Faculty of Medicine

University of Dhaka

PREVALENCE OF SHOULDER PAIN WITH FUNCTIONAL DISABILITY AMONG DIABETES MELLITUS PATIENTS IN BANGLADESH

By

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Master of Science in Physiotherapy

Session: 2013-2014

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, **"Prevalence of shoulder pain with functional disability among diabetes mellitus patients in Bangladesh''**, submitted by Abu Naim Mohammad Bazlur Rahim, for the partial fulfillment of the requirements for the degree of Master of Science in Physiotherapy.

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Declaration Form

- This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidate for any degree

- This dissertation is being submitted in partial fulfillment of the requirements for the degree of M.Sc. in Physiotherapy.

- This dissertation is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by giving explicit references. A Bibliography is appended.

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Date:…………………………………………………………………………...

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Contents

Abbreviations

BHPI   :   Bangladesh Health Professions Institute

CRP   :   Center for the Rehabilitation of the Paralysed

BMRC   :   Bangladesh Medical Research Council

WHO   :   World Health Organization

IRB   :   Institutional Review Board

DM   :   Diabetes Mellitus

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Abstract

Purpose: The purpose of this study was, to assess the prevalence of Prevalence of Shoulder Pain with Functional Disability among Diabetes Mellitus Patients in Bangladesh. *Objectives:* To explore the socio demographic characteristics of diabetic patient, to assess the association between shoulder pain and diabetes mellitus, to identify the number of diabetic patient suffering from shoulder pain, to determine the common treatment option, to understand the severity of pain, to explore the functional disabilities due to shoulder pain. *Methodology*: A quantitative cross sectional research model in the form of a prospective type survey design is carried out in this study. Conveniently 212 participants among the patients with Diabetes Mellitus were collected from BIRDEM General Hospital and Tangail Diabetic Hospital, Bangladesh. The instruments used included direct interview, a standard questionnaire and shoulder pain and disability index (SPADI). Data were numerically coded and captured in Excel, using an SPSS 20.0 version program. *Result*: The findings of the study provide a baseline of information about prevalence of Shoulder pain among the patients with Diabetes Mellitus. In this study, 72.6% (n=154) respondents were female and rests of 27.4% (n=58) were male. The mean age of the participant was 42.44 years. Study found that majority cases 75.9% (n=161) participants were suffering Type-2 diabetes mellitus whereas 24.1% (n=51) respondents were suffering Type-1 diabetes. Most of 60.4% (n=128) participants were living at urban area followed by 39.6% (n=84) participants were living at rural area. Study focuses 25.5% (n=54) diabetes patients were suffering shoulder pain. Among them, 22.2% (n=12) diabetes patients were feeling disability due to pain.

Keywords: Shoulder Pain, Diabetes Mellitus, Prevalence, Functional Disability.

CHAPTER-I: **INTRODUCTION**

1.1 Background Information

Insulin, a hormone that is produced by the pancreas which controls the blood glucose levels. Due to the malfunctioning of this hormone in any aspect that is, either in its production or its action or both, leads to high blood glucose levels. The inability of insulin to control the blood glucose level leads to a situation known as "Diabetes Mellitus" or hyperglycaemia, which is a group of metabolic diseases (Aydeniz, et al., 2008).

It is a chronic condition of high morbidity and mortality. For DM, according to American Diabetes Association classification system, there are four basic types of DM that is, "Type I DM", "Type II DM", "Gestational Diabetes Mellitus"(GDM) and "other specific types". These terms emphasize on the management and treatment of DM rather than the cause of the disease. Among these types, Type 1 DM and Type 2 DM are the most common and usually seen. In Type 1 DM, the absence of insulin leads to poor metabolism of protein, fat and carbohydrate. Type 2 DM represents approximately 90% of all cases. These patients have insufficient amount of insulin production or the amount is not balanced for their level of glycaemia with primary defect in insulin resistance (Wyatt, et al., 2006).

People with diabetes mellitus is increasing due to population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030 (Wild, et al., 2004). Globally type 1 diabetes mellitus and type 2 diabetes mellitus account for 5-10% and 90-95% of all cases respectively (American

Diabetic Association, 2009). According to International Diabetes Federation there are 7.1 million people with diabetes mellitus in Bangladesh in 2015.

Diabetes mellitus affect connective tissues in many ways and causes different alterations in periarticular and skeletal systems (Douloumpakash et al., 2007). It can cause chronic damage which is unalterable and progressive affecting various organs and systems of the body. Although the precise cause of diabetes related to musculoskeletal (MSK) disorders and complications remains uncertain, there is confirmation that hyperglycemia alters the structural matrix and mechanical properties of tissues by accelerating non-enzymatic glycosylation and abnormal collagen deposition in periarticular connective tissues leading to diffuse arthrofibrosis (Aydeniz, et al., 2008). It may alter or modify the presentation, severity and pathophysiology of many musculoskeletal syndromes. Common therapies, treatments and management may differ in their effects and actions for patients with other diseases as compared to diabetic patients. Diabetes mellitus affects the musculoskeletal system of the human body, as a result, various musculoskeletal complication are seen affecting the limbs, feet and spine as a whole. Musculoskeletal complaints (MSCs) are among the major health problems worldwide and the most frequent cause of long-term sickness. Increased mortality has been reported among individuals with chronic widespread MSCs, which further emphasizes that this group of patients may constitute an important public health problem. A survey was done which showed that DM was associated with higher prevalence of chronic MSCs (Hoff & Ole, 2008).

Diabetes mellitus (DM), a worldwide high prevalence disease, is associated with a large variety of rheumatic manifestations. It acts as a base for many musculoskeletal disorders and complications, causing pain, disease or even disability which later on

affects and disturbs the quality of life of an individual. If it is left untouched than the awful part is the fact it acts as a food to many rheumatic conditions and associated circumstances which becomes the major cause of crippling deformities and other disabilities for many diabetic patients. But if it is correctly diagnosed it is usually controllable by the particular handling and management given by a multidisciplinary team work (Ahmad, et al., 2012).

The selected disorders are: burning of feet and numbness of feet, delayed wound healing, Callosities formation, pressure ulcers and incidence of fracture. Other musculoskeletal problems occur with increased frequency in diabetic patients, including Dupuytren's disease, carpal tunnel syndrome, adhesive capsulitis of the shoulder, tendinitis, synovitis, osteoarthritis involving both, upper and lower extremities, rheumatoid arthritis, fibromyalgia and Systemic Lupus Erythematosus (Barki, et al., 2013).

Browne et al. (2001) reviewed commonly seen musculoskeletal disorders within the diabetic population and found the following trends:

Shoulder adhesive capsulitis: defined as shoulder pain with decreased range of movement, occurring in up to 30% of patients with diabetes, compared with 2.5% of non-diabetic population. More commonly bilateral in Diabetes patients.

Shoulder hand syndrome: adhesive capsulitis, painful, swollen, tender hands associated with vasomotor and skin changes and 7.4% of patients with Shoulder hand syndrome had diabetes.

Cheiroarthropathy: skin is thickened and tight, patients may exhibit the 'prayer sign' due to flexor tendon contracture. Cheiroarthropathy is more known for its associations rather than its symptoms, with proliferative retinopathy and neuropathy.

Dupuytren's disease: focal flexor contracture and thickened palmar fascia.

Carpal Tunnel Syndrome: Fibrosis of flexor retinaculum of wrist, along with neural ischemia in diabetes. Corticosteriod injection is less helpful in diabetes as the aetiology is usually non inflammatory, and this treatment can prolong hyperglycemia.

Hyperostosis: Due to the anabolic effects of insulin on bone, vertebral hyperostosis which mirrors ankylosing spondylitis causes ossification of the vertebral ligaments.

Gout, and arthritis: Hyperuricemia is associated with insulin resistance even prior to the development of diabetes, along with diuretics which predispose to gout.

In 2004, the National Health Interview Survey determined that 58% of diabetic patients would have functional disability. Recent data show that the prevalence of MSK manifestations in the hands and shoulder in patients with type 1 or type 2 diabetes is 30%. Statistics show increase burden of MSK diseases in diabetic patients such as degenerative joint diseases were more common (53.2%) than inflammatory arthropathies (20.1%). These manifestations, which are some of the causes of chronic disability, involve not only joints, but bones and the soft tissues as well. These manifestations are closely linked to age, prolonged disease duration and vascular complications in the form of retinopathy (Ahmad et al., 2012). The percentages of diabetic patients with functional disability are increasing day by day as the number of diabetic patients are increasing, and hence a major public health problem can create.

A physical therapist is specially trained to decide the best option available for individual diabetic patients and some of the benefits that can be observed are Improve glucose levels, drop off use of oral hypoglycemic agents, reduce body fat and stress, and improve functioning of the circulatory system. There is a definite improvement in balance and ultimately decrease risk of fall. (Barki, et al., 2013).

Physical therapy can be the mainstay treatment for diabetics suffering from musculoskeletal problems. Results from a study conducted by Hooper (1999) showed

patients with diabetes mellitus can get benefit through pure immersion in a heated pool at 37 to 40 degree, reduction in medication, weight and a good glycemic control were some of the benefits that were observed. Physical therapy manages the pain caused by the rheumatic manifestations and associated problems, it can also treat these musculoskeletal tribulations and at the same time works on the postural correction, stretching and strengthening of weak and shortened muscles in order to prevent the resulting deformities and disabilities so as to improve the different activities of daily living of diabetic patients making them independent and improving their quality of life. Most previous studies related to the association between diabetes and musculoskeletal syndrome have not included a control group or differentiated between type 1 and type 2 diabetes or included only a single musculoskeletal syndrome (Fasika, et al, 2013).

However musculoskeletal complications also contribute to the loss in quality of life of Type 2 DM patients. The occurrence of pain in the shoulder and adhesive capsulitis in Type 2 DM are described in greater proportion than in the general population. The shoulder is a complex joint whose performance is crucial for upper limb function and personal autonomy. Shoulder pain is a common musculoskeletal condition with a tendency to become chronic. In diabetes, shoulder problems have been described as the most disabling manifestation of musculoskeletal disorders. Its mechanism has not been well elucidated. Despite the lack of studies, it is known that persistently high levels of glucose leads to accumulation of advanced glycosylation end-products (AGEs), which form cross-links with collagen (Maillard reaction), making it inelastic and more prone to degenerative processes. Human collagen undergoes progressive changes with age that are characterized by changes in color (yellowing), insolubilization and resistance to digestion by proteolytic enzymes. These age-related

changes are accelerated in diabetes. It is estimated that a patient with diabetes has at least twice the amount of this type of collagen than the non-diabetic population of similar age. The understanding of the association between DM and this type of joint involvement is important for improving the quality of life of these patients. (Czelusniak, et at., 2012).

Significant shoulder pain and disability can affect activities of daily living. Reduced mobility and pain in shoulder joint may decrease diabetic patient's ability to perform activities crucial for independent living (Graf, 2008).

There are few self-completed, non-disease-specific shoulder questionnaires available to evaluate shoulder joint functions. These are the Shoulder Pain and Disability Index (SPADI), Simple Shoulder Test (SST), United Kingdom Shoulder Disability Questionnaire (SDQ-UK), American Shoulder and Elbow Surgeon's Shoulder Assessment Form (M-ASES), Oxford Shoulder Score (OSC), Subjective Shoulder Rating System (SSRS), Shoulder Rating Questionnaire (SRQ), and Dutch Shoulder Disability Questionnaire (SDQ-NL) (Paul et al., 2004). The Shoulder Pain and Disability Index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional activities. The pain dimension consists of five questions regarding the severity of an individual's pain. Functional activities are assessed with eight questions designed to measure the degree of difficulty an individual has with various activities of daily living that require upper-extremity use (Roach, et al., 1991).

1.2 Justification of the study

Diabetes mellitus exerts serious health problems both in developed and developing countries. The prevention and control of diabetes in developing countries deserve urgent attention since the disease is expected to double in these countries in the next 20 to 25 years. The problem of diabetes mellitus in Bangladesh is also increasing day by day as like as whole world. Diabetic patients often suffer with many types of musculoskeletal problem like as shoulder pain, frozen shoulder, hand syndrome, back pain, neck pain, osteoarthritis, elbow pain, epicondylitis, carpal tunnel syndrome, Dequerven tenosynovities, leg and foot pain, amyotrophy etc (Douloumpaks, et al., 2007). But they are not aware about these problems. In Bangladesh this problem is more severe. This study aims to address these problems and design physiotherapy intervention for this diabetic patient with musculoskeletal problem. The shoulder problems associated with diabetes may go unrecognized or simply be overlooked in daily clinical practice. However, many of these shoulder complications are treatable, with resultant improvements in quality of life and more independence in activities of daily living (Kim, et al., 2001). This study also will be helpful in making physiotherapist to aware about the musculoskeletal problem of diabetic patient. It will assist to make current physiotherapy practice more holistic and effective for the diabetic patient with musculoskeletal problem in Bangladesh. This study might give a clear reflection of the prevalence of musculoskeletal problem arises among the patient with diabetes. Physiotherapy plays a vital role in the management of diabetic patient. So it will also be helpful for physiotherapist in working in this area for delivering treatment service. This study will also be helpful for different organizations working in this area for including physiotherapy service in their program for delivering a comprehensive treatment service. As a result patients would be more benefited.

1.3 research Question

What is the prevalence of shoulder pain with functional disabilities among the diabetic patients in Bangladesh?

1.4 Study Objectives

General objective

- To explore the shoulder pain and functional disabilities among the subjects suffering with diabetes mellitus.

Specific objectives

- To explore the socio demographic characteristics of diabetic patient.

- To assess the association between shoulder pain and diabetes mellitus.

- To identify the number of diabetic patient suffering from shoulder pain.

- To determine the common treatment option.

- To understand the severity of pain.

- To explore the functional disabilities due to shoulder pain

1.5 List of variables

Independent Variables

- Socio demographic factors

- Types of Treatment

- Family history of patient

- Functional disabilities

- Diabetes mellitus

Dependent Variables

- Shoulder pain

1.6 Operational Definition

Diabetes mellitus

Diabetes is a chronic disease, when the pancreas does not produce enough insulin then it occurs, or when the body cannot use the insulin effectively then it produces. This leads to an increased concentration of blood glucose (WHO, 2016). Diabetes is a common, chronic condition that is associated with poor quality of life and is leading underlying cause of death (Laslett et al., 2007). Diabetes Mellitus is characterized by chronic hyperglycemia with disturbances of carbohydrate, fat and protein metabolism resulting from defects in insulin secretion, insulin action, or both.

Functional Disability

According to World Health Organisation (WHO), A functional concept of disability, defines a disability as any long-term limitation in activity resulting from a condition or health problem.

Shoulder Pain

Shoulder pain includes any pain that arises in or around the shoulder. Shoulder pain may originate in the joint itself, or from any of the many surrounding muscles, ligaments or tendons. Shoulder pain usually worsens with activities or movement of the arm or shoulder.

Shoulder pain and disability index

The Shoulder Pain and Disability Index (SPADI) was developed by Williams et al. (1995) to measure current shoulder pain and disability. The SPADI contains 13 items

that assess two domains; a 5-item subscale that measures pain and an 8-item subscale that measures disability.

CHAPTER-II :	LITERATURE REVIEW

Wild et al., (2004) demonstrated a study to estimate the prevalence of diabetes and the number of people of all ages with diabetes for years 2000 and 2030. Data on diabetes prevalence by age and sex from a limited number of countries were anticipated to all 191 World Health Organization member states and applied to United Nation's population estimates for 2000 and 2030. For developing countries urban and rural populations were considered separately. He stated that the number of people with diabetes in the world is expected to approximately double between 2000 and 2030, based only upon demographic changes (assuming age specific prevalence remains constant). The greatest relative increases will occur in the Middle Eastern Crescent, sub-Saharan Africa and India. The greatest absolute increase in the number of people with diabetes will be in India. Most of the expected population growth between 2000 and 2030 will be concentrated in the urban areas of the world.

Douloumpakas et al. (2007) conducted a pilot study including 208 consecutively selected patients with type 2 diabetes mellitus regularly followed-up at the Diabetes Center of the Hippokration University Hospital. Among the diabetic patients who were screened according to the Short Musculoskeletal Function Assessment Questionnaire for musculoskeletal symptoms and findings, 82.6% were found to exhibit musculoskeletal abnormalities, mainly of the degenerative, non-inflammatory type. He concluded that musculoskeletal disorders are a common finding among patients with type 2 diabetes. Obesity and accumulation of abnormally glycosylated by products have been proposed as potential pathogenetic mediators of these connective tissue abnormalities.

Cagliero et al. (2002) conducted a study in 100 patients with type 1 diabetes and 100 patients with type 2 diabetes, as well as in 100 control patients. Patients were asked to complete a short written questionnaire about their medical, surgical, and orthopedic history, and were examined in a standard fashion by the same investigator. The physical examination focused on hand and shoulder abnormalities. The results have shown that 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% of the diabetic patients and none of the control patients ($P<0.01$), Dupuytren's disease in 16% of diabetic and 3% of control patients ($P<0.01$), and flexor tenosynovitis in 12% of diabetic and 2% of control patients ($P<0.04$), while carpal tunnel syndrome occurred in 12% of diabetic patients and 8% of control patients ($P<0.29$). He stated that musculoskeletal diseases are present in 40% of diabetic patients. He further recommended that examination of the hands and shoulders should be included in the evaluation of patients with diabetes.

Aydeniz et al. (2008) conducted a study to investigate the prevalence of the most frequently occurring hand and shoulder complications in type 2 diabetes mellitus patients. He found the presence of cheiroarthropathy, frozen shoulder, Dupuytren's contracture and trigger finger in 102 type 2 diabetes mellitus patients and 101 ages and sex matched non-diabetic controls. Cheiroarthropathy, frozen shoulder and Dupuytren's contracture were significantly more prevalent in the diabetic group than in the control group. Females were slightly more affected with frozen shoulder than males and advanced cases (stage 2) of cheiroarthropathy occurred more frequently in females. Duration of diabetes was related to an increased risk of cheiroarthropathy.

Sarkar et al. (2008) conducted a study undertaken in the department of medicine from November 2003 to July 2005 with a view to find out the prevalence of different

rheumatological problem in Indian diabetic population. Although several such studies have been conducted in western population. A total of 80 patients were studied out of which 43 had some form of rheumatological manifestations. Dupuytren's contracture was found in highest number of cases (n=23) followed by limited joint mobility in 16 patients; adhesive capsulitis in 19 patients; trigger finger in 4 patients, aglodystrophy, carpal tunnel syndrome and hyperostosis were found in 2, 3 and 2 cases respectively. Symptomatic osteo-arthritis was found in 19 cases.

Arkkila et al. (1996) conducted a cross sectional study with 291 type 1 and 134 type 2 diabetic patients. He found the prevalence of shoulder capsulitis 10.3% in type 1 and 22.4% in type 2 diabetic subjects. Shoulder capsulitis was associated with the age in types 1 ($P < 0.01$) and 2 ($P < 0.05$) diabetic patients and with the duration of diabetes in type 1 patients ($P < 0.01$). He further said that it is more important to know the effect of control of diabetes during the first years of disease on development of shoulder capsulitis. This study shows that shoulder capsulitis is a common disorder in type I and II diabetic patients. It is associated with age in type I and II diabetic patients and with the duration of diabetes in type I patients, which explains most of its correlations with diabetic complications.

According to Abate et al. (2013) frozen shoulder, rotator cuff tears, cheiroarthropathy, and Dupuytren's contracture involve joints, tendons, and ligament diseases, which are strictly related to a diabetic condition. As a consequence, joint mobility is reduced, with functional limitation, leading to impaired ability to perform the daily living activities of a person. These diseases are involved with complex pathogenetic mechanisms. Diabetes is a concomitant factor in terms of promoting and aggravating anatomic and functional damage, mainly due to increased formation of AGEs. Overweight and advanced ages are frequently associated with type 2 diabetes, which

further increases the risk for these. Elderly people are a growing segment of the population in western countries, and non-insulin-dependent type 2 diabetes mellitus is an age-related disease. Therefore, limited joint motion must be regarded as a fundamental public health problem. Some joint diseases, especially cheiroarthropathy, are often precursors of chronic diabetic complications.

Laslett et al. (2008) said that a number of factors are associated with shoulder pain and shoulder symptoms in patients with diabetes. They did a cross-sectional study with follow-up after 6 and 12 months. After 12 months of follow-up, one-quarter of participants without pre-existing symptoms at baseline developed clinically significant pain (28%) or disability (25%). Of the patients with pre-existing shoulder pain or disability, half reported clinically significant worsening in shoulder pain (58%) or disability (45%) over 12 months. Few patients demonstrated clinically significant improvement in pain (11%) or disability scores (19%). The remaining one-third of the patients reported no change in symptoms (30% pain; 35% disability). Increasing intensity of pain scores between baseline and 12 months was associated with older age, higher HbA1c and less pain at baseline.

Mavrikakis et al. (1989) examined two groups, one of 824 adult diabetics and one of 320 age and sex matched non-diabetics for abnormal glucose metabolism and calcifications on anteroposterior shoulder x rays. Two hundred and sixty two (31-8%) of the diabetics had shoulder calcification compared with 33 (10-3%) of the control group. Diabetes of long duration treated with insulin for a long time was associated with a larger percentage of shoulder calcifications. He concluded that calcific shoulder periarthritis is three times more prevalent in diabetics than in a non-diabetic control group.

Paul et al. (2004) did a cross sectional study on assessment of validity and a longitudinal assessment of responsiveness to change of four shoulder questionnaires: The Dutch Shoulder Disability Questionnaire (SDQ-NL); the United Kingdom Shoulder Disability Questionnaire (SDQ-UK); and two American instruments, the Shoulder Pain and Disability Index (SPADI) and the Shoulder Rating Questionnaire (SRQ). 180 primary care consulters with new shoulder region pain each completed two of the questionnaires, as well as Euro QoL and 10 cm visual analogue scales (VAS) for overall pain and difficulty due to the shoulder problem. Postal follow up at 6 weeks included baseline measures and self-rated assessment of global change of the shoulder problem (seven point Likert scale). Strongest correlations were found for SDQ-UK with EuroQoL score and for SPADI and SRQ with shoulder pain and difficulty VAS. All shoulder questionnaires correlated poorly with active movement at the painful shoulder. SPADI and SRQ performed better on ROC analysis than SDQ-NL and SDQ-UK (areas under the curve of 0.87, 0.85, 0.77, and 0.77, respectively). However, SRQ scores changed significantly over time in stable subjects. All four shoulder questionnaires had similar overall validity and patient acceptability. SPADI and SRQ were most responsive to change. Additionally, SPADI was the quickest to complete and scores did not change significantly in stable subjects.

MacDermid et al. (2004) conducted a study to determine cross sectional and longitudinal validity of the SPADI. Community volunteers (n = 129) who self-identified as having shoulder pain were enrolled in a study. Patients were examined by a physical therapist using a standardized assessment process to insure that their pain was musculoskeletal in nature. Patients completed the SPADI, the Coping Strategies Questionnaire (CSQ) and the Sickness Impact Profile (SIP) at a baseline

assessment and again 3 and 6 months later. The internal consistencies of the SPADI subscales were high (α > 0.92). The SPADI demonstrated significant changes over time, but these were poorly co-related to the SIP or CSQ suggesting that these scales measure different parameters. The SPADI is a valid measure to assess pain and disability.

Czelusniak et al. (2012) studied prevalence of shoulder pain and dysfunction in 150 patients from Southern Brazil with type 2 diabetes mellitus. Pain was present in 63.4%, and dysfunction in 53.4% of the studied sample; 26.6% of the patients rated shoulder performance as bad. He found no association between plasma glucose and joint function except for active flexion of the shoulder and fasting glucose. He found that woman has worse shoulder performance.

Laslett et al. (2007) did a cross sectional study to investigate shoulder pain and disability and quality of life over 12 months in patients with diabetes and non-diabetic control group. He stated that shoulder complaints are typically chronic in nature, with 41-50% patients still reporting shoulder symptoms 1-3 years later. The prevalence of current shoulder symptoms was 35% in diabetics and 17% in controls as calculated by SPADI (prevalence of adhesive capsulitis was 7% and the prevalence of rotator cuff pathology was 35.6%).Shoulder symptoms are common affecting 1 in every 3 diabetic patients and 1 in every 6 control patients and are associated with poor physical and mental Quality of Life in addition to shoulder pain and disability, and are worse in patients with diabetes, even in a population with relatively moderate shoulder pain and disability. He chose not to match for age or gender in order to investigate the effect of age on shoulder pain and disability or quality of life.

Bridgman et al. (2012) studied with 800 diabetic and 600 non diabetic patients and found the evidence of periarthritis in 86 (10.8%) diabetics and 14 (2.3%) non

diabetics, a statistically significant difference between 2 groups of patients (P<0.005). He stated that shoulder capsulitis is related with the severity of diabetes because 36% of the affected patients were insulin dependent.

In 2004, the National Health Interview Survey determined that 58% of diabetic patients would have functional disability. Recent data show that the prevalence of musculoskeletal manifestations in the hands and shoulder in patients with type 1 or type 2 diabetes is 30%. Statistics show increase burden of musculoskeletal diseases in diabetic patients such as degenerative joint diseases were more common (53.2%) than inflammatory arthropathies (20.1%). These manifestations, which are some of the causes of chronic disability, involve not only joints, but bones and the soft tissues as well. These manifestations are closely linked to age, prolonged disease duration and vascular complications in the form of retinopathy. The percentages of diabetic patients with functional disability are increasing day by day as the number of diabetic patients are increasing, and hence can create a major public health problem (Hooper, 1999).

Kidwai et al. (2013) conducted an observational study with 210 Type 2 diabetic patients and 203 non-diabetic person. He found that, the frequencies of hand region abnormalities were significantly higher in the diabetic subjects as compared to the control group. Limited joint mobility is 9.5% in diabetic subject and 2.5% in non-diabetic subjects. In the shoulder region of diabetic subjects, adhesive capsulitis and tendonitis was found in 10.9% and 9.5% respectively as compared to 2.5% and 2% in control. A weak but positive relationship was observed between age and duration of diabetes with these upper limb abnormalities. He found no correlation between the frequencies of these abnormalities with control of diabetes. He also observed a significant association of hand and shoulder involvement with Type 2 diabetes.

Thomas et al. (2007) examined two groups, one of 865 diabetic and the other group of non-diabetic person at the same time for the duration of 3 months. External rotation was measured for both shoulders of the participants along with initial questionnaire for both groups. Frozen shoulder was defined as pain for more than 3 months and external rotation of less than 50% of the unaffected shoulder. Bilateral frozen shoulder was defined as external rotation of less than 30 degree in both shoulders. He found that, shoulder pain is present in 25.7% of diabetic patient and 5.0% for general medical patients.4.3% of diabetic patients fulfilled the criteria of frozen shoulder compared with 0.5% of general medical patients. He stated that the prevalence of painful or stiff shoulder is greater in diabetic patients than general medical patients.

Fasika et al. (2013) did a cross sectional study to find out the prevalence of shoulder and hand complications and associated factors among diabetic patients at the University of Gondar Teaching Referral Hospital in Northwest Ethiopia. He took 301 diabetes mellitus patients as the subject. Out of the total subjects 54.2% were female. He found the cumulative prevalence of shoulder and hand complications is 16.6% and the majority of them were female which account for 36 (20.1%). The prevalence was higher in type 2 diabetes mellitus patients. The prevalence of hand and shoulder complication is higher in female and older patients. Shoulder and hand complication in a higher rate is observed in a reported duration of DM illness of 7 years and above (28.3%). Highest prevalence of shoulder and hand complication in female which is 20.1 %. Analysis showed that hand and shoulder complications is associated with age, sex, type of diabetes and the duration of diabetes mellitus illness. This study showed that the higher prevalence of shoulder and hand complication among urban dwellers which is 18.3%.

Cole et al. (2009) conducted a population based study with 3128 participants who were assessed for diabetes mellitus as well as shoulder complains by questionnaires and Shoulder Pain and Disability index (SPADI), physical assessment, blood sampling for fasting plasma glucose and HbA1c levels. Among the participants, 21.8% had reported shoulder pain and stiffness and 7.1% participants has fulfilled the criteria of diabetes mellitus. This study showed the higher prevalence of shoulder pain and stiffness compared to those participants without diabetes. Diabetes mellitus patients were more likely to have shoulder pain and/or stiffness. Among the participants who had shoulder pain and/or stiffness, 37.1% were obese. Participants who are non-obese, there was no significant difference in prevalence of shoulder symptoms between those with diabetes and those without diabetes. Among subjects with shoulder pain and/or stiffness, the SPADI pain sub score was not significantly different between those with and those without diabetes; however, there was a significant increase in the SPADI disability sub score and in the total SPADI score among those with diabetes.

Ramchurn et al. (2009) did a study with 96 people during the period January to March 2007 to find out the upper limb abnormalities and poor metabolic control in diabetes. The participants mean age was 55 and 63% were predominantly male. He showed that, thickening of flexor tendon and limited joint mobility was the most common features. Carpal tunnel syndrome was present in 20% diabetic patients and 13% of Dupuytrens contracture was found. Shoulder capsulitis was found in 20% diabetic patients and 5% account for tendonitis. Shoulder capsulitis was more common (39%) in type 2 diabetes mellitus compared to type 1 diabetes mellitus (11%). In just 33% of patient either retinopathy or neuropathy was present with no upper limb disease, increasing to 41% of hand abnormalities, 67% of shoulder involvement and 76%

patients have both hand and shoulder abnormalities. Study showed the greater disability among those patients who have both hand and shoulder findings, while that has only hand findings and no upper limb findings has least disability.

Gundtoft et al. (2013) conducted a study with the patients who were referred by the general physician with shoulder symptoms. These patients with shoulder symptoms were compared to the patients with knee symptoms and diagnosed with diabetes mellitus. Total 221 patients with shoulder symptoms were included. No significant difference found in the prevalence of unknown diabetes mellitus between the groups of patients with shoulder symptoms and the group of patients with knee symptoms. He stated the significantly higher prevalence of diagnosed diabetes mellitus in the group of patients with shoulder symptoms.

Laslett et al. (2007) conducted a cross sectional study to investigate shoulder pain and disability and quality of life for over 12 months duration in patients with diabetes and non-diabetic patient in control group. This study showed that shoulder complaints are typically chronic in nature, with 41-50% patients has reported shoulder symptoms 1-3 years later. The prevalence of current shoulder symptoms was 35% in diabetics and 17% in controls as calculated by Shoulder Pain and Disability Index (SPADI). The prevalence of adhesive capsulitis was 7% and the prevalence of rotator cuff pathology was 35.6%). Shoulder symptoms are common affecting 1 in every 3 diabetic patients and 1 in every 6 control patients and are associated with poor physical and mental Quality of Life in addition to shoulder pain and disability, and are worse in patients with diabetes, even in a population with relatively moderate shoulder pain and disability. He chose not to match for age or gender in order to investigate the effect of age on shoulder pain and disability or quality of life.

Hoff et al. (2008) did a survey among 64785 participants, (46.5%) reported chronic musculoskeletal complains, where 3240 (5.0%) had chronic widespread musculoskeletal complains, and the remaining 26917 had (41.5%) chronic non-widespread musculoskeletal complains (MSCs). The prevalence of chronic MSCs increased with age with a peak in the age group 60–64 years (59.7%), and was higher for women than men in all age groups (overall 50.1% versus 42.6%, p < 0.001). No significant association was found between chronic musculoskeletal complains and type 1 DM or latent autoimmune diabetes of the adult.

Attar, (2012) performed a cross sectional study from June 1, 2010, to June 30, 2011, to evaluate musculoskeletal manifestations in adult diabetic patients at an outpatient clinic of King Abdulaziz University Hospital, Jeddah, Saudi Arabia including 252 diabetic patients; 45 (17.9%) had musculoskeletal manifestations. Of these 45 patients, 41 (91.1%) had type 2 diabetes. The most common musculoskeletal manifestations were carpal tunnel syndrome (*n*=17, 6.7%), shoulder adhesive capsulitis (*n*=17, 6.7%), and diabetic amyotrophy (*n*=12, 4.8%). A significant association was found between the development of musculoskeletal manifestations and manual labor, overweight, and vascular complications. Musculoskeletal disorders were more common in patients with type 2 diabetes (*n*=41, 91.1%) than in those with type 1 diabetes (*n*=4, 8.9%). Almost half (48.9%) of the patients with musculoskeletal disorders had more than one manifestation. The manifestations were carpal tunnel syndrome and shoulder capsulitis in 17 cases (6.7%) each, , diabetic amyotrophy in 12 patients (4.8%), flexor tenosynovitis in 11 patients (4.4%), diabetic cheiroarthropathy in 8 patients (3.2%), crystal arthropathy in 7 patients (2.7%), diabetic sclerodactyly in 5 patients (2.0%), and plantar fasciitis in 3 patients (1.2%). Dupuytren's disease, muscle infarction, neuropathic arthropathy, diffuse idiopathic skeletal hyperostosis, de

Quervain's tenosynovitis, and osteomyelitis were found in one case each (0.4%). The most common MSK manifestations were CTS and adhesive capsulitis. He estimated that more than 50% of diabetic patients will suffer from chronic disability. According to Gregg et al. (2002), some factors that contribute to chronic disability in diabetic patients include vascular complications, in addition to predisposing conditions, such as obesity and low physical activity. It was reported that patients with type 2 diabetes had greater impairments in mobility and more difficulties performing basic activities of daily living (ADL) than similarly aged non-diabetic persons. This leads to loss of independence, and it may predict future hospitalization, institutionalization, and death.

Walker-Bone et al. (2004) conducted a 2 stage cross-sectional study to determine the prevalence, interrelation, and impact of musculoskeletal disorders of the upper limb in the general population. A total of 9,696 randomly selected adults of working age were surveyed in a 2-stage cross-sectional study involving a screening questionnaire and a standardized physical examination in symptomatic subjects. Age- and sex-specific prevalence rates were estimated for several musculoskeletal disorders and for nonspecific pain in the upper limbs. The overlap and impact on daily activities and healthcare utilization were explored. Among 6,038 first-stage responders, 3,152 reported upper limb symptoms and 1,960 were subsequently examined. Of subjects with pain, 44.8% had 1 or more specific soft-tissue disorders. Site-specific prevalence rates were as follows: shoulder tendinitis 4.5% among men and 6.1% among women; adhesive capsulitis 8.2% among men and 10.1% among women; lateral epicondylitis 1.3% among men and 1.1% among women; de Quervain's disease 0.5% among men and 1.3% among women; other tenosynovitis of the hand or wrist, 1.1% among men and 2.2% among women. He stated that upper limb pain is common in the general

population and is often associated with physical signs suggestive of specific upper-limb disorders. These disorders have a substantial impact on physical function and use of health care.

Ardic et al. (2003) performed a cross-sectional study to investigate early diabetic musculoskeletal complications on the basis of a collaborative multidisciplinary study design. For this purpose 78 patients (mean age 57.8 ± 11.9 years, 55 women and 23 men) who had type II DM for 15 years maximally and 37 non-diabetic controls (mean age: 55.7 ± 11.5, 27 women and 10 men) were randomly selected for inclusion in the study. All patients were evaluated by the Rheumatology, Orthopedic Rehabilitation and Hand Rehabilitation Divisions. Dupuytren's disease was present in 17 (21.8%) of 78 diabetic subjects as the most frequent and statistically significant complication of the musculoskeletal system. In correlation and logistic regression analysis, only retinopathy was significantly associated with duration of diabetes and diabetic foot.

Larkin et al. (2014) conducted a cross-sectional study to explore the Musculoskeletal Complications in Type 1 Diabetes Mellitus patients. This cross-sectional analysis was performed in 1,217 participants. The study population had an average age of 52 years, and mean duration of type 1 diabetes was 31 years. Cheiroarthropathy, defined as any one of the following abnormalities: adhesive capsulitis, carpal tunnel syndrome, tenosynovitis, Dupuytren's contracture, or a positive prayer sign, was present in 807 of the subjects (66%). The most common type of cheiroarthropathy was adhesive capsulitis, found in 372 of the subjects (31%), followed by carpal tunnel syndrome (n = 362; 30%), flexor tenosynovitis (n = 340; 28%), positive prayer sign (n = 251; 22%), and Dupuytren's contracture (n = 105; 9%). Of the participants, 400 (33%) had one type of cheiroarthropathy by report or had a positive prayer sign based on examination; 241 participants (20%) had two types of cheiroarthropathy, 124 (10%)

had three, and 42 (3%) had four or five. Among those with two types of cheiroarthropathy, the most common combinations were carpal tunnel syndrome and flexor tenosynovitis (31%) followed by the combination of carpal tunnel syndrome and adhesive capsulitis (17%).

Morrato et al. (2003) did a survey with 23,283 adults who responded when asked about whether they were physically active and information on socio-demographic characteristics and health conditions were self-reported. A total of 39% of adults with diabetes were physically active versus 58% of adults without diabetes. The proportion of active adults without diabetes declined as the number of risk factors increased until dropping to similar rates as people with diabetes. After adjustment for socio-demographic and clinical factors, the strongest correlates of being physically active were income level, limitations in physical function, depression, and severe obesity (BMI $\geq$40 kg/m2). The majority of patients with diabetes or at highest risk for developing type 2 diabetes do not engage in regular physical activity.

According to Zyluk and Puchalski, (2015) the prevalence of limited joint mobility in diabetes is variable, ranging from 8% to 50%; it occurs significantly more frequently in juvenile, insulin-dependent, long-lasting and poorly-controlled diabetes. Carpal tunnel syndrome is the commonest peripheral neuropathy, affecting about 6% women population aged over 40. The prevalence of CTS in diabetes has been reported as between 11 and 25% and it is estimated that CTS occurs three times fold more frequently among diabetics than in general population (3-6%). Conversely, 5-8% CTS patients may have diabetes. The prevalence of Dupuytren's disease in diabetics ranges from 3-32%, comparing to 1-7% in general European population and to 13% in non-diabetics. The prevalence of trigger finger in diabetes has been reported as between 10 and 20%, comparing to 1-2% in general population. Conversely, about 25% patients

with trigger digits suffer from diabetes. Multiply finger and bilateral involvement is significantly more frequent in diabetics as well as coexistence with carpal tunnel syndrome.

A population-based case-control study with detailed assessment of diabetes and functional status was undertaken by Sinclair et al. (2008). 403 case subjects and 403 matched control subjects were studied (median age 75 years, 51% female). Subjects with diabetes had more comorbidities than control subjects (mean 2.5 vs. 1.9, $P < 0.0001$) and were more likely to have severe functional impairment (4 vs. 1%, Barthel score <5, $P < 0.001$). Health status pertaining to physical function was reduced in case subjects. In a multivariate model controlling for age, hypertension, cerebrovascular disease, chronic obstructive pulmonary disease, cancer, osteoarthritis, and dementia, diabetes remained significantly associated with mobility limitation. Older people with diabetes have considerable functional impairment associated with reduced health status.

Korff et al. (2005) conducted a cohort study of 1,642 diabetic individuals. In the study population, 19% had significant work disability: 12% were unemployed, 7% of employed subjects had missed ≥5 days from work in the prior month, and 4% of employed subjects reported having had severe difficulty with work tasks. Depressive illness, chronic disease comorbidity, and diabetes symptoms were associated with all three types of work disability. Diabetes complications predicted unemployment and overall work disability status, whereas obesity and sedentary lifestyle did not predict work disability. Among subjects experiencing both major depression and three or more diabetes complications, >50% were unemployed; of those with significant work disability. Depressive illness was strongly associated with unemployment and problems with work performance.

Hoftun et al. (2011) did a study with 7373 adolescents aged 13–18 years to determine the prevalence of self-reported chronic idiopathic pain among adolescents and to explore how pain interferes with daily activities. Chronic pain was reported by 44.4% of the participants, and 25.5% reported pain in at least 2 locations. Chronic idiopathic musculoskeletal pain was most prevalent (33.4%), and the neck/shoulder was most commonly affected. Musculoskeletal pain in 3 or more locations was reported by 8.5%. Pain almost daily was reported by 10.2%. More girls than boys reported pain. In girls, the prevalence of pain increased with age. A high number of pain-associated disabilities were reported, and 58.5% described difficulties doing daily activities in leisure time. Subjective disabilities were higher in girls, and increased with the frequency of pain and the number of pain locations, as shown by high disability in adolescents with musculoskeletal pain in 3 or more locations. Chronic idiopathic pain, especially multisite pain, is common among adolescents, and those suffering from it report a major impact on several areas of daily living.

Tate et al. (2011) conducted a cross-sectional study to determine whether physical characteristics, exposure, or training variables differ between swimmers with and without shoulder pain or disability. A total of 236 competitive female swimmers aged 8 to 77 years were participated. Nine (21.4%) swimmers aged 8 to 11 years, 8 (18.6%) swimmers aged 12 to 14 years, 19 (22.6%) high school swimmers, and 13 (19.4%) masters' swimmers had shoulder pain and disability. Differences that were found in 2 or more age groups between athletes with and without shoulder pain and disability included greater swimming exposure, a higher incidence of previous traumatic injury and patient-rated shoulder instability, and reduced participation in another sport in the symptomatic groups (P< .05). Reduced shoulder flexion motion,

weakness of the middle trapezius and internal rotation, shorter pectoralis minor and latissimus, participation in water polo, and decreased core endurance were found in symptomatic females in single varying age groups (P< .05).

Laslett, et al., (2007) showed that, a Cross-sectional studies show that a number of factors are associated with shoulder pain and shoulder symptoms in patients with diabetes. These include advancing age, diabetes duration and diabetes complications including retinopathy, albuminuria and autonomic neuropathy, but not peripheral neuropathy. Therefore, the relevant question for the treating clinician is which factor(s) determine persistence or worsening of pain and disability over time. The link between shoulder pain or disability and diabetes is postulated to be excessive glycosylation of connective tissue, particularly collagen. Patients who have had long-term intensive treatment of their diabetes have been shown to have lower levels of skin collagen glycosylation, glycoxidation and cross-linking (Salmela, et al., 2003), and slower rates of accumulation of advanced glycosylation end-points (AGEs), than patients treated under conventional regimes. Elevation of AGEs have been associated with early stages of clinically evident nephropathy and retinopathy (Beisswenger, et al., 2005).

Abate, et al., (2013) stated that, Several rheumatologic manifestations are more pronounced in subjects with diabetes, ie, frozen shoulder, rotator cuff tears, Dupuytren's contracture, trigger finger, cheiroarthropathy in the upper limb, and Achilles tendinopathy and plantar fasciitis in the lower limb. These conditions can limit the range of motion of the affected joint, thereby impairing function and ability to perform activities of daily living. This review provides a short description of diabetes-related joint diseases, the specific pathogenetic mechanisms involved, and the role of inflammation, overuse, and genetics, each of which activates a complex

sequence of biochemical alterations. Diabetes is a causative factor in tendon diseases and amplifies the damage induced by other agents as well. According to an accepted hypothesis, damaged joint tissue in diabetes is caused by an excess of advanced glycation end products, which forms covalent cross-links within collagen fibers and alters their structure and function. Moreover, they interact with a variety of cell surface receptors, activating a number of effects, including pro-oxidant and proinflammatory events. Adiposity and advanced age, commonly associated with type 2 diabetes mellitus, are further pathogenetic factors. Prevention and strict control of this metabolic disorder is essential, because it has been demonstrated that limited joint motion is related to duration of the disease and hyperglycemia. Several treatments are used in clinical practice, but their mechanisms of action are not completely understood, and their efficacy is also debated.

Whiting, et al., (2011) stated that, Diabetes mellitus (DM) is one of the most debilitating common chronic diseases across the globe known by increased blood glucose, resulting from defects in insulin secretion, insulin action, or both. Its burden continues to increase with the changing lifestyles of human beings, characterized by reduced physical activity, and increased obesity. Based on the global estimate by the International Federation of Diabetes (IDF), DM prevalence in 2011 was 366 million people; and this is expected to rise to 552 million by 2030. The projected growth of DM in sub-Saharan Africa is high at 91%, with those affected increasing from 14.7 million in 2011 to 28 million in 2030. According to the extrapolated data, the prevalence of DM in Ethiopia was 3.4% in 2011 and estimated to rise to 3.7% by 2030.

Another study showed that, Several abnormalities of the shoulder and the hand have been described in diabetic patients. DM affects connective tissues in many ways and

causes different alterations in periarticular and skeletal systems (Arkkila, et al., 2006). There is more prevalence of musculoskeletal (MSK) disorders of the shoulder and the hand in DM patients compared with the general population (Cagliero, et al., 2002). The increasing prevalence of DM and longer life expectancy of the diabetic patient have contributed to an increased frequency of clinically important alterations in the MSK system, the exact pathophysiology of most of these MSK disorders remains obscure. However, connective tissue disorders, neuropathy, vasculopathy or combinations of these problems, may underlie the increased incidence of MSK disorders in DM. The most commonly recognized and studied shoulder and hand MSK complications are frozen shoulder, limited joint mobility, trigger finger, Dupuytren's contracture, and carpal tunnel syndrome (Kim, et al., 2001). Frozen shoulder has been reported as a common complication in DM patients with a prevalence ranging from 11% to 30%, and its occurrence is associated with the duration of diabetes and age (Ardic, et al., 2003).

The prevalence of limited joint mobility of the hand in DM patient has been found to be quite variable, ranging from 8% to 50%, and its prevalence increased significantly with the duration of diabetes. Diabetic patients with a frozen shoulder are more likely to have limited joint mobility of the hand than DM patients without a frozen shoulder (Kim, et al., 2001). Dupuytren's contracture is a complication of the hand that has been reported in 16–42% of DM patients. Its prevalence increases with disease duration (Ardic, et al., 2003). Carpal tunnel syndrome is seen in up to 20% of diabetic patients and its prevalence generally increases with duration of diabetes (Ramchurn, et al., 2009). Trigger finger, also called stenosing flexor tenosynovitis, is another frequent diabetic complication with a prevalence ranging from 11 - 28% in diabetic patients associated with the duration of diabetes and age (Ramchurn, et al., 2009).

Complications of DM are numerous and can affect different body systems. Involvement of the MSK system is common and can result in disability (Arkkila, et al., 2006). However, it is usually overlooked in clinical and research practices. Higher levels of complications result when the control of DM is poor. Poor glycaemic control can lead to worsening of certain MSK conditions (Smith, et al., 2003). Sex, age, duration of DM, type of DM, microvascular complications and poor glycaemic control were the identified factors associated with the presence of MSK complications in DM patients (Mathew, et al., 2011). Though various studies revealed a significantly higher rate of shoulder and hand complication in DM patients, there is limited evidence from East Africa, particularly in Ethiopia. To the author's knowledge, no study has been conducted to assess the prevalence and associated factors of MSK complications among DM patients in Ethiopia. Hence, this study will provide valuable information for decision makers, health care planners, evaluators and medical practitioners for promoting better health, quality of life, and the prevention of disability. Therefore, the objective of the study is to determine the prevalence and associated factors of shoulder and hand musculoskeletal complications among diabetic patients in Northwest Ethiopia (Mathew, et al., 2011).

Smith, et al., (2003) s1tated that, adhesive capsulitis, or frozen shoulder, has been reported round about 20% of diabetic patients. This term refers to a stiffened shoulder joint usually caused by thickening and contraction of the capsule which results in a substantial decrease in capsular volume capacity. Patients complain shoulder stiffness with decreased ROM and pain though the pain of this conditions in diabetic patient is usually less than that of the general population. Adhesive capsulitis, frozen shoulder, shoulder periarthritis, or alliterative bursitis is the most disabling of the common musculoskeletal problems. There is gradual limitation of shoulder movement,

especially lateral rotation and abduction. The thickened joint capsule is closely applied and adherent to the humerus head, due to which there is too much limitation in range of motion of shoulder joint. The exact origins of adhesive capsulitis are not determined but still it has been related with several other conditions, such as trauma to shoulder, other conditions such as respiratory and cerebral. Usually adhesive capsulitis have three distinct phases: painful, adhesive, and resolution phases. Adhesive capsulitis appears at a younger age in patients with diabetes and is usually less painful, although it responds less well to treatment and lasts longer1.

The estimated prevalence is 11–30% in diabetic patients and 2–10% in nondiabetics. Adhesive capsulitis is associated with the duration of diabetes and age.

Huang, et al., (2010) showed that, a higher prevalence of frozen shoulder (20–29%) has been reported in diabetes mellitus (DM) patients. However, the outcome of these patients has only been studied previously in Western countries. None have been documented in Asia. Adhesive capsulitis of the shoulder (frozen shoulder) is characterized by a gradual increase in pain and stiffness. This condition has three stages lasting up to one to three years and does not recur in the same shoulder. The etiology of frozen shoulder is yet to be discovered and excellent results of manipulation under anesthesia (MUA) have been reported by many authors but few have focused on patients with DM. Hence, in this study, we compared the objective improvement in range of motion and the subjective improvement in function after MUA in patients with and without non-insulin dependent DM.

The estimated prevalence of adhesive capsulitis (AC) is 11%–30% in diabetes; they are considerably greater than those have no diabetes. AC has been associated with the duration of diabetes and age with diabetics experiencing significantly greater pain and dysfunction. DM is considered as an epidemic in the modern world and much of its

morbidity and mortality is related to micro and macro vascular problems or disorder. It is also linked with other disorders of the hand and shoulder that can be very incapacitating and significantly compromise their quality of life12, 13. Musculoskeletal (MSK) complications of DM are the most common endocrine disorder. These have been usually poorly recognized and poorly treated compared with other conditions, such as neuropathy, retinopathy, and nephropathy. These are, some of the etiology of disability, involve not only the joints, but also the bones and other tissues. An Interview Survey was done in 2004 by national health survey and they determined that 58% of diabetic patients would have functional disability. The percentage of diabetic patients with functional disability will increase as diabetic patients 'number increases, and therefore makes a great burden on common health problem. Current studies show that the prevalence of MSK manifestations in the hands and shoulders in patients with type 1 or type 2 diabetes is 30%. These manifestations are closely linked to age prolonged disease duration and vascular complications in the form of retinopathy (Atta, et al., 2012).

The decreased ROM is worst in abduction and lateral rotation. Medial rotation is affected least. It seems to be twice as common in diabetic patients. Therapy is largely conservative and minimizing progress of the adhesions mobilization of the shoulder which include gentle stretching and range of motion exercises, and the use of analgesics and/ or intra-particular injections (Ramchurn, et al., 2009). The relation between DM and AC has been shown in previous few studies. Bridgman reviewed the medical records of 800 diabetic subjects and found evidence of per arthritis in 10.8%, compared with 2.3% in a control group of 600 non-diabetic subjects(Attar, et al., 2012). Pal, et al., (1986) found shoulder capsulitis in 20.4% of insulin dependent and in 18.3% of non-insulin dependent diabetes patients and in 5.3% of normal subjects.

In a study of 824 type II diabetic and 320 control subjects shoulder capsulitis was observed in 31.8% and 10.3% of subjects, respectively. Bilateral involvement of shoulder capsulitis was more common in diabetic (10%) than in the control subjects (3%). Diabetic shoulder capsulitis seems to appear at a younger age, may be less painful, responds less well to treatment, and lasts longer than non-diabetic shoulder capsulitis. A high frequency of other hand syndromes, such as limited joint mobility, has been found among diabetic patients with shoulder capsulitis. The association between limited joint mobility and micro vascular complications of diabetes has been well documented, but there are also two studies showing an association between shoulder capsulitis and retinopathy. However, no association between shoulder capsulitis and diabetic neuropathy has been found. The purpose of this study was to investigate the prevalence of shoulder capsulitis and its association to the diabetic complications in diabetic subjects. Qidwai & Ashfaq, (2010) stated that, Adhesive capsulitis has an incidence of 3–5% in the general population and up to 20% in those with DM. This is one of the most common MSK disorder seen in orthopedics. Though some practitioners' suggest AC as a self-limiting disorder that resolves in 1–3 years, other studies report ranges of between 20 and 50% of patients with adhesive caspulitis which suffer long-term ROM deficits that may last up to 10 years. The typical patient that develops adhesive capsulitis is a female in her 5th to 7th decade of life. There is generally no preference for handedness and adhesive capsulitis rarely occurs simultaneously bilaterally however, others have reported that it can occur sequentially bilaterally in up to 40–50% of patients. Adhesive capsulitis is commonly associated with other systemic and non systemic conditions. By far the most common is the co-morbid condition of diabetes mellitus, with an incidence of 10–36 % (Kidwai, et al., 2012).

CHAPTER-III	METHODOLOGY

3.1 Study Design:

This study was conducted using cross sectional survey under a quantitative study design. Survey methodology was chosen to meet the study aim as an effective way to collect data.

3.2 Study area:

Data was collected from the BIRDEM General Hospital, Dhaka and Tangail Diabetic Hospital.

3.3 Study Population:

The study populations were the patient with Diabetes Mellitus who attended at BIRDEM General Hospital, Dhaka and Tangail Diabetic Hospital.

3.4 Sample size:

Sample is a group of subjects were selected from population, who are used in a piece of research (Hicks, 2000). A sample is a smaller group taken from the population. Sometimes the sample size may be big and sometimes it may be small, depending on the population and the characteristics of the study. According to the prevalence of shoulder pain, estimated sample size 212.

3.5 Sampling procedure:

Findings the appropriate number and type of people taking part in the study is called "sampling" (Hicks, 2000). The study was conducted by using the convenience sampling methods due to the time limitation and as it was the one of the easiest, cheapest and quicker method of sample selection. The researcher used this procedure, because, getting of those samples whose criteria were concerned with the study purpose.

3.6 Inclusion criteria:

- Both male and female was included
- Medically diagnosed Diabetes Mellitus patient
- Patient who were willingly to participate

3.7 Exclusion criteria:

- Traumatic injury around the shoulder joint
- Patients with rheumatological, neurological diseases and other orthopeadic condition like ankylosing spondylitis, septic arthritis, osteoarthritis.
- Patient who were medically unstable.
- Occupations requiring excessive effort of the anatomical components of the upper limbs were excluded.

3.8.1 Data collection instrument

A structured questionnaire and demographic information chart was used as a data collection instrument. Questionnaire was made by the researcher. It was tested by a pilot study. There was also used shoulder pain and disability index (SPADI) scale. It was developed by Williams et al. (1995) to measure current shoulder pain and disability. The Shoulder Pain and Disability Index (SPADI) is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional activities. The pain dimension consists of five questions regarding the severity of an individual's pain. Functional activities are assessed with eight questions designed to measure the degree of difficulty an individual has with various activities of daily living that require upper-extremity use. The SPADI is the only reliable and valid region-specific measure for the shoulder. Each item is measured on an 11 cm visual analogue scale, producing figures ranging from 0 to 10. Pain and disability subscale scores are calculated as the mean of the corresponding items on a 0–100 scale, the highest score indicating the most severe pain and disability. The total score is calculated as the average of the pain and disability subscales. If more than two items of a subscale are not responded to, no SPADI score is calculated (Roach, et al., 1991). In that time some other necessary materials were used like pen, pencil, and white paper and clip board. The English questionnaires were translated into Bengali by a professional translators. Researcher had taken permission from each volunteer participant by using a written consent form in Bengali & English.

3.8.2 Procedure of data collection

At the very beginning researcher clarified that, the participant has the right to refuse to answer of any question during completing questionnaire. They can withdraw from the study at any time. Researcher also clarified to all participants about the aim of the study. Participants were ensured that any personal information would not be published anywhere. Researcher took permission from each volunteer participant by using a written consent form. After getting consent from the participants, standard questionnaire was used to identify the complain and collect demographic information. Questions were asked according to the Bangla format. For conducting the interview, the researcher conducted a face to face interview and asked questions. Physical environment was considered strictly. Stimuli that can distract interviewee were removed to ensure adequate attention of interview. Interviewee was asked questions alone as much as possible with consent as sometimes close relatives can guide answer for them. The researcher built a rapport and clarified questions during the interview. Face to face interviews are the most effective way to get full cooperation of the participant in a survey (Fraenkel & Wallen, 2000). Face to face interviews are also effective to describe characteristics of a population. Face to face interviews was used to find specific data which describes the population descriptively during discussion. According to the participants' understanding level, sometimes the questions were described in the native language so that the patients can understand the questions perfectly and answer accurately. All the data were collected by the researcher own to avoid the errors.

3.9 Data analysis

Descriptive statistics were used to analyze data. Descriptive statistics refers methods of describing a set of results in terms of their most interesting characteristics (Hicks, 1999). Data were analyzed with the software named Statistical Package for the Social Science (SPSS) version 20.0. The variables were labelled in a list and the researcher established a computer based data definition record file that consist of a list of variables in order. The researcher put the name of the variables in the variable view of SPSS and defined the types, values, decimal, label alignment and measurement level of data. The next step was cleaning new data files to check the inputted data set to ensure that all data has been accurately transcribed from the questionnaire sheet to the SPSS data view. Then the raw data were ready for analysis in SPSS. Data were collected on frequency and contingency tables. Measurements of central tendency were carried out using the mean plus standard deviation (SD) for variables. For the study of the association of numeric variables chi squared test were used.

Data were analyzed by descriptive statistics and calculated as percentages and presented by using table, bar graph, pie charts etc. Microsoft office Excel 2010 was used to decorating the bar graph and pie charts. The results of this study were consisted of quantitative data. By this study a lot of information were collected.

3.10 Ethical Consideration

The study protocol was sent to BHPI review board for approval as per the existing rules. Permission was taken from Head of Physiotherapy department of BHPI, CRP to conduct the study. Verbal consent was taken from the participant informing them about the purpose of the study, anonymity, their rights to refuse answering any question, withdrawn from the study at any point of time and other issues was mention

in the form before starting the interviews. For any kind of use of the study, there would be no identification of any participants, only the data was used. The data were kept in a secure place where only the researcher has the access.

A total 212 respondents with diabetic mellitus patients were interviewed for this study. Socio-demographic characteristics of the respondents are presented below;

Age of the participant

In this research, researcher shows that the mean age of the participant was 42.77 years (SD^{+}-11.85). Majority of the respondents 35.7% were 41 to 50 years of age followed by 33.3% were 31-40 years age, 12.7% were 51-60 years of age, 8.5% cases were below 30 years of age, 5.2% cases were 61-70 years of age and the rest of 4.2% cases only above 71 years of age (Figure-1).
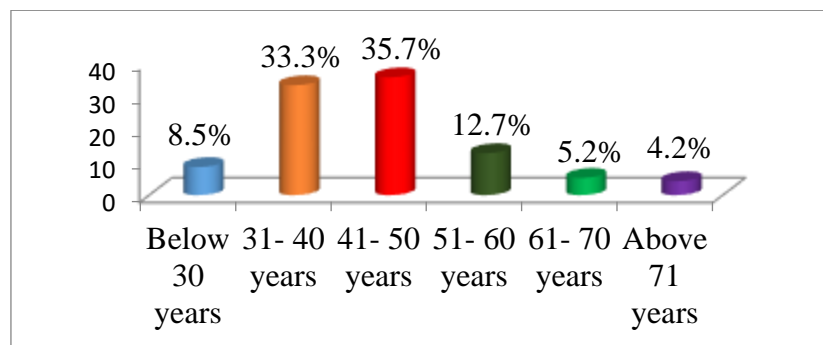

Figure-1: Age of the participant

Gender of participant

Study revealed that out of 212 participants 72.6% (n=154) respondents were female and rests of 27.4% (n=58) were male (Figure-2).
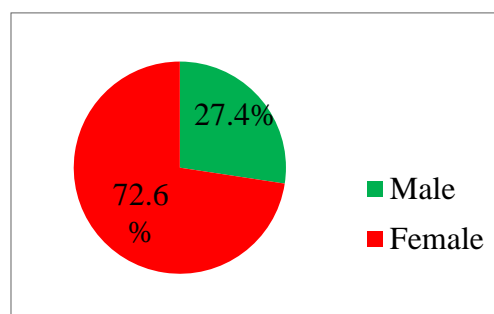

Figure-2: Gender of participant

Educational background of the participants:

This figure showed that higher secondary passed participants were highest rate that was 34.9% (n= 74). Secondary passed participant were second highest rate that was 22.2% (n=47). Bachelor passed, primary passed, illiterate or only signature participants were according to 17%, 16%, and 9.9% (Figure-3).
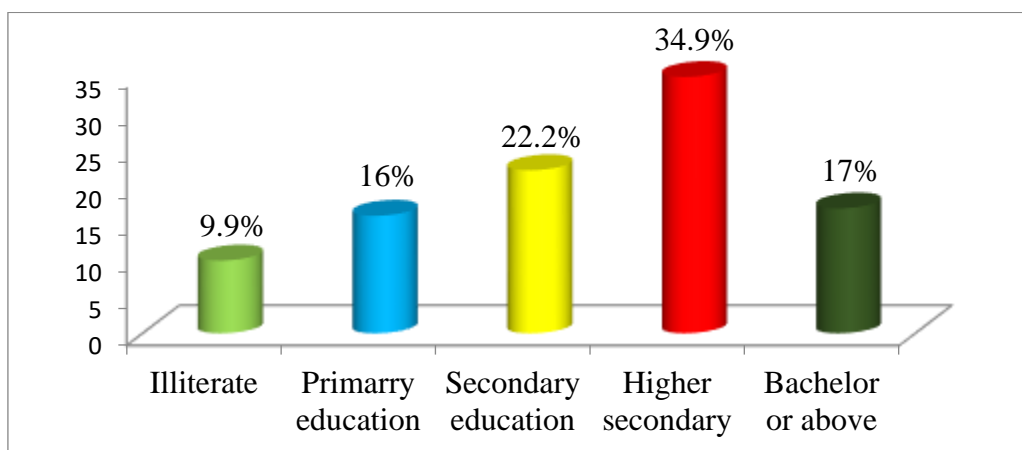

Figure-3: Educational background of the participants

Living area of the participants

The study had identified that among 212 participants, most of 60.4% (n=128) participants were living at urban area followed by 39.6% (n=84) participants were living at rural area (Figure-4).
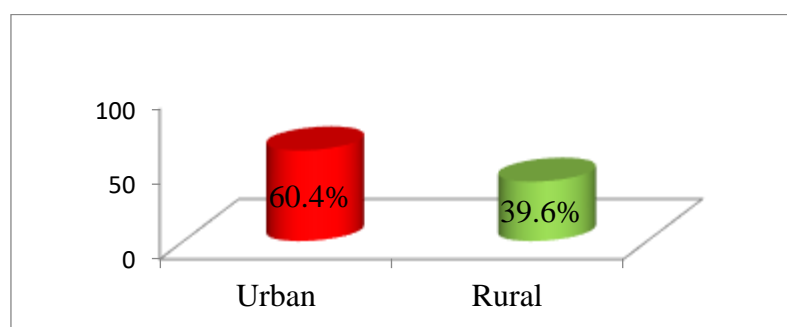

Figure-4: Living area of the participants

Health status of the participants

The study had identified that among 212 participants most of participants 48.1% were in good health, followed by 47.2% were in fair health, and rest of 4.7% were in poor health (Figure-5).
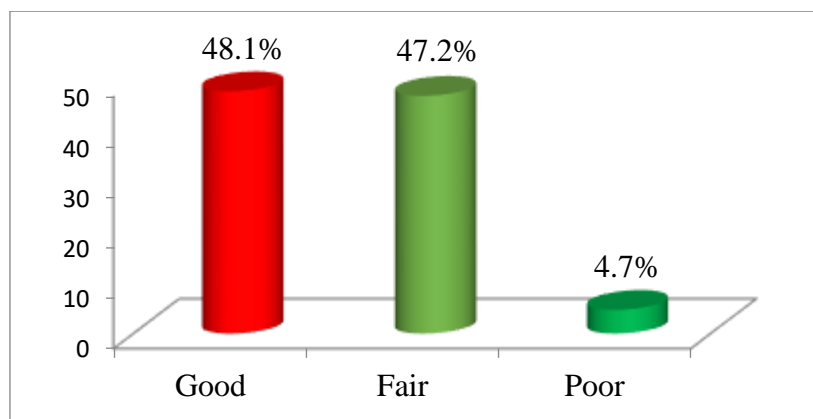

Figure-5: Health status of the participants

Durations of diabetes mellitus

In total 78.8% of the respondents were suffering for diabetes for about 11-15 years, 9.9% of the respondents were suffering for duration of diabetes for more than 15 years, 10.4% had in duration of diabetes 6-10 years, 0.9% cases were suffering for diabetes only 2-5 years in duration (Figure-6).

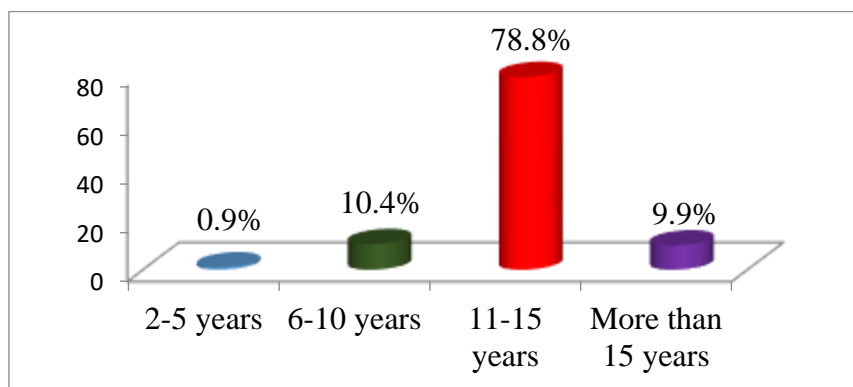**Figure-6:** Durations of diabetes mellitus

Association between shoulder pain and duration of diabetes mellitus:

In the association test using chi square (x2) the value was 6.43 but P value was .092 (p<.05) which indicates it was not significant.

Type of diabetes that individual patient are suffering from:

Study found that majority cases 75.9% (n=161) participants were suffering from Type-2 diabetes mellitus whereas 24.1% (n=51) respondents were suffering from Type-1 diabetes mellitus (Figure-7).
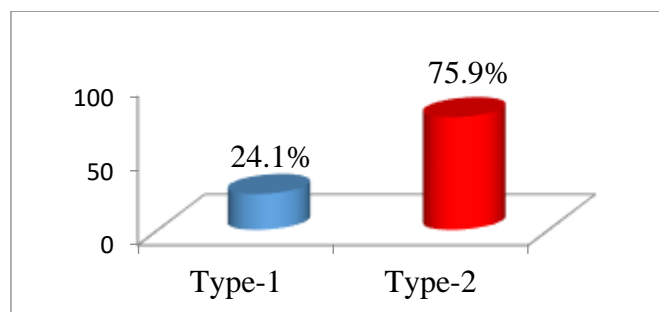

Figure-7: Type of diabetes you are suffering from

Association between shoulder pain and different types of diabetic patient:

In the association test using chi square($x2$) the value was 0.539 which indicates among variables was not significant because p was 0.463 ($p>0.05$).

Type of treatment participants are taking for diabetes

Study focuses maximum diabetes patients 38.2% (n=81) were on maintenance of food and medication for their control of diabetes followed by 31.1% (n=66) only on food control and exercises whereas 13.7% (n=29) cases only did food control and insulin, 9.4% cases had taken only insulin, 7.5% cases only on medication (Figure-8).
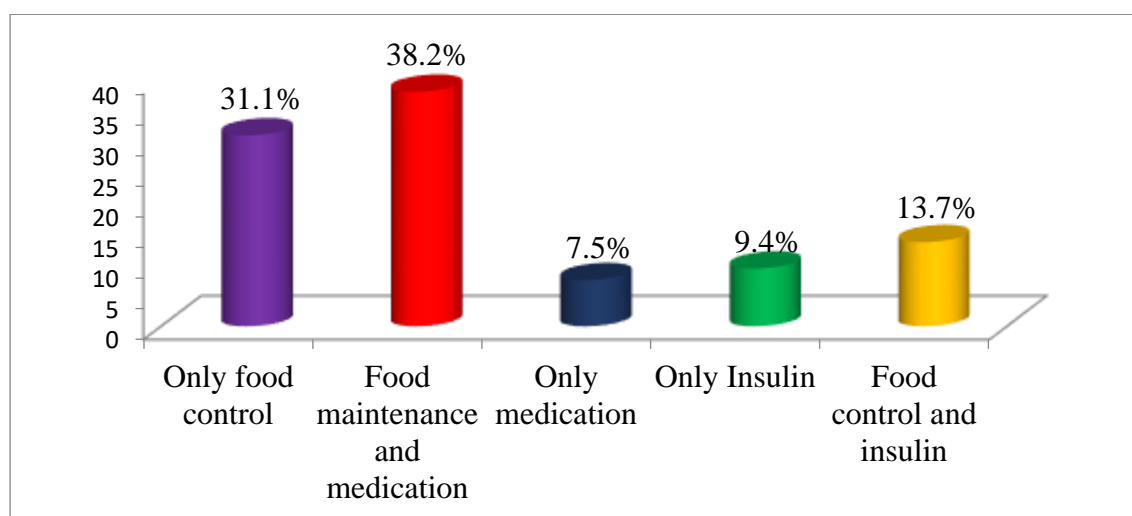

Figure-8: Type of treatment participants are taking for diabetes

Participants feel pain on shoulder

Study focuses 25.5% (n=54) diabetes patients were suffering shoulder pain, and 74.5% (n=158) were not suffering shoulder pain (Figure-9).
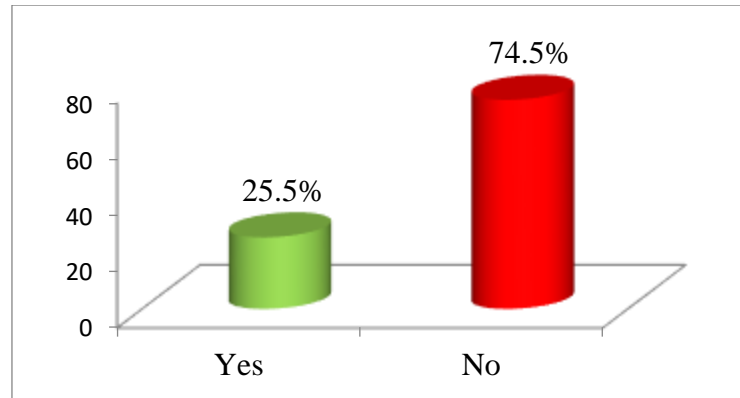
Figure- 9: Participants feel any pain on shoulder

Association between shoulder pain and different ages of diabetic patient:

In the association test using chi square(x2) the value was 14.493 which indicates among variables was significant because p was 0.013(p<0.05).

Participant feels disability due to pain on shoulder

Study focuses, 25.5% (n=54) diabetes patients were suffering from shoulder pain. Among them, 22.2% (n=12) diabetes patients were feeling disability due to pain, and 77.8% (n=42) were not feeling any disability due to pain (Figure-10).
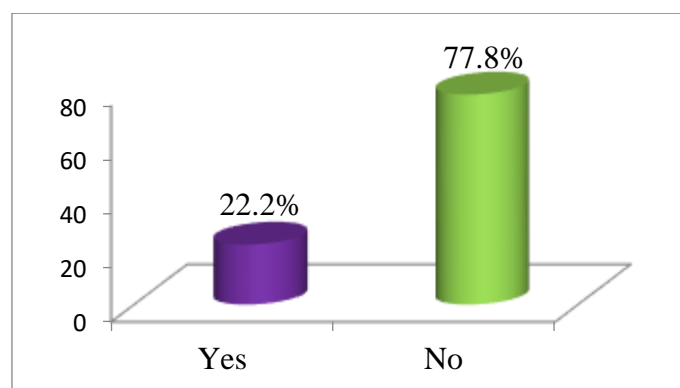
Figure-10: Participant feels disability due to pain shoulder

Association between disability and different ages of diabetic patient:

In the association test using chi square(x2) the value was 5.096 which indicates among variables was not significant because p was 0.165(p>0.05).

Patients feel pain and disability according to Shoulder Pain and Disability Index (SPADI)

Study show that, the mean pain score at SPADI was 48.33% and disability at SPADI 44.03% (Figure-11).

Figure-11: Mean pain and disability at SPADI

Type of treatment received for shoulder pain

Study focuses among the shoulder pain patients, most of them 59.3% were taking medicine, 14.8% were taking physiotherapy, 9.3% were taking both medicine and physiotherapy and 16.7% were nothing takes any treatment for their pain (Figure-12).

Figure-12: Type of treatment received for shoulder pain

In the present study, it was found that 25.5% patients were suffering from shoulder pain among the sample. Laslett et al., (2007), found that only the painful symptoms, 1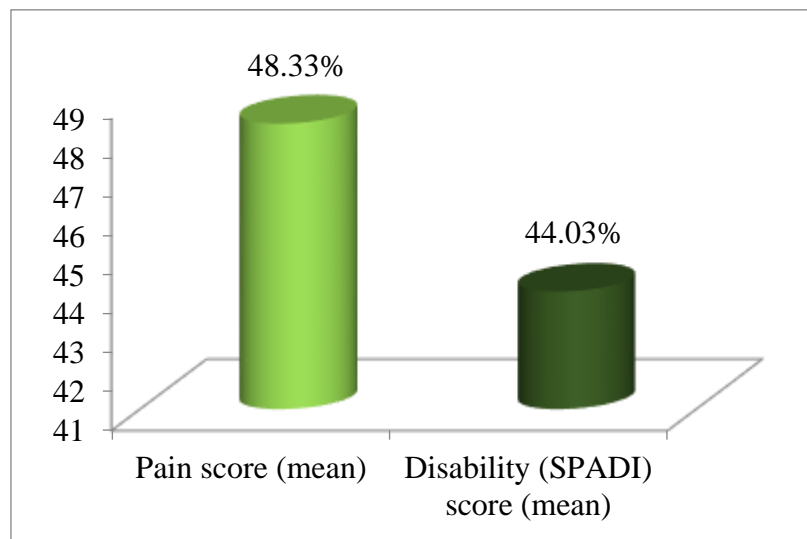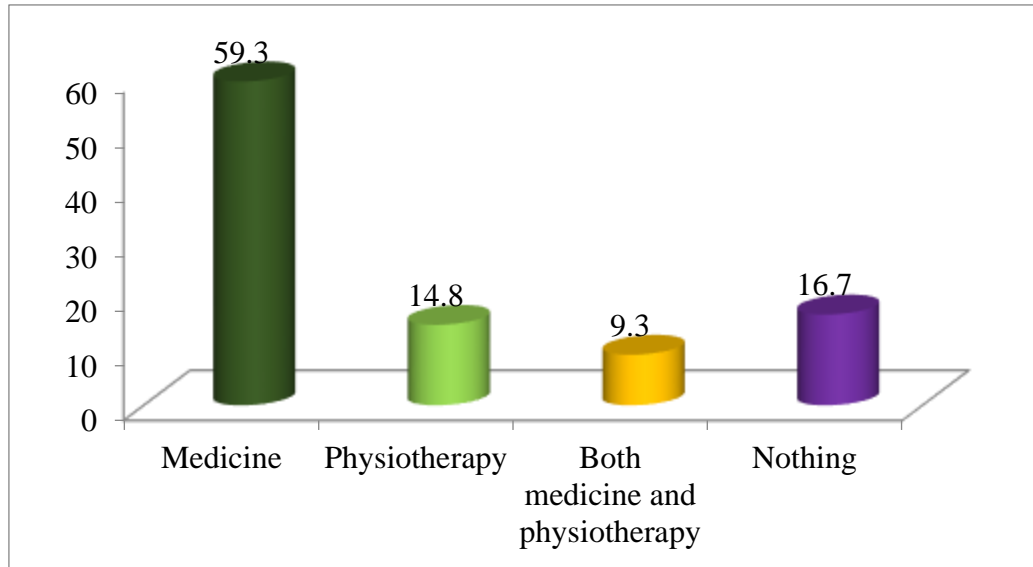 out of 3 diabetic patients had complaints related to the shoulder. In contrast, Aydeniz et al., (2008) found a prevalence of 14.7% suffering shoulder pain among 102 diabetic patients. Mathew, et al., (2011), reported a similar finding in 16.4% of their study. Ramchurn, et al., (2009), found 25% were suffering of their 96 diabetic patients. Another study found that a prevalence of adhesive capsulitis of the shoulder in 10% of cases of type 1 diabetes, and 22% of cases of type 2 diabetes among the 291 patients (Arkilla, et al., 1996). Although the reason of high prevalence of shoulder pain in diabetic patients is unknown. It is believed that in patients with diabetes are associated with microvascular disease. Microvascular diseases cause abnormal collagen repair, which predisposes patients to adhesive capsulitis (Seigel, et al., 1999). In addition, increased glycosylation of collagen protein and increased formation of abnormal glycation end products and their subsequent accumulation was found to have harmful effect on a number of cellular and extracellular processes that might facilitate adhesion and fibrosis (Thomas, et al., 2007). However, it is important to note that most of the series above only involved cases of frozen shoulder (adhesive capsulitis), which is the most severe form of this type of joint disorder. Frozen shoulder causes an almost complete loss of mobility, and active or passive glenohumeral joint contracture of the capsule, which adheres to the humeral head, reducing joint volume. A number of observational studies have indicated that diabetes is associated with frozen shoulder. Subsequent studies have supported the association between diabetes and frozen shoulder. In a study by Pal, et al., (1986) showed that the prevalence of frozen

shoulder in another of these studies was 19% in diabetic patients compared with 5% in nondiabetic subjects. These authors defined frozen shoulder as unilateral shoulder pain for at least 1 month, inability to lie on the affected shoulder, and restricted active and passive shoulder joint movements in all planes.

In this study researcher was found that the mean age of participants was 42.77 years. And Maximum participant was 41-50 years (36%). Fasika et al. (2013) found that majority of participant were 41-50 years and mean age was 45.9 years. Another study by Ulusoy, et al., (2011), in Turkey found that the common age of frozen shoulder was between 40 and 60 years. Both the study supports the present findings. Some authors have claimed that the higher prevalence in older persons may be because frozen shoulder is an inflammatory response to ageing changes in the shoulder joint and or tendons of the shoulder. However there is no definite evidence of this. There is a significant association between the shoulder pain and ages of diabetic patient and it is statistically significant (p=.013, x2 test).

In the study, revealed that more than half of the participants 73% (n=154) were female and rest of 27% (n=58) were male. Douloumpakas et al. (2007) found in their study that was very similar to this study that among 208 participants, 119 were female those has diabetes and rest of 89 were male. It was found significantly the highest number of female 32% has diabetes from 0-5 year age range which was found statistically non-significant (X^2=2.325, df=3, P>0.05) at 5% significant level. However, in a recent study by Watson, et al., (2007), found that 57% of the patient population was female and 43% was male. So female might be the highly vulnerable

for incidence of diabetes. But none of the articles revealed any cause of female predominance.

In this study researcher was found that higher secondary passed participants were highest rate that was 35% (n= 74). Another study showed that higher secondary passed participants was 27.2% (Sultana, et al., 2015).

In this study it was identified that among 212 participants, most of 61% (n=128) participants were living at urban area followed by 39% (n=84) participants were living at rural area. In a study, Fasika et al., (2013) found that majority of participant were lived in urban area (66.9%).

The study had identified that among 212 participants most of participants 48% were in good health, followed by 47% were in fair health, and rest of 5% were in poor health.

In this study, total 79% of the respondents were suffering for diabetes for about 11-15 years of age, 10% of the respondents were suffering for duration of diabetes for more than 15 years of age, 11% had in duration of diabetes 6-10 years of age, 1% cases were suffering for diabetes only 2-5 years in duration. In a study Pal, et al., (1986) found that duration of diabetes was a risk factor for shoulder pain. Another study Arkkila et al., found that duration of diabetes is risk factor for shoulder pain in type 1 diabetic patients. In contrast, Simon, et al, (2007) found that longer duration of diabetes correlates with an increased risk of frozen shoulder and some evidence for a similar association for type 1 diabetes versus type 2. The study focused that there have a association between shoulder pain and duration of diabetes but this did not reach statistical significant (p=.092, x2 test).

In this study researcher was also found that majority 76% (n=161) participants were suffering Type-2 diabetes mellitus whereas 24% (n=51) respondents were suffering Type-1 diabetes. This study correlated of fasika, et al.(2013) findings found that maximum patients suffering from Type-2 diabetes mellitus. The study found that there was not statistically significant association between the shoulder pain and types of diabetic patient (p=.463, x2 test).

Study focuses maximum diabetes patients 38% (n=81) were taking maintenance of food and medication for their control of diabetes followed by 31% (n=66) were only taken food control and exercises whereas 14% (n=29) cases only did food control and insulin, 9% cases had taken only insulin, 8% cases had only taken only medication. Others study shown that life style modification and medication are used for control of diabetes (Sultana, et al., 2015)

Researcher was also found that, among the diabetic patient with shoulder pain, 22.2% (n=12) were felt disability due to pain, and 77.8% (n=42) were not feels any disability due to pain. In this study researcher was also found that, the mean pain score at SPADI were 48.33% and disability score at SPADI ware 44.03%. Which were nearly similar with Uddin et al. (2014),   they found that, the mean score of pain at SPADI 56.7% and disability score at SPADI 51%. They also found higher score of pain and disability among the diabetic patient than non diabetic patients but no statistically significant difference in pain and disability in frozen shoulder patients with or without diabetes were detected.

In this study researcher was also found that, 59.3% were taking medicine, 14.8% were taking physiotherapy, 9.3% were taking both medicine and physiotherapy and 16.7% were taking no treatment for their pain and disability. Physical therapy can be the mainstay treatment for diabetics suffering from musculoskeletal problems. Physical

therapy manages the pain caused by the rheumatic manifestations and associated problems, it can also treat these musculoskeletal disorders and at the same time works on the postural correction, stretchings and strengthening of weak and shortened muscles in order to prevent the resulting deformities and disabilities so as to improve the different activities of daily living of diabetic patients making them independent and improving their quality of life (Barki et al., 2013). Due to lack of proper education and consistent awareness programs, it is hard to assess the level of awareness regarding physical therapy and its various effects. Peoples are still unaware from the advantageous and therapeutic effects of physical therapy in variety of aspects that is, about its role in prevention or in maintenance or even in increasing muscles movement and strength. Unfortunately, no prior studies were performed to assess the level of awareness concerning effects of physical therapy.

Study limitations

Despite best efforts with research, the present study was not completely free from all limitation and impediments which had affected the accuracy of the study.

Limitations are:

Sample size was small to generalize the study result.

Study was conducted only in BIRDEM general hospital, Dhaka and in Tangail diabetic hospital. So this study would not be generalized for whole Bangladesh.

This study was done in a short period, so all factors in relation to diabetes patient's musculoskeletal problem may not be highlighted. If enough time was available, knowledge on this thesis could be extended.

CHAPTER-VI	CONCLUSION AND RECOMMENDATION

6.1 Conclusion

In conclusion, this study has found that there is a high prevalence of shoulder pain and functional difficulties among the diabetic patients in Bangladesh. Shoulder pain and functional disability are significantly high in female and in older diabetes mellitus patients in Bangladesh. Therefore examination of the shoulder should be carefully addressed by health care providers. The understanding of the association between diabetic mellitus and this type of joint involvement is important for improving the quality of life of these patients. The study also focused that most of the diabetic patients with shoulder pain and functional disability were not taking proper rehabilitation according to their problem. Because of, most of the patients were not taking physiotherapy treatment. Physiotherapy treatment plays a vital role for the treatment of this type of patients. So it is important to make awareness about physiotherapy treatment and its effects on prevention and management of shoulder pain with functional disability among diabetic patients.

6.2 Recommendation

A large study is recommended, involving increased number of participants may increase the significance of results. More specific criteria in the inclusion of Diabetes Mellitus would ensure consistency of participants. The narrowing of variables such as age, gender, race in order to increase validity. Future study should include a multiple blinding procedure of data collection to maintain intra-rater reliability. Increasing the number of the participants and conduct the research in different places. Take sample from others specialized diabetic hospitals in different district in Bangladesh.

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ANNEXURE

1. Informed Consent (Bangla)
2. Informed Consent (English)
3. Questionnaire (Bangla)
4. Questionnaire (English)
5. Permission Letter

সম্মতিপত্র

আসসালামুআলাইকুম / নমস্কার,

আমি আবু নইম মোহাম্মদ বজলুর রহীম, ঢাকা বিশ্ববিদ্যালয়ের চিকিৎসা অনুষদের অধিভুক্ত বাংলাদেশ হেলথ প্রফেশনস্ ইন্সটিটিউট এর এম.এস.সি ইন ফিজিওথেরাপি কোর্সের চূড়ান্ত বর্ষের একজন শিক্ষার্থী। অধ্যায়নের অংশ হিসেবে আমাকে একটি গবেষণা সম্পাদন করতে হবে এবং এটা আমার প্রাতিষ্ঠানিক কাজের একটা অংশ। নিম্মোক্ত তথ্যাদি পাঠ করার পর অংশগ্রহণকারীদের গবেষণায় অংশগ্রহনের জন্য অনুরোধ করা হলো।

আমার গবেষণার বিষয় হল "বাংলাদেশে ডায়াবেটিস রোগে আক্রান্ত রোগীদের কাঁধের ব্যাথা ও একইসঙ্গে কাজে অক্ষমতার প্রাদুর্ভাব"। এই পরীক্ষামূলক গবেষণার মাধ্যমে আমি ডায়াবেটিস রোগে আক্রান্ত রোগীদের কাঁধের ব্যাথা ও কাজে অক্ষমতার হার নিরূপণের একটি অনুমান পরীক্ষা করব। আমি যদি আমার গবেষণাটি সার্থকভাবেসম্পূর্ণ করতে পারি তবে যেসব ডায়াবেটিস রোগীরা কাঁধের ব্যাথায় ভুগেছেন তারা উপকৃত হবেন এবং এটি হবে একটি পরীক্ষামূলক প্রমাণ। গবেষণাটি সম্পাদনের জন্য, আমার তথ্য সংগ্রহ করা প্রয়োজন হবে। গবেষণার ক্ষেত্র বিবেচনা করে আপনার মাঝে আমার গবেষণায় অংশগ্রহণ করার জন্য প্রয়োজনীয় বৈশিষ্ট্য লক্ষ্য করা গেছে। এজন্য, আপনি আমার গবেষণার একজন সম্মানিত অংশগ্রহণকারী হতে পারেন এবং আমি আপনাকে আমার গবেষণায় অংশগ্রহন করতে অনুরোধ জানাচ্ছি।

আমি প্রতিজ্ঞা করছি যে,এই গবেষণা আপনার জন্য ঝুঁকিপূর্ণ হবে না অথবা আপনার কোন ক্ষতি করবে না। গবেষণা চলাকালীন সময়ে কোন রকম দ্বিধা বা ঝুঁকি ছাড়াই যেকোন সময়ে আপনি এটাকে বাদ দিতে পারবেন। এই গবেষণার প্রাপ্ত তথ্য সম্পূর্ণভাবে গোপনীয় থাকবে এবং অংশগ্রহণকারীর ব্যক্তিগত তথ্য অন্য কোথাও প্রকাশ করা হবে না।

যদি আপনার গবেষণা সম্পর্কে কোনো জিজ্ঞসা থাকে তবে আপনি অনুগ্রহপূবক যোগাযোগ করতে পারেন গবেষক আমি আবু নইম মোহাম্মদ বজলুর রহীম, ফিজিওথেরাপি বিভাগ , বিএইচপিআই অথবা ডা. কামাল আহাম্মেদ, সহযোগী অধ্যাপক, হেলথ সার্ভিস ম্যানেজমেন্ট বিভাগ, সিআরপি, সাভার, ঢাকা-১৩৪৩ এর সাথে।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে ?
আমি কি শুরু করতে পারি ?

হ্যাঁ ☐   না ☐

অংশগ্রহণকারীর স্বাক্ষর ও তারিখ ....
সাক্ষাতকারগ্রহনকারীর স্বাক্ষর ও তারিখ ....
সাক্ষীর স্বাক্ষর ও তারিখ ....

প্রশ্নপত্র (বাংলা)

এই প্রশ্নপত্রটি "বাংলাদেশে ডায়াবেটিস রোগে আক্রান্ত রোগীদের কাঁধের ব্যাথার সঙ্গে কাজে অক্ষমতার প্রাদুর্ভাব" চিহ্নিত করার জন্য তৈরি করা হয়েছে এবং এই প্রশ্নপত্রটি গবেষণায় অংশগ্রহণকারী ব্যক্তি সঠিক উত্তরের বাম পাশে (V) চিহ্ন দিয়ে পূরণ করবেন, এবং বিশেষ ক্ষেত্রে গবেষক কালো অথবা নীল কালি ব্যবহার করবেন।

ভাগ-ক : আর্থ-সামাজিক তথ্য সম্পর্কিত প্রশ্ন

১.১	অংশগ্রহণকারীর নাম :	
১.২	যোগাযোগের নম্বর:	
১.৩	বয়স :	|__|__| বছর
১.৪	লিঙ্গ :	১= পুরুষ ২= মহিলা
১.৫	শিক্ষাগত যোগ্যতা?	১= অশিক্ষিত ২= প্রাথমিক ৩= মাধ্যমিক ৪= উচ্চ মাধ্যমিক ৫= সম্মান ৬= অন্যান্য
১.৬	পেশা	১= চাকুরীজীবী ২= ব্যবসায়ী ৩= গৃহিনী ৪= শ্রমিক ৫= অন্যান্য
১.৭	বসবাসের এলাকা	১= শহর ২= গ্রাম
১.৮	শারীরিক অবস্থা	১= ভাল ২= মোটামুটি ভাল ৩= খারাপ
১.৯	কতদিন ধরে ডায়াবেটিসে ভুগছেন?	১= ০-১ বছর ২= ২-৫ বছর ৩= ৬-১০ বছর ৪= ১১-১৫ বছর ৫= ১৫ বছরের বেশি

১.১০	আপনি কোন ধরণের ডায়াবেটিসে ভুগছেন?	১= টাইপ -১
		২= টাইপ -২
১.১১	আপনি ডায়াবেটিসের জন্য কি ধরণের চিকিৎসা নিচ্ছেন?	১= শুধু খাবার নিয়ন্ত্রণ
		২= খাবার নিয়ন্ত্রণ ও ঔষধ
		৩= শুধু ঔষধ
		৪= শুধু ইনসুলিন
		৫= খাবার নিয়ন্ত্রণ ও ইনসুলিন

ভাগ-ক: উপসর্গ ও ঝুঁকি সূচক সম্পর্কিত প্রশ্ন

২.১	আপনার কাঁধে কি কোনও ধরণের ব্যাথা আছে? যদি থাকে, তাহলে নিচের প্রশ্নগুলোর উত্তর দিন।	১= হ্যাঁ ২= না
২.২	আপনার কাঁধের ব্যাথার কারনে আপনি কি কোনও ধরনের অক্ষমতা অনুভব করেন? যদি করে থাকেন, তাহলে নিচের প্রশ্নগুলোর উত্তর দিন।	১= হ্যাঁ ২= না
২.৩	আপনার কাঁধে ব্যাথার তীব্রতা কেমন ? ০-১০ সীমার মাঝে আপনার কাঁধের ব্যাথার পরিমাণ সংখ্যার উপর বৃত্তাংকন করুন। ০ মানে ব্যাথা নেই এবং ১০ মানে ব্যাথার সবচেয়ে খারাপ অনুভূতি। যেমন- যদি কারও ব্যাথার অনুভূতি খুব খারাপ থাকে তাহলে সে এভাবে বৃত্তাংকন করবেঃ ব্যাথার স্কেল: ব্যাথা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ⑩ সবচেয়ে খারাপ ব্যাথা	
	ক) আপনার কাঁধের ব্যাথার সর্বোচ্চ স্তর কত? ব্যাথা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ সবচেয়ে খারাপ ব্যাথা	
	খ) আক্রান্ত কাঁধে ভর করে শুয়ে থাকলে ব্যাথার পরিমান কত? ব্যাথা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ সবচেয়ে খারাপ ব্যাথা	
	গ) উঁচু তাক থেকে কিছু নামানোর সময় ব্যাথার তীব্রতা কত? ব্যাথা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ সবচেয়ে খারাপ ব্যাথা	
	ঘ) আপনার ঘাড়ের পিছনে স্পর্শ করার সময় ব্যাথার তীব্রতা কত ?	

	ব্যাথা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ সবচেয়ে খারাপ ব্যাথা
	ঙ) আক্রান্ত হাতে কোনও কিছু ধাক্কা বা চাপ দেওয়ার সময় ব্যাথার পরিমান কত? ──────────────────── ব্যাথা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ সবচেয়ে খারাপ ব্যাথা
২.৪	**নিম্নোক্ত কাজগুলোর ক্ষেত্রে আপনি কতটুকু অসুবিধার সম্মুখীন হন? ০-১০ সীমার মাঝে আপনার অক্ষমতার পরিমাপ সংখ্যার উপর বৃত্তাংকন করুন।** **অক্ষমতা স্কেল:** ─────────────────────── ⬭ সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	ক) চুল পরিস্কার করার সময়? ──────────────────── সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	খ) পিঠ পরিস্কার করার সময়? ──────────────────── সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	গ) সোয়েটার পরিধান করার সময়? ──────────────────── সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন

	ঘ) বোতামযুক্ত শার্ট পরিধান করার সময়? _____ সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	ঙ) প্যান্ট পরিধান করার সময়? _____ সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	চ) উঁচু তাকে/র‍্যাকে কোনও কিছু রাখার সময়? _____ সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	ছ) ১০ পাউন্ড/ ৫ কেজি ওজনের কোনও বস্তু বহন করার সময়? _____ সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন
	জ) পেছনের পকেট থেকে কোনও কিছু বের করতে? _____ সবচেয়ে বেশি অসুবিধা অসুবিধা নেই ০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০ অন্যের সাহায্য প্রয়োজন

২.৫	আপনি কাঁধের ব্যাথার জন্য কি ধরণের চিকিৎসা নিয়েছেন?	১= ঔষধ
		২= ফিজিওথেরাপি
		৩= ঔষধ ও ফিজিওথেরাপি উভয়ই
		৪= কোনটাই না
		৫= অন্যান্য

জরিপটি সম্পূর্ণ করার জন্য আপনাকে ধন্যবাদ

Consent Form

Assalamualaikum\ Namashker,

I am Abu Naim Mohammad Bazlur Rahim, Final part of M.Sc. in Physiotherapy student of Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Mastars degree, I have to conduct a research project and it is a part of my study. The participants are requested to participate in the study after a brief of the following.

My research title is "Prevalence of Shoulder Pain with Functional Disability among Diabetes Mellitus Patients in Bangladesh". Through this study I will find out the prevalence of shoulder pain and functional disability of the persons who suffer from diabetes mellitus in Bangladesh. If I can complete this study successfully, Diabetes Mellitus patients may get benefits who are suffering from shoulder pain with Functional Disability.

To fulfill my research project, I need to collect data. So, you can be a respected participant of this research. For this purpose I would like to know about some personal and other related questions about shoulder problems and DM. This will take approximately 15-20 minutes. I would like to inform you that this is a purely academic study and will not be used for any other purposes. I assure that all data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw consent and discontinue participation at any time of the experiment. You also have the rights to answer a particular question that you don't like.

If you have any query about the study or right as a participant, you may contact with researcher Abu Naim Mohammad Bazlur Rahim, Dept. of Physiotherapy or Dr. Kamal Ahmed, Associate professor, Department of health service management, BHPI, CPR, Savar, Dhaka-1343.

Do you have any questions before I start?

So, may I have your consent to proceed with the interview?

Yes ☐   No ☐

Signature and date of participant ……………………………..

Signature and date of the interviewer ……………………………..

Signature and date of the witness ………………………………..

Questionnaire (English)

This questionnaire is developed for the study "Prevalence of Shoulder Pain with Functional Disability among Diabetes Mellitus Patients in Bangladesh" and this section will be filled (V) mark in the left of point by the participant, but in special consideration researcher using a black or blue pen.

SECTION-A: Socio-demographic Information

1.1	Participant's Name:	
1.2	Contact No.:	
1.3	May I know your age please?	|__|__| years
1.4	Sex:	1= Male 2= Female
1.5	What is your education?	1= Illiterate 2= Primary education 3= Secondary education 4= Higher secondary 5= Bachelor or above 6= Other
1.6	What is your profession?	1= Service holder 2= Businessman 3= Housewife 4= Labor 5= Other
1.7	Your residential or living area?	1= Urban 2= Rural
1.8	Health Status	1= Good 2= Fair 3= Poor
1.9	Durations of diabetes mellitus?	1= 0-1 year 2= 2-5 years 3= 6-10 years 4= 11-15 years 5= More than 15 years
1.10	Which type of diabetes you are suffering from?	1= Type 1 2= Type 2
1.11	What type of treatment you are taking for diabetes?	1= Only food control 2= Food maintenance and medication

		3= Only medication 4= Only Insulin 5= Food control and insulin

SECTION-B: Symptoms and Risk indicator related questions

2.1	Have you feel any shoulder pain? If yes, then answer the following.	1= Yes 2= No
2.2	Have you feel any disability due to shoulder pain? If yes, then answer the following	1= Yes 2= No

2.3	How severe is your pain? Please circle the number that best describes the question being asked. **Pain scale:** No pain at all 0 1 2 3 4 5 6 7 8 9 10 Worst pain
	a) At its worst? 0 1 2 3 4 5 6 7 8 9 10
	b) When lying on the involved side? 0 1 2 3 4 5 6 7 8 9 10
	c) Reaching for something on a high shelf? 0 1 2 3 4 5 6 7 8 9 10
	d) Touching the back of your neck? 0 1 2 3 4 5 6 7 8 9 10
	e) Pushing with the involved arm? 0 1 2 3 4 5 6 7 8 9 10
2.4	How much difficulty do you have? Please circle the number that best describes the question being asked. **Disability scale:** No difficulty 0 1 2 3 4 5 6 7 8 9 10 So difficult, it requires help
	a) Washing your hair? 0 1 2 3 4 5 6 7 8 9 10
	b) Washing your back? 0 1 2 3 4 5 6 7 8 9 10

	c) Putting on an undershirt or pullover sweater? 0 1 2 3 4 5 6 7 8 9 10	
	d) Putting on a shirt that buttons down the front? 0 1 2 3 4 5 6 7 8 9 10	
	e) Putting on your pants? 0 1 2 3 4 5 6 7 8 9 10	
	f) Placing an object on a high shelf? 0 1 2 3 4 5 6 7 8 9 10	
	g) Carrying a heavy object of 10 pounds? 0 1 2 3 4 5 6 7 8 9 10	
	h) Removing something from your back pocket? 0 1 2 3 4 5 6 7 8 9 10	
2.5	What type of treatment you received for your shoulder pain?	1= Medication 2= Physiotherapy 3= Both physiotherapy & medication 4= None 5= Others

Permission Letter

Ref: CRP/BHPI/03/16/6374   Date: 05/03/2016

To
Director
BIRDEM General Hospital,
122, Kazi Nazrul Islam Avenue, Shahbagh, Dhaka-1000

Subject: Regarding permission to collect data from diabetic patients.

Dear Sir,

Greetings from Bangladesh Health professions Institute (BHPI)!

For your kind information, Bangladesh Health professions Institute (BHPI) - an academic institute of Centre for the Rehabilitation of the Paralysed (CRP) has been conducting MSc in Physiotherapy program under the Faculty of Medicine, University of Dhaka since 2013. This is a two years fulltime course and our 1st batch and 2nd batch students already have completed their Part-1 examination. In Part-2 they have to conduct a thesis project.

Mr Abu Naim Mohammad Bazlur Rahim is one of our students is going to do his research project in the field of Diabetics. His research title is "Prevalence of Shoulder Pain among Diabetes Mellitus Patients in Bangladesh" supervised by Dr. Kamal Ahmed, Associate Professor, Bangladesh Health Professions Institute (BHPI). The purpose of this study is to identify the prevalence of shoulder pain among diabetic patients. He wishes to collect data from your renowned hospital.

He is doing a cross sectional study. He has already obtained ethical permission from Institutional Review Board (IBR) of our institute. I would like to assure that anything of his research project will not harmful for the participants.

We will appreciate if you kindly help our student by providing permission for data collection and co-operate him.

Hope you will extend your collaboration for developing the quality of research in the field of physiotherapy and rehabilitation.

Please do not hesitate to ask if you have any quires regarding any issues.

Thank you

Sincerely

05/03/2016

Nasirul Islam
Principal (acting), BHPI

Ref: CRP-BHPI/IRB/02/16/040

Date: 27.02.2016

To

Abu Naim Mohammad Bazlur Rahim
Part – II, M.Sc. in Physiotherapy
Session: 2013-2014, DU Reg. 1396
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal – **"Prevalence of shoulder pain with functional disability among diabetic patients in Bangladesh"** by IRB of BHPI.

Dear Abu Naim Mohammad Bazlur Rahim,

Congratulation!

The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application on January 21, 2016 to conduct the above mentioned thesis, with yourself, as the Principal investigator. The Following documents have been reviewed and approved:

SL#	Name of the Documents
1	Thesis Proposal
2	Questionnaire
3	Information sheet & consent form.

Since the study involves answering a questionnaire that takes 15 to 20 minutes, have no likelihood of any harm to the participants rather possibility of benefit by knowing the prevalence of shoulder pain with functional disability among diabetic patients in Bangladesh. From the information of Questionnaire, IRB has approved the study to be conducted in the presented form at the meeting held at 08:30 AM on February 25, 2016 at BHPI.

IRB expects to be informed about the progress of the study, any changes occurring in the course of the study, any revision in the protocol and patient information or informed consent and ask to be provided a copy of the final report. IRB of BHPI is working accordance to Nuremberg Code 1947, World Medical Association Declaration of Helsinki, 1964 - 2013 and other applicable regulation.

Best regards,

S.M. Ferdous Alam
Assistant Professor
Dept. of MSc in Rehabilitation Science
Member Secretary, Institutional Review Board (IRB), BHPI.

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ, ফোন ঃ ৭৭৪৫৪৬৪-৫, ৭৭৪১৪০৪ ফ্যাক্স ঃ ৭৭৪৫০৬৯

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404, Fax : 7745069, E-mail : contact@crp-bangladesh.org, www.crp-bangladesh.org

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