Association of diabetic peripheral neuropathy with lower limb muscle strength and the ankle range of motion of patients who attend diabetic clinics at the National Hospital of Sri Lanka

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Diabetes mellitus is characterized by chronic hyperglycemia, with diabetic peripheral neuropathy (DPN), the most common type of neuropathy affecting the peripheral nervous system. Most people with diabetes develop diabetic foot, which causes biomechanical changes and muscle alterations. This study assessed the association of DPN with lower limb muscle strength and ankle range of motion (ROM), as well as the correlation between ankle ROM and leg muscle strength in diabetic patients at the National Hospital, Sri Lanka. An analytical cross-sectional study involved 60 participants with DPN and 60 without DPN, using the purposive sampling method. Demographic data were assessed using interviewer-administered questionnaires. A handheld dynamometer and a universal long-armed goniometer were used to measure muscle strength and ankle ROM in both limbs. The Mann-Whitney U test and Spearman correlation tests were employed for data analysis. There was no significant difference in age (DPN:55.70 ± 4.96 years, without DPN:54.47±4.56 years, p=0.08) or body mass index (DPN:25.65±3.82 kg m^{-2}, without DPN:25.85±4.18 kg m^{-2}, p=0.862) between the two groups. There was no significant difference in dorsiflexor strength (Right; DPN;4.89±1.15 kg, without DPN;4.77±0.89 kg, p=0.753, Left; DPN;4.95±1.27 kg, without DPN;4.85±0.87 kg, p=0.891) or plantar flexor strength (Right; DPN;5.62±0.85 kg, without DPN;5.90±1.03 kg, p=0.105, Left; DPN;5.76±0.87 kg, without DPN;5.93±0.97 kg, p=0.222) between the two groups. However, a significant difference in plantar flexion ROM was observed in both limbs (Right; DPN;34.97±2.86°, without DPN;37.67±1.06°, p<0.001, Left; DPN;34.90±2.88°, without DPN;37.53±3.38°, p=0.001) as well as in right dorsiflexion ROM (DPN;9.63±0.84, without DPN; 10.23±1.06, p=0.001) except in left dorsiflexion. Dorsiflexor strength and ROM were correlated (p=0.045), except for the right side of the DPN group; plantar flexion ROM did not correlate with strength. The DPN was significantly associated with ankle ROM, with enhanced dorsiflexor muscle strength contributing to improved dorsiflexion. This underscores the need for early diagnosis and targeted interventions to optimize both ROM and muscle strength for better ankle function.

Keywords: *Diabetic peripheral neuropathy*, *Ankle ROM*, *Muscle strength*