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PHYSIOTHERAPY MANAGEMENT OF GUILLAIN-BARRÉ SYNDROME IN A TERTIARY HOSPITAL IN SOUTH-SOUTH NIGERIA: A CASE REPORT

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ABSTRACT

Background: Guillain-Barré Syndrome (GBS) is a potentially life-threatening post infectious disease characterized by rapidly progressive, symmetrical weakness of the extremities. It can cause life-threatening complications, particularly if the breathing muscles are affected or if there is dysfunction of the autonomic nervous system. **Case Presentation:** This is a case report of Physiotherapy management of a 51-year old female patient with Guillain-Barré Syndrome (GBS). Patient was referred from the neurology unit, department of Internal Medicine, University of Port Harcourt Teaching Hospital (UPTH) to the neurology clinic of the physiotherapy department, UPTH as a case GBS after series of investigations. Appropriate physiotherapy intervention was given for a period of 36 weeks after a thorough assessment of the patient. The Guillain-Barre Syndrome Disability Score was used to assess the overall functional status of the patient while the Oxford Muscle Grading Scale was used to assess for muscle strength. The Numerical Pain Rating Scale (NPRS) was used to assess the level of pain in the limbs while the Berge Balance Scale (BBS) was used to assess the patient's balance. The case report was presented in line with the CARE: Case Report Guideline for case reports. All ethical procedures were followed. **Treatment outcome:** Treatment outcome revealed that the Guillain-Barré Syndrome Disability Score reduced from 4 to 2 while that of Berg Balance Scale increased from 3 to 42 after 36 weeks of intervention. Pain level on range of motion of the limbs based on the Numerical Pain Rating Scale reduced from 6/10 to 1/10 on the upper limb and from 8/10 to 2/10 on the lower limbs. **Conclusion:** Physiotherapy is effective in the management of patients with Guillain-Barré Syndrome. Early referral to Physiotherapy is key to pain management, balance control and overall functional status of the patients.

KEYWORDS: Physiotherapy Management, Guillain-Barre syndrome, Tertiary Hospital, South-South Nigeria, Case Report.

INTRODUCTION

Guillain-Barré syndrome (GBS) is a rare group of autoimmune polyneuropathies involving the peripheral nervous system, causing symptoms such as numbness, tingling, and weakness that can progress to paralysis which reaches a maximum severity within 4 weeks [1,2]. It is characterized by rapidly progressive and generally ascending symmetrical muscle weakness, accompanied by decreased or absent osteotendinous reflexes [3]. The cause of GBS is unknown, though it is considered a post-infectious immune mediated neuropathy [4]. According to Expósito et al., [3], there are four clinical forms of GBS namely: acute inflammatory demyelinating polyradiculoneuropathy (AIDP), acute motor axonal neuropathy (AMAN), acute sensory and motor axonal neuropathy (ASMAN), and Miller-Fisher syndrome.

Although about 70% of patients with GBS recover fully, about 30% of individuals diagnosed with GBS have residual weakness after 3 years and experience long-term weakness [4]. So, even though GBS is not considered a chronic condition, it often has long-term effects and patients may have ongoing neurological deficits that affect their quality of life, work and social lives [5]. During the onset of symptom, most patients describe the initial symptoms that were manifested as strange or odd sensations or peculiar feelings [6]. As the condition deteriorates, they attempt to explain their symptoms as the result of normal everyday activities or occurrences (such as medication side effects or tiredness), or feared having better known conditions, such as cancer or stroke [7]. Uncertainty for patients often becomes overwhelming, making them eager to find out what is happening to them [6, 8]. According to Hooks [6] and Forsberg et al., [8], this feeling of uncertainty is made worse by a general lack of information and knowledge of GBS, among patients and healthcare professionals.

GBS occurs worldwide with an overall incidence rate of 1–2 cases per 100,000 people per year, affecting all age groups, but is slightly more common in males than in females [9]. Young or middle-aged adults are more affected [10]. It typically occurs after an infectious disease in which the immune response generates antibodies that cross-react with gangliosides at nerve membranes [11]. This autoimmune response results in nerve damage or functional blockade of nerve conduction. In patients with GBS, a specific type of preceding infection can be identified and *Campylobacter jejuni* is responsible for most of these infections [12]. After *C. jejuni* infection, there is molecular mimicry which leads to the generation of antibodies that cross-react with specific gangliosides on peripheral nerves [12]. This leads to demyelination which results in reduced conduction velocity or complete conduction block.

According to Shahrizaila et al., [13], Donofrio [14], and Ansar et al., [15], the signs and symptoms of GBS include Parasthesia, difficulty in walking, weakness of the legs that spreads to the upper body, difficulty breathing, difficulty with bladder control or bowel function, blurred or double vision etc.

Below are pictorial representations of the structure of a typical neuron (*Fig. 1*) and that of an affected nerve in Guillain-Barre Syndrome (*Fig.2*):

STRUCTURE OF NEURON

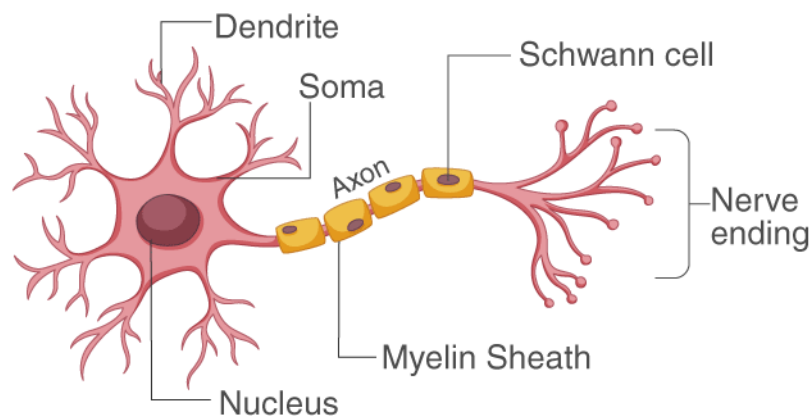


Fig 1 (Typical structure of neuron [16].)

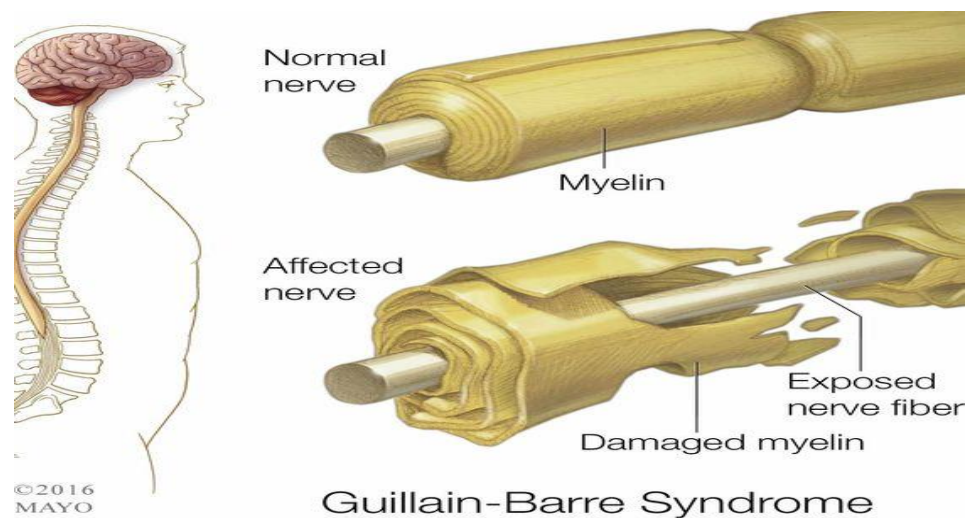


Fig 2 (Affected nerve in Guillain-Barre Syndrome [16].)

DIAGNOSIS, MANAGEMENT AND PROGNOSIS OF GUILLAIN-BARRÉ SYNDROME

Guillain-Barre syndrome is typically diagnosed by physical examination, electrophysiological criteria, and cerebrospinal fluid (CSF) studies [10, 17, 18]. The differential diagnosis includes AIDS-related polyradiculopathy, arachnoiditis, neurosarcoidosis, leptomenigeal carcinomatosis, chronic inflammatory demyelinating polyneuropathy (CIDP), and myasthenia gravis etc. Management of GBS largely depends on the clinical presentation. It involves a multidisciplinary approach which includes medical and physiotherapy managements [19]. The medical management usually includes the use of intravenous immunoglobulin (IVIg), corticosteroids, plasmaphoresis, and supportive management [4, 20-22]. Physiotherapy management is specific to the individual needs and aims to maximize patient's potentials, quality of life and independence [23].

OUTCOME MEASURES

There are several outcome measures that can be used in the management of GBS [24]. The outcome measures used in this study include Guillain-Barré Syndrome Disability Score for overall functional status of the patient, Oxford Muscle Grading Scale for muscle strength, Berg Balance Scale for balance control, and the Numerical Pain Rating Scale (NPRS) for assessing the level of pain. The Guillain-Barré Syndrome (GBS) disability score is a widely accepted scoring system to assess the functional status of patients with GBS [24, 25]. The lowest score is 1 while the highest score is 4. Score of 4 means that the patient is bedridden or chair-bound, score of 3 means that patient is able to walk 10m across an open space with help. Score of 2 means that the patient is able to walk 10m or more without assistance but unable to run, while score of 1 means that there is minor symptoms and the patient is capable of running. The Oxford muscle grading scale is a scale of 1 to 5. 1 is the lowest score while 5 is the highest score. According to Berg et al., [26] as cited by Oti et al., [27], “the Berg Balance Scale (BBS) is used to objectively determine a patient’s ability or inability to safely balance during a series of predetermined tasks. It is a 14-item list with each item consisting of a five-point ordinal scale ranging from 0 to 4, with 0 indicating the lowest level of function and 4, the highest level of function”. The NPRS is a scale of 0 to 10. Number 0 means no pain while number 10 denotes maximum pain.

CASE PRESENTATION

A case of a 51-year old female patient with Guillain-Barré Syndrome (GBS) who was referred from the neurology unit, department of Internal Medicine, University of Port Harcourt Teaching Hospital (UPTH) to the neurology clinic of the physiotherapy department, UPTH.

The presenting complaints were heaviness of the legs and inability to walk, heaviness of the chest, hands and inability to make proper use of the hands. Patient was apparently healthy until August 2021 when she started having knee pain which she thought to be knee osteoarthritis. Around October of same year, patient started having weakness on both legs and the entire lower limbs which gradually ascended to the upper limbs. Prior to the onset of symptoms, there was a history of respiratory infection, but no history of trauma or seizure.

The past medical histories of the patient were malaria, typhoid fever and respiratory infection. Surgical history was cesarean section done in 2010, 2013 and 2016. Recent drug history as patient could remember includes vitamin E, pradoxal, and vitamin B complex. Since the onset of symptom, patient’s appetite for food reduced significantly. On observation, patient was afebrile to touch, acyanosed, anicteric, neither pale nor dehydrated, and was in no obvious respiratory distress. The blood pressure, pulse rate and respiratory rates were all within normal range.

On examination, no abnormality was detected in the head/neck region. Chest examination revealed elliptical chest shape but with a reduced vital capacity. Abdomen moved with respiration. There was also no abnormality detected at the pelvis/perineum region.

The findings in the upper and lower limb regions are described on tables 1, 2, 3, 4, & 5 below:

Table 1 (Physical Examination of the Upper limbs Pre-intervention.)

	Right	Left
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Sensation (light and deep)	Intact	Intact
Tone	Normotonia	Normotonia
Proprioception	Intact	Intact
Stereognosis	Intact	Intact
GMP	2	2
Muscle Bulk	Obvious atrophy	Obvious atrophy
PROM	Full at all ranges but painful at the IPJs (NPRS = 6).	Full at all ranges but painful at the IPJs (NPRS = 6).
Grip strength	Poor	Poor
Edema	Absent	Absent
Brachial reflex	Normal	Normal
Spasticity	Absent	Absent

Table 2 (Physical Examination of the Lower limbs Pre-intervention.)

	Right	Left
Tone	Hypotonia	Hypotonia
Sensation (light and deep)	Intact	Intact
Proprioception	Intact	Intact

GMP	1	1
Muscle Bulk	Obvious atrophy	Obvious atrophy
PROM	Full and pain-free but painful at knee joint (NPRS = 8).	Full and pain-free but painful at knee joint (NPRS = 8).
Patella tendon reflex	Normal	Normal
Patella mobility	Mobile	Mobile
Edema	Absent	Absent
Spasticity	Absent	Absent
TA tightness	Present	Present
Ankle clonus	Present	Present

Table 3 (Treatment Outcome of the Upper limbs Post-intervention.)

	Right	Left
Sensation (light and deep)	Intact	Intact
Tone	Normotonia	Normotonia
Proprioception	Intact	Intact
Stereognosis	Intact	Intact
GMP	4	4

Muscle Bulk	Nil obvious wasting	Nil obvious wasting
AROM	Full at all ranges but limited and slightly painful at the IPJ (NPRS = 1)	Full at all ranges but limited and slightly painful at the IPJ (NPRS = 1)
PROM	Full at all ranges but slightly painful at IPJs (NPRS = 1)	Full at all ranges but slightly painful at IPJs (NPRS = 1)
Grip strength	Fair	Fair
Edema	Absent	Absent
Brachial reflex	Normal	Normal
Spasticity	Absent	Absent

Table 4 (Treatment outcome of the Lower limbs Post-intervention.)

	Right	Left
Tone	Normotonia	Normotonia
Sensation (light and deep)	Intact	Intact
Proprioception	Intact	Intact
GMP	4	4
Muscle Bulk	Nil obvious wasting	Nil obvious wasting

AROM	Limited and slightly painful at knee joint (NPRS = 2).	Limited and slightly painful at knee joint (NPRS = 2).
PROM	Full and pain-free at other joints but painful at the knee joint (NPRS = 2).	Full and pain-free at other joints but painful at the knee joint (NPRS = 2).
Patella tendon reflex	Normal	Normal
Patella mobility	Mobile	Mobile
Edema	Absent	Absent
Spasticity	Absent	Absent
TA tightness	Absent	Absent
Ankle clonus	Absent	Absent

Table 5 (Scores of Outcome Measures Pre and Post-Intervention.)

Outcome Measures	Pre-Intervention	Post-Intervention (after 36 weeks of intervention)
GBS Disability Score	4	2
Berge Balance Scale	3	42
Oxford Muscle Grading Scale	Both ULs = 2 Both LLs = 1	Both ULs = 4 Both LLs = 4

Pain Numerical Rating Scale	Both ULs = 6 Both LLs = 8	Both ULs = 1 Both LLs = 2
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Physiotherapy Management

Physiotherapy is very important in the management of Guillain-Barré Syndrome. The goals of Physiotherapy management can be grouped into short term and long-term goals [28-30]. Based on the findings of via the examination of this patient, she was being managed as a case of quadriparesis secondary to Guillain-Barre Syndrome. The short-term goals of physiotherapy management were patient and caregiver education/counseling, pain relief, prevention of deep vein thrombosis (DVT), maintenance of cardiopulmonary functions and overall physiological properties of the muscles, and supporting of joints in functional position to minimize damage or deformity. The treatment means for these short-term goals were chest physiotherapy, transcutaneous electrical nerve stimulation (TENS), thermotherapy, soft tissue mobilization, use of compression stockings, passive mobilization, bed mobility exercises and the use of orthotic devices.

The long-term goals included strengthening of weak muscles, improving endurance, posture, balance and co-ordination, and retaining normal movement patterns. The means for achieving these long-term goals were free active exercises, assisted active exercises, progressive resisted active exercises, proprioceptive neuromuscular facilitation (PNF), balance training and co-ordination exercises, precision exercises, rhythmic stabilization, standing and walking re-education.

Several factors determine the prognosis of GBS [31]. Overall, the clinical course, severity and outcomes of GBS are highly variable [22]. The predictors of poor outcome include: GBS Disability Scale score ≥ 3 after 6 months, diarrhea preceding GBS onset, and advancing age [24, 32].

CASE SUMMARY

This is a case report of Physiotherapy management of a 51-year old female patient with Guillain-Barré Syndrome (GBS). Patient was referred from the neurology unit, department of Internal Medicine, University of Port Harcourt Teaching Hospital (UPTH) to the neurology clinic of the physiotherapy department, UPTH as a case GBS after series of investigations. Appropriate physiotherapy intervention was given for a period of 36 weeks after a thorough assessment of the patient. The Guillain-Barré Syndrome Disability Score was used to assess the overall functional status of the patient while the Oxford Muscle Grading Scale was used to assess for muscle strength. The Numerical Pain Rating Scale (NPRS) was used to assess the level of pain in the limbs while the Berge Balance Scale (BBS) was used to assess the patient's balance. The case report was presented in line with the CARE: Case Report Guideline for case reports. All ethical procedures were followed. Treatment outcome revealed that the Guillain-Barré Syndrome Disability Score reduced from 4 to 2 while that of Berg Balance Scale increased from 3 to 42 after 36 weeks of intervention. Pain level on range of motion of the limbs based on the Numerical Pain Rating Scale reduced from 6/10 to 1/10 on the upper limb and from 8/10 to 2/10 on the lower limbs.

DISCUSSION

This article presented a case report of the physiotherapy management of a 51-year-old female patient with Guillain-Barré Syndrome (GBS). Patient was referred from the neurology unit of the University of Port Harcourt Teaching Hospital (UPTH) to the neurology clinic of the physiotherapy department, UPTH as a case of GBS after series of investigations. Physiotherapy intervention was given for a period of 36 weeks after a thorough assessment of the patient.

The result of this study revealed that Physiotherapy is effective in the management of GBS. It was evident in the scores of the various outcome measures used pre and post-intervention. The GBS Score reduced from 4 to 2 while that of Berg Balance Scale increased from 16 to 42. Pain level on range of motion of the limbs based on the Numerical Pain Rating Scale reduced from 5/10 to 1/10 on the upper limb and from 8/10 to 1/10 on the lower limbs. This agrees with the finding of Gawande et al., [33] who investigated the effectiveness of physiotherapy in a case report of a 20-year old girl with complaints of generalized weakness, fever and pain in the lower limb. They concluded that physiotherapy is effective in the management of GBS through the scores of GBS disability scale and the Functional Independence Measure (FIM) which were used as the outcome measures. The findings of this study are also in consonance with the assertion of Simatos et al., [23] who stated that “various types of exercise programmes improve physical outcomes such as functional mobility, cardiopulmonary function, isokinetic muscle strength, and work rate and reduce fatigue in patients with GBS”.

Although there are quite a number of studies on GBS, there is still paucity of information on the effectiveness of the physiotherapy intervention as an important modality of multidisciplinary care in GBS [19, 23]. Simatos et al., [23] conducted a systematic review on the influence of exercise on patients with GBS. They reported seven articles of which one showed that that high-intensity exercise relative to lower intensity exercise significantly reduced disability in patients with GBS, as measured with the Functional Independence Measure (FIM). Although they opined from their study that exercise programmes improve physical outcomes in patients with GBS, they concluded that making confident conclusions about the effects of exercise interventions on physical outcomes in patients with GBS is not possible because of insufficient high-quality literature.

Sulli et al., [34] in their systematic review asserted that the analysis of three randomized controlled trials (RCTs) showed that various types of rehabilitation interventions are correlated to an improvement in the well-being of patients with GBS. They also concluded that it is difficult to draw definite conclusions on the effectiveness of rehabilitation treatment in patients with GBS, and recommended that high-quality future studies are needed to confirm these hypotheses.

CONCLUSION

The study has shown that physiotherapy is effective in the management of Guillain-Barre Syndrome. Early referral to Physiotherapy is key to pain management, balance control and overall functional status of the patients. More studies of higher quality such as Randomized Controlled Trials (RCTs) should be explored for more evidence-based conclusions on the effectiveness of physiotherapy intervention in the management of patients with GBS.

CONFLICT OF INTEREST DECLARATION

The authors declare no conflict of interest

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