

**COMMON MUSCULOSKELETAL DISORDERS AMONG THE  
DIABETIC PATIENTS ATTENDED AT BIRDEM GENERAL  
HOSPITAL IN DHAKA**

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Bachelor of Science in Physiotherapy (B. Sc. PT)

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for the acceptance of this dissertation entitled

**COMMON MUSCULOSKELETAL DISORDERS AMONG THE DIABETIC PATIENTS ATTENDED AT BIRDEM GENERAL HOSPITAL IN DHAKA**

Submitted by **Apurbo Roy**, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B. Sc. PT).

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## **DECLARATION**

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that for any publication, presentation or dissemination of information of the study. I would be bound to take written consent form my supervisor.

**Signature:**

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## Acronyms

|               |  |
|---------------|--|
| <b>BHPI</b>   | Bangladesh Health Professions Institute  |
| <b>BIHS</b>   | Bangladesh Institution of Health Sciences  |
| <b>BIRDEM</b> | Bangladesh Institute of Research and Rehabilitation for Diabetes,<br>Endocrine and Metabolic |
| <b>BMD</b>    | Bone Mineral Density   |
| <b>BMI</b>    | Body Mass Index  |
| <b>CHD</b>    | Congenital Heart Disease   |
| <b>CTS</b>    | Carpal Tunnel Syndrome   |
| <b>DAB</b>    | Diabetes Association of Bangladesh   |
| <b>DC</b>     | Dupuytren's Contracture  |
| <b>DISH</b>   | Diffuse Idiopathic Skeletal Hyperostosis   |
| <b>DM</b>     | Diabetes Mellitus  |
| <b>HSC</b>    | Higher Secondary School Certificate  |
| <b>IDF</b>    | International Diabetes Federation  |
| <b>IGF</b>    | Insulin Growth Factor  |
| <b>MSCs</b>   | Musculoskeletal Complains  |
| <b>NCDs</b>   | Non Communicable Disease   |
| <b>NCV</b>    | Nerve Conduction Velocity  |
| <b>NIDDM</b>  | Non Insulin Dependent Diabetes Mellitus  |
| <b>OA</b>     | Osteoarthritis   |
| <b>RMSD</b>   | Rheumatic Musculoskeletal Disease  |
| <b>SEAR</b>   | South-East Asia Region   |
| <b>SPSS</b>   | Statistical package for Social Sciences  |
| <b>SSC</b>    | Secondary School Certificate   |
| <b>UK</b>     | United Kingdom   |
| <b>US</b>     | United States  |
| <b>WHO</b>    | World Health Organization  |

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## Abstract

*Purpose:* Diabetes mellitus is associated with a variety of musculoskeletal problem. In Bangladesh many diabetic mellitus patients are suffering with different musculoskeletal complications. This study represents the common musculoskeletal disorder among the diabetic patients. *Objectives:* To discover the common musculoskeletal complain demonstrated by the diabetic patients; and to determine the socio demographic characteristics of the study population. *Methodology:* A cross sectional study was conducted. One hundred subjects were selected by using convenience sampling technique. Data was collected from the participants through face to face interview. Descriptive statistics was used for data analysis. *Results:* The study results show that more than half of the participants 65% were male and 35% were female. The study also reveals that (n=100) 76% diabetic patient were suffering from musculoskeletal pain and 24% diabetic patient were free from musculoskeletal pain. According to the regional complain the study results demonstrate that, 9% had neck pain, 28% low back pain, 8% shoulder pain, 4% elbow pain, 7% Participants were wrist pain, 8% finger pain, 12% knee pain. *Conclusion:* Musculoskeletal disorder among the diabetic patient lead to pain, discomfort and disability. Moreover, the quality of life of the patient also alter for such consequence. The multidisciplinary team approach should be implemented in order to enhance quality of care of the diabetic patient to resolve the musculoskeletal disorder.

**1.1 Background**

In developing countries, rising diabetes rates present enormous challenges to poverty eradication and economic development. The total population in Bangladesh was recorded 150.5 million people in 2011 (World Bank, 2012). Bangladesh is a least developed country with a disproportionately high diabetes population. No studies have been conducted to evaluate the reasons behind the considerable differences in the diabetes prevalence among least developed country. Among all people living with diabetes in the 48 least developed countries, more than one-third live in Bangladesh (The blueprint for change program, 2012).

The number of diabetic patients is annually growing at a rate of three percent in the country and if the present rate continuous, the number of diabetics will double to 10.4 million by 2030. The term diabetes is a silent killer of this country; India and Bangladesh have the highest number of diabetic patients in south East Asian region. Bangladesh has 5.7 million patients which is 6.1 percent of the total population (Reazuddin, 2013).

Diabetes was the seventh leading cause of death based on U.S. death certificates in 2007. Diabetes is likely to be under reported as a cause of death. Studies have found that about 35 to 40 percent of decedents with diabetes had it listed anywhere on the death certificate and about 10 to 15 percent had it listed as the underlying cause of death. Overall, the risk for death among people with diabetes is about twice that of people of similar age but without diabetes (Death among people with diabetes, 2007).

The prevalence of both type of diabetes varies considerably around the world and is related to difference in genetic and environmental factors. The prevalence of known diabetes in Britain around 2-3%, but is the higher in the middle and Far East (e.g. 12% in Indian subcontinent). A pronounced rise in the prevalence of type 2 diabetes occurs in migrant population to industrialized countries, as in Asian and Afro-Caribbean immigrants to the U.K (Rahim et al., 2011).

Type-2 diabetes is now being observed in children and adolescents, particularly in some ethnic groups, such as Hispanic and Afro-Americans. Type-1 diabetes is more common in children in Caucasian population and in Northern-Europe its prevalence in children has doubled in last 20 years, with a particular increase in children less than 5 years of age. In Europe and North-America the ratio of type-2 to type-1 is approximately 7:3 (Rahim et al., 2011).

Type-2 diabetes is now a global health problem. Recent epidemiological reports showed that increased prevalence of diabetes in Turkey (7.2%), India (8.2%), Pakistan (11.1%), and Hawaii (20.4%). In European population, age standardized prevalence varied from 3-10%. Some Arab, migrant Asian Indian, Chinese and Hispanic American population were at higher risk with prevalence of 14-20%. The higher prevalence's was found in the Nauruan 41% and the pima\papago Indians 50% (Rahim et al., 2011).

It is said that the developing countries will bear the brunt of diabetes epidemics in 21 century. Diabetes is now affecting many in the workforce; it has a major and deleterious impact on both individual and national productivity. The socio economic consequences of diabetes and its complications could have a seriously negative impact on the economics of developed and developing nations (WHO, 2011).

Diabetes is now one of the most common non communicable diseases globally. It is the fourth or fifth leading cause of death in most high income countries and there is substantial evidence that it is epidemic in many low and middle income countries. Complications from diabetes such as coronary artery and peripheral vascular disease, stroke, diabetic neuropathy, amputations, renal failure, and blindness are resulting in increasing disability, reduced life expectancy and enormous health costs for virtually every society. Diabetes is certain to be one of the most challenging health problems in the 21<sup>st</sup> century (Richard et al., 2010).

Diabetes mellitus is associated with several musculoskeletal disorders. The incidence of diabetes mellitus and the life expectancy of the diabetic patient have both increased, resulting in increased prevalence and clinical importance of musculoskeletal alterations in diabetic subjects. The development of musculoskeletal

disorders is dependent on age on the duration of diabetes mellitus. It has been difficult to show a direct correlation with the metabolic control of diabetes mellitus. Most of these disorders can be diagnosed clinically but some radiological examination may help, especially in differential diagnosis (Arkkila et al., 1996).

Every diabetic patient has a risk of various bone and joint disorder in future life. Factors such as nerve damage (diabetic neuropathy), arterial disease and obesity may contribute to these problems, but often the cause is not clear. Not long ago Diabetes was regarded as rare condition but the number of people with diabetes is increasing due to population growth, aging, urbanization, and increasing prevalence of obesity and physical inactivity. The complications of diabetes mellitus are numerous and include involvement of the musculoskeletal system (Wild et al., 2004).

Musculoskeletal disorders are common in type 2 diabetic subjects and examination particular regions of the hands, the joints, shoulders and feet, as well as the skeleton should be included in the evaluation of patients with diabetes mellitus. Most musculoskeletal complications seen to be associated with the duration of diabetes mellitus and appear in diabetic patients of younger age than their counter parts in the general population. Musculoskeletal disorders in these patients and probably related to the long term glycemic control of the diabetes. However no direct association could be proven with the metabolic control of the disease (Doulaumpakas et al., 2007).

Generally type-2 diabetes affects populations between 40 and 70 years of age and it is the most common type of the disease (Ozdirenc et al., 2004). There is a higher incidence of type-2 diabetes in urban than in rural areas (King et al.,1998) as well as incidence is associated with population whose lifestyle has changed from traditional patterns to a modern “Westernized” model (Bloomgarden, 1996).

Diabetes mellitus is a global health issue affecting children, adolescent, and adult. According to the WHO approximately 180 million people worldwide currently have type-2 diabetes mellitus; over 95 percent of people with diabetes have this form (WHO, 2008). Some musculoskeletal disorders are more prevalent in the diabetic population than in the general population such as rotator cuff tendonitis, frozen shoulder, osteoarthritis etc (Gilek & stahl, 2012). In present world prevalence

Diabetes Mellitus 2.8% of the total population and in Bangladesh more than 90% of the all diabetes patients belong to Type-2 diabetes (Kalra et al., 2010).

The prevalence of diabetes for all age-groups worldwide was estimated to be 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million in 2030. The prevalence of diabetes is higher in men than women, but there are more women with diabetes than men. The diabetes mellitus in urban population in developing countries is projected to double between 2000 and 2030 (Sarah, 2004).

An increasing trend in diabetes prevalence has been reported; comparatively it was more in urban areas than rural.

**Diabetes Prevalence- Rural Vs Urban:**

| Country    | Rural | Urban |
|------------|-------|-------|
| Bangladesh | 4%    | 8%    |
| Nepal      | 3%    | 15%   |
| Sri Lanka  | 8.7%  | 16.4% |
| India      | 6.4%  | 12.1% |

Table-1: Prevalence of diabetes mellitus in urban and rural area

About 1.1 million people were estimated to have died due to diabetes in 2005 and almost 80% of diabetes deaths occur in low- and middle-income countries and mostly people under the age of 70 years, 55% of diabetes deaths are in women (Gabriel, 2009). Diabetes mellitus (DM) possess a serious threat to developing countries like Bangladesh. According to latest WHO estimate about 7 million that means 70 lack people in Bangladesh have diabetes (Hossain et al., 2013).

Physiotherapy plays a pivotal role in the management of diabetes mellitus. Exercise is a basis in the management of diabetes, and the physiotherapist holds a place of importance in helping diabetic patients lead a better quality of life (Kalra et al., 2007).

According to World Health Organization (2011) the prevalence of diabetes mellitus in South East Region at a glance in table-2.

| <b>Country</b>                 | <b>In 2000</b>    | <b>In 2030 (Prediction)</b> |
|--------------------------------|-------------------|-----------------------------|
| Bangladesh                     | 3,196,000         | 11,140,000                  |
| Bhutan                         | 35,000            | 109,000                     |
| Dem. People's Rep. of<br>Korea | 367,000           | 635,000                     |
| India                          | 31,705,000        | 79,441,000                  |
| Indonesia                      | 8,426,000         | 21,257,000                  |
| Maldives                       | 6,000             | 25,000                      |
| Myanmar                        | 543,000           | 1,330,000                   |
| Nepal                          | 436,000           | 1,328,000                   |
| Sri Lanka                      | 653,000           | 1,537,000                   |
| Thailand                       | 1,536,000         | 2,739,000                   |
| <b>Total</b>                   | <b>46,903,000</b> | <b>119,541,000</b>          |

Table-2: Prevalence of diabetes mellitus in South East Region

## **1.2 Rationale**

Diabetes mellitus poses 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 increased 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.

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 are the common musculoskeletal disorders among the diabetic patients.

### **1.4 Objectives**

#### **1.4.1 General objective**

- To explore the common musculoskeletal disorders among the diabetic patient.

#### **1.4.2 Specific objectives**

- To identify the number of diabetic patient affected by musculoskeletal disorder.
- To find out the common musculoskeletal disorders in different body region of diabetic patient.
- To explore the socio demographic characteristics of diabetic patient.
- To determine the common treatment option.
- To understand the severity of pain.
- To discover how long the diabetes patient was suffering this musculoskeletal problem.



### 1.5 List of variables

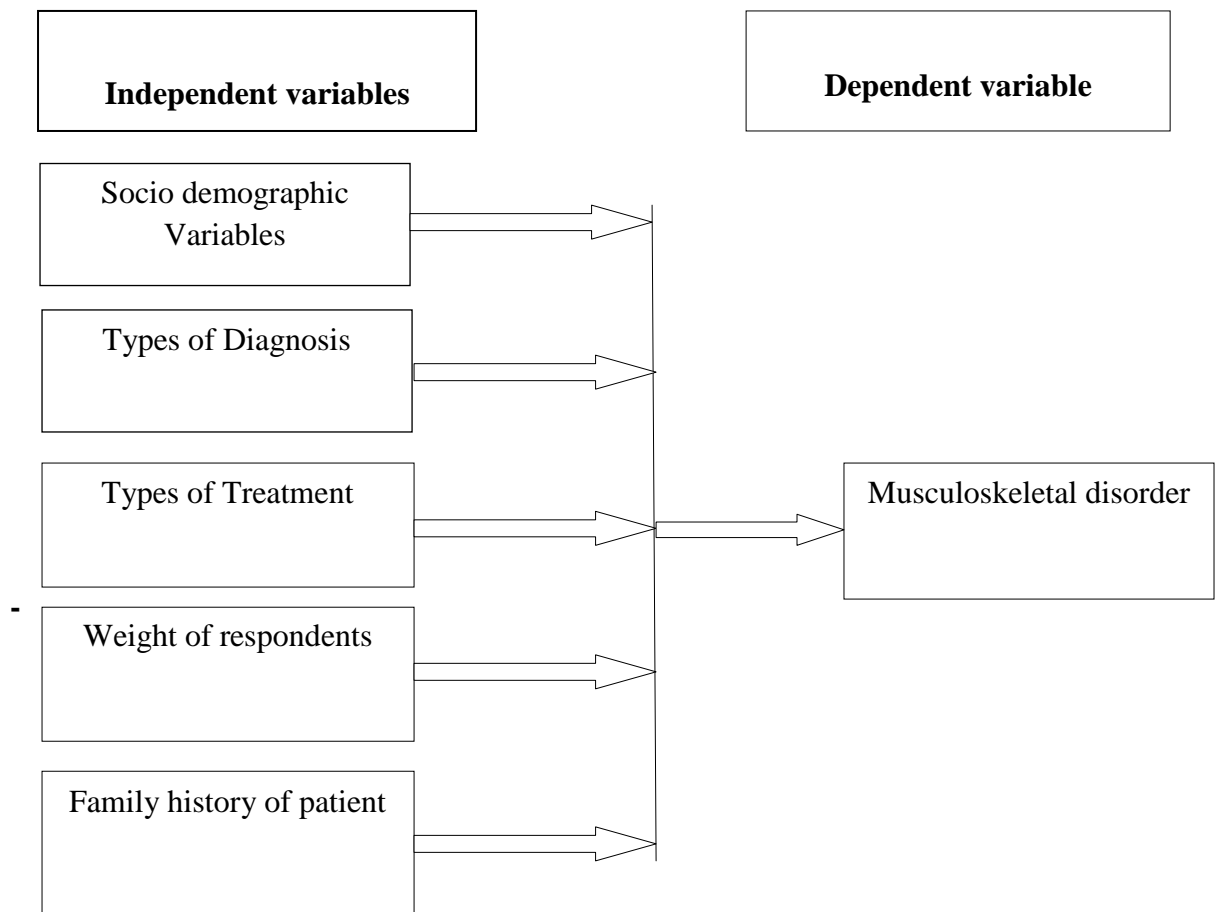


Table-3: List of variables

## **1.6 Operational definition**

### **Diabetes mellitus**

Diabetes mellitus is a group of chronic metabolic conditions, all of which are characterized by elevated blood glucose levels resulting from the body's inability to produce insulin or resistance to insulin action, or both.

### **Musculoskeletal disorder**

A musculoskeletal disorder is a condition where a part of musculoskeletal system is injured over time. The term musculoskeletal disorder identifies a large group of conditions that result from traumatizing the body in either a minute or major way over a period of time.

Musculoskeletal disorders are among the most common of human afflictions. They affect all age groups and frequently cause disability, impairments, and handicaps. They consist of a variety of different diseases that cause pain or discomfort in the bones, joints, muscles, or surrounding structures, and they can be acute or chronic, focal, or diffuse. Approximately 33 percent of U.S adults are affected by musculoskeletal signs or symptoms, including limitation of motion or pain in a joint or extremity. In one study of Detroit residents who kept track of daily health symptoms in a diary, musculoskeletal symptoms constituted the most frequent category of health symptoms. The prevalence of musculoskeletal disorders generally increases with age, with the majority of persons aged seventy-five and over having some form of musculoskeletal disorder, especially arthritis (Felson, 2000).

Musculoskeletal disorders are chronic, disabling, and costly. They affect people of all ages, cultures, and ethnic groups. These disorders are the leading cause of disability and loss of function, as well as limitation and impairment of activities for people over the age of 18. These conditions affect nearly one in two adults and, among medical conditions, lead to the greatest number of lost workdays and medical bed days in the United States (Steve et al., 2012).

A large proportion of the musculoskeletal problems for which patients seek medical attention are related to periarticular structures and do not represent a true articular process or a more generalized systemic illness (Wise, 2003). Musculoskeletal complications are most commonly seen in patients with a longstanding history of type-2 diabetes. Some of the complications have a known direct association with diabetes, whereas others have a suggested but unproven association (Kim et al., 2001).

Diabetes mellitus is associated with a variety of musculoskeletal complications and their prevalence in these patients has increased in the recent years affecting significantly their quality of life. A wide range of musculoskeletal syndromes have been described in association with diabetes, namely diabetic cheiro-arthropathy,

adhesive capsulitis of shoulder, carpal tunnel syndrome, Dupuytren's contracture, hyperostosis, osteoarthritis, hyperuricaemia etc (Antony, 2012).

Arthritis and musculoskeletal conditions constitute a major public health problem, as large contributors to illness, pain and disability. They occur frequently, placing a high economic and personal burden on the community. This burden includes the use of hospital and primary care services, disruptions to daily life, and lost productivity through functional limitations and activity restriction (Rahman et al., 2005).

Studies have demonstrated that local and widespread musculoskeletal pains are more common in patients with the type-2 diabetes. Musculoskeletal disorders are significant health and safety issues for which challenges and opportunities exist to better understand objective causes and effects, economic impacts and effective strategies to prevent and treat this complicated disorders (Seaman, 2013).

The rheumatologic manifestations of diabetes mellitus are the following syndromes of limited joint mobility, diabetic hand syndrome (diabetic cheiroarthropathy), adhesive capsulitis (frozen shoulder, periartthritis), trigger finger (flexor tenosynovitis), Dupuytren's contractures, osteoporosis, diffuse idiopathic skeletal hyperostosis (DISH), neuropathies, neuropathic arthritis, (Charcot joints, diabetic osteoarthropathy), Carpal tunnel syndrome, diabetic amyotrophy, reflex sympathetic dystrophy, various other neuropathies, diabetic muscle infarction (Serban et al., 2012). Diabetes mellitus is a chronic metabolic condition characterized by persistent hyperglycaemia with resultant morbidity and mortality related primarily to its associated microvascular and macrovascular complications. It is common, with recent estimates showing that 7.5% of Australians over 25 have diabetes, of which 50% of cases are undiagnosed. Most of these patients (85%) have type 2 diabetes mellitus. Type 2 generally occurs in people over 40 and is characterized by insulin resistance (Smith, et al., 2003).

The prevalence of diabetics is increasing rapidly in the developing countries including Bangladesh and it is a chronic disease which is never cured, but a diabetic's patient can lead a normal life by controlling the disease through balanced diet, taking appropriate drug, and exercising regularly. In 2007, the International Diabetes

Federation (IDF) estimates that 3.8 million or 4.8% of people living in Bangladesh with diabetes. By 2025, that number will have expected to grow to 7.4 million or 6.1% of the population. This explosion in diabetes prevalence will place Bangladesh among the top ten countries in terms of the number of people living with diabetes in 2025. IDF and WHO predict that the number of women in the world with diabetes will double in less than 20 years and in Bangladesh the number of women with diabetes will grow from the current 2 million to 4 million by 2025. During the same period, men with diabetes will rise from 1.8 million to 3.4 million (Rahim et al., 2011).

Diabetes mellitus affects connective tissues in many ways and causes different alterations in periarticular and skeletal systems. Several musculoskeletal disorders have been described in these patients which can be divided into three categories: a. disorders which represent intrinsic complications of diabetes, such as limited joint mobility or diabetic cheiroarthropathy, stiff hand syndrome, and diabetic muscular infarction, b. disorders with an increased incidence among diabetics, such as Dupuytren's disease, shoulder capsulitis, neuropathic arthropathy, osteopenia (in type-1 DM), flexor tenosynovitis, septic arthritis, acute proximal neuropathy, proximal motor neuropathy, pyomyositis and the diffuse idiopathic skeletal hyperostosis (DISH) syndrome, the diagnosis of which depends on the radiographic recognition of a minimum of two bridges connecting three consecutive vertebrae in diabetics usually complaining of backache, and finally c. disorders for which a possible association with diabetes has been proposed but not proven yet, such as osteoarthritis and the carpal tunnel syndrome (Douloumpakas et al., 2007).

Diabetes is a multi-system disorder affecting 3-7% of the adult population in different geographical areas. Adhesive capsulitis of shoulder joint is well established as a complication of diabetes. Trigger finger, catching and snapping of the fingers and complications involving joints e.g. Charcot's arthropathy are frequent in diabetic patients (Shahzaman et al., 2008).

Diabetes can affect the shoulder in several ways. First, adhesive capsulitis, or frozen shoulder, has been reported in 19% of diabetic patients. This term refers to a stiffened glenohumeral joint usually caused by a reversible contraction of the joint capsule.

Calcific periarthritis of the shoulder is also seen in diabetes, where it is roughly three times more common than in people without diabetes. Reflex sympathetic dystrophy, also known as “shoulder-hand syndrome,” is seen in diabetic patients, although whether it occurs with increased frequency is controversial (Kim et al., 2001). A higher prevalence of frozen shoulder (20–29%) has been reported in diabetes mellitus (DM) patients (Jung et al., 2010).

Several sonographic studies, performed in the general population, show that the prevalence of rotator cuff tears increases with age. The prevalence of tears ranges widely, roughly from 0-15% in the 60s to 30-50% in 80s. In addition, after a surgical repair, diabetics show a restricted shoulder range of motion and a higher incidence in re-tears (Mechele et al., 2010).

Diabetes mellitus (DM) is considered as an epidemic in the modern world and much of its morbidity and mortality is related to micro and macro vascular complications (Saera et al, 2013). Prolonged hyperglycemia in uncontrolled diabetic patients results in collagen glycosylation. Glycosylated collagen is less soluble, offers increased resistance to collagenases and accumulates in connective tissue, which not only alters the extra cellular matrix structure and function but also affects cell viability (Crispin & Alcocer, 2003).

Syndromes of limited joint mobility mainly involve upper limb musculoskeletal structures and seem to be associated with diabetes duration, poor metabolic control and presence of microvascular complications. Diabetic cheiroarthropathy, or "stiff-hand syndrome" is characterized by painless limitation of mobility of the small joints of the hands. The prevalence ranges from 8% to 50% among patients with diabetes, compared with only 4% to 20% among individuals without DM (Serban et al., 2012). The prevalence of proteinuria and retinopathy was of 11% in diabetic patients without diabetic cheiroarthropathy versus 50% in diabetic patients with diabetic cheiroarthropathy (Rosenbloom et al., 1981).

Dupuytren contracture (DC) is characterized by the thickening and shorting of the palmar fascia, causing a contracture in flexion of the affected finger. In nondiabetic patients, the most affected fingers are the fourth and the fifth, but in individuals with

DM, DC mainly affects third and fourth fingers and the hand involvement is frequently bilateral (Childs, 2005).

The prevalence of DC in diabetes ranges between 20% and 63%, higher than among subjects without diabetes, 13% (Crispin and Alcocer, 2003 Smith et al., 2003). DC is associated with diabetes duration, long-term poor metabolic control and presence of microvascular complications (Arkkila et al., 2003). Diabetic cheiroarthropathy and Dupuytren contracture may coexist in the same patient (Smith et al., 2003).

Treatment of DC includes a good glycemic control, physiotherapy, topical steroid injection, and for the refractory cases surgery. Generalized hand stiffness has been observed after the surgical intervention (Fournier et al., 2008). Trigger finger (stenosing flexor tenosynovitis) is caused by the inflammation and subsequent narrowing of the pulley, which causes finger blocking in flexion with the active extension failure. The middle and index fingers are the most commonly involved (Katzman et al., 1999).

The prevalence of trigger finger ranges between 5% and 36% among patients with type-1 and 2 DM as compared with 2% in the general population (Chgliero et al., 2002). The incidence of these disorders in diabetic subjects is associated with actual duration of the disease, not with glycemic control (Chammas et al., 1995). Trigger finger treatment consists in the modification of the activities to avoid the triggering of the digits, nonsteroidal anti-inflammatory drugs, splinting, corticosteroid injection into the tendon sheath and surgical release (Ryzewicz et al., 2006).

Adhesive capsulitis (frozen shoulder) is a condition characterized by an insidious and progressive loss of active and passive mobility of glenohumeral joint, presumably due to the capsular contraction (Owens, 1996). The estimated prevalence of this condition is of 11-30% in diabetic patients, which is considerably greater than in non-diabetics (Smith et al, 2003). Diabetes of long duration treated with insulin was associated with a larger percentage of shoulder calcification (Mavrikakies et al., 1989).

Osteoporosis can occur in the diabetic patient as a direct consequence of the disease, but it can be also a treatment manifestation. The results of Nord Torndelag in Norway

showed significant increase of hip fracture among women with type-I DM compared with non-diabetic women. (Relative risk=6.9, CI=2.2-21.6) (Forsen et al., 1999).

Regarding type-2 diabetes, this association is not yet very well established. It was demonstrated that oral antidiabetic agents, the thiazolidinediones cause a bone mass decrease and a risk fracture increase (Lecka et al., 2010). Diffuse idiopathic skeletal hyperostosis (DISH) (Forestier' Disease) is associated with ligamentous ossification of the anterolateral aspect of the spinal column, sometimes leading to bony ankylosis. It was demonstrated that DISH is associated with diabetes mellitus particularly with non-insulin dependent diabetes. Several other metabolic disturbances and concomitant diseases have been suggested to be associated with DISH including obesity, increased waist circumference, hypertension, dyslipidemia, hyperuricaemia, metabolic syndrome (Dragon et al., 1995, Vezyrogloe et al., 1996, Kiss et al., 2002, Sarzi et al., 2004).

Insulin has been proposed as a factor that promotes growth in DISH. In one study, patients with DISH and those with osteoarthritis had elevated levels of insulin and growth hormone, however, the level of IGF-1 was higher in patients with DISH than in those with osteoarthritis (Denko et al., 1994).

The diagnosis of DISH is based on radiologic features. Radiographic criteria for the diagnosis proposed by Resnick and Niwayama require the involvement of at least four contiguous thoracic vertebral segments, preservation of intervertebral disc spaces and the absence of apophyseal joint degeneration or sacroiliac inflammatory changes (Resnick et al., 1988). Neuropathic arthritis (Charcot joints, diabetic osteoarthropathy) is a condition characterized in its early stages by acute inflammation that leads to bone and joint fractures, dislocation, instability and gross deformities (Nielson et al., 2008). In patients with diabetes, Charcot osteoarthropathy is associated with a longstanding duration of diabetes and peripheral neuropathy. The prevalence estimated among diabetic patients varies from 0.08 to 13% (Frykberg et al., 2008).

Carpal tunnel syndrome (CTS) is a painful disorder caused by the compression of the median nerve between the carpal ligament and other structures within the carpal tunnel. It has been reported in up to 20 percent of diabetic patients, but the incidence



rises to 75 percent in those with limited joint mobility (Botek et al., 2010). CTS may be more common in those with prediabetes (Gamstedt et al., 1993). Diabetic amyotrophy is a condition occurring in type-1 and 2 DM, in which patients develop severe aching or burning and lancinating pain in the hip and thigh, followed by a weakness and wasting of the thigh muscle and significant weight loss. It is associated with poor glycemic control (Russell et al., 2008). The results of the electrodiagnostic studies, which are often met, are consistent with the presence of a neurogenic lesion that involves lumbosacral roots, plexus and peripheral nerves (Tracy et al., 2008). This condition is most likely caused by inflammatory, immune-mediated vascular Radiculoplexopathy (Dyck et al., 1999 & Kawamura et al., 2008).

Kilfoyle et al., studied the therapy with pulsed methylprednisolone and noted a significant improvement in pain and weakness in the majority of the patients (Kilfoyle et al., 2003). Reflex sympathetic dystrophy is a component of complex regional pain syndrome (CRPS), a neuropathic pain disorder with significant autonomic features. CRPS is divided into CRPS-I (reflex sympathetic dystrophy) and CRPS II (causalgia) reflecting, respectively, the absence or the presence of documented nerve injury. CRPS I typically develop after a minor tissue trauma or bone fracture and is associated with a predisposing condition (Bruehl et al., 2003).

Diabetes mellitus and other endocrine (hyperthyroidism, hyperparathyroidism) and metabolic disease (IV hyperlipidemia) are predisposing conditions (Marshall et al., 2000). Diabetic muscle infarction (DMI) is an uncommon complication of diabetes that was first described by Angervall (Angervall & Stener, 1965). The most disabling of the common musculoskeletal problems is adhesive capsulitis, which is also known as frozen shoulder, shoulder peri-arthritis, or obliterative bursitis. It is characterised by progressive, painful restriction of shoulder movement, especially external rotation and abduction (Reeves, 1975).

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 longer (Forgacs et al., 1994 & Griggs et al., 2000). The association between the hand abnormality and the duration of diabetes but not age or sex is a consistent finding (Gamstedt, 1993).

LJM is most commonly seen in type-1 diabetics, with a prevalence of 8–50%, compared with 0–26% in controls, with differences in prevalence estimates possibly related to differences in the definitions used and perhaps differences in glycaemic control (Crisp et al., 1984). The prevalence of Dupuytren's contracture in diabetic patients ranges from 20 to 63%, compared with 13% in the general population (Carsen et al., 1993). Among patients with Dupuytren's contracture, 13–39% has diabetes (Lennox et al., 1993).

CTS is common in patients with diabetes, with an estimated prevalence of 11–16%, compared with an incidence of about 125 per 100 000 population over a five year period (Stevens et al., 1988). About 5–8% of patients with CTS have diabetes. CTS are more common in women than in men. Associations between carpal tunnel syndrome and age and the duration of diabetes have been suggested (Jung et al., 1971).

The prevalence of flexor tenosynovitis is estimated at 11% in diabetic patients, compared with <1% in non-diabetics (Leden et al., 1983). Carpal tunnel syndrome (CTS) can be seen in up to one third of diabetic patients and its prevalence generally increases with duration of the disease (Nicodemus et al., 2001). Postmenopausal women with diabetes are at greater risk of hip fracture than age-matched controls (Mavrikakis et al., 1989).

Adhesive capsulitis occurs in 10% -33% of Diabetics and is more common in Diabetics than in non-Diabetics. The typical patient is female with NIDDM of long duration who present with diffuse soreness and global loss of motion of shoulder. Up to 50% of patients have bilateral involvements. Shoulder hand syndrome also known as Reflex Sympathetic Dystrophy Syndrome and is referred to as Complex Regional Pain Syndrome Type-1. It is characterized by pain and swelling usually in the distal extremity accompanied by vasomotor instability, trophic skin changes and rapid development of bony demineralization. In Diabetes of long duration there is thickening and tightening of the skin particularly of the dorsum of hands giving the resemblance to the waxy tight skin seen in patients with Systemic Sclerosis (Musa et al., 2006).

Limited joint mobility in the foot is a common condition owing to increased foot pressure and foot ulceration (Wyatt & Ferrance, 2006). Dupuytren's contracture is the palmar or digital thickening, tethering, or contracture of the hands. In patients with diabetes, the ring and middle finger are more commonly affected, compared with the fifth finger in patients without diabetes. The contractures are generally milder in diabetics than in patients with Dupuytren's contracture who do not have diabetes, and the prevalence increases with advancing age (Smith et al., 2003).

Patients present with nodular thickening of the palmar fascia leading to flexor contracture usually of the fourth and fifth digits. CTS commonly occur in diabetic patients. Up to 15% of all patients with CTS will have diabetes. Patient presents with numbness in the median nerve distribution, nocturnal paresthesia, hand pain and pain radiating to the arm and shoulder. Tinels and Phalens signs may be positive. NCV can be done for confirmation (Musa et al., 2006).

Reflex sympathetic dystrophy is also known as algodystrophy, Sudeck's atrophy, and chronic regional pain syndrome type-1. It is characterized by localized or diffuse pain, usually with associated swelling, trophic changes, and vasomotor disturbances, with impaired mobility of the affected region (Smith et al., 2003).

Diabetic subjects are more likely to be involved with degenerative arthritis earlier and in the more severe form. Osteoarthritis may be linked with obesity in Diabetes. Calcium pyrophosphate deposition arthropathy is characteristically seen in older subjects and usually affects larger joints (Musa et al., 2006).

Diabetes is not clearly a risk factor for osteoarthritis (OA). However, obesity is a risk factor for both conditions. Several studies have reported an association of early OA and diabetes. Both large and small joint OA have been reported to be increased in type-2 diabetes. However, OA of the weight-bearing joints in the affected type-2 diabetic patients may be related to their obesity and not to the diabetes itself. It is not yet known whether diabetes is a risk factor for OA independent of obesity (Kim et al., 2001).

The complications of diabetes mellitus are numerous and include involvement of the musculoskeletal system. Several rheumatic conditions are more prevalent or caused by the long term metabolic consequences of diabetes mellitus. When the control of diabetes is poor, higher levels of diabetic complications result (The Diabetes Control and Complications Trial Research Group, 1993).

Poor glycaemic control can lead to worsening of certain rheumatic conditions. Pharmacotherapy, diet, and a regular, sensible physiotherapy program should be the cornerstone of diabetes management. It is our recommendation that all patients with diabetes have an appropriate exercise program, overseen by their medical practitioner, as an integral part of their diabetes management in order to reduce the frequency and severity of complications (Wyatt & Farrance, 2006).

Insulin has been available for the treatment of diabetes mellitus for some 75 years. Also, per oral drugs for the treatment of particularly Type-2 diabetes and medications for preventing and controlling associated diseases and complications have been available for decades. Together with a constant improvement in the knowledge of how to prevent and manage the complications of diabetes this has had a huge impact on the survival of people with diabetes and, in particular, the quality of life of people with diabetes. Despite this, diabetes is still a serious disease even in countries where treatment is available. Furthermore, lifestyle-induced health problems combined with ageing of populations in the developed world and improved general living standards and survival in the developing world are producing more, not less people with diabetes. For the individual untreated diabetes means that the ability to produce and consume or the quality of life, and the ability to prosper as a person, are potentially limited depending on the severity of the person's diabetes and whether there are complications. From a societal perspective, a potential contribution from a productive person to the welfare of the household and the rest of society is lost. In contrast, optimal treatment for diabetes has positive effects on human health and, consequently, people with diabetes can live an almost normal life with a reduction in their otherwise high risk of disability and premature death. Access to treatment for diabetes also positively impacts the patients' quality of life and their financial situation through improved productivity. Their intellectual and emotional capacity and that of their

families are no longer primarily focused on worries about health but rather on more positive, forward-looking and productive activities (Green et al., 2005).

The prevention of diabetes related musculoskeletal problems requires preventive approach involving diabetic patients and interdisciplinary team. Diabetic management in an optimal way occasionally musculoskeletal care, education for patients and their family, implementer screening and risk assessment tools by health providers may have a critical role in prevention of diabetic related musculoskeletal problems (Evazi & Avadi, 2012).

### 3.1 Study design

This study aimed to find out the possible common musculoskeletal disorders among the diabetic patient in BIRDEM General Hospital. A cross sectional study design was used to conduct the study. Cross sectional study is one of the forms of observational study (Park, 2007). It is one of the most commonly used survey research design (Zechmeister, 2003).

### 3.2 Study site and area

Data was collected from the BIRDEM General hospital, Shahbag, Dhaka. As this is a survey on common musculoskeletal disorders among the diabetic patient in BIRDEM General Hospital. So, the study area was physical medicine department of BIRDEM General Hospital.

### 3.3 Study population and sampling

Study populations were type-2 diabetic patients in Bangladesh. Convenience sampling was used to conduct this research. This method of sampling also referred as accidental, volunteer or opportunistic sampling. Researcher made up inclusion and exclusion criteria and select those individual meets inclusion criteria voluntarily in the study.

### 3.4 Sample size

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 (Bailey, 1997, p. 121). According to the prevalence of diabetes in physical medicine department of BIRDEM General Hospital, estimated sample size 156 (by following  $\frac{z^2 pq}{d^2}$ , where  $z= 1.96$ ,  $p= 0.07$ ,  $q= 1-p$ ,  $d=0.04$ ). But due to time limitation, 100 Type 2 diabetes patients selected as study sample from the BIRDEM General Hospital.

### **3.5 Sample selection criteria**

#### **3.5.1 Inclusion criteria**

- The patient with diabetes mellitus in selected hospital (BIRDEM General Hospital).
- Type-2 diabetic patient
- Both sexes are included

#### **3.5.2 Exclusion criteria**

- Type-1 diabetes mellitus patient
- Medically unstable patient
- Patient with other pathological evidence.

### **3.6 Data collection instrument**

A structured questionnaire and demographic information chart used as a data collection instrument. In that time some other necessary materials are used like pen, pencil, and white paper and clip board. The English questionnaires were converted into Bengali to ask the participants during interviews. Researcher took permission from each volunteer participant by using a written consent form in English

### **3.7 Procedure of data collection**

At very beginning it was clarified that the participant had the right to refuse to answer of any question during completing questionnaire. They could withdraw from the study at any time. It also clarified to all participants about the aim of the study. Participants were ensured that any personal information would not be published anywhere. Took permission from each volunteer participant by using a written consent form. After getting consent form the participants, standard questionnaire was used to identify the musculoskeletal complain and collect demographic information. Questions were asked according to the Bangla format.

For conducting the interview, 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 were asked questions alone as much as possible with consent as sometimes close relatives can guide answer for them. Then built 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, p. 436). Face to face interviews are also effective to describe characteristics of a population. Face to face interviews were 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.

### **3.8 Field test**

Prior to collect data a field test was performed with three participants in the BIRDEM General Hospital. To make a feasible questionnaire was translated into Bengali. This test was performed to determine any difficulties that are exist in the questionnaires as well as the procedure of data collection. This test also helped the researcher to check the appropriateness of wording as well as ease of understanding of the questions.

### **3.9 Data analysis**

Descriptive statistics was used to analyze data. Descriptive statistics refers methods of describing a set of results in terms of their most interesting characteristics (Hicks, 1999, p. 284). Data were analyzed with the software named Statistical Package for the Social Science (SPSS) version 16.0. The variables were labeled in a list and established a computer based data definition record file that consist of a list of variables in order. 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 had been accurately transcribed from the questionnaire sheet to the SPSS data view. Then the raw data was ready for analysis in SPSS. Data was analyzed by descriptive statistics and calculated as percentages and presented by using table, bar graph etc. Microsoft office Excel 2007 is used to decorating the bar graph.



### **3.10 Ethical consideration**

This study got permission on the ethical review board of the department of physiotherapy, BHPI. During the course of this study, interested subjects were given consent forms and the purpose of the research and the consent form were explained to them verbally in Bengali. The participants were informed that their participation would be fully voluntary and they had the right to withdraw or discontinue from the research at any time without any hesitation or risk. They were also informed that confidentiality would be maintained. Information might be published in any presentations or writing, but their personal identity such as their name and address will not be mention in the study. The participants were informed that the data was collected by written questionnaire. The supervisor also checked the consent form and questionnaire. For this study took permission during interview from every single participant with signature on a written consent form of the participants who were interested. The participants were informed about their role in the research process. Informed the participant about the aim of the research and procedures involved in the study. They had also informed that if they wish they were free to withdraw from the study any time. Also mentioned the participants that the information provided by the particular might be published but their name and address would not be used in research project. The study information only discusses with supervisor but this would not share with any other person. These materials were disposed off after completion of the research project. The study results might not have any direct effects on them but the Physiotherapy professional may be benefited from the study in future. Participants were also informed that they would not get any harmful things from the study.

### **3.11 Limitations**

Despite best efforts with research, the present study was not completely free from all limitation and impediments. Limitations are:

- Sample size was small to generalize the study result.
- This study was done in a short period, so all factors in relation to diabetes patient's musculoskeletal problem may not be highlighted.
- Study was conducted only in BIRDEM General Hospital. So this study result would not be generalized for whole Bangladesh.
- To identify musculoskeletal problem laboratory diagnosis was not available to all participants. This can be limitation of this study.
- Time and resources are limited have a great deal of impact on the study.

#### 4.1 Distribution of diabetic patient having musculoskeletal problem

Among the participants (N=100) about 76% of diabetic patient suffering from musculoskeletal problems and 24% not having musculoskeletal problems. The Distribution of diabetic patient having musculoskeletal problem was showed in (Figure-1).

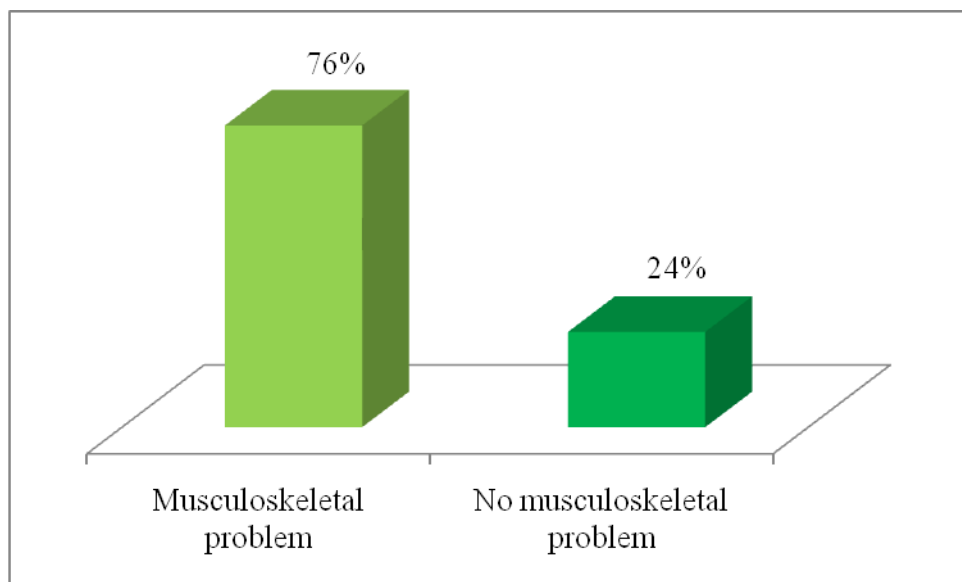


Figure-1: Distribution of musculoskeletal problem.

## 4.2 Age group

A total of 100 diabetic patients were participant. The mean age of the respondents (N=100) was 45.19 years. The distribution of the subjects into the age band was as follows: 30-40 years (48%), 41-50 years (25%), 51-60years (19%), and 61-70 years (8%). Age of the respondents was showed in (Figure-2).

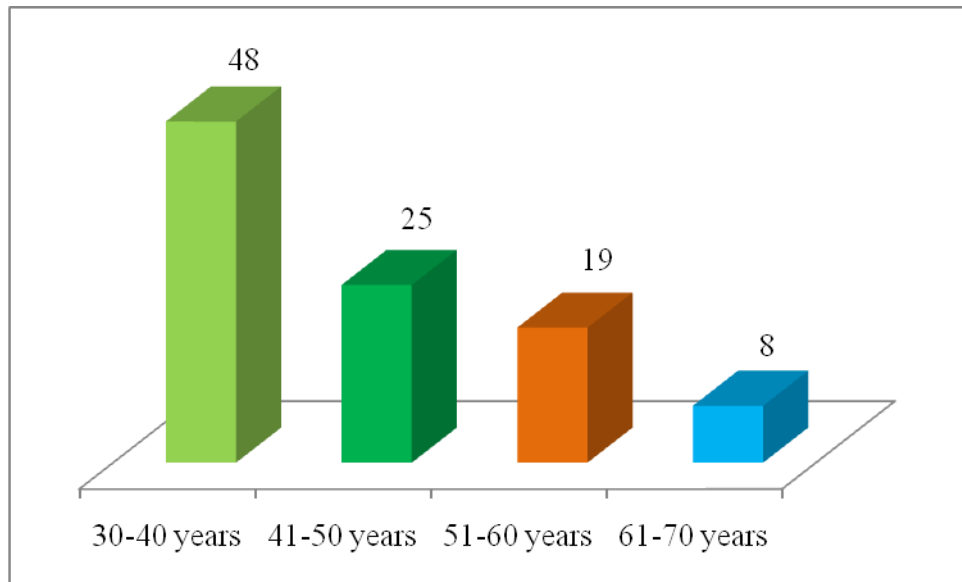


Figure-2: Age band of the Participants.

Among the participants most commonly affected age band were (30-40) and (41-50) years and the percentage was 100%. It was shown in (Table-4).

| Age of the respondent | Musculoskeletal complaints |           | Total      |
|-----------------------|----------------------------|-----------|------------|
|                       | Yes                        | No        |            |
| 30-40 Years           | 29                         | 20        | 49         |
| 41-50 Years           | 24                         | 0         | 24         |
| 51-60 Years           | 16                         | 3         | 19         |
| 61-70 Years           | 7                          | 1         | 8          |
| <b>Total</b>          | <b>76</b>                  | <b>24</b> | <b>100</b> |

Table-4: Participants affected by musculoskeletal disorder according to their age.

### 4.3 Gender

The bar chart showed that among the 100 participants it was found that 35% were female and 65% were male. (Figure-3)

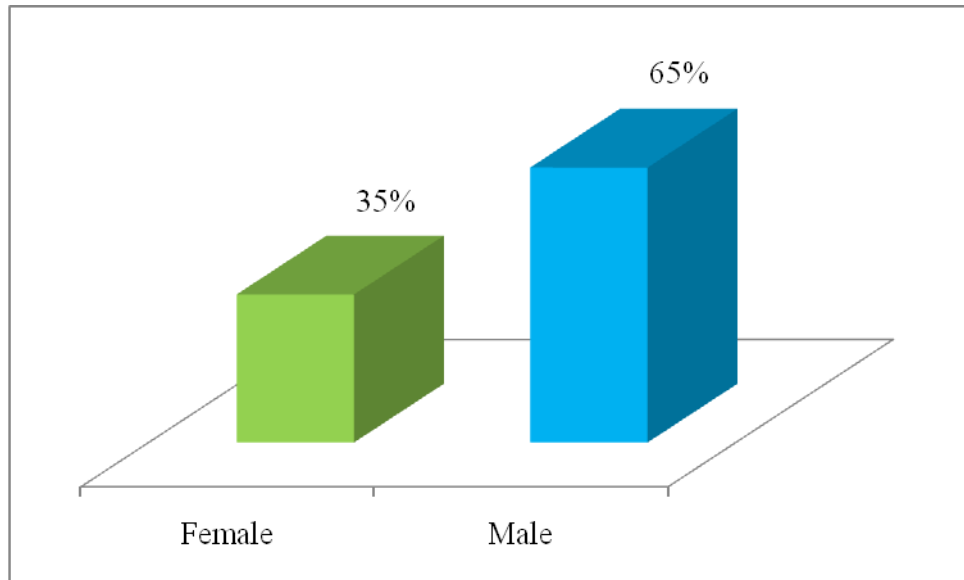


Figure-3: Gender of the participants.

#### 4.4 Body weight

The distribution of the subjects into the body weight was as follows: 30-40kg (1%), 41-50kg (6%), 51-60 (44%), and 61-70 (47%), 71-80(3%), 81-90(1%). Body weight of the respondents was showed in (Figure-4).

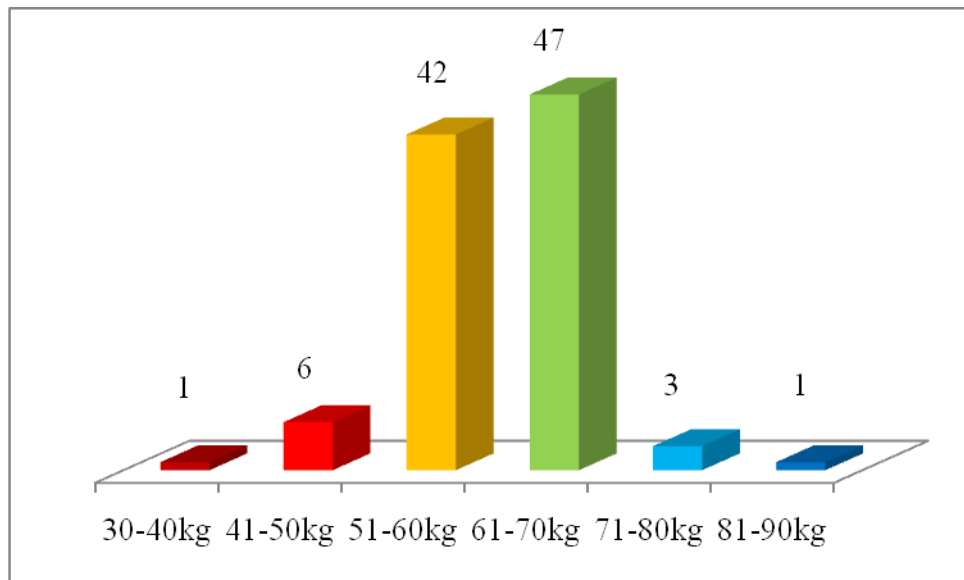


Figure-4: Body weight of the respondents.

#### 4.5 Living area

The bar chart showed that among the 100 participants it was found that 89% were live in urban area and 11% live in rural area. (Figure-5)

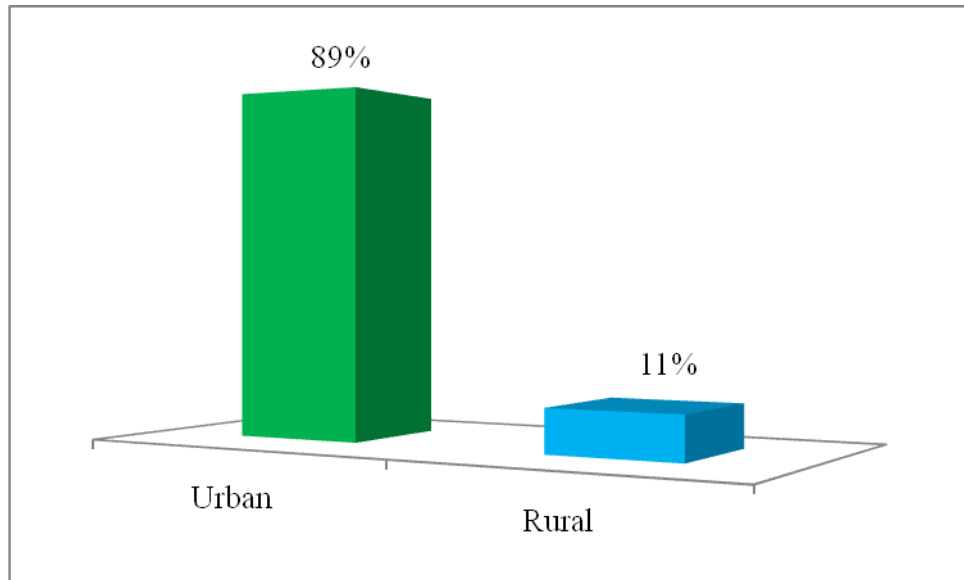


Figure-5: Living area of the participants.



#### 4.6 Educational status

The bar graph showed that the highest number of participants 40% is in the Graduate, 37% are passed the H.S.C and 12% were completed the S.S.C and 6% were completed the post graduation, 5% are passed the primary education level.

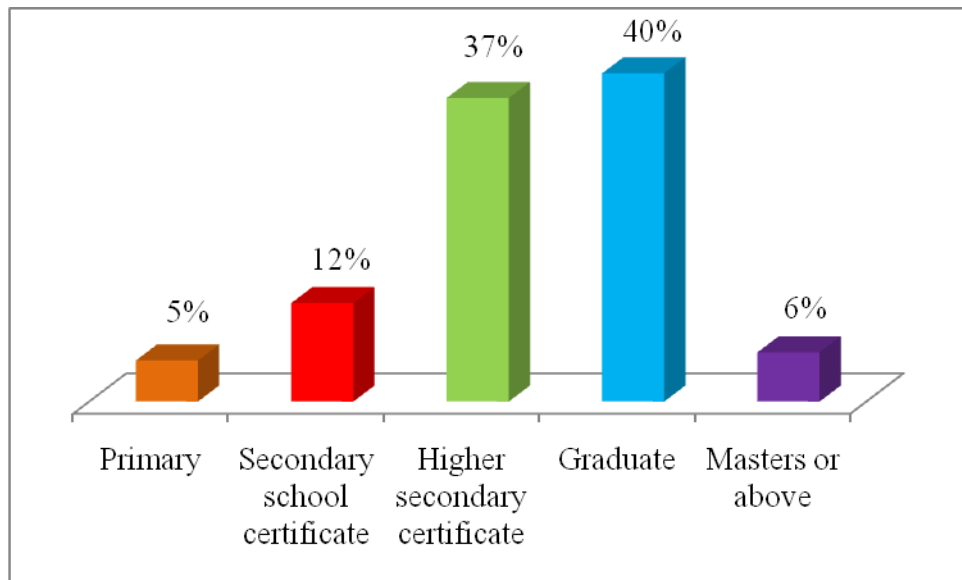


Figure-6: Educational status of the participants.

#### 4.7 Occupation

Among the participants 6% are service holder, 1% are banker, 9% are teacher, 27% are housewife, 23% are businessman, 4% are job in the private farm, 4% are job in the NGO, 11% are driver, 13% are retired, and 1% job in the other sector.

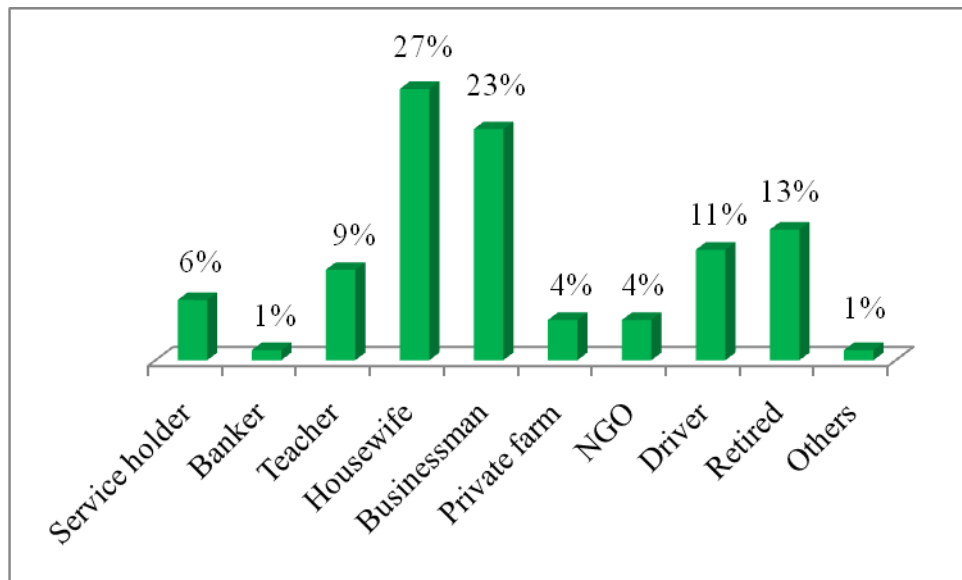


Figure-7: Occupation of the participants.

#### 4.8 Working hours in a day

Among the participants (n=100), 29% diabetes patient works 6 hours, 65% diabetes patient works 8 hours, 5% diabetes patient works 10 hours and 1% diabetic patient Works 12 hours. Working hours in a day was showed in (Figure-8).

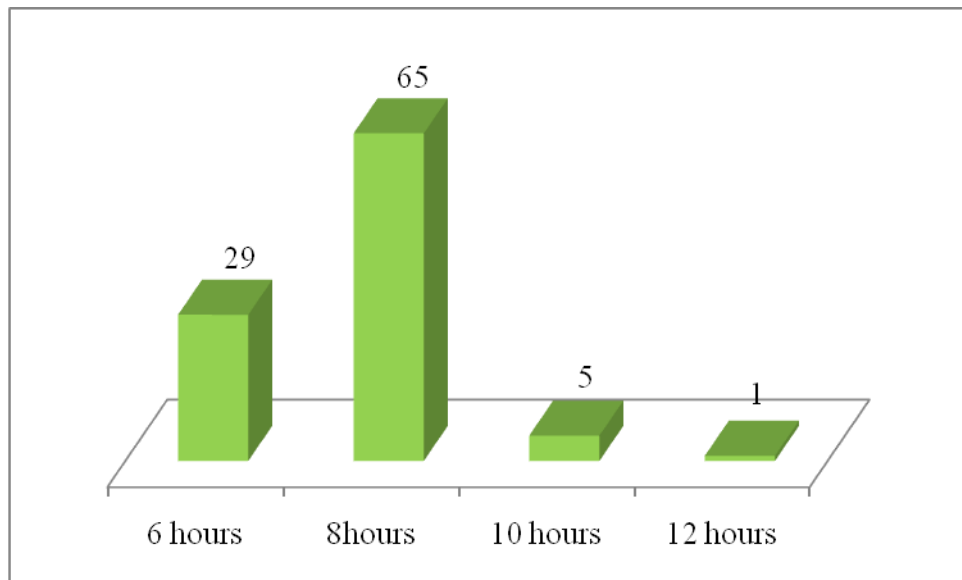


Figure-8: Working hours in a day.

#### 4.9 Any pain or discomfort present

Among the participant 75% diabetic patient are suffering from musculoskeletal pain and 25% diabetic patient are free from musculoskeletal pain. These was showed below (figure-9)

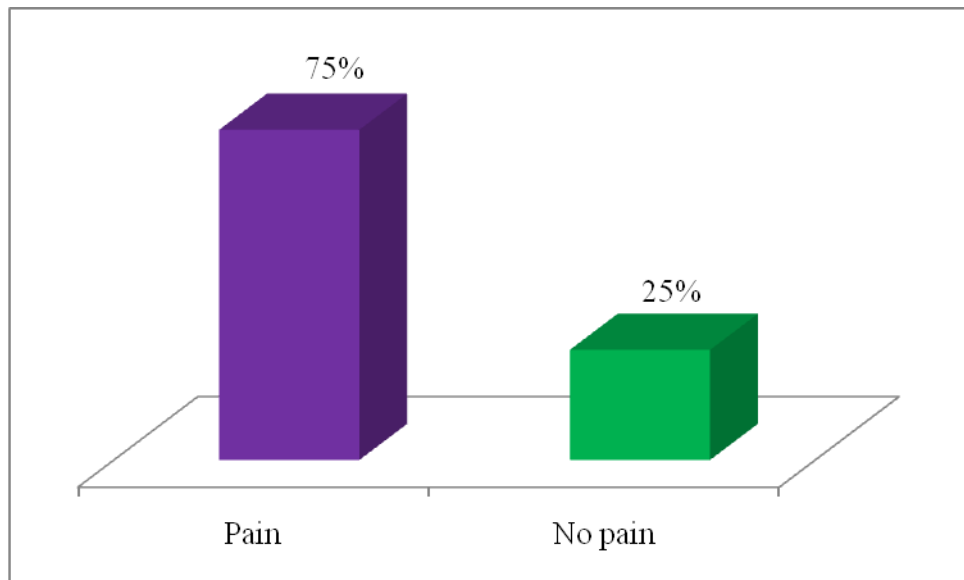


Figure-9: Percentage of musculoskeletal pain.

#### 4.10 Site of pain in diabetic patient

Among the participant, 9% diabetic patients are neck pain, 28% diabetic patients are low back pain, 8% diabetic patients are shoulder pain, 4% diabetic patient are in elbow pain, 7% diabetic patients are wrist pain, 8% are fingers pain and 12% diabetic patients are suffering from knee pain.

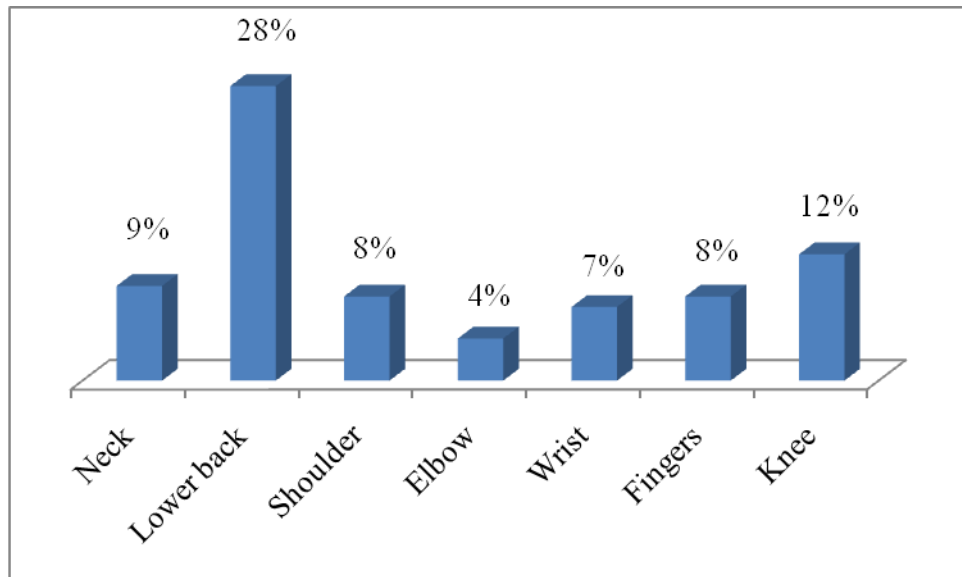


Figure-10: Site of pain of diabetic patient.

#### 4.11 Severity of pain

Among the participants, 2% diabetic patients are suffering from mild pain, 67% are suffering from moderate pain, and 7% diabetic patients are suffering from severe pain.

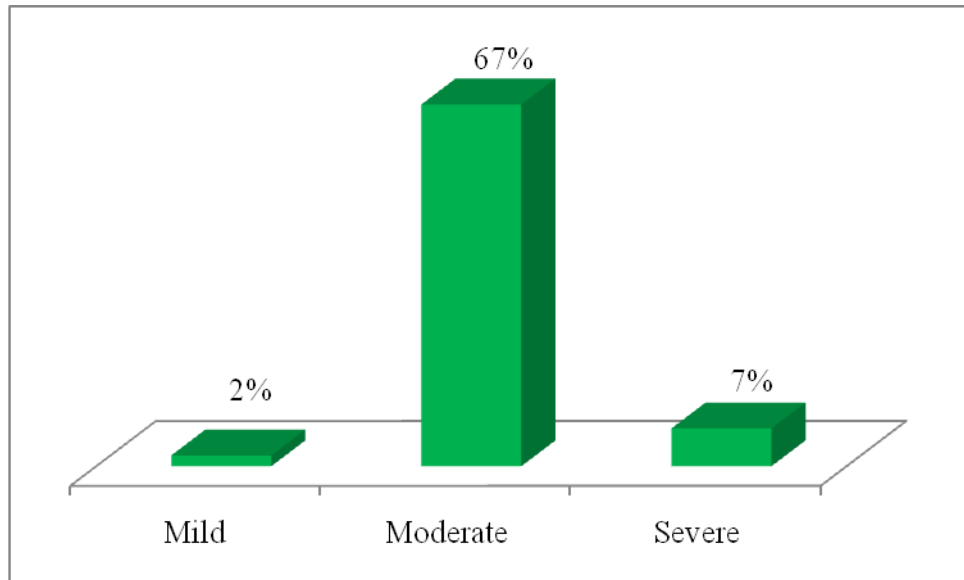


Figure-11: Severity of pain of the participants.

#### 4.12 Pattern of sign and symptom

Among the participants, swelling present in 8% patients, joint stiffness present in 2% patients, muscle weakness present in 10% patients, arthritis present in 5% patients, tendinitis present in 5% patient, capsulitis present in 8% patient, movement difficulties present in 38% patients.

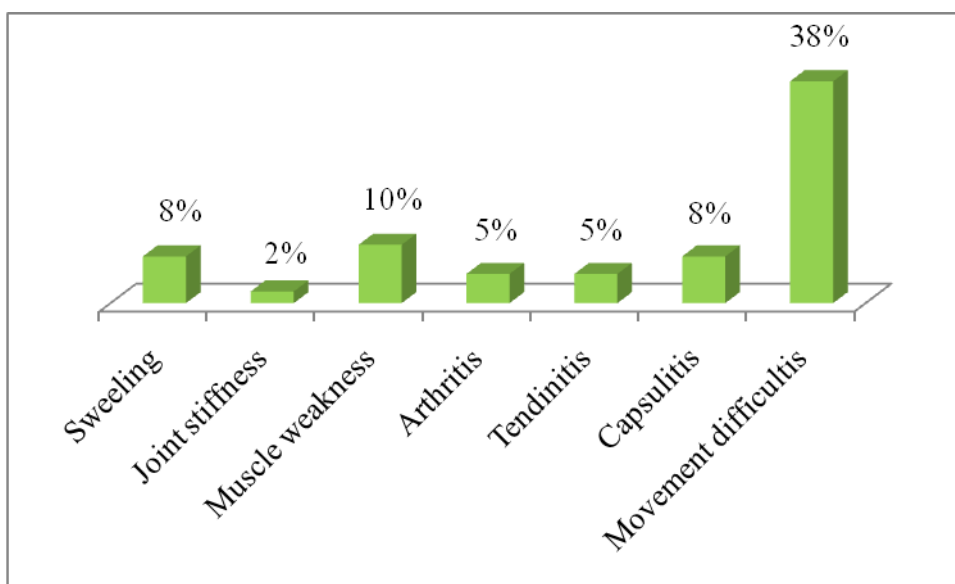


Figure-12: Pattern of sign and symptoms.

#### 4.13 How long has the problem existed

Among the participants, 13% are suffering from pain in less than 6 month, 11% are suffering from pain in 6 month to 1 year, 30% are suffering from pain in more than 1 year and 22% are suffering from pain in more than 5 years.

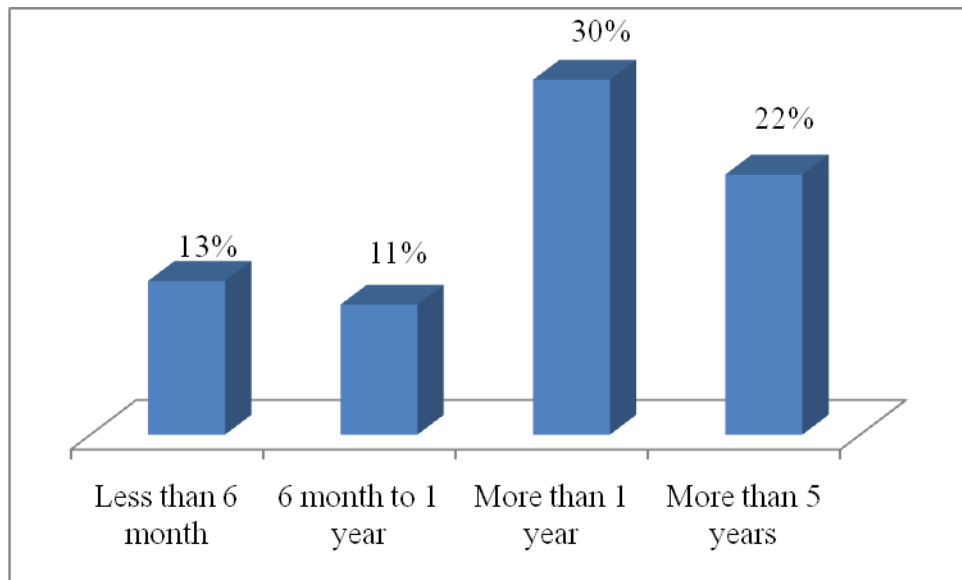


Figure-13: How long has the problem existed.



#### 4.14 Treatment receive of the participants

58% patients are receiving medication, 3% patients are receiving physiotherapy and rest 15% patients are receiving both physiotherapy and medication.

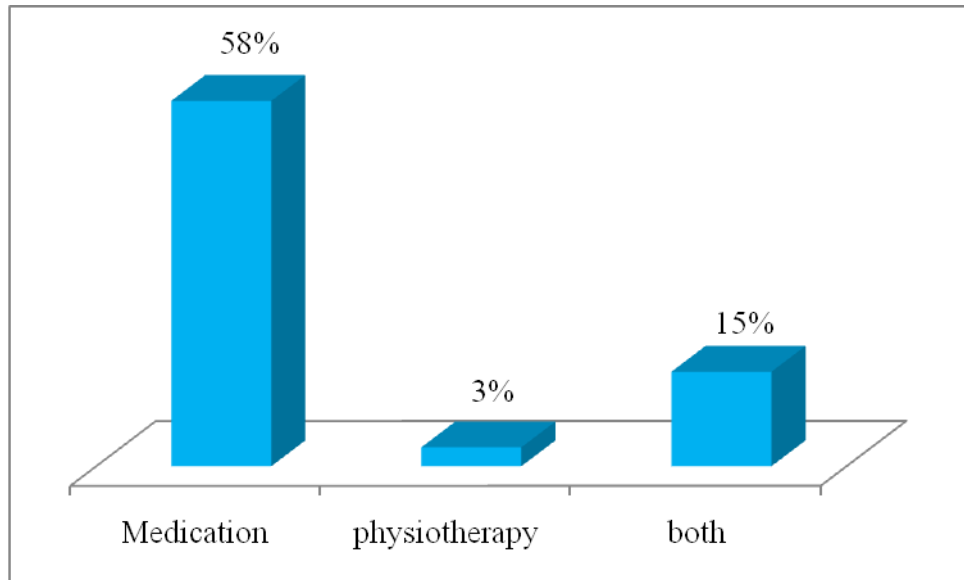


Figure-14: Treatment receives of the participant.

#### 4.15 Result of the physiotherapy

Decrease pain in 13% patient, Increase pain in 1% patient, No change in 62% patients.

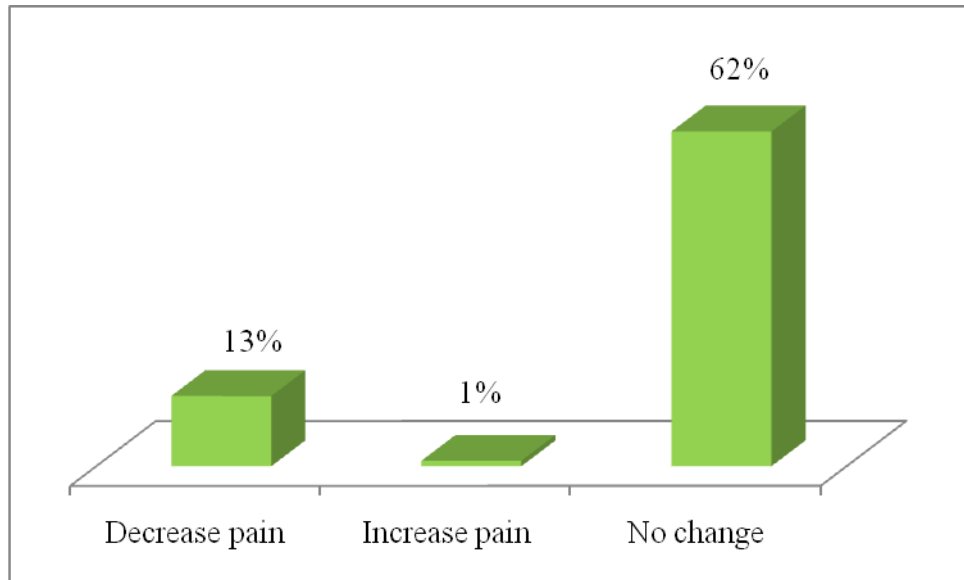


Figure-15: Result of the physiotherapy.

#### 4.16 Diagnosed musculoskeletal problem

8% diabetes patients are frozen shoulder, 11% are osteoarthritis, 8% are rheumatoid arthritis, 1% are ankylosing spondilitis, 4% are carpal tunnel syndrome, 9% are neck pain, 27% are low back pain, 8% are other musculoskeletal problem, 24% are no problem.

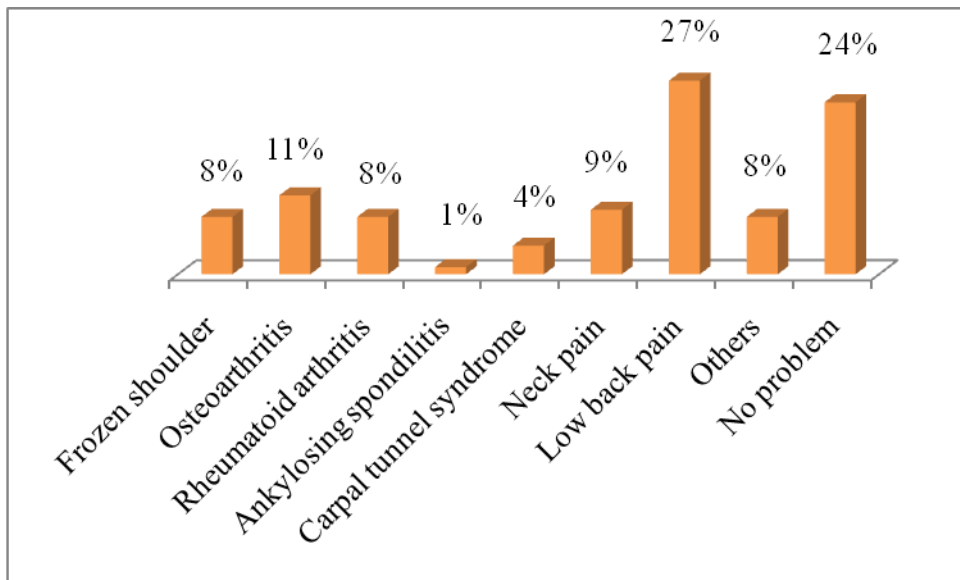


Figure-16: Diagnosed musculoskeletal problem.

RMSDs in T2DM have often been overlooked and neglected. This constant neglect has led to a setback of health education in DM with regards to the joints and extremities, which is of paramount importance. The average man with diabetes is ignorant of these complications which adversely affect health-related quality of life. This in turn exerts a significant healthcare burden on society, much of which can be avoided if proper care is taken. Since the first step toward treating a disability in the community warrants a survey to assess its load and the risk factors, an effort has been made to elucidate the prevalence of RMSD complications in a diabetic cohort. Comparison of these RMSDs with those in the nondiabetic, general population has shown a statistically significant difference. This difference can be clearly ascribed to the presence of DM. Other studies have also reported a greater frequency of rheumatic syndromes in diabetic patients than in the general population (Sarker et al., 2003). Most RMSD complications seem to be associated with the duration of DM and appear in diabetic patients of younger age more than their counterparts in the general population (Brown, 2005). In this research, 30% were found to have DM of more than 1 year's duration. Duration of diabetes was also determined as one of the independent factors responsible for RMSD in the logistic regression model. Age group and level of education were also found to have a significant effect on the presence of RMSD in the research. An interesting observation which came to light was the large number of patients who were diagnosed as having RMSD for the first time in this study. This highlights the importance of looking for specific RMSD conditions in individuals with DM, which often get missed in routine rheumatology examination. Subjective assessment of the patient's pain is pivotal in analyzing the morbidity caused by RMSD. However, only 76% of these subjects were diagnosed with RMSD. The maximum self reported pain site of lower back coincided with the most common diagnosis of lumbar spondylosis. Physician's assessment should not always be based on the final diagnosis. Patient's perspective of pain should also be taken into consideration. An interesting study from Greece has reported a higher proportion of osteoarthritis of the upper extremities in a diabetic population (Douloumpakas et al., 2007). LBP was detected in 63% of DM patients and 47% of our control group. The data on LBP are based on self-reports using a screening question. Self-reporting is the

only source to assess information on health problems like LBP, but under or over reporting may be introduced in both groups (Picavet et al., 1999). The findings of this study revealed that the prevalence of LBP in diabetic patients was relatively higher than control group. Higher prevalence of LBP were found in the diabetic group than in the sample of the general population group, which holds true for both men and women and was comparable with evidences about prevalence of LBP in general population of other communities as well. If diabetes mellitus could have a strong effect on the micro or macrovascular network of vertebrae and spinal degeneration, we could expect that a long-term involvement to this condition would be capable of causing some severe diabetes related consequences and should reveal an effect on the low back area. Our findings confirmed that the rate of LBP was significantly higher than the general population (Evazi & Abadi, 2012). Sarkar et al., have described 31% of their population with DM to have osteoarthritis, out of which 85% belonged to the T2DM group. But in this research only 12% are suffering from knee pain and diagnosis is knee osteoarthritis. Back pain was the most frequent musculoskeletal complain (32.9%) in our series which was similar to the findings (Bjella et al., 1980). Ashis et al., showed that, the most common RMSD in this cohort was osteoarthritis of knees. This is much higher than the point prevalence of osteoarthritis knees (7.6%) in the general population. Rheumatoid arthritis was the commonest inflammatory arthropathy in the present series which was also reporter (Alam et al., 1998). It may be concluded that degenerative disorders of the MSK system are more common than the inflammatory ones amongst the diabetics (Shahzaman et al., 2008).

The study based on data gathered from diabetic patients in BIRDEM General Hospital. The mean age of the respondents was 45.19 years. Among the 100 participant the highest age range was (30-40) years and (41-50) years of the participants. Among the participants (N=100) about 76% of diabetic patient suffering from musculoskeletal problems and 24% not having musculoskeletal problems. Among the 100 participants it was found that 35% were female and 65% were male. The distribution of the subjects into the body weight was as follows: 30-40kg (1%), 41-50kg (6%), 51-60 (44%), and 61-70 (47%), 71-80(3%), 81-90(1%). Among the 100 participants it was found that 89% were live in urban area and 11% live in rural area.

The bar graph shows that the highest number of participants 40% is in the Graduate, 37% are passed the H.S.C and 12% were completed the S.S.C and 6% were completed the post graduation, 5% are passed the primary education level. Among the participants 6% are service holder, 1% are banker, 9% are teacher, 27% are housewife, 23% are businessman, 4% are job in the private farm, 4% are job in the NGO, 11% are driver, 13% are retired, and 1% job in the other sector.

Among the participants (n=100), 29% diabetes patient works 6 hours, 65% diabetes patient works 8 hours, 5% diabetes patient works 10 hours and 1% diabetic patient Works 12 hours. Among the participant 75% diabetic patient are suffering from musculoskeletal pain and 25% diabetic patient are free from musculoskeletal pain. Among the participant, 9% diabetic patients are neck pain, 28% diabetic patients are low back pain, 8% diabetic patients are shoulder pain, 4% diabetic patient are in elbow pain, 7% diabetic patients are wrist pain, 8% are fingers pain and 12% diabetic patients are suffering from knee pain.

Among the participants, 2% diabetic patients are suffering from mild pain, 67% are suffering from moderate pain, and 7% diabetic patients are suffering from severe pain. Among the participants, swelling present in 8% patients, joint stiffness present in 2% patients, muscle weakness present in 10% patients, arthritis present in 5% patients, tendinitis present in 5% patient, capsulitis present in 8% patient, movement difficulties present in 38% patients. Among the participants, 13% are suffering from pain in less than 6 month, 11% are suffering from pain in 6 month to 1 year, 30% are suffering from pain in more than 1 year and 22% are suffering from pain in more than 5 years. 58% patients are receiving medication, 3% patients are receiving physiotherapy and rest 15% patients are receiving both physiotherapy and medication. Decrease pain in 13% patient, Increase pain in 1% patient, No change in 62% patients. 8% diabetes patients are frozen shoulder, 11% are osteoarthritis, 8% are rheumatoid arthritis, 1% are ankylosing spondylitis, 4% are carpal tunnel syndrome, 9% are neck pain, 27% are low back pain, 8% are other musculoskeletal problem, 24% are no problem.

Overall, an association between DM and OA seems to exist and additional studies including a larger number of patients, and directly comparing osteoarthritic findings

in diabetics and non-diabetics will be needed to verify and explore the pathophysiology of the connection of the two disorders (Douloumpakas et al., 2007).

## CHAPTER-VI: CONCLUSION AND RECOMMENDATIONS

### 6.1 Conclusion

Although not commonly recognized as a complication of diabetes, musculoskeletal manifestations are present in about 18% of diabetic patients. With this frequency, we suggest including examination of the periarticular region of the joints in the hands and shoulders whenever a diabetic patient complains of joint pain as many of these complications are potentially treatable, especially if diagnosed early. It has been clear that a good number of musculoskeletal disorders are associated with Diabetes mellitus. These disorders not only increase the disability of patients but some of the musculoskeletal syndrome has definite correlation with other diabetic complications for example LJM and retinopathy has been well established. Finally Diabetes must be considered in the differential diagnosis of Musculoskeletal Syndromes when other signs and symptoms suggestive of Diabetes are present. Diabetes quite commonly affects the musculoskeletal system in a number of ways. These conditions, although resulting in significant morbidity, are often unrecognized or overlooked. However, many of the rheumatologic complications of diabetes, while not necessarily curable, are treatable to varying degrees. Such treatments can afford improvement in quality of life and allow more independence in activities of daily living. Thus, having an awareness of the potential musculoskeletal complications of diabetes can be an invaluable part of diabetes care. Diabetes quite commonly affects the musculoskeletal system in a number of ways. These conditions, although resulting in significant morbidity, are often unrecognized or overlooked. However, many of the rheumatologic complications of diabetes, while not necessarily curable, are treatable to varying degrees. Such treatments can afford improvement in quality of life and allow more independence in activities of daily living. Thus, having an awareness of the potential musculoskeletal complications of diabetes can be an invaluable part of diabetes care. Diabetes is a common condition which is becoming even more common with the passage of time. Chiropractors have an opportunity to intervene at several different points in the diabetes time line. By emphasizing and recommending healthy lifestyle choices to their patients, they can hopefully help to decrease the incidence of obesity, alcohol abuse and dietary indiscretions that can predispose to diabetes, especially in Native American, African-American and Hispanic populations, in which



the inherent risk of diabetes seems to be even greater than it is within the non-Hispanic Caucasian population.

By concentrating upon secondary prevention in those patients who already show signs of glucose intolerance or who are already in a diabetic state, complication rates can be reduced, or the amount of time before complications arise can be lengthened. Although there is little specific data about the progression of the discussed musculoskeletal complications of diabetes, several studies, including the United Kingdom Prospective Diabetes Study (UKPDS), the Diabetes Control and Complications Trial (DCCT), and the Japanese Kumamoto study showed that aggressive control of serum glucose in diabetics slowed the progression of microvascular disease, including retinopathy, nephropathy and neuropathy. If microvascular disease progression is slowed, it can likely be assumed that the sequelae of microvascular disease would also be slowed. By recognizing the musculoskeletal effects and complications of diabetes, chiropractors can better manage, and help to manage, many of the pathologies that are currently seen as a natural consequence of the high glucose state. In making the proper diagnosis and offering the appropriate treatment and referral, the chiropractor then distinguishes him or herself as an integral and cooperating member of the total healthcare team.

## 6.2 Recommendations

The following recommendations to certain authorities and personnel:

- Government need to plan awareness program in different area of our country for preventing the diabetes and controlling the use of tobacco and others behavioral risk factors.
- Specialized those were involved in the management and treatment team for type 2 diabetic patients, should refer to Physiotherapists for improvement for the client's conditions.
- BIRDEM Hospitals was providing massive services to the diabetic patients and need to create more post for Physiotherapy to provide collaborative services.
- Continued and regular study in this area should play an essential part in improving quality of life of the type 2 diabetes patient. Recommendation for other researcher as follows:
  - ✓ Increasing the number of the participants and conduct the research in different places.
  - ✓ Using simple random sampling.
  - ✓ Including both subjective and objective to find out the objective.
  - ✓ Take sample from BIHS and include other diabetic hospitals.

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## APPENDIX

### Appendix -1: Consent form

#### CONSENT FORM

*(Please read out to the participant)*

Assalamualaikum/Namasker, my name is *Apurbo Roy*, I am conducting this study for partial fulfillment of Bachelor of Science in Physiotherapy degree, titled “**Common musculoskeletal disorder among the diabetic patient.**” from Bangladesh Health Professions Institute (BHPI), University of Dhaka. I would like to know about some personal and other related information about musculoskeletal problem among the diabetic patient. You will answer some questions which are mention in this form. 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 purpose. All information provided by you will be treated as confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous.

Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me and Md.Obaidul Haque, Associate Professor, Head of the Department, Department of Physiotherapy, BHPI, CRP, Savar, Dhaka.

Do you have any questions before I start?

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

YES

NO

Signature of the participant \_\_\_\_\_

Signature of the Interviewer \_\_\_\_\_

## Appendix-2: Questionnaire

### Questionnaire

#### Section 1: Socio-Demographic Information

| QN | Questions and filters      | Responses  |
|----|----------------------------|--|
| 1. | Name:                      |  |
| 2. | Address and mobile number: |  |
| 3. | Age:                       | _ _  yrs   |
| 4. | Gender:                    | 1 Female<br>2 Male   |
| 5. | Patients body weight:      | ----- kg   |
| 6. | Patients living area:      | 1 Urban<br>2 Rural   |
| 7. | Educational status:        | 1 Primary<br>2 Secondary school certificate<br>3 Higher secondary certificate<br>4 Graduate<br>5 Masters or above<br>6 Others  |
| 8. | Occupation:                | 1 Service holder<br>2 Banker<br>3 Teacher<br>4 Doctor<br>5 Farmer<br>6 Housewife<br>7 Day laborer<br>8 Businessman<br>9 Private farm<br>10 NGO<br>11 Driver<br>12 Unemployed<br>13 Retired<br>14 Others (specify): |

|    |                         |  |
|----|-------------------------|--|
| 9. | Working hours in a day: | <ul style="list-style-type: none"> <li>1 6 hours</li> <li>2 8 hours</li> <li>3 10 hours</li> <li>4 12 hours</li> <li>5 More than 12 hours</li> </ul> |
|----|-------------------------|--|

**Section 2: Musculoskeletal related Information:**

| QN | Questions and filters                   | Responses  |
|----|---|--|
| 1. | Do you have any pain or discomfort:     | <ul style="list-style-type: none"> <li>1 Yes</li> <li>2 No</li> </ul>  |
| 2. | If Yes, In which site do you feel pain: | <ul style="list-style-type: none"> <li>1 Neck</li> <li>2 Upper back</li> <li>3 Lower back</li> <li>4 Shoulder</li> <li>5 Elbow</li> <li>6 Wrist</li> <li>7 Fingers</li> <li>8 Knee</li> <li>9 Ankle</li> <li>10 Foot</li> <li>11 Heel</li> </ul>   |
| 3. | Severity of pain:                       | <ul style="list-style-type: none"> <li>1 Mild</li> <li>2 Moderate</li> <li>3 Severe</li> </ul>   |
| 4. | Pattern of sign and symptom             | <ul style="list-style-type: none"> <li>1 Muscle cramp</li> <li>2 Parasthesia or numbness</li> <li>3 Swelling</li> <li>4 Joint stiffness</li> <li>5 Muscle weakness</li> <li>6 Muscle wasting</li> <li>7 Gangrene</li> <li>8 Arthritis</li> <li>9 Bursitis</li> <li>10 Tendinitis</li> <li>11 Capsulitis</li> <li>12 Movement difficulties</li> </ul> |

|    |   |  |
|----|---|--|
| 5. | How long has the problem existed:           | <ul style="list-style-type: none"> <li>1 Less than 6 month</li> <li>2 6 month to 1 year</li> <li>3 More than 1 year</li> <li>4 More than 5 years</li> </ul>  |
| 6. | What types of treatment do you receive:     | <ul style="list-style-type: none"> <li>1 Medication</li> <li>2 Physiotherapy</li> <li>3 Both</li> </ul>  |
| 7. | If physiotherapy, then what was the result: | <ul style="list-style-type: none"> <li>1 Decrease pain</li> <li>2 Increase pain</li> <li>3 No change</li> </ul>  |
| 8. | Diagnosed musculoskeletal problem:          | <ul style="list-style-type: none"> <li>1 Frozen shoulder</li> <li>2 Osteoarthritis</li> <li>3 Rheumatoid arthritis</li> <li>4 Ankylosing spondylitis</li> <li>5 Cervical spondylitis</li> <li>6 Carpal tunnel syndrome</li> <li>7 Neck pain</li> <li>8 Low back pain</li> <li>9 Diabetic amyotrophy</li> <li>10 Dupuytren's contracture</li> <li>11 Diabetic foot</li> <li>12 Others (specify)</li> <li>13 No problem</li> </ul> |

### Appendix -3: Permission Letter From BIRDEM



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)  
BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI)

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তারিখঃ ২৭.০৩.২০১৩

প্রতি  
মহা পরিচালক  
বারডেম  
ইয়াহিম মেমোরিয়াল ডায়াবেটিস সেন্টার  
শাহ বাগ, ঢাকা।

বিষয়ঃ রিসার্চ প্রজেক্ট (dissertation) এর জন্য আপনার প্রতিষ্ঠান সফর ও তথ্য সংগ্রহ প্রসঙ্গে।

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পল্লীস্বাস্থ্যসেবার পুনর্বাসন কেন্দ্রে-সিআরপি'র শিক্ষা প্রতিষ্ঠান বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) ঢাকা বিশ্ববিদ্যালয় অনুমোদিত বিএসসি ইন ফিজিওথেরাপী কোর্স পরিচালনা করে আসছে।

উক্ত কোর্সের ছাত্রছাত্রীদের কোর্স কারিকুলামের অংশ হিসাবে বিভিন্ন বিষয়ের উপর রিসার্চ ও কোর্সওয়ার্ক করা বাধ্যতামূলক।

বিএইচপিআই'র ৪র্থ বর্ষ বিএসসি ইন ফিজিওথেরাপী কোর্সের ছাত্র অর্পূর্ব রায় তার রিসার্চ সংক্রান্ত কাজের তথ্য সংগ্রহের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আগ্রহী। তার রিসার্চ শিরোনাম "Common musculoskeletal problem in diabetic patient in a tertiary care."

তাই তাকে আপনার প্রতিষ্ঠান সফর এবং প্রয়োজনীয় তথ্য প্রদান সহ সার্বিক সহযোগিতা প্রদানের জন্য অনুরোধ করছি।

ধন্যবাদান্তে

মোঃ ওবায়দুল হক  
সহযোগী অধ্যাপক ও কোর্স-কো অর্ডিনেটর  
ফিজিওথেরাপী বিভাগ  
বিএইচপিআই।



Approved by  
Director