

# Impact of the COVID-19 Pandemic on the Frequency, Clinical Spectrum and Outcomes of Pediatric Guillain-Barré Syndrome in India: A Multicentric Ambispective Cohort Study

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## Abstract

**Objective:** To study impact of COVID-19 pandemic on frequency, clinical/electrophysiological profile and treatment outcomes in pediatric Guillain-Barré syndrome (GBS). **Background:** GBS is the most frequent cause of pediatric acute flaccid paralysis. The effect of the COVID-19 pandemic on pediatric GBS is unclear in the literature. **Methods:** We conducted an ambispective, multicentric, cohort study involving 12 of 27 centres in GBS Consortium, during two periods: pre-COVID-19 (March-August 2019) and during COVID-19 (March-August 2020). Children  $\leq 12$  years who satisfied National Institute of Neurological Diseases and Stroke criteria for GBS/variants were enrolled. Details pertaining to clinical/laboratory parameters, treatment and outcomes (modified Rankin Scale (mRS) at discharge, GBS Disability score at discharge and 3 months) were analysed. **Results:** We enrolled 33 children in 2019 and 10 in 2020. Children in 2020 were older (median 10.4 [interquartile range 6.75–11.25] years versus 5 (2.5–8.4) years;  $P = 0.022$ ) and had more sensory symptoms (50% versus 18.2%;  $P = 0.043$ ). The 2020 group had relatively favourable mRS at discharge (median 1 (1–3.5) versus 3 (2–4);  $P = 0.042$ ) and GBS disability score at 3 months (median 0 (0–0.75) versus 2 (0–3);  $P = 0.009$ ) compared to 2019. Multivariate analysis revealed bowel involvement ( $P = 0.000$ ) and ventilatory support ( $P = 0.001$ ) as independent predictors of disability. No child in 2020 had preceding/concurrent SARS-CoV2 infection. **Conclusions:** The COVID-19 pandemic led to a marked decline in pediatric GBS presenting to hospitals. Antecedent illnesses, clinical and electrophysiological profile of GBS remained largely unchanged from the pre-pandemic era.

**Keywords:** AIDP, AMAN, COVID-19, IVIg, Guillain-Barré syndrome, SARS-CoV2

## INTRODUCTION

Guillain-Barré syndrome (GBS) is the most frequent cause of pediatric acute flaccid paralysis.<sup>[1]</sup> It is characterized by rapidly developing, symmetrical ascending weakness, areflexia and usually a monophasic course. Based on clinical and electrophysiological features, GBS is subclassified into several variants; classically, these include acute demyelinating inflammatory polyneuropathy (AIDP) and acute motor axonal neuropathy (AMAN). Children generally have more favorable long-term outcomes compared to adults, with excellent motor recovery.<sup>[2]</sup>

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Since the advent of the coronavirus disease-19 (COVID-19) pandemic, a slew of reports and reviews on GBS linked with the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) have emerged.<sup>[3-7]</sup> However, a large study conducted in the United Kingdom could not find any epidemiological or phenotypic association between SARS-CoV-2 and GBS.<sup>[8]</sup> In contrast, an Italian study found COVID-19-related GBS to be more severe compared to non-COVID-related GBS, and more frequently demyelinating.<sup>[9]</sup> A Spanish study observed that COVID-19-related GBS patients required intensive care admissions more, without increase in mortality compared to control groups.<sup>[10]</sup> Moreover, a definite decline in admission rates for cardiovascular events and stroke has been reported from several centers worldwide.<sup>[11-13]</sup>

Children account for 1 to 5% of COVID-19 cases, and have milder disease and favorable prognosis compared to adults.<sup>[14]</sup> However, a host of neurological associations have been reported with SARS-CoV2. In a case series of four children below 18 years of age with severe COVID-19 infection, neurological features included headache, encephalopathy, brainstem and cerebellar signs, reduced reflexes, and myopathy.<sup>[15]</sup> In a series of three children from India, two fulfilled criteria for multisystem inflammatory syndrome in children (MIS-C) and one presented with febrile status epilepticus.<sup>[16]</sup> The first pediatric GBS case in a 15-years old boy was reported in July 2020,<sup>[17]</sup> and was followed by a few more case reports.<sup>[18-22]</sup>

A decline in the number of patients with GBS observed during the pandemic has been hypothesized to be partly a sequel of decrement in transmission of infections during the pandemic, rather than due to decline in hospital admission rates.<sup>[8]</sup> As is evident from above, although literature has accumulated on a proposed association between SARS-CoV2 and GBS, there is no data on the ramifications of the pandemic on GBS presentation and outcomes among children.

In this multicentric, hospital-based ambispective cohort study, we aimed to study the impact of the COVID-19 pandemic on the frequency, clinical spectrum, and outcomes of GBS among Indian children in comparison with a similar period a year prior to the COVID-19 pandemic setting.

## METHODS

### Study design

We conducted a nationwide, multicentric, observational cohort study involving 27 centres in India through a GBS consortium among both adult and paediatric patients. Paediatric data was utilised for the purpose of this study, which was obtained from 12 centres. Data were collected over two epochs of time: during the pre-COVID-19 period (spanning from 1<sup>st</sup> March to 31<sup>st</sup> August 2019) and during the COVID-19 pandemic (from 1 March to 31 August 2020). Ethics clearance was obtained from the local institutional ethics committee of each centre. Consent was obtained as necessitated by the individual centre's ethics committee. The study was registered with Clinical Trial Registry India (CTRI/2020/11/029143).

### Study participants

Children <12 years were recruited on a consecutive basis, if they could be categorised as GBS or its variants, based on the diagnostic criteria specified by the National Institute of Neurological Disorders and Stroke (NINDS) Committee, and were admitted to the hospital within four weeks of onset of symptoms.<sup>[23]</sup> The NINDS criteria combine clinical features, findings from the cerebrospinal fluid (CSF) and nerve conduction studies (NCS) to define GBS or its variant syndromes. Children with suspected toxin-mediated neuropathies, vasculitic neuropathies and subacute inflammatory demyelinating neuropathy (SIDP) were excluded.

### Data collection

Data from the pre-COVID-19 epoch were collected retrospectively. Data during the COVID-19 pandemic period were obtained prospectively or retrospectively, based on when ethical clearance was provided from each centre. For retrospectively collected data, medical record review was conducted to retrieve information. Data was procured into a predesigned proforma and included patient demography and antecedent events (such as malignancy over the preceding six months, surgery over the preceding three months and infections over the preceding two months), autonomic dysfunction and treatment provided. Neurological symptoms and signs of GBS at study entry, at discharge from hospital and at three months post-discharge were recorded. Disability was assessed using modified Rankin scale (mRS) and GBS Disability Score, wherever applicable. Findings of nerve conduction studies (NCS) and cerebrospinal fluid (CSF) as well as other evaluation parameters available were recorded. NCS data included the local neurologist's interpretation of findings and subtype classification as AIDP, AMAN, acute motor sensory axonal neuropathy (AMSAN), inexcitable nerves, equivocal or normal findings. Deidentified data was collected from each centre and all information was stored anonymously.

### Statistical analysis

Data were presented as mean (SD)/median (IQR) and frequency (%). Continuous variables were compared using Student's *t* test (following normal distributions) or Wilcoxon's sum rank test (for nonnormal distribution). Qualitative variables were compared using Chi-square/Fisher's exact test. Univariate and stepwise multivariable logistic regression analysis were performed to observe independent effect of factors on mRS at discharge, and GBS disability score at discharge and at 3 months. A two-tailed *P* value of  $\leq 0.05$  was considered as significant. Stata version 14 (StataCorp, Lakeway Drive College Station, Texas, USA) was used for analysis.

## RESULTS

There were 33 children with GBS with symptom onset between 1 March 2019 and 31 August 2019. Ten children presented with GBS during the same period in 2020. This represented a drop in number by 69.7% compared to the pre-COVID-19 period. None

of the children in the 2020 group were documented to have preceding or concurrent SARS-CoV2 infection. The detailed clinical and laboratory features are described in Tables 1 and 2.

The median age (interquartile range [IQR]) of children in the 2019 group [5.0 (2.5-8.35) years] was significantly lower than the 2020 group [10.4 (6.75-11.25) years] ( $P = 0.022$ ). In

**Table 1: Clinical characteristics of children with GBS included in the study**

Clinical characteristics	2019 (33 cases)	2020 (10 cases)	P
Median age (years)	5 (2.50-8.35)	10.4 (6.75-11.25)	0.022
Sex (M: F)	18:15 (1.2:1)	6:4 (1.5:1)	0.761
Comorbidities	Abdominal tuberculosis-1 (3.1) Migraine- 1 (3.1) None- 31 (93.8)	None- 10 (100%)	0.585
Antecedent events	None-19 (57.6) Fever-7 (21.2) URI-4 (12.1) Gastroenteritis-3 (9.1) Vaccine-2 (6.1) Jaundice-1 (3.1)	None-6 (60) Fever-3 (30) URI-1 (10) Gastroenteritis-1 (10)	0.594
Weakness	Quadripareisis-24 (72.8) Paraparesis-9 (27.2)	Quadripareisis-8 (80) Paraparesis-2 (20)	0.644
Sensory symptoms	Yes-6 (18.2) No-27 (81.8)	Yes-5 (50) No-5 (50)	0.043
Autonomic dysfunction	Yes-3 (9.1) No-30 (90.9)	Yes-1 (10) No-9 (90)	0.931
Bladder symptoms	Yes-3 (9.1) No-30 (90.9)	Yes-1 (10) No-9 (90)	0.931
Bowel symptoms	Yes-3 (9.1) No-30 (90.9)	Yes-0 No-10 (100)	0.348
Ataxia	Yes-2 (6.1) No-31 (93.9)	Yes-4 (40) No-6 (60)	0.007
Ataxia type	Sensory-1 (3.1) Both-1 (3.1)	Sensory-3 (30) Cerebellar-1 (10)	0.014
Reflexes	Areflexia- 17 (51.5) Hyporeflexia- 12 (36.3) Hyperreflexia-1 (3.1) Normal-3 (9.1)	Areflexia-4 (40) Hyporeflexia-5 (50) Missing-1 (50)	0.614
Limb pain	Yes- 12 (36.4) No- 21 (63.6)	Yes-3 (30) No-7 (70)	0.711
Back pain	Yes- 7 (21.2) No- 26 (78.8)	Yes-2 (20) No-8 (80)	0.934
Cranial nerve involvement	Yes-9 (27.3) No- 24 (72.7)	Yes-5 (50) No-5 (50)	0.179
Facial weakness	Yes- 7 (21.2) No- 26 (78.8)	Yes-3 (30) No-7 (70)	0.564
Bulbar involvement	Yes-8 (24.2) No-25 (75.8)	Yes-4 (40) No-6 (60)	0.330
Oculomotor involvement	Yes- 1 (3.1) No- 32 (96.9)	Yes-2 (20) No-8 (80)	0.065
Ventilatory assistance	Yes-6 (18.2) No-27 (81.8)	None	0.209
Symptom onset to admission (days)	6.5 (3-11) N=32	5 (2-6.25)	0.197
Symptom onset to bulbar weakness (days)	3 (2-4.75)	2.5 (1-4.75)	0.493
Symptom onset to intubation	5 (2.75-6)	None	-
Symptom onset to treatment (days)	7 (3-12)	5 (3-6.5)	0.204

Values represented as median (interquartile range) or frequency (%); M = male; F = female

**Table 2: Evaluation profile among children with GBS**

Investigations	2019 (33 cases)	2020 (10 cases)	P
Electrophysiology	Normal-6 (18.2) Abnormal-25 (75.7) Missing-2 (6.1)	Normal-2 (20) Abnormal-7 (70) Missing-1 (10)	0.850
Electrophysiological diagnosis	Axonal-13 (39.4) Demyelinating-10 (30.3) Inexcitable 3 (9.1%) Normal-5 (15.2) Missing-2 (6%)	Axonal-4 (40%) Demyelinating-2 (20) Inexcitable 1 (10%) Normal-2 (20) Missing-1 (10%)	0.319
Electrophysiological findings	Sensorimotor-11 (33.5) Pure motor-15 (45.4%) Normal-5 (15.1%) Missing-2 (6%)	Sensorimotor-4 (40) Pure motor-4 (30%) Normal-2 (20%) Missing-1 (10%)	0.723
CSF protein (mg/dl)	77 (48.5-93.5) N=17	90 (N/A) N=3	-
CSF cell count	5 (4.25-10) N=16	3 (N/A) N=3	-
CSF glucose (mg/dl)	77 (65.5-85.5)	56 (N/A)	-
MRI Brain	Normal-3 (9.1) Not done-30 (90.9)	Normal-5 (50) Not done-5 (50)	-
MRI Spine	Normal-2 (6.1) Not done-31 (93.9)	Normal-3 (30) Not done-7 (70)	-
HIV status	Negative-29 (87.8) Not done-2 (6.1) Missing-2 (6.1)	Negative-8 (80) Not done-2 (20)	0.09
Porphyria status	Negative- 1 (3) Not done- 29 (87.8) Missing-3 (9.2)	Negative-1 (10) Not done-8 (80) Missing-1 (10%)	0.579
GBS Antibody status	Not done-30 (90.9) Missing-3 (9.1)	Negative-1 (10) Not done-8 (80) Missing-1 (10)	0.064
Hyponatremia	No-30 (90.9) Yes-1 (3) Missing-2 (6.1)	No-9 (90) Yes-1 (10)	0.857
Cause of Hyponatremia	SIADH-1 (3)	SIADH-1 (10)	0.463

Values represented as median (interquartile range) or frequency (%); CSF = cerebrospinal fluid; GBS = Guillain Barre syndrome; SIADH = Syndrome of inappropriate anti-diuretic hormone

both groups, males outnumbered females (18:15 in 2019 and 6:4 in 2020). In the 2019 group, 33.3% ( $n = 11$ ) children had antecedent non-localising fever, or infections in the form of upper respiratory tract infections or gastroenteritis. In the 2020 group, 40% ( $n = 4$ ) children had antecedent infections/fever. Time from symptom onset to admission was 6.5 (IQR 3-11) days in 2019 and 5 (IQR 2-6.25) days in 2020. None of the children in either group had recurrent GBS.

### Neurological findings

Sensory symptoms at presentation occurred in 50% ( $n = 5$ ) children compared to 18.2% ( $n = 6$ ) in the 2019 group ( $P = 0.043$ ). Ataxia at presentation was seen in a higher proportion of children (40%,  $n = 4$ ) compared to 2019 (6.1%,  $n = 2$ ), and this was predominantly sensory ataxia. There were no significant intergroup differences in other clinical features, including cranial nerve involvement, areflexia, limb

or back pain, autonomic nervous system or bowel/bladder involvement. In terms of evaluation parameters, axonal pattern of involvement was noted in 40% of the patients in both groups.

### Treatment and outcomes

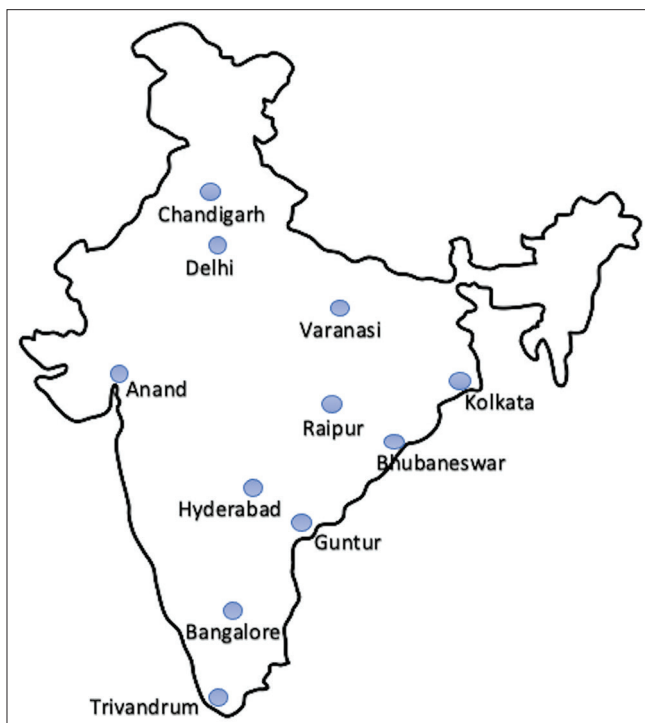
Six patients in the 2019 group required ventilatory assistance and two had ventilatory dependency at follow up. None of the patients in 2020 required ventilatory support. However, this was not statistically significant. There were no differences in symptom onset to bulbar dysfunction, ventilation and treatment initiation.

Intravenous immunoglobulin was used in 32/33 patients in 2019 and all 10 patients in 2020. Outcomes are depicted in Table 3. Median modified Rankin Scale (mRS) score at discharge (1 (IQR 1-4)) was significantly better in 2020

**Table 3: Treatment and outcomes among children with GBS**

	2019 (33 cases)	2020 (10 cases)	P
Treatment modality	IVIg-32 (96.9) Steroids-1 (3.1)	IVIg-10 (100)	0.578
No of days on ventilator	15 (10-53)	None	-
GBS Disability Score (At discharge)	3 (3.5-5.0) N=29	2 (1-3) N=8	0.071
Clinical diagnosis at discharge	Sensorimotor-11 (33.3) Pure motor-16 (48.5) MFS-0MFS-GBS overlap-1 (3.1) Missing-5 (15.1)	Sensorimotor-4 (40) Pure motor-3 (30) MFS-1 (10) Missing-2 (20)	0.220
mRS At discharge	3 (2-4) N=31	1 (1-3.5) N=9	0.042
Complications	VAP-7 (21.2) DVT-1 (3.1) None-25 (75.7)	None-8 (80) Missing-2 (20)	0.920
GBS profile	Monophasic-10 (100%)	Monophasic-10 (100%)	-
GBS Disability Score at 3 months post-discharge	2 (0-3) N=24	0 N=8	0.009
In-Hospital Mortality	None	None	-
Ventilator Dependency	Yes-2 (6.1) No-31 (93.9)	None	-

Values represented as median (interquartile range); GBS = Guillain Barre syndrome; MFS = Miller Fisher syndrome; mRS = Modified Rankin Scale; DVT= Deep vein thrombosis; VAP= Ventilator associated pneumonia

**Figure 1:** Distribution of centers participating in this study across India

compared to 2019 [3 (IQR 1-5)] ( $P = 0.042$ ). Median GBS Disability Score at discharge was 3 (IQR 3-5) in 2019 and 2 (IQR 1-4) in 2020. Median GBS Disability Score at 3 months post-discharge was significantly better in 2020 (0[IQR 0-1]) compared to 2019 (2 [IQR 0-4]) ( $P = 0.009$ ). There was no mortality in either group.

The factors found to be significantly associated with favorable mRS at discharge (mRS 0-2) at discharge in univariate analysis (sensory symptoms ( $P = 0.017$ ), ataxia ( $P = 0.028$ ), ventilatory requirement ( $P = 0.040$ ), axonal type ( $P = 0.040$ )) were adjusted in multivariate analysis to observe independent effects on mRS score. Presence of sensory symptoms at presentation (OR 7.09, 95% CI 1.05-48.01,  $P = 0.045$ ) independently predicted favorable mRS at discharge [Table 4]. Factors significantly associated with GBS disability score at discharge on univariate analysis were sensory symptoms ( $P = 0.034$ ), bowel involvement ( $P = 0.000$ ), ataxia ( $P = 0.008$ ), intubation requirement ( $P = 0.003$ ), axonal pattern ( $P = 0.024$ ). On multivariate analysis, requirement for ventilatory support (Regression coefficient [R]  $-0.76$ ; 95% CI  $-1.37$  to  $-0.16$ ), axonal subtype (R 0.72; 95% CI 0.20–1.24;  $P = 0.008$ ) and bowel involvement (R 1.61; 95% CI 0.70–2.52;  $P = 0.001$ ) were independent predictors of worse disability at discharge. Factors significantly associated with GBS disability score at 3 months on univariate analysis were bowel involvement ( $P = 0.001$ ), intubation requirement ( $P = 0.000$ ) and axonal pattern ( $P = 0.001$ ). Ventilatory support requirement (R  $-1.12$ ; 95% CI  $-1.71$  to  $-0.53$ ;  $P = 0.001$ ) and bowel involvement (R 2.96; 95% CI 2.17–3.74;  $P = 0.000$ ) were independent predictors of worse disability at 3 months.

## DISCUSSION

We report the comparative demographic and clinical profile, and treatment outcomes of children with GBS during the pre-COVID-19 and COVID-19 periods. The number of children presenting with GBS in the pandemic epoch

**Table 4: Multivariate analysis of independent predictors for outcomes**

<b>mRS 0-2</b>			
<b>Predictors</b>	<b>Odds Ratio</b>	<b>P</b>	<b>Confidence interval</b>
No sensory symptoms	7.09	0.045	1.05-48.01
<b>GBS disability at discharge</b>			
<b>Predictors</b>	<b>Regression co-efficient</b>	<b>P</b>	<b>Confidence interval</b>
No intubation requirement	-0.76	0.015	-1.37- -0.16
Axonal sub-type	0.72	0.008	0.20 1.24
Bowel involvement	1.61	0.001	0.70-2.52
<b>GBS disability at 3 months post-discharge</b>			
Bowel involvement	2.96	0.000	2.17-3.74
No intubation requirement	-1.12	0.001	-1.71--0.53

demonstrated a definite decline compared to 2019 in our study. The contraction by nearly two-thirds may be due to the stringent lockdowns in place at the time that this study was conducted, and is consistent with observations from other paediatric emergency and intensive care centres worldwide.<sup>[24-26]</sup> The COVID-19 lockdown in India, initiated on 23<sup>rd</sup> March 2020, was lifted on 31 May 2020. However, travel restrictions were lifted in a phased manner, and 'Unlock 9.0' was initiated in February 2021. This, along with fear of contracting COVID-19 in the hospital, may have deterred parents from approaching hospitals. However, the fact that no patients required ventilatory support and could be managed with one course of IVIg alone in the pandemic epoch suggests that children with even lesser disease severity continued to attend hospitals. The large decline in patient number has been partly attributed to the drastic social distancing, containment measures and hand and respiratory hygiene contributing to a reduction in transmission of respiratory infections and diarrheal illnesses.<sup>[8]</sup> In our study, however, this remains conjectural as the low patient numbers in 2020 do not permit in-depth analysis of antecedent infections.

Children who presented with GBS in 2020 were significantly older compared to children in 2019. There may be several reasons for this: older children may have left home for brief periods during the lockdown, exposing them to the risk of infections. This was corroborated in one Italian study in which nearly 25% of children with neurological disability reported regularly leaving home during lockdown, usually for short walks locally.<sup>[27]</sup>

The time from onset of symptoms to admission was not found to be significantly different between the two groups, suggesting that there was no delay in presentation despite the pandemic and the lockdown. These findings echo those of a surveillance report from the United Kingdom, in which reported delays in presentation of children to emergency during the UK lockdown were found to be low, and even among the delayed group, rates of hospital admission were small.<sup>[28]</sup> Another study suggested

that although overall paediatric emergency admissions dropped, mortality remained unchanged.<sup>[29]</sup> The median time to admission was shorter in 2020, although not different statistically from 2019. It is probably that children were under the supervision of their parents or caretakers throughout the day since online teaching was adopted during lockdown. As a result, subtle complaints may have been observed in a timely manner by caretakers, resulting in children being brought readily to the hospital.

We observed certain differences in the clinical phenotype of GBS during the two study epochs. During the pandemic period, children reported higher proportions of sensory symptoms (paraesthesia) at onset. Similarly, the proportion of children presenting with ataxia (predominantly sensory type) was higher during the pandemic compared to the pre-pandemic period. However, there were no differences between the groups in terms of limb or back pain, and other clinical features and evaluation parameters were comparable. Sensory symptoms are an early feature of GBS and are usually underreported by young children.<sup>[30,31]</sup> It is probable that, with the advent of the lockdown and home schooling, these became more noticeable and easily recalled by children. Moreover, the 2020 cohort comprised older children who are more likely to report sensory complaints.

Axonal subtype was the most common electrophysiological type in our study. Previous Indian studies in paediatric GBS have variably reported AIDP or AMAN to be the most common subtype, although in western countries, AIDP remains most frequent. In a single-centre study in northern India, conducted among 140 children with GBS collected over a 10-year period, AIDP was the most common subtype in 67.8% children, followed by AMAN (23.6%) and AMSAN (4.3%).<sup>[32]</sup> In other studies from tertiary centres in different parts of India, AMAN has been noted to be the most frequent subtype.<sup>[33-35]</sup> The association of the axonal subtype with a more acute and severe course has been consistently noted in the literature.

Interestingly, the mRS score at discharge and the GBS disability score at 3 months post-discharge was also significantly better in children in 2020. This is probably because none of these children required ventilation, unlike the 2019 cohort, suggesting relatively milder disease. Independent predictors for disability at 3 months post-discharge for the entire cohort included presence of bowel involvement and requirement for ventilatory support. Data about factors that predict favourable outcomes or recovery in paediatric GBS are limited. In a cohort of 215 children, cranial neuropathy, requirement for ventilation, quadriplegia and the presence of 'inexcitable' electrophysiology served as predictors of adverse outcomes, in terms of ambulation. The strongest predictor, however, was motor weakness at 10<sup>th</sup> day of disease onset, on multivariate analysis.<sup>[36]</sup> In another study from Iran among 324 children, cranial nerve involvement and absent compound motor action potentials were independent predictors of poor functional outcome.<sup>[37]</sup> In studies from India, need for artificial ventilation,

delay in independent walking, inexcitable nerves on conduction testing, and axonal subtype have been associated with poorer outcomes.<sup>[38,39]</sup>

Our study is the first to assess the impact of COVID-19 pandemic on the profile and outcomes of GBS among children. It is also strengthened by its multicentric and nationwide nature, with centres spanning both government medical colleges as well as private hospitals.

Our study is limited by a small sample size. Data collection was largely retrospective. We could not separately analyse predictors of outcome in the two groups due to low patient numbers in the 2020 group. Moreover, data collection was somewhat heterogeneous. Paediatric data was obtained from only 12 of the 27 centres in GBS consortium as some centres catered to adults alone and some to both adult and paediatric patients. This is likely to have led to under-representation of paediatric data in this study. Reporting of NCS findings relied on the local investigators' expertise as we did not centralise raw NCS data collection and interpretation, likely leading to some variability in findings. Certain clinical parameters, such as neurological deficits at nadir, and laboratory parameters such as antiganglioside antibodies were not available for all patients, thereby restricting strength of analysis.

## CONCLUSION

The COVID-19 pandemic led to a large decline in the number of children with GBS presenting to hospitals. Children with GBS who were admitted were older in age, had more frequent sensory complaints and ataxia and showed better outcomes at discharge and at 3 months compared to children in the pre-pandemic period. However, antecedent illnesses, associated clinical features such as autonomic dysfunction and cranial neuropathy and electrophysiological profile of GBS remained largely unchanged from the pre-pandemic era.

## Ethical approval

The study was approved by the institutional ethics committee of All India Institute of Medical Sciences, New Delhi (IEC-808/07.08.2020, RP-21/2020) and by each centre's local institutional ethics committee.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

## Financial support and sponsorship

Nil.

## Conflicts of interest

There are no conflicts of interest.

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## **SUPPLEMENT 1: LIST OF CENTERS (ALPHABETICAL ORDER)**

1. Apollo Gleneagles Hospitals, Kolkata, West Bengal, India
2. Apollo Hospitals, Sheshadripuram, Bangalore, India
3. Institute of Medical Sciences, Banaras Hindu University, Varanasi, India
4. Kalinga Hospital Limited, Bhubaneswar, Odisha, India
5. Lady Hardinge Medical College, New Delhi, India
6. Lalitha Super Specialities Hospital Pvt. Ltd., Guntur, Andhra Pradesh, India
7. NH MMI Narayana Superspeciality Hospital, Raipur, Chattisgarh, India
8. Nizam's Institute of Medical Sciences, Hyderabad, Telangana, India
9. Post Graduate Institute of Medical Education and Research, Chandigarh, India
10. Ramakrishna Care Medical Sciences, Pvt Ltd, Raipur, India
11. Shree Krishna Hospital and Paramukhswami Medical College, Bhaikaka University, Karamsad, Anand, Gujarat, India
12. Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala, India