



3-2017

Spectrum of gullian barre syndrome in children

Dr. Shaila Ali

The Children's Hospital & the Institute of Child Health, Lahore, Pakistan, dralishaila@hotmail.com

Dr. M. Zia ur Rehman

The Children's Hospital & the Institute of Child Health, Lahore, Pakistan

Dr. Tipu Sultan

The Children's Hospital & the Institute of Child Health, Lahore, Pakistan

Follow this and additional works at: <http://ecommons.aku.edu/pjns>

 Part of the [Neurology Commons](#)

Recommended Citation

Ali, Dr. Shaila; Zia ur Rehman, Dr. M.; and Sultan, Dr. Tipu (2017) "Spectrum of gullian barre syndrome in children," *Pakistan Journal of Neurological Sciences (PJNS)*: Vol. 12 : Iss. 1 , Article 5.

Available at: <http://ecommons.aku.edu/pjns/vol12/iss1/5>

SPECTRUM OF GULLIAN BARRE SYNDROME IN CHILDREN

Dr. Shaila Ali¹, Dr. M. Zia ur Rehman², Dr. Tipu Sultan³

^{1,2,3}Department of Pediatric Neurology The Children's Hospital & the Institute of Child Health, Lahore, Pakistan

Correspondence to: Dr. Shaila Ali, House # 15, Al-Razzaq Villas, Madhall Road, Sahiwal, Pakistan, Email: dr alishaila@hotmail.com

Date of submission: March 30, 2016 **Date of revision:** September 18, 2016 **Date of acceptance:** October 15, 2016

ABSTRACT

Introduction: GBS is a post-infectious poly-neuropathy involving mainly motor but sometimes also sensory and autonomic nerves. This is an epidemiological report on seasonal & monthly distribution of GBS & differences in GBS incidence between male & female in Punjab, Pakistan. **Objective:** To determine the seasonal variation, age and gender differentiation in children with GBS along with EMG/NCS findings. **Study Design:** Retrospective, observational, cross sectional study. **Place and duration of study:** Department of Neurology, Childrens Hospital & The Institute of Child Health, Lahore from January 2014 to December 2014. **METHODS:** We extracted data from multi centers retrospectively in a 1 year period (January 2014- December 2014). In order to compare the frequency of GBS in different months & seasons we used the chi-square test. **RESULTS:** There was male predominance with 52.11% (n=37). Highest number of cases (70.4%) were found in age group (11-18 Years) (n=50). Seasonal (P=0.01) and monthly (P=0.02) variation among GBS was observed throughout the year with more prevalence in summer (49.29%) followed by spring (25.35%). Regional data of Punjab revealed highest number of cases 36.6% (n=26) in South Punjab followed by west Punjab 28.16% (n=20) **CONCLUSION:** Our study shows that there is significant monthly and seasonal variation in the admission rate of patients with GBS in Punjab.

Keywords:

GBS, epidemiology, seasonal variation, Punjab.

INTRODUCTION:

Acute flaccid paralysis is a clinical syndrome characterized by rapid onset of weakness in a child aged less than 15 years due to any cause or any paralytic illness of any age when polio is suspected^(1,2). GBS is one of the most common differential diagnosis when AFP is suspected, both in endemic and non-endemic poliomyelitis affected areas⁽³⁾. GBS is an acute inflammatory polyradiculoneuropathy involving mainly motor but sometimes also sensory and autonomic nerves^(4,5). Mostly it is preceded by infectious agents like *Campylobacter jejuni*, *Mycoplasma pneumoniae*, CMV, EBV, Varicella zoster virus, HIV and Zika virus⁽⁶⁻¹⁵⁾. A viral illness is followed by sudden onset of symmetrical ascending paralysis within 2-6 weeks in majority of the patients⁽⁵⁾. Clinically, patients have signs of a lower motor neuron lesion including hypotonia, hyporeflexia or areflexia along with paresthesias and cranial nerve involvement⁽¹⁶⁾.

Incidence of GBS is 0.4 -1.3 cases per 100,000 per year in children in US while it is 3-4 cases per 100,000 per year in Asian countries^(16, 17). Geographic variations occur worldwide among incidence rate of GBS. This diversity may be due to two factors including climatic changes and heterogeneity of triggering pathogenic agents⁽³⁾. Developing countries, where incidence of AFP especially GBS is high, have additional triggering factor in form of malnutrition which makes the children more vulnerable to infections. GBS occur in all age groups. But mostly two peaks are observed, first peak in young adulthood and second peak in elderly age group⁽¹⁸⁾. Although it is an autoimmune disease but males are predominantly affected as compared to females.^(3,16,19)

Electrophysiological studies play a key role in establishing the diagnosis of GBS. In addition to a very useful tool for diagnosis, different variants can be identified for prognostication of GBS. AIDP, commonly known as GBS is an acute monophasic demyelinating neuropathy. Early findings of EMG/NCS may be normal

or near normal. Later, there are findings suggestive of demyelination on NCS in the form of prolonged distal latencies, slow conduction velocities, conduction block/temporal dispersion and evidence of prolonged or absent delayed responses including F and H waves. In case of axonal GBS, other variants are AMAN, MFS and AMSAN which show reduced amplitudes in motor, sensory or both sensorimotor respectively. This is an epidemiological report on seasonal & monthly distribution of GBS & differences in GBS incidence between male & female in Punjab, Pakistan. Moreover, electrophysiologically different variants are also categorized in this study.

Objective: To determine the seasonal variation, age and gender differentiation in children with GBS along with EMG/NCS findings.

Study Design: Cross Sectional Study.

Place and duration of study: Department of Neurology, Children Hospital & The Institute of Child Health, Lahore from January 2014 to December 2014.

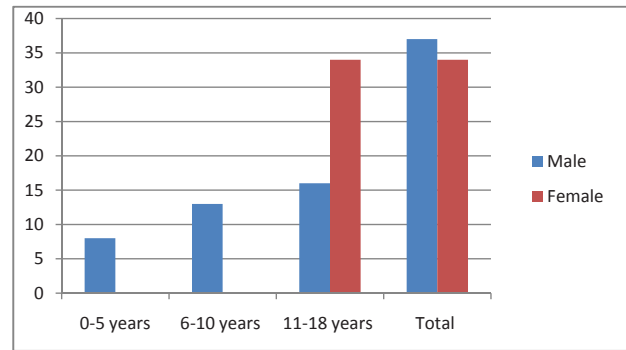
METHODS:

Punjab is the second largest province of Pakistan in area and largest in population. Its climate is moderate with four regular seasons²⁰. We extracted the data from multicenter retrospectively, in a 1 year period from January 2014 to December 2014.

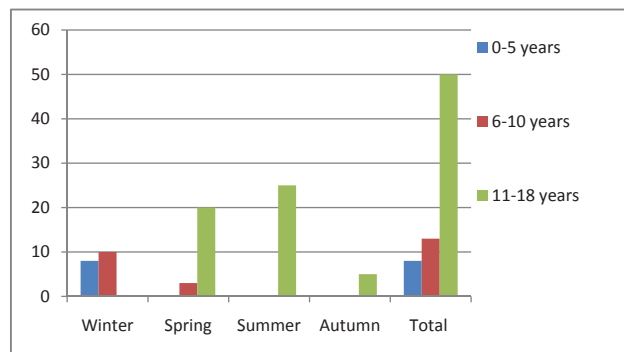
The diagnosis of GBS was made on history, clinical assessment, electrophysiological studies, CSF examination and stool sampling (for isolation of polio virus) according to AFP surveillance protocol by WHO. Demographic data included age, gender, date of admission and provisional location of the patients.

RESULTS:

Out of 71 cases of GBS, there was male predominance with 52.11% (n=37) while female with 47.8% (n=34), having male to female ratio of 1:2 to 1. Highest number of cases (70.4%) were found in age group (11-18 Years) (n=50) followed by school children (18.30%) which was found in age group (6-10 Years) (n=13). While preschool children in age group (0-5 Years) (n=8) were least affected (11.26%) (BAR CHART 1). Seasonal (P=0.01) and monthly (P=0.02) variation among GBS was observed throughout year with more prevalence in summer (49.29%) followed by spring (25.35%). (BAR CHART 2)

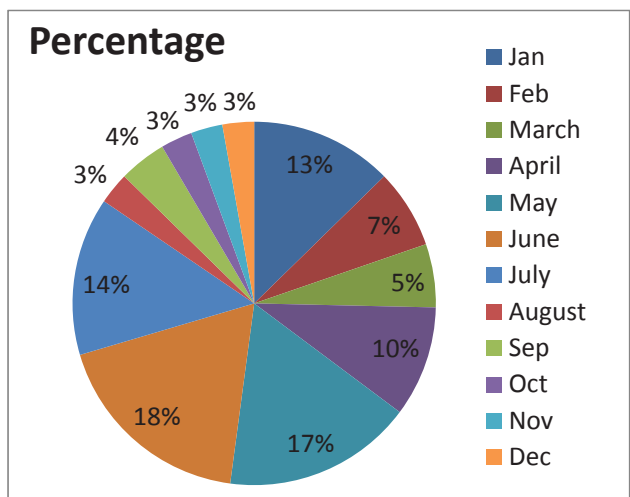


BAR CHART 1 Gender and Age Distribution



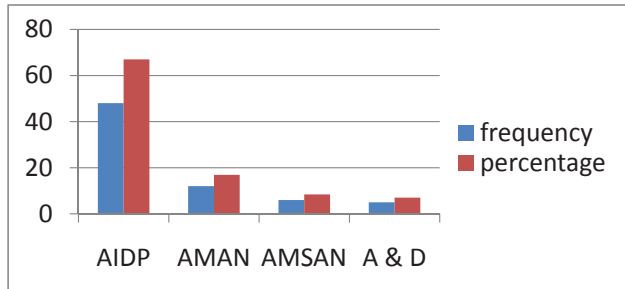
BAR CHART 2 SEASONAL and AGE variation

Regional data of Punjab revealed highest number of cases 36.6% (n=26) in South Punjab followed by West Punjab 28.16% (n=20). Whereas North and East Punjab had less number of cases than the former areas. With respect to months, May to July had maximum number of cases having 14-18% of patients than the rest of the year. October to December contributed least number of cases (2.8%). February to April accounted from 5-10% whereas in August and September 2-4% of GBS patients were notified (Pie chart 3).



PIE CHART 3 Monthly Variation

Most of the patients in this study fall in AIDP category with 67% (n=48). While AMAN was found in 16.9% (n=12) cases. Rest of the patients could not be classified as having single variant with the particular NCS(the unknown variant might have benefited from repeat NCS later), showed both axonal and demyelinating neuropathy (7%) (n=5) and AMSAN (8.4%) (n=6).(BAR CHART 4)



BAR CHART 4 Varients of GBS

DISCUSSION:

Active surveillance of AFP including GBS plays pivotal role in monitoring of polio endemic areas like Pakistan .In the present study GBS varied significantly with respect to months and seasons. This variation was similar to other studies conducted in Brazil, China, South Korea, Greece and Taiwan⁽²¹⁻²⁵⁾. There were few countries which shared some seasonal variations with our study but not all, like Iran had highest incidence in spring and winter, Netherlands had more cases in summer and winter while in UK and Kuwait GBS was more prevalent in spring and winter months⁽²⁶⁻²⁹⁾. Sweden showed its own seasonal variation of autumn having more cases of GBS⁽³⁰⁾. There are some studies which showed no seasonal variations in countries like Italy, Spain and Northwest of Iran⁽³¹⁾. Even in same country, due to climatic changes and different geographical locations, incidence of GBS was reported differently like in Bangladesh, incidence of GBS in southern divisions was, 2.5 per 100,000 as compared to northern divisions which had 1.7 per 100,000.Similar results were concluded from a study in Iraqi children⁽³⁾.In general, this variation is due to the differences in climate and infection rates^(32,33). Among the 3 age groups, adolescents had highest incidence of GBS 70.4 % followed by school children(Table 1). Similar results were found by a study done recently in India with 55% school aged children to be involved more than other age groups. Contrary to this, another study revealed pre-school children predominance⁽³⁾. Different studies showed that there was male predominance which is consistent with our study^(3,17,19,26).(Table1)

AIDP is the most common variant in this study (67%) followed by AMAN (16.9%)(Table 4). There was a study conducted by Pi-Lien H et al which also showed that most of the patients had AIDP. One recent study in India showed opposite results with AMAN (38.9%) to be the most common variety followed by AMSAN (22.2%). On the other hand both axonal and demyelinating variety was least common in both, our (7%) and Indian study (16.7%). AMAN and AMSAN is common in Northern China, Japan and Mexico while US has 5-10% of both. AIDP is more prevalent about 90% in Europe and North America. There is scarce data available in our population on account of different varieties. More studies having prolonged study period and adequate sample size is needed to know the exact pattern of the disease.

CONCLUSION:

The peak seasonal clustering noted by us in the summer months was consistent significantly with other Asian studies. The age and gender distribution of GBS in our series, which showed children with peak incidence in 11-18 years age, is different from studies done in other countries.

KEY MESSAGE:

Non polio cases of AFP are more than polio. For global eradication of poliovirus, Pakistan should remain vigilant for effective surveillance of polio and non-polio cases. Every case of AFP should be reported so that we can have our own incidence and prevalence.

LIMITATION OF STUDY:

More studies having long duration of study period, including all seasons more than once and large sample size from multicenters , is needed to know the exact pattern of the disease .

REFERENCES

1. Acute Flaccid Paralysis Surveillance –Health Protection.<https://www.hpsc.ie/hpsc/A-/Vaccine/Preventable>.Jul 22,2013.
2. Case definitions for the four diseases requiring notification in all.[www.who.int/ihr/Case Definitions](http://www.who.int/ihr/Case%20Definitions).
3. Jasem J, Marof K, Nawar A , Khalaf Y, Aswad S, Hamdani F, Islam M, Kalil A, Guillain-Barré syndrome as a cause of acute flaccid paralysis in Iraqi children: a result of 15 years of nation-wide study.BMC Neurol 2013 Dec;13:195

4. Beherman R, Kliegman R, Jenson H: Nelson's Textbook of Pediatrics. 2003, Philadelphia: Saunders
5. Hughes RA, Cornblath DR: Guillain-Barre syndrome. *Lancet*. 2005, 366 (9497): 1653-1666.
6. Visser LH, van der Meché FG, Meulstee J, Rothbarth PP, Jacobs BC, Schmitz PI, et al. Cytomegalovirus infection and Guillain-Barré syndrome: the clinical, electro physiologic, and prognostic features. Dutch Guillain-Barré Study Group. *Neurology*. 1996 Sep. 47(3):668-73. [Medline].
7. Kang JH, Sheu JJ, Lin HC. Increased risk of Guillain-Barré Syndrome following recent herpes zoster: a population-based study across Taiwan. *Clin Infect Dis*. 2010 Sep 1. 51(5):525-30. [Medline].
8. Seneviratne U. Guillain-Barré syndrome. *Postgrad Med J*. 2000 Dec. 76(902):774-82. [Medline]. [Full Text] Visser LH, van der Meché FG, Meulstee J, Rothbarth PP, Jacobs BC, Schmitz PI, et al. Cytomegalovirus infection and Guillain-Barré syndrome: the clinical, electrophysiologic, and prognostic features. Dutch Guillain-Barré Study Group. *Neurology*. 1996 Sep. 47(3):668-73. [Medline]
9. Van Koningsveld R, Van Doorn PA. Steroids in the Guillain-Barré syndrome: is there a therapeutic window?. *Neurologia*. 2005 Mar. 20(2):53-7. [Medline].
10. Islam Z, Jacobs BC, van Belkum A, Mohammad QD, Islam MB, Herbrink P, et al. Axonal variant of Guillain-Barre syndrome associated with *Campylobacter* infection in Bangladesh. *Neurology*. 2010 Feb 16. 74(7):581-7. [Medline].
11. Islam Z, van Belkum A, Cody AJ, Tabor H, Jacobs BC, Talukder KA, et al. *Campylobacter jejuni* HS:23 and Guillain-Barre syndrome, Bangladesh. *Emerg Infect Dis*. 2009 Aug. 15(8):1315-7. [Medline]. [Full Text].
12. Kalra V, Chaudhry R, Dua T, Dhawan B, Sahu JK, Mridula B. Association of *Campylobacter jejuni* infection with childhood Guillain-Barré syndrome: a case-control study. *J Child Neurol*. 2009 Jun. 24(6):664-8. [Medline].
13. Van den Berg B, van der Eijk AA, Pas SD, Hunter JG, Madden RG, Tio-Gillen AP, et al. Guillain-Barre syndrome associated with preceding hepatitis E virus infection. *Neurology*. 2014 Feb 11. 82(6):491-7. [Medline].
14. Zika virus. Centers for Disease Control and Prevention. Available at <http://www.cdc.gov/zika/disease-qa.html>. 2016 Feb 4; Accessed: 2016 Feb 8.
15. Romero S, McNeil DG Jr. Zika virus may be linked to surge in rare syndrome in Brazil. *New York Times*. 2016 Jan 21. Available at <http://www.nytimes.com/2016/01/22/world/americas/zika-virus-may-be-linked-to-surge-in-rare-syndrome-in-brazil.html>.
16. *Pediatrics in Review* April 2012, VOLUME 33 / ISSUE 4 Guillain-Barré Syndrome Beth A. Rosen
17. Islam Z, Jacobs BC, Islam MB, Mohammad QD, Diorditsa S, Endtz HP. High incidence of Guillain-Barré syndrome in children, Bangladesh. *Emerg Infect Dis*. 2011 Jul; 17(7)
18. Evans OB, Vedanarayanan V. Guillain-Barré syndrome. *Pediatr Rev*. 1997 Jan. 18(1):10-6. [Medline].
20. <http://Climate of Pakistan from Wikipedia ,the encyclopedia>
21. Rocha MS, Brucki SM, Carvalho AA, Lima UW. Epidemiologic features of Guillain-Barré syndrome in Sao Paulo, Brazil. *Arq Neuropsiquiatr* 2004;62:33-37.
22. McKhann GM, Cornblath DR, Griffin JW, Ho TW, Li CY, Jiang Z, Wu HS, Zhaori G, Liu Y, Jou LP. Acute motor axonal neuropathy: a frequent cause of acute flaccid paralysis in China. *Ann Neurol* 1993;33:333-342.
23. Coe, C. J. Guillain-Barré syndrome in Korean children. *Yonsei Med J* 1989;30:81-87.
24. Jiang GX, Cheng Q, Link H, de Pedro-Cuesta J. Epidemiological features of Guillain-Barré syndrome in Sweden, 1978-93. *J Neurol Neurosurg Psychiatry* 1997;62: 447-453.
25. Van Koningsveld R, Van Doorn PA, Schmitz PI, Ang CW, Van der Meché FG. Mild forms of Guillain-Barré syndrome in an epidemiologic survey in The Netherlands. *Neurology* 2000;54:620-625.
26. Borhani HA, Amin BM, Zamiri N, Sabayan B, et al. Seasonal Variation of Guillain-Barré Syndrome Admission in a Large Tertiary Referral Center in Southern Iran: A 10 Year Analysis. *Acta Neurol Taiwan* 2012 June;21(2):60-6321:
27. Ismail EA, Shabani IS, Badawi M, Sanaa H, Madi S, Al-Tawari A, Nadi H, Zaki M, Al-saleh Q. An epidemiologic, clinical, and therapeutic study of childhood Guillain-Barré syndrome in Kuwait: is it related to the oral polio vaccine? *J Child Neurol* 1998;13:488-492.
28. Hughes RA, Rees, JH. Clinical and epidemiologic features of Guillain-Barré syndrome. *J Infect Dis* 1997;176:S92-S98.

29. Nachamkin I, Arzarte Barbosa P, Ung H, Lobato C, Gonzalez Rivera A, Rodriguez P, Garcia Briseno A, Cordero LM, Garcia Perea L, Perez JC, Ribera M, Aldama PC, Guitérrez GD, Sarnat LF, García MR, Veitch J, Fitzgerald C, Cornblath DR, Rodriguez Pinto M, Griffin JW, Willison HJ, Asbury AK, McKhann GM. Patterns of Guillain-Barré syndrome in children: results from a Mexican population. *Neurology* 2007 23;69:1665-1671.
30. Winner, SJ., Evans, JG. Age-specific incidence of Guillain-Barré syndrome in Oxfordshire. *Q J Med* 1990;77:1297-1304.
31. McGrogan A, Madle GC, Seaman HE, de Vries CS. The epidemiology of Guillain-Barré syndrome worldwide. A systematic literature review. *Neuroepidemiology* 2009;32:150-163.
32. Islam Z, Jacobs BC, van Belkum A, Mohammad QD, Islam MB, Herbrink P, Diorditsa S, Luby SP, Talukder KA, Endtz HP: Axonal variant of Guillain-Barre syndrome associated with *Campylobacter* infection in Bangladesh. *Neurology*. 2010, 74 (7): 581-587
33. Landaverde JM, Danovaro-Holliday MC, Trumbo SP, Pacis-Tirso CL, Ruiz-Matus C: Guillain-Barre syndrome in children aged <15 years in Latin America and the Caribbean: baseline rates in the context of the influenza A (H1N1) pandemic. *J Infect Dis*. 2010, 201 (5): 746-750.

Conflict of interest: Author declares no conflict of interest.

Funding disclosure: Nil

Author's contribution:

Dr. Shaila Ali: Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review

Dr. Zia Ur Rehman: Data collection, data analysis

Dr. Tipu Sultan: Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review