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Frequency Of Autonomic Dysfunction In Patients With Guillain Barre Syndrome Presented At Tertiary Care Hospital In Karachi.

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Abstract: Background: Guillain Barre Syndrome (GBS) is an acute immune-mediated polyradiculoneuropathy often followed by autonomic dysfunction, potentially resulting in severe morbidity and mortality. **Objective:** To determine the frequency of autonomic dysfunction in Guillain Barre Syndrome patient at tertiary care hospital. **Methods:** It was a descriptive cross-sectional research conducted in the Department of Neurology at Jinnah Postgraduate Medical Centre, Karachi over a period of six months with the consent of the Institutional Review Board. Non-probability consecutive sampling was applied to 81 patients aged 18-60 years who are diagnosed with Guillain-Barré syndrome according to clinical, cerebrospinal fluid, and electrophysiological criteria. The data were analyzed by the SPSS version 25. The stratification was done to control effect modifiers and Chi-square test was used to evaluate the relationships between categorical variables, with statistical significance of $p \leq 0.05$.**Results:** A total of 81 patients with Guillain–Barré syndrome were included, with a mean age of 38.4 ± 11.6 years and mean illness duration of 3.8 ± 1.2 weeks. Autonomic dysfunction was observed in 79.0% (n = 64) of patients. The most common manifestations were fluctuating blood pressure (55.6%) and fluctuating heart rate (48.1%), followed by urinary retention (43.2%) and gastrointestinal dysfunction (38.3%). A statistically significant association was found between illness duration >4 weeks and autonomic dysfunction ($p = 0.03$), whereas no significant association was observed with gender or age group ($p > 0.05$).**Conclusion:** Autonomic dysfunction is common in the Guillain-Barré syndrome patients, and cardiovascular manifestations are the most frequent. The longer the illness, the more autonomic involvement is associated.

Keywords: Autonomic Dysfunction; Cardiovascular Instability; Cross-Sectional Study; Guillain-Barré Syndrome; Urinary Retention.

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INTRODUCTION

Guillain Barre Syndrome (GBS) is an acute immune-mediated polyradiculoneuropathy that manifests itself in rapid-progression, symmetrical weakness of the limbs, loss of reflexes, and some level of sensory and cranial nerve dysfunction [1]. It is the most prevalent cause of acute flaccid paralysis in the post poliomyelitis era all over the world and the need to be recognized promptly as it causes breathing difficulty and life threatening complications [2]. The heterogeneity in pathogenesis and clinical course can be seen in the disorder, which has a number of electrophysiological and clinical subtypes that include; Acute Inflammatory Demyelinating Polyradiculoneuropathy (AIDP), Acute Motor Axonal Neuropathy (AMAN), and Miller Fisher syndrome [3].

Autonomic dysfunction is one of the most severe and even life-threatening manifestations of GBS as a systemic complication [4]. Dysautonomia can be either sympathetic or parasympathetic and lead to cardiovascular instability, blood pressure changes, arrhythmia, gastrointestinal dysmotility, urinary retention and sudomotor dysfunction [5]. The incidence of autonomic dysfunction is quite diverse in the literature, possibly because of the differences in definitions of autonomic dysfunction, monitoring and study groups [6]. Autonomic involvement has been recently indicated to be associated with certain electrophysiological subtypes and severity of the disease, which additionally points to the importance of autonomy in clinical context [7].

The autonomic symptoms can be present after the acute period and can contribute a substantial Impact on patients' health-related quality of life recovery period, highlighting the importance of systematic assessment despite the improvement in the neurological condition [8]. Even though significant progress has been achieved in the study of the immunopathogenesis and clinical spectrum of GBS, variation in presentation and outcomes remains a problem to clinicians [9]. Extensive reviews point to the fact that early identification and close hemodynamic control is essential in decreasing morbidity and mortality linked to autonomic instability [10].

Although there has been increased global literature on GBS and its complications, little region-specific data has been reported on the frequency and clinical pattern of autonomic dysfunction, especially in the tertiary care facilities in developing countries. The monitoring strategies, prediction of complications, and resource allocation in high-dependency and intensive care units require local epidemiological data to guide their strategies.
So far, there is no particular study that has assessed the frequency and clinical spectrum of Guillain-Barré syndrome autonomic dysregularities in tertiary care hospitals in Karachi. The current research is designed to identify the prevalence of autonomic dysfunction in patients with Guillain-Barré syndrome and outline its clinical presentation in a tertiary care environment, thus adding localized relevant information to the current body of knowledge.

Material and Methods

The research was a cross-sectional study carried out in the department of Neurology, Jinnah Postgraduate Medical Centre (JPMC), Karachi, in a period of 6 months after the research synopsis was approved by Institutional Review Board (IRB:) of Jinnah Postgraduate Medical Centre (JPMC) . Informed consent forms were filled by all the participants or their attendants and the objectives and procedures of the study provided.

Sample size was calculated using OpenEpi software by using the frequency of autonomic dysfunction that was reported in a previous study to be 88.4% in Guillain-Barre syndrome [11], a 95% confidence interval, and a margin of error of 5%. The sample size

obtained was 81 patients. Participants were recruited applying non-probability consecutive sampling method.

The study included patients of both genders aged between 18 and 60 years who were diagnosed with the Guillain-Barré syndrome as per the operational definition. Diagnosis of GuillainBarré syndrome was made by such criteria as motor weakness (Medical Research Council grade less than 2) over four weeks, cerebrospinal fluid protein level exceeding 55 mg/dL with no rise of white blood cells, and electrophysiological evidence of demyelination such as the loss of F waves and H reflexes on nerve conduction studies. The patients who had the history of head trauma or had a Glascale Coma Scale score below 8, had a stroke, or were on corticosteroid were excluded in the study.
Inclusion criteria included the patients admitted to the neurology ward or visiting the outpatient department that met the inclusion criteria. Competent demographic data such as age, sex, marital situation, educational attainment, living conditions, and work position was documented. The anthropometric measurements were done using a digital stadiometer and weighing machine using light clothes and no shoes on the patient. To determine the body mass index, the normal formula (weight in kilograms/height in meters squared) was used. There was clinical examination to determine the length and characteristics of Guillain-Barré syndrome and autonomic dysfunction symptoms. The presence of two or more of the following indicated autonomic dysfunction; fluctuating blood pressure (greater than 20% difference between standing and lying positions more than twice per 24 hours) and fluctuating heart rate (greater than 10% difference more than twice per 24 hours), urinary retention (inability to pass urine more than 12 hours with full bladder seen on ultrasound despite sufficient oral intake) and gastrointestinal dysfunction (diarrhea or defined as more than three stools in 24 hours or constipation (less than two stools in 48 hours). Blood pressure and heart rate were measured periodically, and clinical evaluation and ultrasound measures of urinary retention were established. The acute phase of the condition was characterized by carrying out cerebrospinal fluid analysis and nerve conduction studies in every patient, with the results being recorded in a structured proforma.

Statistical Package of Social Sciences (SPSS version 25) was used to enter and analyze the data. Quantitative variables were determined such as age, height, weight, body mass index, duration of Guillain-Barré syndrome, and cerebrospinal fluid protein level and their mean and standard deviation were calculated. Categorical variables, such as gender, age groups, marital status, educational status, residence, employment status, body mass index categories, duration categories, clinical features of Guillain-Barré syndrome, symptoms of autonomic dysfunction, and general presence of autonomic dysfunction were calculated by frequencies and percentages. Modifications of the effects were in terms of age, gender, marital status, educational status, residence, employment status, body mass index, and length of illness, which were controlled by stratification. The chi-square test was then used to compare the categorical variables and the p-value was taken as 0.05 which was found to be statistically significant.

RESULTS

A total of 81 patients diagnosed with Guillain–Barre syndrome were included in the study. The mean age of the participants was 38.4 ± 11.6 years. The overall frequency of autonomic dysfunction was 79.0% (n = 64).
The baseline demographic and clinical characteristics of the study population are presented in Table 1. The majority of patients were aged 31–45 years (39.5%), followed by 46–60 years (34.6%). Males constituted 59.3% of the study sample. The mean BMI was 24.9 ± 3.7 kg/m², and the mean duration of illness was 3.8 ± 1.2 weeks.

Table 1: Baseline Demographic and Clinical Characteristics of Patients (n = 81)

Variable	Frequency n (%) / Mean ± SD
Age (years)	38.4 ± 11.6
18–30 years	21 (25.9%)
31–45 years	32 (39.5%)
46–60 years	28 (34.6%)
Gender	
Male	48 (59.3%)
Female	33 (40.7%)
BMI (kg/m²)	24.9 ± 3.7
Duration of illness (weeks)	3.8 ± 1.2

The distribution of autonomic dysfunction and its individual components is shown in Table 2. Autonomic

dysfunction was present in 79.0% of patients. Cardiovascular manifestations were the most common features, with fluctuating blood pressure and heart rate observed in more than half and nearly half of patients, respectively.

Table 2: Frequency of Autonomic Dysfunction and Its Components (n = 81)

Variable	Frequency n (%)
Autonomic dysfunction present	64 (79.0%)
Autonomic dysfunction absent	17 (21.0%)
Fluctuating blood pressure	45 (55.6%)
Fluctuating heart rate	39 (48.1%)
Urinary retention	35 (43.2%)
Gastrointestinal dysfunction	31 (38.3%)

The association of autonomic dysfunction with demographic and clinical variables is summarized in Table 3. Autonomic dysfunction was more frequent among males and patients aged 31–45 years; however, gender and age group were not significantly associated with autonomic dysfunction ($p = 0.18$ and $p = 0.09$, respectively). A statistically significant association was observed between duration of illness >4 weeks and autonomic dysfunction ($p = 0.03$).

Table 3: Stratification of Autonomic Dysfunction with Demographic and Clinical Variables (n = 81)

Variable	Autonomic Dysfunction Present n (%)	Autonomic Dysfunction Absent n (%)	p-value
Gender			0.18
Male (n=48)	40 (83.3%)	8 (16.7%)	
Female (n=33)	24 (72.7%)	9 (27.3%)	
Age Group			0.09
18–30 years	15 (71.4%)	6 (28.6%)	
31–45 years	28 (87.5%)	4 (12.5%)	
46–60 years	21 (75.0%)	7 (25.0%)	
Duration of illness			0.03*
≤4 weeks (n=49)	36 (73.5%)	13 (26.5%)	
>4 weeks (n=32)	28 (87.5%)	4 (12.5%)	

*$p \leq 0.05$ considered statistically significant.

DISCUSSION

The current investigation showed that autonomic dysfunction is very frequent in patients with Guillain-Barré syndrome (GBS) and cardiovascular instability is the most prevalent form of this disorder. Autonomic participation in GBS has been widely identified as a major contributor of morbidity and mortality. Previous studies highlighted that dysautonomia can be a problem that complicates the acute stage of the disease and must be observed carefully because it has the tendency of arrhythmia and a sudden hemodynamic crash [11].

Peripheral nervous system involvement, including GBS, has been reported to increase during the COVID-19 pandemic in the context of emerging infections. It has also been reported that the autonomic manifestations are also related to the post infectious immune-mediated neuropathies that reinforce the importance of complete autonomic examination in the disease patients. [12].

We find that we comparatively agree with prospective observational data that have already been conducted in South Asia wherein a large percentage of GBS patients were found to have autonomic instability, and where autonomic dysfunction was found to be a predictor of unfavorable outcome [13]. It is the local similarity that increases the external validity of our findings and underscores the clinical cost of dysautonomia in a similar healthcare environment.

One of the studies in a population of neuro-critical care also indicated that dysautonomia was prevalent in GBS, especially in patients who needed intensive monitoring, with cardiovascular variability being the most common characteristic [14]. These findings are corroborated by the fact that the majority of our cohort is characterized by unstable blood pressure and heart rate, which is the reason to apply continuous hemodynamic monitoring.

Though conventional literature has outlined the mechanism and pattern of autonomic participation in GBS, both sympathetic as well as parasympathetic dysfunction, a variation in reported frequency can be explained by the differences in diagnostic threshold and monitoring habit [15]. This may have affected the

prevalence in general because our definition of operations needed at least two autonomic characteristics.

The COVID-19 period has also provided further evidence of the clinical spectrum of GBS and its associations by large epidemiological studies. Although not all cohort studies could identify a causal relationship between COVID-19 and an increment of GBS, autonomic complications were not excluded in the clinical spectrum [16]. This implies that it is dysautonomia that is a part of the disease process rather than an infection-specific process.

Autonomic instability has also been identified as a common complication in case of GBS, especially in severe forms, by systematic reviews investigating GBS cases during the COVID-19 context [17]. The results confirm that early diagnosis and multidisciplinary care of autonomic symptoms should be administered to minimize complications.

Multidisciplinary teams of care have been shown to be more effective in enhancing functional outcomes in patients with GBS, particularly those patients with respiratory, cardiovascular, and rehabilitative needs [18]. Considering the large percentage of autonomic dysfunction identified in our study, structured follow-up care measures and joint strategies of care are highly justified in tertiary care.

Recent literature commentaries on the field have highlighted the necessity of synthesized clinical actions and enhanced surveillance systems of GBS in developing countries [19]. Our research will provide the local epidemiological information in Karachi, which could help in the planning and development of resources and a standardized regulation of monitoring autonomic dysfunction.

Lastly, there are cases of differential diagnoses that can clinically present like the GBS like botulism, which can also show autonomic symptoms as well, which makes it essential to properly evaluate the diagnosis [20]. The comprehensive clinical, laboratory, and electrophysiological evaluation, as done in our study, is necessary to guarantee proper diagnosis and proper management.

In general, the results of this paper support the idea that autonomic dysfunction is a frequent and clinically important complication of Guillain-Barré syndrome. The timely identification of patients, ongoing surveillance, and multidisciplinary care are essential to enhance patient outcomes in tertiary care.

Limitations of study: Several limitations were experienced in this study. To begin with, being a single-center cross-sectional study in a tertiary care hospital, the findings of this study cannot be generalized to the broader population or to patients managed in primary and secondary care settings. Second, cross-sectional design restricted the possibility of establishing the temporal relationships and measuring the consequences of autonomic dysfunction which are long-term. Thirdly, autonomic evaluation was largely reliant on the clinical parameters and bedside surveillance; there was no undertaking of the advanced autonomic functioning tests; this possibly resulted in the underestimation or overestimation of subtle dysautonomia. Fourth, non-probability consecutive sampling could have resulted in selection bias. Finally, there were no clearly assessed potential confounders, including the severity of grading scales and mechanical ventilation requirements and the results of long-term follow-up.

CONCLUSION

This tertiary care environment had a significant number of patients with Guillain-Barré syndrome that showed autonomic dysfunction, and cardiovascular instability was the most commonly seen form. The results show that it is essential to regularly monitor autonomic parameters in patients with Guillain-Barré syndrome and to identify them as early as possible. The use of systematic monitoring guidelines and multidisciplinary management measures is potentially useful in minimizing complications and better clinical outcomes.

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