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PREVALENCE OF SHOULDER PAIN AND DISABILITY AMONG DIABETIC PATIENTS IN LAHORE

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Abstract

Diabetes mellitus, as defined by the World Health Organization, is a metabolic disorder characterized by elevated blood glucose levels. Individuals with diabetes are more prone to developing musculoskeletal complications compared to the general population, with shoulder pain being one of the most frequently reported issues. The etiology of shoulder pain in diabetes is multifactorial and may involve degeneration of joint cartilage, excessive weight loss, family history of diabetes, obesity, and physical inactivity. The present study aimed to determine the *prevalence of shoulder pain and disability among diabetic patients in Lahore*. This cross-sectional observational study was conducted over a six-month period. Data were collected using the Shoulder Pain and Disability Index (SPADI), which consists of 13 questions. A non-probability convenience sampling technique was employed. Participants were recruited from the Diabetic Institute of Pakistan, Mayo Hospital, Dilawar Hussain Foundation (DHF) Diabetes Management Center, and Family Care Medical & Diabetes Center, Lahore. A total of 174 diabetic patients participated, the majority being female (n = 99; 56.9%), with a mean age above 40 years. The results revealed that 44 patients (25%) had mild pain and disability, 18 (10%) had moderate pain and disability, 16 (9%) had severe pain and disability, 29 (17%) had very severe pain and disability, and 66 (38%) experienced extreme pain with severe disability. The overall mean score was 3.30 ± 1.667 (mean ± SD). This study demonstrates that shoulder pain is a prevalent complaint among female diabetic patients, with a significant proportion experiencing extreme pain and severe disability. The findings underscore the need for targeted interventions, early screening, and preventive strategies to address musculoskeletal health in diabetic populations.

Introduction

Diabetes is a metabolic disorder marked by high blood sugar level, according to the World Health Organization (WHO) (Ahmad et al., 2020). Diabetes can have major long-term effects on the neurological and circulatory systems. DM is a condition of impaired fasting glucose and impaired glucose tolerance that may rapidly cause harm to numerous body systems. Microvascular complications and macrovascular complications of Diabetes Mellitus (DM) lead to shortened life expectancy and considerable morbidity (Ajit & Oak, 2023). The two most common kinds of diabetes are type 1 (which results in the loss of insulin production due to cellular-mediated autoimmune death of pancreatic islet beta cells), and type 2 (which is brought on by either insulin deficit or insulin resistance). There are a number of additional kinds of diabetes, such as gestational diabetes, which affects pregnant women, type 3 diabetes, which is brought on by insulin resistance in the brain, secondary diabetes, which develops as a result of another illness, and neonatal diabetes, which affects infants under

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the age of six months. 85% to 95% of all cases of diabetes in developed countries are type 2. Type 1 diabetes is more common in young people than type 2, which is more common in adults and elderly people (Alabdali et al., 2021). According to the estimated prevalence of stiff shoulder with diabetes mellitus at 71.5%, over half of individuals with the condition have previously been diagnosed with type I or type II diabetes. There is a 10% to 20% lifetime risk and a 4% point prevalence of getting a frozen shoulder in diabetes people. According to certain studies, the prevalence of adhesive capsulitis in diabetic is rising, and this increase may be connected to the person age, gender and time period of diabetes. The frequency of frozen shoulder peaks between the ages of 40 and 60, and it is uncommon before the age of 40. It affects women more frequently than males (Albaker et al., 2023). Patients who have diabetes are more likely to suffer from MSK issues than other diseases, and these patients commonly experience shoulder discomfort (Aldossari et al., 2020). In addition to lowering quality of life, shoulder discomfort makes it difficult to carry out everyday tasks. "Adhesive capsulitis" is the combine term used for the most common shoulder and rotator cuff diseases (Aljethaily et al., 2020). Codman introduced the term "frozen shoulder" to describe a condition that causes slow-onset shoulder pain and discomfort that resides close to the deltoid insertion. The majority of patients have difficulty falling asleep on the affected side. There is also restricted external rotation and glenohumeral elevation (Asamoah-Boaheng et al., 2019). Reduced active and passive range of motion (ROM), especially external rotation, is caused by the glenohumeral joint capsule's stiffness. Many individuals claim that frozen shoulder is a self-restricting disorder, which means it does not go away on its own without treatment. But there is enough of evidence to show that many people with frozen shoulder have persistent pain and limited range of motion (Bhawna[1] & Kundu, 2016). Restricted glenohumeral joint movements and pain are common symptoms of frozen shoulder (Bhise et al.). Furthermore, a study conducted in Australia found that diabetic people with present shoulder complaints had a lower quality of life and more shoulder discomfort than non-diabetic people. Also, it was discovered that diabetic people with frozen shoulders had less mobility than those without the condition (Dyer et al., 2021). It is seen that physiological changes related to aging, such as lowering joint cartilage, decaying and diminished tissue repair, could raise the risk of musculoskeletal diseases (Farooq et al., 2021). Additional risk factors for DM include hypertension, dyslipidemia (elevated triglyceride or LDL cholesterol levels or decreased HDL cholesterol), non-alcoholic fatty liver disease, gestational diabetes during pregnancy and PCO (polycystic ovarian syndrome) (Garcilazo et al., 2010). Family history of diabetes, obesity, advanced age (40 years and older), and inactivity are also common warning signs for diabetes mellitus (Hsu & Sheu, 2016). The fundamental reason for shoulder pain among diabetic patients is the humerus head adhering to the glenohumeral cavity. It has been suggested that adhesions may develop as a result of hyperglycemia causing uneven collagen deposition in the connective tissues around the joints (Inayat et al., 2017). Inflammation is the fundamental process that causes tendon dysfunction, which happens in diabetes mellitus. TNF and IL-6 are two examples of inflammatory mediators that are chronically released in people with diabetes. These mediators result in chronic inflammation, the accumulation of collagen and other extracellular matrix components, and the formation of fibrosis that causes adhesions in the joint (Juel et al., 2017). Diabetics have poor wound healing and are prone to microangiopathy. These factors can combine with low macrophage colony stimulating factor (M-CSF) expression resulting in poor response to an initially offensive inflammatory pathogen. This, in turn, can cause frozen shoulder to be more

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severe, painful, and less responsive to conservative treatments aimed at suppressing inflammation (Kabbabe et al., 2010).

MATERIALS AND METHODS

This was a cross-sectional observational study. The study was completed within 6 months after the approval of the synopsis. The data was collected from the diabetic patients of "Diabetic's Institute of Pakistan", "Mayo Hospital", "Dilawar Hussain Foundation (DHF) Diabetes Management Centre" and "Family Care Medical & Diabetes Center" in Lahore. The sample size was calculated using the following formula through WHO online calculator. Where, Z= Standard normal distribution level corresponding to desired confidence level (Z=1.96 for 95% CL), P is anticipated population proportion = 0.13**,** d is absolute precision =0.05**,** Confidence interval = 5%**.** By putting these values, the sample size was 174. Non-probability convenience sampling technique was used in our study. Tool used for data collection purpose was SPADI (Shoulder Pain and Disability Index). The Shoulder Pain and Disability Index is the only specific questionnaire to access Shoulder pain and disability. It consists of two parts. Part A is about pain and contains 5 questions, while Part B is about disability and contains 8 questions. Patients with a high score suffer from severe pain and disability. All diabetic patients older than 40 years were eligible for participation in study. There were both men and women present. Patients that were pre diabetic, with any traumatic pain and with infection in shoulder joint area were not allowed to participate in the study. Data was collected from the "Diabetic's Institute of Pakistan", "Mayo Hospital", "Dilawar Hussain Foundation (DHF) Diabetes Management Centre" and "Family Care Medical & Diabetes Center" in Lahore. Permission was taken from the higher authorities of diabetic center & then consent form was compulsory to sign from participants before filling up the questionnaire. Each questionnaire was making sure that there is no missing data. For the analysis and coding of data, statistical package for social sciences SPSSV23 was used in our study. Table and charts were made for the calculation of variables.

RESULTS

The study involved 174 diabetic patients, with a predominance of females (99, 56.9%) over males (75, 43.1%). The mean age of participants was 56.48 years (SD ±9.907), ranging from 40 to 86 years. Pain and disability levels were assessed using the SPADI scale, which showed an average score of 3.30 (SD ±1.667), with a minimum value of 0 and a maximum value of 5. The distribution revealed that 44 patients (25%) had mild pain and disability, 18 (10%) had moderate pain and disability, 16 (9%) had severe pain and disability, 29 (17%) had very severe pain and disability, and 66 (38%) experienced extreme pain and severe disability. When evaluating pain at its worst, 33 patients (19%) reported no pain, 19 (10.9%) had mild pain, 42 (24.1%) moderate pain, 64 (36.8%) severe pain, and 16 (9.2%) experienced the worst pain. Pain during specific activities was also assessed: when lying on the involved side, 36 patients (20.7%) reported no pain, while 20 (11.5%) had mild pain, 40 (23%) moderate pain, 61 (35.1%) severe pain, and 17 (9.8%) reported worse pain. Reaching for a high shelf resulted in 41 (23.6%) with no pain, 24 (13.8%) with mild pain, 37 (21.3%) with moderate pain, 53 (30.5%) with severe pain, and 19 (10.9%) with worse pain. Similarly, pushing with the involved arm caused no pain in 42 patients (24.1%), mild pain in 34 (19.5%), moderate pain in 32 (18.4%), severe pain in 47 (27%), and worse pain in 19 (10.9%). Functional disability was evaluated for various activities. For washing hair, 53 patients (30.5%) had no disability, 26 (14.9%) mild disability, 46 (26.4%) moderate

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disability, 39 (22.4%) severe disability, and 9 (5.2%) the worst disability. Washing the back resulted in no disability for 42 (24.1%), mild disability for 29 (16.7%), moderate disability for 34 (19.5%), severe disability for 48 (27.6%), and the worst disability for 21 (12.1%). Placing an object on a high shelf caused no disability in 36 patients (20.7%), mild disability in 26 (14.9%), moderate disability in 35 (20.1%), severe disability in 53 (30.5%), and the worst disability in 24 (13.8%). Carrying a 10-pound object caused no disability in 36 (20.7%), mild disability in 19 (10.9%), moderate disability in 21 (12.1%), severe disability in 56 (32.2%), and the worst disability in 42 (24.1%). Overall, 62 patients (35.6%) experienced mild disability, 27 (15.5%) moderate disability, 52 (29.9%) severe disability, and 33 (19%) the worst disability. These findings highlight the significant burden of pain and functional limitations among diabetic patients, particularly during common daily activities.

Table 4.1: Age of participants

	Frequency
N	174
Minimum	40.00
Maximum	86.00
Mean	56.4828
Std. deviation	9.90692

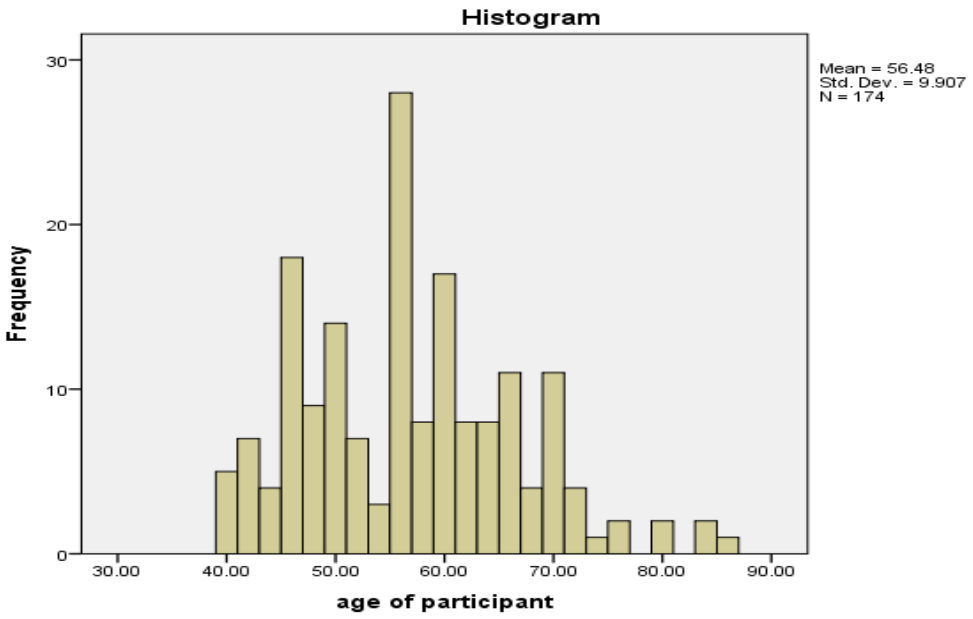

Figure 4.1: Age of participant

Table 4.2: Gender of participants

	Frequency	Percent	Valid percent	Cumulative Percent
Male	75	43.1	43.1	43.1
Female	99	56.9	56.9	100.0
Total	174	100.0	100.0	

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	Frequency	Percent	Valid Percent	Cumulative Percent
No pain	33	19.0	19.0	19.0
Mild pain	19	10.9	10.9	29.9
Moderate pain	42	24.1	24.1	54.0
Severe pain	64	36.8	36.8	90.8
Worst pain	16	9.2	9.2	100.0
Total	174	100.0	100.0	

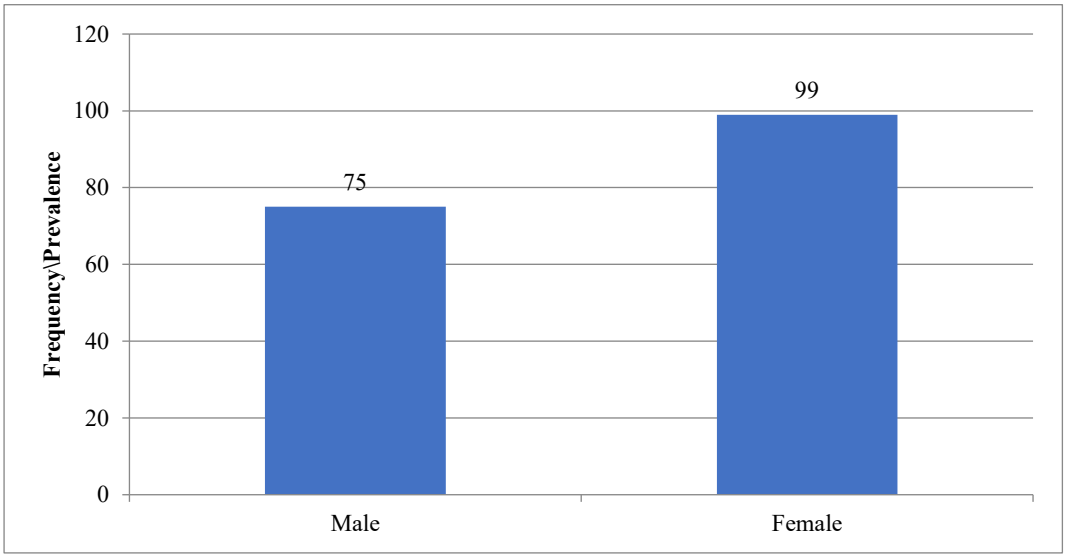

Figure 4.2: Gender of participants.

Table 4.3: demonstrates that 33(19%) had no pain, 19 (10.9%) had mild pain, 42 (24.1%) had moderate pain, 64 (36.8%) had severe pain and 16 (9.2%) had worse pain.

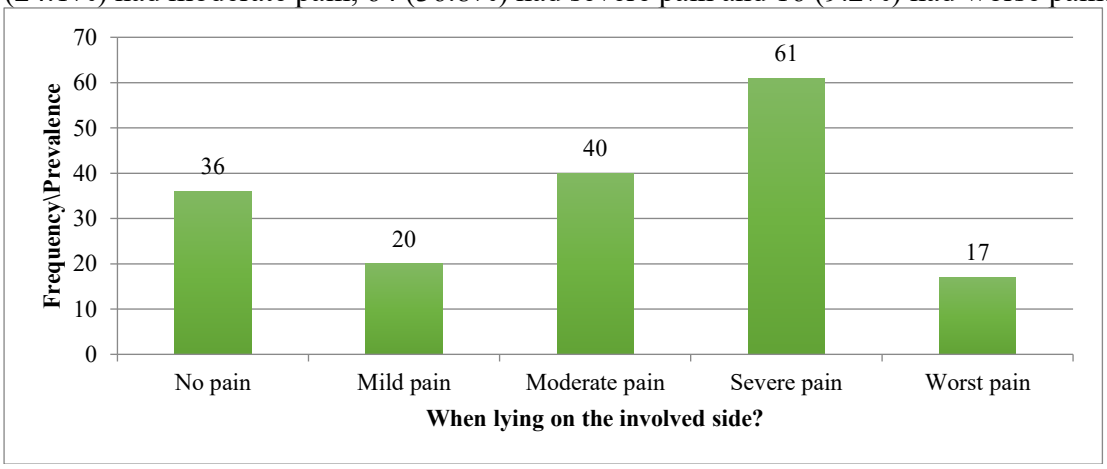

Figure 4.3: This graph illustrates that 36(20.7%) had no pain, 20 (11.5%) had mild pain, 40 (23.0%) had moderate pain, 61 (35.1%) had severe pain and 17 (9.8%) had worse pain.

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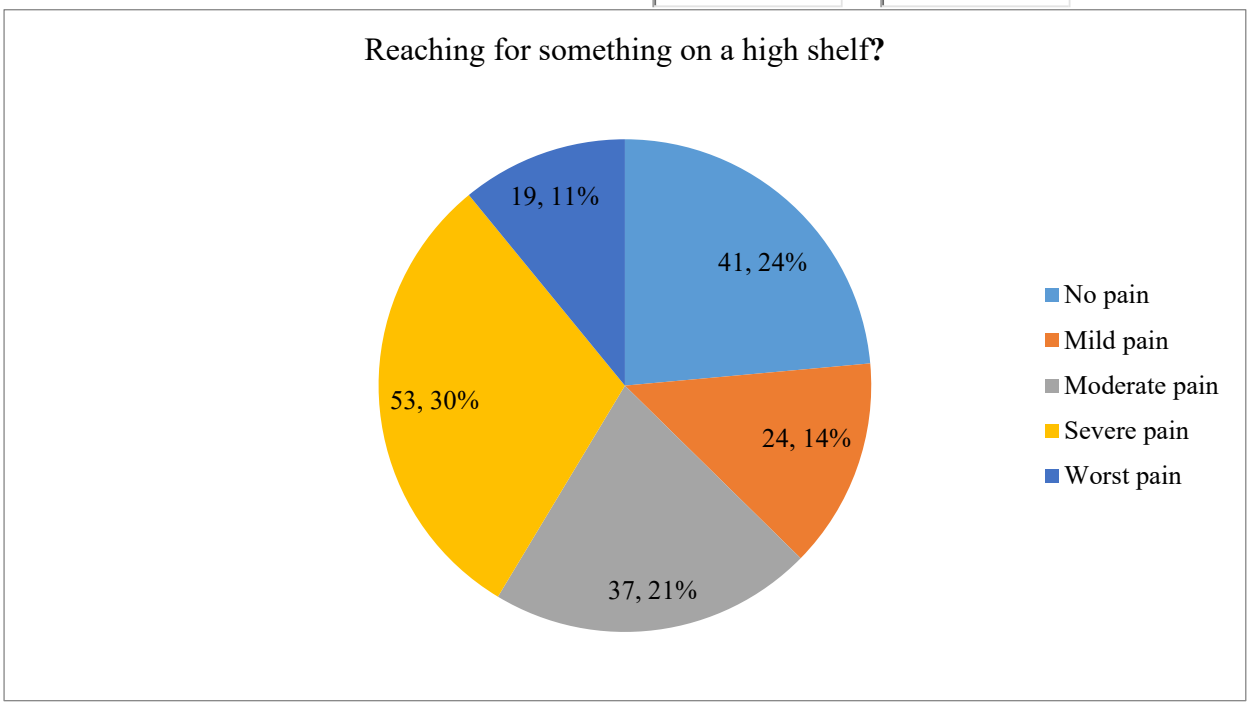

Figure 4.4: The fig demonstrates that 41(23.6%) had no pain, 24 (13.8%) had mild pain, 37 (21.3%) had moderate pain, 53 (30.5%) had severe pain and 19 (10.9%) had worse pain.

	Frequency	Percent	Valid Percent	Cumulative Percent
No pain	47	27.0	27.0	27.0
Mild pain	27	15.5	15.5	42.5
Moderate pain	42	24.1	24.1	66.7
Severe pain	46	26.4	26.4	93.1
Worst pain	12	6.9	6.9	100.0
Total	174	100.0	100.0	

Table 4.4: This table illustrates that 47 (27.0%) had no pain, 27 (15.5%) had mild pain, 42 (24.1%) had moderate pain, 46 (26.4%) had severe pain and 12 (6.9%) had worse pain.

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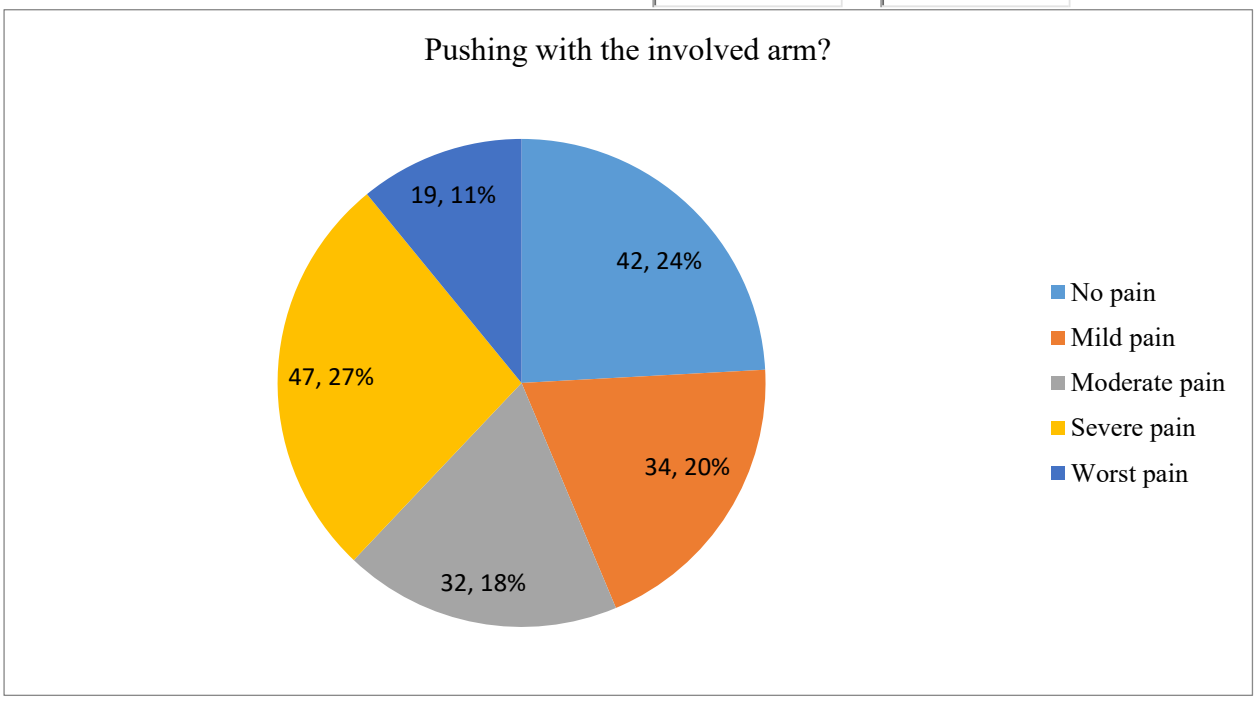

Figure 4.5: This fig demonstrates that 42 (24.1%) had no pain, 34 (19.5%) had mild pain, 32 (18.4%) had moderate pain, 47 (27.0%) had severe pain and 19 (10.9%) had worse pain.

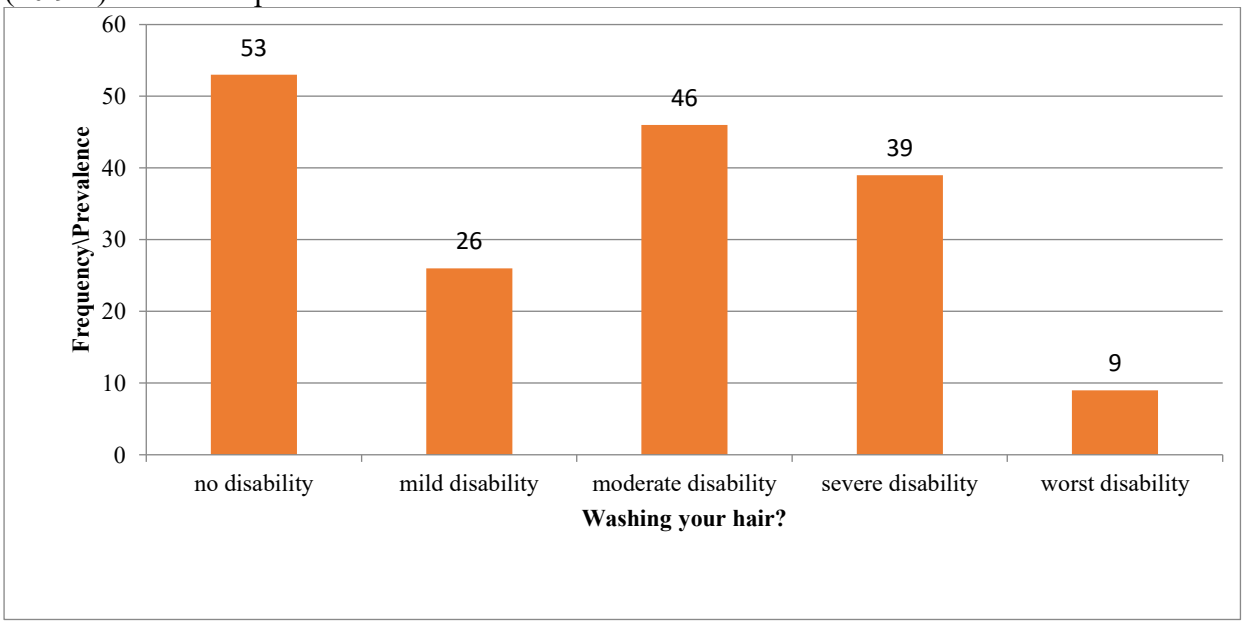

Figure 4.6: Fig shows that 53(30.5%) had no disability, 26(14.9%) had mild disability, 46(26.4%) had moderate disability, 39(22.4%) had severe disability and 9(5.2%) had worst disability.

	Frequency	Percent	Valid Percent	Cumulative Percent
no disability	42	24.1	24.1	24.1
mild disability	29	16.7	16.7	40.8

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moderate disability	34	19.5	19.5	60.3
severe disability	48	27.6	27.6	87.9
worst disability	21	12.1	12.1	100.0
Total	174	100.0	100.0	

Table 4.5: Illustrates that 42(24.1%) had no disability, 29(16.7%) had mild disability, 34(19.5%) had moderate disability, 48(27.6%) had severe disability and 21(12.1%) had worst disability.

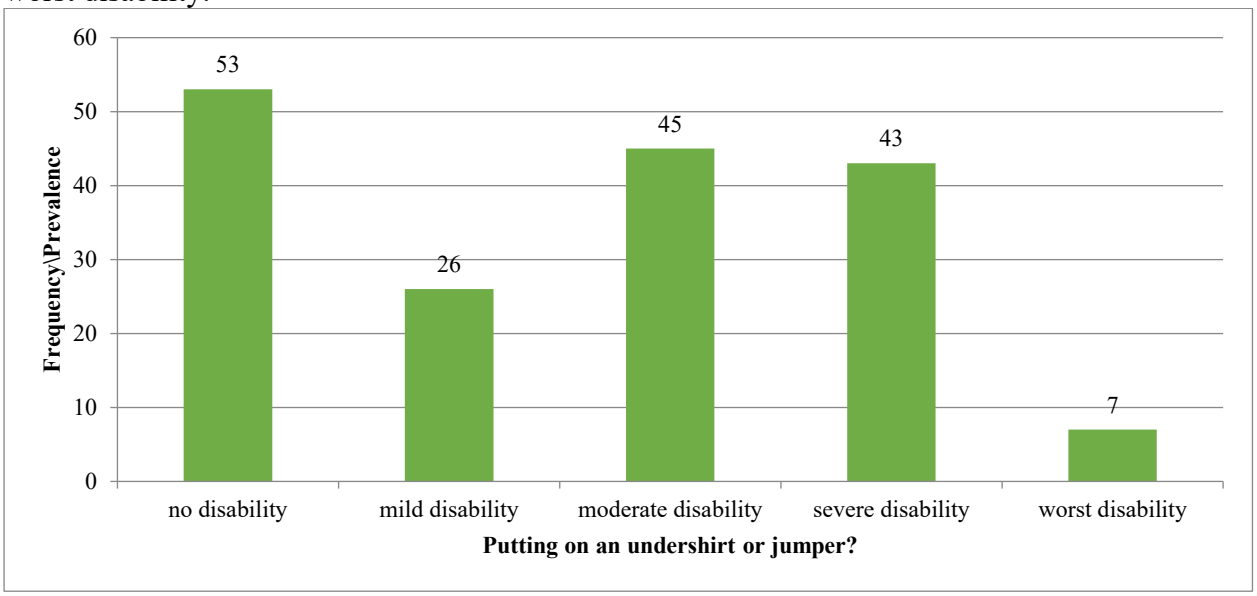

Figure 4.7: Demonstrates that 53(30.5%) had no disability, 26(14.9%) had mild disability, 45(25.9%) had moderate disability, 43(24.7%) had severe disability and 7(4%) had worst disability.

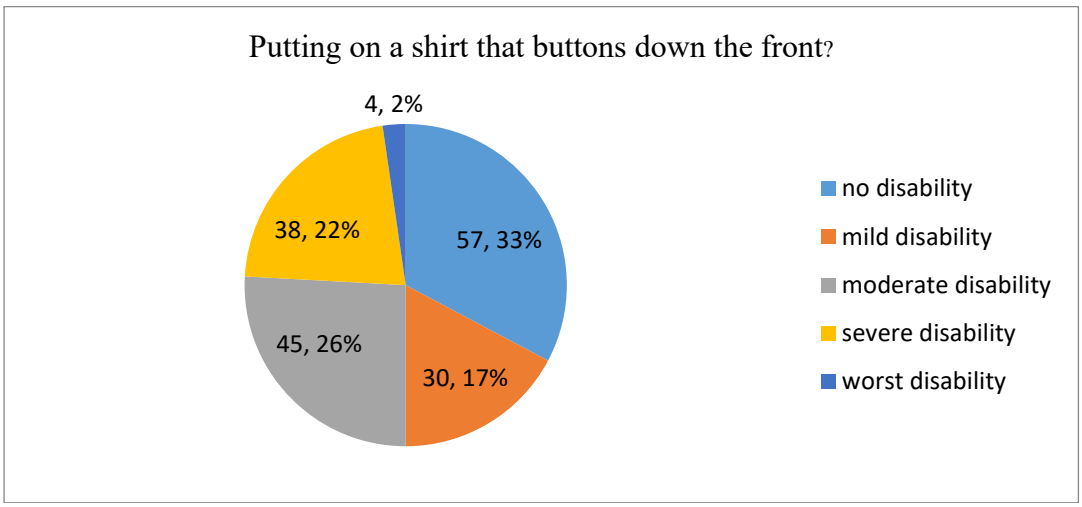

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Figure 4.8: Shows that 57(32.8%) had no disability, 30(17.2%) had mild disability, 45(25.9%) had moderate disability, 38(21.8%) had severe disability and 4(2.3%) had worst disability.

	Frequency	Percent	Valid Percent	Cumulative Percent
no disability	56	32.2	32.2	32.2
mild disability	33	19.0	19.0	51.1
moderate disability	42	24.1	24.1	75.3
severe disability	37	21.3	21.3	96.6
worst disability	6	3.4	3.4	100.0
Total	174	100.0	100.0	

Table 4.6: Illustrates that 56(32.2%) had no disability, 33(19.0%) had mild disability, 42(24.1%) had moderate disability, 37(21.3%) had severe disability and 6(3.4%) had worst disability.

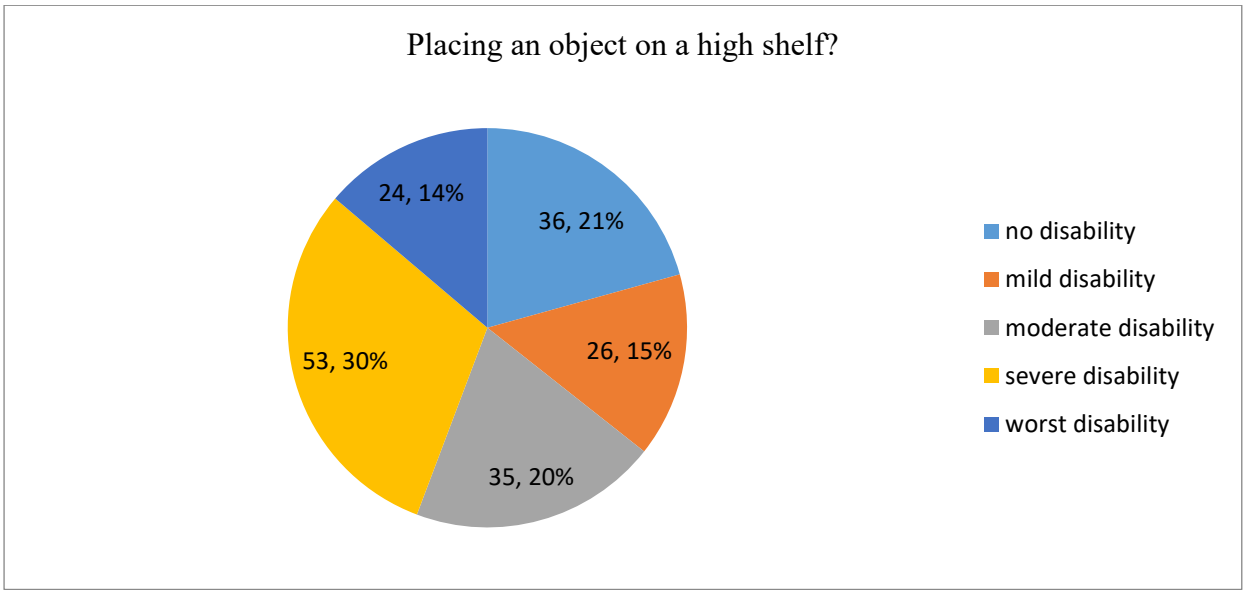

Figure 4.9: Demonstrates that there were 36(20.7%) had no disability, 26(14.9%) had mild disability, 35(20.1%) had moderate disability, 53(30.5%) had severe disability and 24(13.8%) had worst disability.

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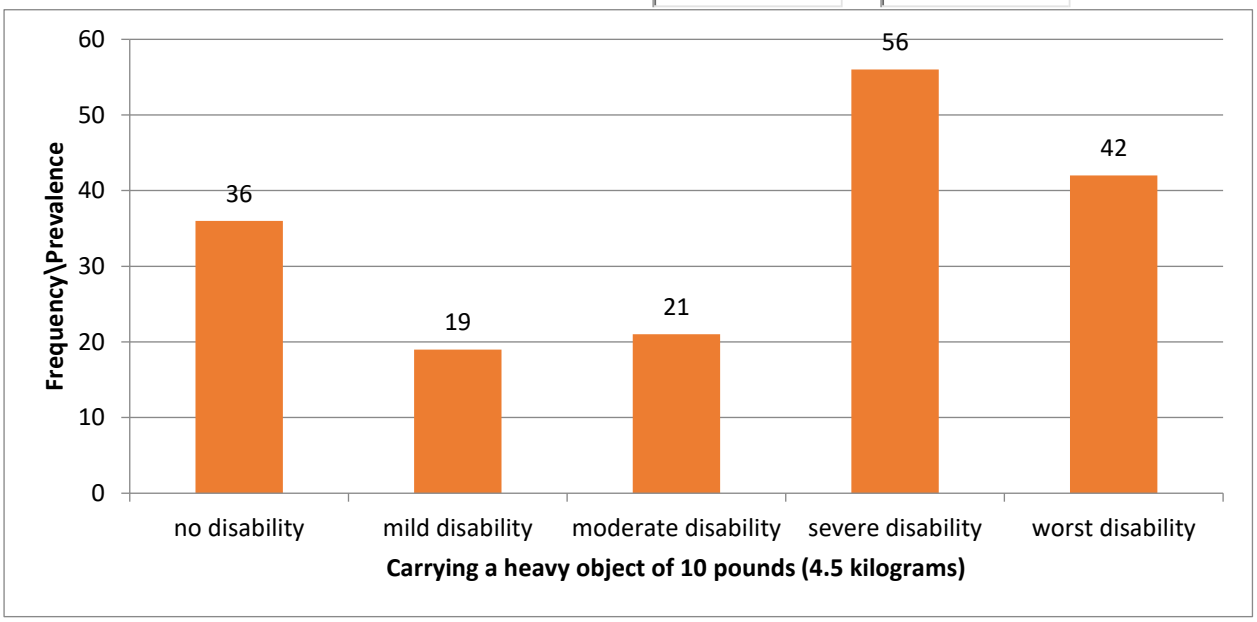

Figure 4.10: Carrying a heavy object of 10 pounds (4.5 kilograms) Shows that 36(20.7%) had no disability, 19(10.9%) had mild disability, 21(12.1%) had moderate disability, 56(32.2%) had severe disability and 42(24.1%) had worst disability

Table 4.7: Removing something from your back pocket?

	Frequency	Percent	Valid Percent	Cumulative Percent
no disability	50	28.7	28.7	28.7
mild disability	21	12.1	12.1	40.8
moderate disability	43	24.7	24.7	65.5
severe disability	50	28.7	28.7	94.3
worst disability	10	5.7	5.7	100.0
Total	174	100.0	100.0	

Table 4.7: Illustrates that 50(28.7%) had no disability, 21(12.1%) had mild disability, 43(24.7%) had moderate disability, 50(28.7%) had severe disability and 10(5.7%) had worst disability.

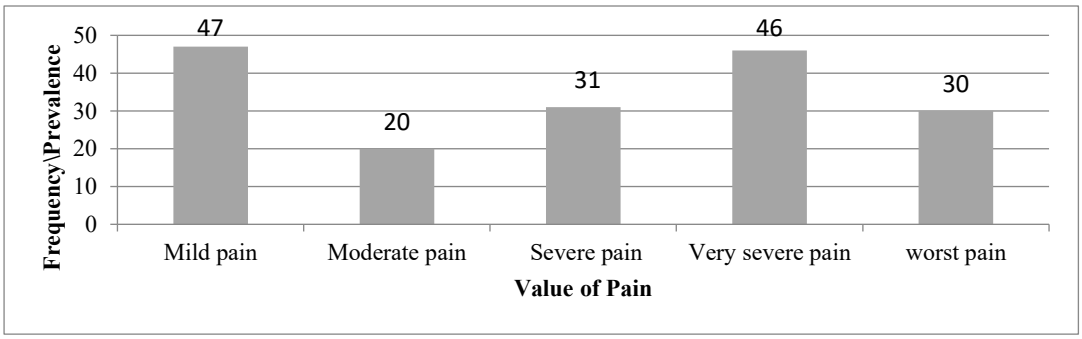

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Figure 4.11: Value of Pain demonstrates that 47 (27.0%) had mild pain, 20 (11.5%) had moderate pain, 31 (17.8%) had severe pain, 46 (26.4%) had very severe pain and 30 (17.2%) had worse pain.

	Range	Frequency	Percent	Valid Percent	Cumulative Percent
Mild disability	0-20	62	35.6	35.6	35.6
Moderate disability	21-40	27	15.5	15.5	51.1
Severe disability	41-60	52	29.9	29.9	81.0
Worst disability	61-80	33	19.0	19.0	100.0
Total		174	100.0	100.0	

Table 4.8: illustrates that 62 (35.6%) had mild disability, 27 (15.5%) had moderate disability, 52 (29.9%) had severe disability, 33 (29.9%) had worst disability.

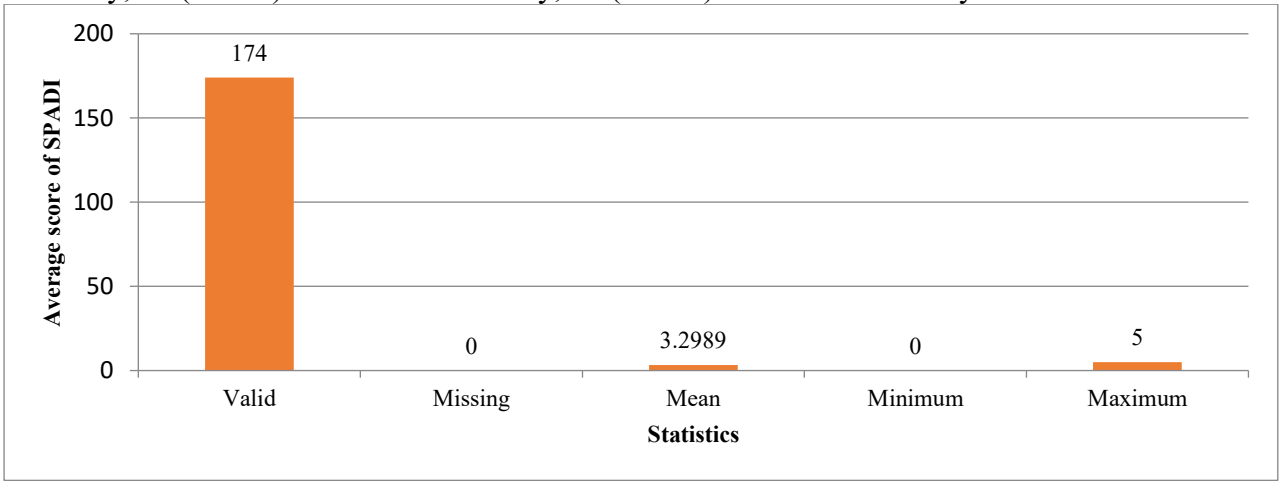

Figure 4.12: shows that the average score of SPADI was 3.2989 with minimum value of 0 and maximum value of 5.

	Range	Frequency	Percent	Valid Percent	Cumulative Percent
No pain and disability	0	1	.6	.6	.6
Mild pain and disability	0-20	44	25.3	25.3	25.9
Moderate pain and disability	21-40	18	10.3	10.3	36.2
Severe pain and disability	41-60	16	9.2	9.2	45.4
Very severe pain and disability	61-80	29	16.7	16.7	62.1
Extreme pain and severe disability	81-100	66	37.9	37.9	100.0
Total		174	100.0	100.0	

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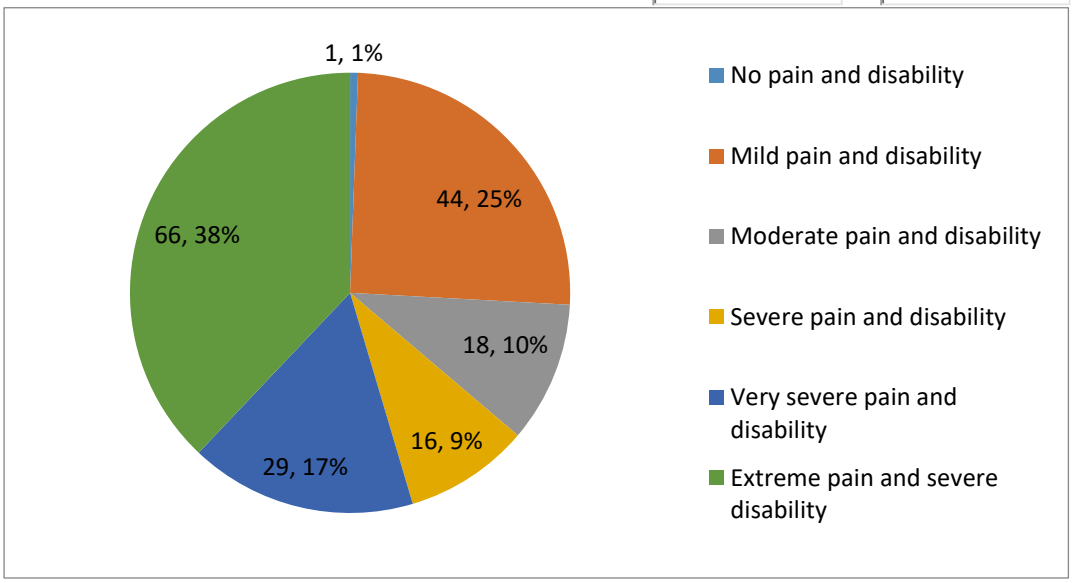

Figure 4.13: 1 (1%) had no pain and disability, 44 (25%) had mild pain and disability, 18 (10%) had moderate pain and disability, 16 (9%) had severe pain and disability, 29 (17%) had very severe pain and disability and 66 (38%) had extreme pain and disability.

DISCUSSION

This study examined the prevalence of shoulder pain and disability in individuals with diabetes mellitus in Lahore, enrolling 174 participants. The results demonstrated that shoulder pain occurred more frequently than disability in this population. Specifically, 1% of participants reported no pain or disability, 25% experienced mild pain and mild disability, 10% had moderate pain and disability, 9% reported severe pain and disability, 17% presented with very severe pain and disability, and 38% suffered from extreme pain accompanied by severe disability. When compared to the findings of Muhammad Nazim Farooq et al., who conducted a cross-sectional survey involving 328 diabetic patients, our prevalence rates differ. In their cohort, 281 participants (85.7%) were affected by both pain and disability, with a mean SPADI score of 40.28 (Pandey & Madi, 2021). Our work, also a cross-sectional observational, focused on diabetic patients aged over 40 years and similarly identified pain as more prevalent than disability. Importantly, our results highlighted that 38% of participants experienced extreme pain with severe disability. The outcomes are also comparable to those of Mohammad Moin Uddin et al., who carried out a prospective comparative study between diabetic and non-diabetic individuals. In their research, 71.4% of 140 individuals reporting shoulder pain and disability were diagnosed with adhesive capsulitis. Among the 40 patients with adhesive capsulitis, 65% were male and 35% female; 42.5% were diabetic, 5% had impaired glucose tolerance, and 52.5% were non-diabetic. The mean SPADI scores for diabetic and non-diabetic groups were 51 ± 15.5 and 57 ± 16, respectively, with no statistically significant difference in pain and disability between the two groups (Petersmann et al., 2019). To determine the extent of shoulder involvement among diabetic individuals, our analysis revealed that 1% reported no symptoms, 25% had mild pain and disability, 10% had moderate pain and disability, 9% had severe pain and disability, 27% had very severe pain and disability, and 38% reported extreme pain with severe disability. Our data share similarities with those of Iqra Yaseen et al., who performed a cross-sectional study in Karachi, Pakistan,

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to investigate frozen shoulder in diabetic patients. Out of 190 participants, 60.52% reported shoulder pain, which was more common among females; 54.78% of these cases were diagnosed as frozen shoulder (Rai et al., 2019). In another study, Clevio Desouza et al. assessed 300 patients with type 2 diabetes mellitus using the UCLA-m scale. They reported that 63.4% experienced shoulder pain and 53.4% had shoulder dysfunction, with higher prevalence observed among elderly and female participants (Sandhiya et al., 2023).

Our observations are also consistent with the work of Faisal Inayat et al., who explored the prevalence and etiology of frozen shoulder in diabetic patients in Lahore. Their study, involving 80 diabetic participants (42 women, 38 men), identified frozen shoulder in 33 individuals, corresponding to a prevalence of 41.3% (Sana'a et al., 2019). Overall, the findings of the current study emphasize that shoulder pain and disability are frequent complications in diabetic patients, with pain being more prominent. The substantial proportion of patients experiencing extreme pain with severe disability underscores the importance of early screening, preventive strategies, and tailored rehabilitation programs to reduce long-term functional impairment in this group.

CONCLUSION

The findings of this study demonstrate that shoulder pain is a frequent complaint among female patients with diabetes, with a substantial proportion experiencing extreme pain accompanied by severe disability. These results highlight shoulder pain as a common and impactful complication in the diabetic population. However, certain limitations should be acknowledged. The relatively small sample size limits the generalizability of the findings to all individuals with diabetes. Additionally, constraints related to time and funding posed challenges to the scope and depth of this research. To improve patient outcomes, individuals with diabetes should be counseled on the role of regular exercise in alleviating shoulder pain and disability. Adopting a balanced diet, maintaining a healthy body weight, and adhering to prescribed medications are essential components of management. Given the notable prevalence observed, further large-scale, multicenter research is recommended to better understand the underlying mechanisms, risk factors, and effective interventions for shoulder pain in diabetic populations.

PATIENT CONSENT

A filled consent form was taken before the induction of each participants in this study.

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REFERENCES

Ahmad, Q., Yaseen, I., Sattar, R., Abbas, U., & Nawaz, U. (2020). Prevalence of frozen shoulder among patients with diabetes: a single center experience from Karachi, Pakistan. *Rawal Medical Journal*, *45*(4), 838-841.

Ajit, O. M., & Oak, B. (2023). Prevalence of shoulder pain in people with uncontrolled diabetes in the western part of India: A cross-sectional study. Endocrine Abstracts,

Online ISSN 3007-2387

Print ISSN 3007-2379

Alabdali, L. A. S., Jaeken, J., Dinant, G.-J., van den Akker, M., Winkens, B., & Ottenheijm, R. P. (2021). Prevalence of upper extremity musculoskeletal disorders in patients with type 2 diabetes in general practice. *Medicines*, *8*(2), 8.

Albaker, A. B., Mishiming, O. S., Alharbi, D. M., Mazyad, M., Alenazi, S. A. A., Alqarni, A. O., Albaqami, F. M., Alsulaiman, S. A., & Alzahrani, K. (2023). Prevalence of frozen shoulder among diabetic patients in Western region of Saudi Arabia. *Medical Science*, *27*, e127ms2903.

Aldossari, K. K., Shubair, M. M., Al-Zahrani, J., Alduraywish, A. A., AlAhmary, K., Bahkali, S., Aloudah, S. M., Almustanyir, S., Al-Rizqi, L., & El-Zahaby, S. A. (2020). Association between Chronic Pain and Diabetes/Prediabetes: A Population-Based Cross-Sectional Survey in Saudi Arabia. *Pain Research and Management*, *2020*(1), 8239474.

Aljethaily, A., Alshuwayrikh, A., Alkhonezan, S., Alasmari, A., Almakdob, M., Albogami, A., Aloriney, A., Ahmed, I., & Alzahrani, B. (2020). The Prevalence of Shoulder Pain and Its Functional Limitations Among Patients With Uncontrolled Diabetes. *Cureus*, *12*(11).

Asamoah-Boaheng, M., Sarfo-Kantanka, O., Tuffour, A. B., Eghan, B., & Mbanya, J. C. (2019). Prevalence and risk factors for diabetes mellitus among adults in Ghana: a systematic review and meta-analysis. *International health*, *11*(2), 83-92.

Bhawna[1], N., & Kundu, Z. S. (2016). Prevalence of shoulder pain among adults in Northern India. *Asian Journal of Health and Medical Research (AJHMR) Volume*, *2*, 18-22.

Bhise, S., Nandanwar, A. Y., Borkar, S., Nawdikar, G., Kulthe, S., & Patil, S. To Study Prevalence of Diabetes Mellitus in Adhesive Capsulitis of the Shoulder-A Cross-sectional Study in a Tertiary Care Center.

Dyer, B. P., Burton, C., Rathod-Mistry, T., Blagojevic-Bucknall, M., & van der Windt, D. A. (2021). Diabetes as a prognostic factor in frozen shoulder: a systematic review. *Archives of rehabilitation research and clinical translation*, *3*(3), 100141.

Farooq, M. N., Mehmood, A., Amjad, F., & Syed, J. (2021). Shoulder pain and functional disability in type 1 diabetic patients: A cross-sectional survey. *Pakistan Journal of Medical Sciences*, *37*(4), 1211.

Garcilazo, C., A Cavallasca, J., & L Musuruana, J. (2010). Shoulder manifestations of diabetes mellitus. *Current Diabetes Reviews*, *6*(5), 334-340.

Hsu, C. L., & Sheu, W. H. H. (2016). Diabetes and shoulder disorders. *Journal of diabetes investigation*, *7*(5), 649.

Inayat, F., Ali, N. S., Shahid, H., & Younus, F. (2017). Prevalence and determinants of frozen shoulder in patients with diabetes: a single center experience from Pakistan. *Cureus*, *9*(8).

Juel, N. G., Brox, J. I., Brunborg, C., Holte, K. B., & Berg, T. J. (2017). Very high prevalence of frozen shoulder in patients with type 1 diabetes of≥ 45 years' duration: the dialong shoulder study. *Archives of physical medicine and rehabilitation*, *98*(8), 1551-1559.

Kabbabe, B., Ramkumar, S., & Richardson, M. (2010). Cytogenetic analysis of the pathology of frozen shoulder. *International journal of shoulder surgery*, *4*(3), 75.