

Effect of Musculoskeletal Disorders on ADLs of Patients with Diabetes

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Abstract:

Background: An increased prevalence of musculoskeletal disease is recognised in diabetes and is a common source of disability. It is known to predominantly affect the upper limbs especially the hand and shoulder. The relationship with other complications of diabetes and glycaemic control is uncertain. Physical disability is a useful measure of the overall effect of diabetes on health. Disability can be defined in several ways, including difficulties with activities of daily living (ADL), difficulties with instrumental activities of daily living (IADL), and mobility limitations. Therefore, in this study, the effect of musculoskeletal disorder on patients with diabetes was investigated. **Objective:** To evaluate the effect of musculoskeletal disorders on ADLs of patients with diabetes. **Methodology:** After getting the ethical approval from the institutional ethical committee, subjects were screened based on the inclusion and exclusion criteria. Subjects willing to participate in the study were enrolled and a written informed consent was obtained from all the participants. Demographics of the patients were noted in the data collection sheet. ADLs, IADLs and Nordic scale were taken on patients. **Results:** Mostly involved joint is shoulder joint and knee joint and due to this patient face difficulty in their ADLs like overhead activities (dressing and bathing) and toileting. **Conclusion:** The risk of musculoskeletal disorders is more in diabetic patients due to poor glycemic control and according to the involved joint they face difficulty in their activities of daily living.

Key words: Musculoskeletal disease, Physical disability, Activities of Daily living, ADLs scale, IADLs scale

Introduction:

An increased prevalence of musculoskeletal disease is recognized in diabetes and is a common source of disability. It is known to predominantly affect the upper limbs especially the hand and shoulder. The relationship with other complications of diabetes and glycaemic control is uncertain.[1] The prevalence of diabetes worldwide has more than doubled over the past three decades, with an estimated 347 million adults living with diabetes in 2008. Diabetes increases the risk of disabling disorders including cardiovascular disease, retinopathy, renal failure, and peripheral vascular disease. Physical disability is a useful measure of the overall effect of diabetes on health. Disability can be defined in several ways, including difficulties with activities of daily living (ADL), difficulties with instrumental activities of

daily living (IADL), and mobility limitations.[2] The risk of disability associated with diabetes has been studied previously with results ranging from no association to a doubling of risk

Musculoskeletal abnormalities are common and multiple in diabetic patients. They often result from pathologic changes in the microvasculature (microangiopathy), connective tissue, and peripheral nerves related to chronic hyperglycemia. Their prevalence in patients with diabetes varies depending upon the diagnostic criteria, the study population and is generally correlated with poor glycaemic control and the occurrence of other complications of diabetes. These entities are important to recognize because they often respond to treatment, preventing pain and disability and improving quality of life.[3]

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The relationship between upper limb locomotor disability and other complications of diabetes are, at best, inconsistent while the effect of improved metabolic control of diabetes on such disability has not been studied. Hence, the aims of this study will be to confirm the increased prevalence of musculoskeletal disease in diabetes, to identify possible associations between musculoskeletal disorders and established complications of diabetes.[4] The following have been described in diabetic patients: stiff hand syndrome; Dupuytren's contracture; trigger finger; shoulder capsulitis; calcify peri-arthritis of the shoulder; carpal tunnel syndrome; muscular infarction; Musculoskeletal disorders in diabetes mellitus Intrinsic complications of DM Increased incidence of DM Likely association Limited joint mobility syndrome Stiff hand syndrome Muscular infarctions Dupuytren's disease Adhesive capsulitis Neuropathic arthropathy Flexor tenosynovitis Septic arthritis DISH Diabetic neuropathies Osteoarthritis Carpal tunnel syndrome DISH: diffuse idiopathic skeletal hyperostosis diffuse idiopathic skeletal hyperostosis (DISH); and Charcot's arthropathy.[3,5] Hence the study was undertaken to find out the effect of musculoskeletal disorders on ADLs of patients with diabetes.

Methodology:

Participants: The present study included 50 patients of diabetes who consented to participate in the study. The study was performed at Dr. Vithalrao Vikhe Patil Memorial Hospital; Physiotherapy OPD Ahmednagar, India begins in September 2022 to may 2023. The present study is an observational study with purposive sampling method. All the subjects voluntarily consented to participate in this study prior to initiation. Data collection was carried out after approval had been granted by Institutional Review Board. Inclusion criteria was patients diagnosed with diabetes, both male and female aged >18, ambulatory and community dwelling. Exclusion criteria were patients with severe cognitive impairment, aphasia, any other neurological or orthopedic disorder.

Method: After getting ethical approval, patients with diabetes of age above 18 years were screened as subjects for the study according to the inclusion and exclusion criteria. The brief written consent was taken from the subjects. The demographic including name, age and gender were collected.

Outcome Measures: ADLs scale, IADLs scale and Nordic questionnaire was taken.

Data Analysis: Statistical analysis performed by using GraphPad InStat software version 3 and Microsoft Excel. Descriptive analysis was used to find out mean and standard deviations for outcome measures.

Results:

Figure 1: Distribution of Subjects according to Age

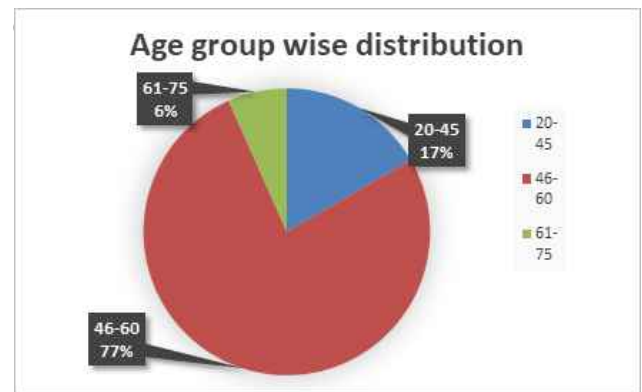


Figure 2: Distribution of Subjects according to

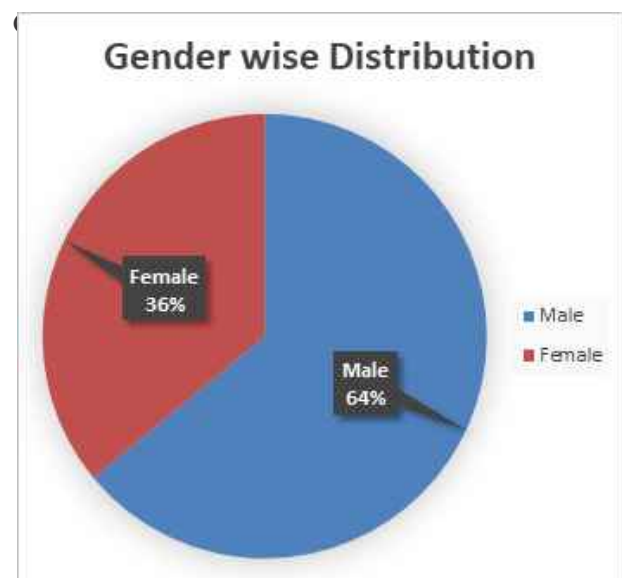


Figure 3: Distribution of Subjects according to their Occupation

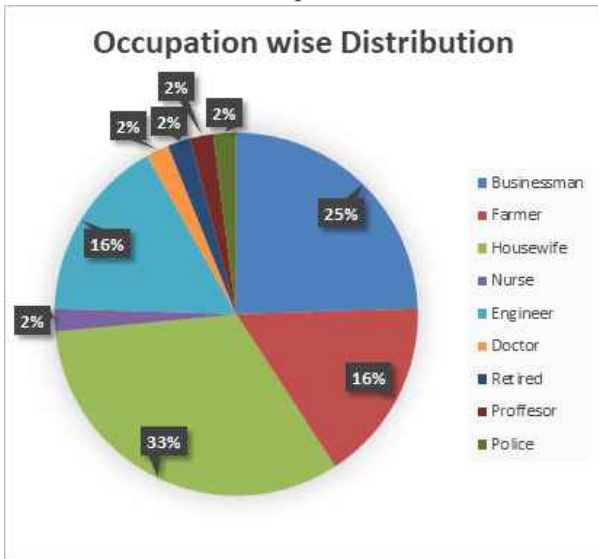


Figure 4: Distribution of Subjects according to their Hand Dominance

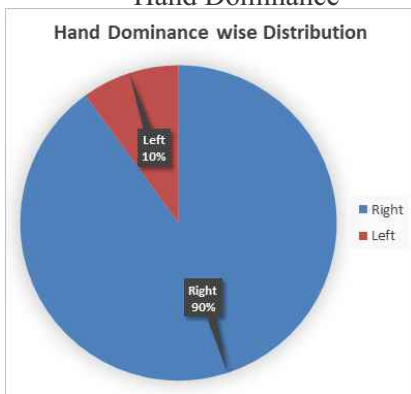


Figure 5: Distribution of Subjects according to their Exercise Habit

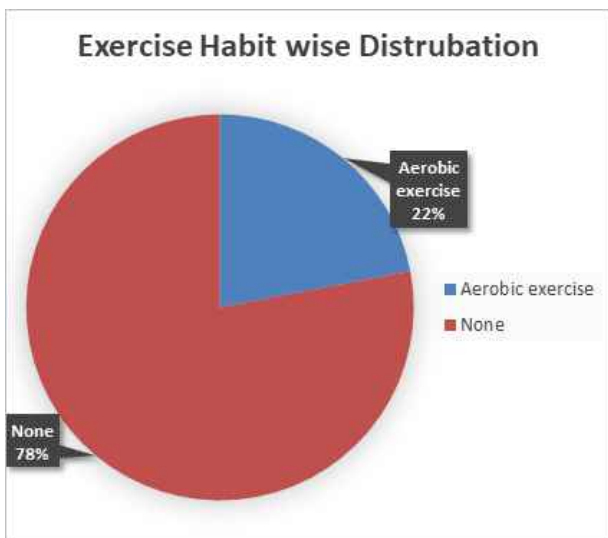


Figure 6: Distribution of Subjects according to their BMI

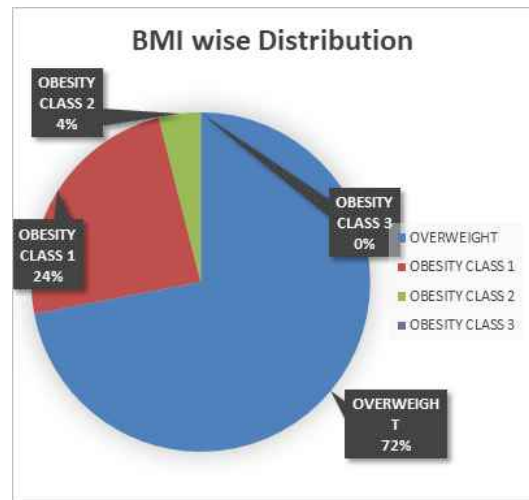


Figure 7: Distribution of Subjects according to Duration of Diabetes

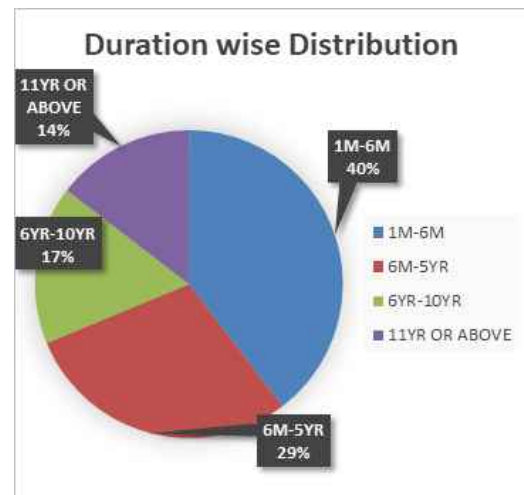


Figure 8: Distribution of Subjects according to Abnormalities

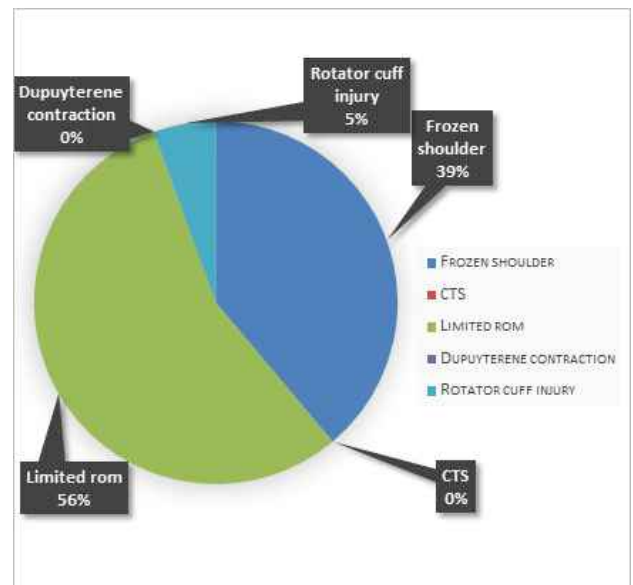


Figure 9: Distribution of Subjects according to Complications

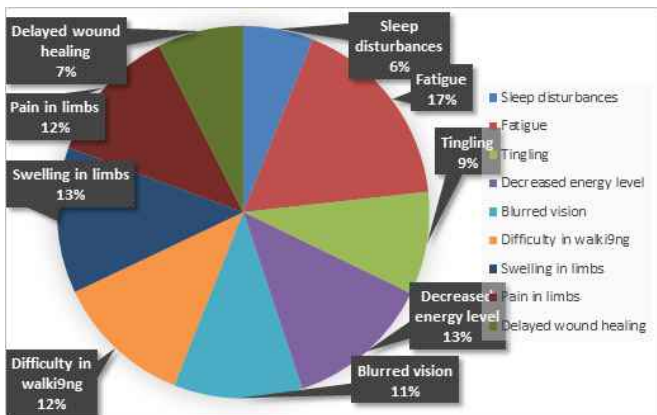


Figure 10: Distribution of Subject according to Nordic Result

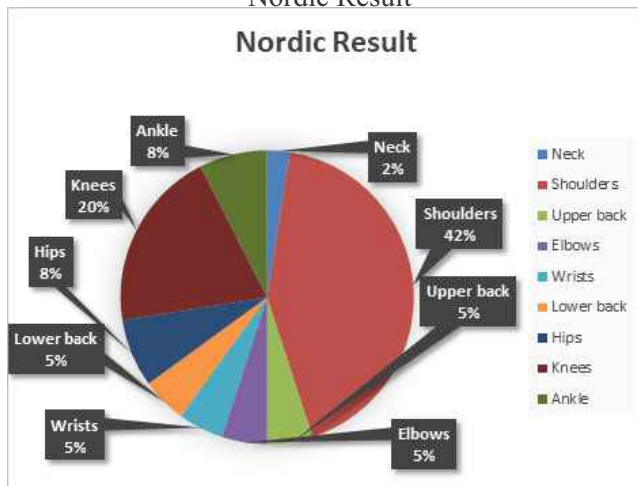


Figure 11: Distribution of Subjects according to ADL Score

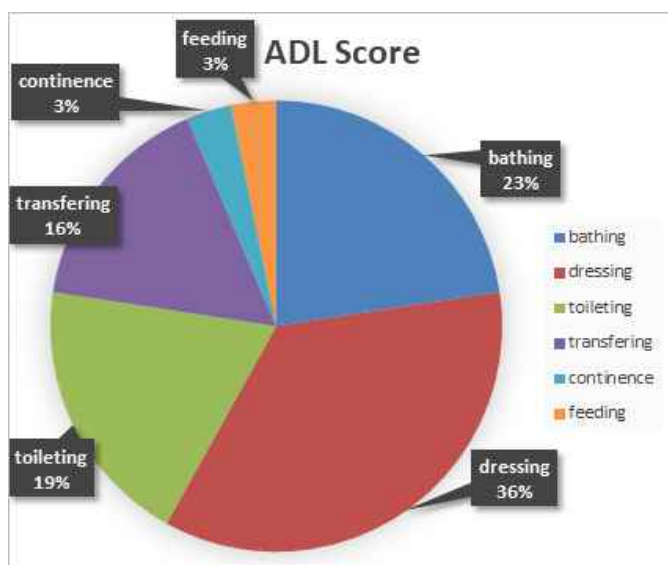
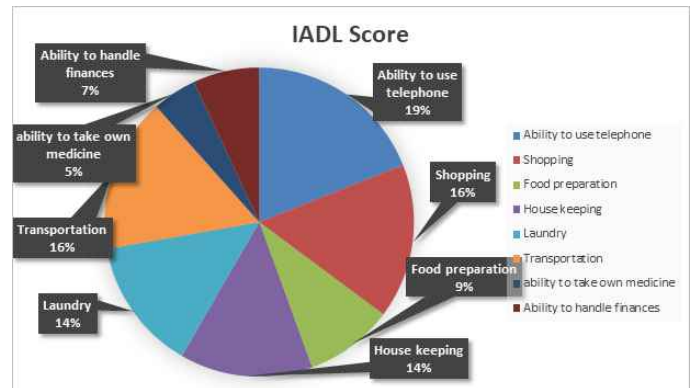


Figure 12: Distribution of Subjects according to their IADL Score



Discussion:

This study demonstrates a clear link between diabetes and musculoskeletal disorders. These findings occur on a background of data which clearly confirms other published findings, including a high prevalence of musculoskeletal disorders in people with diabetes. Majority of population has affected shoulder joint and knee joint. Housewives are more affected occupation wise. Mostly overhead activities of people are affected like bathing and dressing followed by toileting. Frozen shoulder and limited range of motions are the most common abnormalities.

In the study by Joshi SA et.al (2021)[6] the prevalence of musculoskeletal disorders in people with type 2 diabetes mellitus remains high despite advances in medical management over the last two decades. People with diabetes have diagnosed upper extremity condition. People with diabetes should be screened for upper extremity diagnoses that could limit their function. People with disability resulting in hand disorders were lower than the shoulder disorders. A combination of hand and shoulder disorders resulted in greater disability. In my study also shoulder was more affected joint mostly in housewives because of overhead activities.

In a study by Shah KM et.al (2015)[7] they concluded that shoulder limited joint mobility, in particular decreased external rotation, and was seen in individuals with diabetes as compared to control participants. In my study there was also more prevalence of limited range of motion mostly of shoulder and knee joint due to disorders like frozen shoulder and osteoarthritis which results due to overhead activities and Indian toilet at homes or because of lifestyle.

In a study by Douloumpakas I et.al (2007) [8] musculoskeletal disorders are a common finding among patients with type 2 diabetes. Obesity and accumulation of abnormally glycosylated byproducts have been proposed as potential pathogenetic mediators of these connective tissue abnormalities. Of particular interest is, however, the common association of osteoarthritis, involving even non-weight bearing joints in patients with type 2 diabetes, indicating a common pathophysiologic mechanism connecting these two clinical conditions. In my study also obese people were more affected with musculoskeletal disorders. Knee joint was the second most affected joint due to obesity as it is the weight bearing joint.

In a study by Cagliero E et.al (2002)[9] the prevalence of musculoskeletal disorders was greater in diabetic patients than in control patients (36% vs. 9%, $p < 0.01$). Adhesive capsulitis was present in 12%. They concluded that musculoskeletal disorders of the hand and shoulder occur more commonly in diabetic patients. In my study adhesive capsulitis was present in 43% of population due to overhead activities.

In a study by Wong E et.al (2013)[10] diabetes is associated with a strong increase in the risk of physical disability. Efforts to promote healthy ageing should account for this risk through prevention and management of diabetes. But in my study no disability is seen due to musculoskeletal disorders in diabetic patients. There is pain and limited joint range seen with some complications but as such disability is not seen as most of the population is working population and can tolerate the pain and no significant functional dependency is seen.

Conclusion:

The risk of musculoskeletal disorders is more in diabetic patients due to poor glycemic control and according to the involved joint they face difficulty in their activities of daily living.

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