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Prevalence Of Shoulder Pain And Disability Among Diabetis Mellitus: -A Cross Sectional Study

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Abstract

Hyperglycaemia, the hallmark of diabetes mellitus, causes severe end-organ damage, including musculoskeletal problems. It affects 11% to 30% of diabetics, due to abnormalities in collagen it results in stiff joints. It has a substantial impact on quality of life and necessitates comprehensive care. The objective of this study was to find out how common shoulder pain and disability are in people with diabetes mellitus. A cross-sectional study with 125 diabetic patients older than 18 was carried out at Santosh Hospital in Ghaziabad. Based on the inclusion criteria, participants were chosen and data on musculoskeletal problems were gathered using SPADI. Hand trauma, diseases of central or peripheral nervous systems, end-stage renal disease, chronic rheumatoid arthritis, and thyroid disorders are the exclusion criteria.

The study discovered a strong correlation between diabetic patients' pain and disability. The relationship was validated by a chi-square test ($\chi 2 = 146.112$, $p < 0.001$), which showed a significant difference in the mean scores for pain and disability. The study also showed that pain and SPADI scores varied by gender, the older diabetic patients report more severe musculoskeletal symptoms. Gender had no bearing on disability scores; however, affected side-specific differences were noted in pain, disability, and SPADI scores.

These findings demonstrate how crucial it is to create interventions that are specific to the patient's gender, age, and side of the affected area in order to improve the prognosis of shoulder pain and disability in individuals with diabetes. Adequate management techniques are necessary to effectively handle these musculoskeletal issues.

KEY WORDS: - Diabetes Mellitus, Shoulder Pain & Disability, SPADI

INTRODUCTION

Diabetes mellitus is a heterogeneous group of disorders characterized by hyperglycemia due to an absolute or relative deficit in insulin production or action. The chronic hyperglycemia of diabetes mellitus is associated

with end organ damage, dysfunction, and failure, including the retina, kidney, nervous system, heart, and blood vessels.[1]

Diabetes is a chronic illness that is common and persistent, characterized by either inefficient insulin production or usage. Blood sugar levels are regulated by the essential hormone insulin. Hyperglycemia, or increased blood sugar, is the outcome of uncontrolled diabetes. Extended periods of high blood sugar cause significant damage to different bodily systems, particularly the nervous system and blood vessels. The resulting harm presents serious health hazards, highlighting the need for efficient diabetes treatment techniques to reduce the long-term problems linked to this widespread illness. [who2023]

About 77 million Indians over the age of 18 have type 2 diabetes, and another 25 million are prediabetic, meaning they are at risk of developing the disease in the future. The diabetes epidemic in India is a serious public health issue. Unbelievably, more than half of these cases go untreated, increasing the risk of health issues.[3]

Adults with diabetes have an increased risk of heart attacks and strokes. Additionally, the concomitant conditions of neuropathy and decreased blood flow increase the risk of infections, foot ulcers, and the need to amputate a leg.[3]

Diabetic retinopathy is a major cause of blindness, resulting from long-term damage to tiny retinal blood vessels. Furthermore, one of the main reasons of renal failure is diabetes. India's high rate of diabetes highlights the urgent necessity. In addition to being associated with well-known consequences such as neuropathy, retinopathy, and nephropathy.[3]

The prevalence of mellitus diabetes has grown worldwide and is seen as a major public issue. Diabetes mellitus is a class of metabolic disorders characterized by hyperglycemia caused by defects in insulin production, insulin action, or both. DM is divided into two different types: Type 1 diabetes is an autoimmune illness characterized by pancreatic beta cell destruction and absolute insulin insufficiency, with a high prevalence in children. The most prevalent kind of diabetes is type 2 diabetes, which is caused by increasing peripheral resistance to insulin action.[3]

Diabetes mellitus (DM) is also closely associated with a range of musculoskeletal symptoms that are sometimes overlooked in clinical settings. Disease duration and control are correlated with subclinical musculoskeletal abnormalities that are a result of the influence of diabetes mellitus (DM) on connective tissues. These alterations take many forms within the periarticular and skeletal systems. Even though these symptoms are usually disregarded, they significantly lower the affected people's quality of life. Even though these problems are common, the exact etiology is still unknown, pointing to a complicated interaction between a number of variables, such as anomalies of the connective tissue and problems related to the macro and microvascular systems. It is critical to comprehend these musculoskeletal conditions in order to improve patient outcomes and provide comprehensive diabetes management.[4]

Diabetes mellitus is associated with a great variety of musculoskeletal manifestations, many of which are subclinical and correlated with disease duration and its inadequate control. They should be recognized and treated properly, because their management improves the patients' quality of life.[1]

Diabetes has an extensive effect on different joints. It affects the axial skeleton as well as peripheral joints, which can result in a variety of musculoskeletal diseases. Patients with diabetes are known to have pathological diseases in their hands and shoulders, including adhesive capsulitis, tenosynovitis, carpal tunnel syndrome, and reduced joint mobility. Diabetes and musculoskeletal manifestation specialists must work closely together to identify these issues early on for successful care. Research shows a strong relationship between the length of diabetes and the frequency of musculoskeletal symptoms. Examples of these studies include the National Health Interview Survey from 2004 and more recent studies like the one conducted by Bhat et al. in 2019.[3]

Interestingly, persons who have had diabetes for longer than ten years are more likely to develop these diseases. Furthermore, studies highlight the correlation between musculoskeletal symptoms and variables such inadequate glucose regulation, body mass index (BMI), length of diabetes, and patient age. Even with the abundance of study on this subject, there is still a dearth of information from some areas, including our own nation, which highlights the need for greater investigation and a more comprehensive understanding of the musculoskeletal symptoms in individuals with diabetes. [4]

Frozen shoulder (FS) or adhesive capsulitis is a group of symptoms involving the glenohumeral joint that include discomfort, stiffness and/or a functional limitation. It is one of the musculoskeletal problems that can be particularly troublesome in diabetic people. Even though adhesive capsulitis is a common condition, its prevalence in the diabetic population is significantly higher, ranging from 11% to 30%.[5]

The pathological process of inflammation and subsequent fibrosis results in the adherence of the joint capsule to the humeral head, causing a progressive and painful restriction of gleno-humeral movement. The three

stages of adhesive capsulitis progression are painful, adhesive, and resolution; the entire cycle can take up to two years. Frozen Shoulder mainly affects the older population, with a female predominance.[5]

The pathophysiology of frozen shoulder (FS) in diabetics revolves around collagen, which is an essential component of ligaments, tendons, and cartilage that preserves joint integrity. Increased glucose molecule binding to collagen is thought to cause aberrant collagen deposits in the shoulder's tendons and cartilage, which in turn causes stiffness in diabetics. This condition's development is also linked to inflammation and fibrosis.[5]

The prevalence of frozen shoulder (FS) is significantly higher in the diabetic population, affecting roughly 11%-30% of this population as opposed to 2%-10% in the non-diabetic population. Moreover, patients who sustain injuries to their shoulders or have shoulder surgery run a higher risk of developing FS, especially if joint immobilization lasts for an extended period of time. Gentle abduction, external rotation, and/or internal rotation at the level of the shoulder joint, within the limits of pain, has been recommended for long-term care in Frozen shoulder patients.[5]

Shoulder pain is a very prevalent musculoskeletal disorder. After low back pain and neck pain it ranks as third most prevalent musculoskeletal complaint. Shoulder pain is more common among adults.[5]

The prevalence of shoulder pain increases with age and has been found to be more prevalent among females. Shoulder pain may lead to inability in carrying out daily life activities, work and leisure activities and smoking is also as an important risk factor for shoulder pain. One of the most frequently reported musculoskeletal problems, shoulder pain, has been shown to vary in frequency between the sexes; studies typically report a higher incidence in females.[6]

Nevertheless, a few prevalence studies have not been able to find any appreciable variations in shoulder pain between the sexes. The complex relationship between obesity and musculoskeletal disorders, which has been thoroughly studied in the literature to date, indicates a significant correlation between obesity and shoulder tendon injuries. The summary of studies on shoulder pain consistently emphasizes the connection between obesity and the condition's manifestation, underscoring the necessity for more research to clarify the underlying mechanisms and improve interventions for people suffering from this common and complex musculoskeletal issue. Diabetes has been considered as a risk factor for shoulder pain and Adhesive capsulitis or frozen shoulder is the most common musculoskeletal problem due to diabetes.[6]

HYPOTHESIS

Null hypothesis [H0]

There is no significant prevalence of shoulder pain and disability among diabetes mellitus.

Alternative hypothesis [H1]

There is significant prevalence of shoulder pain and disability among diabetes mellitus.

AIM AND OBJECTIVES

The aim of the current study is to find the out the prevalence of the shoulder pain and Disability in patient with diabetes mellitus.

METHODOLOGY

UDY DESIGN: Cross sectional Study

URCE OF DATA: Santosh Hospital, Ghaziabad

MPLE SIZE: 125

ETHOD OF COLLECTION OF DATA:

INCLUSION CRITERIA:

1. Patient with Diabetes Miletus
2. Age - Above 18yrs
3. Both genders- male & female

EXCLUSION

1. Hand trauma
2. Central or peripheral nervous system disease
3. Chronic rheumatic disease
4. End-stage renal disease
5. Thyroid disorders

SAMPLING TECHNIQUE: convenient sampling
MATERIALS AND TOOLS REQUIRED:

1. Pen
2. Paper
3. Pencil
4. Rubber
5. Table
6. Chair

STUDY DURATION: 4 months
PROCEDURE

The study was done with population of Ghaziabad in Santosh Hospital. Clients who were diagnosed with Diabetes milietus with above age of 18 years for both male and female Gender. There was total 125 number of clients with DM above 18 years were chosen for this study. After the complete purpose, procedure, benefits and consequences of this study was explained to the clients in details. A consent was obtained from each client. Client's Shoulder pain and disability among diabetes mellitus was assessed based on participant's history, and using standardized scale i.e., shoulder and pain Disability Index (SPADI) and score was calculated. After the data collected using outcome data was analyzed. The study was done with in a period of 4 months.

DATA ANALYSIS

At Santosh Hospital in Ghaziabad, a cross-sectional study involving 125 patients with diabetes mellitus was carried out. Individuals with hand trauma, nervous system disorders, chronic rheumatic disease, end-stage renal disease, or thyroid disorders were excluded from the study, while participants of both genders who were 18 years of age or older were admitted. Throughout the course of four months, data was gathered utilizing simple supplies like a pen, paper, and table through the use of convenient sampling. After completion of all evaluation result were collected and data were put and analyzed by using SPSS version. Data were collected using SPAID scale.

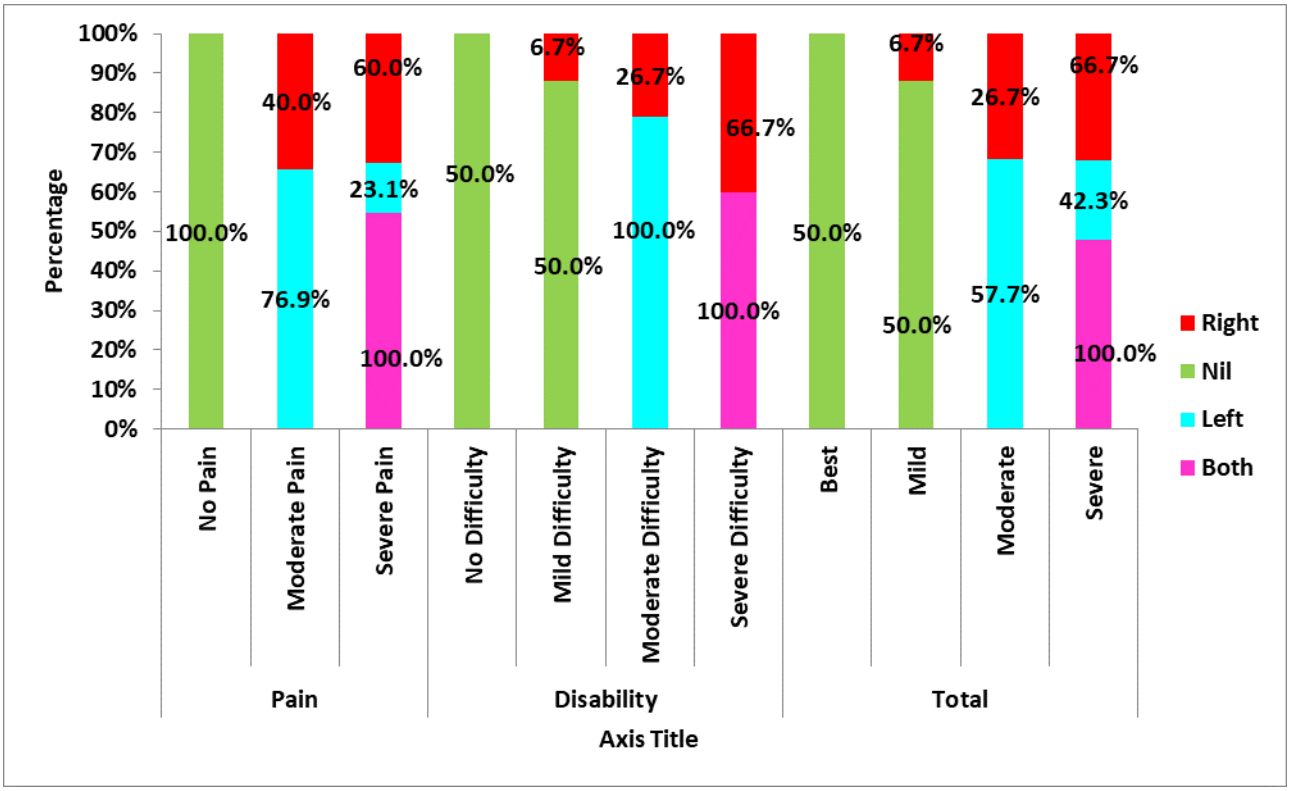
RESULTS

There is **Association** between the Pain and Disability. As the level of disability increases, the number of individuals experiencing pain also tends to increase.
For example, among those with no difficulty, none reported moderate or severe pain, while among those with severe difficulty, 37 out of 45 reported severe pain.

The chi-square test ($\chi 2 = 146.112$, $p < 0.001$) indicates a **significant association** between disability and pain levels, meaning they are not independent of each other.

		Affected								Total		χ^2 – Value (P - Value)
		Both		Left		Nil		Right				
		N	%	N	%	N	%	N	%	N	%	
Pain	No Pain	0	0.0%	0	0.0%	34	100.0%	0	0.0%	34	27.2%	145.029 (0.000) S
	Moderate Pain	0	0.0%	20	76.9%	0	0.0%	24	40.0%	44	35.2%	
	Severe Pain	5	100.0%	6	23.1%	0	0.0%	36	60.0%	47	37.6%	
Disability	No Difficulty	0	0.0%	0	0.0%	17	50.0%	0	0.0%	17	13.6%	158.280 (0.000) S
	Mild Difficulty	0	0.0%	0	0.0%	17	50.0%	4	6.7%	21	16.8%	
	Moderate Difficulty	0	0.0%	26	100.0%	0	0.0%	16	26.7%	42	33.6%	
	Severe Difficulty	5	100.0%	0	0.0%	0	0.0%	40	66.7%	45	36.0%	
Total	Best	0	0.0%	0	0.0%	17	50.0%	0	0.0%	17	13.6%	119.717 (0.000) S
	Mild	0	0.0%	0	0.0%	17	50.0%	4	6.7%	21	16.8%	
	Moderate	0	0.0%	15	57.7%	0	0.0%	16	26.7%	31	24.8%	
	Severe	5	100.0%	11	42.3%	0	0.0%	40	66.7%	56	44.8%	

S – Significance NS – Not Significance



DISCUSSION

Diabetes, a condition well-known for its effects on metabolism, has been shown to have effects on the musculoskeletal system in addition to other organ systems. People with diabetes may experience significant limitations in their daily activities, mobility, and general well-being due to musculoskeletal and upper extremity issues.

The study involved 125 subjects, with an age range of 18 to 65 years, and a mean age mistakenly reported as 100 years. The gender distribution included 73 males and 52 females. The demographic breakdown revealed that a significant portion of the subjects were aged between 45 and 55 years (50.4%), followed by those over 55 years (36.0%), and a smaller group under 45 years (13.6%).

In terms of pain and disability outcomes, the SPAID-pain score had a mean of 50.6% with a standard deviation of 32.91%, while the SPAID-disability score and SPAID-total score had means of 48.1% and 49.5% with standard deviations of 31.65% and 31.68%, respectively. Pain severity was categorized as no pain (27.2%), moderate pain (35.2%), and severe pain (37.6%), with no reports of mild or worst pain. Disability levels were similarly stratified, with 13.6% reporting no difficulty, 16.8% mild difficulty, 33.6% moderate difficulty, and 36.0% severe difficulty, indicating a significant impact on daily functions.

Gender-specific analysis indicated that females had higher mean scores for SPAID-pain (61.23% vs. 42.99%), SPAID-disability (54.64% vs. 43.49%), and SPAID-total (57.85% vs. 43.51%) compared to males. The differences in SPAID-pain and SPAID-total scores between genders were statistically significant, with p-values of 0.002 and 0.012 respectively, while SPAID-disability showed a non-significant difference with a p-value of 0.052.

The distribution of pain and disability across different sides of the body showed that the right side was more frequently affected (48.0%), followed by no side (27.2%), the left side (20.8%), and both sides (4.0%). Chi-square and Fisher's Exact Test revealed significant associations between affected side and SPAID variables. Specifically, severe pain and difficulty were predominantly reported by participants affected on both sides or the right side, with highly significant p-values of 0.000 in both cases.

Independent t-tests comparing pain and disability scores highlighted a significant difference between these two outcome measures ($t = -4.787$, $p = 0.000$), suggesting that the subjects experienced varying degrees of pain and disability, which impacted their overall SPAID scores.

Overall, this study demonstrates a substantial burden of pain and disability among the participants, with significant gender differences and associations between the affected side of the body and the severity of pain and disability. These findings underscore the importance of tailored interventions that consider these demographic and clinical characteristics to effectively manage pain and improve functional outcomes in affected individuals.

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CONCLUSION

This study aimed to examine the prevalence of shoulder pain and disability among individuals with diabetes mellitus, with particular attention to gender differences, age-related severity, and the impact of the affected side. The findings support the alternative hypothesis (H1) that there is a significant prevalence of shoulder pain and disability among diabetes mellitus patients. Notably, the study revealed that females experience higher levels of pain and overall SPAID scores compared to males, while disability scores do not significantly differ between genders. Additionally, older participants reported more severe musculoskeletal symptoms. The affected side of the body significantly influences pain, disability, and overall SPAID scores, with those affected on the right side or both sides experiencing higher severity. The statistically significant differences between the mean scores of pain and disability underscore the complex interplay of these factors in diabetic patients. These insights underscore the need for targeted interventions that consider gender, age, and the specific side affected to effectively manage shoulder pain and disability, thereby improving the overall prognosis for diabetic patients.

LIMITATION OF THE STUDY

- The cross-sectional design of this study is one of its limitations, as it makes it more difficult to prove a link between musculoskeletal disorders and diabetes mellitus.

- Furthermore, because the study primarily focuses on upper extremity disorders and ignores other types of muscular dysfunction or particular types of diabetes, it may not fully capture the spectrum of musculoskeletal dysfunction associated with diabetes mellitus.
- The inability to distinguish between various forms of diabetes mellitus within the study population may also restrict the applicability of the results to particular diabetic patient subgroups.
- Furthermore, using self-reported data to assess symptoms and make diagnoses could lead to biases and inaccuracies.

FUTURE -RECOMMENADTION OF THE STUDY

It is recommended that further interventional research be conducted to evaluate the musculoskeletal health of individuals with different forms of Diabetes Mellitus in order to develop new approaches for reducing the distress experienced by these individuals and promoting improved quality of life.

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