

CHARACTERISTICS OF ADHESIVE CAPSULITIS AMONG THE DIABETIC PATIENTS

Kamrun Naher Irin

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

Session: 2007-2008

BHPI, CRP, Savar, Dhaka



Bangladesh Health Professions Institute (BHPI)

Department of Physiotherapy

CRP, Savar, Dhaka-1343

Bangladesh

February, 2013

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

**CHARACTERISTICS OF ADHESIVE CAPSULITIS AMONG THE
DIABETIC PATIENTS**

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

.....

Md. Shofiqul Islam

B. Sc. PT (Hons.), MPH
Assistant Professor
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka
Supervisor

.....

Mohammad AnwarHossain

B. Sc. PT (Hons.), Dip. Ortho. Med., MPH
Associate Professor, Physiotherapy &
Head, Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....

Nasirul Islam

B.Sc. PT (Hons.), MPH
Assistant Professor &
Course Coordinator, M. Sc. in Physiotherapy
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....

Muhammad Millat Hossain

B.Sc. PT (Hons.)
Lecturer
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

.....

Md. ObaidulHaque

B.Sc. PT (Hons.), Dip. Ortho. Med., MPH
Associate Professor & Head of the Department
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka

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 the study. I would be bound to take written consent from my supervisor.

Signature:

Date:

KamrunNaherIrin

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

Session: 2007-2008

BHPI, CRP, Savar, Dhaka-1343

Contents

	Page No.
Acknowledgement	i
Acronyms	ii
List of Tables	iii
List of Figures	iv-v
Abstract	vi
CHAPTER-I: INTRODUCTION	1-6
1.1 Background	1-2
1.2 Rationale	3
1.3 Research Question	4
1.4 Objectives	4
1.5 Conceptual framework	5
1.6 Operational definition	
CHAPTER-II: LITERATURE REVIEW	7-15
CHAPTER-III: METHODOLOGY	16-20
3.1 Study design	16
3.2 Study area	16
3.3 Study population	16
3.4 Sample size	16
3.5 Sampling procedure	17
3.6 Inclusion criteria	17
3.7 Exclusion criteria	17
3.8 Data collection instruments	17
3.9 Data collection procedure	18
3.10 Data analysis	18
3.11 Ethical consideration	18-19
3.12 Informed consent	19
3.13 Limitations	20
CHAPTER-IV: RESULTS	21-41
CHAPTER-V: DISCUSSION	42-45

	Page No.
CHAPTER-VI: CONCLUSION AND RECOMMENDATIONS	46-47
6.1 Conclusion	46
6.2 Recommendations	47
REFERENCES	48-52
APPENDIX	53-58

Acknowledgement

First of all, I am grateful to almighty Allah for enabling me to complete this dissertation then I will like to thanks my parents to assist me in all aspect of my life.

I would like to express my highest gratitude to my honorable thesis supervisor and respected teacher, Md. Shofiqul Islam for keeping me consistent supervision and excellent guidance from the beginning of this study. I am thankful to my respectable Head of the Department, Physiotherapy, BHPI, Md. Obaidul Haque. I am indebted to Prof. Liaquat ali, Director, BIHS for providing me the opportunity to collect data from BIHS. I am grateful to Romana Sayrin, Senior Physiotherapist & Head of the Department of Physiotherapy, BIHS hospital, who helped me a lot to conducting data.

I would like to offer special thanks to Md. Moniruzzaman, Senior Research Fellow, Department of Community Medicine, Lecturer of Public Health Department, BIHS for his valuable advice, guidance and help throughout the study. I am also indebted to Md. Nasirul Islam, Assistant professor, Md. Sohrab hossain and Mohammad Anwar Hossain, Associate Professor, Department of Physiotherapy, not only for their valuable suggestion and guidelines but also for their optimistic and courageous attitude to taking challenges that have inspired me throughout the project.

I would like to give special thanks to my Senior Fabia alam and A.K.M. Minarul Tawhid for their suggestion and I am thankful and grateful for their help. I want to express my gratitude to all the concerned authorities who allowed me to carry out this study

I would like to express my gratitude to all of my friends and classmates. I am very grateful to Librarian of BHPI for her support and other staff for providing resources.

Finally, I would like to thanks to those entire individual who are directly or indirectly involved with this study.

Acronyms

BHPI	Bangladesh Health Professions Institute
BIHS	Bangladesh Institute of Health Sciences
BIRDEM	Bangladesh Institute of Research and Rehabilitation for Diabetes Endocrine and Metabolic
BMI	Body Mass Index
CRP	Centre for the Rehabilitation of the Paralyzed
FS	Frozen Shoulder
DM	Diabetes Mellitus
MSCs	Musculoskeletal Complains
SPS	Statistical Package for Social Sciences
WHO	World Health Organization
NSAID	Non Steroid Anti Inflammatory Drug

List of Tables

		Page No.
Table-1:	Cross tabulation between age and gender	23
Table-2:	Occupation of the participants	25

List of Figures

		Page No.
Figure-1:	Age range of the participants with percentage	21
Figure-2:	Gender of the participants with percentage	22
Figure-3:	Educational level of the participants with percentage	24
Figure-4:	Onset of diabetes mellitus among the participants with percentage (months & years)	26
Figure-5:	Controlled or uncontrolled diabetes mellitus among the participants with percentage	27
Figure-6:	Treatment taking for diabetes among the participants with percentage	28
Figure-7:	Onset of adhesive capsulitis among the participants with percentage according to the months	29
Figure-8:	Affected side of the shoulder among the involved participants with percentage	30
Figure-9:	Presents complains of the adhesive capsulitis among the involved participants	31
Figure-10:	Percentage of Severity of joint pain among the involved participants	32
Figure-11:	Percentage of local tenderness of the joint among the involved participants	33
Figure-12:	Shoulder pain during the overhead activity among the involved participants with percentage	34
Figure-13:	Pain Increase during movement and rest of the participants with Percentage	35
Figure-14:	Lying on the affected side of the participants during the time of sleep with percentage	36
Figure-15:	Pain hampering daily activity of the participants with percentage	37

		Page No:
Figure-16:	Getting less strength in muscle of the participants with percentage	38
Figure-17:	Severity rate of muscle weakness of the participants with percentage	39
Figure-18:	Decrease range of motion of the participants with percentage	40
Figure-19:	Severity of decrease range of motion of the participants with percentage	41

Abstract

Purpose: The purpose of the study was to find out the characteristics of adhesive capsulitis among the diabetic patients. *Objectives:* This study was aim to explore socio-demographic characteristics of Shoulder Capsulitis with diabetes patients; to find out the past medical history among the patients affected by adhesive capsulitis; to determine the number of affected shoulder among the patient with shoulder capsulitis and to explore disease related information among the patients with adhesive capsulitis. *Methodology:* A descriptive type of cross sectional study of 50 participants was conducted. 50 participants with adhesive capsulitis among the diabetes were identified from outpatient in physiotherapy department of BIHS. The data was collected by using a structural questionnaire by face to face interview. Data were analyzed through SPSS 16 version. *Results:* The mean age of 50 participants was 49.72 (± 6.253). Highest number of participants 34% (n=17) were in the age range between 48-53 years. More than half of the participants 66% (n=33) were female. Highest number of participants had some secondary education 26% (n=13) followed by only 2% (n=1) uneducated. Highest number respondents 46% (n=23) found those are housewife. More than half of the participants 62% (n=31) suffering controlled diabetes. Highest number of participants 52% (n=26) have moderate level of pain and followed by 98% (n=49) pain increase during movement. Among the participants 64% (n=32) have moderate type of decrease ROM, 46% (n=23) have mild level of muscle weakness. *Conclusion:* This study helps to explore a various clinical manifestation of adhesive capsulitis in the diabetic patients. Individuals should aware of avoidance of under stress activity of shoulder, performing certain amount of overhead activity, control of blood sugar level. Acknowledging these characteristics of shoulder capsulitis among the diabetic patients will be useful for the prevention and treatment of this condition in Bangladesh.

Key Words: Characteristics, Adhesive capsulitis, Diabetes.

1.1 Background

Musculoskeletal problems are becoming the center of attention of the health care profession and the pain and disability associated with these problems represent a significant increasing health burden worldwide (Spearing et al., 2005). Adhesive capsulitis of the shoulder is a common affliction, affecting 2-5% of the general adult population and up to 20% of patients with diabetes and typically occurs in adults between 40-65 years of age (Shah et al., 2007; Kelley et al., 2013). In western countries approximately 7-2% of the population suffers from a painful or stiff shoulder. The annual incidence of the shoulder disorders in general practice is noted between 7-13% in 1000 patients per year and 30% of all patients with new episodes of shoulder pain in Dutch primary care are referred for physiotherapy (Liesdel et al., 1997). Adhesive capsulitis is commonly associated with other systemic and non-systemic conditions. The most common in the co-morbid condition of diabetes mellitus with an incidence of 10-34% are estimated in the England (Bridgman, 1972). According to the Center for Disease Control and Prevention about 13.7 million people in the United States sought medical care in 2003 for shoulder problems (Vanden et al., 2003).

Adhesive capsulitis is the most disabling musculoskeletal problem which is also known as frozen shoulder, shoulder periarthritis or adhesive bursitis. It is characterized by progressive, painful restriction of shoulder movement especially external rotation and abduction. The thickened joint capsule is closely adherent to the humeral head, resulting in considerable reduction in the volume of the glenohumeral joint. The exact cause of adhesive capsulitis is not known, but there are several other conditions, including shoulder trauma, cerebral conditions, cardiac conditions and respiratory conditions. The natural history of the disease is characterized by three distinct phases: painful freezing phase pain and loss of motion of the glenohumeral joint in all directions, adhesive or frozen phase stiffness reaches its maximum and the resolution or thawing phase range of motion returns to normal. Frozen shoulder is often considered to be self-limiting full resolution of symptoms does not always occur. Only 59% of the patients had a near normal

shoulder after 4 years. Persistent symptoms are commonly mild (Favejee et al., 2010; Smith et al., 2003).

Frozen shoulder is a condition in which shoulder becomes painful and stiff. It may occur due to minor injury to the shoulder but often develops without a known reason. Frozen shoulder can also be associated with other health problems such as diabetes. For this condition, the pain and stiffness can limit the ability to do simple everyday activities like getting dressed, brushing hair or reaching into a cabinet. The problem lasts 1 to 2 years and the incidence occurs higher in females than males. Frozen shoulder patients usually experience an initial period characterized by an aching shoulder at rest, severe pain with movement and difficulty sleeping due to shoulder pain. This condition leads to a progressive loss of motion (freezing) and limited function of the shoulder over several months (Kelley et al., 2013).

The occurrence of one side frozen shoulder has the chance to the risk of contralateral shoulder involvement by 5% to 34% and simultaneously bilateral shoulder involvement occurs often 14% of the time (Neviaser&Hannafi, 2009). The relationship between shoulder capsulitis and diabetes mellitus is most common, with the incidence of shoulder capsulitis being two to four times higher in diabetes than in the general population (Neviaser&Hannafin, 2010; Smith et al., 2001). Shoulder capsulitis with diabetes has been described as the most disabling of the musculoskeletal manifestations of diabetes mellitus (Kordella, 2002).

Various studies have proved that shoulder pain is a benign and self-limiting problem. Only about 50% of all new episodes of shoulder pain presented in primary care show complete recovery within 6 months and after one year, this proportion increases to only 60%. In the period 1987-1995, the state of Washington (USA) each year accepted over 6000 work disability claims related to shoulder problems (Reilingh et al., 2008).

1.2 Rationale

Diabetes mellitus serious health problems both in developed and developing countries. The problem of diabetes mellitus in Bangladesh is also increased day by day as like as whole world. Diabetes patients mostly suffer many types of musculoskeletal problem like as frozen shoulder or adhesive capsulitis, carpal tunnel

Syndrome, Dupuytren's disease and flexor tenosynovitis etc. There is an increased incidence of frozen shoulder in people with diabetes thought to affect 20% people with diabetes at some stage in their life. The incidence of diabetes mellitus and the life expectancy of the diabetic patient have both increased, resulting in the increased prevalence and clinical musculoskeletal manifestation in diabetic subjects (Mohammad, 2010).

Adhesive capsulitis of the shoulder or frozen shoulder is the most common and disabling of diabetes mellitus is associated with several musculoskeletal disorders. To minimize the occurrence of adhesive capsulitis in diabetic patients, it is important to build up awareness about it. This study will help to identify the socio-demographic characteristics and clinical manifestation of adhesive capsulitis with diabetes in Bangladesh.

Most common cause of adhesive capsulitis is the muscle wasting, immobility etc. Also the causes of activity limitation thus decrease the quality of life. If the characteristics of shoulder capsulitis is find out that means the vulnerable age group of shoulder capsulitis, the group of people are affected by frozen shoulder, predisposing factors of shoulder capsulitis, clinical representation of shoulder, as a physiotherapist it will help to diagnose shoulder capsulitis easily and it will give details information to the patient about shoulder capsulitis. After accomplishing the graduation course a physiotherapist can acknowledge the different characteristics and clinical manifestation of shoulder capsulitis with the diabetic patients in Bangladesh. Physiotherapists should help to ensure the guidance of preventive measure of adhesive capsulitis and reading this study will help them. As a health professional research improves our knowledge and makes the profession strongest. So there is no alternative option to do research as a professional to develop the profession.

1.3 Research question

What are the characteristics of shoulder capsulitis among diabetic patients?

1.4 Objectives

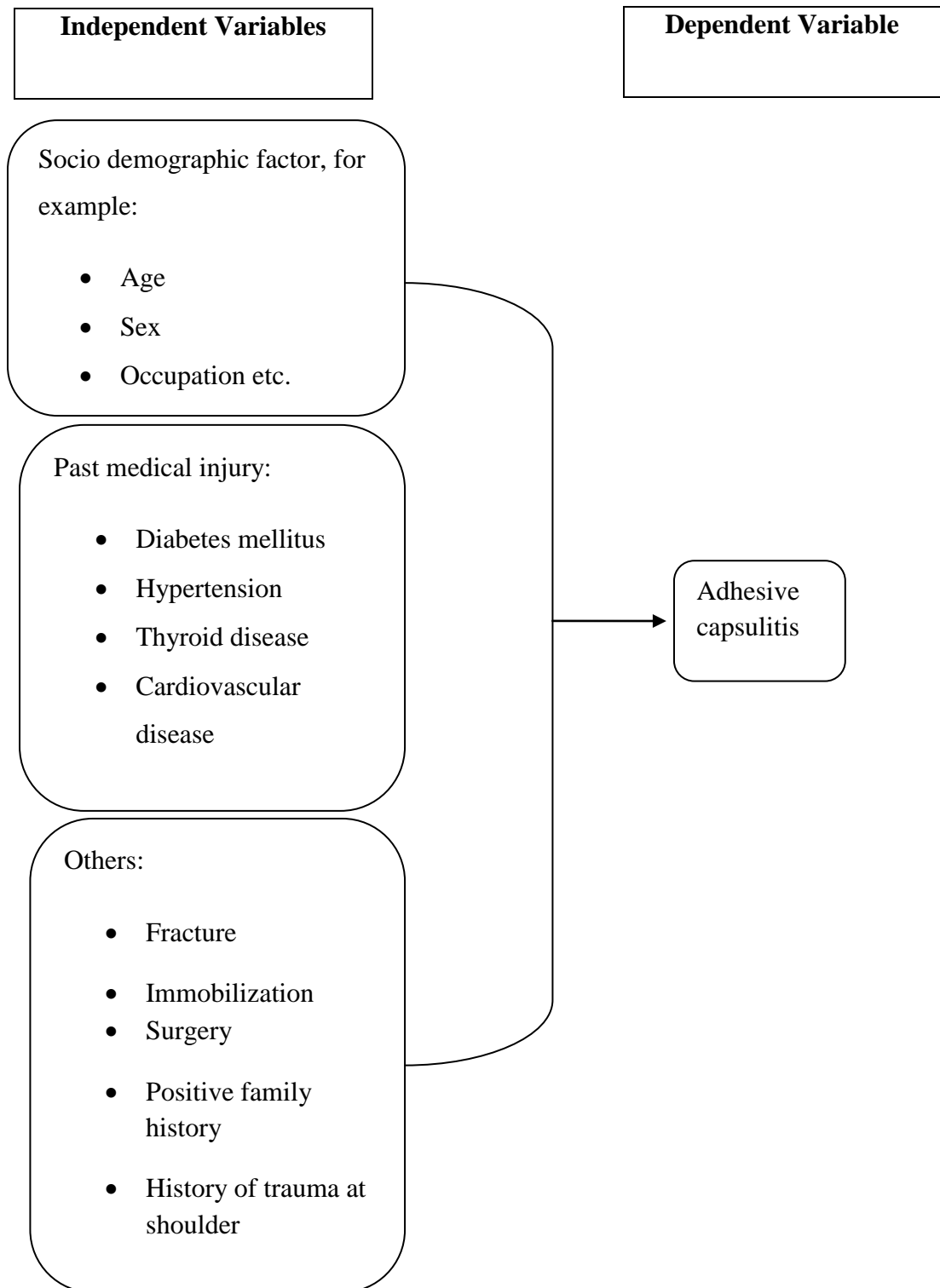
1.4.1 General objective

- To find out characteristics of adhesive capsulitis among diabetic patients.

1.4.2 Specific objectives

- To explore socio-demographic characteristics of Shoulder Capsulitis with diabetes patients.
- To find out the past medical history among the patients affected by adhesive capsulitis.
- To determine the number of affected shoulder among the patient with shoulder capsulitis.
- To explore disease related information among the patients with adhesive capsulitis.

1.5 List of variables



1.6 Operational Definition

Characteristics

Characteristics of adhesive capsulitis mean pain, inactivity, muscle weakness & wasting, decreased range of motion, tenderness etc.

Adhesive Capsulitis

Adhesive capsulitis is a common, painful condition of the shoulder that is associated with loss of range of motion in the glenohumeral joint. It results from contraction of the glenohumeral joint capsule and adherence to the humeral head. The term 'frozen shoulder' commonly used to describe adhesive capsulitis and other conditions associated with loss of range of motion at the joint. Although adhesive capsulitis is often self-limited, it can persist for years and may never fully resolve. In this study the cases were identified as per diagnosis at BIHS.

Diabetes Mellitus

Diabetes Mellitus is a chronic disease, which occurs when the pancreas does not produce enough insulin, or when the body cannot effectively use the insulin it produces. The leads to an increased concentration of glucose in the blood (Hyperglycemia).

Diabetes mellitus (DM) is a chronic systemic disease characterized by an increased concentration of glucose in the blood that occurs when the pancreas does not produce enough insulin. Normally blood glucose levels are tightly controlled by insulin, a hormone produced by the pancreas. Insulin lowers the blood glucose level. When the glucose level elevates that means after eating food, insulin is released from the pancreas to normalize the glucose level. In patient with diabetes, the absence or insufficient production of insulin causes hyperglycemia. Diabetes is a chronic medical condition, meaning that although it can be controlled, it lasts for a lifetime (Ozdirenc et al., 2003). The prevalence of diabetes for all age groups worldwide was estimated to be of 2.8% in 2000 and 4.4% in 2030. The total number of people with diabetes is projected to raise from 171 million in 2000 to 366 million in 2030. This increasing prevalence of the diabetes and associated conditions including rheumatic manifestations. The rheumatologic manifestations of diabetes mellitus are the following adhesive capsulitis (frozen shoulder, periartthritis) (Serban&Udrea, 2012).

It has been observed that people who lead an inactive lifestyle are more vulnerable to non-insulin dependent diabetes or type-2 diabetes mellitus. Such people have unexercised muscles and tissues which can affect the overall action of insulin and reduced its capacity in the utilization of glucose. Stress is another very important cause of diabetes mellitus. In some high risk people, stress can cause malfunctioning of the pancreas and hence, secretion of insulin. Several reasons can bring on stress and trauma (Centers for Diseases Control & Prevention, 2011).

Diet is one of the important factors triggering diabetes mellitus. Diabetes mellitus is a condition in which the blood sugar levels increase and any diet that contains carbohydrates (more specifically sugars) in it, is directly responsible for increasing the overall blood sugar level. The following foods are directly responsible for the development and aggravation of diabetes mellitus such as all foods containing sugar such as jam, jelly, chocolates, desserts, ice cream, candy etc.

Honey in all forms. Cokes, cola drinks, and all such artificially sweetened cold drinks. Milk and milk products, including cheese, butter and condensed milk. Fruits with high sugar content and their juices. Oily foods, Alcoholic beverages, including wines (Centers for Chronic Disease Prevention and Health promotion, 2007).

Infection can also cause diabetes mellitus. Some microorganisms can infect the pancreas and reduced its functioning. The diabetes mellitus type 1 due to the infection of the Coxsackie virus on the pancreas (Ship, 2003). Diabetes mellitus a very strong hereditary connection. People who have the human leukocyte antigen (HLA) in their blood which is most obtained from the parents, they have strong tendency towards developing diabetes mellitus (Ship, 2003). Diabetes mellitus can occur at any age. Diabetes mellitus type 2 mostly occurs in adulthood. It can begin in youth but its repercussion on the overall health and found in the later stage of life when the person reaches in middle age. Diabetes mellitus type 1 was once called juvenile diabetes because it was found in children and adolescents predominantly (National Center for Chronic Disease Prevention & Health Promotion, 2007).

Type 1 or Insulin Dependent Diabetes Mellitus (IDDM): in type 1 diabetes, the pancreas undergoes an autoimmune attack by the body itself, and is rendered incapable of making insulin. Abnormal antibodies have been found in the majority of patient with type 1 diabetes. The patient with type 1 diabetes must rely on insulin medication for survival (Garvan Institute of Medical Research, 2010).

Type 2 or Non Insulin Dependent Diabetes Mellitus (NIDDM) or Adult Onset Diabetes Mellitus: in type 2 diabetes mellitus, patients can still produce insulin but do so relatively inadequately for their body needs. In many cases pancreas produces larger than normal quantities of insulin. A major feature of type 2 diabetes is a lack of sensitivity to insulin by the cells of the body (Hastell et al., 1999).

Another type of Diabetes is Gestational Diabetes. Diabetes can occur temporarily during pregnancy. Significant hormonal changes during pregnancy can lead to blood sugar elevation in genetically predisposed individuals. Women with gestational diabetes will finally develop type 2 diabetes in later stage of life (Garvan institute of Medical Research, 2010). Secondary diabetes may develop when the pancreatic tissue responsible for the production of insulin is destroyed by disease such as chronic

pancreatitis, trauma, or surgical removal of pancreas. Other forms of diabetes mellitus include congenital diabetes, which is due to genetic defects of insulin secretion, cystic fibrosis-related diabetes, steroid diabetes and several forms of monogenic diabetes (Hastell et al., 1999).

Adhesive capsulitis commonly occurs in patients with certain medical co-morbidities and is often co-related with increased pain and dysfunction with these co-morbid medical factors. Most well known is the strong association between diabetes and shoulder capsulitis. The association after observing a 10.8% incidence among 800 diabetic patients and only a 2.3% incidence in 600 non diabetic, the rate of bilateral frozen shoulder was high among diabetic patients and subsequent studies have supported this observation (Arkkila et al., 1996; Fisher et al., 1986).

The number of people with diabetes need for efficient physiotherapy services will continue to grow. In order to improve the health and well-being of all people with diabetes including specialized physiotherapist in the team management of diabetes mellitus is one of the imperative concerns (Kalra et al., 2007). In the case of type-1 diabetes, which always requires insulin replacement, the way type-2 diabetes is managed may change with adjusting for various factors such as age, smoking, alcohol intake, body mass index (BMI) and exercise (Tiermy et al., 2002).

Diabetes can affect the shoulder in several ways. The most common musculoskeletal problems among diabetic patients are adhesive capsulitis, which are also known as frozen shoulder, shoulder periarthritis or obliterate bursitis. It is progressive, painful restriction of external rotation and abduction of shoulder joint movement, because the thickened joint capsule adherent to the humeral head. As a result volume of the glenohumeral joints reduced (Smith et al., 2003). Calcify periarthritis of the shoulder is roughly three times more common than in people without diabetes. Pain spread from shoulder to hand in the affected limb. Classical examination findings swelling of the affected limb or area, skin changes, increased sensitivity to temperature and touch (hyperesthesia) and vasomotor instability. Patchy osteoporosis may be seen among the diabetic patients (Martin, 2008). Frozen shoulder is an idiopathic condition with spontaneous onset of shoulder pain and severe limitation of glenohumeral movement in all directions, including at least 50% reduction in external rotation. The pain is often

severe and characteristically disturbs the sleep which persists more than four weeks (Baslund et al., 1990).

Adhesive capsulitis is an insidious and progressive loss of active and passive mobility of the glenohumeral joint in order to the capsular contraction. The estimated prevalence is of 11-30% in diabetic patients more than in non-diabetics. Long duration diabetes is treated with insulin which is associated with shoulder calcification. Adhesive capsulitis appears to other shoulder conditions such as major trauma, rotator cuff tear, rotator cuff contusion, labral tear, bone contusion, subacromial bursitis, cervical or peripheral neuropathy, previous surgical procedure in early disease process and radiographs, it could be adhesive capsulitis if history of these other conditions is negative (Serban&Udrea, 2012).

Shoulder pain with Frozen Shoulder is progressive which is felt mostly at night the shoulder movement occurs to the end of its range of motion (ROM). It can be caused by certain combined movements of the shoulder such as abduction and external rotation (e.g. grooming hair, reaching for a seatbelt overhead) or extension and internal rotation (e.g. reaching for a back pocket). The pain gradually increases and at last becomes constant pain at rest also which is felt by all movements of the shoulder and worsened by repetitive movements involved upper extremity, psychological stress, exposure to cold or vibration and changes in the weather. Before subsiding or abolishing, the pain usually lasts 1-2 years in 90% patients approximately (Ewald, 2011).

The incidence of adhesive capsulitis is approximately 2-5% in the general population otherwise in children and peaks between 40 and 70 years of age. People are in adhesive capsulitis women are more affected than men although genetic or racial predilection is negative. It is common in persons with insulin dependent, non-insulin dependent diabetes and with prediabetes (glucose intolerance). The risk of developing of adhesive capsulitis increases on the contralateral side with adhesive capsulitis patients (Ewald, 2011).

Adhesive capsulitis may affect both shoulders either simultaneously or sequentially in 16% of patients. Bilateral adhesive capsulitis is more than in persons with diabetes than in those without diabetes. In 14% of patients the contralateral shoulder also becomes affected when adhesive capsulitis still is active in the initial shoulder. Contralateral adhesive capsulitis usually occurs within five years of disease onset after the first has resolved. The non-dominant shoulder is slightly more likely to be affected (Cagliero et al., 2002).

The hallmark of adhesive capsulitis is decreased range of motion and shoulder pain. The pain is poorly localized, deep ache. The pain is usually in the area of the anterior or posterior capsule if it is localized. The pain may radiate to the biceps area. Patients may have progressive pain and stiffness when reaching overhead, away and behind the back. Crepitus may be present on the involved side. As with many shoulder conditions, pain may impair sleep. Adhesive capsulitis does not show red flag symptoms such as fever, night sweats and unexplained weight loss like more serious causes of shoulder pain. The shoulder can dislocate either forward, backward and downward. The arm appears out of position when the shoulder dislocates, the dislocation also produces pain. Muscle spasms may increase the intensity of pain. Swelling, numbness, weakness and bruising are likely to develop (Ewald, 2011).

Shoulder capsulitis is classified into two categories: (1) primary, which is insidious and idiopathic or (2) secondary, which is generally due to trauma or subsequent immobilization. Primary shoulder capsulitis starts gradually and progression of symptoms, with no participating event that can be identified. These conditions causing loss of range of motion in the shoulder and severe pain which limit their daily activities. It is not uncommon for a patient with shoulder pain and not realized there is a loss of motion (Manske & Prohaska, 2008). Primary frozen shoulder is a severely debilitating condition with a prevalence of between 2% and 5%. It is frequently difficult to manage. Diagnostic criteria were initially described by Codman in 1934 and still hold true today. They include pain in the shoulder which comes on slowly and is felt at the insertion of the deltoid, inability to sleep on the affected side, atrophy of the spinati, and little in local tenderness. There is restriction of both active and passive movement, with painful and restricted elevation and external rotation. Stiffness may also occur after fracture or in association with joint diseases such as

osteoarthritis (OA) this is referred to as a secondary frozen shoulder (Hand et al., 2007).

Three phases of clinical presentation of Frozen Shoulder is Painful or freezing phase: duration 2-9 months and is characterized by an acute synovitis of the glenohumeral joint. Pain and stiffness around the shoulder with constant pain is worse at night. Little response to non-steroidal anti-inflammatory drugs. Adhesive or frozen phase: occurs at 4-12 months. The pain gradually subsides but stiffness remains. Some patient may be felt with some restriction of movement and weakness present. Pain is apparent only at the extremes of movement. Gross reduction of glenohumeral movements with obliteration of external rotation followed closely by shoulder flexion and internal rotation. The patient is unable to lie on the affected side. Resolution or thawing phase: the recovery stage begins when pain resolve and ROM to improve over a period of 5-26 months. Mean duration from onset of frozen shoulder to the greatest resolution is over 30 months (Hussain, 2010; Cyriax, 1982; Ulusoy et al., 2001).

The pathophysiology of shoulder capsulitis is poorly understood. Pain associated with shoulder capsulitis can cause a limitation or selective immobilization the painful shoulder. Prolonged immobilization of a joint has been shown to cause several detrimental pathophysiological findings including decreased collagen production and alter sarcomere number in muscle tissue (Manske&Prohaska, 2008). Analysis of surgical specimens suggests that capsular hyperplasia and fibrosis have a role. The percentage of cytokine suggests a possible autoimmune process but the relationship is not well established (Rodeo et al., 1997).

The diagnosis of shoulder pain and mobility deficits associated with primary or secondary adhesive capsulitis is determined from the history and physical examination. Patients typically present with a gradual and progressive onset of pain, likely sleep-disturbing night pain and pain at end ranges of movements. Patients also present with painful and restricted active and passive ROM in both elevation and rotation that occurs for at least one month and reached a worsened. Functional activities such as reaching overhead, behind the back or out to the side become increasingly difficult due to pain and stiffness (Connell et al., 2002).

The history and physical examination are essential to differentiating between the stiff and pain full shoulder and the shoulder with true shoulder capsulitis (Hsu et al., 2010). Patient often describes an insidious onset vague, dull pain at the deltoid insertion due to innervations of the joint capsule by the axillary nerve. Night pain is very common feature and sleeping on the affected shoulder is usually symptomatic. As the patient progress from the freezing to the frozen stage, the pain become more severe and the restriction in elevation and rotation increases (Ewald, 2011).

On examination, the patient will usually have tenderness at the deltoid insertion and over the anterior capsule and posterior capsule with deep palpation. The physical examination is marked by the loss of both passive and active range of motion. This motion may also be painful as the capsule reaches its stretching point. Most critical in the physical examination of the patient is the evaluation of passive range of motion. Forward flexion, abduction, internal rotation and external rotation should be assessed with control of scapulothoracic motion. It is important to compare the affected and unaffected sides to accurately assess deficits and limitation of lateral rotation, abduction and medial rotation (LAM) test for confirmatory findings because shoulder capsulitis does not affect the dynamic stabilizers of the shoulder (i.e. rotator cuff, biceps tendon, and deltoid muscle), strength should be preserved in all planes. However, patients with shoulder capsulitis may not have enough range of motion to perform strength testing. Resisted strength testing can result in pain related weakness that mimics true weakness. Patient with advanced shoulder capsulitis may also have muscular atrophy that can cause weakness (Ewald, 2011; Hsu et al., 2010; Manske&Prohaska, 2008).

Shoulder capsulitis is primarily a clinical diagnosis. Because of the high prevalence of diabetes and prediabetes in patients with adhesive capsulitis, physicians should consider fasting glucose testing in patients who have not been diagnosed with diabetes. Additional serologies are usually not indicated but may be performed if autoimmune or infectious conditions are suspected. Erythrocyte sedimentation rate and C-reactive protein levels may be elevated in patients with primary adhesive capsulitis but these tests are not sensitive or specific. Definitive diagnosis of adhesive capsulitis is achieved only through direct surgical observation. However, this is not usually necessary other imaging modalities can be used to supplement the history and

physical examination. Capsular thickening can sometimes be observed on magnetic resonance imaging (MRI) in patients with adhesive capsulitis (Ewald, 2011). The MRI did reveal the presence of a rotator cuff tear. The patient with a frozen shoulder and a small rotator cuff tear is often classified as having a secondary frozen shoulder but can often be treated with a primary frozen shoulder (Lannotti& Williams, 2007).

Treatment of the shoulder capsulitis often involves the use of anti-inflammatory agent or corticosteroid. NSAIDs may be used during any phase as an attempt to relieve symptoms. In non operative treatment include medical management and physiotherapy management. Medical treatment of shoulder capsulitis often involves anti-inflammatory drugs and intra-articular corticosteroid injection. Intra-articular corticosteroid injection is also commonly used to decrease the inflammation of the shoulder joint (Manske&Prohaska, 2008).

Physiotherapy treatment is the first option for frozen shoulder. Reviewed studies suggest that many patients treated with physical therapy benefited from reduced symptoms, increased mobility and functional improvement. Physical therapy includes stretching, heating modalities, strengthening exercises and manipulation. For patients who are awakened by shoulder pain, a gentle ROM program performed within the pain freerange facilitates their return to sleep. Ice therapy or heat packs can be effective to help pain relief. Patient can apply most heat to the shoulder and then perform their stretching exercise. The use of heat is to increase tissue temperature and extensibility. Strengthening exercises have a greater role during the thawing stage. Manipulation of the joint must occur only after the frozen stage is present (Ellenbacker, 2006; Cluett& Jonathan, 2010).

Surgical intervention is considered when there is no improvement in pain or shoulder motion after an appropriate course of physical therapy and medication. When surgery is considered, the patient must consider that most patients will improve if given sufficient time and that surgery has risk involved. Surgical intervention is aimed at stretching or releasing the contracted joint capsule or arthroscopy (American Academy of Orthopedic SurgeonsPhysician, 2007).

In arthroscopic surgery, release of the capsule and subscapularis tendon is performed. Capsular release combined with subscapularis tendon release resulted in good clinical results without significant loss of internal rotation strength. Surgery always includes a postoperative physical therapy program beginning the day of surgery with passive range-of-motion exercises and motion devices (Liem et al., 2008). Mobilizing physiotherapy is usually combined with intra-articular injection of local steroids with manipulation under an anesthetic, Radiotherapy, sympathetic ganglion block and oral steroids have been suggested. Prevention has an important part to play. Adhesive capsulitis should be preventable in many patients at particular risk this unpleasant problem (Thomas et al., 1980).

3.1 Study design

This study has done through using cross sectional convenient 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

The study was conducted from outpatient in physiotherapy department at Bangladesh Institute of Health Sciences (BIHS) hospital Mirpur-1, Dhaka. BIHS & hospital is a component of Health Care Development Project (HCDP) –an enterprise of Diabetic Association of Bangladesh under Bangladesh-Netherlands joint cooperation.

3.3 Study Population

Diabetes patient at the Bangladesh Institute of Health Sciences (BIHS) hospital.

3.4 Sample size: 50 participants (who have adhesive capsulitis with diabetes) were selected as sample in this study.

The equation of sample size calculation are given below-

$$n = \left\{ \frac{Z(1 - \frac{\alpha}{2})}{d} \right\}^2 \times pq$$

Here,

$$Z(1 - \frac{\alpha}{2}) = 1.96$$

P = 0.191 (Here P = Prevalence and P = 19.1%)

$$q = 1 - p$$

$$= 1 - 0.191$$

$$= 0.81$$

$$d = 0.05$$

According to this equation the sample should be more than 200 people but due resource constrain the study was conducted with 50 patients attending at Bangladesh Institute of Health Sciences (BIHS) randomly.

3.5 Sampling procedure

There were 50 participants with shoulder capsulitis among the diabetes were selected through convenient sampling procedure from outpatient in Physiotherapy Department of BIHS. Participants were selected from BIHS because they were easily accessible for diabetic patients. Data was collected through convenient sampling procedure because this procedure was more feasible and less time consuming to obtain relevant information.

3.6 Inclusion criteria

- Medically diagnosed diabetes mellitus patients who have characteristics of adhesive capsulitis.
- Both male and female are include.

3.7 Exclusion criteria

- Unstable medical condition.
- Medically undiagnosed patient.
- Mentally challenged patients.

3.8 Data collection instruments

Data was collected using, Papers, Pen, Pencil, scale, file, clip board, Diary, Computer and pen drive.

3.9 Data collection procedure

All new consecutive patients who attended at Bangladesh Institute of Health Sciences (BIHS) were diagnosed as shoulder capsulitis were asked to participate in the study. At the beginning the participants had the right to refuse to answer of any question during completing questionnaire. They could withdraw from the study at any time. At the beginning of research the permission were taken from each volunteer participant by using a written consent form. After getting consent from the participants, standard questionnaire was used to identify the characteristics of adhesive capsulitis with the diabetes mellitus. The data was conducted by face to face interview and asked question. Face to face interviews are the most effective way to get full cooperation of

the participant in a survey (Fraenkel and wallen, 2000, p. 436). The study found that almost maximum participants were female and the mean age of the participants was 49.72 (± 6.253) years, most of participant's occupations were housewife. The questions were divided into two sections which almost covered all issues regarding characteristics of adhesive capsulitis in the diabetes mellitus. In the questionnaire participant's demographic information including age, sex, level of education, occupational history, onset of diabetes, type of diabetes, treatment taking for diabetes and characteristics related including-onset of shoulder capsulitis, dominant side, pain, stiffness, local tenderness, pain during movement and rest, pain during overhead activity, muscle weakness and ROM of the joint was asked.

3.10 Data analysis

Descriptive statistics was used to analyze data. Descriptive statistics refers method 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 and calculated as percentages and presented by using table, bar graph, pie charts etc. Microsoft office Excel 2007 is used to decorating the bar graph and pie charts.

3.11 Ethical consideration

It was ensured that it would maintain the ethical issue at all aspects of the study because it is the crucial part of the all form of research. A research proposal was submitted to the local ethical review committee of Physiotherapy Department, Bangladesh Health Professions Institute and obtained approval. At first researcher was applying for official permission for the study from the authority of BIHS. Then the director of the BIHS permitted to collect data at BIHS hospital (Appendix-3). The ethical consideration was making sure by an informed consent letter to the participants. Consent was obtained by providing each participant a clear description of the study purpose. They were informed that their participation was 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 not is mention in the study. They

were assured that taking part in this study would not cause any harm to them but the result of the study would be beneficial for them.

3.12 Informed consent

Written consent (Appendix) was given to all participants prior to completion of the questionnaire. The written consent was taken from every participants including signature. The participants were informed clearly that their information would be kept confidential. The participants was informed or given notice that the research result would not be harmful for them. It was explained that there might not a direct benefit from the study for the participants but in the future cases like them might get benefit from it. The participants had the rights to withdraw consent and discontinue participation at any time without prejudice to present. Information from this study was anonymously coded to ensure confidentiality and was not personally identified in any publication containing the result of this study.

3.13 Limitations

There were some situational limitation and barriers while considering the study.

Those are as follows:

- Expected sample size was more than 200 for this study but due to resource constrain just 50 sample were taken which is very small to generalize the result for the wider population of shoulder capsulitis.
- It was a hospital based study, these were not reflecting the whole population and not find the real picture of adhesive capsulitis with diabetes properly.
- The questionnaire was developed only through searching sufficient literature but considering the context of the demography of the population a pilot study would substantial before developing questionnaire.
- Time and resources were limited which have a great deal of impact on the study and affect the result of the study to generalize for wider population.
- The researcher was a 4th year B.Sc. in physiotherapy student so she had limited experience with techniques and strategies in terms of the practical aspects of research. As it was the first the research so might be there were some mistakes.

The purpose of the study is to find out the characteristics of adhesive capsulitis among the diabetic patients and to achieve this goal the result need to calculate and analysis in a systematic way and Data were analyzed by descriptive statistics and calculated as percentages and presented by using bar graphs, pie charts and tables.

Socio-demographic Information

4.1 Age Group

The above bar graph shown, among 50 participants the highest number participants, in the age range of 40-44 years, 22% (n=11) participants were in the aged between 45-47 years, 16% (n=8) participants were in the age between 48-53 years 34% (n=17) and 28% (n=14) were found in the age range between 54-65 years.

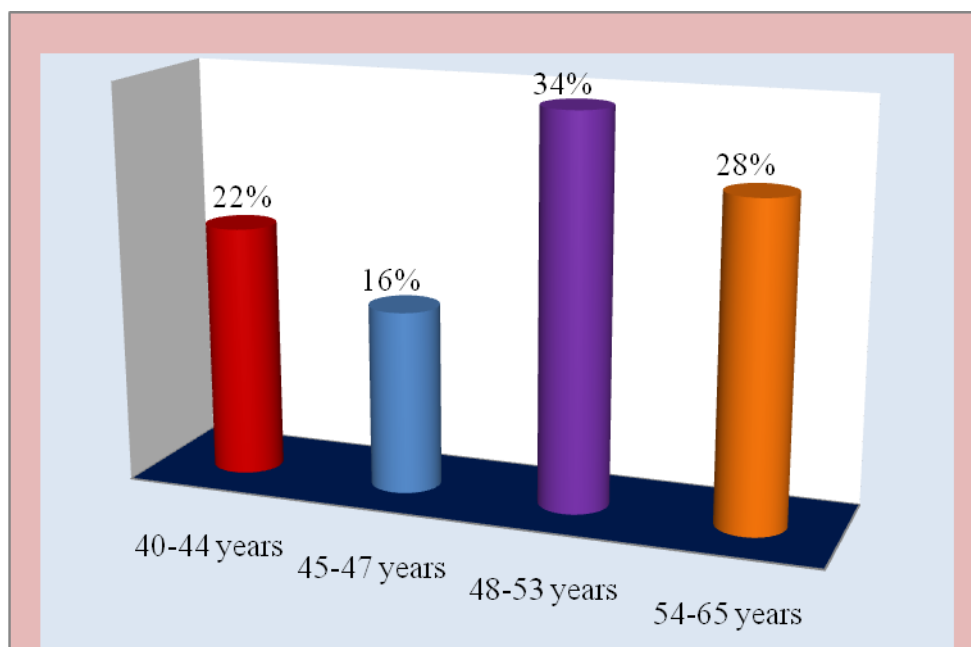


Figure-1: Age group of the participants.

4.2 Gender of the participants

The study was conducted on 50 participants of adhesive capsulitis with diabetes patients. Out of 50 participants 34% (n=17) were male and 66%(n=33) were female. Here the result of this study is female were predominantly higher than male. The study shows the sex distribution among the participants.

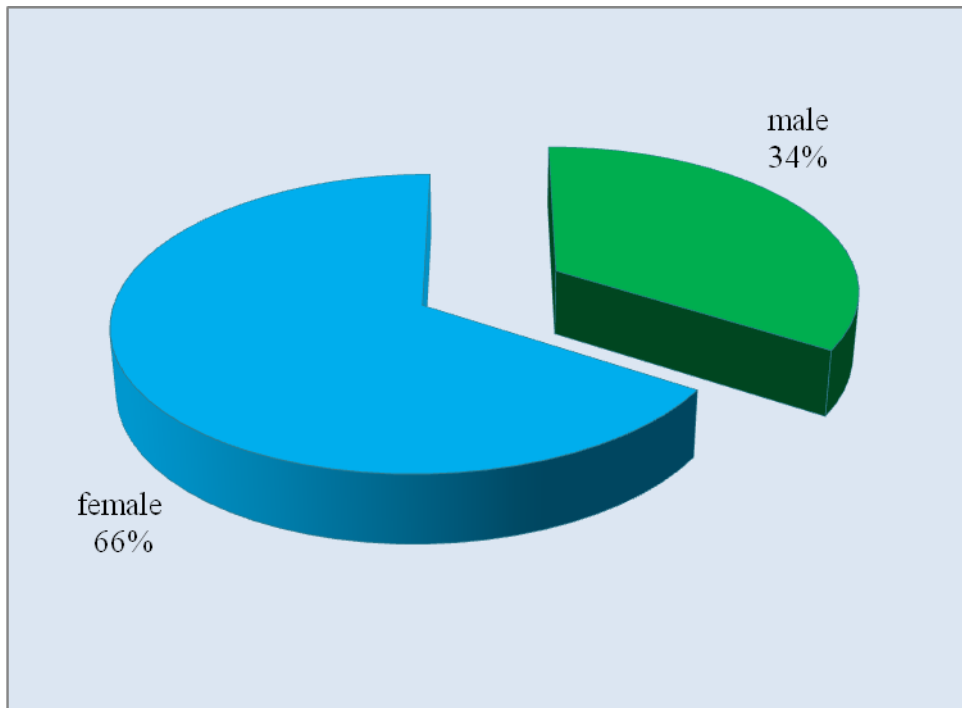


Figure-2: Gender of the participants.

4.3 Age and gender of the participants

Among the 50 participants 10 participants were male and 24 participants were female in age group between 40-52 years, 7 were male and 9 were female above in age group between 53-65 years. There mean age was 49.72 (± 6.253) years and minimum age was 40 years and maximum age was 65 years. In percentage 22% (n=11) participants were between 40-44 years, 16% (n=8) were between 45-47 years, 34% (n=17) were between 48-53 years and 28% (n=14) were between 54-65 years. Overall 68% participants were between age group 40-52 years and 32% participants were between age group 53-65 years where 34% participants were male and 66% participants were female.

Age group	Gender of the participants		Total
	Male	Female	
40 – 52 Years	10	24	34 (68%)
53 – 65 Years	7	9	16 (32%)
Total	17 (34%)	33 (66%)	50 (100%)

Table-1: Cross Tabulation between Age and Gender of the participants.

4.4 Education

The bar graph shows that the lowest number of participants 2% (n=1) is in the never attended school, number of participants 10% (n=5) is in the completed some primary education, number of participants 14% (n=7) is in the completed primary education, highest number of participants 26% (n=13) is in the completed some secondary education, number of participants 10% (n=5) were completed the secondary and 22% (n=11) were completed the secondary education and 16% (n=8) were completed the bachelor or above.

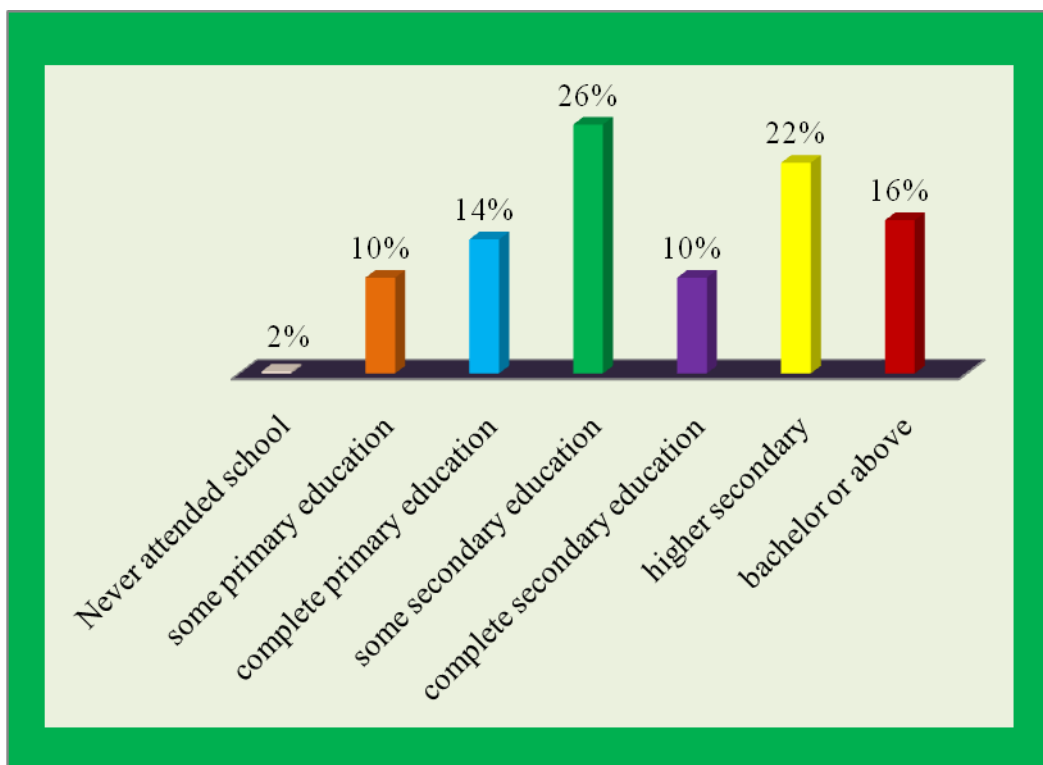


Figure-3: Educational status of the participants.

4.5 Occupation of the participants

Among the participants a highest number respondents 46% (n=23) found those are housewife, 28% (n=14) participants occupation is service holder, 10% (n=5) respondents are businessman. In Bangladesh most common occupation is farmer or labor in agriculture sector and from the participants 6% (n=3) were labor in agriculture area and only 4% (n=2) participants were labor in non-agriculture, 6% (n=3) participants occupation are teacher.

Occupation of the participants	Number (n)	Percentage (100)
Service holder	14	28
Businessman	05	10
Housewife	23	46
Teacher	03	6
Labor (agriculture)	03	6
Labor (non agriculture)	02	4
Total	50	100

Table-2: Occupation of the participants.

4.6 Onset time of diabetes mellitus

From the 50 participants it was found that the highest numbers of them 84% (n=42) were found those suffered from years with diabetes, 16% (n=8) are suffered with diabetes from months.

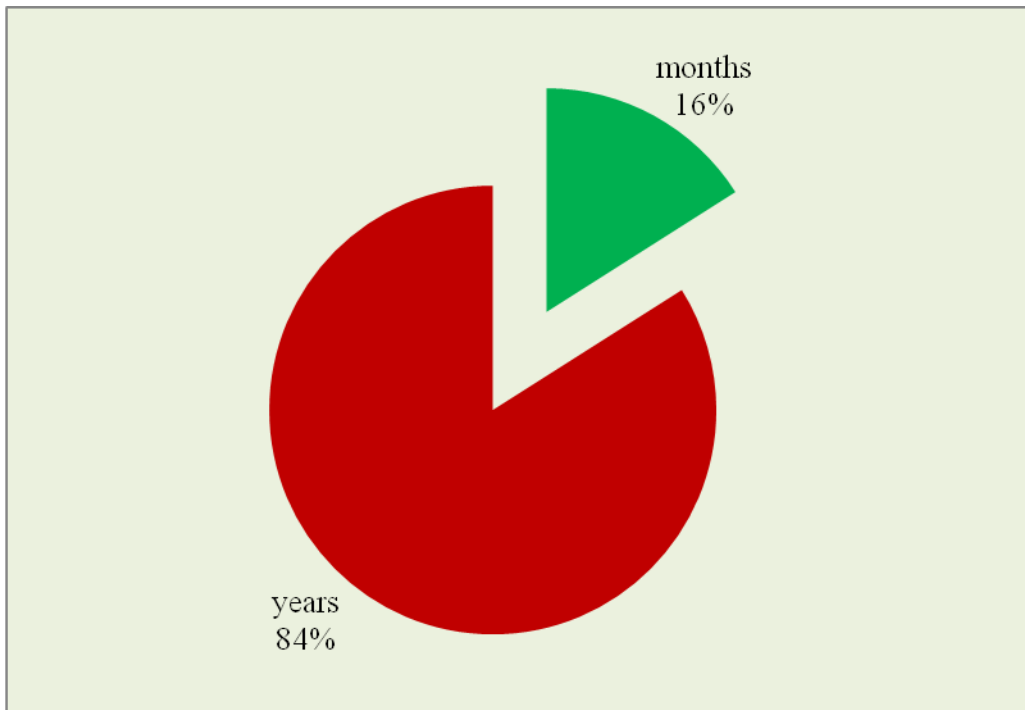


Figure- 4: Onset of diabetes mellitus.

4.7 Controlled or uncontrolled diabetes mellitus

Among the 50 participants 62% (n=31) of them have controlled glycaemic level they were in controlled diabetes and 38% (n=19) were uncontrolled diabetes.

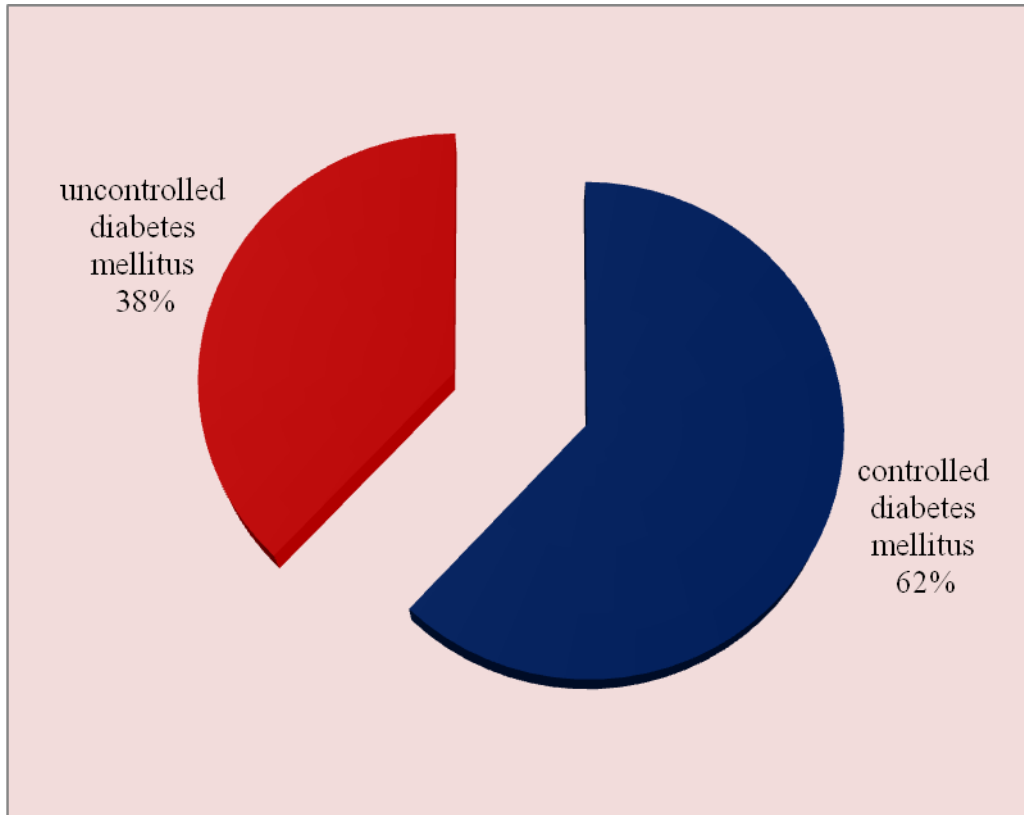


Figure-5: Controlled or uncontrolled diabetes mellitus.

4.8 Treatment taking for diabetes

The bar graph shows that among the 50 participants 24% (n=12) only food control or maintain for a diabetes, 36% (n=18) participants taking treatment as a food control/maintenance and medication, only 8% (n=4) taking only medication for diabetes, 32% (n=16) participants taking treatment food control/maintenance and insulin for diabetes.

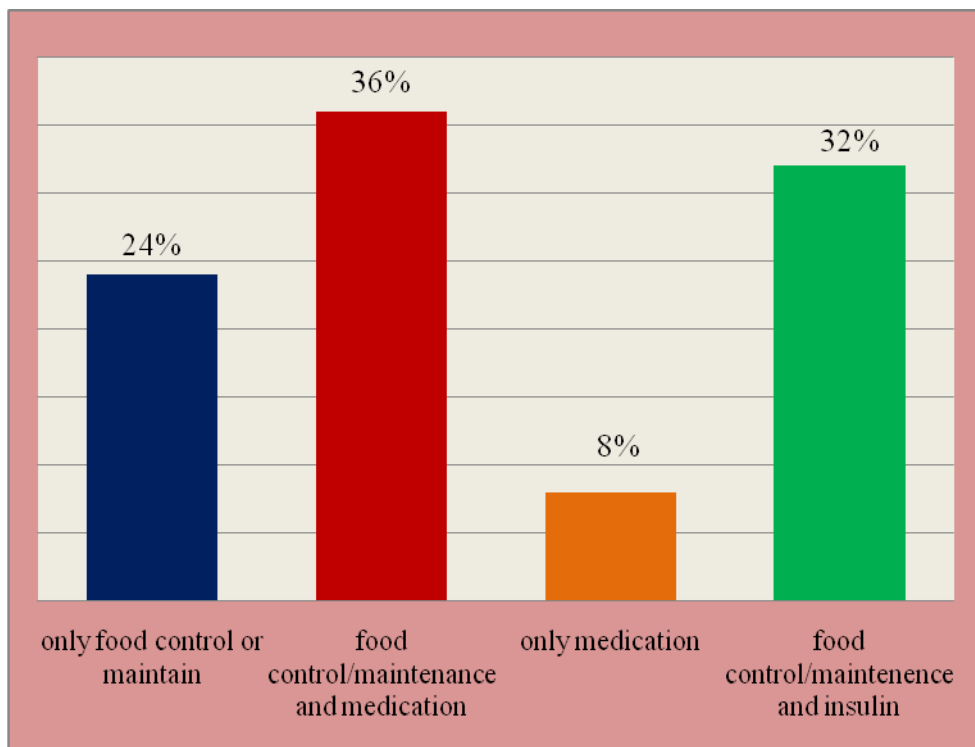


Figure-6: Treatment taking for diabetes.

4.9 Onset of adhesive capsulitis

The bar graph shows that the highest number of participants 42% (n=21) were found those suffered from 1-6 months and 42% (n=21) within the 6-12 months and also seven to twelve months. 10% (n=5) participants are suffered from 13-20 months, and only 6% (n=3) participants suffered from 20-26 months.

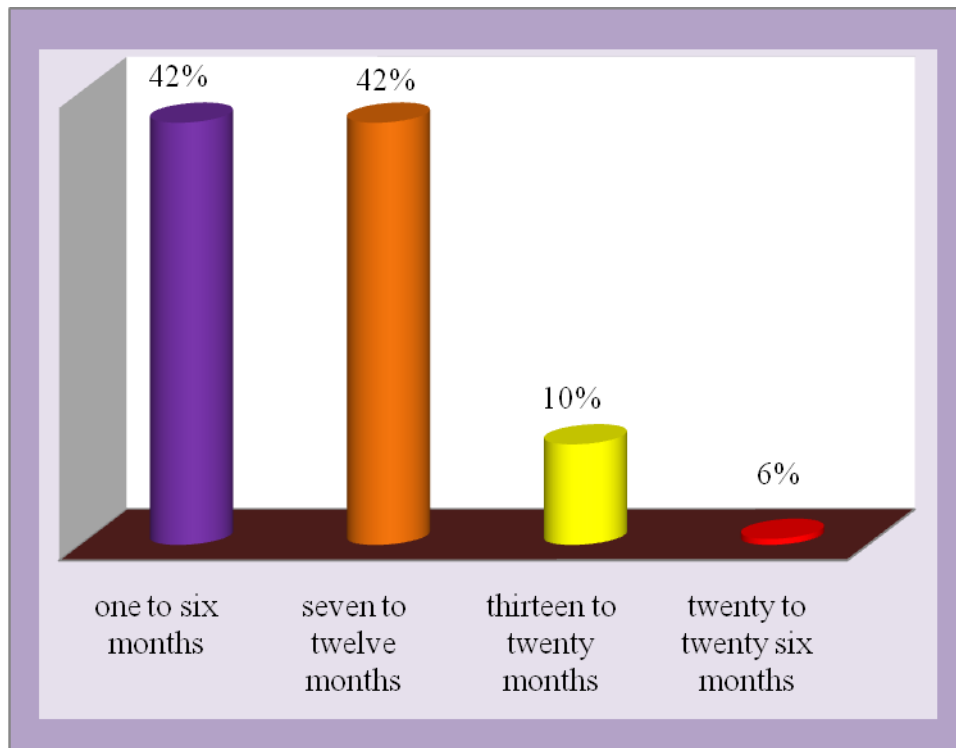


Figure-

7: Onset of adhesive capsulitis.

4.10 Affected side of the shoulder

The bar graph shows that among the participants it was found that 57% (n=28) had capsulitis to their right shoulder, 25% (n=12) had capsulitis to their left shoulder of the body is dominant, and 18% (n=10) had capsulitis to their both shoulder.

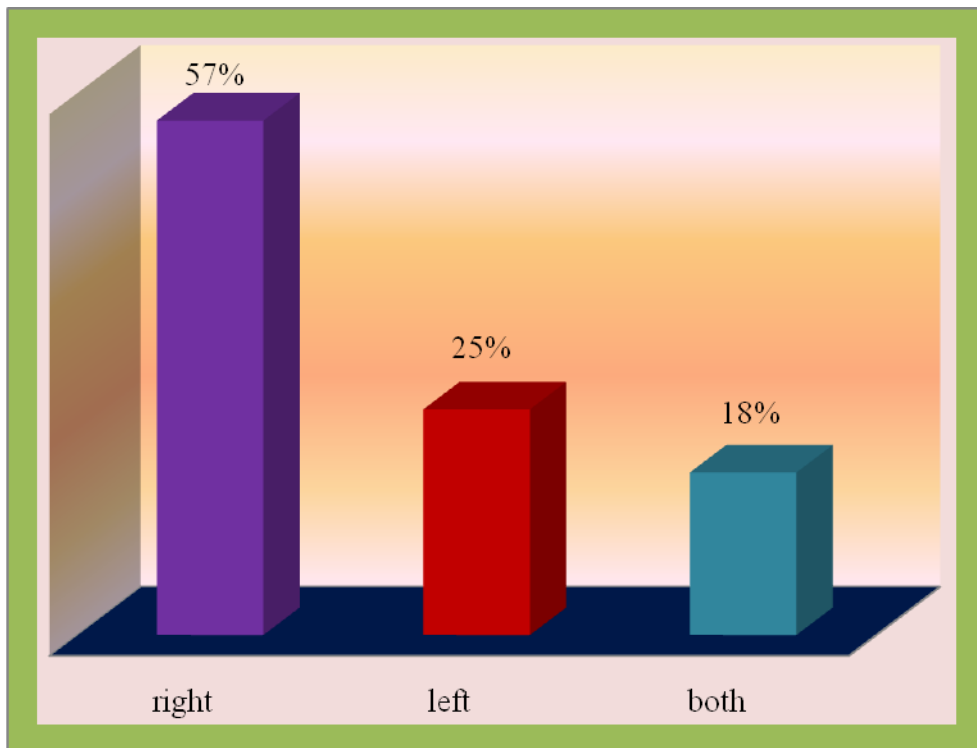


Figure-8: Affected side of the shoulder.

4.11 Presents complain of the participants

The bar graph shows among the 50 participants it was found that 2% (n=1) has only stiffness, 2% (n=1) also has only movement loss. Most of the participants 46% (n=23) has suffered by pain, stiffness, and movement loss. 50% (n=25) has also suffered by pain, movement loss.

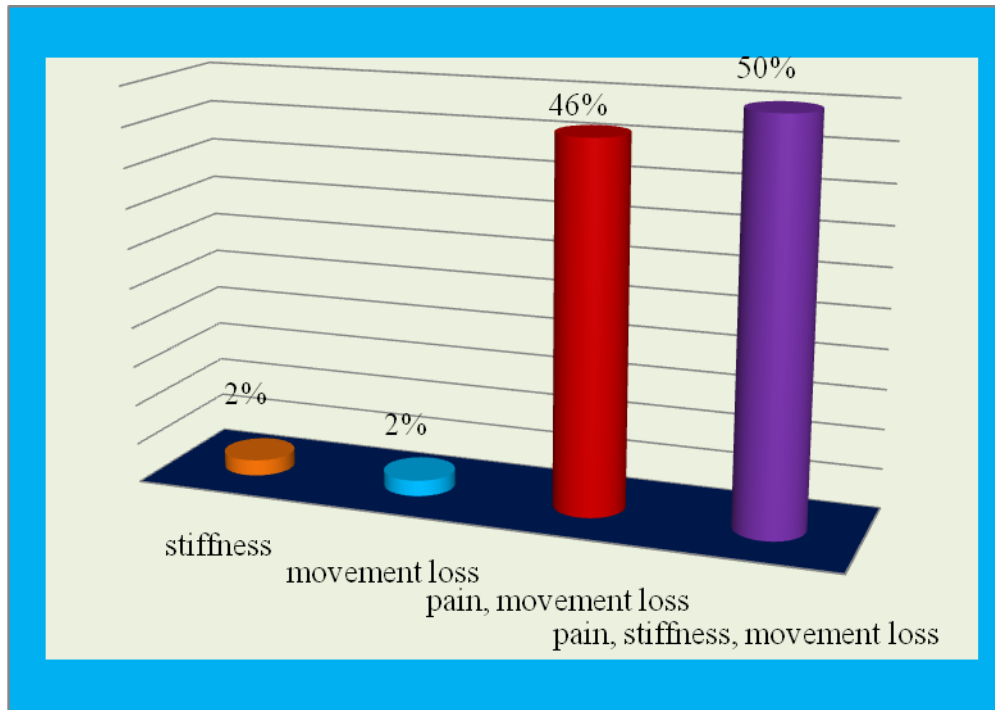


Figure- 9: Presents complain of the participants.

4.12 Severity of joint pain

Among the 50 participants it was found that nearly 32% (n=16) has severe type of pain. Among the participants 52% (n=26) has moderate level of pain and limited number 16% (n=8) also has mild type of pain.

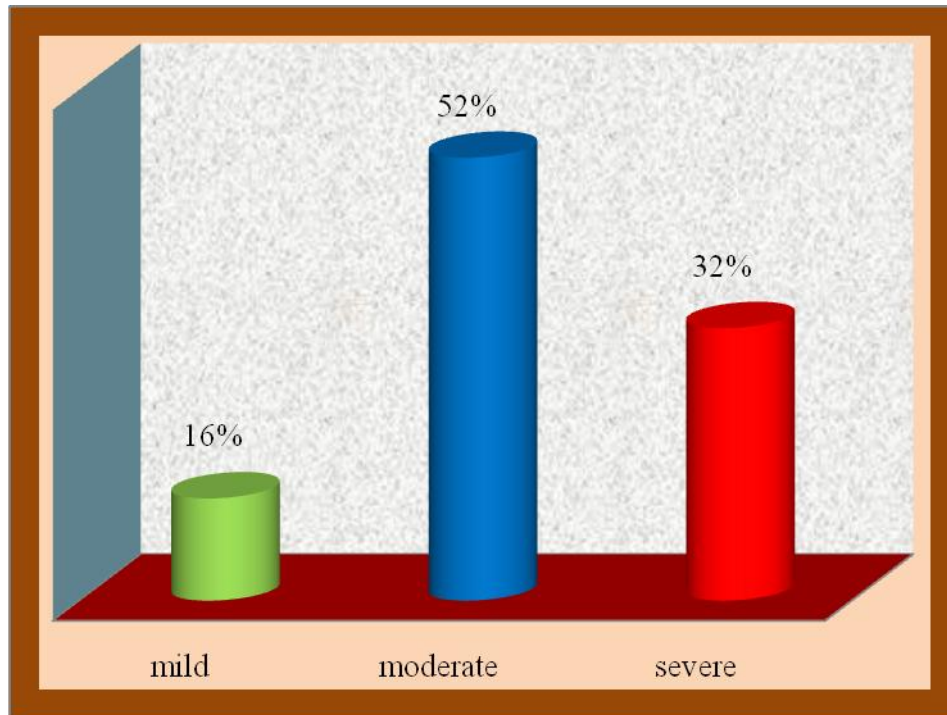


Figure- 10: Severity of joint pain.

4.13 Local tenderness of the joint

The bar graph shows that among 50 participants it was found that 36% (n=18) those have local tenderness in the medial side of the joint, 16% (n=8) has tenderness in the lateral side of the joint, 32% (n=16) has local tenderness in the entire joint, and 16% (n=8) has no local tenderness in the joint.

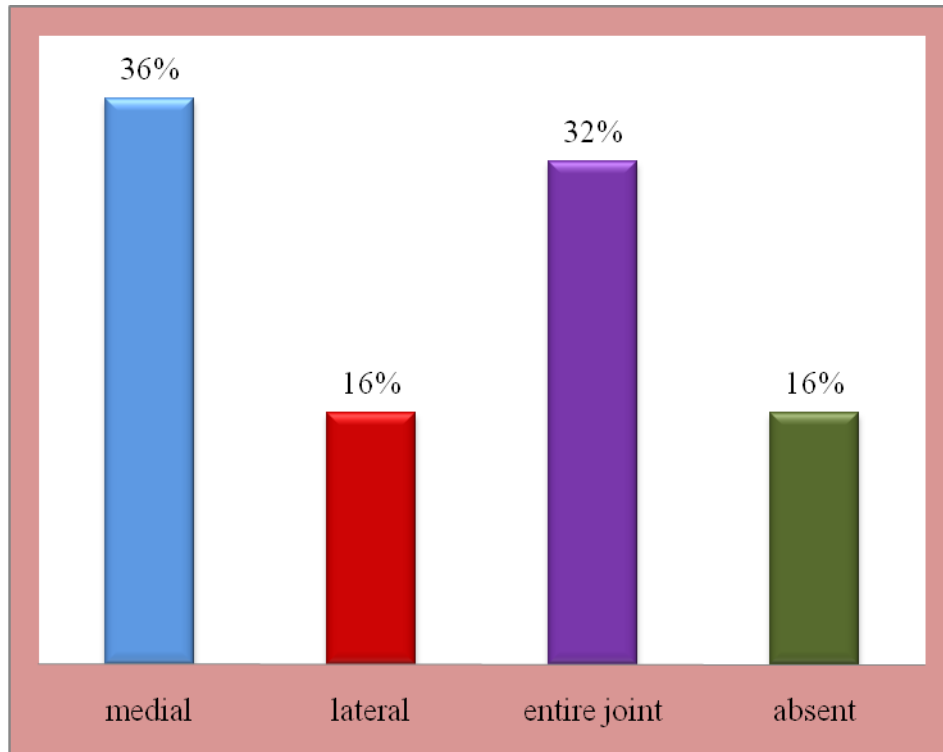


Figure-11: Local tenderness of the joint.

4.14 Shoulder pain during overhead activity

Among the highest number of participants it was found that 98% (n=49) has shoulder pain during overhead activity, and only 2% (n=1) has no shoulder pain during overhead activity.

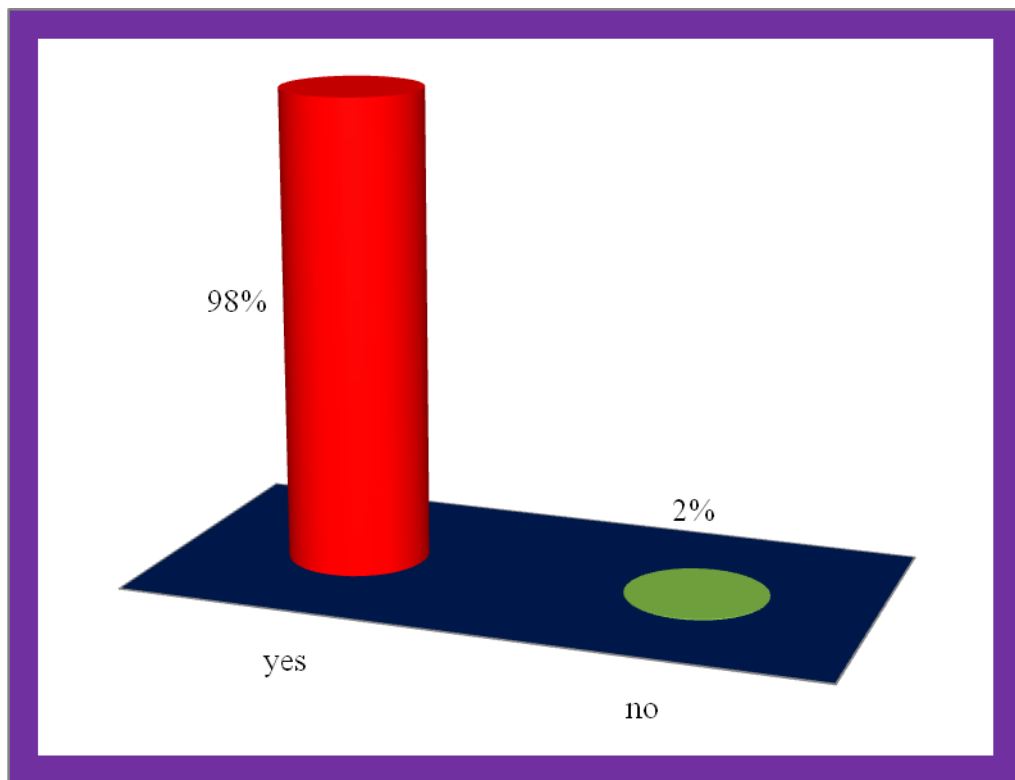


Figure-12: Shoulder pain during overhead activity.

4.15 Increase of pain during movement and rest

The pie chart shows that among the highest number of participants 98% (n=49) pain increase during movement, and only 2% (n=1) pain increase in the rest.

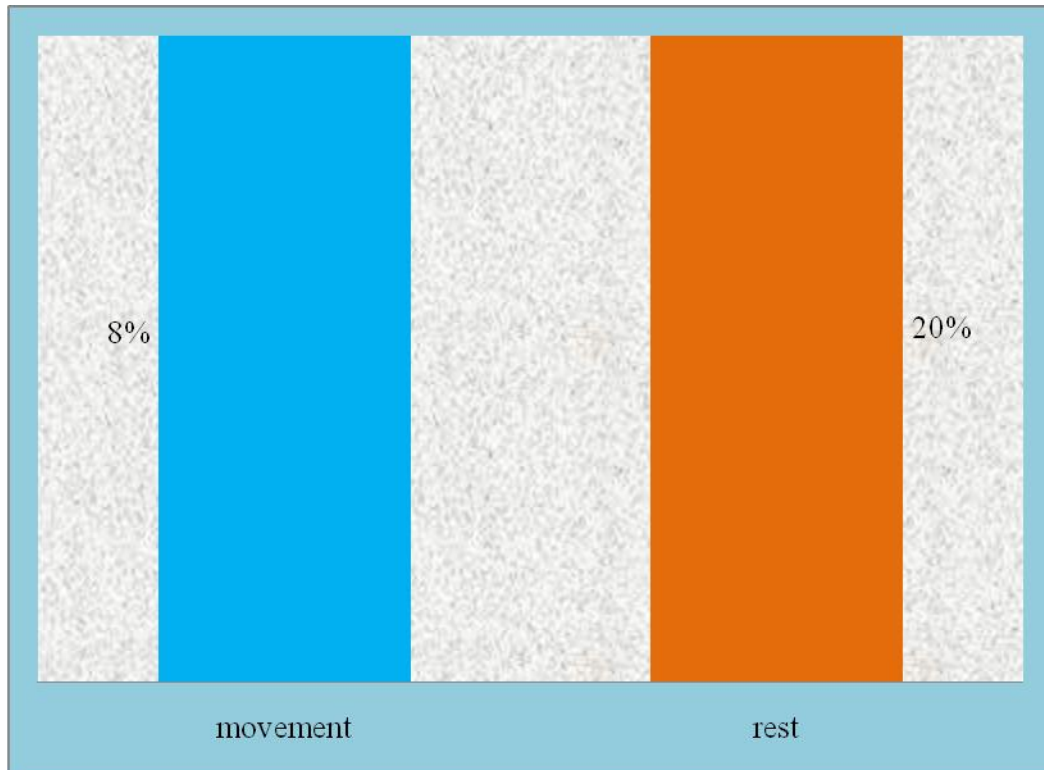


Figure-13: Increase of pain during movement and rest.

4.16 Lying on the affected side

The pie chart shows that among the participants it was found that more than half of them 54% (n=27) can not lie on the affected side and 46% (n=23) of total population can lie on the affected side.

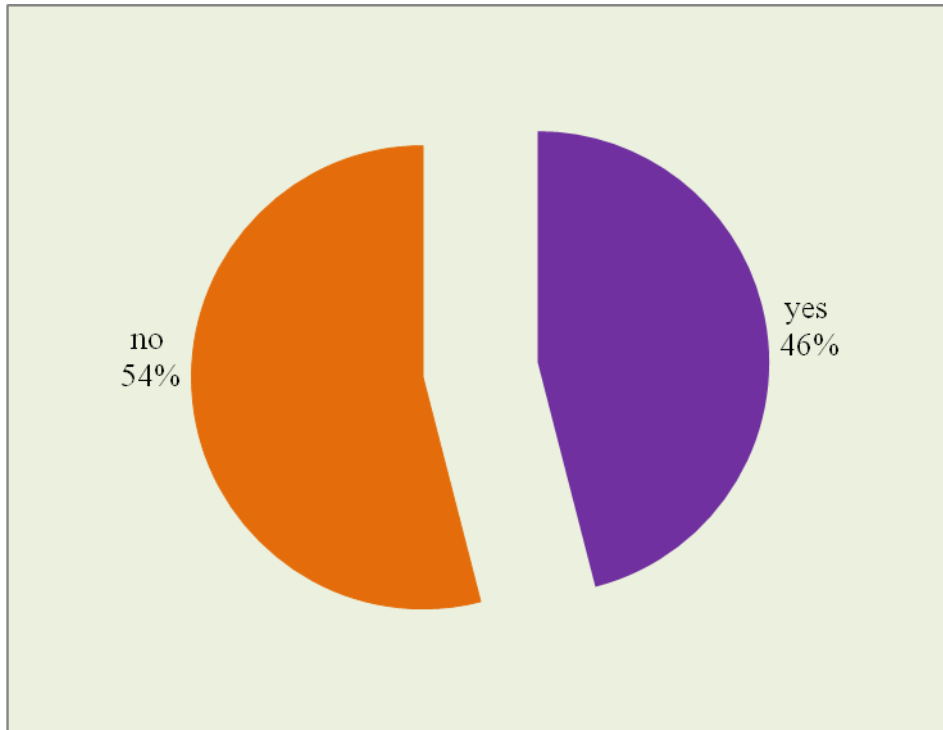


Figure-14: Lying on the affected side.

4.17 Pain hampering daily activity

Among the 50 participants 82% (n=41) of them reported that pain hampered their daily activity and pain not hampering 18% (n=9) of the participants.

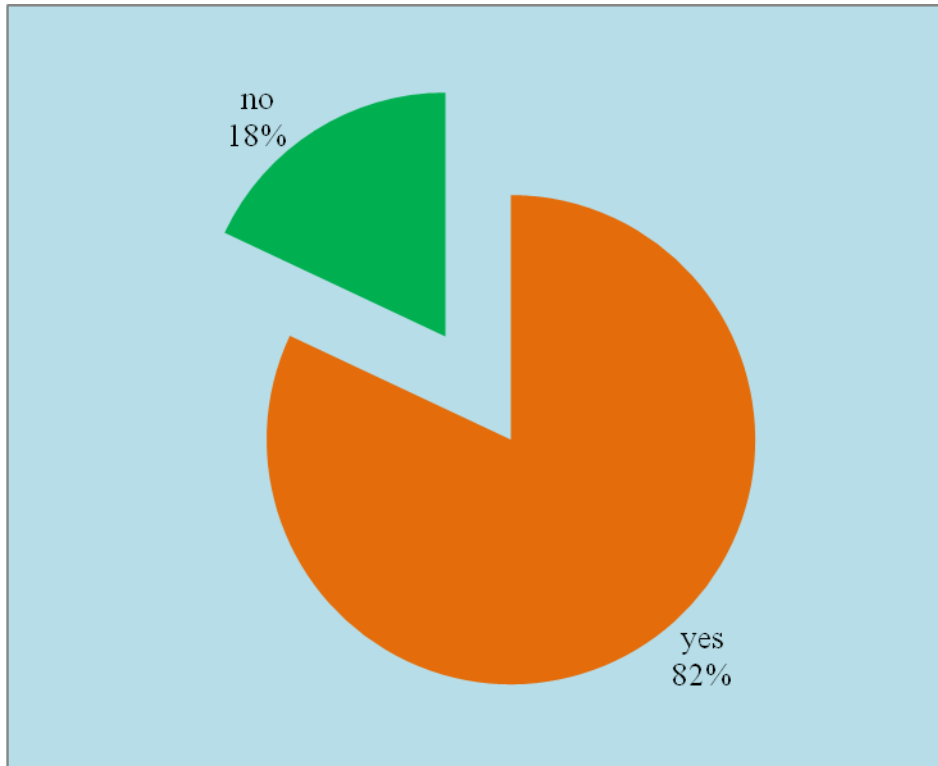


Figure-15: Pain hampering daily activities.

4.18 Getting less strength in muscle

The bar chart shows that among the participants it was found that 100% (n=50) of them were suffered less strength in the muscle.

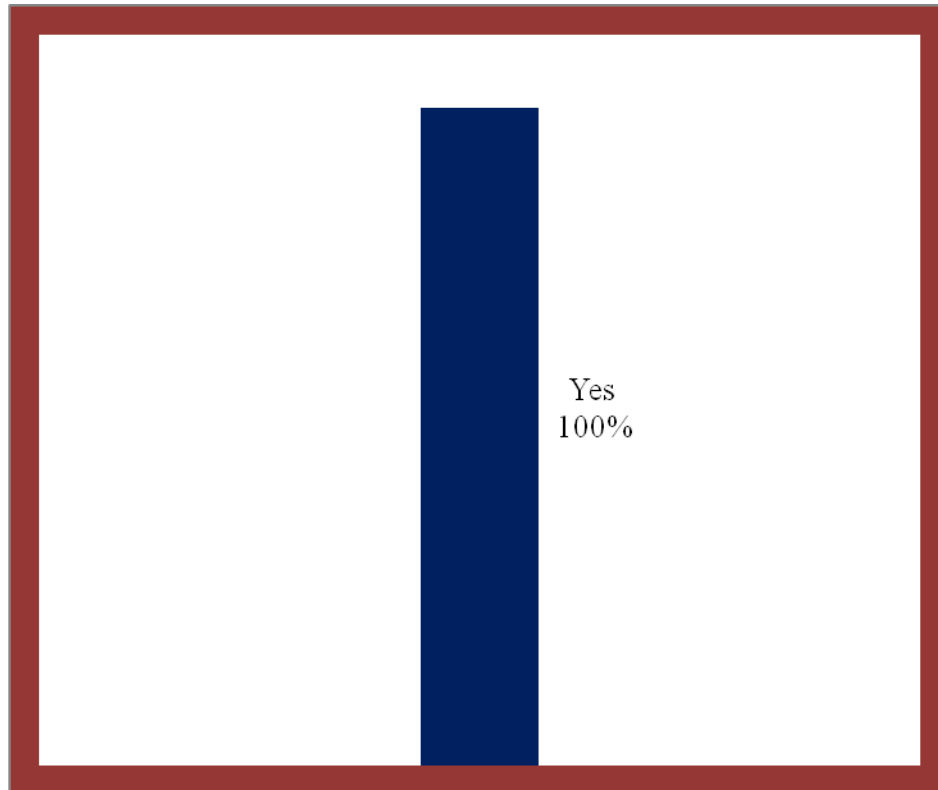


Figure- 16: Getting less strength in muscle.

4.19 Severity rate of muscle weakness

From the participants those have muscle weakness it was found that half of them 50% (n=25) has moderate type of muscle weakness, 4% (n=2) has severe type of muscle weakness, and also 46% (n=23) has mild level of muscle weakness.

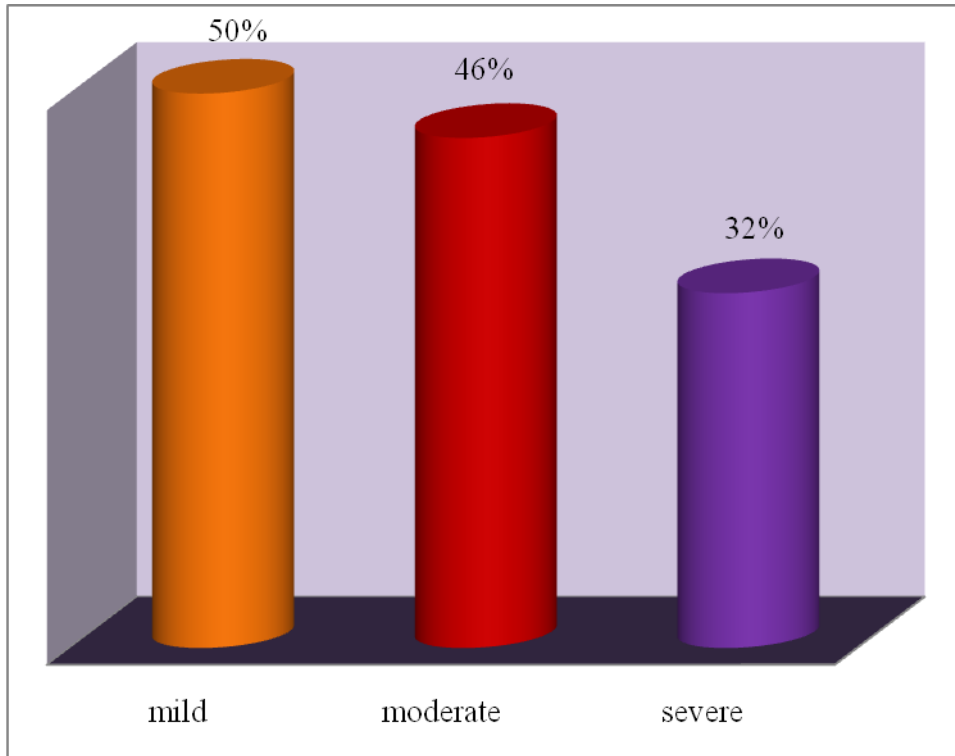


Figure-17: Severity rate of muscle weakness.

4.20 Decrease range of motion

The bar chart shows that among the highest participants it was found that 96% (n=48) are getting decrease range of motion. Among them 4% (n=2) are not decrease range of motion.

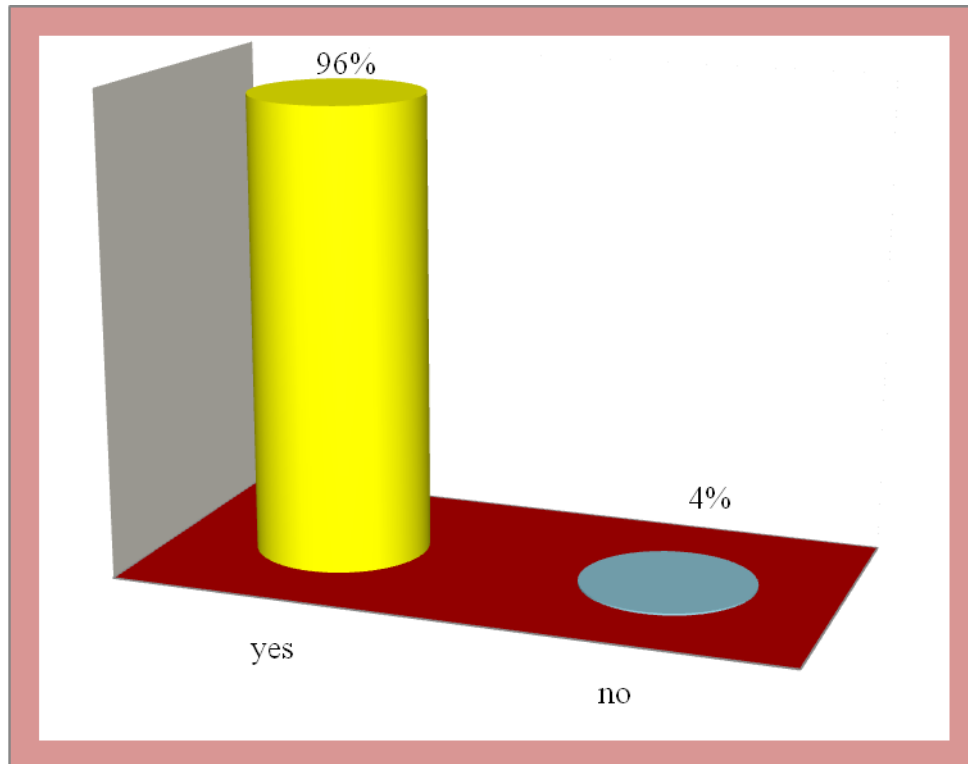


Figure-18: Decrease range of motion.

4.21 Severity of decrease range of motion

From the participants those have movement difficulties among them 64% (n=32) have moderate type of decrease range of motion, 14% (n=7) has severe decrease range of motion and 22% (n=11) has mild type of decrease range of motion.

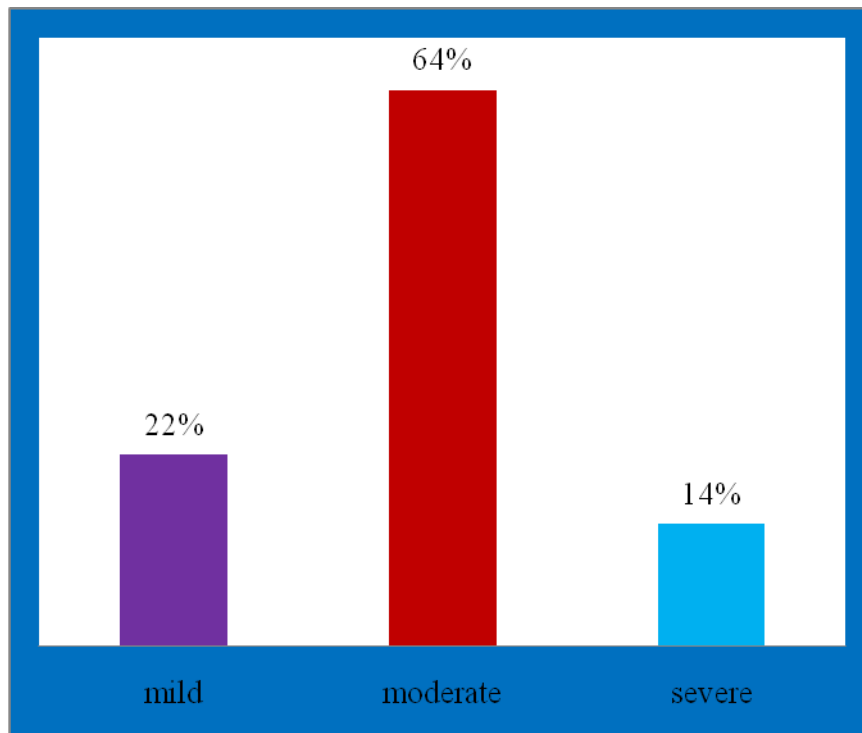


Figure-19: Severity rate of decrease range of motion.

CHAPTER- V:DISCUSSION

Frozen shoulder commonly occurs in patients with certain medical comorbidities and is often correlated with increased pain and dysfunction with these comorbid medical factors (Wolf & Green, 2002). Most well-known is the strong association between diabetes and adhesive capsulitis (Bridgman, 1972). This study found that among the 50 participants with shoulder capsulitis were exposed to diabetes.

In this study, 50 participants were selected who had adhesive capsulitis with diabetes. This study found that the average age of the incidence of the shoulder capsulitis was 50 years (± 10 Years). Earlier studies also found that in typical patients shoulder capsulitis developed in 5th to 7th decade of life and the age range from 40 to 65 years (Bridgman, 1972; Lloyd-Roberts & French, 1959; Hand et al., 2008) which was similar this study. Among the respondents 22% (n=11) of them were in the age range of 40-44 years and 16% (n=8) were in the aged between 45-47 years, 34% (n=17) participants were in the age between 48-53 years and 28% (n=14) were found in the age range between 54-65 years. The study was conducted on 50 participants of adhesive capsulitis with diabetes patients.

Among the 50 participants 34% (n=17) were male and 66% (n=33) were female. Here the result of this study is female were predominantly higher than male. Majority of the respondents of this study was male but earlier studies found that female are more affected with shoulder capsulitis (Hand et al., 2008) which indicate dissimilarities from our findings. This might be because this was a hospital based study and females seek less care than men in least develop countries like Bangladesh (Ahmed et al., 2000).

Education is important issue for the socio-demographic characteristics. In this study found 2% (n=1) is in the never attended school, number of participants 10% (n=5) is in the completed some primary education, number of participants 14% (n=7) is in the completed primary education, highest number of participants 26% (n=13) is in the completed some secondary education, number of participants 10% (n=5) were completed the secondary and 22% (n=4) were completed the higher secondary

education and 16% (n=8) were completed the bachelor or above. So this study indicates that less education level might be the vital issue for incidence of DM due to lack of education they were not aware the DM, risk factors and its treatments. So the prevalence of this problem is increasing day by day. (Pal et al., 1986) found shoulder capsulitis in 18.31% of controlled diabetes mellitus and in 20.41% in uncontrolled diabetes mellitus patients. In this study participants reported 62% (n=31) of them have controlled glycaemic level they were in controlled diabetes and 38% (n=19) were uncontrolled diabetes. It also found that 76% (n=42) of total participants follow the treatment and its guidelines. If the people with DM follow the treatment and guideline then they have better life than others. Type-1 diabetes patients with poor control of diabetes seemed to have more shoulder capsulitis than patients with better control of diabetes.

Among the 50 participants it was found that 57% (n=28) had capsulitis to their right shoulder, 25% (n=12) had capsulitis to their left shoulder of the body is dominant and 18% (n=10) had capsulitis to their both shoulder. Majority of the shoulder capsulitis respondents was affected to their right side. But in case of handedness shoulder capsulitis is distributed in either side as 31% of the right handed shoulder capsulitis respondents develop their shoulder capsulitis in left hand. There are some controversies about the handedness because some study found that nondominant hand is more frequently involved (Hand et al., 2008; Levine et al., 2007) and some found that rarely occurs bilaterally (Binder et al., 1984; Reeves, 1975).

(Hazleman, 1972) found that 50% (n=31) of the patients reported that the shoulder was either painful or stiff or both at the time of follow up. 19% (n=12) had mild pain, 16% (n=10) had mild stiffness and 15% (n=9) had both and also other study shows that 60% (n=37) of the 62 participants demonstrated some restriction of motion. Only 11% (n=7) had mild functional limitation. In this study it was found that 2% (n=1) has only stiffness, 2% (n=1) also has only movement loss. Most of the participants 46% (n=25) has suffered by pain, stiffness and movement loss. 50% (n=23) has also suffered by pain, movement loss.

Among the 50 participants it was found that nearly 32% (n=16) has severe type of pain. In this study participants reported 52% (n=26) has moderate level of pain and limited number 16% (n=8) also has mild type of pain. (Simmonds, 2007) found the 10% had mild pain, 27% had mild or moderate pain and 18% had severe pain. We also found significant differences between the involved and uninvolved shoulders with regard to all ranges of active and passive shoulder motion at the shoulder joint.

(Shaffers et al., 1992) found that 80% of the 62 participants reported some interference with function. The restriction predominantly involved recreational activities for 8% (n=16), overhead activity for 72% (n=36). There was strongly association between functional impairment and subjective symptoms. Among the 50 participants it was found that 98% (n=49) has shoulder pain during overhead activity and only 2% (n=1) has no shoulder pain during overhead activity.

(Balci et al., 1999) also found that 29% (man=33.6%, women= 25.9%) had adhesive capsulitis having at least one months of shoulder pain, an inability to lie on the affected side and restriction active and passive shoulder motion and at least 50% reduced in external rotation motion. (Shaffers et al., 1992) also found that 69% (n=43) of patients had a history of pain at night which often was associated with inability to sleep in the affected side. Among the 50 participants reported that more than half of them 54% (n=27) can not lie on the affected side and 46% (n=23) of total population can lie on the affected side.

(Shaffers et al., 1992) found that the ROM was reported as being is one of four categories: no restriction (90%), mild restriction (80-89%), moderate restriction (70-79%) of the expected motion, marked restriction (<70%). In this study found that among the 50 participants those have movement difficulties among them 64% (n=32) has moderate type of decrease range of motion, 14% (n=7) has severe decrease range of motion and 22% (n=11) has mild type of decrease range of motion.

Total participants (n=50) in this study reported that getting less strength in the muscles of the shoulder joint. In this study among the 50 participants those have muscle weakness it was found that half of them 50% (n=25) are getting moderate level of muscle weakness, 4% (n=2) are getting severe level of muscle weakness, and also 46% (n=23) are getting mild level of muscle weakness. (Cagliero et al., 2002)

found that musculoskeletal disorders were more common in patients with type-1 diabetes than in those with type-2 diabetes. Among the 71 participants was found that 86% (n=43) participants of type-1 diabetes with adhesive capsulitis has musculoskeletal manifestation and 56% (n=28) participants with type-2 diabetes with adhesive capsulitis of the shoulder also has musculoskeletal manifestation.

CHAPTER- VI: CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Frozen shoulder, also known as adhesive capsulitis refers to a condition where the shoulder becomes painful and stiff. It may occur following a relatively minor injury or trauma to the shoulder but most often develops without a clear reason. Adhesive capsulitis can also be linked to other health problems such as diabetes and thyroid disease. With this condition, the pain and stiffness can limit performing daily tasks. Literature showed that the condition affects between 2%-5% of the general population and up to 20% of patients with diabetes and typically occurs in adults between 40-65 years. The problem usually lasts 1 to 2 years. The objective of this study to find out the characteristics of adhesive capsulitis among the diabetic patients.

From the study it can be concluded that the socio-demographic characteristics like most vulnerable age group is 40-65, female are more vulnerable than male, most of the participants educational level are complete some secondary education, housewife are more affected group among all occupation, duration of diabetes and type of diabetes. At this study also found that shoulder capsulitis related information like severity of pain, dominant shoulder, local tenderness, pain during movement and overhead activity, hampering daily activity, stiffness, muscular manifestation and limited joint ROM etc.

The findings show the necessity of preventive measure focusing on adhesive capsulitis with diabetes and health promotion should focus on life style, blood sugar, repetitive shoulder movement. In practice, the results of this study can help to estimate adhesive capsulitis problems, promotion of healthy lifestyle, controlled blood sugar level, perform daily task and to reduce disease related clinical manifestation. It is important to take comprehensive preventive measures to address a range of work and life conditions that can be improved to decrease the clinical manifestation and incidence of adhesive capsulitis in diabetic patients.

6.2 Recommendations

The following recommendations to certain authorities and personnel are proposed:

- Government need to plan awareness program in different area of our country for preventing the diabetes and others behavioral risk factors.
- BIHS hospitals providing massive services to the diabetic patients and need to create more post for physiotherapy to provide collaborative services.
- The results of the study demonstrate the characteristics of the Shoulder capsulitis through purely an observational research but further research would need to be carried out considering proof of hypothesis in type-1 and type-2 diabetes and type of pain in different activities, bending activity and past history of trauma and other risk factor those related with shoulder capsulitis through further Cohort study.
- Continued and regular study in this area should play an essential part in improving quality of life of the adhesive capsulitis in the diabetic patient.

Recommendations for other researcher as follows:

- ✓ Increasing the number of the participants and conduct the research in different places.
- ✓ Other important aspects including range of motion, muscle weakness, parasthesia and numbness, functional activity of the Shoulder joint etc. should further are included in such type of research.
- ✓ Including both subjective and objective to find out the objective.
- ✓ Take sample from BIHS and include other diabetic hospitals.

REFERENCES

- Ahmed, S.M., Adams, A.M., Chowdhury, M., and Bhuiya, A., (2000). Gender, socioeconomic development and health-seeking behavior in Bangladesh. *Social Science Medicine*, 51:361-71.
- American Academy of Orthopedic Surgeons Physician. (2007). Musculoskeletal Symptoms. Available From: <http://www.aaos.org/Research/stats/Common%20Orthopaedic%20Symptoms%20Seen%20by%20a%20Physician.pdf>[Accessed on 26 March, 2013].
- Arkkila, P.E., Kantola, I.M., and Viikari A.L., (1996). Shoulder capsulitis in type 1 and type 2 diabetic patients: association with diabetic complication and related disease. *Annals of the Rheumatic Disease*, 55 (12):907-914.
- Balci, N., Balci, M.K., and Tuzuner, S., (1999) Shoulder adhesive capsulitis and shoulder range of motion in type II diabetes mellitus: association with diabetic complications. *Journal of Diabetes Complications*, 13:135-140.
- Baslund, B., Thomsen., and Jensen, E.M., (1990). Frozen Shoulder: Current Concepts. *Scandinavian Journal of Rheumatology*, 19:321-325.
- Binder, A.I., Bulgen, D.Y., and Hazleman, B.L., (1984). Frozen shoulder: a long term prospective study. *Annals of the Rheumatic Disease*, 43 (3):361-364.
- Bridgmen, J.F., (1972). Periarthritis of the shoulder and diabetes mellitus. *Annals of the Rheumatic Disease*, 31(1):69-71.
- Cagliero, E., Apruzzese, W., Perlmutter, D., Dodenhoff, R.M., Levy, O., and Wilson, A., (2002). Manipulation under anesthesia for primary frozen shoulder: effect on early recovery and return to activity. *Journal of Shoulder and Elbow Surgery*, 9 (1):417-422.
- Centers for Disease Control and Prevention, 2011. National diabetes fact sheet: national estimates and general information on diabetes and prediabetes in the United States. Department of Health and Human Service. Available

from:<diabetes.niddk.nih.gov/DM/PUBS/statistics/DM_statistics.pdf>.[Accessed on 16 March, 2013].

- Cluett., andjonathan., (2010). Frozen shoulder. Available from:<http://orthopaedicsabout.com/cs/frozenshoulder/a/frozenshoulder.htm>[Accessed on 06 February, 2013].
- Connell, D., Padmanabhan, R., and Buchbinder, R., (2002). MR imaging in differential diagnosis. *European Radiology*, 12:2100-2126.
- Cyriax, J.H., (1982). *Orthopedic Medicine-Diagnosis of Soft Tissue Lesions*, 8th ed.,Oxford:BallireTindall.
- Ellenbecker, T., (2006). *Shoulder rehabilitation: Non-operative treatment*,New York: Thieme Medical Publishers.
- Ewald, A., (2011). Adhesive capsulitis: a review. *American Academy of family physician*, 83 (4):417-422.
- Favejee, M.M., Huisstede, B.M.A., and Koes, B.W., (2010). Frozen shoulder: the effectiveness of conservative and surgical interventions. *British Journal of Sports Medicine*, 45:49-56.
- Fisher, L., Kurtz, A., and Shipley, M., (1986). Chiroarthropathy and frozen shoulder in patients with insulin-dependent diabetes mellitus. *Rheumatology*, 25(2):141-146.
- Fraenkel, J.R., and Wallen, N.E., (2000). *How to design & Evaluate research in education*, 4th ed., London: McGraw Hill.
- Garvan Institute of Medical Research, (2010). *Disease fact sheet: type 1 diabetes*, Garvan Institute of Medical Research.
- Hand, C., ClipshamL, K., Rees, J.L., and Carr, A.J., (2008). Long-term outcome of frozen shoulder. *Journal of Shoulder & Elbow Surgery*, 17:231-236.
- Hand, G.C.R., Athanasou, N.A., Matthews, T., Carr, A.J., (2007). The pathology of frozen shoulder, *Journal of Bone and Joint Surgery-British*, 89:928-932.
- Hastell, C., Chilvers, E.R., Hunter, J.A.A., and Boon, N.A., (1999). *Davidson's Principles and Practice of Medicine*, 8th ed., London: Churchill Livingstone.

- Hazleman, B.L., (1972). The painful stiff shoulder. *Rheumatology and Physical Medicine*, 11:413-21.
- Hsu, J.E., Anakwenze, O.A., and Warrender, W.J., (2010). Current review of adhesive capsulitis. *Journal of Shoulder and Elbow Surgery*, 20(3):502-514.
- Hussain, A.A.M., (2010). Prevalence of frozen shoulder in diabetic patients, Iraq: Kufa Training Center.
- Kalra, S., Kalra, B., Sharma, N., and Sharma, S., (2007). Physiotherapy in the management of diabetes mellitus: utility & benefits, *The Internal Journal of Pain, Symptom Control & Palliative Care*, 8(1):3-4.
- Kelley, M.J., Michael, A., Shaffer, John, E., Kuhn, J.E., Lori, A., Michener, Amee, L., Seitz, and Timothy, L., (2013). Shoulder Pain and Mobility Deficits: Adhesive Capsulitis. *Journal of Orthopedics & Sports Physiotherapy*, 43(5):1-31
- Kordella, T., (2002). Frozen shoulder and diabetes. Frozen shoulder affects 20 percent of people with diabetes. Proper treatment can help you work through it. *Diabetes Forecast*, 55 (8): 60-64.
- Lannotti, I., and Williams, G., (2007). *Disorders of the Shoulder: Diagnosis and management*(Vol. 1), Philadelphia: Lippincott Williams & Wilkins.
- Levine, W.N., Kashyap, C.P., and Bak, S.F., (2007). Nonoperative management of idiopathic adhesive capsulitis. *Journal of Shoulder and Elbow surgery*, 16(5):569-573.
- Liem, D., Felix, M., Lothar, T., Bjoern, M., Joern, S., and Wolfgang, P., (2008). The influence of arthroscopic subscapularis tendon and capsule release on internal rotation strength in treatment of frozen shoulder. *Journal of Shoulder and Elbow surgery*, 36 (5):921-926.
- Liesdel, C., Vander, D.K., Koes, B.W., and Bouter. L.M., (1997). Increase association of diabetes mellitus with capsulitis of the shoulder and shoulder hand syndrome. *Journal of Elbow Surgery*, 16(5):569-573.
- Lloyd-Roberts, G.C., and French, P.R., (1959). Periarthritis of the shoulder: a study of the disease and its treatment. *British Medical Journal*, 1:1569-571.

- Manske, R.C., and Prohaska, D., (2008). Diagnosis and management of adhesive capsulitis. *Current Review of Musculoskeletal Medicine*, (3-4):180-189.
- Martin, D., (2008). Adhesive capsulitis: A reminder to treat the whole patient. *Southern Medical Association*, 101(6):578-579.
- Mohammad, A.A.H., (2010). Prevalence of frozen shoulder in diabetic patients, Iraq: Kufa Training Center.
- National Center for Chronic Disease Prevention and Health Promotion, (2007). Working together to manage diabetes: a guide for pharmacists, podiatrists, optometrists, and dental professionals, U.S. Department of Health and Human Services, Public Health Service. Centers for Disease Control and Prevention. Available from: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC1120740/> [Accessed on 23 March, 2013].
- Neviasser, A.S., and Hannafin, J.A., (2010). Adhesive capsulitis: a review of current treatment. *American Journal of Sports Medicine*, 38(11):2346-2356.
- Ozdirenc, M., Biberoglu, S., and Ozcan, A., (2003). Evaluation of physical fitness in patients with type 2 diabetes mellitus. *Diabetes Research and Clinical Practice*, 60(7):171-177.
- Pal, B., Anderson, J., Dick, W.C., and Griffiths, I.D., (1986). Limitation of joint mobility and shoulder capsulitis in insulin- and noninsulin-dependent diabetes mellitus. *British Journal of Rheumatology*, 25:147-51.
- Reeves, B., (1975). The natural history of the frozen shoulder syndrome. *Scandinavian Journal of Rheumatology*, 4(4):193-196.
- Reilingh, M.L., Kuijpers, T., Tanja-Harfterkamp, A.M., and Vander, D.A., (2008). Course and prognosis of shoulder symptoms in general practice. *Journal of Rheumatology*, 47:724-730.
- Serban, A.L., and Udrea, G.F., (2012). Rheumatic manifestations in diabetic patients. *Journal of Medicine and Life*, 5(3): 252–257.
- Shaffer, B., Tibone, J.E., and Kerlan, R.K., (1992) Frozen shoulder. A long-term follow-up. *Journal of Bone & Joint Surgery*, 74:738-746.

- Shah, N., and Lewis, M., (2007). Shoulder adhesive capsulitis: Systemic review of randomized trials using multiple corticosteroid injections. *British Journal of General Practice*, 57:662-667.
- Ship, J.A., (2003). Diabetic and Oral health: An overview. *The Journal of the American Dental Association*, 134:4-10.
- Simmonds, F.A., (2007). Shoulder pain with particular reference to the frozen shoulder. *Journal of Bone and Joint Surgery*, 31(3):426-432.
- Smith, L.L., Burnet, S.P., and Mcneil, J.D., (2003). Musculoskeletal manifestations of diabetes mellitus. *British Journal of Sports Medicine*, 37:30-35.
- Smith, S.P., Devaraj, V.S., and Bunker, T.D., (2001). The association between frozen shoulder and Dupuytren disease. *Journal of Shoulder and Elbow Surgery-America*, 10(2):149-151.
- Spearing, N., March. L., Bellamy, N., Bogduk, N., and Brook, P.M., (2005). Management of musculoskeletal pain. *Journal of Rheumatology*, 8(1):1-5.
- Thomas, D., Williams, R.A., and Smith, D.S., (1980). The frozen shoulder: a review of manipulative treatment. *Rheumatology Rehabilitation*, 19:173-9.
- Tiermy.,Mcphee., and Papadakis., (2002). *Current medical diagnosis and treatment*, 41ed., London: McGraw hill.
- Ulusoy, H., Sarica, N., Aslam, S., Olcay, and Erkonkmaz, U., (2001). The efficacy of supervised physiotherapy for the treatment of adhesive capsulitis. *Bratislav Lek Listy*, 112(4):204-207.
- Vanden.,Dolder, P.A., and Roberts, D.L., (2003). A trail into the effectiveness of massage in the treatment of shoulder pain. *Australian Journal of Physiotherapy*, 49:183-188.
- Wolf, J.M., and Green,A., (2002). Influence of comorbidity on self-assessment instrument scores of patients with idiopathic adhesive capsulitis. *Journal of Bone & Joint Surgery*, 84:1167-73.
- World Health Organization, (2006). Definition and diagnosis of diabetes mellitus and intermediate hyperglycemia: report of a WHO/IDF consultation. World Health Organization. Available from:<http://www.who.int/diabetes/publications/definition%20and%20diagnosis%20of%20diabetes_new.pdf>. [Accessed on 25 March, 2013].

APPENDIX

Appendix- 1

VERBAL CONSENT FORM

(Please read out to the participants)

Assalamualaikum/Namasker, my name is Kamrun Naher Irin, I am conducting this study for a Bsc in Physiotherapy project study dissertation titled “**Characteristics of Adhesive Capsulitis Among the Diabetic Patients**” at Bangladesh Health Professions Institute (BHPI), under University of Dhaka. I would like to know about some personal and other related information about adhesive capsulitis. This will take approximately 20 – 30 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. The data has been collected in such way that not directly related with Bangladesh Institute of Health Sciences (BIHS), so that your participation in the research will have no impact on your present or future treatment in this area. 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 Kamrun Naher Irin and/or Md. Shofiqul Islam, Assistant Professor, 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 or work?

Yes

No

Signature of the Participant _____ Date:

Signature of the Interviewer _____ Date

Appendix- 2 (a)

Questionnaire

“Characteristics of Adhesive Capsulitis among the Diabetic Patients”

Section-1: Patient’s Identification	
1.1	Identification Number:
1.2	Date of Interview:
1.3	Name of respondents:
1.4	Address: House number /vill: P.O: P.S: Dist:
1.5.	Contact number:
1.6	Place of data collection:
1.7	Consent Taken: <input type="checkbox"/> Yes <input type="checkbox"/> No

Appendix- 2(b)

Section 2:Demographic information

QN	Questions and filters	Responses
2.1	May I know your age please?	_ _ yrs
2.2	Sex:	1 =Female 2= Male
2.3	Address and conduct number:	
2.4	What is your education?	1=Never attended school 2=Some primary education 3=Completed primary education 4=Some secondary education 5=Completed secondary education 6=Higher secondary 7=Bachelor or above 8= Other (Specify).....
2.5	What is your profession (occupation)?	1=Service holder 2=Businessman 3=Housewife 4=Teacher 5=Labor (agriculture) 6=Labor (non-agriculture) 7=Other (Specify).....
2.6	Your residential or living area?	1= Urban 2= Rural 3= Semirural

2.7	Health Status	1=Good 2=Fair 3=Poor
2.8	Onset time of diabetes mellitus?	1=Months 2=Years
2.9	What type of treatment you are taking for diabetes?	1=Only food control or maintain 2=Food / maintenance and medication 3=Only medication 4=Only Insulin 5=Food control\maintenance and insulin 6=Others (specify).....

Appendix- 2 (c)

Section 3: Adhesive capsulitis related information

QN	Questions and filters	Responses
3.1	Onset of your adhesive capsulitis?	1=In months.....
3.2	What is your dominant side?	1=Right 2=Left
3.3	What are your present symptoms?	1=Pain 2=Stiffness 3=Movement loss 4=Pain, Movement loss 5=Pain, Stiffness, Movement loss 6=Others (specify).....
3.4	Severity of joint pain?	1=Mild 2=Moderate 3=Severe

3.5	Local tenderness	1=Medial 2=Lateral 3=Entire joint
3.6	Pain at shoulder during overhead activity?	1=Yes 2=No
3.7	Can you lie on the affected side?	1=Yes 2=No
3.8	Pain down the outside of the upper extremity?	1=Yes 2=No
3.9	Pain increase during	1=Movement 2=Rest
3.10	Is it hampering in your daily activity?	1=Yes 2=No
3.11	Do you have a swelling of the joint?	1=Yes 2=No
3.12	Are you getting less strength in your muscle?	1=Yes 2=No
3.13	The Severity rate of muscle weakness?	1=Mild 2=Moderate 3=Severe
3.14	Do you have muscle wasting?	1=Yes 2=No
3.15	Do you feel decrease range of motion?	1=Yes 2=No
3.16	Do you feel decrease range of motion?	1=Yes 2=No
3.17	The Severity of decreased range of motion?	1=Yes 2=No
3.18	Do you find any difficulty reach for the back pocket?	1=Yes 2=No

Appendix-3



বাংলাদেশ হেল্থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই) BANGLADESH HEALTH PROFESSIONS INSTITUTE (BHPI) (The Academic Institute of CRP)

CRP-Chapain, Savar, Dhaka, Tel: 7745464-5, 7741404, Fax: 7745069
BHPI-Mirpur Campus, Plot-A/5, Block-A, Section-14, Mirpur, Dhaka-1206. Tel: 8020178, 8053662-3, Fax: 8053661

তারিখঃ ০২.০৪.২০১৩

প্রতি
পরিচালক
বিআইএইচএস হাসপাতাল
ঢাকা।

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

জনাব,

আপনার সদয় অবগতির জন্য জানাচ্ছি যে, পক্ষাঘাতগ্রস্তদের 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 ছাত্রী কামরুন নাহার আইরিন তার রিসার্চ সংক্রান্ত কাজের তথ্য সংগ্রহের জন্য আপনার সুবিধামত সময়ে আপনার প্রতিষ্ঠানে সফর করতে আহ্বান। তার রিসার্চ শিরোনাম “Charecteristics of adhesive capsulitis among the diabetic patients.”

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।

