

Review Article

A review on tools for measuring activity limitation in diabetic peripheral neuropathy

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ABSTRACT

The burden of diabetic peripheral neuropathy (DPN) ranges from 10.5% to 32.2% and up to half of the diabetic patients will eventually develop neuropathy in the course of their disease. The present paper reviews the existing tools and measures for assessing activity limitation as a result of DPN; using a not exhaustive search strategy, limited to PubMed. The tools available for the assessment of activity limitation as a consequence of DPN are based on International Classification of Functioning, Disability and Health (ICF) and are equally effective. The researcher must make the choice based on cultural validation and specific study objectives. Researchers should select a set of tools and procedures that are appropriate for study purposes, study settings and strive to use them consistently.

Keywords: Diabetic peripheral neuropathy, Activity limitation, Disability, Assessment, Tools, ICF

INTRODUCTION

India is the diabetic capital of the world with 7.3% (95% CI 7.0 to 7.5) of the population being diabetic.¹ The prevalence of diabetes has increased 1.78 times in the last decade and it is expected to increase 134.3 million by the year 2045.² In Asian Indians, type 2 diabetes mellitus is characterised by an early age of onset and incidence at low BMI levels. Based on available evidence, Asian Indian individuals are more susceptible to diabetes mellitus and its consequences than white people.³ The rising prevalence of DM translates to an increasing number of people with complications. Majority of the diabetic patients suffer from any of the microvascular (52.1%) or macrovascular (29.7%) complication and the most common complication being neuropathy.^{4,5} The current burden of diabetic peripheral neuropathy (DPN) ranges from 10.5% to 32.2% and up to half of the diabetic patients will eventually develop neuropathy in the course of their disease.⁶ The risk factors for the development of DPN include age, duration of diabetes,

dyslipidaemia, glycated haemoglobin, microvascular complications, macrovascular complications, and alcoholic status.

It is projected that diabetic foot ulcer (DFU) will occur in about 15% of the diabetic population. DPN primarily contributes to the development of DFU among other factors like biomechanical imbalances, trauma, and peripheral vascular disease. Importantly, 85% of all lower limb amputations in patients with diabetes are preceded by DFU. The impact of resulting disability is significant; on the individual, the family, the community, and the healthcare system.⁷ Nearly 50% of the patients with DPN are asymptomatic and they seldom seek medical care, unless they develop with a visible foot ulcer. DPN is missed in the early stages if not overlooked in the foot examinations.⁵ In addition to impaired sensation in the proximities, the consequences of diabetes include damage to the eyes resulting in visual impairment and subsequent blindness (diabetic retinopathy). All these factors contribute to mobility and activity limitation among

diabetic patients. For example, being confined to bed or house, requiring special aid in getting

around either inside or outside the house, limitation to perform the basic activities of daily living (ADL) that include eating, washing, dressing, going to toilet and moving about.⁸

It is critical to understand how the disease influences the affected person's activities of daily living within their household and community in order to create interventions that minimise the consequences and improve the quality of life of diabetic patients. Furthermore, if such measures are to be implemented on a large scale in the long run, some way of assessing their efficacy must be available.⁸ The first step would be to estimate the burden of activity limitation; for which learning various tools to assess activity limitation in diabetic patients due to neuropathy is imperative. The present paper reviews the existing tools and measures for assessing activity limitation as a result of DPN.

A scoping review of papers assessing activity limitation was conducted. The search was done on PubMed using the keywords 'scales' AND 'activity limitation' AND 'diabetes' on 31st October 2021. No filters were applied, and this resulted in 624 articles. Finally, 45 studies using scales or measures to assess activity limitation were selected. The search was not exhaustive and limited to PubMed as the purpose was to see the different scales or measures used for assessing activity limitation.

TOOLS FOR SCREENING ACTIVITY LIMITATION IN DPN

Though there are wide range of tools for assessing disability, there are only hand full of tools that have been adapted for screening activity limitation in neuropathy. They are as follows:

International Classification of Functioning, Disability, and health (ICF), ICF Core Set (ICF-CS) for Diabetes Mellitus, Screening of Activity Limitation and Safety Awareness (SALSA) and WHO Disability Assessment Scale (WHODAS) v2.0.

INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH (ICF)

ICF places every individual in the framework of "functioning and disability are results of the interaction between the health conditions of the person and their environment". ICF and ICD (International Classification of Diseases) both are a part of WHO Family of International Classification and complement each other. The ICF is not linked to any specific health issue or disease; rather, it defines the related functioning characteristics from different perspectives at the body, person, and societal levels.⁹ The ICF is based on the biopsychosocial model that comprises of both medical

and social model. It sees disability as the result of interaction between the contextual and environmental factors based on which the ICF is divided into two parts. Further, each part has its components; the Functioning and disability has Body functioning and structure, activities and participation as components, while contextual factors has Environmental and Personal factors as components. In turn each component is subdivided into domains and categories.^{9,10}

ICF has a very flexible framework that can be adapted at individual, institutional and social levels. It serves as a standardisation tool for all forms of data with reference to disability around the world. Persons with all types of impairments will benefit from the ICF not just for identifying their health care and rehabilitation requirements, but also for recognising and evaluating the impact of their physical and social environments on the disadvantages they encounter in life. It is modified time to time based on the existing evidences, and also has been validated cross-culturally.

ICF CORE SET (ICF-CS) FOR DIABETES MELLITES

The ICF-CS for DM was adapted from ICF in the year 2004, specific for Diabetes Mellitus. It is similar in structure with ICF and has 99 categories altogether: 36 categories in body functions, 16 in body structure, 18 second line categories in activity and participation and 29 from environmental factors. The advantage of using ICF-CS for DM is, it is more specific and comprehensive. The qualifier scale of the categories of body functions, body structures and activities and participation have 5 response categories, each ranging from 0 to 4; no, mild, moderate, severe or complete impairment or difficulty. The qualifier scale of the environmental factors has 9 response categories ranging from -4 to +4. A specific environmental factor can be a barrier (-1 to -4), a facilitator (1 to 4), or can have no influence (0) on the patient's life.¹¹

SCREENING OF ACTIVITY LIMITATION AND SAFETY AWARENESS (SALSA)

SALSA was developed based on International Classification of Functioning, Disability and Health (ICF). Impairment is defined "as problems in body function or structure, such as a significant deviation or loss, which may be described as primary – such as sensory loss in a limb – or secondary – such as an ulcer caused by the lack of sensation". It is a cross-cultural tool with a 20 item questionnaire. The SALSA was developed through multi centric participation of five countries - China, Israel, Brazil, Nigeria and India.⁸ The SALSA assess the three domains mobility, self-care and wound healing. It also aims to integrate the patients knowledge on dangerous activities that they should avoid, else can lead to tissue damage owing to sensory deficit induced by

peripheral neuropathy. The average SALSA score in the study population ranges from 10-75.⁸

The SALSA is more relevant and specific to assess the activity limitation due to any type of long-standing neuropathy caused either due to leprosy, diabetes or any pathology. It has been validated and translated in 14 languages including Tamil, Bengali, Chinese, Indonesian, Hebrew, Nepali, Hindi, French etc. It requires minimal training and does not need any equipment's.⁸

WHO DISABILITY ASSESSMENT SCALE (WHODAS) V2.0

The WHODAS v2.0 was also based on ICF, since ICF was extensive and impractical for daily use, the WHO developed the WHODAS in order to offer an uniform approach to access disability among people around the globe. It assess the functioning across six domains namely cognition, mobility, self-care, getting along, life activities and participation. There are three versions of WHODAS, the full detailed 36 item questionnaire, a shorter 12 item questionnaire and a hybrid version 12+24 questionnaire. The average time needed to use WHODAS was 5 minutes to 20 minutes. It has a Cronbach's alpha of 0.98 and was validated across the various WHO regions.¹²

Though there are various general tools for measuring disability that can be linked to ICF, WHODAS is one of its kind that it encompasses all the areas of ICF and can be applied to wide range of illness. It can be used across clinical, community and general populations. The WHODAS was developed as a result of a comprehensive cross-cultural research that took place in 19 countries throughout the world and hence it can be incorporated in wide range of settings across cultures.¹²

DISCUSSION

A cross-sectional study was conducted by Fatma and Noohu (2020) in India among 120 Diabetic patients to assess body function impairment, body structure, activity limitation and participation using ICF-CS. It was observed that patients with DPN have critical concerns in Body functions and Body structure. It was concluded that to improve health standards, these individuals should be targeted with more rigorous treatment.¹³

In a study conducted among 79 type 2 diabetes mellitus patients to evaluate the activity limitation and social participation in Brazil (2009), the researcher used SALSA for accessing the activity limitation. The score analysis of the SALSA scale revealed that 67.1 percent of the patients examined had scores over 20 points, indicating some degree of activity restriction. This scale's average score was 26.5. It was also observed that the SALSA scale scores showing activity limitation was linked to a diabetes duration of more than ten years.¹⁴

A descriptive study was conducted by Al-Banna et al in Erbil City, Kurdistan Region of Iraq to assess 400 diabetic patients with WHO DAS 2.0 and evaluate the levels of disability among them. It was observed that Diabetic patients with moderate degree of impairment were the most common (57%) and diabetic patients with low level of disability were the least common (23%). In 20% of the group, there was a severe level of impairment.¹⁵

CONCLUSION

There are very few studies on the assessment of disability or activity limitation in patients with diabetic neuropathy and hence it is the need of the hour to focus research on impairment due to DPN. The tools available for the assessment of activity limitation as a consequence of DPN are based on ICF and are equally effective. The researcher must make the choice based on cultural validation and specific study objectives. Researchers should select a set of tools and procedures that are appropriate for study purposes, study settings and strive to use them consistently.

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