testing, guiding resource allocation in constrained environments, and supporting clinical decision

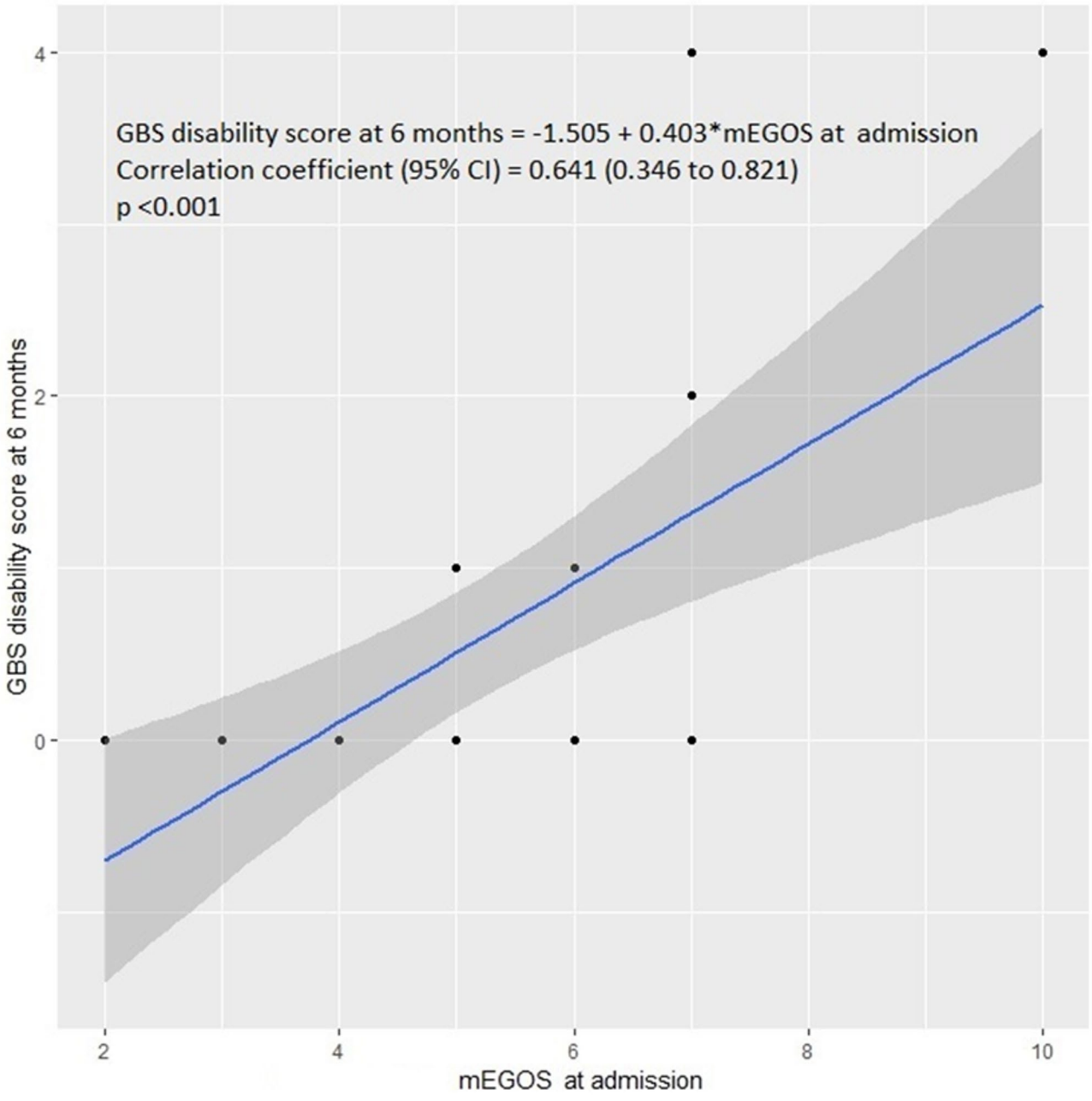


**Fig. 6** Correlation between mEGOS at admission and GBS disability score at 6 months

**Table 6** Comparison of mEGOS at admission with outcome at different time points

| Outcome | | mEGOS at admission (Mean ± SD) | *p*-value |
|---|---|---|---|
| At 1 month | Disability | 6.18 ± 1.6 | 0.007 |
| | No disability | 4.38 ± 1.54 | |
| At 3 months | Disability | 6.8 ± 2.05 | 0.016 |
| | No disability | 4.73 ± 1.52 | |
| At 6 months | Disability | 8.5 ± 2.12 | 0.003 |
| | No disability | 4.84 ± 1.49 | |

**Table 7** Comparison of mEGOS at 1 week with outcome at different time points

| Outcome | | mEGOS at 1 week (Mean ± SD) | *p*-value |
|---|---|---|---|
| At 1 month | Disability | 6.64 ± 1.96 | < 0.001 |
| | No disability | 2.88 ± 1.36 | |
| At 3 months | Disability | 8.2 ± 1.64 | < 0.001 |
| | No disability | 3.55 ± 1.68 | |
| At 6 months | Disability | 10.0 ± 0.0 | < 0.001 |
| | No disability | 3.96 ± 1.95 | |

making during diagnostic uncertainty. This dual utility of both prognostic and diagnostic underscores the importance of integrating these models into structured pediatric neurological assessment protocols.

While this study provides valuable insights into pediatric GBS prognosis, several limitations must be acknowledged. The single-centre design and modest cohort size may affect the generalizability of our findings, particularly given the disease's inherent clinical variability and low incidence. These constraints underscore the need for multicentre collaborative studies with extended follow-up periods to enhance statistical power for subtype-specific analyses, validate the models across diverse populations, and establish age-stratified reference values. The current paucity of pediatric-specific GBS research further emphasizes this imperative, as existing adult-derived prognostic parameters may not fully capture the unique pathophysiological and recovery patterns in children.

## Conclusion

The current study advances the pediatric literature on prognostication in GBS and supports the applicability of mEGOS and EGRIS, integrating diagnostic differentials and comparative multicentric data would enrich its translational relevance. Future studies should aim to establish comprehensive diagnostic and prognostic algorithms tailored for pediatric populations, supporting timely treatment decisions and targeted strategies for improved prognosis in resource-limited settings.

### Abbreviations

| | |
|---|---|
| GBS | Guillain Barre Syndrome |
| PPV | Positive Predictive Value |
| NPV | Negative Predictive Value |
| NCV | Nerve Conduction Velocity |
| AMAN | Acute Motor Axonal Neuropathy |

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### Author contributions

DP and VA analyzed the data and prepared the manuscript draft. AN reviewed the manuscript. All authors read and approved the final manuscript.

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### Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

## Declarations

### Ethics approval and consent to participate

The study received ethical approval from the Research Ethics Review Committee of IMS and SUM Hospital, Siksha 'O' Anusandhan, Deemed to be University, Bhubaneswar, vide ref.no/IEC/IMS.SH/SOA/2023/484. Written informed consent was obtained from all participants and their caregivers.

### Consent for publication

Not applicable.

### Competing interests

The authors declare that they have no competing interests.

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