Original Article

Seasonal Variation in Occurrence of GBS

Seasonal Variation in Occurrence of Guillian Barre Syndrome (GBS) in Local Population of Pakistan

Raja Zaigham Abbas, Maryam Javed, Usman Ali Khan, Fatima Javed and Muhammad Athar Javed

ABSTRACT

Objective: To report the effect of seasonal variation in a large cohort that are clinically diagnosed with GBS in tertiary care hospital which will serve as reference for region of Pakistan.
Study Design: Retrospective / cross-sectional study
Place and Duration of Study: This study was conducted at the Neurology Department, Mayo Hospital Lahore in collaboration with various private and public hospitals in Punjab from March 2013 to February 2015.
Materials and Methods: The Inclusion criteria was proven cases of GBS diagnosed according to the Ashbury et al. criteria for GBS based on clinical and electrophysiological findings requiring plasmapharesis. Exclusion criteria included patients of neuropathies associated with chronic inflammatory demyelination (CIDP), diabetes, and other metabolic, toxic and vasculitic neuropathies. A Performa containing demographic, clinical, CSF analysis and electrophysiological detail was designed which was filled by treating physician before requesting for plasmapheresis. The data was analyzed using SPSS version 17.
Results: A total of 185 patients were included in the study with 112(60.5%) males and 73(39.5%) females and M: F ratio of 1.53: 1. The mean age was 35.24(SD 15.51) with a range from 11-78 years. Ninety nine (53.5%) cases presented between 20- 40 years of age. The highest incidence of GBS (n=86, 46.5%) was seen during winter season (Dec - Feb), followed by 36(19.5%) in spring (March - May), 46 (24.9%) in rainy summer (June - Sept) or southwest monsoon period and only 17(9.2%) in post monsoon (Oct- Nov).
Conclusion: The present study provides data suggesting that there is significant (p=.000) seasonal variation in frequency of GBS patients with the highest frequency observed in winter. The study supports the finding GBS being more common in males as compared to females.
Key Words: Guillian Barre Syndrome (GBS), Seasonal variation, plasmapheresis

Citation of articles: Abbas RZ, Javed M, Khan UA, Javed F, Javed MA. Seasonal Variation in Occurrence of Guillian Barre Syndrome (GBS) in local Population of Pakistan. Med Forum 2018;29(8):20-23.

INTRODUCTION

GBS is usually a post infectious state whereby the immune system of a person while reacting against the pathogen also cross reacts with the host nervous system causing immune mediated nerve injury. It is usually an autoimmune mediated demyelinating polyradiculo-neuropathy that equally affects males & females. Multiple triggering events have been reported in its pathogenesis such as C jejuni, hepatitis, Epstein Bar virus, haemophilus influenza, cytomegalovirus and Zika virus infections[1-5].

Clinical features involve severe back pain and limb paresthesias over the limbs. Weakness begins in the most proximal muscles. Symmetric muscle weakness are accompanied by depressed or absent deep tendon reflexes. Legs are more typically involved than arms, which creates the illusion of an ascending paralysis. The weakness of oropharyngeal and facial muscles is observed in 50% of cases due to involvement of cranial nerves[6]. Other important clinical manifestations include areflexia, oculomotor weakness & ataxia[7-10]. It is also associated with numbness & tingling of feet[11].

Various studies on electro diagnosis, nerve conduction and F waves have been conducted with well documented results but the studies reporting the effect of seasonal variation on GBS are few. In Pakistan only two studies have been carried out to analyze the effects of seasonal variations on occurrence of GBS. Both have little cohort size and indicates varying results[12,13].

Retrospective studies have also been carried out in India & Iran show case clustering during winter season[14,15]. However a few other Indian & Iranians studies also show the maximum occurrence of disease during summer season[16,17]. Rebecca Prevots et al indicates that there are no seasonal variations noted in GBS patient in USA[18]. Because of the different seasonal conditions in different geographical regions it's very difficult to comment on geographical trends.

Department of Neurology, King Edward Medical University/Mayo Hospital Lahore.

Correspondence: Muhammad Athar Javed, Department of Neurology, King Edward Medical University/Mayo Hospital Lahore.
Contact No: 03214786198
Email: dratharjaved59@gmail.com

Received: February, 2018; Accepted: June, 2018

MATERIALS AND METHODS

This retrospective cross sectional study was conducted at Mayo Hospital Lahore in collaboration with various private and public hospitals from March 2013 to February 2015. The study cohort involved 185 patients with the age limit >12-80 years involving both sexes. The inclusion criteria for diagnosis of GBS involve patients fulfilling the Ashbury and Cornblath's criteria of GBS and patients who required plasmapharesis. The exclusion criteria involved the patient with age less than 12 years, patients with different neuropathies like Chronic Inflammatory Demyelinating Polyneuropathy (CIDP), Diabetic peripheral neuropathy (DPN) & neuropathies due to toxic, metabolic, vasculitic and hereditary causes. A Performa containing demographic details, History & examination, EMG/NCS finding & CSF findings was filled by the physician at the time of primary plasmapharesis. Data was analyzed by using the SPSS version 17. Stastical significance was determined by the Pearson Chi-Square test.

RESULTS

Demographics: Out of 185 patients who were accessed 112 (60.5%) were male whereas 73 (39.5%) were female with the male to female sex ratio being 1.53:1 (Figure 1).

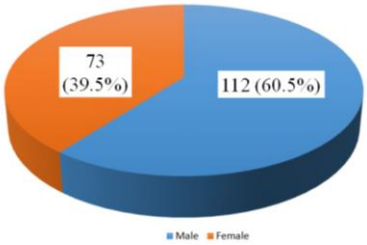

Figure No.1: Pie chart indicating male to female ratio in case of GBS

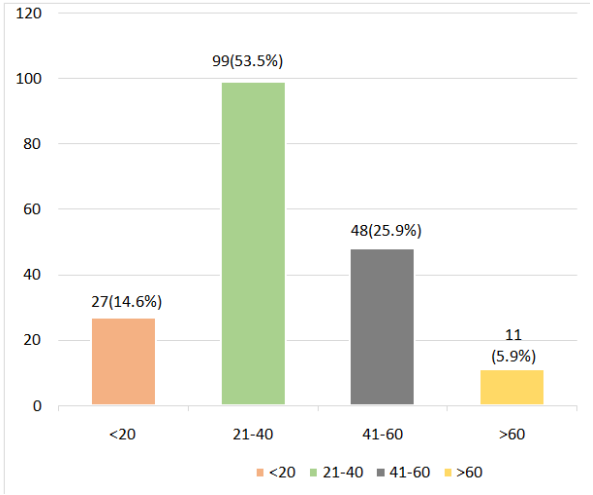

Figure No.2: Chart depicting frequency of GBS in various age groups.

The patient's age limit ranged from >12-80 years with the mean age of 35.24 years. The GBS analysis in various age groups showed the peak incidence in age group of 21-40 year (n= 99, 53.5%), followed by the age group of 41-60 (n=48, 25.9%), the age group <20 (n=27. 14.6%) with the least number of cases (n=11, 5.9%) were seen in patient aged >60 years **(Figure 2).**

Seasonal variations: The frequency of GBS in various months was observed and highest incidence (n=86, 46.5%) was seen in winter season from December to February, followed by summer season (n=46, 24.9%) from June to September, spring season (n=36, 19.5%) from March to May & lowest incident rate was seen in rainy season (n=17, 9.2%) in month of October & November as shown in Figure 3. The distribution of GBS in various season is depicted in Figure 4 which shows highest case clustering during winter season with the second peak was seen during summer season.

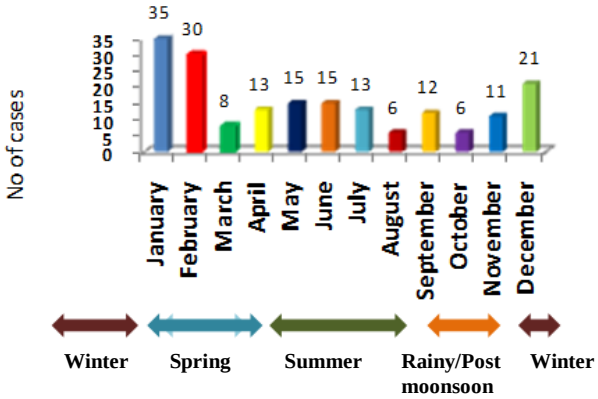

Figure No.3: Chart indicates the seasonal variations in case of GBS.

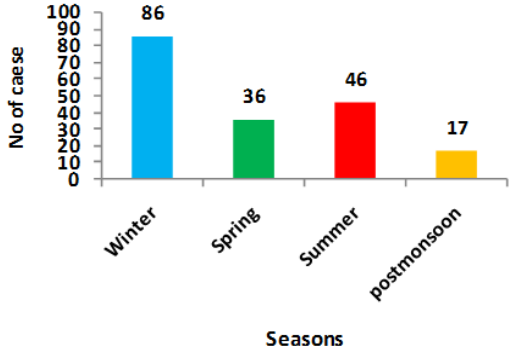

Figure No.4: Distribution of GBS in various seasons.

Statistical Analysis: Statically significance was determined by the Pearson Chi-Square test using SPSS 17. The value of X2= .000 shows significant variation in frequency of GBS with clear prediction that the highest incident is seen during winter season. The results of chi square test are highlighted in Table 1.

Table No.1: Result of Chi- Square test showing the frequency of GBS during winter season - Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.550E2a	33	.000
Likelihood Ratio	458.806	33	.000
Linear-by-Linear Association	50.204	1	.000
N of Valid Cases	185		

a. 34 cells (70.8%) have expected count less than 5. The minimum expected count is .55.

DISCUSSION

We did demographical profiling of patients who presented to out-patient department of neurology in Mayo Hospital Lahore with the diagnosis of GBS. Although disease is common throughout the year but the highest incident peak was observed during winter from December to February and the second peak was observed during summer season. The previous Pakistani study by Zaheer et al indicates major clustering of disease during summer season whereas another study by Yaqoob et al indicates the highest incident during spring & Rainy season[12,13] depicted in Table 2.

Table No.2: Seasonal Variation in GBS in different studies of the world.

Study group	Summer	Spring	Rainy/ fall	Winter
Local studies				
Present study (Pak) n=185	46 (24.9%)	36 (19.5%)	17 (9.2%)	86 (46.5%)
Zaheer et al (Pak) n =25	16 (64%)			9(26.5%)
Yaqoob et al (Pak) n =34	3 (8.82%)	11 (32.4%)	11 (32.4%)	9 (26.5%)
Asian studies				
Haghighi et al (Iran) n =389	90 (23.13%)	113 (29.04%)	71 (18.25%)	115 (29.56%)
Akbayram et al (Iran) n =25	10 (40%)	8 (32%)	5 (20%)	2 (8 %)
Geetanjali et al (India) n =65	27 (41.53%)	19 (29.23%)	8 (12.30%)	11(16.92%)
Sharma et al (India) n = 50	11 (22%)	20 (40%)		19 (38%)
Coe et al (Korea) n = 129	54 (40.90%)	25 (18.93%)	35 (26.51%)	15 (11.36%)
International studies				
Sivadon-Tardy et al (France)				60%
Rocha et al (Brazil)		62 %		
Larson et al (Norway)				Maximum
Arami et al (Saudi arabia) n =75	14 (18%)	15 (21%)	14 (18%)	32 (43%)
Louie et al (USA) n = 98	22%	20%	27%	31%
Rebecca et al	No seasonal Variations noted			

In Asian countries the studies have been conducted in India, Iran and Korea. From India Geetanjali et al indicates the highest incident rate (41.53%) during summer season[17] whereas Sharma et al showed the peak during spring season (40%)[14]. Coe et al from Korea showed the major outbreak during summer season[19]. These findings are strikingly different from our studies because of different geographical and climate conditions. The study from Iran however showed the results similar to our studies indicating maximum incidence during winter season shown in Table 2.

Studies from other parts of world like Saudi Arabia[20], Norway[21], USA[22] and France[23] also show peak clustering during winter season. In Brazil highest incident is observed during spring season[24]. One of the study from USA depicted that there is no seasonal variation noted in case of GBS[25]. Hence the review of all these studies indicates that it is hard to define any specific trend of seasonal variations for GBS patients because the climate conditions are strikingly different even in neighboring countries. So the study with larger cohort size and maximum time span may only serve as reference study for that area of the world.

Our study shows that there is significant (p=.000) variation in frequency of GBS patients with a clear predilection towards winter season. GBS is more common in males than females in our local population with maximum frequency between 20- 40 years of age. Larger studies are required to confirm our finding and possible association with upper respiratory tract infections such as influenza which are common during this season so that preventive measures can be taken to prevent this illness.

CONCLUSION

The present study provides data suggesting that there is significant (p=.000) seasonal variation in frequency of GBS patients with the highest frequency observed in winter. The study supports the finding GBS being more common in males as compared to females.

Author's Contribution:

Concept & Design of Study:	Raja Zaigham Abbas
Drafting:	Maryam Javed
Data Analysis:	Usman Ali Khan
Revisiting Critically:	Fatima Javed, Muhammad Athar Javed
Final Approval of version:	Raja Zaigham Abbas

Conflict of Interest: The study has no conflict of interest to declare by any author.

REFERENCES

1. Ropper AH. Ischemic compression paresthesias in Guillain-Barré syndrome. Arch Neurol 1991;48: 1261-2.
2. Jacobs BC, Rothbarth PH, Van der Meché FG, Herbrink P, Schmitz PI, De Klerk MA, et al. The spectrum of antecedent infections in Guillain-Barre syndrome a case-control study. Neurol 1998; 51(4):1110-5.
3. McCarthy N, Andersson Y, Jormanainen V, Gustavsson O, Giesecke J. The risk of Guillain–Barre syndrome following infection with Campylobacter jejuni. Epidemiol Infect 1999; 122(1):15-7.
4. Mori M, Kuwabara S, Miyake M, Noda M, Kuroki H, Kanno H, et al. Haemophilus influenzae infection and Guillain–Barré syndrome. Brain 2000;123(10):2171-8.
5. Rees JH, Soudain SE, Gregson NA, Hughes RA. Campylobacter jejuni infection and Guillain–Barré syndrome. New Eng J Med 1995;333(21):1374-9.
6. Hauser SL, Asbury AK. Guillain-Barre Syndrome & Other Immune-Mediated Neuropathies. Harrison's Principles of Int Med McGraw Hill 2009;(16):2667-2671.
7. Phillips MS, Stewart S, Anderson JR. Neuropathological findings in Miller Fisher syndrome. J Neurol, Neurosurg Psychiatr 1984; 47(5):492-5.
8. Ropper AH. Miller Fisher syndrome and other acute variants of Guillain Barre syndrome. Baillieres Clin Neurol 1994;3:95-106.
9. Yuan CL, Wang YJ, Tsai CP. Miller Fisher syndrome: a hospital-based retrospective study. Eur Neurol 2000;44(2):79-85.
10. Ropper AH. Unusual clinical variants and signs in Guillain-Barré syndrome. Arch Neurol 1986; 43(11):1150-2.
11. Amato AA. Guillain Barre syndrome & related disorders. Revista Mexicana de Neurociencia 2005; 6(5):455-69.
12. Zaheer M, Naeem M, Nasrullah M. Seasonal Variation and Sex Distribution in Patients with Guillain-Barre Syndrome. Pak J Neurolog Sci 2008;3:6-8.
13. Yakoob MY, Rahman A, Jamil B, Syed NA. Characteristics of patients with Guillain Barre Syndrome at a tertiary care centre in Pakistan, 1995-2003. J Pak Med Assoc 2005;55(11):493-496.
14. Sharma A, Lal V, Modi M, Vaishnavi C, Prabhakar S. Campylobacter jejuni infection in Guillain-Barré syndrome: A prospective case control study in a tertiary care hospital. Neurol Ind 2011;59(5): 717-721.
15. Haghighi AB, Banihashemi MA, Zamiri N, Sabayan B, Heydari ST, Safari A, et al. Seasonal variation of Guillain-Barre syndrome admission in a large tertiary referral center in southern Iran: a 10 year analysis. Acta Neurologica Taiwanica 2012; 21(2):60-321.
16. Akbayram S, Doğan M, Akgün C, Peker E, Sayın R, Aktar F, et al. Clinical features and prognosis with Guillain-Barré syndrome. Ann Ind Acad Neurol 2011;14(2):98-102.
17. Sharma G, Sood S, Sharma S. Seasonal, age & gender variation of Guillain Barre syndrome in a tertiary referral center in India. Neuroscience and Med 2013;4(01):23.
18. Prevots DR, Sutter RW. Assessment of Guillain-Barré syndrome mortality and morbidity in the United States: implications for acute flaccid paralysis surveillance. J Infect Dis 1997;175 (Supplement_1):S151-5.
19. Coe CJ. Guillain Barre Syndrome in Korean Children. Yonsei Med J 1989; 30: 81-87.
20. Arami MA, Yazdchi M, Khandaghi R. Epidemiology and characteristics of Guillain-Barre syndrome in the northwest of Iran. Annals Saudi Med 2006;26(1):22-27
21. Louie M, Gilchrist JM, Woodard C. Guillain-Barre syndrome: a 5-year Rhode Island hospital experience. Rhode Island Med 1994;77(5):135-140
22. Sivadon-Tardy V, Orlikowski D, Rozenberg F, Caudie C, Sharshar T, Lebon P, et al. Guillain-Barré syndrome, greater Paris area. Emerg Infect Dis 2006;12(6):990.
23. Larsen JP, Kvale G, Nyland H. Epidemiology of the Guillain-Barré syndrome in the county of Hordaland, Western Norway. Acta Neurolog Scandinavica1985;71(1):43-7.
24. Rocha MS, Brucki SM, Carvalho AA, Lima ÚW. Epidemiologic features of Guillain-Barre syndrome in Sao Paulo, Brazil. Arquivos de neuro-Psiquiatria 2004; 62(1):33-7.
25. Prevots DR, Sutter RW. Assessment of Guillain-Barré syndrome mortality and morbidity in the United States: implications for acute flaccid paralysis surveillance. J Infect Dis 1997; 175 (Supplement_1):S151-5.