

## The Roy's adaptation model in a patient with Guillain-Barre Syndrome (GBS): a case report

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### Abstract

**Purpose:** The incidence of Guillain-barré syndrome (GBS) may increase during an infectious disease outbreak or pandemic. Disease progression often has an impact on the patient and family. Presents how Roy Adaptation Model (RAM) can guide nurses to assist and identify patient needs with GBS in a hospital setting. **Methods:** A case report. The RAM assessment uses Russo (2019) through interviews and observation, and the RAM intervention was guided by Akram Mansouri et al. (2019). **Results:** Patients showed adaptive behavior following RAM intervention in 4 modes. RAM intervention by integrating patient and family to help the patient's cognators coping with recognizing and responding adaptive self-management to stimuli. **Conclusions:** The RAM guidelines were applicable for nurses to identify realistic and effective interventions for patients diagnosed with GBS involving the family in the hospital setting.

**Keywords:** Guillain-barré syndrome; Roy adaptation model; intervention Roy adaptation model

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## INTRODUCTION

Guillain-Barré syndrome (GBS) cases increased during the pandemic (1). GBS is an uncommon disease and potentially fatal autoimmune disorder (2,3). The prevalence of GBS is about 1-3 per 100,000 worldwide, and the disease is more common in men than women, and the incidence increases during infectious disease outbreaks and with age (1,4,5). The incidence of variant types include 72.1% Acute inflammatory demyelinating polyneuropathy (AIDP), 16.3% Acute Motor Axonal Neuropathy (AMAN), 4.7% Acute Motor-Sensory Axonal Neuropathy (ANSAN), and 4.7% Miller Fisher syndrome (6,7). GBS patients often complain of worry and stress due to fear of being paralyzed, intubating, and uncertainty about the disease process (8). Thus, GBS has the characteristics of a chronic disease that will impact their lives' physical and psychosocial aspects (9).

Because GBS is a rare disease that is uncertain and interferes with aspects of the patient's life, nursing care

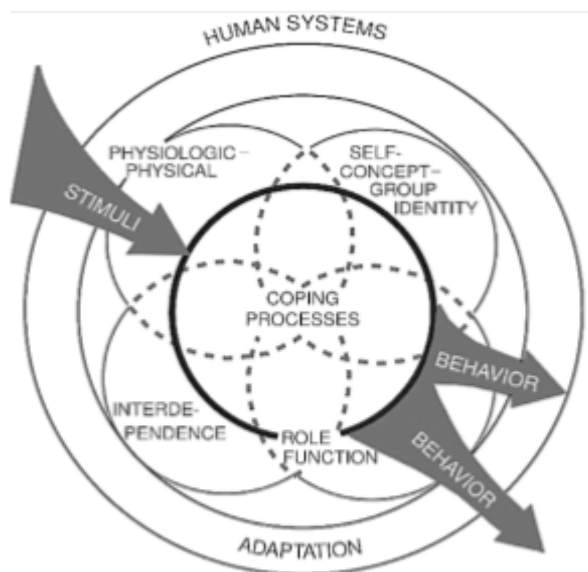
needs to be provided comprehensively with a conceptual model of nursing guidance that focuses on the uniqueness of each patient used to guide nursing practice to achieve care outcomes (10). The Roy Adaptation Model (RAM) conceptual nursing model is widely used to address problems caused by chronic diseases (11–15). Thus the conceptual model of nursing RAM can be used as a guide by nurses in providing nursing care plans and understanding patients with GBS to help them adapt to their condition.

Several studies have shown that applying adaptation models in nursing that are practical, cost-effective, and safe are widely applied using the RAM (16). Sosha and Al Kaladeh criticized RAM and found this model effective in explaining adaptation in humans (17). Frazao et al. study using RAM in End-Stage Renal Disease (ESRD) patients showed that the adaptation model was the best and was suitable for ESDR patients (18).

Although the advantages of applying the nursing model have been described, nurses tend to underestimate its application (10). The reason is that nurses lack understanding and are unfamiliar with the nursing model and how to apply the nursing model (19,20). Therefore, this case report presents how RAM can guide more familiar nurses to help identify patients with GBS needs in a hospital setting. Unfortunately, no study found current cases of GBS using RAM in the literature review. This case report offers an opportunity to understand the application of theory-based advanced nursing practice.

### **Theory-based nursing practice with the Roy Adaptation Model (RAM)**

The authors of this case report try the RAM application to guide nurses during the hospitalization of a woman patient with GBS. In this case, RAM provides a holistic approach to comprehensive care. RAM focuses on humans' physiological and psychosocial adaptations to their environment, resulting in certain behaviors (21).



**Figure 1. The Roy adaptation model, 2<sup>nd</sup> ed., by Roy, C., & Andrews, H. A., 1999, Stamford: Appleton & Lange (22)**

Figure 1 shows RAM components consisting: of stimuli and entrance to the system (21–23). There are four modes of RAM, a category of individual behavior: physiological-physical mode, self-concept, role function mode, the interdependence mode. The inner circle in the middle of the RAM overlaps with the four modes identified as two subsystems: the cognator and regulator subsystems. This subsystem is a coping and adaptive process. Nursing targets on RAM are individual adaptations to four modes contributing to their health, quality of life, and dignified death (16,22,24).

## **CASE PRESENTATION**

A 39-year-old woman diagnosed with GBS, a patient private hospital, was referred to the national referral hospital. After ten days of treatment, no improvement. She said he suddenly complained of feeling numb and heavy on his left leg three weeks ago when he woke up. She still complains of tingling, numbness of the right hand and the soles of both feet, and a heavy feeling in both feet when moved. She has a history of bronchial asthma controlled by an inhaler. The muscle scale examination: upper extremities: 4+/5/5 (left) and 5/5/4+ (right) for the shoulder, upper arm, forearm, and hand. Lower extremities: 4/5/5 (left) and 5/5/3 (right) for the upper and lower limbs. Physiological reflexes: Biceps +2/+2, Triceps +1/+1. Laboratory investigation (29/06/2021 at 01:08:29 pm), white blood cells (WBCs) mildly elevated (14.84 L), electrolyte was normal (30/06/2021 at 08:54:37 am): Na<sup>+</sup> (138mmol/L), K<sup>+</sup> (3.90mmol/L), Cl<sup>-</sup> (106mmol/L), Ca<sup>+</sup> (2.09 mmol/L), kidney function was normal: BUN (17.30mg/dL) Creatinine (0.65mg/dL), and liver enzymes were normal: SGOT/AST (11U/L), SGPT/ALT (18U/L). Clinical pathology examination (01/07/2021 at 02:04:22 pm) *Cryptococcus* Antigen (negative), Liquor Cerebro Spinalis (LCS): None LCS (negative), Lactate LCS (2.67mmol/L) mildly elevated, Pandy LCS (negative), lactate dehydrogenase. (LDH) LCS (24U/L). Ziehl-Neelsen (ZN) test (Negative), GeneXpert: Genex Obs 1: molecular rapid test check, Genex Qty 1: MTB Not Detected. Electroneuromyography (ENMG): AMAN type (Acute Motor Axonal Neuropathy).

She has good health awareness, lacks knowledge about her illness, is reluctant to open up other than her husband, and does not know how to reduce stress. Her husband said that when his wife complained of numbness and tingling in her left leg, he immediately took the initiative to go to a doctor for treatment, even though she was afraid to go to a healthcare facility because of the pandemic condition. The husband said he wanted his wife's needs to improve, and his wife added that she wanted to do her usual activities and work without worry and not get tired. During the nurses' assessment, her husband showed a faster answer and a more proactive response than the patient.

## **METHOD**

The assessment and intervention were carried out from June 30 to July 5, 2021, i.e., until the patient was discharged. The patient agreed to engage in the intervention, and the results would be published.

1. The first author, as a nurse, conducted data collection (Appendix: Supplementary Material 1): The RAM assessment uses Russo (2019) (25) through interviews and observation regarding the four modes of

RAM on the first day, which took 20-30 minutes, and the RAM intervention guided by Mansouri on 2-5 days (15).

2. Identify problems and stimulus reactions from the findings of the assessment. Interventions focus on issues that a nurse can solve independently to obtain adaptability from the patient.

3. Evaluation of RAM through comparison before and after RAM intervention. It is possible to see developments and use more effective nursing practices.

## RESULTS

Table 1 shows the summary of assessment and RAM educational program. In the physiological mode, the adaptive problems of the patient, in this case, were visible based on the assessment of muscle strength and complaints of weakness in the lower extremities. She often experienced fear of falling, fatigue, difficulty sleeping, often tingling, and numbness in the extremities. Most felt in the feet. Interventions guided

**Table 1. Summary of Assessment and RAM educational program**

RAM assessment			Interventions of RAM		RAM evaluation
Four modes of RAM (Day 1)	Types of stimuli			Interventions of RAM	Four modes of RAM (Day 5)
	Focal	Contextual	Residual		
Physiological	GBS	Physical limitations, stress, the uncertainty of disease progression, relationship with husband and family	She has good health awareness, lacks knowledge about her illness, is reluctant to open up other than her husband, and does not know how to reduce stress.	Physiological	
Weakness: Numbness, tingling in the extremities. Most felt in the feet, fear of falling, fatigue, difficulty sleeping.				Day 1: We discussed knowledge regarding the disease, therapy, possible complications. Identify causes of fatigue and sleeplessness. There is a risk of falling. Days 2-5: Ensure a safe environment and activities within capabilities. Teaches AROM (Active range of motion) 5 repetitions of 15-60 minutes. Validation of ability of ROM to maintain physical condition. Planning exercise therapy: walking for 15-20 minutes (3x/week) following outpatients.	Patients know the disease and the treatment process in the hospital. Able to prevent the risk of falling and overcome fatigue and get enough sleep, learn to do ROM independently according to instructions and plans for exercise therapy: walking will be done at home.
Self-concept				Self-concept	
She has negative feelings: Anxiety, fear, loneliness, worry, and shame. She is religious.				Day 1: Discuss the patients' perceptions of her condition and body image. Social, cultural, and spiritual. Days 2-5: Support the patient's interests such as reading or watching tv or youtube channel regarding sermons, listening to music. Her husbands are encouraged to provide positive reinforcement and support for patients to carry out activities according to their abilities and interact with family and other friends. Contact a mental health professional if needed.	The patient still does not accept her disease but argues that there is a lesson in everything. The patient is positive and motivated to do interests to improve her mood.
Role function			Role function		
She has many roles in the family and is part of society. She has considerations of limiting herself to be active in various activities.			Day 1: Discuss the patient's role, understand feelings response to changing roles. Days 2-5: Encourage good thinking about the roles that have been carried out so far. Emphasize the qualities of the patient's role. The husband also supports the ability of his wife. The patient can also share her condition with family, friends, or co-workers for help and support. Patients continue to prioritize health and safety in carrying out their routine duties.	The patient feels ready to carry out her roles and activities after returning from the hospital. In addition, the patient feels that she receive support from her family and relatives.	
Interdependence			Interdependence		
Acceptance of the family in caring for the patient			Day 1: Discussion of patient interaction with family. The ability of the family to carry out the necessary care. Day 2-5: Discuss husband and family's expectations, acceptance, and capacity for outpatient care and treatment by setting up specific activities.	There are no barriers to patient and family interaction. The patient's husband actively provides information on the progress of the patient's condition to their family.	

by Akram et al. (2019) (15) to address her problems in the physiological mode are carried out by discussing diseases, medications, treatments, possible complications, and the current nursing care plan to identify causes of fatigue and sleeplessness and provide a safe environment and activities.

According to her ability, the exercise is AROM (active range of motion) with five repetitions of 15-20 until 60 minutes every day and stopping before the patient complains (26). She learns AROM, assisted by her husband. She was also advised to walk exercises for 15-20 minutes, 3x/week, in their home. These therapies, AROM, and walking exercises are guided by a systematic review of research by Arsenault et al. (2016) and Dayyer et al. (2018)(27,28). She is also taught to adapt daily activities during the exercise. For example, when her lower extremities weakness, she can perform daily activities such as cooking while sitting to prevent falls during these daily activities.

On self-concept, as in Table 1, she expressed anxiety, loneliness, and uncertainty about disease progression. A study showed that GBS patients felt that they had lost their identity. This feeling is accompanied by shame, especially in self-care, and emotions such as frustration, guilt, anger, and gratitude (29,30).

The nurse discusses her illness perception and social, cultural, and spiritual body image. According to her perception of body image, the patient is the most important thing to be healthy and accepted by her husband. Instead, she revealed diligent prayer according to religious orders. The nurse supports the patient's interests, such as reading or watching tv or youtube channel regarding sermons and listening to music. Nurses provide knowledge to husbands to actively provide positive reinforcement to patients and suggest consulting or contacting mental health providers as a strategy to improve coping with patients and families with GBS (26).

*On role function mode*, as a wife and a mother, she will try to keep daily activities according to his ability. Before the pandemic, she was active in the community, such as in religious and social activities. She would be limited to actively participating in various activities.

The nurse encourages good thinking about the roles that have been carried out so far. Emphasize the qualities of the patient parts. For example, the nurse identified a strong desire to keep her job status and daily activities. She refused to discuss sexuality because she felt it taboo. She has explained the problems she might face if her physical condition decreases, and she is still asked to prioritize her health.

*On interdependence mode*, according to the case results (see Table 1), it was found that she had a proactive and attentive husband. In each discussion session, her husband actively listened and inquired about his wife's care and treatment to help her avoid stress and exhibited a healthy connection. Based on the response, the nurse uses an adaptation measure related to marital status in this case. According to the assessment, the nurse gives four modes of RAM daily intervention each time (Table 1). Then the nurse evaluates the outcome. The final evaluation was carried out before the patient's discharge planning at the hospital. These results indicate the patient's acceptance, ability to recognize needs, and good adaptation management.

## DISCUSSIONS

In this case report, the patient (39 years old) diagnosed with GBS complained of tingling and numbness in the right hand and both feet, and both feet felt heavy when moved. The patient spills grief over the uncertainty of her condition to her husband. Several kinds of literature explain that patients with GBS are potentially fatal, have an uncertain disease course, and have varied clinical conditions characterized by

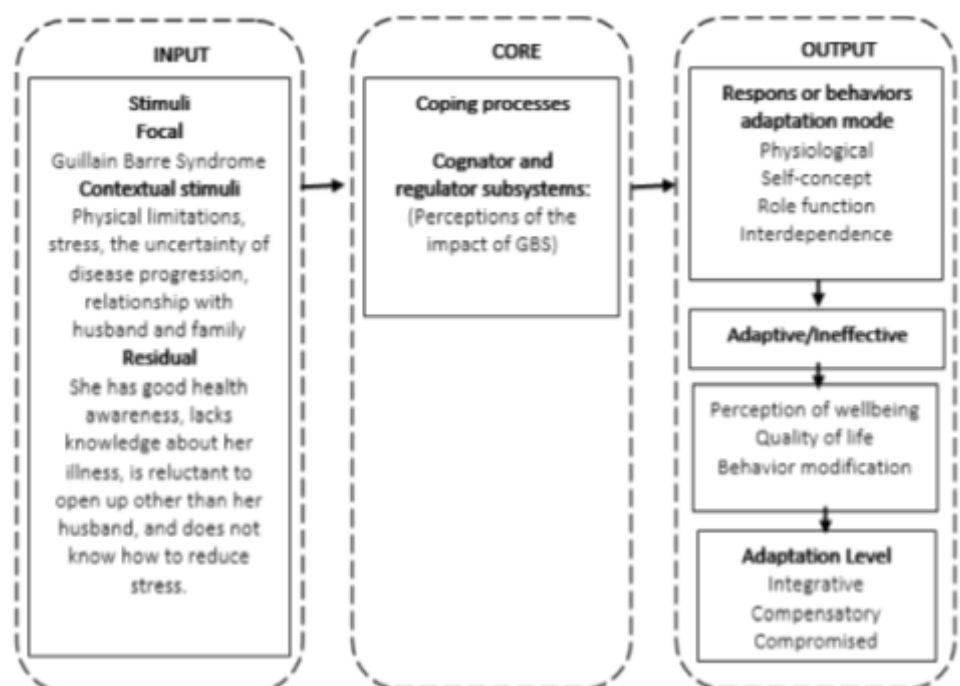


Figure 2. Adaptation of patients with GBS to Roy's model (modification from Diaz & Cruz, 2018)

symmetrical paralysis of the extremities progressing rapidly. In addition, the fatigue felt can significantly contribute to morbidity and quality of life for patients (1,4,31,32). The care plan uses nursing models to deliver targeted, systematic, and effective care (21–23). In this instance, GBS patients are cared for using the Callista Roy theory adaptation nursing model (RAM). Problems are evaluated and resolved through four modalities of adaptation: physiological, self-concept, role function, and interdependence. The primary objective of nursing care is to assist patients in adapting to all modes. In this case, applying the RAM model has been shown to encompass assessment and intervention of biopsychosocial requirements and providing ready skills for patients and their families to cope with the disease and continuously adjust to their situations.

Overall, the summary of this case report showed in Figure 2. The concept of RAM of 4 modes as input processes triggered by focal stimuli because the patient has GBS disease, followed by context stimuli of physical limitations, especially disease uncertainty, and contextual stimulation of social-cultural and spiritual beliefs. RAM intervention by integrating patient and family helps Cognator's coping process as core related to perceptions and feelings of the impact of GBS to recognize and respond to existing stimuli by producing adaptive skills in self-management. According to research, GBS patient perception determines the coping strategies used, for example, through rejection or patients trying to return to daily life, accepting fate, controlling emotions, and increasing belief and pleasure in God (33).

The patient, in this case, showed adaptive behavior in four RAM modes, and the family was proactively involved in planning behavior modification according to the patient's ability. A study revealed that patients with GBS considered support from their family and friends very valuable. Patients felt accepted and motivated while managing their disease (8,33). These results can positively increase the perception of well-being and quality of life and promote behavior modification. In the long term will determine the level of adaptation of the patient.

## CONCLUSION

This case report showed that applying RAM in GBS patient nursing practice assists nurses in developing a framework for assessing the adaptation needs of individuals and families based on their health circumstances. The benefits of RAM are that it helps patients and families enhance their engagement with the treatments and their awareness regarding health issues. The willingness and openness of patients and families are crucial during the initial identification of

RAM and determining interventions to respond to patient needs.

In the context of nursing education, the use of RAM assists students in holistically bridging the theoretical models and concepts studied with nursing practice. Students can acquire the correct knowledge, learn how to treat patient conditions, and make it easier to determine nursing interventions. There is an urgent need for additional research, particularly for applying RAM to chronic diseases and evaluating its effectiveness in generating positive patient attitudes.

## REFERENCES

1. Rahimi K. Guillain-Barre syndrome during COVID-19 pandemic: an overview of the reports. *Neurol Sci* [Internet]. 2020 Nov 1 [cited 2021 Jul 10];41(11):1.
2. Esposito S, Longo MR. Guillain-Barré syndrome. *Autoimmun Rev* [Internet]. 2017 Jan 1 [cited 2021 Jul 11];16(1):96–101.
3. Shahsavari H, Zare Z, Parsa-Yekta Z, Griffiths P, Vaismoradi M. Learning situations in nursing education: A concept analysis. *Res Theory Nurs Pract*. 2018;32(1):23–45.
4. Shahrizaila N, Lehmann HC, Kuwabara S. Guillain-Barré syndrome. *Lancet* [Internet]. 2021 Mar 27 [cited 2021 Jul 11];397(10280):1214–28.
5. Centers for Disease Control and Prevention. Guillain-Barré Syndrome CDC [Internet]. CDC. 2019 [cited 2021 Nov 6].
6. Aragonès J, Altimiras J, Alonso F, Celedón G, Alfonso S, Roura P, et al. Incidence and clinical characteristics of Guillain-Barré syndrome in Osona (Barcelona, Spain), 2003-2016. *Neurologia* [Internet]. 2018 [cited 2021 Jul 11];
7. Delannoy A, Rudant J, Chaignot C, Bolgert F, Mikaeloff Y, Weill A. Guillain-Barré syndrome in France: a nationwide epidemiological analysis based on hospital discharge data (2008-2013). *J Peripher Nerv Syst* [Internet]. 2017 Mar 1 [cited 2021 Jul 11];22(1):51–8.
8. Forsberg A, Widén-Holmqvist L, Ahlström G. Balancing everyday life two years after falling ill with Guillain-Barré syndrome: a qualitative study. *Clin Rehabil* [Internet]. 2015 Jun 12 [cited 2021 Jul 11];29(6):601–10.
9. Leonhard SE, Mandarakas MR, Gondim FAA, Bateman K, Ferreira MLB, Cornblath DR, et al. Diagnosis and management of Guillain-Barré syndrome in ten steps. *Nat Rev Neurol* 2019 1511 [Internet]. 2019 Sep 20 [cited 2021 Jul 11];15(11):671–83.
10. DeSanto-Madeya S. Using case studies based on a nursing conceptual model to teach

- medical-surgical nursing. *Nurs Sci Q* [Internet]. 2007 Oct [cited 2021 Nov 6];20(4):324–9.
11. Soomar SM. Integrating Roy's Adaption Model in Care of Palliative Clients-A Case Scenario Analysis. *JOJ Nurs Heal Care*. 2018;8(4):8–10.
  12. Monir Nobahar, Mohadese Saffari, Hassan Babamohamadi, Nemat Sotodehasl, Majid MirmohammadkhaniWodak. The effect of a care plan based on the Roy adaptation model on general health in hemodialysis patients; a randomized controlled clinical trial. *J Ren Inj Prev*. 2020;x(x):1–11.
  13. Rosińczuk J, Końtuniuk A, Górska M, Uchmanowicz I. The Application of Callista Roy Adaptation Model in the Care of Patients with Multiple Sclerosis – Case Report. *J Neurol Neurosurg Nurs*. 2015;4(3):121–9.
  14. Zhang W. Older adults making end of life decisions: An application of Roy's adaptation model. *J Aging Res*. 2013;2013.
  15. Mansouri A, Shahram B, Nasrin E, Amal S M, Bayan S. The effect of an educational program based on Roy's adaptation model on the quality of life of patients suffering from heart failure: A clinical trial study. *Jpn J Nurs Sci* [Internet]. 2019 Oct 1 [cited 2021 Sep 25];16(4):459–67.
  16. Nobahar M, Saffari M, Babamohamadi H, Sotodehasl N, Mirmohammadkhani M. The effect of a care plan based on the Roy adaptation model on general health in hemodialysis patients; a randomized controlled clinical trial. *J Ren Inj Prev* [Internet]. 2020 Feb 14 [cited 2021 Jul 11];9(2):e11–e11.
  17. Shosha GA, Al Kalaldehy M. A critical analysis of using Roy's adaptation model in nursing research. *Int J Acad Res*. 2012 Aug 5;4(4):26–31.
  18. Frazão CMF de Q, Paiva M das GMN de, Sá JD de, Bezerra CMB, Silva FBBL e, Lira ALB de C. Chronic kidney patients in hemodialysis: a study on the mode of the psychosocial theory of Roy. *Rev Pesqui Cuid é Fundam Online* [Internet]. 2014 Oct 1 [cited 2021 Jul 11];6(4):1455–63.
  19. Senesac P. Implementing the Roy Adaptation Model: From Theory to Practice. *Roy Adapt Assoc Rev* [Internet]. 2003;4(2):5.
  20. Callis AMB. Application of the Roy Adaptation Theory to a care program for nurses. *Appl Nurs Res* [Internet]. 2020 Dec 1 [cited 2021 Nov 6];56.
  21. Roy C. Overview of Process for Creating Knowledge for Practice. *Gener middle range theory from Evid to Pract*. 2014;3–27.
  22. Gibson MK, Rogers HH, Avila M. Applying a Middle Range Nursing Theory: Roy's Adaptation Model, to the Caregivers of Mental Illness Sufferers. 2020;
  23. McEwen M, Evelyn W. Theoretical basis for nursing 5th edition. Lippincott Williams & Wilkins; 2019. 174–178 p.
  24. Diaz LJR, Cruz D de ALM da. Adaptation model in a controlled clinical trial involving family caregivers of chronic patients. *Texto Context - Enferm* [Internet]. 2018 Jan 8 [cited 2021 Jul 12];26(4):970017.
  25. Russo SA. Development and Psychometric Analysis of the Roy Adaptation Modes Scale (RAMS) to Measure Coping and Adaptation. The City University of New York; 2019.
  26. Nguyen TP, Taylor RS, Boyle AGR. Guillain Barre Syndrome (Nursing). *StatPearls* [Internet]. 2020 Nov 19 [cited 2021 Jul 14]
  27. Dayyer K, Rahnama N, Nassiri J. Effect of Eight-Week Selected Exercises on Strength, Range of Motion (RoM) and Quality of Life (QoL) in Patients with GBS. *Neonatal Pediatr Med* [Internet]. 2018 Dec 6 [cited 2021 Nov 8];4(2):1–6.
  28. Arsenault NS, Vincent P-O, Yu BHS, Bastien R, Sweeney A. Influence of Exercise on Patients with Guillain-Barré Syndrome: A Systematic Review. *Physiother Canada* [Internet]. 2016 [cited 2021 Jul 12];68(4):367.
  29. van den Berg B, Walgaard C, Drenthen J, Fokke C, Jacobs B, van Doorn P. Guillain-Barré syndrome: pathogenesis, diagnosis, treatment and prognosis. *Nat Rev Neurol* [Internet]. 2014 [cited 2021 Jul 14];10(8):469–82.
  30. Hugh W, Bart C J, Pieter A van D 3. Guillain-Barré syndrome. *Lancet (London, England)* [Internet]. 2016 Aug 13 [cited 2021 Jul 15];388(10045):717–27.
  31. Albiol-Pérez S, Forcano-García M, Muñoz-Tomás MT, Manzano-Fernández P, Solsona-Hernández S, Mashat MA, et al. A Novel Virtual Motor Rehabilitation System for Guillain-Barré Syndrome. *Methods Inf Med* [Internet]. 2018 Jan 22 [cited 2021 Jul 12];54(02):127–34.
  32. Drory VE, Bronipolsky T, Bluvshstein V, Catz A, Korczyn AD. Occurrence of fatigue over 20 years after recovery from Guillain-Barré syndrome. *J Neurol Sci* [Internet]. 2012 May 15 [cited 2021 Jul 12];316(1):72–5.
  33. Dokoochaki R, Molazem Z, Rambod M. Self-management experiences in Guillain Barre Syndrome patients: A phenomenological study. *Rev Latinoam Hipertens*. 2020;15(3):189–94.