

**WORK RELATED MUSCULOSKELETAL DISORDERS OF  
NECK AND UPPER EXTRIMITY AMONG THE COMPUTER  
USERS**

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

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

**WORK RELATED MUSCULOSKELETAL DISORDERS OF  
NECK AND UPPER EXTRIMITY AMONG THE COMPUTER  
USERS**

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

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## **Declaration**

I declare that the work presented here is my own. All 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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## Abbreviations

<b>BMRC:</b>	Bangladesh Medical and Research Council
<b>CANS:</b>	Complaints of Arms, Neck and Shoulders
<b>CTS:</b>	Carpal Tunnel Syndrome
<b>ICOH:</b>	International Commission on Occupational Health
<b>ULMSDs:</b>	Upper Limb Musculoskeletal Disorders
<b>WHO:</b>	World Health Organization
<b>WMSDs:</b>	Work-related Musculoskeletal Disorders

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## Abstract

*Purpose:* The purpose of the study was to identify work related musculoskeletal disorders of neck and upper extremity among the professional computer users.

*Objectives:* To identify exact area of discomfort or pain in body and explore the socio demographic characteristic (age, sex, education, religious status) of computer users with musculoskeletal problem, to examine and interpret how the job experience and duration of work & previous history of accident affects the prevalence of WMSDs, identify and clarify the interruption of work & the diagnosis and their treatment options in person affected by WMSDs. *Methodology:* the study design was descriptive cross sectional study. Total 78 samples were selected by convenient sampling from Saver Bazar. Data was collected by mixed type questionnaire. Descriptive statistics were used for data analysis which focused through table, pie chart and bar chart. *Results:* Sixty-one (78%) participants had work related musculoskeletal disorders (WRMSDs) and male shows greater prevalence n=55 (71%). The participants who were less than or equal 30 year most commonly suffered from WRMSDs n=53 (68%). Professional computer users who had job experience five years n=33 (42%) and working hour > six hours n=46 (39%) most commonly suffered by WRMSDs. The participants who sometimes took break was mostly affected n=24 (31%). Most commonly affected body part was neck n=23 (30%). Among the affected participants n=26 (33%) had work interruption. Fifty-one (65%) participants had no previous history of accident. The participants who were affected among them n=36 (46%) approached physician and n=8 (10%) had an unknown diagnosis. Thirty-four (44%) participants received treatment among them only n=1 (1%) received physiotherapy along with medication. *Conclusion:* From this study it is found that neck and elbow is the commonest area of complain among professional computer users.

*Key words:* Work-related Musculoskeletal Disorders, Neck, Upper extremity, Computer users.

**1.1Background**

Computer based customer service work or call centre work is one of the most rapidly growing occupations in the world (Rampel et al, 2006). Musculoskeletal disorders of the upper extremities and neck are the most common occupational health problem associated with this type of work (Hells et al, 1994). Nowadays computers have become a vital tool to keep pace with time and progress. A variety of sectors including banks, government offices, private entities, autonomous institutions etc have computerized their data systems for smooth and faster flow of information (Rampel et al, 2006). Work-related musculoskeletal disorders are common among computer users, especially affecting the neck and shoulder region (Tittiranonda et al, 1999). One important aspect that has greatest impact on our daily lives in modern time is computer with small size and affordable price. Computer assisted injuries, which started gaining prominence in India from past five years and have now turned into an epidemic resulting in computer related health problems (Srilatha et al, 2011). Musculoskeletal disorders, which are often soft tissue injuries, occur when there is a mismatch between the physical requirements of job and the physical capacity of the human body. Several previous reviews have indicated a possible causal relationship between computer work and musculoskeletal complaints in the neck and arm (Punnett & Bergqvist, 1997). Consequently, the proliferation of computers in the modern office setting has generated concern related to potential health hazards associated with their use. There have been numerous operator complaints of a wide range of symptoms with work-related musculoskeletal disorders (WMSDs) is important among them (Veiersted & Waersted, 1999).

Occupational computer use has become very common in the last decades. In 2003, the United States entailed over 77 million persons who used a computer at work (Ijmker et al, 2006). In the European Union, over 88 million persons used a computer at work in 2002. More over 50 million European workers reported to use the computer at least half of their work time (Ijmker, 2006).Recent large-scale surveys show one-year prevalence's of hand, arm, shoulder and neck symptoms ranging from 24 to 44% among office workers in Europe (Jensen et al, 2003).

The available epidemiological evidence suggests that hand, arm, shoulder and neck symptoms are associated with the duration of computer use and increase steadily with each hour of computer use per day (Punnett & Bergqvist, 1997). A study showed that the one-year prevalence of complaints of arm, neck and shoulder (CANS) was 56.9%, commonest region of complaint was forearm/hand (42.6%), followed by neck (36.7%) and shoulder/arm (32.0%) (Ranasinghe et al, 2001). In a study in Karnataka State, India it is noted that the overall WMSD prevalence of 57.7% which is almost two-fold higher than the prevalence of 33% reported from a Netherlands survey of neck and upper extremity symptoms among computer users (Elbestar et al, 2011). A study conducted by Dr. Rempel (2005) in USA showed that 63 participants among 182 were diagnosed with one or more incident of musculoskeletal disorders. The frequency of synovitis in Denmark is 9.1 % Finland 7.6% Norway 0.7% Sweden 1.4% (Rempel et al, 2005). In French region in 2002-2005 a study was done with 3710 computer workers where a total of 472 workers experienced at least one upper-extremity musculoskeletal disorder (Roquelaure et al, 2009).

In Asia the one-year prevalence of CANS in a study population was 63.6%. Prevalence of mild cases was 53.7% (male's versus females, 55% versus 52% respectively). The one-year prevalence of severe cases was 10% (males 11.7%, females 8.8%). The most commonly reported complaints were neck and shoulder symptoms (37.1% and 34.3% respectively), followed by hand, wrist and upper arm complaints (23.6%, 21.4% and 18.6% respectively) and elbow complaints and lower arm (11% and 9% respectively) (Ranasinghe et al, 2011). In USA the prevalence rates of CANS in 2006 are 54% of the respondents who reported at least one complaint in the arm, neck and shoulder (Elbestar et al, 2011).

## **1.2 Rationale**

We are living in the electronic age. World is now very much depend on computer. Nowadays Bangladesh is in the revolution toward Digital Bangladesh which indicates increase use of information technology in every aspect. Therefore, computer will be a common work tool in almost every workstation in perspective of Bangladesh. With an increase in the intensity, frequency and popularity of computer use inside and outside at home, the incidence of WMSDs has been increased. However, there are only few attempts to inquire this site of health service. From the study computer users will be able to identify the musculoskeletal problem related to their work that can influence their activities. They may provide proper recommendation for every problem which will be helpful for them. This study will also help to discover the lacking area of computer users about their posture before doing any activities. From the study the researcher can identify the most vulnerable area the body where the prevalence of work related musculoskeletal disorders is at higher rate. Thus the computer users can be aware about the poor posture of that particular area. It has been shown in a study that technical computer operators are highly affected (Cook, 1999). Physiotherapy is a developing health profession in Bangladesh. As a specialized health profession in musculoskeletal disorder, physiotherapy is one of the responsible health professions for treating and managing WMSD. Physiotherapists work in large spectrum including musculoskeletal phenomenon. They can also work in the Information technology Farm as consultant or visiting therapist to evaluate and provide advocacy and treatment to lessen the suffering (Buckle, 2005). They can work in promoting preventive program regarding associated risk factors in computer operating tasks. Occupational health and safety regarding work-related musculoskeletal disorder will be a new side to establish and promoting professional competence and development. It is an emerging area in perspective of Bangladesh where physiotherapist can work to gather information about percentage, prevalence and severity of work related musculoskeletal symptoms. Research in this area can establish the skills of physiotherapists be a base for spreading the profession in a new dimension in Bangladesh. For considering these issues researcher is keen to conduct the research in this area.

### **1.3 Research question**

What are the common work - related musculoskeletal disorders of neck and upper extremity among the professional computer users?

### **1.4 Objectives**

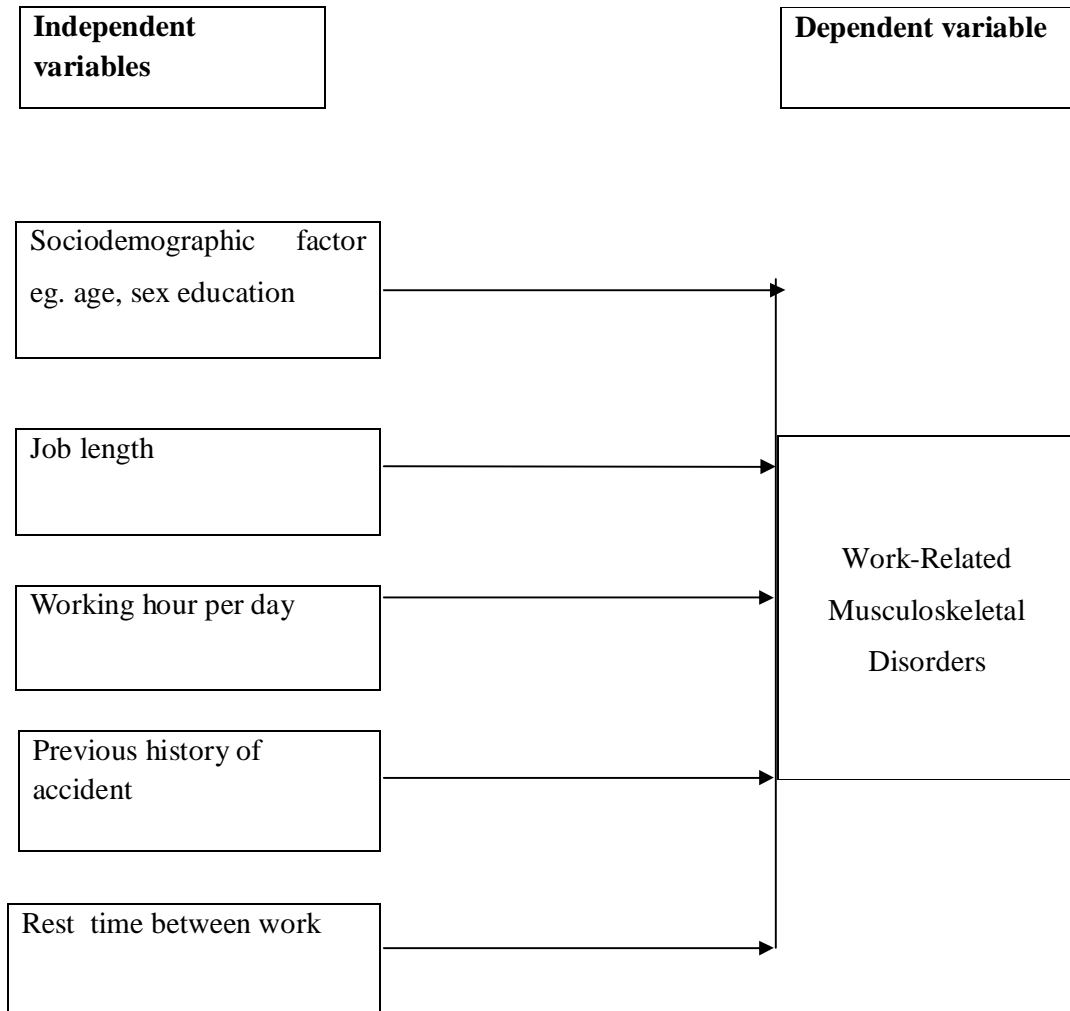
#### **1.4.1 General objective**

To determine the prevalence of common work related musculoskeletal disorders of neck and upper extremity among the professional computer users.

#### **1.4.2 Specific objectives**

- To identify exact area of discomfort or pain in body among professional computer users.
- To explore the socio demographic characteristic (age, sex, education) of professional computer users with musculoskeletal problem.
- To examine how the job experience and duration of work affects the prevalence of WMSDs.
- To interpret how taking rest between works and previous history of accident affects the prevalence of WMSDs.
- To find out the impact of WRMSDs in being off work and its duration in person affected by WMSDs.
- To clarify the diagnosis and their treatment options of the participants affected by WMSDs.

### 1.5 List of variables



## **1.6 Operational definition**

### **Work-Related Musculoskeletal Disorders**

Work related musculoskeletal disorders occur when there is a mismatch between the physical requirements of the job and the physical capacity of the human body.

### **Upper extremity**

The upper limb or upper extremity is the region in an animal extending from the deltoid region to the hand, including the arm, axilla and shoulder.

### **Neck**

The part of the body of an animal or human being that connects the head and the trunk.

### **Computer users**

Those who use computer for their professional purpose.



A musculoskeletal disorder is a condition where a part of musculoskeletal system is injured over time (Srilatha et al, 2011). The most of the upper arm musculoskeletal disorders are characterized by recurrent episodes of pain and disability which may vary in severity and impact (Andersen et al, 2011). Most of the episodes are self-limiting and subside within days or weeks, while some end up with long lasting chronic problems. Musculoskeletal disorders which are often soft tissue injuries occur when there is a mismatch between the physical requirements of job and the physical capacity of the human body. All of these injuries have a history of prolonged repetitive use of the upper extremities with an intense, forceful, and an awkward pattern of movement. The condition may be associated with either specific soft tissue inflammation, such as tenosynovitis, or a specific nerve entrapment, such as carpal tunnel syndrome (Aydezn, 2008). The disorder occur when the body part is called on to work harder, stretch farther, impact more directly or otherwise functions at a greater level than it is prepared for. The immediate impact may be minute, but when it occurs repeatedly the constant trauma cause damage (Murcus et al, 2002).

The term musculoskeletal disorder identifies a large group of conditions that result from traumatizing the body in either a minute or major way over a period of time. It is the buildup of trauma that causes the disorder. These conditions are often focused on a joint and affect the muscle and bone. There are many factors with in computer work, which can lead to the development of musculoskeletal problems in this type of work (Veiersted & Waersted, 1999).

The scientific committee for musculoskeletal disorders of the International Commission on Occupational Health (ICOH) recognizes work-related musculoskeletal disorders which describe a wide range of inflammatory and degenerative diseases and disorders that result in pain and functional impairment (Andersen et al, 2011). Job characteristics, such as high quantitative job demands, having little influence on one's work situation, poor workstation ergonomics, limited rest break and repetitive typing with low or high force have been found to be predictors of WMSDs of wrist and hand ( Hagberg & Wegman, 1987).

Such conditions of pain and functional impairment may affect the neck, shoulders, elbows, forearms, wrists and hands. The conditions for these regions are collectively referred to as the neck and upper limb musculoskeletal disorders (ULDs) (Buckel, 2005). According to the World Health Organization, work-related musculoskeletal disorders arise when exposed to work activities and work conditions that significantly contribute to their development or exacerbation but not acting as the sole determinant of causation.

Work-related musculoskeletal disorders (WMSDs) are a group of painful disorders of muscles, tendons, and nerves. Carpal tunnel syndrome, tendonitis, thoracic outlet syndrome, and tension neck syndrome are examples of such conditions. Work activities which are frequent and repetitive, or activities with awkward postures cause these disorders which may be painful during work or at rest (Das & Ghosh, 2010).

Almost all work regarding computer requires the use of the arms and hands. Therefore, most WMSD affect the hands, wrists, elbows, neck, and shoulders. Work using the legs can lead to WMSD of the legs, hips, ankles, and feet. Some back problems also result from repetitive activities (Buckel, 2005).

Studies generally address repetition as cyclical work activities that involved either repetitive neck movements or repetitive arm/shoulder motions that generate loads to neck/shoulder area (e.g trapezius muscle) (Rajagopal et al, 2012). Most of the studies that examined repetition or repetitive work as a potential risk factors for neck/shoulder MSDs. Force or forceful work or heavy loads to the neck/shoulder or described strenuous work involving the upper extremity that generate loads to the trapezius muscles. Neck or head postures, adverse or extreme head or neck postures or static postures of the head/neck can cause works related musculoskeletal disorders (Lee et al, 2011).

Shoulder musculoskeletal disorders and their relationship to work risk factors have been reviewed by several authors (Hagberg & Wegman, 1987) attributed a majority of shoulder problems occurring in a variety of occupations to workplace exposure. Keshawi (2008) looked specifically at shoulder tendinitis and stated that the epidemiologic literature shows an increased risk for overhead and repetitive work.

Some of the studies that examined repetition as a risk factor for shoulder MSDs had several concurrent or interacting physical work load factors (Shen et al, 1999). Studies that examined force and forceful work or heavy loads to the shoulder or described exposure as strenuous work involving the shoulder abduction, flexion, extension and rotation that could generate loads to shoulder region were also included (Lassen et al, 2004).

There is a relationship between physical factor of repetition and elbow MSDs. studies usually defined repetition or repetitive work for the elbow as work activities that involved flexion and extension or pronation, supination , extension and flexion of the elbow that generates force to the elbow and forearm region (Almeida & Peter, 2004). For review it is included in study that is examine force or forceful work or heavy loads to the elbow or described exposure as strenuous work involving the forearm extensors or flexors which could generate loads to the elbow/forearm region (Griffiths, 1998). Studies that addressed posture or examined workers in those activities or occupations that require repeated pronation and supination, flexion/extension of wrist, either singly or in combination with extension and flexion of the elbow have chance to being attacked by MSDs (Lee et al, 2011). A large British national survey found that keyboard use for more than 4 h per day increased the risk of wrist/hand and shoulder symptoms, but not neck and elbow symptoms (Palmer et al, 2007).

Cyclical or repetitive work activities that involved either repetitive hand/finger or wrist movements such as hand gripping, wrist extension/flexion, ulnar/radial deviation and supination/pronation may cause the MSDs (Roquelaure et al, 1997). Repetitive work is frequently performed in combination with external forces and much of the epidemiologic literature has combined these two factors when determining association with CTS. There is strong evidence that a combination of forceful hand/wrist exertion and repetitiveness are associated with CTS (Roquelaure et al, 1997). It is hypothesized that awkward postures increases the required force necessary to complete a task. Posture may increase or decrease forceful effort; its impact on MSDs may not be accurately reflected in measurement of posture alone (Lee et al, 2011).

Age play an important role in the development of different health problems. As working age increases musculoskeletal complains of musculoskeletal symptoms may become high. WRMSDs affect man and women in their best productive years with the peak frequency of symptoms occurring in the age range 30-55(Griffiths, 1998). Again the literature shows that 22-60 age range is more prone to get WRMDs (Ranasinghe et al, 2011).

The physical capacity of worker varies by gender (male and female). Gender has been suggested as an independent risk factor for the development of repetitive strain injuries. Gender differences are proved in many studies as women are more vulnerable to develop musculoskeletal symptoms than men (Srilatha et al, 2011). A study conducted in ASIA shows that both male and female are affected by WMSDs the percentage is 55% and 52% respectively (Ranasinghe et al, 2011).

Static positioning has becoming an issue of equal importance to repetitive motion in office work. Numerous office workers spend many hours each day performing work at the computer, with little opportunity to move around or change position which causes stiffness and fatigue occur in response to static postures (Sanders, 2004).

The risk of work practices are prolonged static posture, poor posture, repetitive movements and forces. All of these factors may act separately, but the risk is greater if several risk factors work together. Software programmers who work for long time are at high risk of WRMSDs (Keshawi, 2008). A study in USA shows that the employers working at least 2 year on computer complain about WRMSDs (Palmer et al. 2008). The available epidemiological evidence suggests that hand; arm, shoulder and neck symptoms are associated with the duration of computer use and, in fact, increase steadily with each hour of computer use per day (Punnett & Bergqvist 1997). A study in USA shows that the employers working for 6-9 hour on computer complain about WRMSDs (Palmer et al, 2008).

The rules of good body mechanics suggest the natural body postures are most effective. Postures at the end range can be considered awkward. Common awkward postures observed in the office environment involve the neck, back, shoulder and wrist. Prolonged awkward posture of head, neck and upper extremities can contribute to complaints of pain, parathesias and numbness (Sanders, 2004).

There is some evidence of commonly occurred musculoskeletal disorders among computer users. The frequency of myalgia in Denmark is 2.7% Norway 0.3% Sweden 11% and the frequency of synovitis in Denmark is 9.1 % Finland 7.6% Norway 0.7% Sweden 1.4%, tendinitis of hand and wrist in Sweden is 0.8% (Rajagopal et al, 2012).

### **3.1 Study Design**

Cross sectional study design was used to identify the prevalence of work related musculoskeletal disorder (WRMSDs) of neck and upper extremity among the professional computer users. Prospective design had chosen to gather information from a group of participants who are involved in a particular service (computer users) involve. The quantitative study was appropriate for this study because the issue is known about relatively simple and clear-cut.

### **3.2 Study site**

The study area was the Savar Bazar, Savar, Dhaka. This area had chosen because it was convene for the study and there were the samples which meet inclusion & exclusion criteria of the study.

### **3.3 Sample Selection**

Sample was selected by non random convenient sampling procedure. The sample was selected according to the inclusion & exclusion criteria.

### **3.4 Sample size**

According to the equation the sample size required 377 people but due to lack of study time the study was conducted with 78 samples that had meet the inclusion & exclusion criteria.

### **3.5 Inclusion criteria**

- Both male and female was included.
- 22-60 age groups were selected.
- Computer users, who were working at least for 2 years were the sample.
- Computer users who worked at least 6 hours a day.
- Computer users who gave the consent to be a participant

### **3.6 Exclusion criteria**

- Computer users (women), who were pregnant at same period of research because menstruation cycle and pregnancy usually affect fluid levels in body which may contribute to nerve entrapment.
- Computer users, who had any, associated pathological condition at previous year because these also exacerbate of musculoskeletal symptoms.
- Subjects who had recent major accident or surgery in any part of body as they can have discomfort for this reason.

### **3.7 Data collection instrument and tools**

Questionnaire, pen, papers, consent form were the tools of data collection.

### **3.8 Data collection procedure**

A questionnaire was set up. Then researcher had taken permission of authority of her institution to conduct the survey. After that, computer users were selected who had met the inclusion and exclusion criteria. Then a face to face interview was conducted with the consent of the sample. According to the answer of the sample questionnaire was filled up by the researcher.

### **3.9 Data analysis**

After completing the initial data collection every questionnaire had been checked again to find out any mistake or unclear information. The data analysis was performed in SPSS version 16. The variables were labeled in a list in order. The researcher put the name of the variables on the variable view of SPSS and defined the types, values, decimal, label alignment and measurement level of data. Then the inputted data was checked to ensure that all data has been transferred from the questionnaire.

### **3.10 Ethical considerations**

Ethical issues were followed by World Health Organization (WHO) and Bangladesh Medical and Research Council (BMRC). At first to conduct study, the research project was submitted to the Physiotherapy Department of BHPI and obtained approval from the ethical board. . During the course of the study, the samples who were interested in the study had given consent forms and the propose of the research

and the consent form were explained to them verbally. The study did not interfere with their jobs. They were informed that their participation was fully voluntary and they had the right to withdraw or discontinue from the research at any time. They were also informed that confidentiality was maintained regarding their information.

### **3.11 Limitation of the study**

Though the expected sample size was 377 for this study but due to resource constrain & time limitation researcher could manage just 78 samples which is very small to generalize the result for the wider population of the professional computer users. The researcher was only able to collect data only from Savar bazar for a short period of time which will affect the result of the study to generalize for wider population. There is an imbalance between the number of male and female participants, so it influences the result of socio-demographic information particularly sex of the participants. The questionnaire was developed only through searching sufficient literature but considering the context of the demography of the population a pilot study would be substantial before developing questionnaire.

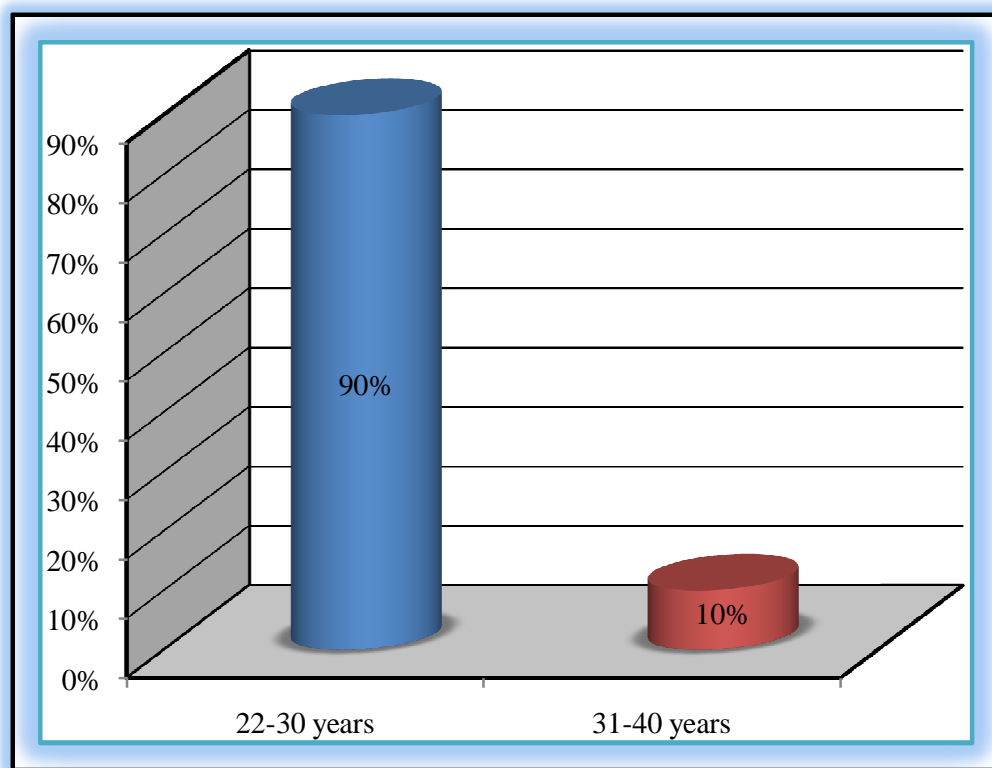


The socio-demographic information along with Work Related Musculoskeletal Disorders (WRMSDs) was taken from 78 participants who work as a professional computer user by the researcher.

#### 4.1 Socio-demographic Information

##### 4.1.1 Age

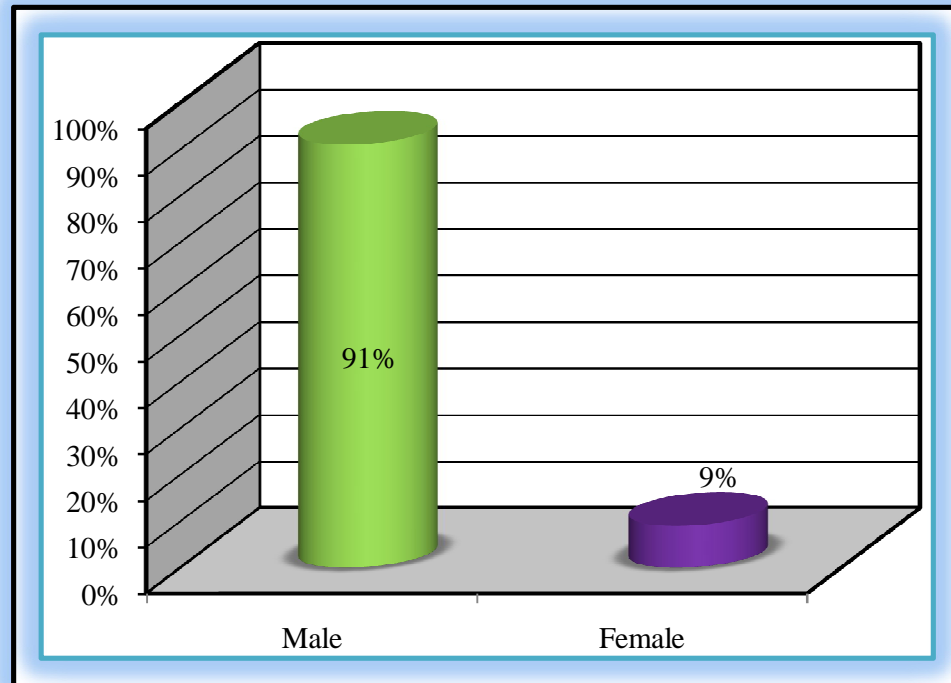
The total participant of the study was 78. The age group 22-30 years includes 90% (n=70) and 31-40 includes 10% (n=8) participants. Figure 1 shows the distribution of age of the participants in bar.



**Figure 1:** Age distribution of the participants

#### 4.1.2 Sex

The number of male participants was 91% (n=71) and female participants were 9% (n=7). Figure 2 shows the distribution of sex of the participants in bar.



**Figure 2:** Sex distribution of the participants

#### 4.1.3 Religious status

Among the 78 participants 89% (n=69) were Muslim and 11% (n=9) were Hindu in religion. In table 1 the religious status of the participants has been shown.

<b>Name of religion</b>	<b>Number(n)</b>	<b>Percent (%)</b>
Muslim	69	89
Hindu	9	11

**Table-1:** Religious status of the participants

#### 4.1.4 Educational status of participants

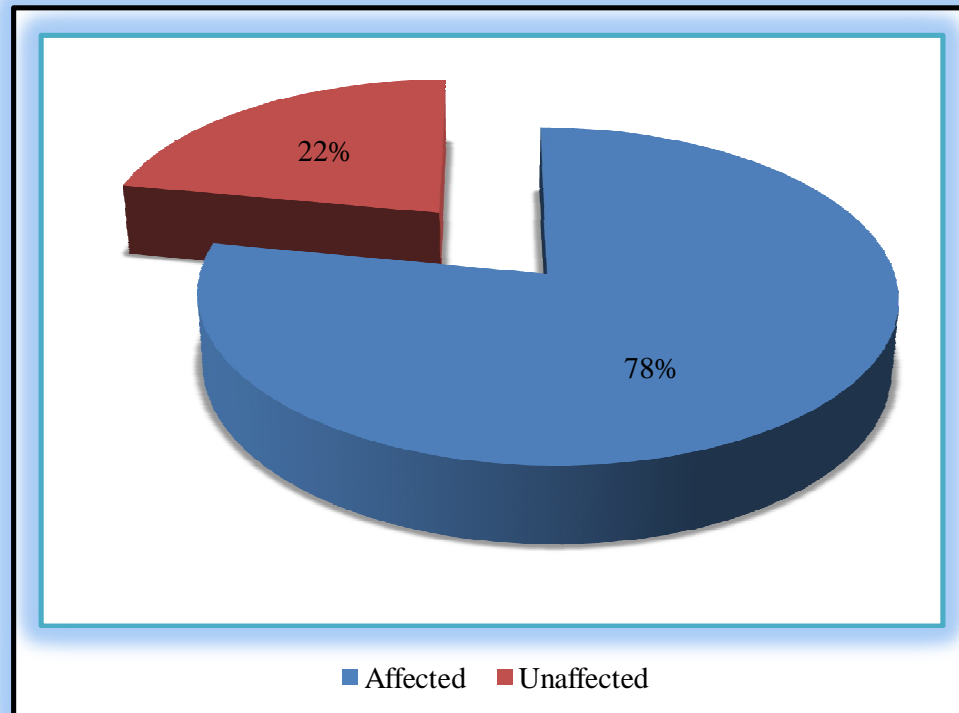
Their educational level was below secondary school certificate 3% (n=2), secondary school certificate 46% (n=36), higher secondary school certificate 36% (n=28), Bachelor and above 15% (n=12). Table-2 shows the educational status of the participants.

<b>Educational status</b>	<b>Number(n)</b>	<b>Percent (%)</b>
Below secondary school certificate	2	3
Secondary school certificate	36	46
Higher secondary school certificate	28	36
Bachelor and above	12	15

**Table-2:** Educational status of the participants

#### 4.2 Number of affected participants

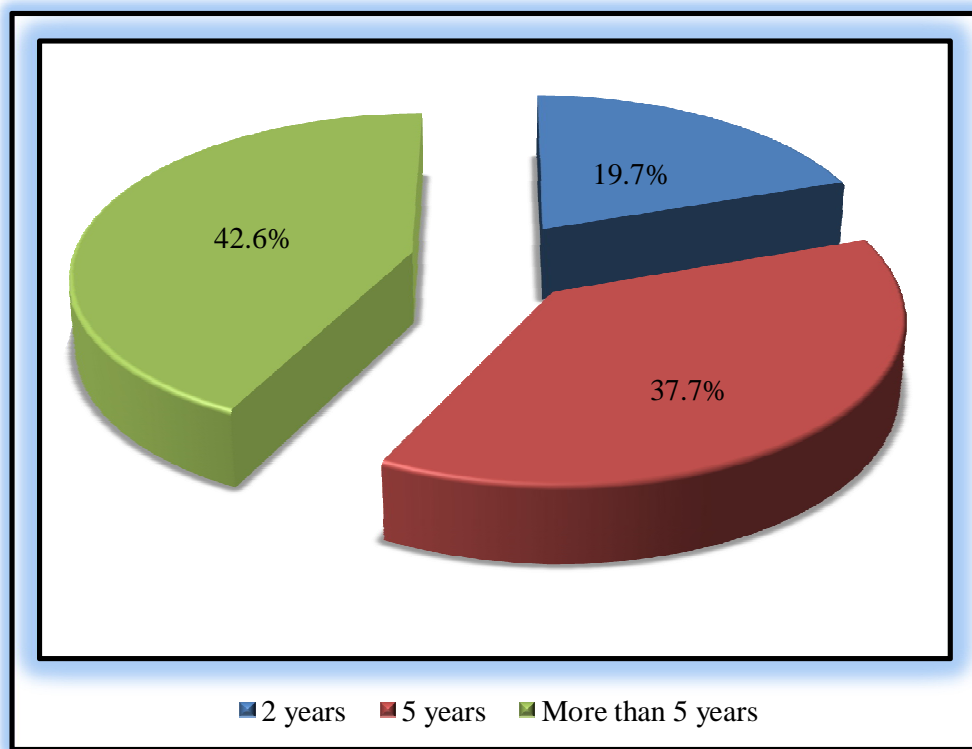
Among the 78 participants 78% (n=61) were affected from work related musculoskeletal disorders and 22% (n=17) were not suffered from work related musculoskeletal disorders. Figure: 3 show the number of affected participants in pie.



**Figure-3:** Number of affected participants

### 4.3 Job length of the affected participants

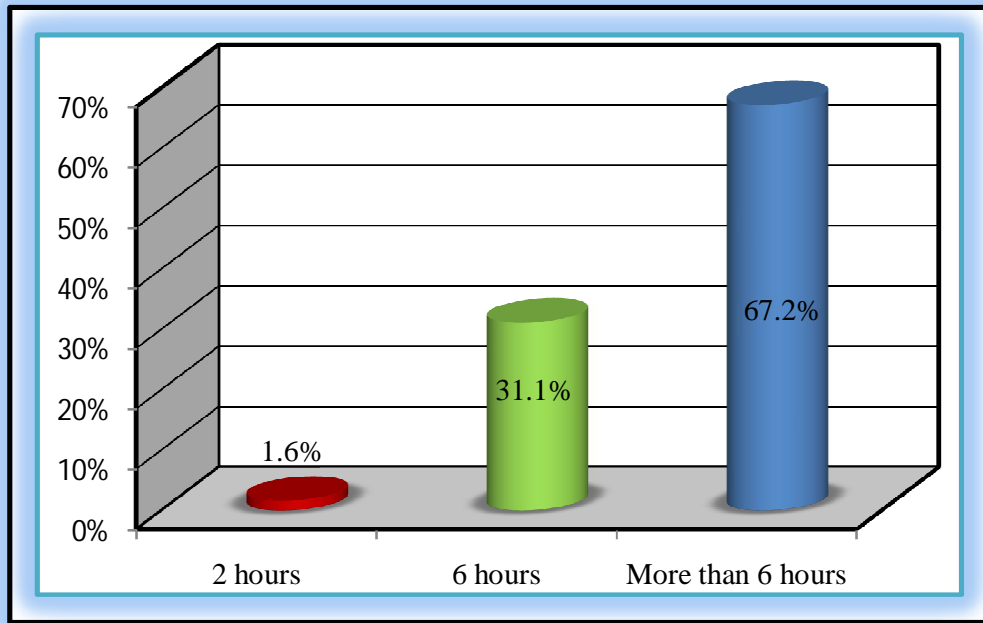
In this study total participants were 78 and among them 61 participants were affected from work related musculoskeletal disorders. According to their job length 2 years there were 19.7% (n=12) participants were affected by WRMSDs. The participants whose job length was 5 years, they were 37.7% (n=23) in number were affected by WRMSDs. There were 42.6% (n=26) participants in another group whose job length was more than 5 years were affected by WRMSDs. So here it can be that the participants whose job length was more than 5 years were mostly affected 42.6% (n=26). The job length of the affected participants has been shown in pie in figure 4.



**Figure 4:** Job length of the affected participants

#### 4.4 Working hour of the affected participants

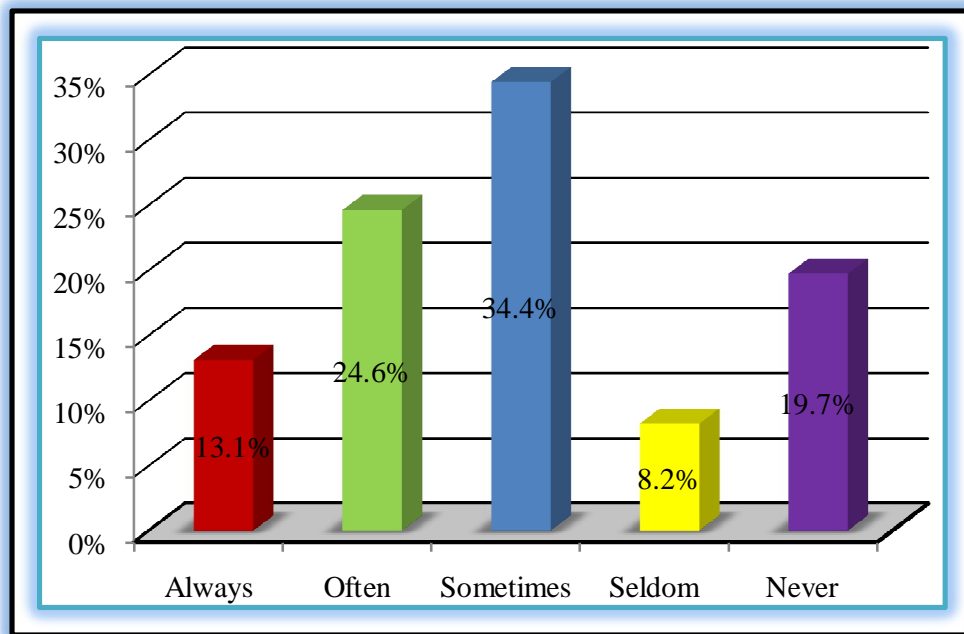
In 61 participants only 1.6% (n=1) had to work 2 hours and this participant was affected by WRMSDs, had worked 5 hours among 31.1% (n=19) participants were affected by WRMSDs and had working hour more than 6 hours, in this group 67.2% (n=41) were affected by WRMSDs. Figure: 5 shows the working hour of the affected participants in bar.



**Figure 5:** Working hour of the participants

#### 4.5 Rest time between works of the affected participants

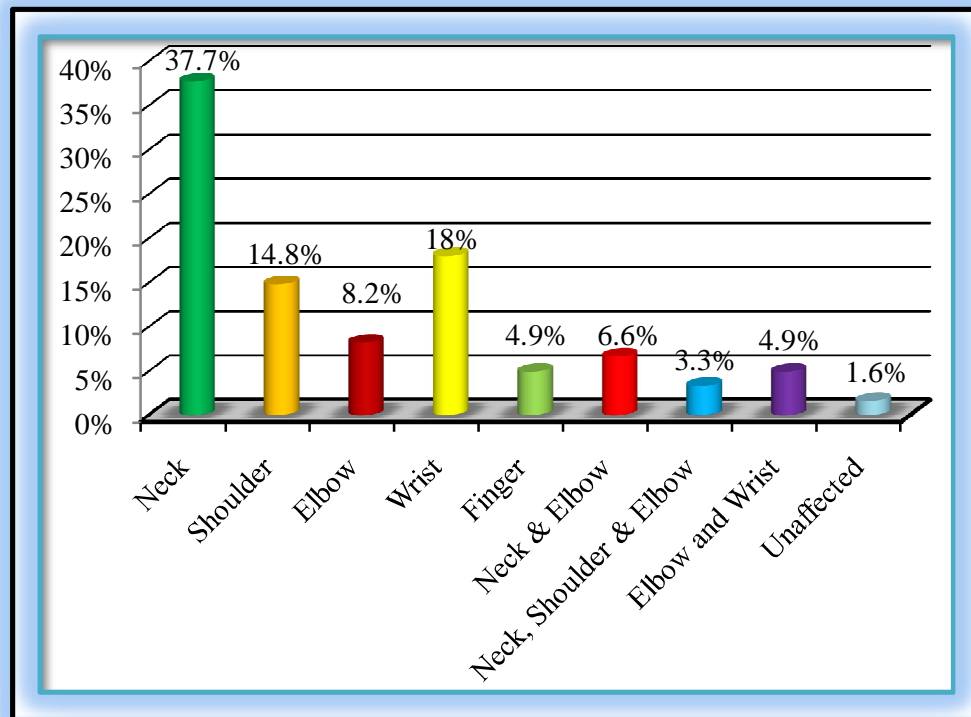
Among 61 participants 13.1% (n=9) participant always taken break were affected by WRMSDs. The participants those often taken break 24.6% (n=15) were affected by WRMSDs. The participants who taken break sometimes in them 34.4% (n=21) were affected by WRMSDs. The participants who seldom took break in them 8.2% (n=5) were affected by WRMSDs. The rest 15% (n=12) participants never taken break were affected by WRMSDs. Rest time between work of the affected participants has shown in figure 6 in bar.



**Figure 6:** Rest time between works of the affected participants

#### 4.6 Affected body part

Among the 61 participants neck was affected in 37.7% (n=23), shoulder was affected in 14.8% (n=9), elbow was affected in 8.2% (n=5), wrist was affected in 18% (n=11), finger was affected in 4.9% (n=3), neck and elbow both were affected in 6.6% (n=4), neck, shoulder and elbow all three were affected in 3.3% (n=2) and 4.9% (n=3) participants were affected by both elbow and wrist. Rest 1.6% (n=1) were unaffected. In figure 7 affected parts of the participants has shown in bar.

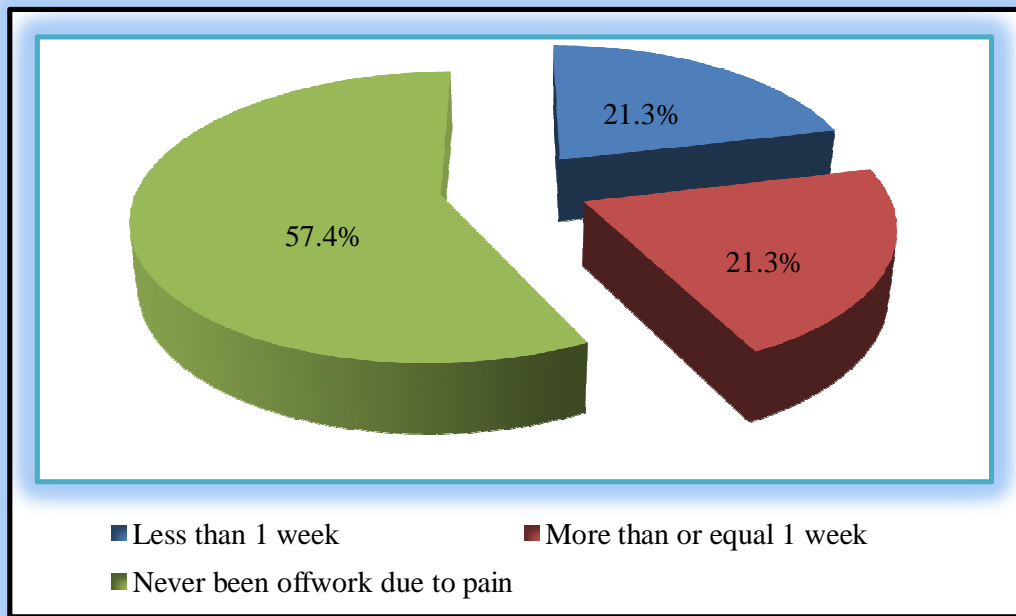


**Figure 7:** Body part affected by WRMSDs of the participants



#### 4.7 Off work due to pain or discomfort:

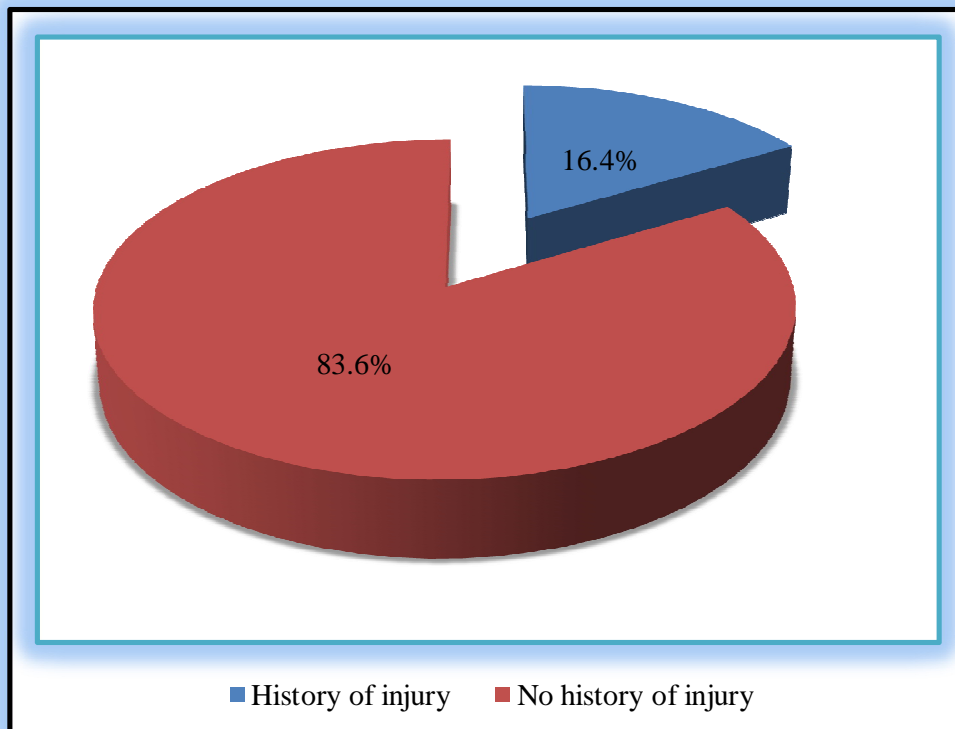
Among 78 participants 42.6% (n=26) were off work due to pain or discomfort and 57.4% (n=52) had never been off work. Between this 42.6% (n=26) participants 21.3% (n=13) experienced off work for less than 1 week and 21.3% (n=13) participants had interruption in work for more than or equal 1 week. Off workless of the participants has shown in figure 8 in pie.



**Figure 8:** Off work due to pain or discomfort

#### 4.8 History of previous accident of the participants

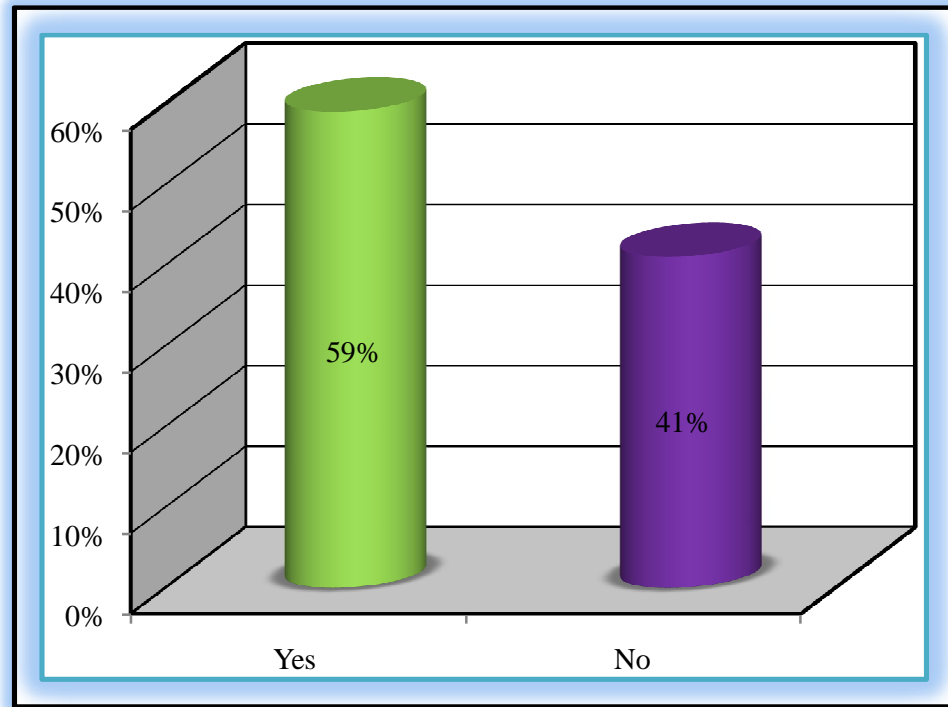
Between total 78 participants 78% (n=61) were affected by WRMSDs among them 16.4% (n=10) had history of previous accident and the other 83.6% (n=51) had no history of previous accident though they were affected by WRMSDs. Figure 9 shows the history of previous accident of the participants in pie.



**Figure 9:** History of previous accident of the participants

#### 4.9 Participants attended to physician

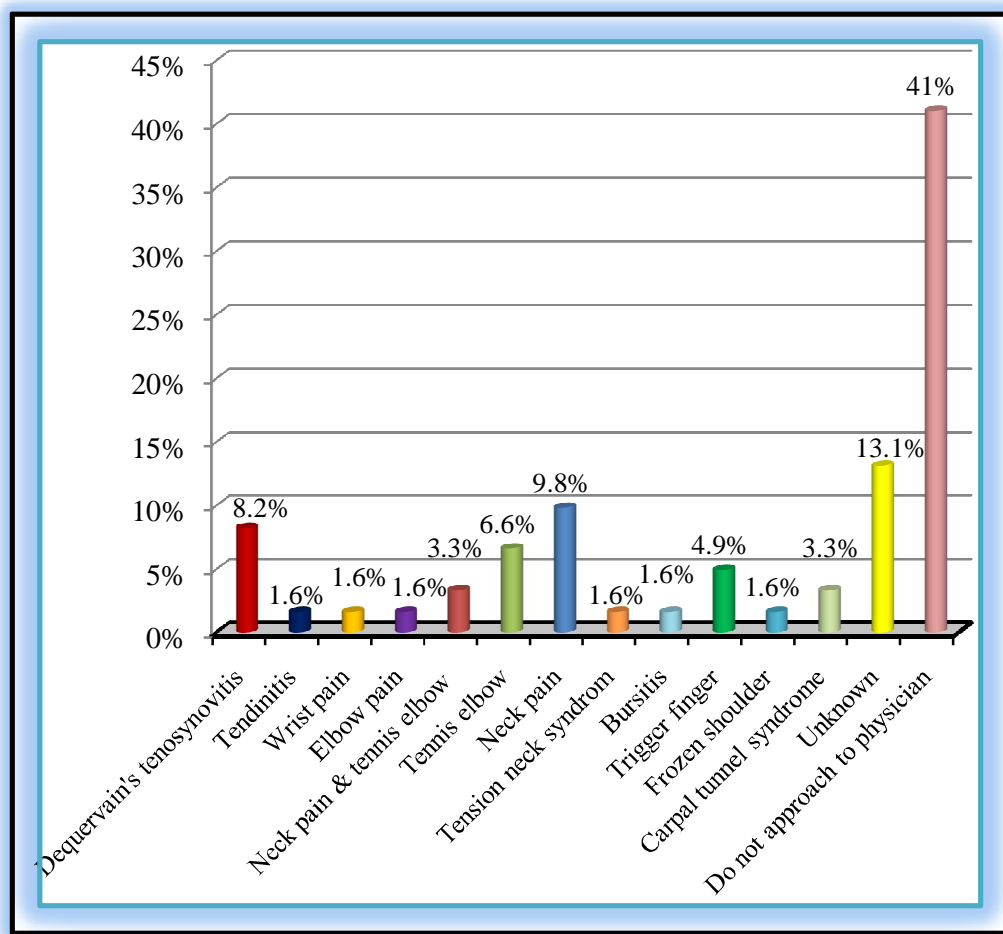
Total participant of the study which was 78 among them 61 participants who were affected by WRMSDs 59% (n=36) participants attended a physician and 41% (n=25) participants didn't approach physician. Percentage of participants attended to physician has shown in bar in figure 10.



**Figure 10:** Participants attended to physician

#### 4.10 Diagnosis of the participants

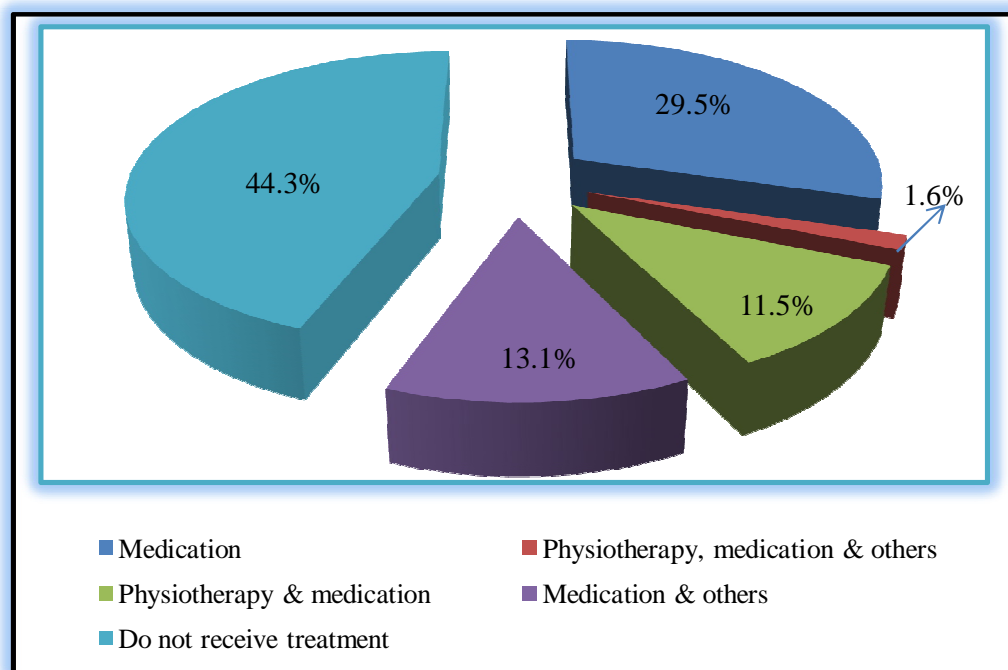
Among 61 participants 41% (n=25) participants didn't approach any physician. Rest 59% (n=36) participants approached physicians and 13.1% (n=8) participant's diagnosis is unknown, 8.2% (n=5) have dequervain's tenosynovitis, 1.6% (n=1) has tendinitis, wrist pain, tension neck syndrome, bursitis, frozen shoulder and elbow pain, 3.3% (n=2) have both neck pain & tennis elbow and carpal tunnel syndrome, 6.6% (n=4) have only tennis elbow, 9.8% (n=6) has neck pain, 4.9% (n=3) have trigger finger. Figure 11 shows the diagnosis of the participants



**Figure 11:** Diagnosis of the participants

#### 4.11 Received treatment of the participants

Among 61 participants 44.3% (n=27) did not received treatment, received treatment options of the participants were medication received by 29.5% (n=18) participants, medication, physiotherapy and others received by 1.6% (n=1) participant, physiotherapy and medication received by 11.5% (n=7) participants, medication and others received by 13.1% (n=8) participants. In figure 12 received treatments of the participants has shown in pie.



**Figure 12:** Received treatment of the participants

This study examined the prevalence of work related musculoskeletal disorders among computer users. The study found that 78% suffered from WRMSDs. This result is comparable to Ranasinghe et al. 2011 in Sri Lanka that (51%) reported WRMSDs in last one year. This result also can be compared with a study in India by Das, 2010 which show that 89% computer users had been suffered from WRMSDs. In China a study was conducted by Cho et al. 2012 where 69% participants were suffered from WRMSDs. In Internet Journal of Pain, Symptom Control & Palliative Care 2005 Adedoyin et al. stated that 73% reported about WRMSDs in Nigeria. This indicates that the percentage of WRMSDs of this study is almost similar to other studies in Asia and other countries.

Most frequent age ranges of participants (68%) have suffered from WRMSDs in between 22-30 years followed by 22% participants 31-40 years. In Asian Journal of Medical Science 2010, it has been shown that 80 percent female and 67 percent male VDT workers of 26–35 years suffered discomfort feeling in India. Wahlstro, 2005 showed that 22% people in less than 35 years old were affected by WRMSDs, in between 35-45 years 30% people were suffered from WRMSDs and in more than 45 years old 48% people were suffered from WRMSDs. Here a verity in age range of affected group can be seen which may be because of sample size.

In literature by Rahman & Atiya 2009, Majority 92% were male and female 8% female were affected by WRMSDs in Malaysia where as this study shows that 71% male participants has greater prevalence of WRMSDs. In a research project that was published at 2004 by Adedoyin et al. showed that 63.5% male and 36.5% female were suffered from WRMSDs in Nigeria. The statistic by Health and safety executive (2008) showed that male are more vulnerable to WRMSDs than female and the statistic is 2900 male in every 100000 males and 2400 female in every 100000 females. In Asian Journal of Medical Science 2010, it was observed that 74 percent male and 84 percent female computer users suffered from discomfort feeling respectively in India. The other studies of Asia supports this study's findings that

male are most commonly affected but the percentage differs may be the sample size is the cause as the most samples of this study were male.

In this study according to the job length of the participants 19.7% were affected in 2 years, 37.7% were affected in 5 years and 42.6% were affected whose job length was more than 5 years.

Here participants with more than 6 hours working duration are affected mostly which is 67.2%. 31.1% participants within 6 hours working duration are affected and 1.6% with 2 hours working duration is affected. Cho et al., 2012, showed that greater than greater than 7 hour/day computer users are more prone to be affected by WRMSDs which supports this study.

In this research 34.4% participants are affected who sometimes take rest between work followed by 13.1% always take break, 24.6% often take break, 8.2% seldomly take break and 19.7% never take break are affected. Palmar, 2008 claimed that repetitive work, static loading are responsible for most of the WRMSDs. Wahlstro, 2005 found in his research the common risk factors were performing the same tasks over and over and working in a same position for long periods. The result of this variable might be influenced by the answers of the participants.

Musculoskeletal discomfort has been found to be a major health problem for computer users and most affected body parts were neck in 37.7% (n=23), shoulder in 14.8% (n=9), elbow in 8.2% (n=5), wrist in 18%(n=11), finger in 4.9% (n=3), neck and elbow in 6.6% (n=4), neck, shoulder and elbow in 3.3% (n=2) and 4.9% (n=3) participants were affected by both elbow and wrist. Ranasinghe et al, 2011 showed commonest region of complaint was forearm/hand (42.6%), followed by neck (36.7%) and shoulder/arm (32.0%) in their research in Sri Lanka. Journal of occupational health 2012, showed the prevalence of WMSDs of the neck, shoulder, wrist/hand, amongst computer users were 55.5%, 50.7% and 31.5% respectively. The results of the studies support the findings of this study.

In this study 42.6% were off work due to pain or discomfort where as Ranasinghe et al, 2011 showed 15.4% reported CANS causing disruption of normal activities in

Sri Lanka. In this study 59% participants approached physician for musculoskeletal discomfort. Ranasinghe et al. 2011, found 1.1% seeking medical advice.

In this study 13.1% (n=8) participant's diagnosis is unknown, 8.2% (n=5) have dequervain's tenosynovitis, 1.6% (n=1) has tendinitis, wrist pain, tension neck syndrome, bursitis, frozen shoulder and elbow pain, 3.3% (n=2) have both neck pain & tennis elbow and carpal tunnel syndrome, 6.6% (n=4) have only tennis elbow, 9.8% (n=6) has neck pain, 4.9% (n=3) have trigger finger. Murcus et al. 2002, found the prevalence of tendinitis 5.7% and tennis elbow and carpal tunnel syndrome is 13.6% in Georgia. There is difference between the results; maybe it is due to sample size or the ignorance of the participants.



Nowadays various types of computer related musculoskeletal disorders are increasing in Bangladesh due to increasing use of computer tremendously in all sectors to improve the quality of health care system as well as the efficiency of health workers and other workers. Work related musculoskeletal disorders have great impact causing severe long term pain, physical disability and give rise to huge costs for society. For the fulfillment of this study the investigator used a quantitative research model in the form of a prospective type survey. Conveniently 78 participants among the professional computer users were collected. The investigator used a questionnaire. Each participant was given a questionnaire to identify the work related musculoskeletal disorders among them and from the documents of the participants the researcher forms a data base for the total sample included in the study. From the data base, it was found that maximum participants had work related musculoskeletal disorders (WRMSDs) and males shows greater prevalence. The participants who were between 22-30 years were most commonly suffered from WRMSDs. The duration of job length and working hour per day have been played a vital role in developing WRMSDs. Professional computer users who had job experience more than five years and working hour more than six hours were most commonly suffered by WRMSDs. Practice of having rest between work influences the prevalence of WRMSDs. The participants who sometimes took break was mostly affected; this result sounds odd may be due to participants felt shy to give the right answer or something else. Most commonly affected body part was neck and forearm. Among the affected participants most had been off work. Most affected participants had no previous history of accident. The participants who were affected most of them attended by a physician but had an unknown diagnosis. Most of the participants received treatment among them only a few received physiotherapy along with medication and other treatment.

A recommendation evolves out of the context in which the study was conducted the purpose of the study was to estimate work related musculoskeletal disorders among professional computer users. Though the researcher has some limitations but researcher identified some further step that might be taken for the better accomplishment of further research. For the esurient of the generalization of the

research it is recommended to investigate large sample. In this study researcher only took the professional computer users working in Saver Bazar to show the prevalence of WRMSDs. But due to time limitation the investigator was not able to gather huge amount of participants and for this reason the result can't be generalized in all over Bangladesh. So for further study it is strongly recommended to increase sample size and area of sample selection to generalize the result in all of the professional computer users in Bangladesh. Beside this, there is an unequal ratio of male and female participants so it is recommended for further study to take the participants equally for comparison of gender and work related musculoskeletal disorders.

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## APPENDIX: I INFORM COSENT (Bangla)

### মৌখিক অনুমতি পত্র

আসসালামুআলাইকুম ,

আমি সাদিয়া শারমিন, বাংলাদেশ হেলথ প্রফেশনস ইন্সটিটিউট (বিএইচপিআই) এ বিএসসি ইন ফিজিওথেরাপী এর ৪র্থ বর্ষের একজন ছাত্রী। কোর্স কারিকুলাম অনুসারে স্নাতক পর্যায়ে আংশিক সমাপ্তির জন্য আমাকে "কম্পিউটার ব্যবহারকারীদের ঘাড় এবং উপরের অঙ্গ-প্রত্যঙ্গের কাজ সম্পর্কিত হাড় ও মাংসপেশির ব্যাধি" নামক একটি রিসার্চ করছি। রিসার্চের লক্ষ্য সম্পাদনের জন্য অংশগ্রন্থকারীকে প্রশ্নের পর্বগুলো পূরণ করতে হবে।

আমি আপনাকে জানাচ্ছি যে, এটা হচ্ছে কেবল একাডেমিক অধ্যয়ন এবং অন্য কোন কাজে ব্যবহার করা হবে না। রিসার্চের, মাসকুলোস্কেলিটাল ডিপার্টমেন্ট এর সাথে সরাসরি সম্পর্কযুক্ত নয় সুতরাং রিসার্চে আপনার অংশগ্রহণ মাসকুলোস্কেলিটাল ডিপার্টমেন্ট থেকে বর্তমান ও ভবিষ্যতে চিকিৎসার উপর কোন প্রভাব ফেলবে না।

আপনার দেয়া সব তথ্য গোপন রাখা হবে এবং এক্ষেত্রে যেকোনো সংবাদ অথবা প্রকাশনার উৎস যে নামবিহীন, তা নিশ্চিত করা হবে। আপনি স্বেচ্ছায় এখানে অংশগ্রহণ করেছেন এবং অধ্যয়ন চলাকালীন যে কোন সময় কোন নেতিবাচক ধারণা ছাড়াই আপনি নিজেকে সরিয়ে ফেলতে পারবেন। সাক্ষাতকার চলাকালীন সময়, কোন প্রশ্ন অপছন্দ করা কিংবা উত্তর না দেয়ার ব্যাপারে আপনার অধিকার রয়েছে।

অংশগ্রহনকারী হিসেবে এই অধ্যয়ন নিয়ে আপনার কোন সংশয় বা প্রশ্ন থাকলে, সরাসরি যোগাযোগ করতে পারেন- সাদিয়া শারমিন, ৪র্থ বর্ষ, বিএইচপিআই, সি আর পি, সাভার, ঢাকা -১৩৪৩।

সাক্ষাৎকারের আগে আপনার কোন প্রশ্ন আছে ?

সুতরাং, সাক্ষাৎকারের জন্য আমি কি আপনার অনুমতি পেতে পারি?

হ্যাঁ ----- না-----

সাক্ষাৎকারীর স্বাক্ষর-----

তারিখ -----

গবেষকের স্বাক্ষর -----

তারিখ -----

## APPENDIX: II INFORM CONSENT (English)

### CONSENT STATEMENT

Assalamualaikum/Namasker, my name is Sadia Sharmin, I am a student of 4th year, B Sc in physiotherapy at BHPI, Savar, Dhaka. According to the course curriculum , I have to conduct a research , titled “Work Related Musculoskeletal Disorders of Neck and Upper Extremity Among The Professional Computer Users”.To accomplish the objective of the research , the participant have to fill up the questionare .

I would like to inform you that this is a purely academic study and will not be used for any other purpose. I am not directly related with this area (Musculoskeletal), so your participation in the research will have no impact on your present or future treatment. All information provided by you will be kept 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 can ask me.

Do you have any questions before I start?

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

YES

NO

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



## APPENDIX: III QUESTIONNAIRE (Bangla)

### প্রশ্ন পত্র

**শিরোনাম:** কম্পিউটার ব্যবহারকারীদের ঘাড় এবং উপরের অঙ্গ-প্রত্যঙ্গের কাজ সম্পর্কিত হাড় ও মাংসপেশির ব্যাধি

কোড নং: \_\_\_\_\_ তারিখ: \_\_\_\_\_ / \_\_\_\_\_ / \_\_\_\_\_

#### ১। সামাজিক জনসংখ্যা তাত্ত্বিক তথ্য

ক) নাম :

খ) বয়স :

গ) লিঙ্গ :

১. পুরুষ      ২. মহিলা      ৩. অন্য

ঘ) ঠিকানা :

ঙ) ফোন নাম্বার:

চ) ধর্ম:

১. মুসলিম      ২. হিন্দু      ৩. বৌদ্ধ      ৪. খ্রিস্টান

২। শিক্ষাগত যোগ্যতা:

১. নিম্ন মাধ্যমিক      ২. মাধ্যমিক      ৩. উচ্চ মাধ্যমিক      ৪. অন্যান্য

৩। আপনার চাকরির অভিজ্ঞতা কতবছর?

১. দুই বছর      ২. পাঁচ বছর      ৩. আরও বেশি

৪। প্রতিদিন আপনি কতক্ষন কাজ করেন?

১. দুই ঘন্টা      ২. ছয় ঘন্টা      ৩. আরও বেশি

৫। আপনি কি কাজের মাঝে বিরতি নেন ?

১. সব সময় ২. প্রায় সময় ৩. কিছু সময় ৪. অল্প সময় ৫. কোন সময়ই নয়

### প্রাসঙ্গিক তথ্য

৬। আপনি কি আগে কখনও শরীরের কোথাও ব্যাথা অনুভব করেন ?

১. হ্যাঁ ২. না

যদি অনুভব করেন , তাহলে কতবার ? \_\_\_\_\_

( উত্তর হ্যাঁ হলে ৭ নং প্রশ্ন অনুসরণ করুন / না হলে, পরবর্তী প্রশ্ন অনুসরণ করুন)

৭। আপনি শরীরের নিম্নলিখিত কোন জায়গায় ব্যাথা অনুভব করেন ?

ক) ঘাড় ডান  বাম

খ) কাঁধ ডান  বাম

গ) কনুই ডান  বাম

ঘ) হাতের কব্জি ডান  বাম

ঙ) আঙ্গুল ডান  বাম

৮। ব্যাথার কারণে কখনও কি কাজ বন্ধ রাখেন ?

১. হ্যাঁ ২. না

যদি বন্ধ রাখেন , তাহলে কয়দিন ? \_\_\_\_\_

৯। পূর্বে কোন দুর্ঘটনায় পড়েছিলেন ?

১. হ্যাঁ ২. না

যদি পড়ে থাকেন , তাহলে কোথায় পড়েছিলেন ? \_\_\_\_\_

১০। ব্যাথার জন্য আগে কখনও কোন ফিজিসিয়ান অথবা ডাক্তারের কাছে  
গিয়েছিলেন?

১. হ্যাঁ                      ২. না

যদি গিয়ে থাকেন , তাহলে রোগ-নির্ণয় কি ছিল  
?\_\_\_\_\_

১১। আপনি কোন ধরনের চিকিৎসা নিয়েছিলেন ?

১. ফিজিওথেরাপি    ২. ওষুধ    ৩. অন্যান্য

**আপনার সাক্ষাৎকারের জন্য আপনাকে ধন্যবাদ**

**APPENDIX: IV QUESTIONNAIRE (English)**

**Questionnaire for WRMSDs of neck and upper extremity**

**Among the computer users**

**1. Socio-demographic information**

**1. Name:** \_\_\_\_\_ **Subject Code:** \_\_\_\_\_

**2. Age:** \_\_\_\_\_

**3. Sex:**

1. Male                      2.Female                      3. Others

**4. Address:** \_\_\_\_\_

**5. Contact no.:** \_\_\_\_\_

**6. Religion:**

1. Muslim      2.Hindu      3. Buddha      4. Christian

**2 Educational level:**

1. Under SSC      2.SSC      3.HSC      4.Others

**3 What is your work experience?**

1. 2 year      2. 5 year      3.others

**4 How many hours do you work per day?**

1. 2 hour      2. 6 hour      3.others

**5 Do you take break between your works?**

1. Always      2.Often      3.Sometimes      4.Seldom      5.Never

**Relevant Information**

**6 Have you ever experienced pain/discomfort at any part of your body?**

1. Yes                      2.No

If yes then how many episode? \_\_\_\_\_

(If yes please answer the question no.7, if no escapes the following question)

**7 Where you have felt pain/discomfort at the following parts of your body?**

- |             |                             |                             |
|-------------|-----------------------------|-----------------------------|
| 1. Neck     | Rt <input type="checkbox"/> | Lt <input type="checkbox"/> |
| 2. Shoulder | Rt <input type="checkbox"/> | Lt <input type="checkbox"/> |
| 3. Elbow    | Rt <input type="checkbox"/> | Lt <input type="checkbox"/> |
| 4. Wrist    | Rt <input type="checkbox"/> | Lt <input type="checkbox"/> |
| 5. Finger   | Rt <input type="checkbox"/> | Lt <input type="checkbox"/> |

**8 Were you off work because of pain or discomfort?**

1. No      2. Yes

If yes then how many days? \_\_\_\_\_

**9 Did you got any accident in your total?**

- 1.No      2. Yes

If yes than where? \_\_\_\_\_

**10 Do you ever referred to the physician or other health professional due to pain?**

1. No      2. Yes

If yes than what was the diagnosis? \_\_\_\_\_

**11 What kind of treatment did you receive?**

1. Physiotherapy      2. Medication      3. Others

## APPENDIX: V PERMISSION LETTER

To

Date:25.07.12

Course co-ordinator,

Department of Physiotherapy,

CRP ,Savar, Dhaka .

Subject: Prayer for permission of data collection for research.

Sir ,

I beg most respectfully to state that I am a student of 4th year, B Sc in Physiotherapy . I am doing research on “Work Related Musculoskeletal Disorders of Neck and Upper Extremity Among The Computer Users ” as a part of our course curriculum , under supervision of Md. Obaidul Haque , Assisstant Professor , BHPI. I want to collect data from Savar Bazar.

I therefore, pray and hope that you would be kind enough to grant me and thus oblige thereby.

Sincerely yours ,

Sadia Sharmin

4th year, Roll-6,

Department of Physiotherapy,

BHPI,CRP,Savar, Dhaka.

*Allowed for data collection*  
*9/25.07.12*

Md. Obaidul Haque  
Assistant Prof. & Course Coordinator  
Department of Physiotherapy  
Bangladesh Health Promotion Institute (BHPI)  
CRP, Chapam, Savar, Dhaka. 1343