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3 **Sensory symptoms on admission as a predictor of respiratory**
4 **insufficiency in patients of Guillain-Barre Syndrome (GBS)**

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9
10 **Abstract**

11 **Objective:** To assess sensory symptoms on presentation as a predictor of
12 respiratory insufficiency in patients of Guillain-Barre Syndrome.

13 **Methods:** The descriptive cross-sectional study was conducted from November
14 2018 to March 2019 at the Neurology Department of King Edward Medical
15 University, Lahore, Pakistan, and comprised patients aged 18-60 years suffering
16 from Guillain-Barre Syndrome as per Brighton criteria. All patients were
17 monitored for respiratory insufficiency by single breath count and arterial blood
18 gases. Data was analysed using SPSS 22.

19 **Results:** Of the 87 patients, 61(70.1%) were male and 26(29.9%) were female.
20 The overall mean age was 37.51±15.36 years. Sensory symptoms were noted in
21 27(31%) patients, and respiratory distress in 17(19.5%). Of those who had
22 sensory symptoms, 10(37%) also had sensory symptoms.

23 **Conclusion:** Respiratory insufficiency in Guillain-Barre Syndrome patients
24 presenting with sensory symptoms was common.

25 **Key Words:** Guillain Barre syndrome, GBS), Respiratory distress, Sensory
26 symptoms.

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28

29 **Introduction**

30 Guillain-Barre Syndrome (GBS) is a potentially disabling, immune-mediated,
31 acquired demyelinating or axonal polyradiculo neuropathy, typically
32 characterised by acute onset of ascending flaccid paralysis, which can progress
33 to respiratory muscle paralysis requiring ventilator support.”¹ The overall
34 incidence of GBS is 1.1/0.1 million/year to 1.8/0.1 million/year. The incidence
35 increases with age, and after 50 years it ranges from 1.7/0.1 million/year to
36 3.3/0.1 million/year. ²

37 Adequate treatment does not guarantee complete cure as some of the patients
38 (14%) continue to suffer from persistent disability even after one year.³
39 Different countries like Thailand,⁴ India,⁵ China,⁶ Bangladesh⁷ and other Asian
40 countries have shown variable outcomes regarding GBS.⁸ Prognosis not only
41 varies with the change in region, but also due to change in clinical sub-types,
42 like axonal GBS mostly showing worse outcome with patients requiring
43 respiratory support due to severe weakness at the outset.^{9, 10}

44 There are few studies on the association of sensory disturbances and respiratory
45 involvement in GBS. Malik MB et al. reported sensory symptoms in 77%
46 patients and, amongst them, 33% had respiratory distress, indicating significant
47 relation.¹¹ Karkare k et al. reported that respiratory involvement was
48 significantly present in GBS patients with pain and paresthesias.¹² Another
49 study of 214 patient showed that poor outcome was associated with mechanical
50 ventilation, but sensory symptoms were not studied as a predictor of poor
51 outcome in these patients.¹³

52 The current study was planned to assess sensory symptoms on presentation as a
53 predictor of respiratory insufficiency in GBS patients.

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55 **Patients and Methods**

56 The descriptive cross-sectional study was conducted from November 2018 to
57 March 2019 at the Neurology Department of King Edward Medical University

58 (KEMU), Lahore, Pakistan, After approval from the institutional ethics review
59 committee, the sample size was calculated at 95% confidence level with 9%
60 absolute precision and expected percentage of respiratory distress in patients
61 with sensory symptoms as 77.27%.¹¹

62 The sample was raised using consecutive sampling from among GBS patients
63 aged 18-60 years of either gender regardless of variants and subtypes using the
64 Brighton criteria.¹⁴ Informed consent was taken from all patients included in the
65 study. Patients with chronic inflammatory demyelinating poly-radiculo-
66 neuropathy (CIDP) and having hypokalemic paralysis were excluded.

67 All the subjects were monitored for respiratory insufficiency by single breath
68 count (SBC) and arterial blood gases (ABGs) at the time of admission. Those
69 who had SBC <20 and partial pressure of Oxygen (pO₂) <80mmHg were labelled as
70 having respiratory insufficiency.

71 Data was analysed using SPSS 22. Frequency and percentage were used for
72 gender, respiratory distress and sensory symptoms, and mean \pm standard
73 deviation (SD) for age (years) and Hughes grade.¹⁵ Chi square test was used to
74 see association among categorical variables, and independent t-test was used for
75 comparing means among respiratory distress groups with respect to age and
76 Hughes grade. Statistical significance was set at $p \leq 0.05$.

77

78 **Results**

79 Of the 87 patients, 61(70.1%) were male and 26(29.9%) were female. The
80 overall mean age was 37.51 ± 15.36 years (Table 1). Sensory symptoms were
81 noted in 27(31%) patients, and respiratory distress in 17(19.5%). Gender-based
82 difference were not significant ($p > 0.05$) (Figure 1).

83 Of the patients with respiratory distress, 10(37%) also had sensory symptoms,
84 while 7(11.7%) were without sensory symptoms ($p = 0.006$) (Table 2).

85 In terms of Hughes grade, 16(26.7%) patients with respiratory distress showed
86 grade ≤ 3 and 1(3.7%) had grade > 3 ($p = 0.012$) (Table 3).

87 Discussion

88 In the current study, respiratory distress was noted in 17 GBS patients; 13
89 males, and 4 females, with males being 3.25 times more prone to distress than
90 females. The results are slightly higher than the other studies where it ranged
91 from 1.5 times to 2.75 times in males than females.^{16,17} The reason for this
92 difference might be the small sample size and geographical differences among
93 the studies.

94 Respiratory failure progresses rapidly from its onset and the pace is so dramatic
95 that ventilator support is sometimes necessary within 24-48 hours. On the other
96 hand, the progression might be sub-acute or over 3-4 weeks' time.¹⁸ So, the tests
97 that are extremely important include SBC followed by ABGs and pulmonary
98 function tests at bedside.¹⁹ Literature shows prevalence regarding sensory
99 symptoms, especially pain, among acute GBS patients, and its long-term impact
100 on outcome.²⁰ However, there are only a few studies focussing on the sensory
101 symptoms and their association with the occurrence of respiratory distress
102 among GBS patients. In the current study, 31% patients showed sensory
103 symptoms whereas 69% had no such symptoms. Out of 87 GBS patients, 19.5%
104 suffered from respiratory distress whereas 80.5% had no such distress. Out of
105 total, 61 patients were males and 26 were females. Comparison of various
106 variables among GBS patients showed statistical significance between
107 respiratory distress and sensory symptoms and Hughes grade ($p \leq 0.05$). None of
108 the other variables were found significant for age and gender with respect to
109 respiratory distress and sensory symptoms. Karkare et al. reported data from 60
110 GBS patients with 48(80%) having sensory dysfunction. Pain and paresthesias
111 was present in 8(20.5%) patients with respiratory involvement ($p=0.02$)
112 compared to patients without any sort of sensory symptoms.¹² Taly AB et al.
113 reported that sensory signs and symptoms were present in the upper limbs
114 (45%) and lower limbs (59%) of GBS patients.²¹ Yawar Y et al. reported 34

115 cases with gastrointestinal infections as the common problem at onset, followed
116 by respiratory infections. Respiratory failure was seen in 55.9% patients.²²

117 The current study has certain limitations. Critically ill patients could not be
118 subjected to any questionnaire-based enquiry. A small sample size and use of
119 purposive sampling were the other limitations.

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121 **Conclusion**

122 Patients with a clinical diagnosis of GBS having sensory symptoms at the time
123 of admission had higher frequency of respiratory distress during admission.

124 This suggests a probable association of sensory symptoms with poor outcome in
125 GBS.

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130

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200 **Table 1: Descriptive Statistics.**

Variable		Frequency	Percentage
Age 37.51±15.36*	≤ 35	45	51.7
	> 35	42	48.3
Gender	Male	61	70.1
	Female	26	29.9
Total		87	100

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Table 2: Respiratory Distress and Sensory Symptoms.

Variable		Respiratory Distress		Total	p-Value
		Yes	No		
Sensory Symptoms	Present	10 37.0%	17 63.0%	27 100.0%	0.006*
	Absent	07 11.7%	53 88.3%	60 100.0%	
Total		17 19.5%	70 80.5%	87 100.0%	

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* Significant (p-value ≤ 0.05)

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209 **Table 3: Mean comparison of Hughes Grade among patients with respiratory distress.**

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Variable		Respiratory Distress		Total	p-Value
		Yes	No		
Hughes Grade	≤ 3	16 26.7%	44 73.3%	60 100.0%	0.012*
	> 3	01 3.7%	26 96.3%	27 100.0%	
Total		17 19.5%	70 80.5%	87 100.0%	

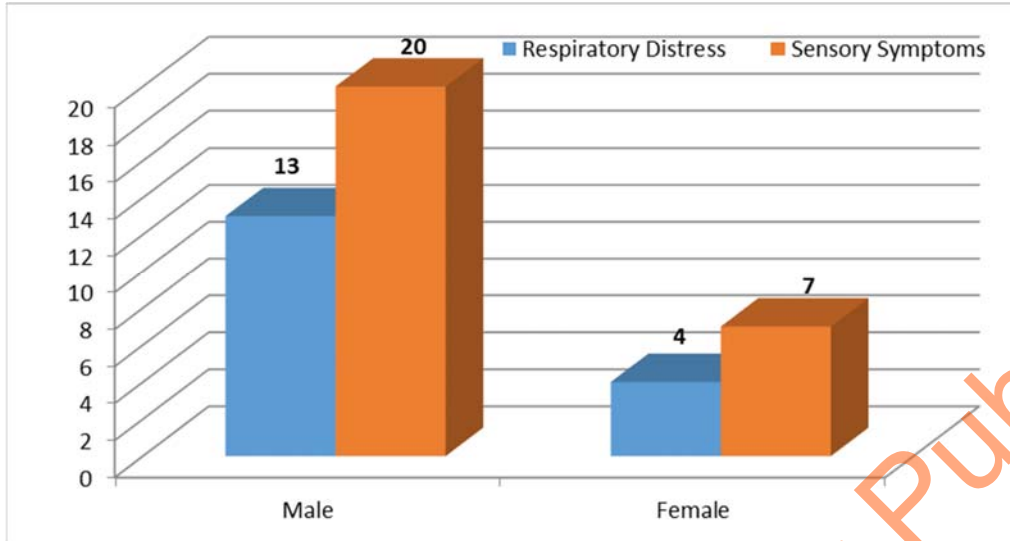
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* Significant (p-value ≤ 0.05)

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Figure: Frequency of respiratory distress and sensory symptoms according to gender in Guillain-Barre Syndrome (GBS) patients

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