The Effect of Gait Training and Range of Motion Exercises on the Quality of Life for Patients with Guillain-Barré Syndrome

Omnia M. Mohamed[1], Sabah A. Ammar[2], Ahmed Hosameldin[3], Zeinab H. Ali[4]

[1]Assistant Lecturer of Critical Care Nursing, Faculty of Nursing, Fayoum University, El-Fayoum, Egypt.
e-mail: Omm03@fayoum.edu.eg
[2]Assistant Professor of Medical Surgical Nursing, Faculty of Nursing, Helwan University, Cairo, Egypt.
e-mail: drsabahammar2014@gmail.com
[3]Assistant Professor of Neurosurgery, Faculty of Medicine, Fayoum University, El-Fayoum, Egypt.
e-mail: ahh11@fayoum.edu.eg
[4]Professor of Medical Surgical Nursing, Faculty of Nursing, Helwan University, Cairo, Egypt.
e-mail:salmame20003@yahoo.com

Received February 9, 2026, accepted May 16, 2026, published October 1, 2026.

ABSTRACT

Context: Acute motor axonal neuropathy, which is caused by a loss of motor control, is the hallmark of Guillain-Barré syndrome (GBS), an acute inflammatory demyelinating polyradiculoneuropathy. Patients with GBS require assistance with everyday activities. The gain in lower extremity muscle strength demonstrated the efficacy of gait training and range-of-motion exercises.

Aim: to evaluate the effect of gait training and range of motion exercises on the quality of life for patients with Guillain-Barré Syndrome.

Methods: A quasi-experimental study design was used to conduct this study. The study was conducted at El-Fayoum University Hospitals and EL-Nabawi El Mohandas General Hospital in the neurological inpatients' ward, both in Fayoum governorate. A purposive sample of 48 patients with GBS, from both genders. Four tools were utilized for data collection. A structured interview questionnaire, Guillain-Barré Syndrome (GBS) Disability Score, Sickness Impact Profile (SIP), and Patient Performance Checklist for doing Gait training and range of motion exercises.

Results: The study shows that total Sickness Impact Profile scores declined dramatically from 33.65±5.07 at week 1 to 24.71±8.42 at week 5, and then sharply to 8.54±7.35 by week 9. The large F value ($F = 388.17$, $p<0.001$) indicates a highly significant improvement in patient quality of life over time following the implementation of gait training and range-of-motion exercises.

Conclusion: It has been demonstrated that specific gait training and range-of-motion exercises significantly enhance patients' physical, mental, and social well-being. Furthermore, the study found a substantial, statistically significant positive link between the sickness impact profile, quality-of-life categories, and the Guillain-Barré syndrome disability score. The findings of this study underscore the need for systemic, policy-level interventions to optimize long-term patient outcomes. Healthcare authorities should integrate GBS-specific quality-of-life (QoL) monitoring into standard neurological admission and follow-up protocols, ensuring holistic care from acute hospitalization through rehabilitation.

Keywords: Gait training, Guillain-Barré Syndrome, quality of life, range of motion exercise

Citation: *Mohamed, O. M., Ammar, S. A., Hosameldin, A., & Ali, Z. H. (2026).* The effect of gait training and range of motion exercises on the quality of life for patients with Guillain-Barré Syndrome. *Evidence-Based Nursing Research, 8*(4), 27-42. https://doi.org/10.47104/ebnrojs3.v8i4.467

1. Introduction

Acute inflammatory neuropathy known as Guillain-Barré Syndrome (GBS), causes motor and sensory abnormalities, autonomic dysfunction, and respiratory failure to develop quickly *(Bondi et al., 2021).* GBS is an immune-mediated illness caused by an abnormal immune response triggered by vaccinations or by respiratory or gastrointestinal (viral or bacterial) infections *(Meregildo-Rodriguez & Bardales-Zuta, 2021).*

Approximately 72% of GBS cases appeared in the previous three years. This is explained by the fact that GBS cases have occurred in epidemics in recent years, with the largest outbreaks in 2018 and 2019. A considerable number of instances started to be reported in the early months of 2020, and this number later rose due to the spread of COVID-19 *(Connors et al., 2022).*

The most common cause of acute flaccid paralysis in the world is Guillain-Barré syndrome (GBS), which is characterized by progressive ascending limb weakness and diminished or absent reflexes. The condition has an annual incidence of about 1-4 cases per 100,000 people, though the risk is slightly higher in males, and it increases by 20% with each decade of life *(Nasreen et al., 2025).*

One to three years following the onset of the illness, about one-third of GBS patients have a poor functional prognosis. Physical function is reduced in these patients. Additionally, GBS patients may exhibit walking limitations. A reduction in walking capacity results in a 1 to 2-year handicap that may last up to 10 years *(Uz et al., 2023). Dokoohaki et al. (2020)* study revealed that 60% of patients still experience paresthesia after a year, and these physical restrictions worsen the emotional health of GBS patients. They are under a lot of stress, and the most distressing things

[1]*Correspondence author: Omnia Mahmoud Mohamed*

This article is licensed under a Creative Commons Attribution -ShareAlike 4.0 International License, which permits use, sharing, adaptation, redistribution, and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made. To view a copy of this license. https://creativecommons.org/licenses/by-sa/4.0/

in their lives are uncertainty about the course of their illness and fear of staying paralyzed.

Due to the possibility of long-term residual impairments, treatment is mainly composed of immunotherapy, specifically intravenous immunoglobulin (Ig) or plasma exchange (PE), both of which have shown considerable efficacy. To recover from these effects, regular monitoring and therapy are required. In addition to some medication interventions, physical activity is essential for the general care of GBS. Frequent exercise improves muscle strength and functional abilities, and helps prevent diseases such as type 2 diabetes and cardiovascular disease. It has been demonstrated that ROM and gait training activities enhance nerve function and lessen neuropathic pain in GBS patients *(Kiper et al., 2025).*

Managing symptoms, including weakness, discomfort, and breathing difficulties with breathing exercises, strengthening, range-of-motion exercises, and gait training activities, physiotherapy treatment seeks to hasten healing and minimize the severity of the problem. Exercise's favorable effects have demonstrated that physical fitness can significantly affect social and psychological factors and outcomes, such as mobility and fatigue levels, in GBS patients. Therapy continuation improves the patients' quality of life by enabling them to resume their regular activities and become functionally independent *(Eiffert et al., 2023).*

Effective GBS management relies heavily on proactive nursing care. Beyond physical monitoring for respiratory or cardiac failure, nurse clinicians must address the profound psychological impact—such as helplessness and anxiety—that accompanies the sudden loss of motor control during the acute phase*. (Susanti et al., 2025).*

2. Significance of the study

The number of patients admitted to the El-Fayoum University Hospital with Guillain-Barré syndrome was approximately 70 in 2021 and 2022. *(Statistics and Registration Office, El-Fayoum University Hospital, 2023).* Physiotherapy is mandatory for GBS recovery, yet research into specific rehabilitation methods is currently insufficient. To address this, nurse clinicians should prioritize documenting tailored physical therapy programs and their efficacy. Doing so will provide the data necessary to guide future evidence-based interventions for this patient population *(Gawande et al., 2024).*

One of the most important objectives of GBS therapy is the restoration of walking mobility. Improvements in baseline physical fitness and targeted muscle strengthening through range-of-motion and gait-training exercises are necessary to achieve this goal *(Lee & Yoon, 2024).* Based on *Wang et al. (2016),* individuals who experienced muscle aches and cramps within the first year following GBS were more likely to have psychological discomfort and depressive symptoms, particularly between three and six months after GBS. More than half of GBS patients experienced sleep disturbances, which were linked to anxiety, discomfort, paresthesia, and the degree of immobility. So, the aim of this study is to assess the effects of gait training exercises and range of motion on quality of life in patients with Guillain-Barré Syndrome.

3. Aim of the study

This study aimed to evaluate the effects of gait training and range-of-motion exercises on quality of life in patients with Guillain-Barré Syndrome. Through the following:

- Assess the quality of life of the studied patients before gait training and range-of-motion exercises implementation.
- Implement gait-training and range-of-motion exercises.
- Evaluate the effect of gait training and range of motion exercises on the quality of life for patients with Guillain-Barré Syndrome.

3.1. Research questions

The current study answered the following question:

- What is the effect of gait training and range of motion exercises on the quality of life for patients with Guillain-Barré Syndrome?

3.2. Research hypothesis

Patients with Guillain-Barré Syndrome will receive gait training exercises and range-of-motion exercises and will have a high quality of life.

4. Subjects & Methods

4.1. Research Design

This study used a quasi-experimental design (pretest/posttest) with the same group. It is clarified as testing causal theories through experimental designs. The program is seen as an "intervention," in which its components will be assessed and tested to determine how well it accomplishes its goals, as measured by a predetermined set of indicators *(Cebula, 2018*). The independent variable in this study is the gait training and range-of-motion exercise program, while the dependent variable is the quality of life of patients with Guillain–Barré syndrome. The study aims to evaluate the effect of the intervention on the patients' quality of life.

4.2. Study Setting

The current study was carried out in the neurological inpatients ward at El-Nabawi El Mohandas General Hospital and El-Fayoum University Hospitals in the Fayoum Governorate. In El-Fayoum University Hospitals, the neurological inpatients ward is located on the fourth floor and consists of four rooms. Each room includes three beds and one bathroom. with a total of 12 beds. Two rooms for males, each with 6 beds; the remaining two rooms for females, each with 6 beds; and the third section for nurses. The nursing section includes an office, a medication section, and the necessary equipment.

The EL-Nabawi Mohandas General Hospital’s neurological inpatients' ward is located on the third floor and consists of two large rooms with 20 beds, manager's offices, a supply store, and two bathrooms. The first section includes 10 beds for males; the second section, for females, includes 10 beds; and the nursing section includes an office, a medication section, and the necessary equipment.

4.3. Subjects

Forthy eight adult patients were included as a purposive sample with a confirmed diagnosis of Guillain-Barré Syndrome. They were selected according to Steven equation, *(Thompson, 2012).*

$$n = \frac{N \times p(1-p)}{\left[\left[N-1 \times \left(d^2 \div z^2\right)\right] + p(1-p)\right]}$$

Inclusion criteria

- Patients had a verified diagnosis of Guillain-Barré Syndrome (only mild and moderate severity based on the Guillain-Barré syndrome (GBS) Disability Score) and who admitted at the study setting for therapy were included.

Exclusion criteria

- Patients who have a severe level of Guillain-Barré Syndrome (such as patients who need invasive mechanical ventilation, pneumonia, septic shock, and cardiac arrhythmia).
- Patients with motor and sensory weakness due to stroke, or myasthenia gravis.

4.4. Tools of Data Collection

Four tools have been used to obtain data.

4.4.1. Structured Interview Questionnaire

After examining relevant articles, the researcher created a method to achieve the study's goal. It was used to evaluate patients' clinical and demographic information. It was divided into two sections:

Demographic information in Part 1. This section was used to evaluate the patients' demographic features. Age, gender, place of residence, occupation, educational level, address and phone number, and marital status were among its seven inquiries.

Part II: Patient medical data. The patients' clinical data were evaluated in this section. It is composed of five questions, including date of disease onset, past medical and surgical history, recent vaccination, the duration between the onset of the disease and starting of treatment, current history of complications (patient need for invasive mechanical ventilation, suffer from pneumonia, septic shock, or pressure ulcers), and duration of hospitalization due to GBS or its complications.

4.4.2. Guillain-Barre´ Syndrome (GBS) Disability Score

The assessment tool was introduced by *Hughes et al. (1978)*. The Guillain-Barré syndrome (GBS) disability score is a widely applied measure used to assess the functional status of patients with GBS. It classifies the level of disability on a scale ranging from 0 to 6, and this scale was used in the present study to determine patient eligibility based on predefined criteria.

Scoring system

This scale involved seven stages from 0 to 6, stated as follows: Score zero for a healthy state (that mean patient is able to do activities of daily living without assistance and absence of any symptoms), score one if the patient has minor symptoms (such as fatigue or mild level of pain) and can run. If the patient can walk ten meters or more without help but cannot run, they receive a score of two. A patient receives a score of three if they can walk 10 meters across an open area with assistance, four if they are bedridden or in a chair, five if they need mechanical-assisted ventilation, and six if they are dead.

If the GDS score is ≥3 (inability to walk without help), the handicap is deemed severe. after the patient's diagnosed with GBS, the GDS score was evaluated at the fifth and ninth weeks of applying the gait training and range of motion exercises to evaluate a patient's functional mobility

4.4.3. Sickness Impact Profile (SIP)

The researcher adjusted the SIP to suit the study's objective. SIP was created by *De Bruin et al. (1994),* to provide an accurate and sensitive assessment of the physical, psychological, and social dimensions of quality of life, as well as the degree of dysfunction resulting from sickness or disability. The Sickness Impact Profile (SIP) was divided into three domains; every domain of which is composed of two subscales listed as follows:

Firstly, the physical domain is divided into two sections. The first of them includes somatic autonomy, which involves (11 statements) designed to assess patient mobility, walking, using stairs, and patient balance. Also, the ability of a patient to perform activities of daily living, such as bathing, feeding, defecation, urination, and dressing. The second section of the physical domain includes mobility control items (9 statements) designed to assess the patient's ability to use stairs without help, walk shorter distances, perform handwork, and move hands or fingers.

Secondly is the psychological domain is divided into two sections. The first of them includes psychological autonomy and communication involved (6 statements) designed to assess the patient's ability for reasoning and solving problems, doing activities involving concentration and thinking, the patient having trouble writing or typing, the patient's reaction to things that are said or done, patient forgetting things that happened recently. Also, if a patient has trouble speaking. The second section of psychological domain is patient emotional stability involved 5 statements, designed to assess patient irritability toward those around him/her (For instance, the patient may respond sharply, be quick to criticize), have frequent outbursts of anger toward family members, be irritable and impatient with themselves (for instance, by blaming themselves for events), stop making jokes with family members as they usually do, and speak less to others.

Thirdly, the social domain that has divided into two sections. The first includes mobility range (4 statements) designed to assess patient ability to do the shopping activity that usually can do, patient can't go out to visit people at all, the majority of the patient's time is spent at home, and they are capable of handling personal or domestic business matters, such as banking, budgeting, and bill payment.

The second section of social domain is the social behavior (5 statements) designed to assess if the patient reduces the amount of time they spend with friends, engages in fewer social activities with groups of people, performs fewer household chores than usual, is unable to engage in typical leisure activities (like watching TV, playing cards, or reading), and, lastly, evaluates their sexual activity.

Scoring system

Each item receives a dichotomous score (yes equals 1, no equals 0), and the scores are then totaled. The Sickness Impact Profile's total score ranges from 0 (best health) to 40 (worst health). These items were assessed once the patient was diagnosed with GBS, then at the fifth week, and finally at the ninth week.

4.4.4. Patient's Performance Checklist of Gait Training and Range of Motion Exercises

Based on pertinent literature *Arya et al. (2024); Gawande et al. (2024)*, the researcher adopted this tool, translated it into Arabic, and utilized it to instruct patients with Guillain-Barré Syndrome, how to carry out and practice range-of-motion exercises and gait training. Additionally, instruct patients' families on how to provide their patients with the assistance they need to perform exercises that enhance their quality of life.

The patient performance checklist included exercises designed to enhance mobility through gait training and range of motion activities. These exercises were categorized into two main sections: upper-limb range-of-motion exercises and gait training exercises. The gait training component comprised four types of exercises. Assisted toe raises were performed in a seated position, where each foot was used alternately to support and lift the other for 15 repetitions, aiming to reduce foot drop.

Heel raises involved lifting the heels off the ground while keeping the toes in contact with the floor, repeated 15 times. Side leg raises were carried out in a standing position by extending each leg laterally to approximately a 45-degree angle, holding briefly, and repeating 15 times per leg. Seated marching was performed by alternately lifting each knee toward the chest while maintaining an upright posture, with 15 repetitions per leg.

The range-of-motion exercise component constituted the second section and was divided into lower- and upper-limb exercises. Lower-limb exercises targeted major joints and included foot movements such as inversion and eversion, toe movements including flexion, extension, abduction, and adduction, as well as knee flexion and extension. Hip joint exercises involved a wider range of movements, including flexion, extension, hyperextension, abduction, adduction, internal and external rotation, and circumduction.

Upper-limb exercises focused on improving mobility of the shoulder, elbow, wrist, fingers, and thumb. Shoulder movements included flexion, extension, hyperextension, abduction, adduction, internal and external rotation, and circumduction. Elbow exercises consisted of flexion, extension, and hyperextension, while wrist movements included flexion, extension, hyperextension, abduction, and adduction. Finger and thumb exercises also involved similar movements, with the addition of thumb opposition.

During the first week, patients were instructed on how to perform both gait training and range-of-motion exercises using a booklet, and their ability to correctly demonstrate these exercises was evaluated during the fifth and ninth weeks.

4.5. Procedures

The Scientific Research and Ethical Committee of the Faculty of Nursing at Helwan University granted ethical approval for this study. The director of Fayoum University Hospital and EL-Nabawi El Mohandas General Hospital, where the study was carried out, granted formal authorization received the study facilitation letter from the postgraduate studies department of the Nursing Faculty at Helwan University outlining the study's purpose and requesting permission to collect data.

Official permission was obtained from the administrative authority of the selected setting for the current study. The researcher obtained verbal and written consent from the studied patients. Participation in the study was voluntary. Studied patients were provided with complete information about the study and their role before signing the informed consent form, explaining the study's goal and nature, offering the option to quit at any time, and guaranteeing data confidentiality by identifying participants with codes rather than names or other personal identifiers are all examples of ethical issues.

The study comprised a pilot study, fieldwork, content validity and reliability, and a preparing phase. To develop data-collection instruments, the preliminary phase involved researching relevant material and gaining a theoretical understanding of many elements of the study through books, papers, online periodicals, and magazines.

Tools validity and reliability: To assess each tool item's degree of representation of the variable to be tested, as well as the tool's overall suitability for investigating the variable within the specified research population, validation was conducted. A panel of five nursing and medical experts, including one professor from Ain Shams University and four assistant professors from Helwan University, evaluated the tools' content for comprehensiveness, accuracy, clarity, relevance, and applicability. Changes were made in response to suggestions.

"The extent to which the instrument yields consistent, reproducible estimates of what is assumed to be an underlying true score" is the definition of the instrument's reliability *(Artner et al., 2021).* Cronbach's Alpha coefficient, which typically spans from 0 to 1 and values better than 0.70 are deemed acceptable, was used to evaluate reliability. The reliability of Guillain-Barré Syndrome Disability Score (α=0.83) and the Sickness Impact Profile (α=0.96) was found in the analysis. Every result was statistically significant at $p \leq 0.05$, indicating that each tool's items are highly consistent in assessing the desired construct and demonstrating strong reliability.

To assess the tools' applicability, clarity, and efficiency as well as the viability of the research procedure, a pilot study was conducted on 10% (5 patients) of the study sample. The tools were adjusted based on the pilot study's findings. Some questions were rearranged and rephrased as part of the modifications. The final version of the tools was created after modification. The study sample does not include patients who participated in the pilot study.

Field Work: Data collection began and continued until the designated number of study samples was completed (from the beginning of June 2024 to the end of April 2025), when the required approvals were obtained to move forward with the proposed study. The study was implemented through the following four phases:

Assessment phase

The baseline data were collected from patients and their medical records during the assessment phase, the first stage of the intervention. This stage was carried out before the intervention started. To determine the admission rate, the best time to gather data, and the implementation of the gait training and range of motion exercise, an exploratory visit was conducted to the neurology units at both research settings. To obtain their best cooperation, the researcher also contacts the doctor and nurses and explains the purpose of the study. After being informed of the study's nature and goals and obtaining their agreement, the patient who met the study's criteria was enrolled.

After introducing herself and outlining the study's goal and nature, the researcher conducted in-person interviews to gather data. To ensure consistency and reliability, each patient was interviewed separately, and the instruments were used according to a predetermined schedule.

To establish the patient's "disability," the Guillain-Barré Syndrome Disability Score was used to assess mobility and demographics. The Sickness Impact Profile was used to assess social, psychological, and physical adaptability to daily living. This thorough assessment sought to identify patients' limited abilities and enhance their quality of life by understanding their specific needs and challenges.

Planning and design phase

The identified needs were translated into the aims and objectives, which were structured into sections presented in the form of booklet. This instructional booklet was developed and prepared in simple, easily understandable Arabic language, supplemented with colored photos and illustrations, to ensure clarity and accessibility for all patients regardless of their educational level.

Implementation phase

During the intervention phase, the patients were adequately informed about the disease, their needs, gait training, range-of-motion exercises, quality of life, and adaptability. The researcher also performed the assigned exercises. Demonstrations, re-demonstrations, and group discussions were part of the teaching strategy.

To ensure patients were sufficiently prepared for practice gait training and range-of-motion exercises, either in the hospital or after discharge, the gait training, range-of-motion exercises was implemented through four structured sessions (one theoretical and three practical).

Theoretical sessions covered information on Guillain-Barré Syndrome, including its etiology, treatments, and complications. Additionally, the definition and goal of range-of-motion exercises and gait training took roughly 30 to 45 minutes.

Practical sessions: The first practical session focused on lower limb range-of-motion exercises, such as foot exercises (inversion and eversion), toe exercises (flexion, extension, abduction, and adduction), knee joint exercises (flexion and extension), and hip joint exercises (flexion, extension, hyperextension, abduction, adduction, internal rotation, external rotation, and circumduction). Videos and pamphlets were used to support the demonstrations. It lasted for about half an hour.

Session 2: Flexion, extension, hyperextension, abduction, adduction, internal rotation, external rotation, and circumduction exercises for the shoulder joint, flexion, extension, and hyperextension exercises for the elbow joint, flexion, extension, and hyperextension exercises for the wrist joint, flexion, extension, hyperextension, abduction, and adduction exercises for the fingers, and flexion, extension, hyperextension, abduction, and opposition. Videos and pamphlets were used to support the demonstrations. It lasted for about half an hour.

Session 3 focused on the patient's performance of gait training exercises, including sitting marches, assisted toe lifts, heel rises, and side leg raises lasted between thirty and forty-five minutes.

The researcher began giving lectures two days a week from 10 a.m. to 1 p.m. The researcher conducted discussions with the patients at the start of each session to assess their understanding and any areas that were unclear or misremembered. The patients were then given a synopsis of the previous session to aid in memory restoration. Every patient received a brief summary of key themes at the conclusion of each session. In addition, a movie and an instructional booklet were sent to the patients under study to pique their interest, inspire them, and provide at-home instruction.

Following a two-month of gait training, range-of-motion exercises application, each patient received frequent phone calls (two calls per week) to ensure adherence to the treatment plan. Additionally, patients' challenges and anxieties arising at home were discussed during regular outpatient clinic meetings. Additionally, the researcher used the WhatsApp app to communicate with patients and provide videos on the practical portion so that patients may revisit it as needed. To stay in touch and meet patients during follow-up appointments at outpatient clinics to complete data collection, the researcher and patients exchanged phone numbers.

Evaluation phase

The purpose of the evaluation phase was to re-evaluate patients following implementation of the gait training, range-of-motion exercises application and to assess their progress by comparing their responses with baseline measurements.

The GBS disability score was used to assess the patient’s functional status, the researcher used the Guillain-Barré Syndrome Disability Score (II), the Sickness Impact Profile (III), and the patient's performance during gait training and range-of-motion exercises (IV).

Five weeks after the gait training, range-of-motion exercises was delivered, the patient's mobility was evaluated again by the researcher using the Guillain-Barré Syndrome Disability Score instrument (II). Additionally, the patient's quality of life was evaluated using the Sickness Impact Profile tool (III), and the patient's performance for gait training and range-of-motion exercises was evaluated using the tool (IV) to gauge changes in the patient's physical mobility.

Lastly, nine weeks after the intervention, a follow-up assessment was carried out utilizing Tools II, III, and IV to gauge improvements in the patients' "quality of life." By comparing the results of range-of-motion and gait-training activities with baseline data, this structured assessment methodology validated the phases of planning and execution.

4.6. Data Analysis

Using the Statistical Package for the Social Sciences (SPSS) version 25 for Windows on an IBM-compatible computer, the gathered data were organized, tabulated, and statistically analyzed. The descriptive statistics were used, including frequencies, percentages, means, and standard deviations. The means of the three groups were compared using the ANOVA (Analysis of Variance), which examines variation within and between effect of gait training and range of motion exercises on the quality of life at different times. The chi-square test was used to assess qualitative variables. Cochran's Q test was employed with a binary (dichotomous, such as yes/no) outcome to assess whether there is significant variation in proportions. When p was equal or less than 0.05, the level value was deemed significant, and when p was less than 0.01, it was deemed extremely significant. When $p \geq 0.05$, no statistically significant difference was taken into account.

5. Results

Table 1 presents the frequency and percentage distributions of the studied patient demographic characteristics. The table reveals that the gender distribution was 47.9% females and 52.1% males, with the cohort (47.9%) in the 31–50 years age group, and the remaining participants split between younger (18–30, 25.0%) and older (51–65, 27.1%). Most participants live in urban areas (60.4%). Only 20.8% were retired, while half are currently employees. 39.6% of the studied patients had a university degree, 31.3% had secondary education, with smaller proportions having primary education (18.8%). Marital status is dominated by married participants (58.3%) with smaller percentages were single/divorced/widowed groups.

Table 2 illustrates the clinical characteristics and medical history of the studied patients. Half the cohort (50.0%) presented within 1 month of onset, with the highest percentage (43.8%) within 1 month-<6 months; only 3 patients had very prolonged onset-to-presentation intervals. A large majority (81.3%) had a recent respiratory or gastrointestinal infection. Recent surgery (25.0%) and Influenza vaccination (10.4%) were less common. Most patients started treatment ≥7 days and 1 month (79.2%), with fewer starting very early (<7 days, 20.9%). Pressure ulcers affected 54.2% of patients. Hospitalization durations are skewed toward 2 weeks–1 month (73%), with smaller proportions longer.

Table 3 demonstrates the somatic autonomy domain at the 1st, 5th, and 9th weeks of assessment. The table shows baseline impairment, with very high proportions of participants requiring assistance with basic physical functions such as mobility, dressing, standing, feeding, bathing, and controlling bowel and bladder. For nearly all items, more than 80–90% of participants initially report severe functional limitations (10.4% very slowly in body movements; 93.8% needing help standing; 97.9% needing help bathing). There is a clear, statistically significant improvement across almost all indicators at 5 weeks, with a dramatic recovery by 9 weeks. Inability to dress without assistance drops from 70.8% at baseline to only 10.4% at week 9, and the proportion unable to move independently falls from 85.4% to 16.7%. Similar improvements are seen in related self-care activities: slow body movements decrease from 10.4% to 4.2%, and lack of bladder control declines from 52.1% to 6.3% at month 9. Cochran's Q test yields highly significant p-values (<0.001) for all items, confirming that these changes over time are statistically meaningful.

Table 4 demonstrates the mobility control domain. The table shows marked functional limitations at baseline, with more than 75–97.9% of participants initially reporting difficulty using stairs, walking short distances, bending, or needing support while moving. Over time, significant improvement occurs across most mobility-related functions. For example, difficulty going up or down stairs decreases from 91.7% at baseline to only 16.7% by week 9, while difficulty walking short distances falls from 83.3% to 47.9%. Tasks requiring balance or fine motor support—such as grasping something to get in or out of bed—show a temporary slight improvement at week 5 followed by further major improvement at week 9 (from 60.4% to 83.3% "No difficulty"). Hand and finger movement problems also nearly disappear by week 9. All items show highly significant Cochran's Q values (p<0.001), confirming a consistent and statistically supported improvement.

Table 5 illustrates the psychological autonomy and communication domain. The table shows a mix of cognitive and communication difficulties at baseline, with nearly half of the participants reporting difficulties with reasoning, concentration, writing, and slow reaction time. A small number express difficulties in memory and speaking. Across the follow-up periods, significant improvement occurs consistently for all items. By week 9, all cognitive and communication difficulties decrease to 0%, meaning no participant still reports these problems. For instance, difficulty solving problems declines from 47.9% at baseline to 0% at week 9, and trouble writing drops from 47.9% to 0%. Even slower reaction to spoken information, one of the more severe issues initially improves from 56.3% to complete resolution at week 9. Cochran's Q test values are all highly significant (p<0.001), confirming that the observed improvements are robust and statistically meaningful.

Table 6 illustrates that the emotional instability is extremely prominent at baseline, with 100% of participants reporting irritability, anger outbursts, reduced joking, and decreased communication. These emotional disturbances markedly improve by week 5, with more than half of participants still showing symptoms and continue to decline dramatically by week 9. For most items, the proportion with emotional symptoms falls to only 6.3% at week 9. All Cochran's Q test results are highly significant (p<0.001), confirming that the reductions in emotional disturbances across the three time points are statistically significant.

Table 7 shows that at baseline, limited mobility range is severe, with 100% reporting inability to shop, stay at home,

or engage in routine activities outside the home (95.8%). These restrictions show a gradual and highly significant improvement by week 9. Inability to visit others decreases from 95.8% at baseline to 47.9% at week 9, and staying at home "most of the time" improves from 100% to 47.9%. Shopping ability shows a late but substantial improvement, with the proportion unable to shop decreasing from 100% to 64.6%. All Cochran's Q test values are significant (p<0.001).

Table 8 shows that social behavior impairments are profound at baseline, with all (100%) participants reporting reduced social activity, shortened visits, and an inability to perform recreational activities. Significant and steady improvement occurs by week 5 and even more prominently by week 9. For example, minimizing visit length decreases from 100% at baseline to only 6.3% at week 9, while reducing social activities drops from 100% to 4.2%. Difficulty with daily housework decreases from 100% to 45.8%. Recreational activity limitations fall from 100% to 4.2%. The only item with no change is sexual activity, which remains at 100% throughout. Cochran's Q test is significant for all changeable items, highlighting a strong recovery pattern in social engagement and social functioning.

Table 9 shows that presents repeated-measures data for the GBS Disability Score across the first, fifth, and ninth weeks of the intervention, showing a clear pattern of functional improvement. At baseline (first week), disability scores ranged from 2 to 5, with a mean of 3.69±0.66, reflecting moderate disability in most patients. By the fifth week, the mean score had decreased significantly to 3.13±0.87, with a wider range (1–4), indicating that some patients had already achieved near-normal function, while others continued to have notable limitations. By the ninth week, the score dropped sharply to 1.88±0.96 (range 0–4), demonstrating substantial functional recovery for the majority of participants. The Repeated Measures ANOVA shows a very large F-value (153.4) with p<0.001, confirming a highly significant improvement over time.

Table 10 shows that the GBS disability score has strong positive correlations with the physical domain at the 1st week (r=0.693), at the 5th week (r=0.653), and at the 9th week (r=0.561). Also, the GBS disability score showed strong positive correlations with the psychological domain at the 1st week (r=0.661), the 5th week (r=0.650), and the 9th week (r=0.505). As well as GBS disability score shows positive correlations with social domain at 1st week (r=0.567), at 5th week (r=0.517), at 9th week (r=0.484), and as total Sickness Impact Profile score with GBS disability score at 1st week (r=0.790), at 5th week (r=0.760), at 9th week (r=0.746), all at p<0.001.

Table 11 shows the overall impact of gait training and range-of-motion exercises on the total Sickness Impact Profile. Total SIP scores declined dramatically from 33.65±5.07 at week 1 to 24.71±8.42 at week 5, and then sharply to 8.54±7.35 by week 9. The large F value (F=388.17, p<0.001) indicates a highly significant improvement over time.

Table (1): Frequency and percentage distribution of demographic characteristics for patients with Guillain-Barré syndrome (n=48)

Demographic characteristics	No.	%
Age (years)		
18-30	12	25.0
31-50	23	47.9
51-65	13	27.1
Mean±SD	36.10±16.08	
Gender		
Female	23	47.9
Male	25	52.1
Residence		
Rural	19	39.6
Urban	29	60.4
Occupation		
Employee	24	50.0
Manual work	9	18.8
Retired	10	20.8
Don't work	5	10.4
Employee	24	50.0
Educational level		
Read and write	3	6.3
Can't read and write	2	4.2
Primary	9	18.8
Secondary	15	31.3
University	19	39.6
Marital status		
Single	11	22.9
Married	28	58.3
Divorced	5	10.4
Widow	4	8.3

Table (2): Frequency and percentage distribution of patients' medical data (n=48)

Medical data	No.	%
Length of disease		
Less than one month	24	50.0
1 month - <6 months	21	43.8
6 months – > 12 months	3	6.3
Suffering from respiratory or GIT infection		
Respiratory tract infection (RTI)	21	43.8
Gastrointestinal infection (GITI)	18	37.5
Not suffering from RTI or GITI	9	18.8
Recent surgery		
Yes	12	25.0
No	36	75.0
Recent vaccination		
Influenza Vaccine	5	10.4
Not vaccinated	43	89.6
The duration from the onset of first symptoms until starting treatment		
<7 days	10	20.9
≥7 days to 1month	38	79.2
Pressure ulcer		
Yes	26	54.2
No	22	45.8
Duration of hospitalization due to GBS or its complications		
2 weeks to 1 month	35	73
>1 month to 2 months	13	27.1

Table (3): Comparison of somatic autonomy among the studied patients at different assessment points (n=48)

Variables of physical domain (somatic autonomy)	Assessment points												*Cochran's Q test*	P value
	At 1st week				At 5th week				At 9th week					
	Yes		No		Yes		No		Yes		No			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Patient using a wheelchair to move anywhere.	24	50	24	50	10	20	38	79.2	2	4.2	46	95.8	33.82	<0.001
Patient getting dressed only with someone's help.	34	70.8	14	29.2	26	54.2	22	45.8	5	10.4	43	89.6	43.42	<0.001
Patient don't move into or out of bed by himself but moved by a person or mechanical aid.	41	85.4	7	14.6	41	85.4	7	14.6	8	16.7	40	83.3	62.23	<0.001
Patient standing up only with someone's help.	45	93.8	3	6.3	41	85.4	7	14.6	8	16.7	40	83.3	63.44	<0.001
Patient do not fasten clothes, and require assistance with buttons, zippers, shoelaces.	41	85.4	7	14.6	11	22.9	37	77.1	2	4.2	46	95.8	62.55	<0.001
Patient do not walk at all.	32	66.7	16	33.3	11	22.9	37	77.1	2	4.2	46	95.8	45.87	<0.001
Patient do not use stairs at all.	40	83.3	8	16.7	25	52.1	23	47.9	5	10.4	43	89.6	50.00	<0.001
Patient required assistance with bathing.	47	97.9	1	2.1	42	87.5	6	12.5	24	50	24	50	36.12	<0.001
Patient don't have control of bladder.	25	52.1	23	47.9	23	47.9	25	52.1	3	6.3	45	93.8	36.61	<0.001
Patient do not have control of bowels.	28	58.3	20	41.7	23	47.9	25	52.1	3	6.3	45	93.8	37.50	<0.001
Patient is very slowly in body movements.	5	10.4	43	89.6	28	58.3	20	41.7	2	4.2	46	95.8	61.48	<0.001

6. Discussion

Patients with Guillain-Barré Syndrome need help with walking. The improvement in lower extremity muscle strength proved that range-of-motion exercises and gait training are effective. As soon as the patient was admitted to the hospital, early rehabilitation began. By optimizing neuromuscular function and restoring the patient's functional independence, the treatment aimed to enhance their quality of life. *(Tanaka et al., 2022)*. This study aimed to evaluate the effects of gait training and range-of-motion exercises on quality of life in patients with Guillain-Barré Syndrome.

Considering age, the current study indicates that nearly half of the studied patients were aged 31-50 years, with a mean age of 36.10±16.08. The reason for this may be that GBS can affect individuals of any age; it most commonly affects adults, with a high concentration of cases appearing between 30 and 50 years of age. Because the individuals in this age group are often more socially active, working in diverse environments, or increasing exposure to infections that trigger GBS, such as Campylobacter Jejuni, influenza, and other respiratory infections.

Table (4): Comparison of mobility control among the studied patients at different assessment points (n=48)

Variables of physical domain (mobility control)	Assessment points												*Cochran's Q test*	P value
	At 1st week				At 5th week				At 9thweek					
	Yes		No		Yes		No		Yes		No			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Patient going up and down stairs more slowly,	44	91.7	4	8.3	8	16.7	40	83.3	8	16.7	40	83.3	53.09	<0.001
Patient is walking shorter distances or stop to rest often.	40	83.3	8	16.7	39	81.3	9	18.8	23	47.9	25	52.1	21	<0.001
Patient using stairs only with mechanical support.	32	66.7	16	33.3	25	52.1	23	47.9	8	16.7	40	83.3	30.47	<0.001
Patient walking by himself with some difficulty.	36	75	12	25	39	81.3	9	18.8	6	12.5	42	87.5	47.57	<0.001
Patient bending down only by holding onto something.	47	97.9	1	2.1	44	91.7	4	8.3	41	85.4	7	14.6	6.75	<0.001
Patient getting in and out of bed or chairs by grasping something for support or using a cane or walker.	29	60.4	19	39.6	28	58.3	20	41.7	8	16.7	40	83.3	14.00	<0.001
Patient standing only for short periods of time.	24	50	24	50	20	41.7	28	58.3	7	14.6	41	85.4	16.35	<0.001
Patient have difficulty doing handwork.	7	14.6	41	85.4	3	6.3	45	93.8	0	0	48	100	10.57	<0.001
Patient moving his/her hands or fingers with some limitation or difficulty.	21	43.8	27	56.3	4	8.3	44	91.7	0	0	48	100	33.91	<0.001

Table (5): Comparison of psychological autonomy and communication (n=48)

Variables of psychological domain (autonomy and communication)	Assessment points												*Cochran's Q test*	P value
	At 1st week				At 5th week				At 9thweek					
	Yes		No		Yes		No		Yes		No			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Patient has difficulty reasoning and solving problems.	23	47.9	25	52.1	15	31.3	33	68.8	0	0	48	100	29.2	<0.001
Patient have difficulty doing activities involving concentration and thinking.	24	50	24	50	15	31.3	33	68.8	0	0	48	100	30.41	<0.001
Patient having trouble writing or typing.	23	47.9	25	52.1	4	8.3	44	91.7	0	0	48	100	39.39	<0.001
Patient reacting slowly to things that are said or done.	27	56.3	21	43.8	10	20.8	38	79.2	0	0	48	100	36.07	<0.001
Patient is forgetting a lot.	5	10.4	43	89.6	0	0	48	100	0	0	48	100	10.00	<0.001
Patient has trouble speaking.	8	16.7	40	83.3	1	2.1	47	97.9	0	0	48	100	12.67	<0.001

Table (6): Comparison of emotional stability among the studied patients at different assessment points (n=48)

Variables of Psychological domain (Emotional stability)	Assessment points												*Cochran's Q test*	P value
	At 1st week				At 5th week				At 9thweek					
	Yes		No		Yes		No		Yes		No			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Patient often has irritable manner toward those around him/her.	48	100	0	0	33	68.8	15	31.3	3	6.3	45	93.8	70.00	<0.001
Patient has frequent outbursts of feeling anger toward family members.	48	100	0	0	33	68.8	15	31.3	3	6.3	45	93.8	70.00	<0.001
Patient has irritable and impatient.	48	100	0	0	24	50	24	50	3	6.3	45	93.8	67.60	<0.001
Patient is not joking with family members as usually do.	48	100	0	0	38	79.2	10	20.8	3	6.3	45	93.8	74.44	<0.001
Patient talking less with people around her/him.	48	100	0	0	41	85.4	7	14.6	12	25	36	75	60.72	<0.001

Table (7): Comparison of mobility range among the studied patients at different assessment points (n=48)

Variables of Social domain (Mobility range)	Assessment points												*Cochran's Q test*	P value
	At 1st week				At 5th week				At 9thweek					
	Yes		No		Yes		No		Yes		No			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Patient can't do any of the shopping activity that usually can do.	48	100	0	0.0	48	100	0	0.0	31	64.6	17	35.4	34.00	<0.001
Patient can't go out to visit people at all.	46	95.8	2	4.2	44	91.7	4	8.3	23	47.9	25	52.1	42.35	<0.001
Patient stays at home most of the time.	48	100	0	0.0	35	72.9	13	27.1	23	47.9	25	52.1	37.52	<0.001
Patient stop taking care of personal or household business affairs.	46	95.8	2	4.2	44	91.7	4	8.3	23	47.9	25	52.1	42.35	<0.001

Table (8): Comparison of social behavior among the studied patients at different assessment points (n=48)

Variables of Social domain (Social behaviors)	Assessment points												*Cochran's Q test*	P-value
	At 1st week				At 5th week				At 9thweek					
	Yes		No		Yes		No		Yes		No			
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Patient minimizing the length of visits with friends.	48	100	0	0.0	25	52.1	23	47.9	3	6.3	45	93.8	67.51	<0.001
Patient doing fewer social activities with groups of people.	48	100	0	0.0	34	70.8	14	29.2	2	4.2	46	95.8	72.52	<0.001
Patient doing less of the regular daily work around the house than would usually do.	48	100	0	0.0	39	81.3	9	18.8	22	45.8	26	54.2	40.23	<0.001
Patient can't do usual recreation activities.	48	100	0	0.0	33	68.8	15	31.3	2	4.2	46	95.8	71.78	<0.001
Patient sexual activity is decreased.	48	100	0	0.0	48	100	0	0.0	48	100	0	0.0	-	-

Table (9): Comparison of Guillain-Barre´ Syndrome (GBS) Disability Score between First, Fifth, and Ninth weeks (n=48)

GBS Disability Score per weeks	Min.	Max.	Mean±SD	F*	P-value
First week GBS disability score	2.00	5.00	3.69±0.66	153.4	<0.001
Fifth week GBS disability score	1.00	4.00	3.13±0.87	153.4	<0.001
Ninth week GBS disability score	0.00	4.00	1.88±0.96	153.4	<0.001

**Repeated Measure ANOVA test*

Table (10): Correlation between GBS disability score at first week, fifth, and ninth weeks and quality of life domains (n=48)

Variables of quality-of-life domains	Test/p-value	First week GBS disability score	Fifth week GBS disability score	Ninth week GBS disability score
Physical domain	Pearson Correlation	0.693	0.653	0.561
	P-value	0.000	0.000	0.000
Psychological domain	Pearson Correlation	0.661	0.650	0.505
	P-value	0.000	0.000	0.000
Social domain	Pearson Correlation	0.567	0.517	0.484
	P-value	0.000	0.000	0.000
Total Sickness Impact Profile score	Pearson Correlation	0.790	0.760	0.746
	P-value	0.000	0.000	0.000

Table (11): The effect of gait training and range of motion exercises on total Sickness Impact Profile score (n=48).

Variables	Min.	Max.	Mean±SD	F*	P-value
Total SIP score at 1st week	24.00	42.00	33.655.07	388.17	<0.001
Total SIP score at 5thweek	11.00	39.00	24.71±8.42	388.17	<0.001
Total SIP score at 9th week	1.00	35.00	8.54±7.35	388.17	<0.001

**Repeated Measure ANOVA test*

This result is consistent with *Aragonès et al. (2021).* They found in a study titled "Incidence and clinical characteristics of Guillain-Barré syndrome," which was carried out in Osona, Spain, that although the risk of GBS rises with age, it has noticeable peaks in young adulthood and middle age, frequently between 40 and 50 years. In a study titled "Prognostic factors in elderly patients with Guillain-Barré Syndrome" carried out in Mexico, *Briseño-Godínez et al. (2021)* found that the prevalence in adults over 60 years was reported in 15-51%, with a mean age of 69.4±7.1 years, which is not consistent with the current study findings.

Regarding gender, the current study finds that just over half of the patients were men. Males and females have different immunological responses, which could account for this observation. This result is consistent with that of *Islam et al. (2024),* who found that male patients were more common in their study "Sociodemographic characteristics of patients presented with Guillain-Barré Syndrome" conducted in Bangladesh. They attributed this finding to the fact that male patients are more frequently admitted to hospitals with GBS, though the exact cause is unknown. Gender variations in GBS may be caused by genetic predispositions or sex hormones. In this regard, testosterone and estrogen may have distinct effects on immunological function. This result may also be explained by the role of sex chromosome-related genetic variables in causing variations in incidence and clinical course.

In the context of residence, the current study shows that about two-thirds of the patients under study lived in urban areas. The reason for this may be due to the Urban residence is a major risk factor because crowded living conditions and

poor sanitation make it easier for infectious pathogens to spread. This finding is consistent with the findings of a study conducted in the United States by *Surendranath et al. (2025)* titled "Comparing Guillain-Barré syndrome outcomes between rural and urban hospitals," and found that over half of the patients under study lived in urban areas due to high population density and close physical contact in Urban residence accelerate the transmission of infections that often trigger autoimmune responses like Guillain-Barré syndrome (GBS),and inadequate waste management or contaminated water systems in crowded neighborhoods increase exposure to bacterial and viral infections (such as Campylobacter jejuni). In addition to that the Urban residents show up in higher numbers in hospital data because they live closer to medical facilities and can seek diagnosis faster than rural residents.

Banerjee et al.'s (2025) study in India titled "Guillain–Barré syndrome outbreak in Pune: A health emergency" contradicts this finding. The results of this study make it clear that prevalence of GBS in rural areas may be higher than reported due to delayed diagnosis, restricted access to intensive care units, and limited availability of immunotherapy.

According to the current study, half of the patients were employed. This conclusion may be related to the fact that workers in high-density settings, such as offices, banks, or retail establishments, are more susceptible to respiratory or gastrointestinal diseases. This result is in line with the findings of *Bhatia et al. (2022),* who reported in their Indian study, "Identification of factors affecting outcomes in patients with Guillain-Barré syndrome," that about half of the patients were employed.

This finding, however, runs counter to *Chen et al. (2025),* who noted in their study "Guillain–Barré Syndrome in older people" that most GBS patients are retired adults aged 60 or older. These patients are characterized by higher severity, slower recovery, and an increased risk of requiring mechanical ventilation due to age-related decline in immune function and decreased nerve repair capabilities.

According to the current study, over two-thirds of the patients were married. Given that most patients were between 31 and 50 years old, this may be related to the sample's age distribution. In a study named "Guillain-Barré Syndrome in adults in a decade: The largest, single-center, cross-sectional study from the Kingdom of Saudi Arabia," *Alkahtani et al. (2023)* found that 98 patients (61.6%) out of 159 cases were married. However, this study found no statistically significant correlation between the syndrome's occurrence and marital status.

Regarding the length of disease, the study shows that half of the patients had suffered from tingling, weakness, and numbness, which typically began in the legs after a bacterial or viral infection lasting less than a month before confirming the diagnosis with GBS. Additionally, there are three primary stages to the GBS timeline: An initial onset lasting up to 4 weeks, a plateau phase lasting month, and a recovery period that may take weeks or even years.

According to *Chrościńska-Krawczyk et al. (2024)* in their research "Guillain-Barré syndrome– what we know and where we are?", most GBS patients can go from tingling to near-total paralysis in a matter of days, underscoring the importance of determining the timeframe. It frequently needs hospitalization right away and close observation for respiratory failure.

About two-thirds of the patients in the current study have a history of respiratory infections (such as the common cold) and gastrointestinal infections, (including diarrhea and stomach pain), prior to the onset of GBS symptoms. This observation could be explained by the immune system mistaking bacterial or viral antigens for nerve components, triggering an immunological response that destroys peripheral nerves.

These results are supported by *Finsterer's (2022)* prospective study, "Triggers of Guillain–Barré Syndrome," which found that infections are the most frequent cause of GBS, accounting for 75% of cases. The pathophysiology of GBS has been linked to bacteria and viruses.

In the same context, *Bhagat and Nemade, (2026)* reported in their review “Autoimmunity and neuropathy: A review of Guillain Barre syndrome," that a considerable percentage of GBS cases are preceded by infectious illnesses, typically within 1-3 weeks of symptom onset. This study demonstrated a strong correlation between gastrointestinal infections, especially those caused by Campylobacter Jejuni, with up to 70% of cases. These axonal variants frequently exhibit poorer functional recovery, significant motor impairment, and faster progression. The idea that pathogen-triggered immune responses specifically target axonal membranes is supported by the existence of antibodies in these patients.

Acute Inflammatory Demyelinating Polyneuropathy (AIDP), the most prevalent GBS subtype in Western nations, is more commonly associated with respiratory tract infections, such as those brought on by Mycoplasma pneumoniae, Cytomegalovirus (CMV), Epstein-Barr virus (EBV), and influenza viruses. Although there is variation depending on age and comorbidities, demyelinating variants, in contrast to axonal forms, involve immune-mediated injury to the myelin sheath and are frequently associated with improved recovery outcomes *(Finsterer, 2022).*

According to the current study, 25% of the patients had recent surgery. This could be because the stress of the procedure or the release of antigens could cause an autoimmune reaction. In the same way, *Gong et al. (2021)* reported in their multicenter retrospective study "Guillain-Barré syndrome triggered by surgery in a Chinese population" that 45 of the 1001 GBS patients they examined—601 males and 400 females—showed symptoms of GBS within six weeks of surgery and were diagnosed with post-surgical GBS. Surgery, particularly orthopedic surgery, was found to be a likely significant predisposing factor for GBS. A more severe course and a worse short-term prognosis were characteristics of the clinical presentation of post-surgical GBS.

Li and Zhang's (2024) literature review study, "Guillain-Barré syndrome after surgery," supports these conclusions. According to this review, an uncommon but important risk factor for major neurologic complications following surgery is post-surgical GBS. Rapidly worsening muscle weakness and areflexia, frequently accompanied by dysphagia, facial paralysis, or respiratory failure, are its hallmark signs. GBS

should be considered when symmetrical weakness persists after a significant surgical procedure.

Only five patients received recent vaccinations, according to the current study. An immune-mediated reaction could be the cause. Immune cells produce antibodies as part of the vaccine's robust immune response. *Nasreen et al.'s (2025)* global case series investigation, "Risk of Guillain-Barré syndrome after COVID-19 vaccination or SARS-CoV-2 infection," supports these conclusions. According to this study, influenza vaccination reduces the risk of contracting the virus that causes Guillain-Barré syndrome. Therefore, by guarding against a natural influenza infection, influenza vaccines prevent GBS. However, at an estimated rate of 1-3 cases per million vaccinations, influenza vaccination can rarely induce GBS in adults within 6 weeks of vaccination.

In the same manner, the CDC reported in 2024 that recent research using data from the Vaccine Adverse Event Reporting System (VAERS) and the vaccine safety datalink found a higher risk of GBS among adults 18 years of age and older following COVID-19 vaccination, but not following Pfizer-BioNTech or Moderna COVID-19 vaccination. Adenovirus-vector-based COVID-19 vaccines, like those made by AstraZeneca, have been linked to a slight, elevated risk of Guillain-Barré Syndrome, a rare autoimmune neurological illness *(Centers for Disease Control and Prevention, 2024).*

According to this study, more than two-thirds of patients received treatment with either intravenous immunoglobulin or plasma exchange for 7 days or more, up to 1 month after the initial symptoms appeared. Atypical presentations (pain, retained reflexes), a lack of early neurologist evaluation, and symptoms that coincide with other illnesses could all contribute to this outcome. Initial misdiagnosis in primary care settings and patient delays in seeking therapy are other variables.

A study entitled "Causes and consequences of diagnostic delay in Guillain-Barré syndrome" was carried out by *Bose et al. (2022).* According to this study, about two-thirds of patients postponed seeking treatment for patient-specific and patient-pathway problems, which are more common in hospitals without neurological units and increase patient mortality.

According to research by *Kenan et al. (2022)* titled "Reasons for delayed treatment initiation in Guillain-Barré syndrome," half of the patients who were ultimately diagnosed with GBS experienced delays in both diagnosis and therapy.

According to this study, more than half of the patients under investigation have pressure ulcers, particularly stage one. They may not be able to feel pressure because of rapid onset paralysis, immobility, and even sensory loss. *Shaikh et al. (2025)* study, "Guillain-Barré Syndrome: Natal to Fatal," supports these conclusions. According to this study, around two-thirds of GBS patients developed pressure ulcers, and incidence rates can be high in intensive care units.

According to this study, nearly three-quarters of patients with GBS or its complications spent two weeks to one month in the hospital due to the risk of rapid, life-threatening paralysis. However, the length of stay varies depending on the severity of the disease, with severe cases requiring intensive care that may last up to 4 months or more.

In the same direction, *Alqahtani et al. (2024),* who carried out a retrospective observational study titled "Characteristics and outcomes of patients with Guillain-Barré syndrome who were admitted to the intensive care unit," discovered that although the majority of patients begin to recover within two to three weeks, complete recovery may take months or even years. The median length of hospital stay is frequently reported between nine and twenty-nine days. After the acute inpatient phase, many patients need rehabilitation. Individuals with GBS who were admitted to the intensive care unit (ICU) and needed mechanical ventilation (MV) were more likely to experience problems there, stay longer, and recover less functionally. GBS severity is probably linked to the worse outcomes and more frequent problems associated with MV.

Regarding the physical domain, which included somatic autonomy and mobility control, the current study's findings showed that patients' capacity to move and perform activities of daily living improved statistically significantly after gait training and range-of-motion exercises were implemented. According to the study, these outcomes may result from the beneficial effects of gait training and range-of-motion exercises on regaining muscular strength, increasing mobility, and boosting independence during GBS recovery.

The results of a study titled "Effectiveness of physiotherapy intervention in Guillain-Barré Syndrome" by *Gawande et al. (2024)* confirmed this conclusion. According to their research, people with GBS have trouble swallowing (dysphagia), walking, climbing stairs, and moving about in general. By using range-of-motion exercises and gait training, patients' mobility, balance, gait, and coordination all significantly improve, lowering their risk of falling. Additionally, it aids in rebuilding muscle strength, particularly in the lower extremities, which are often the most severely affected.

This result is in line with a study on "Physical exercise in Guillain-Barré Syndrome" by *Kiper et al. (2025)*, which found that exercise improves strength, reduces fatigue, and increases functional independence in GBS. Additionally, it improved functional independence, assisted patients in returning to everyday activities, reduced chronic fatigue associated with GBS, and prevented joint stiffness, contractures, muscle atrophy, and pressure sores while preserving flexibility. Consequently, it enhances quality of life by making it easier for people to move from being bedridden or wheelchair-bound to becoming independent, which is essential for both physical and mental health.

The results of the current study show that there is a statistically significant improvement in psychological status following the implementation of gait training and range-of-motion exercises in the psychological domains of psychological autonomy, communication, and emotional stability. According to the researcher, these outcomes could be the result of decreased anxiety and depression linked to GBS, which in turn boosts mental energy and lessens feelings of hopelessness. Consequently, improved self-worth and hope, triggered by witnessing physical improvements such as increased muscle strength or mobility, serve as a

protective coping resource and lower depression, thereby improving quality of life.

Bell et al. (2025) performed a study named "The psychological effects of Guillain-Barré Syndrome." Their results highlight the all-encompassing impact of GBS, highlighting the necessity of rehabilitation and supportive therapy to help prevent or manage symptoms of post-traumatic stress disorder that are frequently linked to admissions in intensive care units. Because of the loss of control, GBS's abrupt, fast paralysis causes severe psychological suffering. Patients can regain control of their bodies through range-of-motion exercises and gait training, which directly improve self-esteem.

Furthermore, *Jenn's (2024)* study on "The emotional and psychological effects of Guillain-Barré Syndrome" corroborated this finding. They found that exercise raises endorphin levels and enhances sleep quality, both of which directly regulate mood and help fight the "mental fatigue" linked to GBS. Consequently, GBS patients have a higher quality of life.

In the social domain, which included mobility range and social conduct, the patients' social status reported that they were irritable, angry, tended to withdraw from others, had difficulty making decisions, or had difficulty speaking and writing. As a result, the current study's findings indicate that social status improved significantly following gait training and range-of-motion exercises. According to the researcher, these findings may be due to increased patient mobility, which would enhance their capacity to engage and converse with others. Additionally, the patient's increased self-esteem encourages him or her to engage in social activities with others and to perform fewer household chores than usual. These findings are supporting the current research hypothesis.

According to *Shrinivasa et al. (2021),* who carried out a retrospective observational study titled "Psychosocial issues associated with Guillain-Barré Syndrome and their management," and reported that about half of patients report long-term changes to or a decrease in their hobbies and leisure activities. The abrupt, usually severe onset of GBS frequently results in strained relationships with family and partners, who may have to take on significant caring tasks, and many patients feel alone and unable to engage in social activities as they used to.

Additionally, *Susanti et al. (2025)'*s study entitled "Patient experiences of the biopsychosocial impact of Guillain-Barré syndrome: A scoping review" corroborated this finding. They observed that social engagement can be hampered by feelings of burdensomeness stemming from a loss of independence. Ineffective communication can also impede social interaction and heighten anxiety during the acute phase. Psychological anguish, such as depression and anxiety, is frequently brought on by the loss of social functioning in conjunction with persistent physical difficulties.

The results of this study show a distinct pattern of functional improvement in the Guillain-Barré syndrome (GBS) Disability Score. The majority of patients had moderate disability at baseline (first week), with a mean score of 3.69±0.66. The mean score dropped to 3.13±0.87 by the fifth week, indicating that some patients had already attained near-normal performance, while others still had substantial limitations. The score dramatically declined to 1.88±0.96 by the ninth week, indicating significant functional recovery for most subjects. According to the researcher, this result may be related to the beneficial effects of gait training and range-of-motion exercises on patients' mobility.

This result is consistent with the findings of *Chaweekulrat and Sanmaneechai (2022),* who reported in a study titled "Prognostic model for time to achieve independent walking with Guillain-Barré syndrome" that the GBS Disability Score exhibits a clear progression. Ninety percent of patients reach their maximum deficit by the end of the fourth week (Acute/Progression Phase). As motor function declines and reaches a plateau (Plateau/Early Recovery Phase), most patients have reached their nadir (maximum weakness) and entered a plateau phase by the end of the first month, around four weeks. Patients with moderate-to-severe GBS frequently have a high disability score (4 or 5), while some may begin to show modest improvements. By the ninth week (Recovery Phase), functional improvement is usually in progress. Recovery begins to become more apparent, especially if the treatment (such as IV Ig) was successful, even though a severe handicap may still exist.

This study demonstrates significant positive relationships between the GBS disability score and the physical, psychological, and social dimensions at the first, fifth, and ninth weeks of the study. Additionally, there were significant positive relationships between the GBS disability score and the overall Sickness Impact Profile score in the first, fifth, and ninth weeks. According to the researcher, this might be because the GBS disability score is a significant, reliable, and independent predictor of future disability and quality of life. Poor physical, social, and psychological quality of life (e.g., increased anxiety/depression) is substantially correlated with early high disability scores (e.g., bedbound or ventilated).

In the same direction, *Jain et al. (2025)* showed that the GBS disability score has the strongest correlation with the physical dimensions of quality of life (mobility, self-care, daily activities) in their study "Utility of prognostic models and early predictors of functional outcome in Guillain-Barré syndrome." Poor physical scores are strongly correlated with high GBS disability scores. Consequently, a higher GBS disability score (more disability) is linked to higher levels of anxiety and depression, and an increased disability directly affects the capacity to participate in social, professional, and familial life, lowering this area of QOL.

7. Conclusion

Based on the findings of the current study, the implementation of a designated gait-training and range-of-motion exercises shown to be highly effective in improving patients' physical, psychological, and social quality of life. In addition, the study revealed a strong, statistically significant positive correlation between the Guillain-Barré syndrome disability score and the sickness impact profile.

8. Recommendations

Based on the findings of the present study, the following are recommended:

For nursing practice

- Integrate structured gait training exercises and range of motion into routine nursing care for patients with Guillain-Barré syndrome to reduce complications and improve recovery.
- Implement nurse training programs to enhance knowledge and nursing skills about Guillain-Barré syndrome.

For patients

- Utilize digital health tools (e.g., mobile Apps, SMS reminders) to reinforce exercise instructions and improve adherence to follow-up.
- Encourage patient feedback on educational materials and care experience to refine future protocols.

For research

- Conduct future studies with larger, more diverse samples and longer follow-up periods to assess long-term outcomes of gait training and the range of motion exercises.
- Advocate for the inclusion of gait-training exercises and range-of-motion exercises in national nursing guidelines for caring for patients with Guillain-Barré syndrome to standardize care across institutions.

9. References

AlKahtani, N. A., Alkhudair, J. A., Bensaeed, N. Z., Alshammari, Y. S., Alanazi, R. F., Khatri, I. A., & Masud, N. (2023). Guillain-Barre syndrome in adults in a decade: The largest, single-center, cross-sectional study from the Kingdom of Saudi Arabia. *Cureus, 15*(6), e40995. https://doi.org/10.7759/cureus.40995

Alqahtani, S., Al-Dorzi, H. M., Arishi, H., Peeran, A., Bin Humaid, F., Alenezi, F. Z., Jose, J., Sadat, M., Alotaibi, N., & Arabi, Y. M. (2024). Characteristics and outcomes of patients with Guillain–Barre Syndrome who were admitted to the intensive care unit: A retrospective observational study. *Journal of International Medical Research, 52*(12). https://doi.org/10.1177/03000605241306655

Aragonès, J. M., Altimiras, J., Alonso, F., Celedón, G., Alfonso, S., Roura, P., & Moreira, A. (2021). Incidence and clinical characteristics of Guillain-Barre Syndrome in Osona (Barcelona, Spain), 2003-2016. *Neurología (English Edition), 36*(7), 525-530. https://doi.org/10.1016/j.nrleng.2018.03.020

Artner, R., Verliefde, T., Steegen, S., Gomes, S., Traets, F., Tuerlinckx, F., & Vanpaemel, W. (2021). The reproducibility of statistical results in psychological research: An investigation using unpublished raw data. *Psychological Methods, 26*(5), 527–546. https://doi.org/10.1037/met0000365

Arya, N. P., Seth, N. H., Raghuveer, R., & Sewani, Y. (2024). Exploring the efficacy of physiotherapy in Guillain-Barre syndrome through virtual reality-based rehabilitation: A case report. Cureus, 16(4), e59042. https://doi.org/10.7759/cureus.59042

Banerjee, S. S., Sahai, S., & Chate, G. P. (2025). Guillain–Barre Syndrome outbreak in Pune: A health emergency. *The Lancet, 405*(10484), 1050-1051. https://doi.org/10.1016/s0140-6736(25)00414-3

Bell, K., Summers, S. J., Moffitt, J., & Hill, G. (2025). The psychological effects of Guillain-Barre Syndrome: A grounded theory study. *Qualitative Health Research, 35*(12), 1354-1364. https://doi.org/10.1177/10497323241304641

Bhagat, S. A., & Nemade, L. S. (2026). Autoimmunity and neuropathy: A review of Guillain Barre syndrome. *International Journal of Pharmaceutical Sciences Review and Research, 86*(1), 34-42. https://doi.org/10.47583/ijpsrr.2026.v86i01.06

Bhatia, V. D., Khant, P. B., Vyshnavee, I., Shiyaf, M., Thunga, G., Gorthi, S. P., & Kunhikatta, V. (2022). Identification of factors affecting outcomes in patients with Guillain Barre Syndrome. *Medicine and Pharmacy Reports, 95*(4), 400-409. https://doi.org/10.15386/mpr-2184

Bondi, M., Engel-Haber, E., Wolff, J., Grosman-Rimon, L., Bloch, A., & Zeilig, G. (2021). Functional outcomes following inpatient rehabilitation of Guillain-Barre Syndrome patients: Intravenous immunoglobulins versus plasma exchange. *NeuroRehabilitation, 48*(4), 543-551. https://doi.org/10.3233/nre-201640

Bose, S., Loo, L. K., & Rajabally, Y. A. (2022). Causes and consequences of diagnostic delay in Guillain-Barré Syndrome in a UK tertiary center. *Muscle & Nerve, 65*(5), 547-552. https://doi.org/10.1002/mus.27506

Briseño-Godínez, M. E., Arauz, A., López-Hernández, J. C., De Saráchaga, A. J., Pérez-Valdez, E. Y., May-Más, R. N., López-Hernández, G., Bazán-Rodriguez, L., Galnares-Olalde, J. A., León-Manríquez, E., & Vargas-Cañas, E. S. (2021). Prognostic factors in elderly patients with Guillain-Barre Syndrome: Does age matter? *The Neurohospitalist, 11*(4), 303-309. https://doi.org/10.1177/19418744211002676

Cebula, K. (2018). Experimental and quasi-experimental research design in education. In L. Hamilton & J. Ravenscroft (Eds.), *Building research design in education: Theoretically informed advanced methods* (pp. 48–68). Bloomsbury Academic. https://doi.org/10.5040/9781350019539.ch-004

Centers for Disease Control and Prevention. (2024). Guillain-Barré Syndrome (GBS) and vaccines: Questions and concerns. https://www.cdc.gov/vaccinesafety/about/guillain-barre

Chaweekulrat, P., & Sanmaneechai, O. (2022). Prognostic model for time to achieve independent walking with Guillain-Barre Syndrome. *Pediatric Research, 92*(5), 1417-1422. https://doi.org/10.1038/s41390-021-01919-3

Chen, X., Ko, W., Waseem, F., Cilcic, L., Kazi, N., & Abdelhafiz, A. (2025). Guillain–Barre Syndrome in older people—A case report and literature review. *Diseases, 13*(9), 306. https://doi.org/10.3390/diseases13090306

Chrościńska-Krawczyk, M., Ziółkiewicz, A., Jartych, A., Jastrzębska, I., Jankowiak, K., Miecznikowska, A., Michalska, D., & Cichocka, A. (2024). Guillain-Barre Syndrome in childhood – what we know and where we are? A therapeutically difficult problem. *Journal of Pre-Clinical*

and Clinical Research, 18(1), 21-25. https://doi.org/10.26444/jpccr/178205

Connors, C., McNeill, S., & Hrdlicka, H. C. (2022). Occupational and physical therapy strategies for the rehabilitation of COVID-19-related Guillain-Barre Syndrome in the long-term acute care hospital setting: Case report. *JMIR Rehabilitation Assisted Technology, 9*(1), e30794. https://doi.org/10.2196/30794

De Bruin, A. F., Buys, M., De Witte, L. P., & Diederiks, J. P. M. (1994). The sickness impact profile: SIP68, a short generic version. First evaluation of the reliability and reproducibility. *Journal of Clinical Epidemiology, 47*(8), 863-871. https://doi.org/10.1016/0895-4356(94)90189-9

Dokoohaki, R., Molazem, Z., & Rambod, M. (2020). Self-management experiences in Guillain Barre Syndrome patients: A phenomenological study. *Revista Latinoamericana de Hipertension, 15*(3). https://doi.org/10.5281/zenodo.4079174

Eiffert, S. R., Stürmer, T., Thorpe, C. T., Traub, R., Raman, S. R., Pate, V., & Kinlaw, A. C. (2023). Vaccine patterns among patients diagnosed with Guillain-Barre syndrome and matched counterparts in a Medicare supplemental population, 2000–2020. *Vaccine, 41*(39), 5763-5768. https://doi.org/10.1016/j.vaccine.2023.08.014

Finsterer, J. (2022). Triggers of Guillain–Barre syndrome: Campylobacter Jejuni predominates. *International Journal of Molecular Sciences, 23*(22), 14222. https://doi.org/10.3390/ijms232214222

Gawande, I., Akhuj, A., & Samal, S. (2024). Effectiveness of physiotherapy intervention in Guillain Barre Syndrome: A case report. *Cureus, 16*(1), e52062 https://doi.org/10.7759/cureus.52062

Gong, Q., Liu, S., Liu, Y., Yao, J., Fu, X., Xiao, Z., & Lu, Z. (2021). Guillain-Barre syndrome triggered by surgery in Chinese population: A multicenter retrospective study. *BMC Neurology, 21*(1), 40. https://doi.org/10.1186/s12883-021-02067-1

Hughes, R. A., Newsom-Davis, J. M., Perkin, G. D., & Pierce, J. M. (1978). Controlled trial of prednisolone in acute polyneuropathy. *The Lancet, 2*(8093), 750-753. https://doi.org/10.1016/s0140-6736(78)92644-2

Islam, M. Z., Ara, A., Yusuf, M. A., Karim, R., Hussain, M. E., & Shaikh, M. M. (2024). Sociodemographic characteristics of patients presented with Guillain Barre Syndrome: Experience at referral neuroscience hospital in Bangladesh. *Journal of National Institute of Neurosciences Bangladesh, 10*(2), 124-129. https://doi.org/10.3329/jninb.v10i2.83517

Jain, R. S., Pemawat, A., Vyas, A., Sharma, B., Jain, D., & Pemmasani, S. P. (2025). Utility of prognostic models and early predictors of functional outcome in Guillain-Barre Syndrome in an Indian cohort. *Neurology Asia, 30*(3), 763-770. https://doi.org/10.54029/2025txx

Jenn, K. (2024). The emotional and psychological effects of Guillain-Barre Syndrome. Guillain-Barre Syndrome. *Immunological Disorders and Immunotherapy, 9*(2), 184. https://doi.org/10.35248/2593-8509.24.9.184

Kenan, G., Regev, T., Kushnir, M., Cohen, O., Gandelman-Marton, R., Kimiagar, I., & Armon, C. (2022). Reasons for delayed treatment initiation in Guillain-Barre syndrome. *Journal of the Neurological Sciences, 434*, 120179. https://doi.org/10.1016/j.jns.2022.120179

Kiper, P., Chevrot, M., Godart, J., Cieślik, B., Kiper, A., Regazzetti, M., & Meroni, R. (2025). Physical exercise in Guillain-Barre Syndrome: A scoping review. *Journal of Clinical Medicine, 14*(8), 2655. https://doi.org/10.3390/jcm14082655

Lee, M. J., & Yoon, S. J. (2024). Changes in body composition, physical fitness and quality of life on robotic gait assisted training in patients with Guillain-Barre Syndrome: A case report. *Physical Activity and Nutrition, 28*(4), 9-14. https://doi.org/10.20463/pan.2024.0027

Li, X., & Zhang, C. (2024). Guillain-Barre syndrome after surgery: A literature review. *Frontiers in Neurology, 15*, 1368706. https://doi.org/10.3389/fneur.2024.1368706

Meregildo-Rodriguez, E. D., & Bardales-Zuta, V. H. (2021). Mortality and disability reported after immunoglobulins or plasmapheresis treatment of Guillain-Barré syndrome. *Le infezioni in Medicina, 29*(4), 589–599. https://doi.org/10.53854/liim-2904-13

Nasreen, S., Jiang, Y., Lu, H., Lee, A., Cutland, C. L., Gentile, A., Giglio, N., Macartney, K., Deng, L., Liu, B., Sonneveld, N., Bellamy, K., Clothier, H. J., Sepulveda Kattan, G., Naus, M., Naveed, Z., Janjua, N. Z., Nguyen, L., … Kwong, J. C. (2025). Risk of Guillain-Barre syndrome after COVID-19 vaccination or SARS-Cov-2 infection: A multinational self-controlled case series study. *Vaccine, 60*, 127291. https://doi.org/10.1016/j.vaccine.2025.127291

Shaikh, M. A., Kumar, D., Nalband, A. M. U., Sharma, S., Bhattu, B. K., Arya, S., Sharma, N., & Tiwari, R. (2025). Guillain-Barré Syndrome (GBS): Natal to fatal: Database research and systematic review. *Journal of Contemporary Clinical Practice, 11*(2), 233-239. https://doi.org/10.61336/jccp/25-02-29

Shrinivasa, B., Marathuparambil, A., Nirmala, B. P., & Srikanth, P. (2021). Psychosocial issues associated with Guillain-Barre Syndrome and their management: Case descriptions. *Journal of Health Sciences & Research, 12*(2), 48-50. https://doi.org/10.5005/jp-journals-10042-1106

Statistics and Registration Office, El-Fayoum University Hospital. (2023). Statistics of patients with Guillain-Barré syndrome [Unpublished institutional data]. El-Fayoum University Hospital.

Surendranath, A., Damani, R., Muddasani, A., & Gupta, A. K. (2025). Comparing Guillain-Barre Syndrome outcomes between rural and urban hospitals in the United States: A retrospective cohort study. *PLOS One, 20*(9), e0333403. https://doi.org/10.1371/journal.pone.0333403

Susanti, V., Trisyani, Y., & Nuraeni, A. (2025). Patient experiences of the biopsychosocial impact of Guillain-Barre syndrome: A scoping review. *Patient Preference and Adherence, 19*, 3755-3767. https://doi.org/10.2147/ppa.s565907

Tanaka, M. (2022). Orem's nursing self-care deficit theory: A theoretical analysis focusing on its philosophical and sociological Foundation. *Nursing Forum, 57*(3), 480-485. https://doi.org/10.1111/nuf.12696

Thompson, S. K. (2012). *Sample size.* In Sampling (3rd ed., pp. 53–56). John Wiley & Sons.

Uz, F. B., Uz, C., & Karaahmet, O. Z. (2023). Three-year follow-up outcomes of adult patients with Guillain-Barré Syndrome after rehabilitation. *Malawi Medical Journal: The Journal of Medical Association of Malawi, 35*(3), 156–162. https://doi.org/10.4314/mmj.v35i3.4

Wang, Y., Zhang, H. L., Wu, X., & Zhu, J. (2016). Complications of Guillain-Barre Syndrome. *Expert Review of Clinical Immunology, 12*(4), 439-448. https://doi.org/10.1586/1744666x.2016.1128829