

# Long term effects of GBS patients on functional recovery and quality of life

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## ABSTRACT:

**Objective:** The study was about to find out the functional recovery and quality of life of post Guillain-Barre' syndrome patients. **Method:** A follow up survey study was conducted on 100 GBS patients. Data was collected by both face to face and telephonic interview from January 2021-july 2021 by using GBS disability scale and through self-designed questionnaire. Descriptive data analysis was done by using Microsoft Office Excel 2019. Frequency tables used to describe the distribution of study variables through filter method. **Results:** Study showed, 45 subjects of age, < 40 years and 55 subjects of age > 40 years participated. The mean age was 40.08 year. GBS affected more in 40-60 age group and male were more affected than female. It was reported in the study that in long term period according to GBS disability scale most participants scored 1 (minor symptoms and capable of running) and 14 subjects scored 6 (dead). In the study (30%) started their recovery during 7d-15d, and 27% got recovered within 6 months. After recovery also they faced problems in getting up from floor, stair climbing, walking, weight lifting, running, U/L balance, pain, SOB and tiredness etc. Due to certain residual impairments, they had faced mild problem in doing their gross motor ADL activities, but still 18 (20%) subjects were unable to do IADL (instrumental ADL) activities and 14 (16%) were unable to do fine motor activities and 20% were able to do the fine motor activities with mild weakness and vibration of hands. Study reported Participants recovered from depression, able to participate socially and improved their QOL, but still 5% participants had faced problems to connect socially, that hampered their QOL. **Conclusion:** participants improved very well in body structure and function components, like supine to sit, sit to stand, walking in a session, lifting heavy weight and bilateral balance, but in long-term still subjects had residual problems like, paresthesia, fatigue, neuropathic pain, as well as unilateral balance that affected their ADL activities, participation, social life style as well as their Quality of life accordingly.

**Keywords:** Long-term, GBS, Functional recovery, Quality of life

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## 1. INTRODUCTION

Guillain-Barre' syndrome (GBS) is the most common cause of acute neuromuscular paralysis in developed countries. GBS is a significant cause of new long-term disability for at least 1,000 persons per year in the United States, and more elsewhere [1]. The demyelination of peripheral nerve axons produces symmetrical motor paralysis, which progressively ascends from the lower extremities and causes tingling, burning sensations and areflexia, altered soft-tissue length, muscle weakness, and sensory changes affect balance, posture, joint mobility, and gait [2].

Guillain-Barre' syndrome is the most common cause of acute flaccid paralysis worldwide. Most patients present with an antecedent illness, most commonly upper respiratory tract infection, before the onset of progressive motor weakness [3]. GBS typically begins with paresthesia in the hands or feet, followed within hours to days by leg and arm weakness. The cardinal clinical features consist of progressive relatively symmetrical weakness, mild sensory symptoms and areflexia, but effects on the cranial and respiratory muscles as well as the autonomic nervous system are not uncommon [4].

Guillain-Barre' syndrome (GBS) is the leading cause of acute paralysis that can potentially affect all of the human population. GBS is believed to be an immune-mediated disease, possibly triggered by a recent infection, and driven by an immune attack targeting the peripheral nervous system. GBS can be divided into several subtypes depending on the phenotype, pathophysiology,

and neurophysiological features. Unfortunately, morbidity and mortality rates are still high despite the current understanding of the pathophysiology and available treatment options[5].

The acute onset is often followed by a plateau phase of 2-4 weeks, before the start of recovery, which usually lasts 1-2 years. In a prospective, longitudinal study of impairment and walking limitation in patients with Guillain-Barre' syndrome in Sweden, we have previously described that recovery mainly occurs during the first year after onset. At two years after onset, residual motor and sensory impairments were still seen in 23/42 patients (55%), and pain and fatigue were reported by about a third of all patients. Impairments may persist beyond this time point, since recovery during the second year was mainly in the area of muscle strength [4].

Guillain-Barre' syndrome is a rapidly progressive disorder that commonly causes significant functional disability in the acute phase. Literature data, including the study conducted in our population of patients, point to the fact that more than one-third of GBS patients at nadir, as well as a quarter of patients on discharge, are chair-bound or confined to bed. Although GBS has a favorable outcome in the majority of patients, a certain number of them could still meet poor outcome with a considerable long-term functional disability that could negatively affect their quality of life [6]. Even if the majority of patients with Guillain-Barre' syndrome (GBS) have a favorable functional outcome some residual motor and sensory signs and symptoms may remain. Treatment of GBS should not be only aimed at improving patients' disability but also at limiting the impact of the disease on their social life [7].

The clinical presentation and severity of these GBS cases was similar to those with non-COVID-19 GBS. GBS-associated COVID-19 appears to be an uncommon condition with similar clinical and diagnostic patterns to GBS before the pandemic[8]. GBS is being recognized as one of the many presentations of the COVID-19 infection. Although the common form is AIDP that might lead to complications, other variants are possible as well[9].

The primary recovery of function occurred during the first 6 months after onset and moderate to severe disability was seen in about 25% of at 2 years after onset. Other prospective clinical studies report similar overall proportions of residual disability at 1-2 years after onset, with moderate to severe disabilities seen in 10-31% of persons at the participants 1 year after onset and in 16-20% at 2 years.

All the studies have done outside India and there are limited studies done in India belongs to the long-term effects of GBS patients. This study will be conducted among GBS patients to know the long-term effects of GBS patients on functional recovery and quality of life.

## 2. METHODOLOGY

A follow up survey study was conducted on 100 GBS patients. Data was collected by both face to face and telephonic interview from January 2021-july 2021 by using GBS disability scale and through self-designed questionnaire.

The copy of case discharge record file with contact no. of GBS Patients of 2016 to 2021(March) were retrieved from SVNIRTAR, SCB MEDICAL COLLEGE AND HOSPITAL CUTTACK, KIIMS HOSPITAL, BBSR and INSTITUTE OF MEDICAL SCIENCE AND SUM HOSPITAL. The data regarding the discharge record with contact number of patients were collected. The subjects were screened first according to the inclusion and exclusion criteria. The subjects were approached with proposal of study via voice call and the procedures of the study were explained to the patient with mobile phones. The informed consent from participants and approval from the institution were obtained (ANNEXURE I). Each patient was contacted with the contact no from the data and the functional outcome and quality of life of patients will be assessed by GBS DISABILITY SCORE (ANNEXURE II) and by a self-designed questionnaire form (ANNEXURE III) by both telephonic as well as face to face interview. The questionnaire form was developed the items to collect the data regarding the **background factors, physical domain, pain, social and emotional issues and the rate of perception of recovery** included in the structured questionnaire. The tool was used in English language and it will be comprehensive.

## 3. DATA ANALYSIS

Data collected through interview were entered into excel spreadsheets and descriptive data analysis was done by using Microsoft Office Excel 2019. Frequency tables used to describe the distribution of study variables through filter method.

## 4. RESULTS

### 4.1 Results PART 1

#### 4.1.1 Subjects with age wise distribution:

Out of 100 participants, 73 male (73%) and 27 female (27%) were taking participated. Mean age is 40.78, median and mode 40 with standard deviation 21.02. M:F ratio 2.7:1.

#### 4.1.2. GBS DISABILITY SCALE scores:

Out of 100 participants, 17% scored 0 (means they are at a healthy state), 32% scored 1 (means they are having minor symptoms and capable of running), 29% scored 2 (they are able to walk 10m or more without assistance but unable to run), only 4% subjects scored 3 (able to walk 10m across an open space with help), 5% scored 4 (bedridden or chair bound), 0% score 5 (means no subject were in the stage of requiring assistance ventilation for at least a part of the day) and 14% individual scored 6 (Dead) respectively.

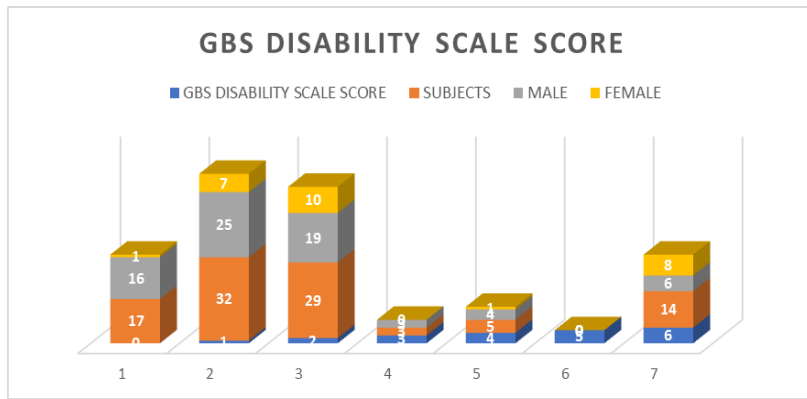


Figure 1

**4.1.3 Recovery starting period:**

Out of 86 subjects, recovery period started within one week in 16(19%) subjects, within 7d-15d it started in 26(30%) subjects, 17(20%) subjects started recovery within 15d-1m and 1m-3m respectively, 3(3%) subjects within 3m-6m and 7(8%) subjects within 6m-1y started their recovery.

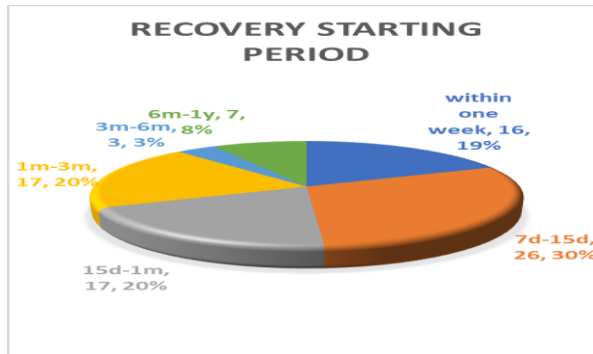


Figure 2

**4.1.4. Recovery of subjects:**

Out of 86 subjects, 8 subjects (9%) recovered within 1m, 2 Subjects (2%) within 2m, 17 subjects (20%) within 3m, 23 subjects (27%) within 6m, 16 subjects (19%) within 1year, 5 subjects (6%) within 1.5year, 6 subjects (7%) within 2 year recovered and 9 subjects (10%) were still continuing recovery. Here the median is 6M, means subjects are recovered more within this time period.

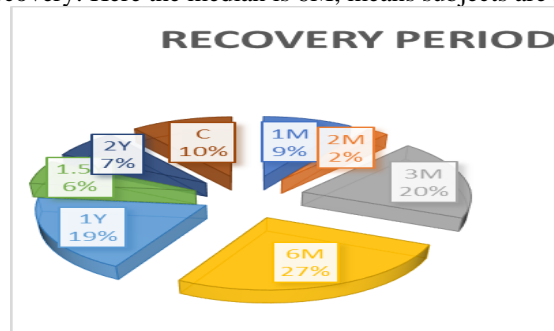


Figure 3

**4.1.5 Continuing recovery subjects with interval period:**

Out of 9 subjects, 6 subjects (67%) started their recovery from 1year and still they continuing and only 1 subject (11%) had their recovery period from 10days, 1month and 6month and still continuing. Here the median is this interval period is 1y-C.

**4.1.6 Residual impairment of continuing recovery subjects:**

It is reported here from the collected data that, Continuing recovery subjects had their residual impairment in physical activities like, getting up from floor, sit to stand, walking, stair climbing, running, lifting heavy weight and unilateral balance, functional limitations like gross motor activities like, eating, drinking, brushing, bathing, dressing, and in different IADL like, cleaning house, shopping, cooking and in fine motor activities also having difficulty in buttoning their shirts, manipulating with coins and beads etc.

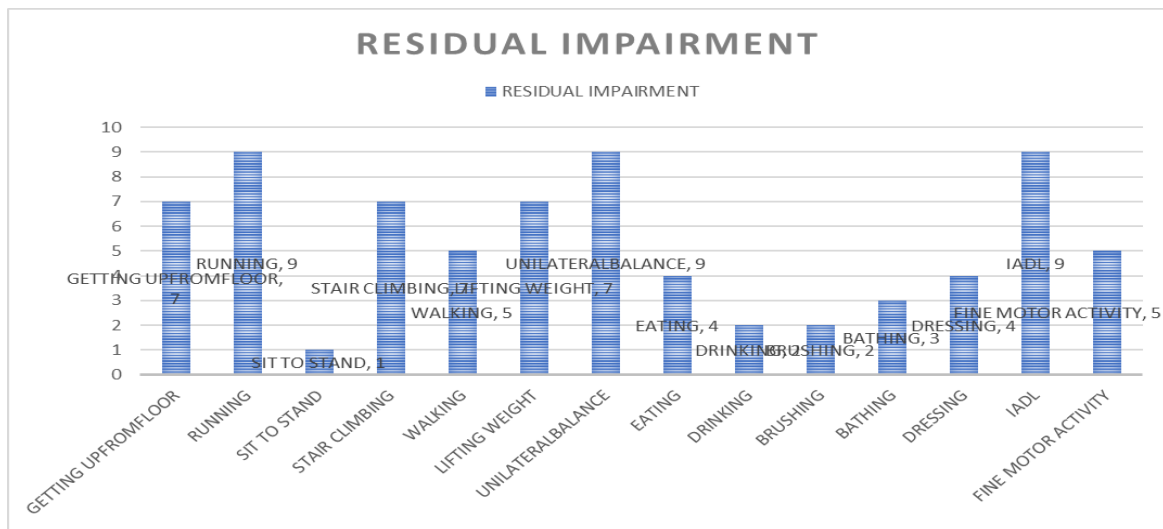


Figure 4

**4.1.7 Recovery starts from body parts:**

Out of 86 participants, 40 subjects started their recovery from B/L lower limb, followed by 19 subjects from B/L upper and lower limb both, 11 subjects from B/L upper limb and rest subjects started recovery from face, trunk, U/L right and left upper limb and U/L right and left lower limb respectively.

**4.2 RESULTS PART 2**

**(BODY STRUCTURE AND FUNCTION COMPONENTS)**

**4.2.1 Relationship between recovery in physical domain during discharge and long-term period:**

Out of 86 participants, 44,49,77,68 subjects had score 0 (not able to do) during discharge period in physical domain like supine to sit, sit to stand, getting up from floor and stair up and down respectively, while in long term period only 1 subject had scored 0 in supine to sit and sit to stand respectively. 7 and 9 subjects scored 0 in the domain getting up from floor and stair walk accordingly. During discharge period 19, 22 subjects are able to do supine to sit and sit to stand with maximal assistance respectively (score 1). During long term 27 subjects scored 2 (able to do with minimal assistance) in getting up from floor, while 45 subjects scored 3 (able to do myself). 83, 79, 62 subjects recovered completely (score 3, able to do supine to sit, sit to stand and stair climbing up and down themselves).

Table 1

BODY STRUCTURE AND FUNCTION COMPONENTS	SCORE 0		SCORE 1		SCORE 2		SCORE 3	
	D	L	D	L	D	L	D	L
SUPINE TO SIT	44	1	19	0	10	2	13	83
SIT TO STAND	49	1	22	2	7	4	8	79
GETTING UP FROM FLOOR	77	7	3	7	5	27	1	45
CLIMBING UP AND DOWN STAIR	68	9	10	2	8	13	0	62

**4.2.2 Relationship between in physical domain during discharge period and long-term period in GBS patient recovery:**

graph reported about the relationship between different physical domain like, walking, weight lifting, running, balance, facial symmetry, bladder and bowel control with score 0 (not able to do) and score 1(able to do). During discharge period, out of 86 participants, 56 subjects able to maintain facial symmetry and 55, 56 subjects abled to control bladder and bowel respectively. During long-term period residual impairments were reported like 38 subjects still not able to maintain U/L balance, 36 subjects not able to run.

Table 2

BODY STRUCTURE AND FUNCTION	SCORE 0		SCORE 1	
	D	L	D	L
WALK	84	5	2	81
LIFTING WEIGHT	85	9	1	77
RUNNING	86	36	0	50
BALANCE B/L	83	6	3	80
BALANCE U/L	86	38	0	48
FACIAL SYMMETRY	30	1	56	85
BLADDER CONTROL	31	3	55	83
BOWEL CONTROL	30	2	56	84

**4.2.3 Long-term recovery of GBS patients in walking:**

Out of 86 subjects, 20 subjects (25%) able to walk 1k.m., followed by 18 subjects (22%) able to walk only 100-500m., 14 subjects (17%) able to walk 2k.m. and 15% able to walk 5k.m., 9% subjects able to walk both 3k.m. and more than 5k.m. respectively. Still 2% and 1% subjects struggled to walk only 10m. and 50m. only. Median is 1k.m.

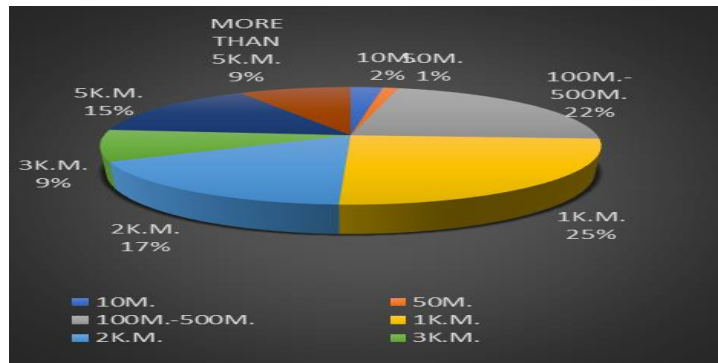


Figure 5

**4.2.4 Long-term recovery of GBS patients in weight lifting:**

Out of 86 subjects, 34% able to lift 2-5k.g., followed by 22% able to lift 5-10k.g., 17% 10-20k.g., 13% 20-30k.g., 9% able to lift above 30k.g. but still 5% subjects had power to lift only 1k.g.

**4.2.5 Relationship between recovery in respiratory parameter during discharge and long-term period:**

During discharge period out of 86 participants, 37 subjects had scored 0 (severe SOB and tiredness), 27 subjects had scored 1 (moderate SOB and tiredness), 13 subjects scored 2 (mild SOB and tiredness) and only 9 subjects scored 3 (never felt SOB and tiredness) but in long-term period only 4 subjects had scored 0, 24 subjects scored 1, 31 scored 2 and 27 scored 3 in SOB and only 5 subjects scored 0, 19 subjects scored 1, 30 scored 2 and 32 subjects scored 3 in tiredness respectively.

Table 3

BODY STRUCTURE AND FUNCTION	SCORE 0		SCORE 1		SCORE 2		SCORE 3	
	D	L	D	L	D	L	D	L
SHORTNESS OF BREATH	37	4	27	24	13	31	9	27
TIREDNES	37	5	27	19	13	30	9	32

**4.2.6 Relationship between pain in GBS patients during discharge and long-term period:**

Out of 86 subjects, during discharge period 27 subjects had pain, but during long-term period 34 subjects had pain and during discharge period 59 subjects had no pain but during long-term period 52 subjects had no pain.

Out of 27 subjects, (44%) and out of 34, (47%) had affected with dull aching type pain during both discharge and long-term period respectively, followed by tingling and numbness.

During discharge period, out of 27 subjects, 8 subjects (29%) had felt all over the body, followed by 6(22%) subjects felt pain over both B/L upper and lower limb, 4(15%) had pain at back to till B/L foot etc. During long-term period, out of 34 subjects, 12(34%) had pain at B/L lower limb below knee.

Intensity of pain was scored according to VAS. During discharge period, out of 27 subjects, 14(52%) had scored 7 to 8 on VAS. Mean VAS was 6.33 with median 7, while during long-term period out of 34 subjects, 13(38%) subjects had scored 3 to 4, 9 subjects (26%) scored 1 to 2 and 5 to 6 respectively. During long term period mean VAS was 3.69 with median 3.



Figure 6

### 4.3 RESULT PART 3 (ACTIVITY AND LIMITATION COMPONENTS)

#### 4.3.1 Recovery in Gross motor activities of daily life:

Here it is reported that, out of 86 participants, most of the subjects are scored 0 (not able to do) in doing gross motor activities during discharge period and during this time median is 0, while in long-term all most all subjects recovered and scored 1(able to do the gross motor activities) and here median is 1.

Table 4

ACTIVITY LIMITATION COMPONENTS GROSS MOTOR ACTIVITIES	SCORE 0		SCORE 1		
	D	L	D	L	
EATING	82	6	4	80	
DRINKING	82	2	4	84	
BRUSHING	81	2	5	84	
BATHING	82	3	4	83	
DRESSING	81	5	5	81	

#### 4.3.2 Recovery in Instrumental activities of daily life (IADL):

During discharge period out of 86 subjects, 84 had scored 0(not able to do) median was 0, while during long-term period only 18 subjects scored 0 and 68 subjects scored 1(able to do) IADL, median was 1.

Table 5

ACTIVITY LIMITATION COMPONENTS	SCORE 0		SCORE 1	
	D	L	D	L
IADL	84	18	2	68

#### 4.3.3 Recovery in Fine motor activities of daily life:

During discharge period out of 86 participants, 83 scored 0 (not able to do), while during long term period only 14 subjects scored 0, 18 subjects scored 1(able to do with some difficulty and vibration of hand) and 54 subjects scored 2 (able to do completely). During discharge period median was 0, while during long term median was 2.

Table 6

ACTIVITY LIMITATION COMPONENTS	SCORE 0		SCORE 1		SCORE 2	
	D	L	D	L	D	L
FINE MOTOR ACTIVITIES	83	14	0	18	3	54

### 4.4 RESULT PART 4 (PARTICIPATION RESTRICTION COMPONENTS)

#### 4.4.1 Recovery in depression during discharge and long-term period:

During discharge period out of 86 subjects, 26 subjects scored 0 (remain depressed all the time), 16 subjects scored 1(depressed most of the times), 21 subjects scored 2(depressed often), 15 scored 3(depressed sometimes) and only 8 subjects scored 4(never remain depressed), while during long-term only 1 and 6 scored 0 and 1 respectively and 19, 25 and 34 subjects scored 2,3 and 4 respectively.

Table 7

PARTICIPATION RESTRICTION COMPONENT	SCORE 0		SCORE 1		SCORE 2		SCORE 3		SCORE 4	
	D	L	D	L	D	L	D	L	D	L
DEPRESSION	26	1	16	6	21	19	15	25	8	34

**4.4.2 Recovery in participation during discharge and long-term period:****4.4.2. a. Taking part in family function:**

Out of 86 subjects, it is reported that during discharge 79(91%) subjects scored 0 (never take part in family functions), while during long-term only 8 subjects scored 0(never take part in family functions) and 1(sometimes take part) respectively, 26 subjects scored 2(often taking part), 25 subjects scored 3(most of the time taking part) and 18 subjects scored 4(taking part in family function all the time).

Table 8

PARTICIPATION RESTRICTION COMPONENT	SCORE 0		SCORE 1		SCORE 2		SCORE 3		SCORE 4	
	D	L	D	L	D	L	D	L	D	L
TAKING PART IN FAMILY FUNCTION	79	8	5	8	1	26	1	25	0	18

**4.4.2. b. Meeting with my friends/relatives:**

During discharge period out of 86 subjects, 81 scored 0-20% participation in meeting with their friends/relatives, while during long-term, only 15 subjects scored 0-20%, 14 subjects scored 21-40%, 21 subjects scored 41-60%, 19 subjects scored 61-80% and 18 subject scored 81-100% in meeting with their friends/relatives respectively.

Table 9

PARTICIPATION RESTRICTION COMPONENT	0-20%		21-40%		41-60%		61-80%		81-100%	
	D	L	D	L	D	L	D	L	D	L
MEETING WITH MY FRIENDS/RELATIVES	81	15	1	14	3	21	0	19	1	18

**4.4.2. c. My friends/relatives meet to me:**

During discharge period out of 86 subjects, only 6 subjects scored 0-20% participation in their friends/relatives meet to them, while during long-term, 16 subjects scored 0-20%. 18 subjects scored 21-40% during discharge period, while in long-term 24 subjects scored 21-40%, 23 and 24 subjects scored 41-60% during discharge and long-term respectively. 36 subjects scored 61-80% during discharge, while in long-term only 11 subjects scored that. Only 6 subjects scored 81-100% during discharge and 11 subjects at long-term.

Table 10

PARTICIPATION RESTRICTION COMPONENT	0-20%		21-40%		41-60%		61-80%		81-100%	
	D	L	D	L	D	L	D	L	D	L
MY FRIENDS/RELATIVES MEET TO ME	6	16	18	24	23	24	36	11	6	11

**4.4.3. Recovery in QOL during discharge and long-term period:**

Out of 86 participants, during discharge period 69 subjects scored themselves having 0-20% QOL, followed by 13 and 12 subjects scored 41-60% and 21-40% QOL respectively, while during long-term, 33 subjects had 81-100% QOL followed by 32 subjects scored themselves, having 61-80% QOL, 13 subjects had 41-60%, 7 subjects had 21-40% and only 1 subject had 0-20% QOL.

Table 11

PARTICIPATION RESTRICTION COMPONENT	0-20%		21-40%		41-60%		61-80%		81-100%	
	D	L	D	L	D	L	D	L	D	L
QOL RATING	69	1	12	7	3	13	2	32	0	33

## 5. DISCUSSION

The study was an attempt to identify the long-term functional recovery and QOL of GBS patients through telephonic interview. In this study, 45 subjects of age, < 40 years and 55 subjects of age > 40 years participated. The mean age was 40.08 year. It is reported in the study that in long term period according to GBS disability scale most participants scored 1(minor symptoms and capable of running) and 14 subjects scored 6 (dead). In this study most subjects (30%) started their recovery during 7d-15d, and 27% got recovered within 6 months. After recovery also they faced problems in getting up from floor, stair climbing, walking, weight lifting, running, U/L balance, pain, SOB and tiredness etc. Due to certain residual impairments, they had faced mild problem in doing their gross motor ADL activities, but still 18 (20%) subjects were unable to do IADL (instrumental ADL) activities and 14 (16%) were unable to do fine motor activities and 20% were able to do the fine motor activities with mild weakness and vibration of hands. Study reported Participants recovered from depression, able to participate socially and improved their QOL, but still 5% participants had faced problems to connect socially, that hampered their QOL.

### AGE AND GENDER:

Study reported GBS mostly affected in the subjects were in the age group of 40-60 years (37%) and males were affected slightly more than the female in all age groups. According to WHO, People of all ages can be affected by GBS, but it is more common in adults and in males. (National health portal, INDIA).

### GBS DISABILITY SCALE:

It is reported in the study that in long term period according to GBS disability scale 49% participants scored 0-1(minimal signs having near normal recovery), followed by 29% scored 2 (moderate disability) and 14 subjects scored 6 (dead). Among the 56 patients interviewed, 44 (78%) were asymptomatic or had minimal signs of neuropathy (0-1 grade of Hughes scale), 7 (13%) remained moderately disabled (grade 2)[10]. At long-term follow-up, 25 (73%) patients had a HDS 0-1, indicating complete / near complete recovery[11].

**Out of 14, 12 subjects dead during hospitalization and 2 subjects during long-term. Out of 12, 3 subjects dead due to some associated complications like shortness of breath, pneumonia, 1 due to chronic kidney disease, 1 due to heart problem, 1 due to liver problem etc. 1 subject dead due to the lack of treatment of medical staffs and 1 subject due to lack of money.**

### RECOVERY:

**Most subjects (30%) started their recovery during 7d-15d, and 27% got recovered within 6 months. 46% started their recovery from B/L L/E. Out of 9 subjects, 6 subjects started their recovery after 1 year and still continuing and 3 subjects had recovery period started after 10days, 1months and 6 months respectively but still they had severe disability.**

According to NIH (National institute of neurology disorder and stroke) The recovery period may be as little as a few weeks up to a few years. Some individuals still report ongoing improvement after 2 years. About 30 percent of those with Guillain-Barré have residual weakness after 3 years. It was observed gradual recovery and QOL during a 6-month follow-up period of GBS patients. According to News medical science, the majority of people who get the condition are back to normal health within a year with the recovery generally taking 6-12 months[12].

### IMPAIRMENT:

Results confirmed here from the study that they improved very well in long-term still subjects had residual impairments in physical domain, pain, IADL and fine motor activities, QOL etc.

**Looking into their dependency 27 subjects (31%) were still able to get up from floor with minimum support, 13 (15%) were able to do stair activities by minimum support, 94% able to walk independently, out of which 18% were able to walk only 100-500m., 2% participants were able to walk only 10m. and 50m. only and 5% were still unable to walk, According to forsberg et al, at 2 weeks, 1 year and 2 years after GBS onset: 62%, 10% and 7% of patients were unable to walk 10 m independently, 5% subjects were able to lift only 1k.g. weight, 36 (41%) are unable to run and 38 (44%) were unable to maintain U/L balance. According maximum score on the BBS (berg balance scale)[4]. 34% subjects were affected with facial asymmetry, and 34%, 36% were affected with bowel bladder control issue, but they recovered completely.**

**Paresthesia:** In most cases of GBS, the immune system damages the myelin sheath that surrounds the axons of many peripheral nerves however, it also may also damage the axons themselves. As a result, the nerves cannot transmit signals efficiently and the muscles begin to lose their ability to respond to the brain's commands. This causes weakness.[13] Guillain-Barré syndrome (GBS) is a serious health problem that occurs when the body's defense (immune) system mistakenly attacks part of the peripheral nervous system. This leads to nerve inflammation that causes muscle weakness or paralysis and other symptoms[14]. Sit-to-stand response to gravity, momentum, and contact forces. Gravity pulls every part down towards the ground. Sitting in a chair and floor are pushing up on bum and feet. Another contact force is friction which prevents feet from sliding as one stand up. Having difficulty in getting up from floor maybe due to weakness in gluteus maximus, quadricep muscle and slow walking as well as maintaining balance issue could be due to weakness of plantar flexor, dorsiflexor and due to intrinsic muscles of the foot.

**Fatigue: In long-term, 34% subjects had felt mild tired and 19% had moderate tiredness respectively.**

The pathogenesis of fatigue after neuromuscular diseases is truly multifactorial and may be caused by peripheral and central processes[15]. Possibly, this orderly recruitment mechanism has become disturbed in severely fatigued patients with GBS. Early recruitment of these large MUs may then easily result in an overshoot of force. It is conceivable that this overshoot either directly or through compensatory processes results in increased fatigue. Furthermore, because after nerve injury the size-ordered



organization of MU properties can be restored after a period of time, large MUs that come from collateral reinnervation fire fast and fatigue quickly, similar to normally large muscle units. This possibly results in an increased clinical fatigue[16].

**Shortness of breath: In long term, 36% and 24% were had mild and moderate problem with Shortness of breath.**

The weakness or paralysis can spread to the muscles that control your breathing, a potentially fatal complication. Respiratory compromise in GBS is linked to many factors. Upper airway compromise and weakness of pharyngeal and laryngeal muscles lead to difficulty in clearing of secretions and airway maintenance, thereby also increasing the chances of aspiration. The weakness of inspiratory and expiratory muscles of respiration leads to poor lung compliance, microatelectasis, hypoxemia, and increased risk of infections due to poor coughing ability. Pulmonary complications are also compounded by immobility, intensive unit stay and mechanical ventilation. Respiratory impairment in the acute phase has been found to be associated with long-lasting functional impairment.

**Residual pain: In long-term 34 subjects (39%) had faced with residual pain, out of which, 47% had dull aching type pain followed by 26% had neuropathic and tingling and numbness type pain respectively. During discharge period, 27% had pain all over the body, where in long term, 34% had pain at B/L L/E below knee.**

Since nerves are damaged in GBS, the brain may receive abnormal sensory signals from the rest of the body. This results in unexplained, spontaneous sensations, called paresthesia, that may be experienced as tingling, a sense of insects crawling under the skin (called formication), and pain. Deep muscular pain may be experienced in the back and/or legs[13].

First, inflamed or damaged large myelinated sensory fibers may lead to dysesthesia and muscle pain in the extremities, which may account for the lower limbs being the most frequently reported pain location. Second, inflammatory reactions may occur. The affected nerve roots may lead to radicular nociceptive nerve pain that affects the lower back or back with radiation to the extremities or trunk. Third, small nerve fibers can also be affected in GBS. The small-fiber sensory impairments during the acute stage were correlated with paresthesia. Finally, different immune antibodies may be mediated by different neural regions and tissue damage; thus, there are multiple pain types and locations in GBS patients during the acute phase[17], which gradually recovered but still in long-term, they suffered with residual pain and paresthesia.

#### **ACTIVITY LIMITATION:**

Due to above-described prolonged residual deficit, subjects had problem in doing their ADL activities. **They were doing their gross motor ADL activities very well, but still 18 (20%) subjects were unable to do IADL (instrumental ADL) activities and 14 (16%) were unable to do fine motor activities and 20% were able to do the fine motor activities with mild weakness and vibration of hands.**

#### **QUALITY OF LIFE:**

Study reported Participants were recovered very well from depression, able to participate socially and improved their QOL. But still **5% young subjects were not able to play football as well they played previously, 2 subjects had 2<sup>nd</sup> attack of GBS, one subject got divorce from his married life due to his health issue, 2% subjects still continued recovery as they could not continue exercises due to their low socio-economic status.** The above reasons had a hazardous impact on their QOL, that affected mostly their day-to-day life style.

### **6. CONCLUSION**

Study concluded that Guillain-Barre syndrome (GBS) affected more in the age group of 40-60 years and is more common in males than females. The recovery period was concluded from few weeks up to a few years. They improved very well in body structure and function components, like supine to sit, sit to stand, walking in a session, lifting heavy weight and bilateral balance, but in long-term still subjects had residual problems like, paresthesia, fatigue, neuropathic pain, as well as unilateral balance that affected their ADL activities, participation, social life style as well as their Quality of life accordingly.

### **7. LIMITATIONS**

1. Small sample size was taken.
2. Due to COVID pandemic physical evaluation could not be taken.

### **8. FUTURE SCOPE FOR STUDY**

1. Prospective study can be done by proper evaluation measure.
2. Duration study can be increased.
3. Large sample size can be taken.
4. Future study can be focused to form a validated and standardized measure for GBS patients.
5. On the basis of residual impairment goal of management should be planned.

### **9. ABBREVIATIONS**

GBS- Guillain-Barre' syndrome, SOB- Shortness of breath, QOL- Quality of life, ADL- Activities of daily life, C- Continuing recovery, D- Discharge period, L- Long term period, U/L- Unilateral, B/L- Bilateral

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