

# **RISK FACTORS OF SHOULDER CAPSULITIS**

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

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BHPI, CRP, Savar, Dhaka



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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

## **RISK FACTORS OF SHOULDER CAPSULITIS**

Submitted by **Eliza Afroze**, for partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy. Session: 2005-2006.

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## **DECLARATION**

I declare that the work presented here is my own. All source 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:**

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# CONTENTS

	<b>Page No.</b>
Acknowledgement	i
Abbreviations	ii
List of Figures	iii
List of Tables	iv
Abstract	v
<b>CHAPTER-I : INTRODUCTION</b>	<b>1 – 4</b>
1.1. Background	1 – 2
1.2. Justification of the study	3
1.3. Research Question	4
1.4. Research Objectives	4
1.4.1. General Objective	4
1.4.2. Specific Objectives	4
<b>CHAPTER-II : LITERATURE REVIEW</b>	<b>5 – 11</b>
<b>CHAPTER-III : METHODOLOGY</b>	<b>12 – 17</b>
3.1. Study Design	12
3.2. Conceptual Framework	13
3.3. Study Site	13
3.4. Study Population	14
3.4.1 Sampling Procedure	14
3.4.2 Inclusion Criteria	14
3.4.3 Exclusion Criteria	14
3.5 Sample Size	14-15
3.6 Data Collection Procedure	15
3.7 Data Analysis	16
3.8 Ethical Consideration	17
3.9 Limitations of the study	17
<b>CHAPTER-IV: RESULT</b>	<b>18– 24</b>
<b>CHAPTER-V: DISCUSSION</b>	<b>25– 26</b>
<b>CHAPTER-VI : CONCLUSION &amp; RECOMMENDATION</b>	<b>27</b>
6.1 Conclusion	27
6.2 Recommendation	27
<b>REFERENCES</b>	<b>28– 30</b>
<b>APPENDIX</b>	<b>31 – 40</b>

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## Abbreviation

<b>BHPI:</b>	Bangladesh Health Professions Institute.
<b>CI:</b>	Confidence Interval.
<b>CRP:</b>	Center for the Rehabilitation of the Paralyzed.
<b>CVD:</b>	Cardio Vascular diseases.
<b>MVT:</b>	Movement.
<b>ROM:</b>	Range of Motion.
<b>SD:</b>	Standard Deviation.
<b>WHO:</b>	World Health Organization.

## List of Figures

	<b>Page No.</b>
Figure 1: Study Design	12
Figure 2: Conceptual Framework	13
Figure 3: Affected Side	19
Figure 4 Mean duration of Capsulitis	19
Figure 5: Repeated overhead activity by sex	20
Figure 6: Percentage of Diabetes among Case	21
Figure 7: Percentage of Diabetes among Control	21
Figure 8: Percentage of Injury or immobility among case and control	22

## List of Tables

	<b>Page No.</b>
Table 1: Characteristics of the Respondents	18
Table 2: Affected Side by Sex	19
Table 3: Repeated Movement of the Respondents	20
Table 4: Duration and type of Treatment of Diabetes	21
Table 5: CVD status by case and control	21
Table 6: Pulmonary Diseases by case and control	22
Table 7: Risk Factors of Shoulder Capsulitis	23



## Abstract

*Purpose:* Shoulder capsulitis is one of the most common musculoskeletal problems seen with an incidence of 3–5% in the general population and up to 20% in those with diabetes. Approximately 2-3% of adults aged between 40 and 70 years develop shoulder capsulitis with a greater occurrence in women. It is commonly associated with systemic and non-systemic conditions. *Objectives:* To identify possible risk factors (specific and nonspecific) associated with Shoulder Capsulitis. *Methodology:* A unmatched case-control was conducted in outdoor physiotherapy department of center for the rehabilitation of the paralyzed. A total 50 patients, 25 cases with shoulder capsulitis and 25 controls without shoulder capsulitis, were interviewed for identifying possible risk factors of shoulder capsulitis. A structured questionnaire was introduced to all individuals to identify the possible exposure to the risk factor. Odds ratio was calculated as a mode of association between disease and exposure. *Results:* The mean age of the respondents was 50 years with a standard deviation of 6. A total 68% respondent was male. 28% of the cases were female whereas 36% of the controls were female. Majority of the respondent (90%) were Muslims. A total 62% of the respondents have at least Secondary education. The average monthly income of the respondent was 20,000 taka. Risk factor of shoulder capsulitis include Male Sex (OR=1.45, 95% CI = 0.44-4.78), repeated movement of affected shoulder (OR= 1.91, 95% CI = 0.62-5.88), Diabetes (OR= 3.17, 95% CI = 0.94-10.07), Cardiovascular disease (OR= 1.63, 95% CI = 0.53- 4.98), Pulmonary diseases (OR= 1.31, 95% CI = 0.31-5.59), injury to the affected shoulder ( OR=1.39 95% CI = 0.28 -7.002) immobility to the affected shoulder (OR= 1.75, 95% CI = 0.37-8.3). Overhead activity of shoulder was found to be protective (OR= 0.62, 95% CI= 0.20-1.89). *Conclusion:* Individuals should aware of avoidance of repeated shoulder activity in occupation, performing certain amount of overhead activity, control of blood sugar level, blood pressure, avoid smoking and avoid complete immobility of the shoulder due to injury or other causes etc.

### 1.1. Background

Chronic diseases, such as heart disease, stroke, cancer, chronic respiratory diseases and diabetes, are by far the leading cause of mortality in the world, representing 60% of all deaths. Out of the 35 million people who died from chronic disease in 2005 (WHO, 2011). Chronic diseases such as diabetes, cardiovascular diseases, injuries and trauma not only responsible for mortality but lead to various morbidity. Shoulder capsulitis is one of the consequences of chronic diseases (Binder, 2007, Tuten et al., 2000).

The shoulder is a unique anatomical structure with an extraordinary range of motion (ROM) that allows us to interact with our environment. A loss of mobility of this joint will cause significant morbidity. Shoulder capsulitis is a poorly understood musculoskeletal condition that can be disabling (Manske and Prohasks, 2008). However the true natural history has also not been definitively established, making evaluation of treatment outcomes difficult (Neviaser and Hannafin, 2010).

This disorder is one of the most common musculoskeletal problems seen in orthopedics with an incidence of 3–5% in the general population and up to 20% in those with diabetes. Approximately 2-3% of adults aged between 40 and 70 years develop shoulder capsulitis with a greater occurrence in women (Stam, 1994) and non dominant hand is more frequently affected (Levine et al., 2007). It is commonly associated with other systemic and non-systemic conditions. By far the most common is the co-morbid condition of diabetes mellitus, with an incidence of 10–36% (Bridgman, 1972).

The relationship between shoulder capsulitis and diabetes mellitus is well documented, with the incidence of shoulder capsulitis being two to four times higher in diabetics than in the general population (Neviaser and Hannafin, 2010, Smith et al., 2001). Shoulder capsulitis affects about 20% of people with diabetes and has been described as the most disabling of the common musculoskeletal manifestations of diabetes mellitus (Kordella, 2002).

Other co-morbid conditions include hyperthyroidism, hypothyroidism, Parkinson's disease, cardiac disease, pulmonary disease, stroke and surgical procedures like cardiac surgery, cardiac catheterization etc are also related to shoulder capsulitis. (Boyle-Walker et al., 1997, Riley et al. 1989).

Earlier study was conducted on shoulder capsulitis as a postoperative complication of aneurysm surgery and the incidence of shoulder capsulitis was 70% among the early, delayed and elective surgery group in which the highest incidence of shoulder capsulitis was found to occur in early surgery group due to immobility of their upper extremity during post-operative treatment (Tanishima et al., 1997).

There is no relative study concerning about the risk factors of shoulder capsulitis in Bangladesh. However a study was conducted to find out the prevalence of shoulder capsulitis among the patients undergoing Cardiothoracic Surgery. The study found that the prevalence of frozen shoulder among the respondents was approximately 35%. The patients with age 60 years or more tend to be associated with the frozen shoulder significantly more than those with age <60 years. Females were particularly prone to develop frozen shoulder (53.3%). The prevalence of frozen shoulder was considerably higher among the diabetics than that among the non diabetics (Uddin et al., 2011).

## **1.2. Justification of the Study**

Shoulder capsulitis is a well-defined condition with its phases of severe pain, increasing stiffness, and the gradual recovery of full movement of the shoulder. Approximately 2-3% of adults aged between 40 and 70 years develop shoulder capsulitis with a greater occurrence in women. Despite many studies, the frozen shoulder phenomenon is nowadays still regarded as an enigma. The disorder has a mysterious and intriguing appeal, with an apparently spontaneous onset and resolution, inflicting a great deal of suffering on patients over a prolonged period of time. No other joint seems to become affected in a similar way (Stam, 1994).

Identifying risk factors for a disease is one of the methods used to gain understanding of its etiology. Since chronic diseases especially diabetes and cardiovascular diseases are emerging which eventually make them at higher risk of developing shoulder capsulitis. Risk factors identification helps in understanding the relationship between shoulder capsulitis and diabetes alerts the practitioners to the risk of diabetic condition in patients with shoulder capsulitis and evaluation of the patients with shoulder capsulitis with diabetes could affect the therapeutic management (Tighe and Oakley Jr, 2008).

Identification of the risk factors of shoulder capsulitis will give us evidence by which we take necessary measure to manage this condition as well as it can help to take preventive measures to minimize the sufferings of this condition.

### **1.3. Research Question**

What are the risk Factors of Shoulder Capsulitis?

### **1.4. Research Objectives**

#### **1.4.1. General Objective**

To identify possible risk factors associated with Shoulder Capsulitis.

#### **1.4.2. Specific Objectives**

1. To explore socio-demographic characteristics of patients with Shoulder Capsulitis.
2. To describe the characteristics of shoulder capsulitis.
3. To find out the association between Diabetes and shoulder capsulitis.
4. To evaluate the association between CVD and shoulder capsulitis.
5. To explore the association between pulmonary diseases and shoulder capsulitis.
6. To identify the association between injury to the affected shoulder and shoulder capsulitis.
7. To find out the association between immobility and shoulder capsulitis.

### **2.1. Shoulder Capsulitis**

Shoulder capsulitis, also known as frozen shoulder, is a common condition involving scapulohumeral pain and loss of motion. This condition was termed “peri-arthritis scapulohumeralis” by Duplay in 1896. Codman, in 1934, characterized the diagnosis of “frozen shoulder” as a condition characterized by pain and reduced range of motion in the affected shoulder. It results from contraction of the glenohumeral joint capsule and adherence to the humeral head. Although shoulder capsulitis is often self-limited, it can persist for years and may never fully resolve (Ewald, 2011).

### **2.2. Epidemiology**

The true incidence of shoulder capsulitis is difficult to assess because many individuals who have the disease will not seek medical attention because of the vague character and insidious onset of the disease. It is a common condition that is often quoted by many studies to affect approximately 2% to 5% of the general population, (Bridgman, 1972, Hand et al., 2008) this incidence, however, is likely inflated, because many studies include populations with specific co-morbid conditions with a higher incidence of frozen shoulder than the general population.

It is rare in children, and peaks between 40 and 70 years of age. Women are more often affected than men. It most commonly affects women aged between 40 and 60 years. There is no known genetic or racial predilection. Frozen shoulder often presents bilaterally. Persons with a history of shoulder capsulitis are at increased risk of developing the condition on the contra lateral side and commonly affects years after onset of symptoms in the first shoulder, but it does not affect the same shoulder twice. Recurrence on the affected side is also possible, especially in patients with diabetes It is common in persons with insulin-dependent and non-insulin-dependent diabetes, and in those with prediabetes (glucose intolerance) (Bridgman, 1972, Ewald, 2011, Shaffer et al., 1992, Tighe and Oakley Jr, 2008).

### **2.3. Classification**

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. Those with primary shoulder capsulitis generally have a very gradual onset and progression of symptoms, with no known precipitating event that can be identified. These symptoms may progress so slowly that the patient does not even seek medical attention until ROM and pain severely limit their daily activities. It is not uncommon for a patient to present with shoulder pain as their only complaint and not realize there is a loss of motion. This is unlike the person afflicted with a secondary shoulder capsulitis who usually notices their symptoms soon after a fall or inciting trauma as their ROM does not appear to improve as expected after the pain from the inciting event should no longer limit ROM (Manske and Prohaska, 2008).

### **2.4. Risk Factors**

Primary or idiopathic shoulder capsulitis may be related to immunologic, biochemical, or hormonal imbalances. Secondary shoulder capsulitis develops from known causes of stiffness and immobility, such as previous shoulder trauma or surgery, and may represent an entirely different condition. Many conditions and procedures cause the upper extremity to be in a dependent position for extended periods of time, but it is unknown whether development of frozen shoulder in many of these cases is related to pain and immobility (Hsu et al., 2010). It was found that 22% of patients report minor trauma to their affected limb before their symptom arises (Hand et al., 2007).

Frozen shoulder commonly occurs in patients with certain medical co-morbidities and is often correlated with increased pain and dysfunction with these co-morbid medical factors. Most well-known is the strong association between diabetes and shoulder capsulitis. Bridgman (1972) first described this association after observing a 10.8% incidence among 800 diabetic patients and only a 2.3% incidence in 600 nondiabetic patients; 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). Other hormonal disorders such as thyroid diseases including hyperthyroidism (Wohlgethan, 1987), hypothyroidism (Bowman et al., 1988), ACTH deficiency (Choy et al., 1991) was found to be associated with the development of shoulder capsulitis.

Patients with various cardiac disorders and cardiac surgery were found to have a higher incidence than in the general population. It was found that the incidence of shoulder capsulitis was 3.3% among the male cardiac surgery patients (Tuten et al., 2000). Bowman et al. (1988) observed that 10 of 14 non diabetes patients with frozen shoulder had ischemic heart diseases. It was also found that diabetes and heart disease are more prevalent in patients diagnosed with shoulder capsulitis compared with control (Boyle-Walker et al., 1997).

Shoulder capsulitis was found to be frequent among those with certain neurological disorder and neurosurgery. It was found that the incidence of shoulder capsulitis was 12.7% among patient with Parkinson diseases compared with the control (1.7%) (Riley et al., 1989). It was also observed that shoulder capsulitis was more frequent among patient with hemiplegic shoulder pain after 1st stroke (50%) (Lo et al., 2003) and neutosurgical patients (25.3%) (Bruckner and Nye, 1981) patient undergoing aneurysm surgery (41%) (Tanishima et al., 1997).

Whether a genetic predisposition for frozen shoulder exists is controversial. One study found that shoulder capsulitis occurs 2 to 3 times more frequently than by chance, but this result may be because of individual specific environmental factors rather than a true genetic component (Hakim et al., 2003). Studies also reveal strong association between shoulder capsulitis and Dupuytren disease, which is also believed to have a heritable component. Although it is reported that Dupuytren disease is 8.27 times more common in patients with frozen shoulder compared with the general population, this strong association is not well understood. (Smith et al., 2001)

## **2.5. Pathophysiology**

The pathophysiology of shoulder capsulitis is poorly understood. Pain associated with shoulder capsulitis can cause a limitation or selective immobilization of the painful shoulder. Prolonged immobilization of a joint has been shown to cause several detrimental pathophysiologic findings including: decreased collagen length, fibrofatty infiltration into the capsular recess, ligament atrophy resulting in decreased stress absorption, collagen band bridging across recesses, random collagen production, and altered sarcomere number in muscle tissue (Manske and Prohasks, 2008).



Analysis of surgical specimens suggests that capsular hyperplasia and fibrosis have a role. The presence of cytokines suggests a possible autoimmune process, but the relationship is not well established (Rodeo et al., 1997).

## **2.6. Clinical Phases**

Shoulder capsulitis presentation is generally broken into three distinct stages. The first stage that is described is called the freezing or painful stage. Patients may not present during this stage because they think that eventually the pain will resolve if self-treated. As the symptoms progress, pain worsens and both active and passive ROM becomes more restricted, eventually resulting in the patient seeking medical consultation. This phase typically lasts between 3 and 9 months and is characterized by an acute synovitis of the glenohumeral joint.

Most patients will progress to the second stage, the frozen or transitional stage. During this stage shoulder pain does not necessarily worsen. Because of pain at end ROM, use of the arm may be limited causing muscular disuse. The frozen stage lasts anywhere 4 to 12 months. The common capsular pattern of limitation has historically been described as diminishing motions with external shoulder rotation being the most limited, followed closely by shoulder flexion, and internal rotation. There eventually becomes a point in the frozen stage that pain does not occur at the end of ROM.

The third stage begins when ROM begins to improve. This 3rd stage is termed the thawing stage. This stage lasts anywhere from 12 to 42 months and is defined by a gradual return of shoulder mobility.

## **2.7. Differential Diagnosis**

The diagnosis of shoulder capsulitis is usually clinical. The history and physical examination are essential to differentiating between the stiff and painful shoulder and the shoulder with true shoulder capsulitis (Ewald, 2011, Hsu et al., 2010). Patients will often describe an insidious onset of vague, dull pain at the deltoid insertion, a pain pattern that may be due to innervation of the joint capsule by the axillary nerve. Night pain is a very common feature, and sleeping on the affected shoulder is usually symptomatic. Painful and restricted elevation and external rotation are common. As the patient progresses from the freezing to frozen stage, the pain becomes more

severe, and the restriction in elevation and rotation increases. Patients will often describe an insidious onset of vague, dull pain at the deltoid insertion, a pain pattern that may be due to innervation of the joint capsule by the axillary nerve. Night pain is a very common feature, and sleeping on the affected shoulder is usually symptomatic. Painful and restricted elevation and external rotation are common. As the patient progresses from the freezing to frozen stage, the pain becomes more severe, and the restriction in elevation and rotation increases.

### **2.7.1. Physical Examination**

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, and internal and external rotation should be assessed with control of scapulothoracic motion. Limitation of Lateral Rotation, abduction and Medial Rotation (LAM) test will be obvious for confirmatory findings (Ewald, 2011, Hsu et al., 2010, Manske and Prohasks, 2008).

Because shoulder capsulitis does not affect the dynamic stabilizers of the shoulder (i.e., rotator cuff, biceps tendon, and deltoid muscle), strength should theoretically 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. Patients with advanced shoulder capsulitis may also have muscular atrophy that can cause weakness (Ewald, 2011, Hsu et al., 2010, Manske and Prohasks, 2008).

### **2.7.2. Diagnostic Testing**

Shoulder capsulitis is primarily a clinical diagnosis. Because of the high prevalence of diabetes and prediabetes in patients with shoulder 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 shoulder capsulitis, but these tests are not sensitive or specific (Ewald, 2011).

Radiographic studies are used to exclude other causes of shoulder pain. Arthrography of the shoulder can also be done to assess the volume of the joint; in frozen shoulder, the axillary fold will be contracted, reducing the normal joint volume. Plain magnetic resonance imaging (MRI) can provide reliable imaging indicators of shoulder capsulitis. Potentially useful findings in frozen shoulder are thickening of the coracohumeral ligament and joint capsule in the rotator interval. Capsular thickening of the axillary recess is often a useful sign. Despite these potentially useful findings, plain MRI and MR arthrography are not initially indicated to diagnose frozen shoulder and should only be used to rule out other intra-articular pathology such as rotator cuff tears or early chondral damage. Ultrasound has also been shown to have utility in diagnosing frozen shoulder (Hsu et al., 2010).

## **2.8. Treatment**

The treatment options of shoulder capsulitis include physiotherapy, distention injections, locally acting steroid injections, manipulation under anaesthetics, open/arthroscopic capsular release (Funk, 2007).

### **2.8.1. Non-Operative Treatment**

#### **2.8.1.1. Anti-Inflammatory Drugs**

Treatment of shoulder capsulitis often involves the use of anti-inflammatory agent or corticosteroids. NSAIDs may be used during any phase as an attempt to relieve symptoms (Manske and Prohaska, 2008).

#### **2.8.1.2. Intra-articular Corticosteroid injections**

Intra-articular corticosteroid injections are also commonly used to decrease the inflammation in the frozen shoulder joint. It is unclear the extent of the benefit of a cortisone injection, but it can help to decrease pain, and in turn allow for more stretching and physical therapy. What is known is the cortisone is only effective when used in conjunction with physical therapy for the management of a frozen shoulder (Cluett, 2010).

### **2.8.1.2. Physiotherapy**

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/or functional improvement

#### ➤ **Exercise and Stretching**

Stretching exercises for frozen shoulder serves two functions. First, is to increase the motion in the joint, second, to minimize the loss of muscle on the affected arm (muscle atrophy).

#### ➤ **Electrotherapy**

Physical therapists can incorporate ultrasound, ice, heat and other modalities into rehabilitation for frozen shoulder. Ice therapy or heat packs can be effective to help pain relief. Applications of moist heat to the shoulder can help to loosen the joint and provide relief of pain. Patients can apply moist heat to the shoulder and then perform their stretching exercise (Funk, 2007, Cluett, 2010).

#### ➤ **Manipulation under anesthesia**

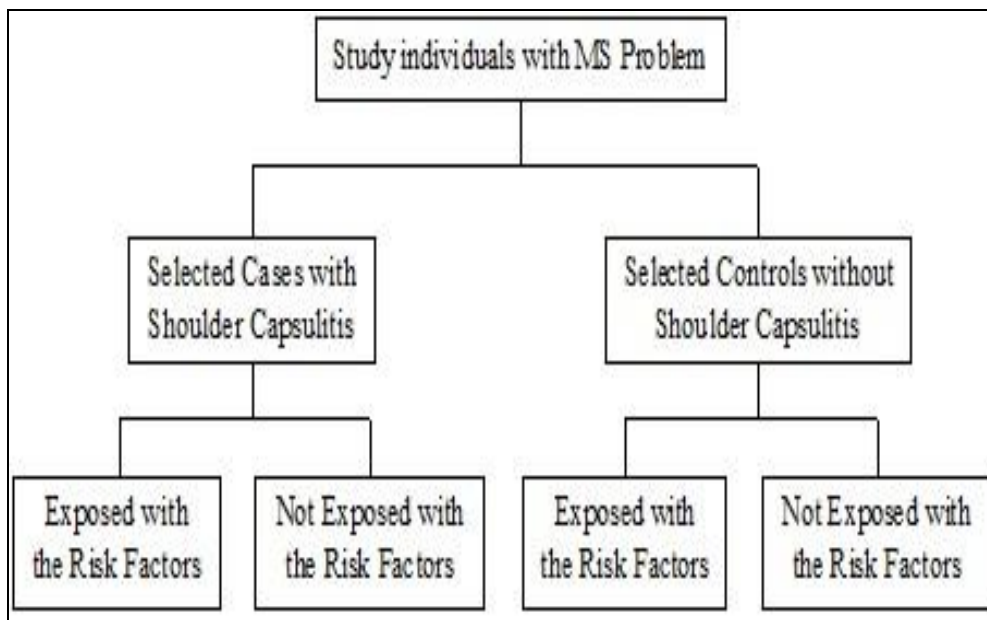
Manipulation under anesthesia as a means of treatment has been advocated. This method allows return of ROM in the operating room. Immediate postoperative physical therapy can be initiated with this form of treatment (Dodenhoff et al., 2000).

### **2.8.2. Surgical Treatment**

The treatment of shoulder capsulitis should lead to the operating room only after a concerted effort at conservative management has failed. There is not a discrete timeline to head to surgery. As a general rule patients should have participated in some form of therapy for at least 2 months, and shown no progress. Patients should feel they are not making progress and have significant pain and limitations of occupation, recreation, or sleep to proceed with surgical intervention (Manske and Prohaska, 2008).

### 3.1. Study Design

Case-control study design was used for identifying the risk factors for shoulder capsulitis of shoulder. People with shoulder capsulitis were selected as case. All individual cases were matched with a control. The entire sample was then searched for the exposure. Figure 1 is demonstrating the design of the case control study.

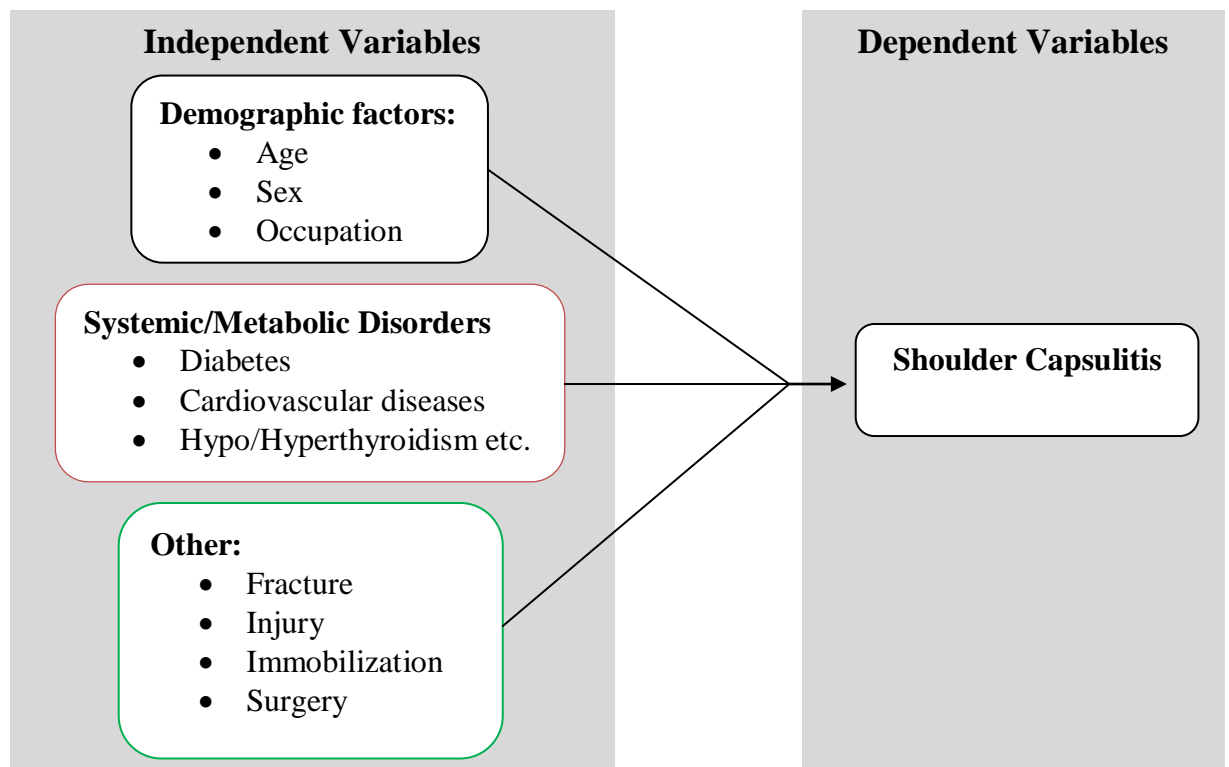


**Figure 1: Study Design**

### 3.2. Conceptual Framework

The anticipation for choosing this design was because Shoulder capsulitis is not so common. On the other hand the risk factors take long latent period for develop the disease. The conceptual framework of this study is presented below.

It was assumed that there might be some demographic variables such as age, sex, occupation which may lead to develop shoulder capsulitis. At the same time some endocrine or metabolic disorder such as diabetes, cardiovascular disease pulmonary diseases may also predispose to develop shoulder capsulitis. It was also assumed that Some other condition such as injury to the affected shoulder, fracture or immobility might act as a risk factors. On the contrary all the above mentioned factors act independently or combined act as a risk factors of shoulder capsulitis.



**Figure 2: Conceptual Framework**

### 3.3. Study Site

The study was conducted in musculoskeletal unit of outdoor physiotherapy department of Center for the Rehabilitation of the Paralyzed (CRP), Savar.

### 3.4. Study Population

The study population was the patient with musculoskeletal problem attended in CRP for treatment.

#### 3.4.1. Sampling Procedure

For this patients attended at outdoor of CRP, Savar with shoulder capsulitis were selected conveniently as case and patients rather than shoulder capsulitis were also chosen conveniently as control.

#### 3.4.2 Inclusion Criteria

- Age limitation 40-70years.
- Confirmed cases (by positive LAM test) of shoulder capsulitis were considered as case.
- Subjects other musculoskeletal problem excluding shoulder problem considered as control.
- Both male and female were included.
- Subjects who were willingly participated.

#### 3.4.2. Exclusion Criteria

- Age less than 40 years and more than 70 years.
- Unstable medical condition.

### 3.5. Sample Size

In the study area there is no previous study from Bangladesh. Also there is no base line data to calculate the sample size. However one study found that patient having diabetes are 5 time at higher risk of developing shoulder capsulitis.

The sample size was calculated using following formula,

$$n = \frac{[Z_{\alpha}\sqrt{(1+m)p^{\wedge}(1-p^{\wedge})} + Z_{\beta}\sqrt{p_1(1-p_1)+mp_o(1-p_o)}]^2}{(p_1-p_o)^2}$$

$$p^{\wedge} = \frac{p_1 + p_o/m}{1 + 1/m}$$

$$p_1 = \frac{p_o\Psi}{1 + p_o(\Psi - 1)}$$

Where,

$Z_{\alpha}$  = alpha = 95% confidence level = 1.96

$Z_{\beta}$  = 1 - power = 80% power = 0.84

$\Psi$  = odds ratio = 5 (Milgrom et al., 2008)

m = number of control per case = 1

$p_o$  = Prevalence of diabetes in Bangladesh = 8.5%  
(Rahman et al. 2007)

Using the above formula and the parameter the sample size calculation is given below

$$p_1 = \frac{0.085 \times 5}{1 + 0.085(5 - 1)} = 0.317$$

$$p' = \frac{0.317 + 0.085/1}{1 + 1/1} = 0.201$$

$$n = \frac{[1.96\sqrt{(1+1)0.201(1-0.201)} + 0.84\sqrt{0.317(1-0.317)+0.085(1-0.085)}]^2}{(0.317 - 0.085)^2} = 46$$

Considering 10% non response rate the final sample size became 50 (25 Case and 25 Control).

### 3.6. Data Collection Procedure

All new consecutive patients who attended at CRP and were diagnosed as shoulder capsulitis were asked to participate in the study.

A structured questionnaire (Appendix 1) was used for identifying the risk factors. This questionnaire is developed after reviewing literature about the risk factors of shoulder capsulitis. In the questionnaire participants demographic information including age, sex, marital status, level of education, income, occupational history including types of job, any repetitive activity, duration/working hour, hobbies, occupational or hobby related exposure including task related exposure, health history including chronic conditions, surgery, fracture or other injury, systemic or non-systemic conditions and life style including physical activity related information were asked.



### 3.7. Data Analysis

Quantitative data was analyzed using SPSS. Descriptive and inferential statistics was used for data analysis. Continuous variables were expressed as mean  $\pm$  SD, and categorical variables as percentages. Prevalence rates was presented as percentage and compared among different patient groups (case & Control; Male& Female etc).

As this was a case-control study for finding the risk factors Odds ratio. An odds ratio is a measure of association typically used to quantify the strength of association between a potential risk or protective factor (exposure) and an outcome. In this study the outcome variable was having shoulder capsulitis or not and analysis was done to identifies different risk factors according to their strength of association.

The odds ratio (OR) was measured by the relative magnitude of the odds of exposure among individuals who have the disease (cases) and the odds of exposure among individuals who do not have the disease (controls) from a typical 2 x 2 table as below:

	Case	Control
Exposure	a	b
N Exposure	c	d

Odds of exposure among cases:  $a/c$

Odds of exposure among controls:  $b/d$

Odds ratio =  $(a/c) / (b/d)$

95% confidence interval was used to identify significance of the OR the risk factors by using following formula:

$$e^{\ln OR \pm z \cdot SE_{\ln OR}}$$

Where e is the base on the natural logarithms ( $e \approx 2.71828\dots$ ), z is a Standard normal deviate corresponding to the desired level confidence ( $z = 1.96$  for 95%), and

$$SE_{\ln OR} = \sqrt{\frac{1}{a} + \frac{1}{b} + \frac{1}{c} + \frac{1}{d}}$$

Confidence interval having 1 between its ranges was considered to be a non significant risk factor.

### **3.8. Ethical Consideration**

The study protocol was sent to BHPI review board for approval as per the existing rules. Permission from in charge of Physiotherapy department of CRP was taken to conduct the study.

Verbal consent was taken from the participant informing them about the purpose of the study, anonymity, their rights to refuse answering any question, withdrawn from the study at any point of time and other issues mentioned in the form before starting the interviews.

For any kind of use of the study there was no identification of any participants only the data was used. The data was kept in a secure place where only the researcher had the access.

### **3.9. Limitations of the study**

The limitations of this study were as follows:

- The study did not represent the total population of the condition because-
  - There was lack of randomization.
  - This was a hospital based study which also is not a ideal sample because people with special characteristics (e.g. severe condition, people living closer to the hospitals, referred by others etc) arrives is that particular hospital.
- This study did not consider other factors that might influence the outcome such as participant body mass index, level of physical activity, dietary habit etc. Because all these factors modify the risk of chronic conditions such as diabetes, hypertension etc.

A total 50 patient with Shoulder Capsulitis (25 case) and without Shoulder Capsulitis (25 Control) was interviewed for this study. Socio-demographic characteristics of the respondents are presented in table 1.

#### 4.1. Characteristics of the Respondents

The mean age of the respondents was 50 years with a standard deviation of 6 (table 1). Majority of the respondents (52%) were 50 to 59 years old followed by 40 to 49 years old (40%). Only 8% of the respondents were 60 years old or above. A total 68% respondent was male. 28% of the cases were female whereas 36% of the controls were female.

**Table 1: Characteristics of the Respondents**

	Total N=50	Case n=25	Control n=25
Age (mean $\pm$ SD)	50 $\pm$ 6	50 $\pm$ 6	50 $\pm$ 6
40-49 Years	20 (40%)	10 (40%)	10 (40%)
50-59 Years	26 (52%)	13 (52%)	13 (52%)
60 Years or above	4 (8%)	2 (8%)	2 (8%)
Sex			
Male	34 (68%)	18 (72%)	16 (64%)
Female	16 (32%)	7 (28%)	9 (36%)
Religion			
Islam	45 (90%)	21 (84%)	24 (96%)
Hindu	4 (8%)	3 (12%)	1 (4%)
Christian	1 (2%)	1 (4%)	0
Education			
Never attended school	6 (12%)	1 (4%)	5 (20%)
Some primary education	3 (6%)	2 (8%)	1 (4%)
Completed primary education	5 (10)	5 (20%)	0
Some secondary education	5 (10%)	2 (8%)	3 (12%)
Completed Secondary education	6 (12%)	2 (8%)	4 (16%)
Higher Secondary	14 (28%)	6 (24%)	8 (32%)
Bachelor and above	11 (22%)	7 (28%)	4 (16%)
Occupation			
Service Holder	13 (26%)	7 (28%)	6 (24%)
Businessman	11 (22%)	7 (28%)	4 (16%)
Housewife	15 (30%)	7 (28%)	8 (32%)
Teacher	4 (8%)	1(4%)	3 (12%)
Farmer	4 (8%)	1 (4%)	3 (12%)
Other	3 (6%)	2 (8%)	1 (4%)

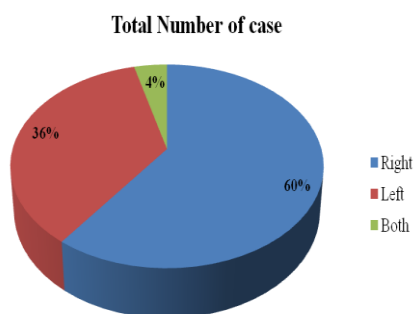
Income (mean $\pm$ SD) `000	20.8 $\pm$ 17.1	24.4 $\pm$ 23.2	17.3 $\pm$ 6.07
Low ( $\leq$ 10,000 tk)	14 (28%)	10 (40%)	4 (16%)
Middle (10,001-30,000 tk)	33 (66%)	12 (48%)	21 (84%)
High ( $\geq$ 30,000 tk)	3 (6%)	3 (12%)	0

Majority of the respondent (90%) were Muslims. A total 62% of the respondents have at least Secondary education. In cases only 4% of the respondent never attended to any school whereas 20% of the control did not have any formal schooling. The greater portions (30%) of the respondent were housewives but in cases housewives, service holders and businessman were equally distributed (28%).

The average monthly income of the respondent was 20,000 taka. There was a difference between the average monthly income of the cases and controls where the mean monthly income of the cases was 24,000 taka and the mean monthly income of controls was 17,000 taka. The greater part of the cases (48%) and controls (84%) were from middle income group.

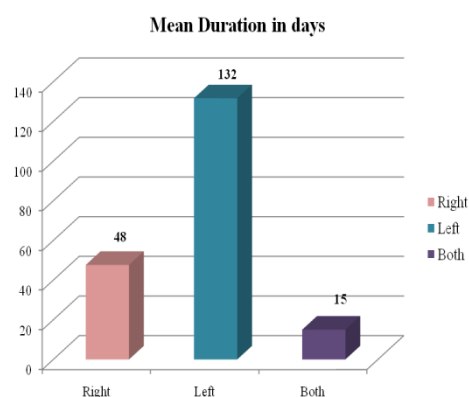
#### 4.2. Characteristics of Frozen Shoulder

Among the shoulder capsulitis cases, 60% had capsulitis to their right shoulder, 36% had in left shoulder and 4% had capsulitis in their both shoulders (figure 3). Mean duration of all the cases was 76 days. Average duration of the problem was higher in left shoulder capsulitis group (figure 4).



**Figure 3: Affected Side**

Majority of the male was affected in their right shoulder while female was equally affected to the both side (table 2).



**Figure 4 Mean duration of Capsulitis**

Sex	Affected side		
	Right	Left	Both
Female	3	3	1
Male	12	6	0

### 4.3. Distribution of Risk Factors

#### 4.3.1. Repeated Movement

**Table 3: Repeated Movement of the Respondents**

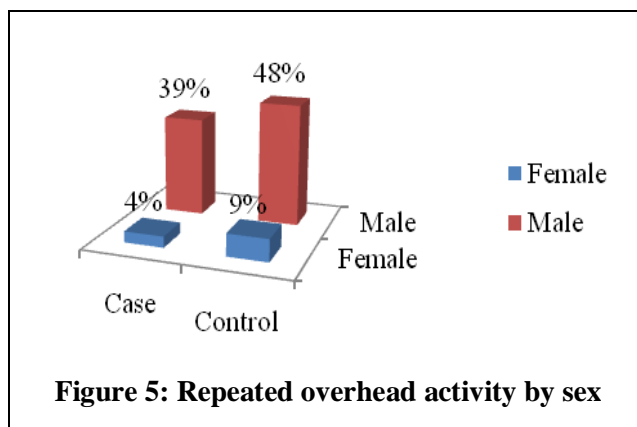
	Case (15)	Control (11)
Flexion	100%	100.0%
Extension	53%	63.6%
Abduction	80%	81.8%
Adduction	53%	54.5%
Internal Rotation	60%	90.9%
External Rotation	13%	9.1%
Circumduction	0	0

In total 52% of the respondent had performed repeated movement of their affected shoulder where 58% were cases and remaining was control. All the cases and

controls performed repeated flexion movement of their affected shoulder (table 3). The repeated abduction movement of affected shoulder was performed by 80% of cases whereas 81% of controls performed the same movement of the affected shoulder. Repeated Circumduction was not performed by any respondent.

#### 4.3.2. Repeated Overhead Activity

In total 46% of the respondent performed overhead activity of their affected shoulder in which 13% of them were female. Among the shoulder capsulitis group only 4% was female who performed overhead shoulder activity compared to 39% of the male

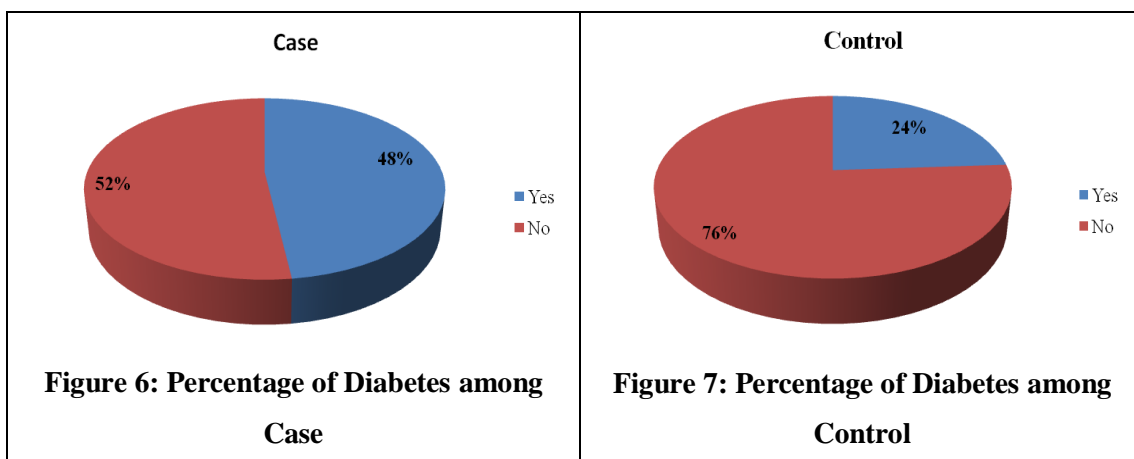


(Figure 5) whereas in control 9% of them were female in compared to 48% of male.

#### 4.3.3. Diabetes

In total 36% of the respondents had diabetes where 67% were male and 33% were female. Among the cases 48% had diabetes (figure 6) whereas 24% of the control (figure 7).

The mean duration of the diabetes was 10 years among the cases whereas the average duration of control was 6 years (table 4). Majority of the diabetic respondents (58%) in the case had diabetes for 10 years or more compared with 17% respondents in the controls (table 4).



Majority of the diabetic respondents (50%) in the case group was treated by food control and insulin whereas in the controls majority was treated with food control and insulin (50%) (table 4).

**Table 4: Duration and type of Treatment of Diabetes**

	Case	Control
<b>Duration (Mean ± SD)</b>	10±6	6±3
≤5 Year	4 (33%)	2 (33%)
6 – 9 Years	1 (8%)	3 (50%)
≥10 Year	7 (58%)	1 (17%)
<b>Mode of Treatment</b>		
Only Food control/maintain	2 (17%)	1 (17%)
Food control / maintenance and medication	4 (33%)	3 (50%)
Food control/Maintenance and Insulin	5 (50%)	2 (33%)

#### 4.3.4. Cardiovascular Diseases (CVD)

46% (52% of the cases & 40% of the controls) of the respondents of this study had any form of CVD where 61% of them were male (table 5). All the respondents of the control had hypertension whereas 85% of the cases who had any form of CVD had hypertension (table 5). This study also found that 52% of the respondents who have any form of CVD also have diabetes.

**Table 5: CVD status by case and control**

	Case	Control
CVD	13 (52%)	10 (40%)
<b>CVD Name</b>		
Hypertension	11 (85%)	10 (100%)
Arterial Diseases	2 (15%)	0

#### 4.3.5. Pulmonary Diseases

18% (20% cases and 16% control) of the total respondents had any form of pulmonary diseases where 33% of them

**Table 6: Pulmonary Diseases by case and control**

	Case	Control
Pulmonary Diseases Name	5 (20%)	4 (16%)
Asthma	2 (40%)	2 (50%)
Allergic Reaction	3 (60%)	2 (50%)

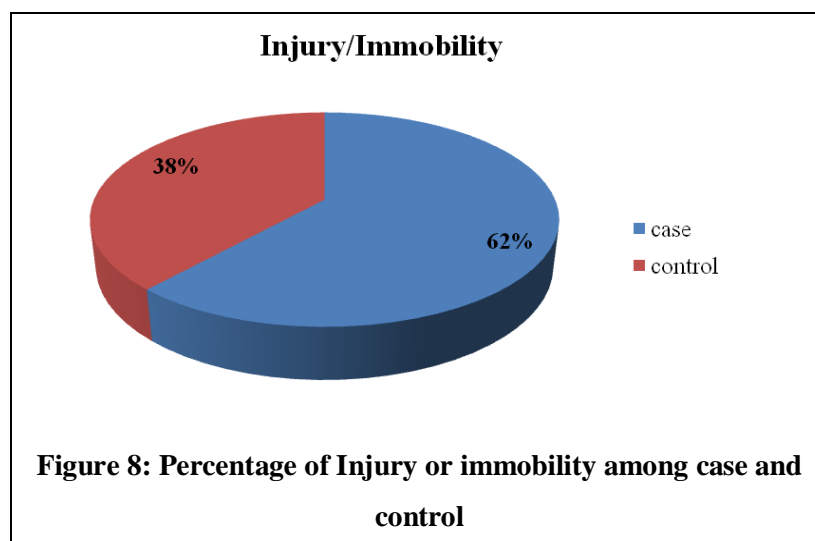
were female (table 6). Pulmonary diseases include asthma (40% in cases and 50% of the controls) and allergic reaction (60% in cases and 50% in controls) among those who were affected in the case and control group.

#### 4.3.6. Other Diseases

This study tried to explore some other diseases which might act as a risk factors of shoulder capsulitis including Hyperthyroidism, Hypothyroidism, Tuberculosis, Parkinson's diseases. But no respondents were found to have these diseases.

#### 4.3.7. Immobility or Injury to the same shoulder

26% of the total respondents were found to have injury of immobility to their affected shoulder. Among them 62% (cases) develop shoulder capsulitis and remaining were not (figure 8).



#### 4.4. Risk Factors Associated with shoulder capsulitis

This study was a case control study and the mode of association between disease and risk factors was Odds ratio. 95% confidence interval was calculated for finding out the significant of the association. If 1 came between the lower bound and the upper bound of confidence interval it was considered as non significant.

The Odds ratio for the male sex of the study was 1.446 suggesting shoulder capsulitis is 1.446 times as frequent in the man compared in the female (Table 7). The confidence interval of odds ratio was ranging from 0.448 to 4.781 indicating that this association was not significant as 1 came between the intervals.

<b>Table 7: Risk Factors of Shoulder Capsulitis</b>					
<b>Variable</b>	<b>Case</b>	<b>Control</b>	<b>OR</b>	<b>95% CI</b>	
				<b>Lower</b>	<b>Upper</b>
<b>Sex</b>					
Male	18	16	1.446	0.438	4.781
Female	7	9			
<b>Age</b>					
50 Years Or Less	14	14	1	0.327	3.055
More than 50 Years	11	11			
<b>Repeated MVT of Shoulder</b>					
Yes	15	11	1.909	0.620	5.876
No	10	14			
<b>Overhead activity</b>					
Yes	10	13	0.615	0.201	1.887
No	15	12			
<b>Diabetes</b>					
Yes	12	6	3.167	0.937	10.701
No	12	19			
<b>Cardiovascular Diseases</b>					
Yes	13	10	1.625	0.530	4.984
No	12	15			
<b>Pulmonary Diseases</b>					
Yes	5	4	1.313	0.308	5.598
No	20	21			
<b>Injury</b>					
Yes	4	3	1.397	0.279	7.002
No	21	22			
<b>Immobility</b>					
Yes	5	3	1.750	0.369	8.302
No	20	21			



The OR of the repeated movement of the affected shoulder was 1.909 which indicated that shoulder capsulitis is 90.9% more frequent among those who did repeated movement of their affected shoulder (table 7). The confidence interval of odds ratio was ranging from 0.620 to 5.876 indicating that this association was not significant.

Odds ratio of performing overhead activity of the affected shoulder was found to be 0.615 suggesting that shoulder capsulitis is 38.5% less frequent among those who perform overhead activity of the affected shoulder (table 7). The confidence interval of odds ratio was ranging from 0.201 to 1.887 indicating that this association was not significant.

Odds ratio of diabetes was found to be 3.167 which indicating that shoulder capsulitis is 3 fold highly frequent among those who had diabetes compared with non shoulder capsulitis group (table 7). The confidence interval of odds ratio was ranging from 0.937 to 10.718 indicating that this association was not significant.

Odds ratio of CVD was found to be 1.625 which indicating that shoulder capsulitis is 62.5% more frequent among those who had any form of cardiovascular diseases. The confidence interval of odds ratio was ranging from 0.530 to 4.984 indicating that this association was not significant.

Odds ratio of pulmonary diseases was found to be 1.313 which indicating that shoulder capsulitis is 1.3 times highly frequent among those who had pulmonary diseases. The confidence interval of odds ratio was ranging from 0.308 to 5.598 indicating that this association was not significant.

Odds ratio of injury to the affected shoulder was found to be 1.397 suggesting that shoulder capsulitis is 39.7% more frequent among those who had injury to their affected shoulder. The confidence interval of odds ratio was ranging from 0.279 to 7.002 indicating that this association was not significant.

Odds ratio of immobility to the affected shoulder was found to be 1.75 suggesting that shoulder capsulitis is 1.75 times more frequent among those who had immobility to their affected shoulder. The confidence interval of odds ratio was ranging from 0.369 to 8.302 indicating that this association was not significant.

The idea of this study was to identify the risk factors of shoulder capsulitis which might help to explore the underlying mechanism of shoulder capsulitis. This study found that the average age of the incidence of the shoulder capsulitis was 50 years ( $\pm$  6Years). 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 60 years (Bridgman, 1972, Hand et al., 2008, Lloyd-Roberts and French, 1959) which was similar this study.

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). It was also observed that majority of the shoulder capsulitis respondents completed at least primary education as well as their occupation involved non manual activity and mostly from middle to high income group. This indicates that though people may have knowledge on their health but their occupation and income might play an important role for the development of diseases in a way that they made them habituated to inhale risky behavior.

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 there are no preferences for handedness and rarely occurs bilaterally (Binder et al., 1984, Reeves, 1975). The duration of the problem was higher among those who were affected in left side which might be due to seeking care lately or they stop their usual activity and made their shoulder less active compared to the opposite side which further provoked their problem (Binder et al., 1984).

In this study 58% respondents with shoulder capsulitis were found to be performing repeated movement of their affected shoulder as a part of their occupation. This is indicating that repeated movement might be a risk factor as it can cause capsular

erosion which may lead to synovitis. It has been proposed that synovitis results in the development of a fibrotic cascade that may involve growth factors such as TGF-beta which is an immunological receptor that may cause capsulitis (Rodeo et al., 1997). On the other hand this study found that majority of the cases did not perform overhead activity. This indicates that not performing overhead activity might be a risk factor because overhead activity causes the shoulder to be stretched up to certain amount. It is well documented that stretching improves the flexibility of the joint so that it can move throughout a full range of movement which is an important component of good health (Brukner and Khan, 2006). This study also revealed that majority of the respondents who did not perform overhead activity of the shoulder was female. This is because majority of the Bangladeshi women's are housewife and household activity does not involve overhead activity of the shoulder which made women more prone to develop shoulder capsulitis.

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 and Green, 2002). Most well-known is the strong association between diabetes and adhesive capsulitis (Bridgman, 1972). This study found that 48% of the patients with shoulder capsulitis were exposed to diabetes.

This study also found that 46% of the patients with shoulder capsulitis had cardiovascular disease where 85% of the cases had hypertension and among them 52% cases had diabetes. Another study also found that diabetes and cardiac disease more prevalent in patients with shoulder capsulitis (Boyle-Walker et al., 1997).

Earlier study revealed that other endocrine disorders including hypothyroidism is highly associated with shoulder (Milgrom et al., 2008). But this study was not able to identify any association between hypothyroidism and shoulder capsulitis as no respondent were found to have the disease. Also no respondent of this study was found to have hyperthyroidism, tuberculosis and Parkinson disease.

## **CHAPTER – VI: CONCLUSION & RECOMMENDATION**

### **6.1. Conclusion**

This study identified some risk factor of developing shoulder capsulitis although they are not found to be statistically significant. But all of them pose high risk for the development of the Shoulder Capsulitis. All these risk factors are modifiable and may be controlled by individual. For example avoidance of repeated shoulder activity in occupation, performing certain amount of overhead activity, control of blood sugar level, blood pressure, avoid smoking and avoids complete immobility of the shoulder due to injury or other causes etc.

### **6.2. Recommendation**

Highly controlled randomized study with large sample at population level is needed to identify true association. Beside subjective assessment objective physical measurement including height, weight, blood pressure etc and biochemical examination including blood glucose level, lipid profile, and lung function is also needed.

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## Appendix 1: Risk Factors of Shoulder Capsulitis Questionnaire (English)

Identification number:	Date of Interview
Start time:	End time:
Name of the Respondents:	
Consent Taken :            Yes                            No	
Name of the Physiotherapist:	
Diagnosis:	

### Section 1: Socioeconomic and Demographic

QN	Questions	Responses	Code
101.	Age (in year)?	_ _ _  yrs	
102.	Sex?	Female	00
		Male	01
103.	Marital status?	Married	00
		Unmarried	01
		Separated	02
		Divorced	03
		Widow	04
		Widower	05
104.	What is your religion?	Islam	00
		Hinduism	01
		Christian	02
		Buddhist	03
		Other (Specify): _____	99
105.	What is your education?	Never attended school	00
		Some primary education	01
		Completed primary education	02
		Some secondary education	03
		Completed secondary education	04
		Higher secondary	05
		Bachelor or above	06
		Other (Specify): _____	99
106.	What is the average monthly income of your household?	_____ Taka	
107.	What is your profession (occupation)?	Rickshaw puller	00
		Farmer	01
		Service Holder	02
		Factory/garments worker	03
		Driver	04
		Businessman	05
		Day laborer	06
		Unemployed	07
		Housewife	08
		Teacher	09
		Other(Specify): _____	99
108.	Does it involve repetitive activity of shoulder?	No	00
		Yes	01



109.	If yes Please specify which movement		No	Yes
	a.	Flexion	00	01
	b.	Extension	00	01
	c.	Abduction	00	01
	d.	Adduction	00	01
	e.	Internal Rotation	00	01
	f.	External Rotation	00	01
	g.	Circumduction	00	01
110.	Does your occupation involves overhead activity?		No	00
			Yes	01
111.	Which is your dominant side?		Right	00
			Left	01
			Both	02
112.	Do you have any hobby that involves repetitive activity of shoulder?		No	00
			Yes	01
113.	If yes Please specify which movement		No	Yes
	a.	Flexion	00	01
	b.	Extension	00	01
	c.	Abduction	00	01
	d.	Adduction	00	01
	e.	Internal Rotation	00	01
	f.	External Rotation	00	01
	g.	Circumduction	00	01

### Section 2: Characteristics of Shoulder Capsulitis (for case only)

QN	Questions	Responses		Code	
201.	When did your problem start?	_ _  in months			
202.	In which side?		Right	00	
			Left	01	
			Both	02	
203.	What are your present symptoms				
	Symptom	Status		Duration	Movement
		No	Yes	in months	
	a. Pain	00	01		
	b. Stiffness	00	01		
	c. Movement Loss	00	01		
	d. Other (Specify): _____				

### Section 3: Systemic diseases

QN	Questions	Responses		Code
301.	Do you have Diabetes?		No	00
			Yes	01
302.	If Yes how long?	_ _  yrs		
303.	What types of treatment you are taking for diabetes?	Only Food control/maintain		00
		Food/ maintainance and medication		01
		Only Medication		02
		Food control/Maintenance and Insulin		03

		Only insuline	04
		Other (Specify): _____	99
304.	If participants are taking insulin then How many times in a day?	Single	00
		Twice	01
		Thrice	02
		Other	99
305.	How much insulin you need to take (ml/dose)?	Single:  _ _ _	00
		Twice:  _ _ _  +  _ _ _	01
		Thrice:  _ _ _  +  _ _ _  +  _ _ _	02
		Other (Specify): _____	99
306.	Do you have overactive thyroid? (hyperthyroidism)	No	00
		Yes	01
307.	Do you underactive thyroid? (hypothyroidism)	No	00
		Yes	01
308.	Do you have any Cardiovascular disease?	No	00
		Yes	01
309.	If yes please specify	Stroke	00
		Hypertension	01
		Myocardial infarction	02
		Arrhythmia	03
		Arterial Diseases	04
		Other (Specify): _____	99
310.	Do you have any pulmonary diseases	No	00
		Yes	01
311.	If yes please specify	Asthma	00
		COPD	01
		Chronic Bronchitis	02
		Allergic reaction	03
		Other (Specify): _____	99
310.	Tuberculosis	No	00
		Yes	01
311.	Parkinson's disease	No	00
		Yes	01
312.	Do you have this types of Problem earlier	No	00
		Yes	01
313.	If yes which when (in month/year)	_ _  yrs  _ _  months	

#### Section 4: Immobility

QN	Questions	Responses	Code
401.	Have you ever injured in this affected shoulder?	No	00
		Yes	01
402.	What type of injury?	Muscular	00
		Ligament	01
		Dislocation	02
		Subluxation	03

		Other (Specify): _____	99
403.	Does it cause immobility to your affected shoulder?	No	00
		Yes	01
404.	Is there any other event that cause immobility / restrict the movement of your shoulder?	No	00
		Yes	01
405.	What cause that event?	Pain	00
		Fracture	01
		Injury	02
		Rotator cuff injury	03
		Surgery	04
		Other (Specify): _____	99
406.	How long the shoulder was immobilized (in month/ year)?	_ _  yrs _ _  months  _ _  day	
Please feel the question if 404 is yes and according to the answer of question 405			
407.	Where did the fracture happen?	Neck	00
		Shoulder	01
		Arm	02
		Wrist	03
		Back	04
		Lower limb	05
408.	Where did the injury occur?	Neck	00
		Shoulder	01
		Arm	02
		Wrist	03
		Back	04
		Lower limb	05
		Other (Specify): _____	99
307.	What types of surgery cause your shoulder immobility?	Shoulder	00
		CABG	01
		Other Cardiothoracic	02
		Brest Cancer	03
		Neck	04
		Back	05
		Lower limb	06
		Other (Specify): _____	99

Any comment

Thank you for your Participation

## Appendix 2: Risk Factors of Shoulder Capsulitis Questionnaire (Bengali)

সনাক্তকারী নাম্বার	সাক্ষাতকার গ্রহণের তারিখ:
সাক্ষাতকার গ্রহণ শুরু সময়:	সাক্ষাতকার গ্রহণের শেষ সময়:
অংশগ্রহণকারীর নাম:	
সম্মতি গ্রহণ করা হয়েছে:	হ্যাঁ না
ফিজিওথেরাপিষ্টের নাম:	
রোগের নাম:	

### সেকশন ১: আর্থ-সামাজিক ও জনসংখ্যাভিত্তিক প্রশ্ন

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড		
১০১.	আপনার বয়স কত?	_____   বছর			
১০২.	আপনার লিঙ্গ কি?	মহিলা	০০		
		পুরুষ	০১		
১০৩.	আপনার বৈবাহিক অবস্থা কি?	বিবাহিত	০০		
		অবিবাহিত	০১		
		আলাদা	০২		
		তালাকপ্রাপ্ত	০৩		
		বিধবা	০৪		
		বিপত্তিক	০৫		
		অন্যান্য (উল্লেখ করুন): .....	৯৯		
১০৪.	আপনার ধর্ম কি?	ইসলাম	০০		
		হিন্দু	০১		
		খ্রিস্টান	০২		
		বৌদ্ধ	০৩		
		অন্যান্য (উল্লেখ করুন): .....	৯৯		
		১০৫.	আপনার শিক্ষাগত যোগ্যতা কি?	কখনো স্কুলে যাইনি	০০
				কিছু প্রাথমিক শিক্ষা	০১
প্রাথমিক শিক্ষা সম্পন্ন করেছি	০২				
কিছু মাধ্যমিক শিক্ষা	০৩				
মাধ্যমিক শিক্ষা সম্পন্ন করেছি	০৪				
উচ্চ মাধ্যমিক শিক্ষা সম্পন্ন করেছি	০৫				
ব্রাতক/ব্রাতকোত্তর	০৬				
অন্যান্য (উল্লেখ করুন): .....	৯৯				
১০৬.	আপনার পরিবারের মাসিক আয় কত?	_____   টাকা			
১০৭.	আপনার পেশা কি?	রিট্রাচালক	০০		
		কৃষক	০১		
		চাকরিজীবী	০২		
		ফ্যাক্টরী/গার্মেন্টস কর্মী	০৩		
		গাড়ীচালক	০৪		
		ব্যবসায়ী	০৫		
		দিনমজুর	০৬		
		বেকার	০৭		
		গৃহিনী	০৮		
		শিক্ষক	০৯		
অন্যান্য (উল্লেখ করুন): .....	৯৯				
১০৮.	আপনার পেশায় কি আপনার কাধ বেশি ব্যবহার হয়?	না	০০		
		হ্যাঁ	০১		
১০৯.	যদি হয় তবে নির্দিষ্ট কোন মুভমেন্ট?	না	হ্যাঁ		
		ক.	ফ্ল্যাক্সন	০০	০১

	খ.	এক্সটেনশন		০০	০১
	গ.	এবডাকশন		০০	০১
	ঘ.	এডাকশন		০০	০১
	ঙ.	ইন্ট-রোটেশন		০০	০১
	চ.	এক্স-রোটেশন		০০	০১
	ছ.	সারকামডাকশন		০০	০১
১১০.	আপনার পেশায় কি হাত উচু করে কোনো কাজ করতে হয়?			না	০০
				হ্যাঁ	০১
১১১.	আপনি সচরাচর কোন হাত ব্যবহার করেন?			ডান	০০
				বাম	০১
				উভয়	০২
১১২.	আপনার এমন কোনো সৌখিন কাজ আছে কি যাতে আপনি কাধ বেশি ব্যবহার করেন?			না	০০
				হ্যাঁ	০১
১১৩.	যদি হয় তবে নির্দিষ্ট কোন মুভমেন্ট?			না	হ্যাঁ
	ক.	ফ্ল্যাক্সন		০০	০১
	খ.	এক্সটেনশন		০০	০১
	গ.	এবডাকশন		০০	০১
	ঘ.	এডাকশন		০০	০১
	ঙ.	ইন্ট-রোটেশন		০০	০১
	চ.	এক্স-রোটেশন		০০	০১
	ছ.	সারকামডাকশন		০০	০১

**সেকশন ২: কাঁধের ক্যাপসুলাইটিসের বৈশিষ্ট্যসমূহ (শুধুমাত্র আক্রান্তদের জন্য):**

প্রশ্ন নং	প্রশ্ন	উত্তর		কোড
২০১.	আপনার কবে থেকে এই সমস্যা শুরু হয়েছে?	_____   মাস		
২০২.	কোন কাঁধে?			ডান
				বাম
				উভয়
২০৩.	আপনার বর্তমান উপসর্গ গুলো কি কি ?			
	উপসর্গ	বর্তমান অবস্থা		কোন মুভমেন্ট
		না	হ্যাঁ	(সময়কাল-মাসে)
	ক. ব্যথা	০০	০১	
	খ. শক্ত হয়ে যাওয়া	০০	০১	
	গ. মুভমেন্ট কম	০০	০১	
	ঘ. অন্যান্য (উল্লেখ করুন): ... ..			

**সেকশন ৩: সিস্টেমিক ডিজিজ**

প্রশ্ন নং	প্রশ্ন	উত্তর		কোড
৩০১.	আপনার কি বহুমূত্র/ডায়াবেটিস রোগ আছে?			না
				হ্যাঁ
৩০২.	যদি থাকে কতদিন যাবত?	_____   বছর		
৩০৩.	আপনার ডায়াবেটিস এর জন্য আপনি কি চিকিৎসা গ্রহণ করেন?	শুধু খাবার এবং নিয়ম মেনে চলি		০০
		খাবার এবং নিয়ম মেনে চলি এবং ঔষধ খাই		০১
		খাবার এবং নিয়ম মেনে চলি না কিন্তু ঔষধ খাই		০২
		খাবার এবং নিয়ম মেনে চলি এবং ইনসুলিন গ্রহণ করি		০৩
		খাবার এবং নিয়ম মেনে চলি না কিন্তু ইনসুলিন গ্রহণ করি		০৪
		অন্যান্য (উল্লেখ করুন): ... ..		৯৯
৩০৪.	যদি ইনসুলিন গ্রহণ করে থাকেন তবে দিনে কত বার?	একবার		০০
		দুইবার		০১

		তিনবার	০২
		অন্যান্য	৯৯
৩০৫.	আপনাকে কি পরিমাণ ইনসুলিন নিতে হয়?	একবার:  __ __	০০
		দুইবার:  __ __  +  __ __	০১
		তিনবার:  __ __  +  __ __  +  __ __	০২
		অন্যান্য (উল্লেখ করুন): ... ..	৯৯
৩০৬.	আপনার কি হাইপারথাইরয়ডিজম আছে?	না	০০
		হ্যাঁ	০১
৩০৭.	আপনার কি হাইপোথাইরয়ডিজম আছে?	না	০০
		হ্যাঁ	০১
৩০৮.	আপনার কি কোনো ধরনের হৃদরোগ আছে?	না	০০
		হ্যাঁ	০১
৩০৯.	যদি থাকে তাহলে কোনটি?	স্ট্রোক	০০
		উচ্চ রক্তচাপ	০১
		মায়োকার্ডিয়াল ইনফার্কশন	০২
		অ্যারিদমিয়া	০৩
		আরটেরিয়াল ডিসিজ	০৪
		অন্যান্য (উল্লেখ করুন): ... ..	৯৯
৩১০.	আপনার কি কোন শ্বাসযন্ত্রের সমস্যা আছে?	না	০০
		হ্যাঁ	০১
৩১১.	যদি থাকে তাহলে কোনটি?	হাঁপানি	০০
		সিওপিডি	০১
		ব্রংকাইটিস	০২
		এলার্জি	০৩
		অন্যান্য (উল্লেখ করুন): ... ..	৯৯
৩১০.	যক্ষা	না	০০
		হ্যাঁ	০১
৩১১.	পারকিনসন ডিজিজ	না	০০
		হ্যাঁ	০১
৩১২.	আপনার কাঁধের ক্যাপসুলাইটিসের সমস্যা কি আগে ছিল?	না	০০
		হ্যাঁ	০১
৩১৩.	যদি হয় তবে কবে থেকে?(কোন মাস/বছর)	__ __  বছর  __ __  মাস	

### সেকশন ৪: নিশ্চলত্ব

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
৪০১.	আপনি কি কখনো এই কাধে আঘাত পেয়েছেন?	না	০০
		হ্যাঁ	০১
৪০২.	যদি পেয়ে থাকেন তবে কি ধরনের আঘাত ছিল?	মাংসপেশী	০০
		লিগামেন্ট	০১
		ডিজলোকেশন	০২
		সাবলাক্সেশন	০৩
		অন্যান্য (উল্লেখ করুন): ... ..	৯৯
403.	এই আঘাতের কারণে কি আপনার কাধের ব্যবহার বন্ধ রাখতে হয়েছিল	না	০০
		হ্যাঁ	০১
৪০৪.	কোন কারণে কি আপনার কাধের ব্যবহার বন্ধ/সীমিত ছিল?	না	০০
		হ্যাঁ	০১
৪০৫.	কি কারণে বন্ধ/সীমিত ছিল?	ব্যথা	০০
		ভাঙ্গা	০১
		আঘাত	০২
		রাটের কাফ ইনজুরি	০৩

		অস্ত্রপাচার	০৪
		অন্যান্য (উল্লেখ করুন): ... ..	৯৯
৪০৬.	কতদিন বন্ধ/সীমিত ছিল?	_____   বছর   _____   মাস   _____   দিন	
যদি ৪০৪ নং প্রশ্নের উত্তর হ্যাঁ হয় তবে ৪০৫ নং প্রশ্নের উত্তরের উপর ভিত্তি করে দয়া করে নিম্নলিখিত প্রশ্নগুলো পূরণ করুন।			
৪০৭.	কোথায় ভেঙ্গেছিল?	ঘাড়	০০
		কাঁধ	০১
		বাহু	০২
		হাত	০৩
		কোমড়	০৪
		নিম্নাংগ	০৫
৪০৮.	কোথায় আঘাত পেয়েছিলেন?	ঘাড়	০০
		কাঁধ	০১
		বাহু	০২
		হাত	০৩
		কোমড়	০৪
		নিম্নাংগ	০৫
		অন্যান্য (উল্লেখ করুন): ... ..	৯৯
৪০৯.	কোন ধরনের অস্ত্রপাচারের কারণে কি আপনার কাঁধের ব্যবহার বন্ধ/সীমিত ছিল?	কাঁধ	০০
		বাইপাস সার্জারি	০১
		অন্যান্য বক্ষ্যব্যর্থাধি ও হৃদরোগ	০২
		স্নন ক্যান্সার	০৩
		ঘাড়	০৪
		কোমড়	০৫
		নিম্নাংগ	০৬
অন্যান্য (উল্লেখ করুন): ... ..	৯৯		

মন্তব্য

অংশগ্রহন করার জন্য ধন্যবাদ

### **Appendix 3: Verbal Inform Consent Research Consent Form Risk Factor of Shoulder Capsulitis**

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Sponsor: Bangladesh Health Professions Institute (BHPI)

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You are invited to participate in a research study under the direction of Eliza Afroze of the Bangladesh Health Professions Institute (BHPI). This study involves individual interviews with patient taking Physiotherapy treatment at Physiotherapy department of Center for the Rehabilitation of the Paralyzed (CRP).

You are being asked to participate in this study. Participation in this research is entirely voluntary. You will not directly benefit from your participation in the study. The potential benefits to your community, science, and humankind in general are improved understanding of the risk factors of shoulder capsulitis which will help to prevent and treat this condition. There is no guarantee of these potential benefits.

If you choose to take part in this study, you will be interviewed for approximately 30 min about your experiences diseases. While there is minimal risk expected as a result of participation in this study, the subject matter may be personal and sensitive. Some of the questions we ask you could make you uncomfortable. You may refuse to answer any of the questions and may take a break or ask your interviewer questions you have at any time during the study. You may stop your participation in this study at any time without consequence. There will be no compensation for participating in this study.

There is possible risk of loss of confidentiality. Every effort will be made to keep your information confidential, however, this cannot be guaranteed. Your name and identity will not be documented anywhere in this study beyond recording your sex, age for purposes of data collection only. Aggregated information, perspectives and opinions from your answers and the answers of other study participants will be published in a way intended to be in no way traceable to any individual participant in the study.

To obtain further information regarding this study, contact the Principal Investigator of this study, Eliza Afroze, by telephone at +88 01717209260, by email at [eliza\\_pbd@yahoo.com](mailto:eliza_pbd@yahoo.com) or by postal service at 20/1/A, 3rd Floor, Sornokunja Housing Society, Mohammodia Housing Limited, Dhaka-1207.

\*To ensure anonymity, your signature is not required in this document. Your willingness to participate in this research study is implied if you proceed with the interview/focus group



## Appendix 4: মৌখিক সম্মতি

### গবেষণায় অংশগ্রহণ করার সম্মতি

গবেষনার নাম : সোলডার ক্যাপসুলাইটিস এর বুকিসমূহ

প্রধান গবেষণাকারীঃ এলিজা আফরোজ	মোবাইল নাম্বার ০৮৮ ০১৭১৭২০৯২৬০
প্রতিষ্ঠানঃ বাংলাদেশ হেল্থ প্রফেশনস্ ইন্সটিটিউট (বি এইচ পি আই)	

বাংলাদেশ হেল্থ প্রফেশনস ইন্সটিটিউট এর ছাত্রী এলিজা আফরোজ এর সার্বিক তত্ত্বাবধানে পরিচালিত একটি গবেষণা কার্যক্রমে অংশগ্রহণের জন্য আপনাকে আমন্ত্রন করা হচ্ছে। পক্ষাঘাতগ্রস্থদের পুনর্বাসন কেন্দ্রে (সি আর পি) এর ফিজিওথেরাপী বিভাগে ফিজিওথেরাপী চিকিৎসা নিতে আগত রোগীদের নিয়ে এই গবেষণা।

আপনাকে এই গবেষণায় অংশগ্রহণের জন্য আহ্বান জানানো হচ্ছে। এই গবেষণায় অংশগ্রহণ সম্পূর্ণ আপনার ইচ্ছামত। আপনি এই গবেষণা থেকে সরাসরি উপকৃত হবেন না। তবে এই গবেষণায় প্রাপ্ত ফলাফল সোলডার ক্যাপসুলাইটিস এর বুকিসমূহ সম্বন্ধে গুরুত্বপূর্ণ তথ্য প্রদান করতে পারে যার মাধ্যমে সোলডার ক্যাপসুলাইটিস রোগটি প্রতিরোধ ও চিকিৎসায় যথাযথ সাহায্য করা সম্ভবপর হবে এবং সর্বোপরি সমাজ, বিজ্ঞান তথা মানবসভ্যতার কল্যান সাধিত হবে। কোন গুরুত্বপূর্ণ তথ্য আদৌ বেরিয়ে আসবে কিনা তাও নিশ্চিত করে বলা যাচ্ছে না।

আপনি যদি এই গবেষণায় অংশগ্রহণের জন্য অনুমতি দেন তাহলে আপনাকে আপনার অসুস্থতা সম্পর্কে কিছু প্রশ্ন করা হবে যাতে আনুমানিক ৩০ মিনিট সময় লাগবে। এই গবেষণায় অংশগ্রহণের ফলে মূলত কোন বুকি নেই, তবে আপনাকে কিছু ব্যক্তিগত প্রশ্ন করা হবে যা আপনার জন্য অস্বস্তিকর হতে পারে। যেকোন ধরনের অস্বস্তিকর প্রশ্নের উত্তর আপনি এড়িয়ে যেতে পারবেন। স্বাক্ষরকার গ্রহণের সময় যেকোন প্রশ্নের উত্তর প্রদান থেকে আপনি বিরত থাকতে পারেন, চাইলে যেকোন পর্যায়ে আপনি বিরতি নিতে পারেন। আপনি চাইলে যে কোন মুহূর্তে গবেষণায় আপনার অংশগ্রহণ প্রত্যাহ্বান করে নিতে পারেন। অংশগ্রহণ প্রত্যাহ্বান আপনার স্বাভাবিক চিকিৎসায় কোন প্রভাব ফেলবে না। গবেষণায় অংশগ্রহণের জন্য আপনাকে কোন আর্থিক সুবিধা প্রদান করা হবে না।

এই গবেষণায় আপনার অংশগ্রহণের গোপনীয়তা নষ্ট হওয়ার কিছুটা বুকি আছে। তবে আমরা আপনাকে আশ্বস্ত করছি যে আপনাকে চিহ্নিত করা যাবে এমন সব তথ্য গোপন রাখার সর্বাত্মক চেষ্টা করা হবে তবে কোনরূপ নিশ্চয়তা আমরা দিচ্ছি না। গবেষণার স্বার্থে আপনার বয়স ও লিঙ্গ ছাড়া আপনাকে সনাক্তকারি কোন তথ্য যেমন আপনার নাম এবং পরিচয় কোথাও লিপিবদ্ধ করা হবে না। আপনার এবং এই গবেষণায় অন্য সকল অংশগ্রহনকারীর প্রদত্ত উত্তর এমনভাবে প্রকাশ করা হবে যাতে কোন অংশগ্রহনকারীকেই সনাক্ত করা সম্ভবপর না হয়।

এই গবেষণা সম্পর্কিত আরও বিস্তারিত তথ্যের জন্য এই গবেষণার প্রধান গবেষক এর সাথে নিম্নের ঠিকানায় অথবা নিম্নের মোবাইল ফোন অথবা ইমেইল এর মাধ্যমে যোগাযোগ করতে পারবেন।

এলিজা আফরোজ

২০/১/এ, ৩য় তলা,

স্বর্ণকুঞ্জ হাউজিং সোসাইটি,

মোহাম্মাদী হাউজিং সোসাইটি, ঢাকা-১২০৭। মোবাইল-০৮৮০১৭১৭২০৯৩৬০

ইমেইল - eliza\_pbd@yahoo.com

\*নাম ও পরিচয় গোপন রাখার জন্য অংশগ্রহনকারীর স্বাক্ষর নেয়া হল না। আপনি এই গবেষণায় অংশগ্রহণ করতে চাইলে আমরা আপনার স্বাক্ষরকার গ্রহণ করব।

To

The Head of the Physiotherapy department,  
Center for the rehabilitation of the paralyzed (CRP)  
Savar, Dhaka-1343

**Subject: Permission to collect data to conduct a research study.**

Sir,

I respectfully to state that I am a student of 4<sup>th</sup> year B.Sc(professional)in Physiotherapy at Bangladesh Health Professions Institute(B.H.P.I).In 4<sup>th</sup> year we have to conduct a research project and I have chosen a title that is "Risk Factors of Shoulder Capsulitis". I have chosen the outdoor Physiotherapy Department of CRP for data collection. For your kind information the research methodology, consent form &questionnaire have submitted with this application.

I therefore pray and hope that you would be kind enough to give me permission to do this study successfully in your department.

Yours faithfully

*Eliza Afroze 09/10/11*

Eliza Afroze  
4<sup>th</sup> year B.Sc(professional) in Physiotherapy of B.H.P.I.  
Savar,Dhaka  
date: 09/10/11

*Give permission for data  
collection at CRP - seminar - plan  
contact with out door include  
PT Dept*

*CA*  
*09/10/11*

Mohammad Anwar Hossain  
Assistant Professor &  
Acting Head of Physiotherapy Dept.  
CRP Chabain Savar-1343