

Current Status of Neurorehabilitation Services in the OIC Countries: Results of an International Online Survey

Zuhaib Hassan, Farooq Azam Rathore, Sermad Mangat

ABSTRACT

Objectives: Neurorehabilitation services are not widely available to most persons with disability (PWD) in the Organization of Islamic Cooperation countries. This study aimed to document status of neurorehabilitation services in OIC countries.

Study Design and Setting: Cross-sectional online survey.

Methods: Self-administered online survey conducted using Google Forms. Key resource persons for each OIC country working in field of neurorehabilitation were identified from various databases. The questionnaire was emailed to 20 identified resource persons. The response rate was 60% (12/20).

Results: Neurorehabilitation services were available in 9 out of 12 surveyed countries. Only 2 countries reported providing access to neurorehabilitation services to 76-100% of their population. Five countries reported less than 25% of population had access to these services. Most commonly available neurorehabilitation services included services for stroke, spinal cord injury, pediatric neurorehabilitation, brain injury, and neuromuscular rehabilitation. Three countries had none of these specialized services. Five countries had neurorehabilitation training programs for physicians and other rehabilitation professionals. Patients had to pay out of pocket for these services in most of surveyed countries, followed by public funding and private insurance. Tele-neurorehabilitation and local disease-specific neurorehabilitation guidelines were not available in most of surveyed countries.

Conclusion: Neurorehabilitation services in OIC region are not widely available, with significant variability in availability and quality. There is a need to develop and improve these services. Sharing knowledge and expertise through various forms, such as exchange visits and online sessions, can help improve neurorehabilitation services in these countries.

Keywords: Disability management, low middle income countries; online survey; physiotherapy; rehabilitation medicine

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INTRODUCTION:

Neurological disorders are an important global public health challenge, with an increasing burden of death and disability in the coming decades.¹ Although communicable neurological disorders have declined, mortality has risen by 39%, and disability-adjusted life years have increased by 15% in the past 30 years. There was an estimate that the elderly population would grow from 7 to 65 million by the end of this century, which would increase demands on the health system, including neurorehabilitation.² The greatest

burden of neurological disease is in low- and middle-income countries (LIC/LMICs), where an estimated 650 million people with disabilities (PWD) reside, accounting for 65% of the total global disability population.³ Despite improved care and survival rates, individuals with long-term neurological conditions face physical and functional limitations, psychological issues, loss of productivity and caregiver's burden that require comprehensive management, including rehabilitation, which places an additional strain on healthcare systems that often lack integrated rehabilitation services.⁴ Only 5-15% of the people with disability can afford an assistive device.⁵ The Organization of Islamic Cooperation (OIC), an intergovernmental organization founded in 1969, comprises 57 Islamic countries,⁶ most of which are classified as LMICs or LICs with underdeveloped healthcare systems. Neurorehabilitation programs provide integrated interdisciplinary care that helps PWD achieve and maintain optimal functioning and social reintegration. A standard multidisciplinary neurorehabilitation team consists of various rehabilitation professionals, including Rehabilitation Medicine physicians as team leaders, neurologists, rehabilitation nurses, physical and occupational therapists, speech pathologists, rehabilitation psychologists, social workers, case managers, and other services such as nutrition and respiratory therapy.⁷ Each professional

Zuhaib Hassan

Senior Registrar, Department of Physical Medicine and Rehabilitation,
PNS Shifa Hospital, Karachi, Pakistan
Email: Eaglearies9@gmail.com

Farooq Azam Rathore (Corresponding Author)

Associate Professor, Department of Physical Medicine and Rehabilitation,
Armed Forces Institute of Rehabilitation Medicine (AFIRM),
Rawalpindi, Pakistan
Email: farooqrathore@gmail.com

Sermad Mangat

Surgeon, Department of Surgery,
Scunthorpe General Hospital, United Kingdom
Email: Sermad.a.mangat@gmail.com

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contributes their expertise to the holistic rehabilitation of PWD. These programs are designed based on the International Classification of Functioning, Disability, and Health (ICF) framework, where activity limitations, participation restrictions, and contextual factors affect functional problems. Interdisciplinary and cross-sectoral efforts are required for neurorehabilitation, involving numerous diverse sectors, professions, and the community to meet patient-centred goals.⁸

Although neurorehabilitation services are well-established in most high-income countries, there is no data on the current status and quality of these services in the OIC region. With a growing and ageing population and an increasing prevalence of major disabling neurological disorders, government commitment to treatment, rehabilitation, and support services for neurologic disorders is crucial. To further explore the challenges and potential solutions in neurorehabilitation in LIC/LMICs, it is essential to understand the unique barriers these countries face. The resources are often limited, and the healthcare infrastructure may not be adequately equipped to handle the complex needs of PWD. Cultural factors, stigma, and lack of awareness about neurological disorders can further impede access to necessary care. In addition, the prevalence of consanguineous marriages in many of these regions contributes to a higher incidence of genetic neurological disorders, compounding the challenge.^{9,10}

Investing in research to gather local data on neurological disorders and their impact is crucial for tailoring neurorehabilitation programs to the specific needs of the population in LIC/LMICs. In addition, integrating traditional and community-based rehabilitation methods can provide a more holistic and culturally sensitive approach to care. Such integration not only addresses the medical aspects of disability but also considers the social, economic, and psychological dimensions, facilitating a more comprehensive and effective rehabilitation process.

Therefore, this online global survey aimed to document the availability, details, and types of neurorehabilitation services and training programs in the OIC countries, identifying service gaps and providing a roadmap for future development of neurorehabilitation services in the OIC region. The survey will explore how neurorehabilitation services are integrated within the broader healthcare system, including primary care, specialized neurologic care, and community-based services. It will examine the training and education of healthcare professionals in neurorehabilitation, highlighting areas for improvement and capacity building. The role of technology and innovation in enhancing access to and the quality of neurorehabilitation services in the OIC region will also be a focal point.

METHODOLOGY:

This study was approved by Ethics Review Committee of the Armed Forces Institute of Rehabilitation Medicine,

Rawalpindi (Case no. 02/2023 dated 16 March 2022). A cross-sectional survey was conducted using a self-administered questionnaire created on Google Forms, a free online tool commonly used for online surveys. The questionnaire consisted of 25 items and four sections. The first section included an informed consent form explaining the aim of the study and ensuring anonymity of participants. The remaining sections included questions related to demographics of disability in the country, availability of general rehabilitation and specialized neurorehabilitation services, details of services, training in neurorehabilitation, availability of local guidelines on neurorehabilitation, and membership in the World Federation for Neurorehabilitation (WFNR). The final question was open-ended, inviting respondents to share their perspectives and views on neurorehabilitation services in the OIC countries.

To identify appropriate resource persons, we explored the national representative and members database of the International Society of Physical and Rehabilitation Medicine (ISPRM)¹¹ and national society web pages of the WFNR.¹¹ The email addresses of the concerned persons were noted.

The study was conducted from January 2022 to March 2022. The questionnaire was distributed in the first week of January 2022, and reminders were sent after two and four weeks. Responses received by the first week of February 2022 were downloaded as a Microsoft Excel file. Once the responses were collected and compiled, descriptive statistics were generated for each question in the survey. Frequencies and percentages were used to describe the responses to the closed-ended questions, which included questions related to the availability of general and specialized neurorehabilitation services, details of services, training in neurorehabilitation, availability of local guidelines on neurorehabilitation, and membership of the World Federation for Neurorehabilitation.

RESULTS:

Key resource persons were identified in 20 out of 57 OIC countries, and 12 of them responded to the survey, resulting in a response rate of 60%. The respondents' current designations varied, with most being associate professors, professors, and heads of departments. Rehabilitation services were reported to be available in all countries, but specialized neurorehabilitation services were only available in 10 countries, with Afghanistan, Benin, and Cameroon reporting their absence. Among the specialized neurorehabilitation services, stroke rehabilitation was available in ten countries, followed by spinal cord injury rehabilitation and pediatric rehabilitation in 8 countries, neuromuscular rehabilitation and traumatic brain injury rehabilitation in 7 countries, and multiple sclerosis rehabilitation in five countries. Three countries reported not having any of these specialized services.

Training programs in neurorehabilitation were available in

11 out of 12 countries, with a percentage of 84.1%. These training programs were available for both PMR physicians and rehabilitation professionals in five countries, only for rehabilitation professionals in three countries, and only for PMR physicians in two countries.

Access to neurorehabilitation services varied across the countries that reported their presence. Only two high-income countries reported 100% access, while less than 25% of the population had access in some countries. In countries where the service is accessible, the range of access was from 26-75%. A professional neurorehabilitation organization was present in nine countries, but most of these organizations were not members of the WFNR. In most countries, rehabilitation medicine physicians were primarily responsible for delivering the neurorehabilitation services, while in some countries, physiotherapists and occupational therapists had the primary responsibility.

The neurorehabilitation services are expensive and many neurological diseases (e.g., multiple sclerosis, motor neuron disease, chronic progressive polyneuropathy) require lifelong services. It can pose a significant economic burden on the patients, their family, public resources and government. The financial cost of providing neurorehabilitation services in this survey varied among different countries, with out-of-pocket expenses by patients being the most common in most countries (10/12), followed by government funding in eight countries and availability of private insurance in six countries. Philanthropic support for these services was available in three countries. (Fig 1).

Different models of neurorehabilitation service delivery include day service, in-patient or outpatient service, virtual, and home service.¹³ Most countries (11/12) provided these services as both in-patient and out-patient services, with five countries offering day services. Indonesia and Malaysia had community-based neurorehabilitation services.

Multidisciplinary neurorehabilitation teams are preferred due to their comprehensive care models. In all countries, physical therapists were available, and rehabilitation medicine physicians, occupational therapists, prosthetists, and orthotists, and social workers were available in 11 countries. (Fig 2)

Teleconsultation services for neurorehabilitation were available in only four countries (Pakistan, Bangladesh, Turkey, and Morocco) out of 12, and were not available in the remaining eight countries.

DISCUSSION:

In this study, we aimed to assess the availability and quality of neurorehabilitation services, mode of delivery, funding methods, access of population, and training structures for healthcare professionals in OIC countries. The survey found that there are significant disparities in the availability and quality of neurorehabilitation services among OIC member states. While some countries offer advanced and

Figure 1: Funding Sources for Neurorehabilitation Services

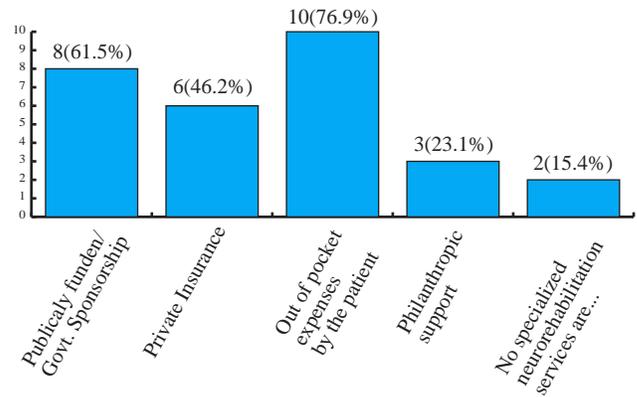
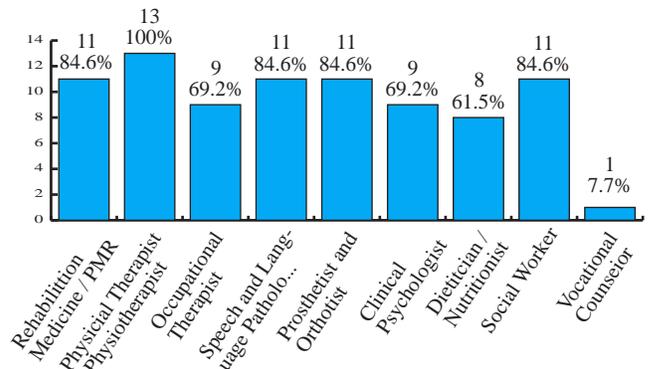


Figure 2: Rehabilitation Team Members Available in the OIC countries



comprehensive services, others lack basic facilities and resources.

While all survey respondents reported the availability of neurological rehabilitation services in their respective countries, the neurorehabilitation services were not comprehensive, highlighting a significant gap in the availability of care for PWD having long term neurological disabilities. National development policies in many LMIC countries have not adequately addressed the concerns of PWD, resulting in a lack of appropriate healthcare services.^{14,15} Geberemichael and colleagues have highlighted that in the African region (with all countries classified as LIC/LMIC), rehabilitation services face significant challenges due to limited political commitments and stakeholder collaborations. Similar challenges have been reported from Bangladesh.¹⁶ Scarce infrastructures and expertise further exacerbate the situation, leading to poorly coordinated efforts. Additionally, community-based rehabilitation programs suffer from fragmentation and lack effective partnerships with healthcare systems.

The survey found that nearly 40% of the study participants reported that only 25% of the total population in OIC countries had access to specialized neurorehabilitation services. The likely reasons for this lack of access may include high treatment costs, lack of public awareness, limited funding, and a scarcity of qualified rehabilitation professionals. While stroke rehabilitation services were

available in most countries, the number of patients who received rehabilitation services following a stroke was alarmingly low.

Training in neurorehabilitation was available in 76.9% of the countries surveyed. Based on the authors experience the training in different OIC and developing countries varies and there are significant variations among different parts of the country. For example, in Pakistan some centres are well equipped and have an adequate infrastructure to offer a comprehensive fellowship training for Rehabilitation Medicine.¹⁷ Whereas some other centres lack many important components of post graduate training. However, it is important to consider that training at the post graduate level alone is not sufficient to address the current gaps in neurorehabilitation services. It is crucial to establish include rehabilitation medicine in undergraduate medical education in the country.

One essential tool that has proven invaluable in developed countries is the establishment of disease registries, which systematically collect data on the prevalence and characteristics of neurological conditions.^{18,19} These registries play a pivotal role in enhancing research, understanding disease patterns, and guiding healthcare policies. However, in contrast, many developing countries including the OIC countries lack such comprehensive disease registries, which limits their ability to gather accurate and up-to-date information on local neurological diseases. To bridge this gap and promote equitable access to quality care, it is essential for developing nations to prioritize the establishment of national registries, gathering essential data about the prevalence of neurological disorders and identifying potential variations in their presentations. By implementation of disease registries, these countries can empower their healthcare systems, foster research collaboration, and ultimately improve the neurorehabilitation outcomes for individuals with neurological diseases.

Telerehabilitation has emerged as a transformative approach to bridging the gap in accessing neurorehabilitation services for individuals facing neurological diseases.²⁰ With a structured effort, telemedicine can facilitate convenient and remote access to specialized care, providing much-needed support to the population in need. This innovative approach enables individuals to receive essential rehabilitation services from the comfort of their homes, overcoming geographical barriers and enhancing the overall accessibility of healthcare.²¹ In the developed world, telerehabilitation has already been well established and proven its effectiveness in improving patient outcomes and reducing healthcare disparities.²² However, in the developing countries, the potential of telerehabilitation remains largely untapped, leaving a significant gap in accessing neurological care for millions of individuals. It is imperative for these nations to recognize the importance of implementing and expanding telemedicine services to meet the growing demand for neurorehabilitation, thereby ensuring equitable and comprehensive care for all

individuals regardless of their geographical location. By embracing telerehabilitation, developing countries can empower their healthcare systems, optimize resources, and offer a lifeline of hope to those in need of neurological care. There are some important limitations of this survey. We were able to reach out to 20 countries and document data from 12 countries only which is less than quarter of the current membership of OIC (57 countries). The data presented represent the view of only one key individual from each country and we did not ask for detailed data and references to support the responses. Respondents filled out a self-report questionnaire, so there is the possibility of incorrectly understanding of the question or misconceptions about their practice. The study design and sample size did not allow for statistical inference, which means that the findings cannot be generalized to the entire OIC region. Rather, the results of this study provide a snapshot of the availability and quality of neurorehabilitation services in the countries that participated in the survey and can be used to identify gaps and areas for improvement in neurorehabilitation services in these countries. Despite these limitations, the current survey is the first formal documentation of the presence, scope, and types of the neurorehabilitation services in the OIC countries. If availability of services is catered for, it can reduce the burden of disability globally. To address the rapidly growing burden of neurological disorders in LMICs, action must be taken at the personal, organizational, governmental, and international levels. It is crucial to establish strong political support, appropriate policies, and good governance for rehabilitation at local, national, and regional levels for efficient service delivery and positive rehabilitation outcomes.

CONCLUSION:

The results of this international online survey shed light on the current state of neurorehabilitation services in OIC countries. The survey found that there are significant disparities in the availability and quality of neurorehabilitation services among OIC member states. While some countries offer advanced and comprehensive services, others lack basic facilities and resources. The survey also highlighted a shortage of trained professionals in the field of neurorehabilitation, with many countries reporting a lack of specialized physicians, therapists, and nurses. This shortage can have a significant impact on the quality of care provided to patients and may hinder their recovery and rehabilitation.²³

The findings of the survey underscore the urgent need for greater investment in neurorehabilitation services in OIC member states. This investment should prioritize the development of specialized training programs for healthcare professionals and the establishment of comprehensive and accessible neurorehabilitation facilities. By addressing these issues, OIC member states can provide better care for individuals living with neurological conditions and improve their quality of life

Authors Contributions:

Zuhaib Hassan: Data analysis, literature review, critical revision and final approval of the version to be published
Farooz Azam Rathore: Conception, data acquisition, drafting work and final approval of the version to be published
Sermad Mangat: Data analysis, literature review, critical revision and final approval of the version to be published

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