**ORIGINAL ARTICLE**

# Frequency of Respiratory Failure and its outcome in children with GBS

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## ABSTRACT

**Background:** Guillianbarre' syndrome is a polyradiculoneuropathy that is usually acute and immune mediated, characterized by symmetric ascending muscle weakness and areflexia.
**Aims:** To observe the frequency of respiratory failure along with outcome in children with GBS.
**Methods:** This was a cross sectional, observational study performed in thedepartment of neurology and intensive care unit of The Children's hospital and The Institute of Child Health, Lahore fromJanuary 2018 to December2018. A total of 100 children of both gender diagnosed as GBS, from 1-15 years of age were included in the study according to inclusion criteria.Signs of respiratory failure and arterial blood gas were monitored in all patients, and outcome of all patients who were put on mechanical ventilator were recorded on a proforma.
**Results:** Out of 100 patients, most were males (62%). Mostly patients were between 1-5 years of age (47%). Weakness of lower limbs, hypotonia and areflexia were the most common presentations (100%), followed by sensory symptoms (66%) and autonomic instability ( 58%).Respiratory failure requiring mechanical ventilation was present in 12 % patients,9 of which were weaned off the ventilator and 3 patients expired.
**Conclusion:** Neuromuscular respiratory failure requiring mechanical ventilation is a usual complication of GBS ,that can lead to increased mortality. Anticipation and early detection of signs of impending respiratory failure can improve the outcome.
**Keywords:** Guillainbarre syndrome, Respiratory failure, outcome

## INTRODUCTION

Guillain-barre'syndromeis described as an inflammatory polyradiculoneuropathy. It presents with symmetric and progressive muscle weakness, areflexia and sensory symptoms, It can affect all age groups and after eradication of poliomyelitis in developed countries, it is the usual cause which leads to acute flaccid paralysis[1,2,3]. The worldwide incidence is 1.1-1.8 per 100,000 population. In children incidence is 0.9-1.1 per 100,000 children[4]. It is an immune mediated disease, also considered as post infectious as described associated with cytomegalovirus, campylobacter jejuni, mycoplasma pneumonia, Epstein – Barr virus[2].

The clinical presentationdevelopsafter 2-4 weeks of a preceding illness. Weakness of muscles that is symmetrical and ascending involving lower limbs and then upper limbs, pain and paresthesia are most common symptoms. Deep tendon reflexes are absent or diminished. There is also autonomic involvement in the form of orthostatic hypotension, arrhythmias, hypertension, bladder dysfunction or paralytic ileus[3]. Respiratory failure is most serious and fatal complication of GBS. Ventilatory support is required in 10% of patients[5] Respiratory involvement occurs in 20-30% cases of GBS. Despite treatment, death or persistent disability occur in 20% cases[6]. Depending on the involvement of different nerve fibers, different variants of GBS include acute inflammatory demyelinating radiculoneuropathy (AIDP), acute sensory and motor axonal neuropathy (AMSAN), acute motor axonal neuropathy( AMAN)[4].

The diagnosis mainly depends on electromyography and nerve conduction studies and CSF examination.The proteins in CSF are increased with no increase in cell number, called albuminocytologic dissociation. Patchy conduction block suggestive of demyelination is seen in nerve conduction studies.[5] GBS treatment is supportive and specific in the form of nursing care of immobile patient , ventilator support, monitoring and management of autonomic involvement, IVIG orplasmaphresis[4].

As respiratory failure is the most common complication of GBS and also the common cause of death, we performed this study to observe the frequency of respiratory failure along with outcome in our patients with GBS. The early detection and anticipation of respiratory failure can decrease the mortality and morbidity associated with GBS. The objective of the study was to observe the frequency of respiratory failure along with outcome in children with GBS.

## PATIENTS AND METHODS

This was a cross sectional observational, study performed in Department ofneurology and intensive care unit,The Children's Hospital and The Institute of Child Health, Lahore, from January 2018 to December 2018. A total of 100 patients of age 1-15 years, ofboth gender, who presented with progressive ascending symmetric muscle weakness of limbs, hypotonia and areflexia were included in the study. Diagnosis was confirmed by nerve conduction

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studies and electromyography.The patients of acute flaccid paralysis, if nerve conduction and EMG were normal, were excluded from the study. The clinical manifestations of GBS and respiratory failure were recorded on a proforma. Those who needed ventilation were monitored and their outcome was noted. Data was entered and analyzed statistically by SPSS version 20.

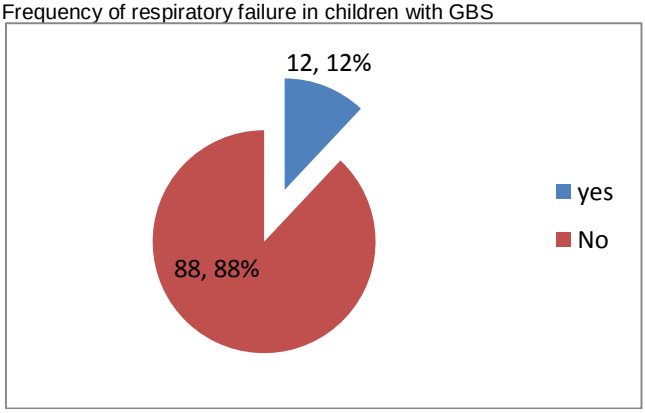
## RESULTS

Our study had 100 patients of GBS,including, 62 males while 38 females, and male to female ratio was 1.6:1.0. Mean age at diagnosis was 6 years (SD± 2.99). Most of the children(47%) with GBS were between 1-5 years of age, 42% were between 6-10 years old while 11% belonged to age between 11-15 years. Weakness of the lower limbs,hypotonia and areflexia were the most common presentation present in all patients. History of preceding illness in the form of fever, respiratory tract or gastrointestinal infection was present in 74% patients. Sensory symptoms in the form of pain in limbs and paresthesias were present in 66% patients. Weakness of upper limbs along with lower limb involvement was present in 52% patients. Cranial nerve involvement assessed by hoarseness of voice and absent gag reflex was seen in 23% and 13% patients respectively. Autonomic instability was observed in 58% cases. EMG and NCS showed axonal variety of GBS in 48% cases, axonal and demyelinating variety in 38% and demyelinating variety in 14%. Respiratory failure requiring mechanical ventilation was present in 12 % patients. 9 of thesewere weaned off the ventilator while 3 patients expired.

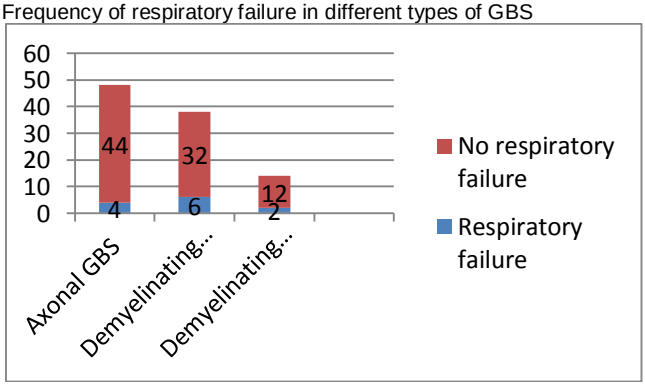
Table 1: Clinical Presentation of GBS in Children (N= 100)

| Clinical presentation | Yes | | NO | | Total | |
|---|---|---|---|---|---|---|
| | Frequency | Percentage | Frequency | Percentage | Frequency | Percentage |
| Preceding illness | 74 | 74.0 | 26 | 26.0 | 100 | 100 |
| Sensory symptoms | 66 | 66.0 | 34 | 34.0 | 100 | 100 |
| Weakness of lower limbs | 100 | 100.0 | 0 | 0 | 100 | 100 |
| Weakness of upper limbs | 52 | 52.0 | 48 | 48.0 | 100 | 100 |
| Hypotonia | 100 | 100.0 | 0 | 0 | 1oo | 100 |
| Areflexia | 100 | 100.0 | 0 | 0 | 100 | 100 |
| Hoarseness of voice | 23 | 23.0 | 77 | 77.0 | 100 | 100 |
| Absent Gag reflex | 13 | 13.0 | 87 | 87.0 | 100 | 100 |
| Autonomic instability | 58 | 58.0 | 42 | 42.0 | 100 | 100 |

Frequency of respiratory failure in children with GBS




Frequency of respiratory failure in different types of GBS




## DISCUSSION

Respiratory failure is the most common complication of GBS. Someindicators which we can monitor at bed side that help to identify the needofmechanical ventilation, are, bulbar dysfunction, rapid disease progression, dysautonomia, , bilateral facial weakness, inability to raise the head and elbows and abnormal lung function tests.[7]

In our study, all children presented with weakness of lower limbs, hypotonia and areflexia. Another study revealed that the most common presenting symptom was ascending paralysis in 93.5% patients.[8]While in ourstudy, 100 % patients presented with ascending weakness.

In our study, 47% patients presented between 1 to 5 years of age,42% were between 6 -10 years oldand 11% were between 11 to 15 years. Previously a study by Alvi M Y and colleagues[9] showed that 38.8% patients were between 1-5 years of age,33% were between 6-10 years old, while 23% were 11-15 years of age. Mean age was 6.2 years. Similarly mean age at presentation by Zuccoli G[10]was 9.41 years and 5.6 years by Akbayram S[11].

In our study, males constitute 62% while females include 38%, with a male: female of 1.6:1.0.Previous studies by Zuccoli G etal[10] and Akbayram S et al[11] showed male: female of 1.4:1 and 1.2:1 respectively.In all studies including my study,ratio of males is slightly higher than females.

In our study respiratory failure was present in 12% patients. Respiratory failure was most common in children between 1-5 years of age 6% and then in6 -10 years of age 5% .The frequency of respiratory failure was low in children more than 10 years. Dhadke SV and colleagues[12]showed in their study that 30% patients required mechanical

ventilation due to respiratory muscle paralysis. Zuccoli G and colleagues[10] showed 17.6% of their patients needed ventilatory support. Akbayrm S et al[11] observed in their study that 8.3% patients required mechanical ventilation. Another study showed respiratory failure requiring mechanical ventilation in 16.1%[8]. Koul R L et al[13] showed 17.3% of their patients required ventilatory support. Another study by Pijil JV revealed 39.5% patients needed mechanical ventilation[15].

It is also observed in our study that respiratory failure was most common in children with acute axonal and demyelinating variety of GBS (6%) and least in demyelinating variety (2%).4% of the patients with axonal GBS developed respiratory failure.

In our study, 3 patients expired out of those requiring ventilatory support for respiratory failure (25%) while 9 patients (75%) were weaned off the ventilator. Netto AB etal[15] found in their study that mortality was 12.1% in mechanically ventilated patients of GBS .Another study revealed mortality rate of 6.45% in their patients[8]

## CONCLUSION

It is concluded that although pediatric Guillainbarre syndrome has good prognosis but neuromuscular respiratory failure that may need artificial ventilation can lead to high mortality rate. All the patients with GBS should be monitored for progression of paralysis and impending respiratory failure so that timely intervention can improve the outcome.

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