ABSTRACT

BACKGROUND: Diabetes mellitus (DM) is a metabolic disorder characterized by hyperglycemia, which results from defects in insulin secretion, insulin action, or both. Deficiency in insulin leads to chronic hyperglycemia with disturbances of protein, carbohydrate, and fat metabolism (ADA, 2014). The prevalence of diabetes is rapidly increasing and is expected to reach epidemic proportions over the next decade. Today nearly 415 million people worldwide are diagnosed with diabetes, with India accounting for 69.2 million. Among the diabetes mellitus, Type 2 diabetes mellitus (T2DM) is the most common form of diabetes affecting 85-90% of the diabetic population. (IDF 2015) It is a multi-system disorder characterized by persistent hyperglycemia caused due to a progressive defect in insulin secretion on the background of insulin resistance (Guariguata et al., 2014). T2DM is associated with many complications of which foot complications are considered to have very high prevalence. There is no data available on overall prevalence of foot and musculoskeletal complications. There is dearth of literature regarding the prevalence of diabetic foot complications and musculoskeletal complications in Indian population. Therefore the present study focuses on estimating the prevalence of musculoskeletal and foot complications in subjects with T2DM and to identify the effect of structured foot health program on foot biomechanics and quality of life in subjects with T2DM.

MATERIALS AND METHODS: Present study was carried out under two phases. Phase I was a cross sectional study in which 724 subjects were screened and 539 subjects were recruited based on inclusion and exclusion criteria. After obtaining written informed consent from all the subjects. Detailed biochemical evaluation including fasting blood
sugar, post-prandial blood sugar and HbA1C was evaluated at the laboratory followed by clinical evaluations were performed to identify foot and complications. Detailed clinical evaluation was performed to identify foot complications (dry skin, callus, fissures, hammer/claw toes, bunions, ingrown nails, fungal infections, Charcot’s foot, and ulcers) using Michigan neuropathy screening instrument (MNSI) and musculoskeletal complications (shoulder adhesive capsulitis, low back pain, plantar fasciitis, early fatigue, carpel tunnel syndrome, deputryens contracture and flexor tenosynovitis) using short musculoskeletal function assessment questionnaire (SMFA).

Phase II was a Randomized controlled trial, Total of 219 subjects were screened and 186 subjects met the inclusion criteria for the study. Finally, 140 subjects gave their final consent to participate in the study and randomized to control and experimental group. After complete clinical evaluation experimental group received structured foot health program along with standard medical care whereas in control group, standard medical care alone was given for the duration of 12 weeks and reassessed at the 12th week.

**RESULTS:** In Phase I study, 60.11% over all musculoskeletal complications which ranged between 0.20% - 31.50 percentage and overall foot complications were 67.1% which ranged between 3.50% - 75.1%. Foot complications like Peripheral neuropathy, fissures and callus was associated with duration of T2DM more than 5 years.

In Phase II study, we found a significant reduction in HbA1C, forefoot plantar pressure (p<0.001) and significant increase in thickness of intrinsic foot muscles in experimental groups as compared to control group (p<0.001). A significant increase in quality of life (p<0.001) was also observed in experimental groups as compared to control group at the end of the study duration.
CONCLUSION: In the present study, high prevalence of musculoskeletal and foot complications were reported. We also observed a novel benefits associated with structured foot health program which includes aerobic training, foot strengthening, self-foot care and education along with standard medical care is the most prudent way to halt or disrupt the natural progression of foot complications. Hence, we conclude in the present study that structured foot health program along with standard care can be an important tool of management in disrupting the natural progression of foot complications without any major adverse events in patients with T2DM.