



Original Article

# Guillain-Barre Syndrome: A Retrospective Study of Clinical and Epidemiological Features in Kurdistan, West of Iran, From 2005 To 2014

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## Abstract

**Background and aims:** The most common cause of acute flaccid paralysis of all ages is Guillain-Barre syndrome (GBS). Further understanding of this disease is important because of its life-threatening nature in life. The aim of this study was to conduct a 10-year survey on epidemiological and clinical features of GBS in Tohid and Besat hospitals, Sanandaj, Iran, from 2005 to 2014.

**Methods:** This study was a retrospective study, based on medical records, in which 98 hospitalized cases in Tohid and Besat hospitals (tertiary referral hospitals), Sanandaj, Iran, between 2005 and 2014 were investigated. The epidemiological and clinical information was obtained from eligible cases. Data analysis was performed using SPSS version 16. Chi-square and *t* test were used for analyses. The significant level was considered at  $P < 0.05$ .

**Results:** The mean age of cases with GBS was 22.16 years. Among final 69 patients who were studied, 36 cases (52.2%) were male and 33 cases (47.8%) were female. Most cases of disease occurred in the spring. Thirty-nine patients (56.52%) had risk factors like history of gastrointestinal infections, respiratory infections, and surgery 2-4 weeks before the disease onset. Four cases (10.25%) needed mechanical ventilation. The most common protocol of treatment was IVIg ( $n = 47$ , 68%). More than half of the patients (52.2%) achieved relative recovery. In 6 patients, (8.7%) relapse was occurred.

**Conclusion:** Our study showed that there was a significant relationship between sensory- motor involvement, gender and age. Moreover, the relationship between gender and prognosis was indicated ( $P < 0.05$ ).

**Keywords:** Epidemiologic features, Clinical features, Guillain-Barre syndrome, Iran

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## Introduction

Guillain-Barre syndrome (GBS) is an acute autoimmune polyneuropathy<sup>1,2</sup> which occurs equally in both sexes.<sup>3</sup> GBS has become the most common cause of acute flaccid paralysis since the eradication of poliomyelitis.<sup>4</sup> Annual incidence rate of GBS worldwide has been reported 0.6 to 4 persons per 100000<sup>5</sup> and 1.5 to 3.4 persons per 100000 in Iran.<sup>6</sup>

Clinical features of the disease include progressive symmetrical ascending muscle weakness in more than two limbs, areflexia with or without sensory involvement, autonomic and brainstem abnormalities. Weakness is prominent in the muscles of lower limbs. Fever is absent at the onset of neural symptoms. Cranial nerve

involvement may affect airway and facial muscles, eye movements, and swallowing.<sup>7</sup> It usually presents with numbness and tingling in the feet.<sup>8</sup>

The main cause of this syndrome is unknown, however approximately 75% of GBS cases occur 2-4 weeks after an acute infectious process, usually in upper respiratory tract or in gastrointestinal.<sup>1,9</sup> It is also possible after surgery, vaccination, or with no susceptible factor.<sup>10</sup> The most common treatments are plasma exchange, intravenous immunoglobulin and steroid therapy.<sup>11,12</sup> This disease annually affects a portion of population, more than 10% of which leads to disability, among them some people suffer from respiratory distress which necessitates being hospitalized for an average of about 50 days in the

intensive care unit (ICU) under mechanical ventilation, but in some cases it may lead to death.<sup>13</sup>

Despite numerous studies in Iran, few studies have investigated the epidemiological and clinical features of GBS.<sup>6,11,14</sup> Further understanding of this disease is important because of its life threatening nature in life. Further studies in the field of GBS are required to achieve a level of cognition. Effective interventions based on their results, would be considered for the prevention, control, and treatment. Therefore the aim of this study was a 10-year survey on epidemiological and clinical features of GBS in Tohid and Besat Hospitals, Sanandaj, Iran, from 2005 to 2014.

### Methods

This research was a retrospective study, in which 98 hospitalized cases in Tohid and Besat hospitals (Sanandaj, Iran) were investigated via diagnostic code of GBS (G61.0) in the International Classification of Diseases (ICD) from 2005 to 2014. These 2 hospitals (Tohid and Besat) were the main referral centers for neurological disorders in Kurdistan with a population of about 1.6 millions.

Among those 98 recorded cases, 85 cases had final diagnosis of GBS and 16 cases were excluded due to insufficient information. The inclusion criterion was final and conclusive diagnosis with GBS. According to this criterion, symmetrical weakness in limbs, from a few days till one month, and lack or loss (reduction) of deep tendon reflex is necessary for diagnosis of GBS. Full recovery was also defined as improvement and elimination of all symptoms in the first month after beginning the treatment, and relative recovery as the reduction of symptoms in the mentioned time. Exclusion criteria were acute flaccid paralysis due to hypokalemia, acute spinal lesions, uncertainty in the diagnosis of GBS, and insufficient recorded information of patients. Diagnostic criteria for GBS were the criteria introduced by Asbury and Cornblath.<sup>15</sup> The epidemiological and

clinical information, risk factors, laboratory findings, and protocols of treatment were obtained from eligible cases.

Data analysis was performed using SPSS version 16. Chi-square and Fisher exact test, *t* test and analysis of variance (ANOVA) and logistic regression were used for analyses. The significant level was considered at  $P < 0.05$ .

### Results

In our study, the most incidence was 0.96 per 100 000 in 2008 and the least was 0.195 in 2015 (Figure 1). Most cases of disease occurred in the spring (Figure 2).

In this study, the mean age was 22.16 (SD = 15.11) years with a range of 7 months to 87 years. Among 69 patients, 36 cases (52.2%) were male and 33 cases (47.8%) were female. Based on occupational status, 26 cases (37.7%) were children ( $\leq 7$  years), 14 cases (20.3%) were student, 11 cases (15.9%) were housekeeper, 2 cases (2.9%) were soldier, 1 case (1.4%) was farmer, 11 cases (15.9%) had other occupations, and 4 cases (5.8%) had no job.

Signs and symptoms of GBS are presented in Table 1. Thirty-nine patients (56.52%) had risk factors such as history of gastrointestinal infections, respiratory infections, and surgery 2-4 weeks before the disease onset (Figure 3). The type of disease manifestation was reported to be ascending in 58 cases (84.1%), descending in 9 cases (13%), and Miller-Fisher in 2 cases (2.9%). In para-clinical findings, CSF analysis was done on 39 cases (56.52%); the result was normal in 13 cases (18.8%), while it was more than 100 mg/dL in 26 cases (37.7%). Moreover, in 64 cases (92.8%) electrodiagnostic tests were carried out; from which 4 cases had no specific finding, but in other patients a peripheral neuropathy or lack of action potential was occurred. Thirty-nine patients (56.5%) were admitted to ICU from which only 4 cases (10.2%) required mechanical ventilation. The average duration of ICU stay was 12.6 days.

Several protocols of treatment were performed such as combined or single use of IVIg, plasmapheresis and plasma exchange. The most common protocol of

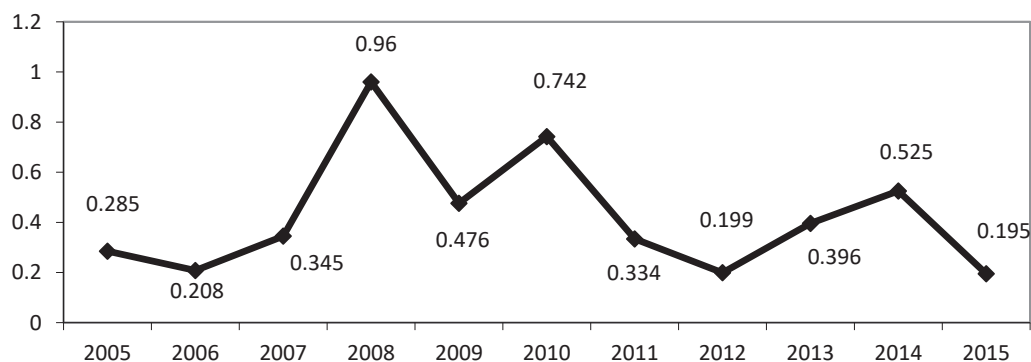


Figure 1. Incidence Trend of Guillain–Barre Syndrome Cases in Kurdistan Province During 2005-2014 (Per 100 000 People).

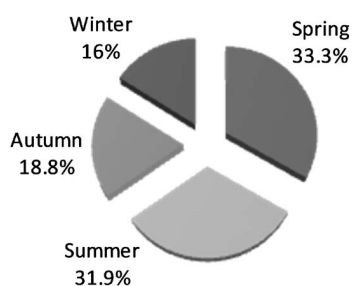


Figure 2. Distribution of the Seasonal Occurrence of GBS Cases (n=69).

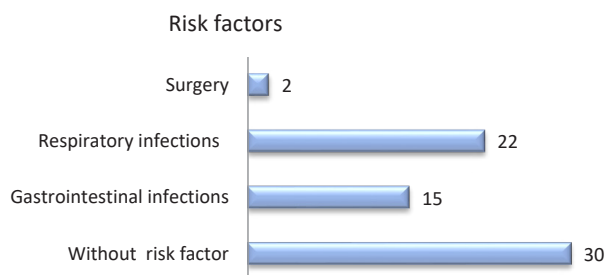


Figure 3. Frequency of the Risk Factors in the Patients (n = 69).

treatment was IVIg (n = 47, 68%). Combined use of IVIg with steroid therapy was applied in 16 cases (23.1%). In 4 cases (6%) other combination therapies were used. Full recovery in 31 patients (44.9%) and relative recovery in 36 patients (52.2%) were achieved and 2 patients (2.9%) died. Relapse of the disease was recorded in 6 patients (8.7%).

Association of age and gender with clinical features of GBS and prognosis with patients' epidemiological features were seen. The results indicated there was a significant relationship between gender and sensory-motor involvement and prognosis ( $P < 0.05$ ) (Table 2). Moreover, a significant relationship was found between age, sensory- motor involvement, and admission to ICU ( $P < 0.05$ ) (Table 3).

### Discussion

In this study, the mean age of cases with GBS was 22.16 years; the age range was between 7 months and 87 years, similar to Adams's opinion.<sup>2</sup> In previous studies the mean age of participants was different; for example, the study of Barzegar et al in North West of Iran showed a mean age of about 5.4 years and Rocha in a Brazilian study reported 34 years as the mean age of participants. Furthermore, in the study of Safari et al in Shiraz the mean age of patients was 29.8 years.<sup>16</sup> It seems the probable reason for this difference in the mean age value was dissimilarity in selection of age groups; for example, 1 to 15 years<sup>6</sup> compared to 1 to 83 years.

In previous studies different values regarding the GBS occurrence ratio of men to women was reported. In our

Table 1. Frequency of the Clinical Signs and Symptoms of the Patients (n = 69)

Disorders	No. (%)
Paresthesia	69(10)
Insentience	40 (58)
Limbs pain	21 (30.4)
Dysphagia	4(5.8)
Cardiac dysrhythmia	5 (7.2)
Problems of breathing	5 (7.2)
Blood pressure changes	3 (3.4)
Sensory-motor involvement	16 (23.2)
Loss/reduction of deep tendon reflex (upper)	40 (58)
Loss/reduction of deep tendon reflex (lower)	64 (92.8)

Table 2. Comparison of Prognosis Between Gender Groups

Variables	Gender		P Value
	Male No. (%)	Female No. (%)	
Sensory motor involvement	12 (33.3)	4 (12.1)	0.04
Prognosis			0.01
Full recovery	21 (58.3)	10 (30.3)	
Relative recovery	13 (36.1)	23 (69.7)	
Expiration	2 (5.6)	0 (0)	

Note: Full recovery was significantly different between males and Females ( $P = 0.01$ ).

Table 3. Comparison of Age Between Groups of Sensory Motor Involvement and ICU Admission

Variables	Age, Mean± SD	P Value
Sensory motor involvement		
Yes	10.38±16.68	<0.001
No	36.62± 22.83	
ICU admission		
Yes	36.98± 24.75	0.003
No	17.70± 21.45	

Note: There are statistically significant differences of mean age between sensory motor involvement and ICU admission groups ( $P < 0.05$ )

study, this ratio was 1.09 whereas other studies indicated ratios of 1.3,<sup>16,17</sup> 1.5,<sup>18</sup> 1.6,<sup>19</sup> 1.8,<sup>20</sup> and 2.4.<sup>14</sup> It is likely the probable cause of these inconsistent findings is the differences in sample sizes and occurrence ratio in men to women.

Unlike the results of a study in Brazil in which the highest prevalence of GBS was in the winter,<sup>21</sup> in this study, the highest prevalence was in the spring. This finding was consistent with the results of the other studies.<sup>6,20,22</sup> The results of several studies suggest that diseases following special infections mostly occur in certain seasons and months of the year.<sup>19</sup>

In this study approximately 32% of patients reported a history of respiratory infections 2-4 weeks before the disease onset. The results of previous studies showed that the most common risk factor in the patients with GBS was the history of infectious diseases, particularly

respiratory infections,<sup>17,20</sup> while in some patients a history of gastrointestinal infections<sup>23</sup> or surgery<sup>14</sup> in the weeks before disease onset was also recorded. It seems that respiratory infections, gastrointestinal infections, surgery, and trauma lead to the stimulation of immune system, while the interaction between Schwann cells and axonal antigens is one of the important factors in the occurrence of GBS.<sup>24</sup>

One of the serious issues in the GBS is autonomic nervous system involvement such as blood pressure changes or cardiac dysrhythmia which is considered as an important cause of mortality in the patients with GBS.<sup>25,26</sup> In our study, in 3.4% of cases blood pressure changes, in 7.2% cardiac dysrhythmia, in 5.8% dysphagia, and in 7.2% of them breathing disorders were reported. Four cases (5.8%) needed mechanical ventilation. Another study in Iran on children showed that 9.3% blood pressure changes, 29.5% dysphagia, and 43.7% had breathing disorders, also 23% required mechanical ventilation.<sup>19</sup> It is likely that these differences can be due to the distribution of studied cases or differences in the measurement criteria of disorders.

In the current study, the type of disease manifestation in 84.1% was ascending, in 13% was descending and in 2.9% was Miller–Fisher. This finding was similar to the results of another study in Iran,<sup>17</sup> but the results of Yoshikawa's study showed that the incidence of Miller–Fisher in the patients with GBS in Japan was higher compared to its incidence in the GBS patients in other Asian countries.<sup>18</sup> Miller–Fisher syndrome is present in 5% of the patients with GBS.<sup>27</sup>

Based on Adams principle in the patients with respiratory failure, the average period of staying in ICU under machine-assisted respiration has been 22 days.<sup>2</sup> In previous studies, the average duration of ICU stay has varied from 19.7 days<sup>28</sup> to 30 days.<sup>29</sup> In our study this duration was 12.6 days. This difference can be due to unequal criteria for ICU admission.

In this study as the results of Mazaheri et al study,<sup>14</sup> more than half (68%) of the patients took IVIg for treatment. This result was confirmed by another cohort study in the Netherlands.<sup>30</sup> Moreover in 23.1%, combination of IVIg and steroid therapy was prescribed. Yazdchi et al indicated that 46% of cases were under plasmapheresis treatment, 26% under IVIg, in 28% of them the combination of these two methods was applied, and in 2 cases steroid therapy beside other treatments was used.<sup>28</sup> Some patients received IVIg and Methylprednisolone; this combination was related with better outcome after adjustment for age.<sup>30</sup>

One of the important findings of this study was the results of association of age and gender with clinical features of GBS, and prognosis with epidemiological

features in the patients. Sensory- motor involvement was significantly higher in men. In our study, in line with Sudulagunta and colleagues' study,<sup>31</sup> not only male patients had higher prevalence (52%) but full recovery was more common in them.

The results of statistical tests indicated that significant association existed between age and admission to ICU and sensory - motor involvement so that in lower age, sensory-movement involvement was mostly reported but admission to ICU was less. Contrary to our results, Taylor et al showed non-significant relationship between age and admission to ICU.<sup>32</sup>

To the best of our knowledge, in previous published studies relationship between these variables was not investigated, so that comparison with other studies was not possible. The limitations of this study include small sample size and lack of sufficient information due to incomplete records.

Based on this study, future researches are recommended with larger sample size and distributed age range. In order to further clarify the differences in clinical and epidemiologic features between adults and children, further studies may be needed.

## Conclusion

Our study showed that there was a significant relationship between sensory- motor involvement, gender and age. The relationship between gender and prognosis was also indicated. Further studies are required in order to clarify the relationship between epidemiological and clinical features and regional patterns.

## Ethical Approval

None applicable.

## Conflict of Interest Disclosures

None.

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