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Prevalence of Carpal Tunnel Syndrome among Computer Operator in Dhaka city

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“Prevalence of Carpal Tunnel Syndrome among Computer Operator in Dhaka city”

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DECLARATION

This work has never before been approved in full for a degree, nor is it presently being presented as a candidate for one. A portion of the criteria for the B.Sc. in Physiotherapy degree are being met by submitting this dissertation.

I confirm that I will receive an inadequate rating and be subject to disciplinary action from the appropriate authorities if it is found in my work that I have plagiarized or otherwise cheated. I guarantee that the bound copy of the thesis and the electronic version are the same.

If the results of this project are published in the future, the research supervisor will be very concerned. The physiotherapy department of SAIC College of Medical Science and Technology (SCMST) will provide consent, and the project will be properly recognized as a graduate thesis.

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LIST OF ACRONYMS

BCTQ	Boston Carpal Tunnel Questionnaire
BMI	Body Mass Index
CTS	Carpal Tunnel Syndrome
FSS	Functional Status Scale
GROC	Global Rating of Change Scale
IASTM	Instrument-assisted soft tissue mobilization
IRB	Institutional Review Board
NCS	Nerve Conduction Study
NMTs	Neurodynamic Mobilization Techniques
QoL	Quality of Life
ROM	Range of motion
ROSA	Rapid Office Strain Assessment
SSS	Symptom Severity Scale
VAS	Visual Analogue Scale
WHO	World Health Organization

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ABSTRACT

Introduction: Carpal tunnel syndrome (CTS) is a condition in which pain, numbness, tingling, and weakness in the hand and wrist are noticed. The common cause of carpal tunnel syndrome is the pressure on the median nerve due to repetitive use of wrists, and the anatomy of the hand or other underlying condition. Talk about the risk factors include anatomic factors, occupational factors, nerve damaging conditions such as diabetes inflammatory conditions such as rheumatoid arthritis, obesity hypothyroidism, gender, tumors such as lipoma or ganglion that protrude onto the carpal tunnel, pregnancy, trauma, and a hereditary. **Objectives:** To find out the prevalence of carpal tunnel syndrome among computer operators in Dhaka city. **Methodology:** A descriptive type of cross-sectional, descriptive research was conducted with 138 computer operators from Dhaka and specific offices where we found the computer operators. BCTQ (Boston Carpal Tunnel Questionnaire) scale used for rating the functional activity. The data were analyzed using SPSS version 20 and inferential statistical tests such as Chi-square and convenience sampling was used. **Result:** The study found that the prevalence of carpal tunnel syndrome was 10.9% with 13.3% reporting to have the history of Diabetes Mellitus. Male (71.7%) prevalence was higher than female (28.3%) prevalence. Severity level varied: normal (6.7%), slight (66.7%), medium (13.3%), and severe (13.3%). In functional level it varied: minimal (6.7%), mild (13.3%), moderate (13.3%) and severe (13.3%). **Conclusion:** carpal tunnel syndrome is a common problem among Bangladeshi computer operators which is impacting in daily activities. Addressing modifiable treatment like neurodynamic, mobilization, splints, stretching can reduce this issue. The findings represent the need for targeted preventive measures and physiotherapy intervention.

Key words: *Carpal Tunnel syndrome, Computer operators, Physiotherapy, Symptom Severity Scale, Functional Status Scale.*

1.1 Background:

Carpal tunnel syndrome (CTS) is a condition in which pain, numbness, tingling, and weakness in the hand and wrist are noticed (Feng et al. 2021, p. 57). The common cause of carpal tunnel syndrome is the pressure on the median nerve due to repetitive use of wrists, and the anatomy of the hand or other underlying condition (Wolny et al. 2017, p. 265). Risk factors include anatomic factors, occupational factors, nerve damaging conditions such as diabetes inflammatory conditions such as rheumatoid arthritis, obesity, hypothyroidism, gender, tumors such as lipoma or ganglion that protrude onto the carpal tunnel, pregnancy, trauma, and a hereditary condition called Charcot-Marie-tooth disease (Palmer et al. 2016, pp. 57-66). Carpal tunnel syndrome usually happens when there is increased pressure within the wrist on a nerve and this was normally called the median nerve (Shem et al. 2020, p. 273).

To avoid carpal tunnel syndrome, it is required to reduce the force and relax grip, take frequent breaks, gently stretch and bend your hands and wrists periodically, watch your form, and make sure your computer mouse is comfortable and does not strain the wrist (Legal, 2017, p. 54). Only mild cases of carpal tunnel syndrome resolve a few self-care practices, while medications and surgery may be necessary for severe cases medications such as ibuprofen and cortisone may be used to relieve pain, and physical therapy can help improve function (Palmer et al. 2016, pp. 57-66).

The patient and attempts made to avoid repetitive actions. On the other hand, symptomatic relief may be gained from a corticosteroid injection (Kesson et al. 2010, p. 78). There are so many diseases which are related to office workers, but the prevalence of carpal tunnel syndrome is more than others. Symptoms start gradually with hand clumsiness, and a tendency to drop things also include hand pain at night (Feng et al. 2021, p. 57). They normally do repetitive motions such as typing or using a mouse for extended periods. (Wolny et al. 2017, p. 265) All this cause compression of the median nerve in the wrist, leading to symptoms like pain, tingling, numbness. (Fagarasanu et al. 2013, p. 26) Poor ergonomics, prolonged use of improper hand

positions, and underlying health factors can contribute to the development of CTS in office settings (Ornstein et al. 2007, p. 98).

Talk about the risk factors include anatomic factors, occupational factors, nerve-damaging conditions such as diabetes inflammatory conditions such as rheumatoid arthritis, obesity, hypothyroidism, gender, tumors such as lipoma or ganglion that protrude onto the carpal tunnel, pregnancy, trauma, and a hereditary condition called Charcot-Marie-tooth disease (Wipperman & Goerl, 2016, p. 82). There are 2 stages of CTS and the 1st stage of the clinical diagnosis, the patient tends to wake up from sleep feeling numbness or swelling on the hand with no noticeable swelling. In that case patient feel extreme pain from the wrist spreading to the shoulder, with a tingling in the hand and fingers and this term known as brachialgia paresthetica nocturne. The 2nd one is development of CTS in the patient at occurrence of symptoms which was normally occur in the day (Ghasemi et al. 2014, p. 77).

To avert carpal tunnel syndrome, it is suggested to reduce the force and relax grip, take frequent breaks, gently stretch and bend your hands and wrists periodically, watch your form, and make sure your computer mouse is comfortable and does not strain the wrist (Legal et al. 2017, p. 64). CTS has been viewed as the most common cause of sick leave, decreased productivity, and personal financial losses among different types of compressive neuropathies (Hulkkonen et al. 2020, pp. 43-49). Wrist and hand musculoskeletal problems affected over 15% of occupational groups including office workers, nurses, and others (Coggon et al. 2019, pp. 1-8).

Different occupational populations are involving with some risk factors that may acceptable or allow to development Carpal tunnel syndrome. The prevalence of Carpal Tunnel Syndrome which is related to work with different occupational studies that varies, spanning from 1 to 61% (Fitch et al. 2021, p. 89). The highest CTS prevalence of 61% was found among industrial workers predominantly using grinding tools, while about 1% of industrial workers with forceful but low repetitive hand use developed carpal tunnel syndrome (McCallum et al. 2019, pp. 908-1107).

Because of growing incidence work-related musculoskeletal disorders (WMSDs) among office workers are of interest to researchers (Hoe et al. 2018, p. 8570). Many

surveys from multiple countries were looking at WMSDs in office workers (Lee et al. 2019, p. 31). According to the National Bureau of statistical of China, over 3 billion employees have been working in office settings in different fields nationwide (Ma et al. 2019, p.89). On the other hand, if we going through others occupations the current investigation found that 8.0% of teachers had carpal tunnel symptoms, similar to a study in Riyadh, Saudi Arabia, which found 9.1% (Hussain et al. 2023, p. 876).

Only mild cases of carpal tunnel syndrome resolve a few self-care practices, while medications and surgery may be necessary for severe cases medications such as ibuprofen and cortisone may be used to relieve pain, and physical therapy can help improve function. The patient and attempts made to avoid repetitive actions. On the other hand, symptomatic relief may be gained from a corticosteroid injection (Shem et al. 2019, p. 67). All these cause compressions of the median nerve in the wrist, leading to symptoms like pain, tingling, numbness (Tamrin & Zakaria, 2016, pp. 230-248). Poor ergonomics, prolonged use of improper hand positions, and underlying health factors can contribute to the development of CTS in office settings (Genova et al., 2020, p. 564). In some cases, they usually not be more serious about this but they investigate that the prevalence of CTS is estimated to be 2.7-5.8% of the general adult population, with the lifetime incidence of 10-15% (Padua et al. 2023, pp. 1273-1284).

There are some tests which are used for carpal tunnel syndrome. These are Tinel's sign, Phalen's test, Carpal compression test, Motor exam, Sensory exam. In Phalen's test the patient is asked to press the backs of their hands together and hold together and hold for 30-60 seconds. A positive sign is tingling in the fingers within 60 seconds. And in carpal compression test pressure is applied with the thumbs over the median nerve within the carpal tunnel, located just distal to the wrist crease. The test is positive if the patient responds with numbness and tingling within 30 seconds. In Tinel's test the doctor lightly taps over the median nerve at the wrist to see if it generates a tingling sensation. (Leshner, 2018, p. 5).

Doctors also check if the motor and sensory functions are all right or not. In this term the strength of the abductor pollicis brevis muscle, which is solely innervated by the median nerve, is tested. The sensory distribution of the median nerve is assessed. (Basotho, 2018, p. 21). The risk factors for carpal tunnel syndrome are including

obesity, monotonous wrist activity, pregnancy, genetic heredity, and rheumatoid inflammation. The symptoms may vary across patients because it classified differently (Genova et al. 2020, p. 22). If we look overall into the condition, it must be amplifying its effect on condition carpal tunnel syndrome is more prevalent amongst women as compared to men and mostly affected elderly population individuals aged between 40 and 60 years (Chammas et al. 2014, p. 768).

Carpal tunnel syndrome is the most common peripheral nerve syndrome worldwide. There are various treatments for this condition. Some scales are used such as the Boston Carpal Tunnel questionnaire, Six Item Carpal Tunnel Symptom Scale etc. (Multanen et al. 2020, p. 330). This tool (BCTQ) also composed of two subscales, the Symptom Severity Scale (SSS) and Functional Status Scale (FSS). The symptom Severity Scale showed pain, numbness, weakness, tingling, and difficulty with fine motor tasks on a typical day in the past 2 weeks. And Functional Status Scale considers the relationship between symptoms and function, including activities such as buttoning, writing, ADL tasks evaluated for a typical day in the past 2weeks and it must be calculated regularly (Heyde & Droege, 2014, pp. 2109-2322).

If we talk about the treatment there are various treatments that exist including non-surgical and surgical options. Notwithstanding these benefits, there is a paucity of evidence about the best approaches for assessment of carpal tunnel syndrome and to guide treatment decision. Impartial approaches for assessment, including electro diagnostic testing and nerve imaging, provide additional information about the extent of axonal involvement and structural change, but their exact benefit to patient is unknown. Nonetheless the best means of integrating clinical, functional, and anatomical information for selecting treatment choices has not yet been identified, patients can be diagnosed quickly and respond well to treatment (Shiri & Hassani, 2015, p. 453).

Treatment options for CTS include conservative methods such as wrist splints, physiotherapy techniques like ultrasound and nerve glides, and medications like NSAIDs and steroids (Wolny, 2017, pp. 22-32). Wrist splints are particularly effective, reducing symptoms in 67% of cases, while physiotherapy can improve pain, range of motion, and strength. Combined approaches, such as splinting with neurodynamic, and

neurodynamic is one of the best treatments, have been shown to be more effective than isolated treatments (Shabbir et al. 2022, pp. 230-260).

Treatment should be started as early as possible otherwise symptoms become worse, and it leads to surgery which is not good for patient because its costly and reason of anxiousness. Women are normally more affected than men. There are other causes we can tell that there are secondary causes like endocrine system diseases, infiltrative lesions in the carpal tunnel, tumoral formations, traumatic events, connective tissue and rheumatic disease and pregnancy. Though there are many diseases that cause CTS, about half of the cases are Idiopathic (Thiese et al. 2014, pp. 3-8). In treatment other instruments are used and those are TENS, ultrasound, short way diathermy, laser etc. We should focus on controlling pain and edema. Cold application also plays an important role in managing carpal tunnel syndrome (Soyur, 2021, p. 120).

1.2 Justification:

The purpose of this study was to look into the rising worry about Carpal Tunnel Syndrome (CTS) among computer users in Dhaka metropolis, Bangladesh. As the digital economy grows quickly and more people work in offices, using computers has become a big part of everyday life. Even though there is more work with computers now, CTS, which is a syndrome that happens when you move your wrists and hands in the same way over and over again, hasn't gotten enough attention in Bangladesh, especially in city offices. Most people don't know what the risk factors and symptoms of CTS are, and the long-term repercussions can have a big effect on quality of life. This study seeks to address the existing information deficit by examining the prevalence, etiology, and effects of CTS specifically among computer operators. This research will elucidate the prevalence and ramifications of CTS on the workforce, offering critical insights into the magnitude of the issue and enhancing awareness of its significance in the workplace.

This research has many benefits. First, it will add to the knowledge we have about CTS in Bangladesh, which doesn't have a lot of research on the subject. By looking at how common CTS is, the research will show the precise risk factors that make it more likely to happen to office workers, such as bad ergonomics, long computer use, and not moving about enough. The results will help public health programs that aim to lower the number of people with CTS, improve the health of workers, and make office workers feel better. The findings may also inform subsequent interventions, including ergonomic enhancements, training initiatives, and preventive health strategies for office employees. This study will not only help prevent and diagnose CTS early, but it will also help people understand how it affects the economy by looking at sick leave and lost productivity. The results will help Bangladesh's quickly digitizing workforce take a more educated and proactive approach to controlling occupational health.

1.3 Research Question:

What is the prevalence of carpal tunnel syndrome among computer operators in Dhaka city?

1.4 Aim of the Study:

The aim of the study is to determine the prevalence of carpal tunnel syndrome among computer operator in Dhaka city.

1.5 Objectives:

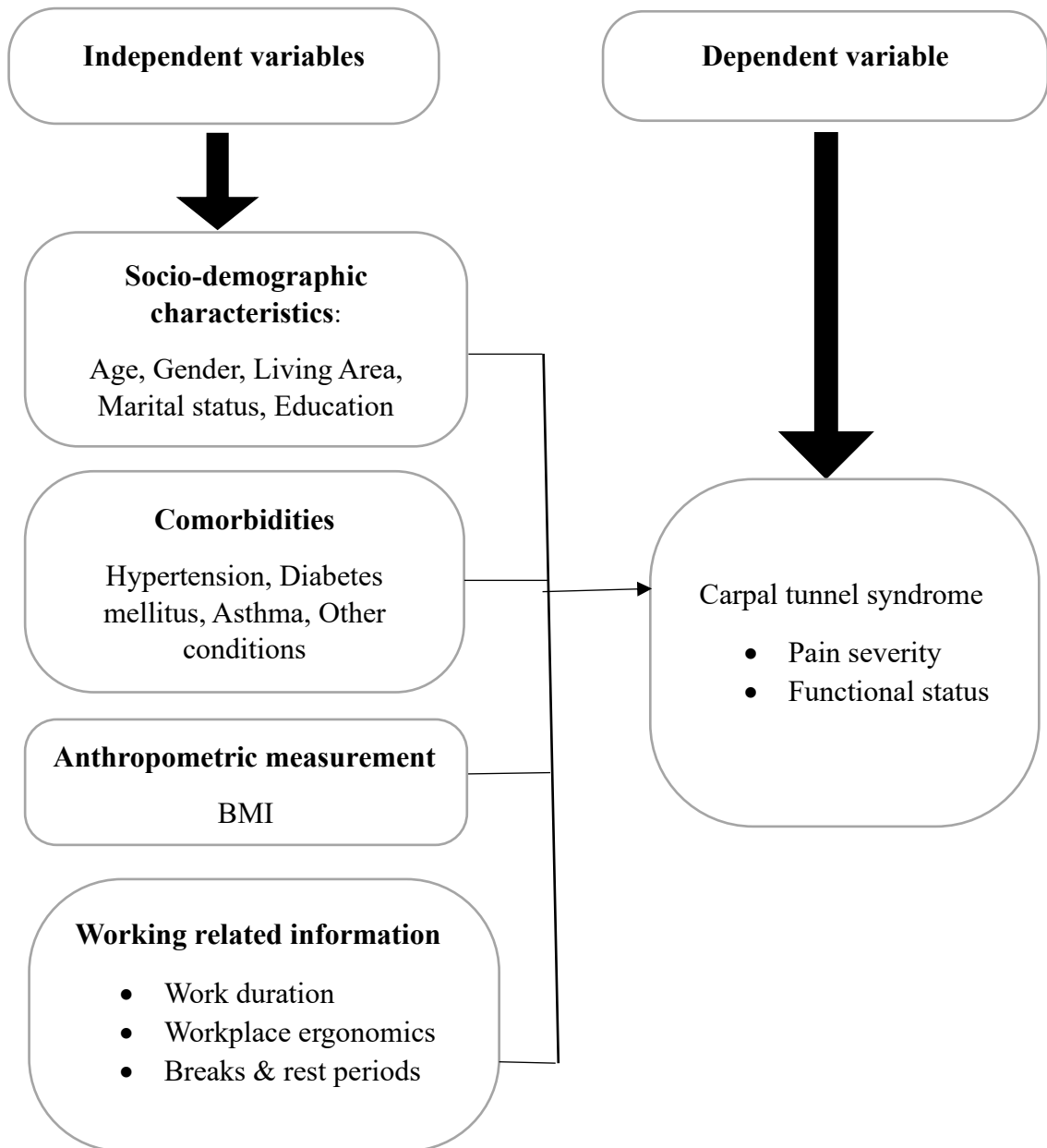
1.5.1 General objective:

- To determine the prevalence of carpal tunnel syndrome among computer operators in Dhaka city.

1.5.2 Specific objectives:

- To calculate the prevalence of carpal tunnel syndrome among computer operators in Dhaka city.
- To assess the sociodemographic characteristics of CTS among computer operators in Dhaka city.
- To assess the symptom severity of carpal tunnel syndrome among the computer operators in Dhaka city by using BCTQ.
- To assess the functional status of carpal tunnel syndrome among the computer operators in Dhaka city by using BCTQ.
- To analyses the association between independent variables (Age, BMI, gender, co-morbidities) and carpal tunnel syndrome.
- To analyses the association between symptom severity scale and carpal tunnel syndrome.
- To analyses the association between functional status scale and carpal tunnel syndrome.

1.6 Conceptual Framework:



1.7 Operational Definition of variables:

Carpal tunnel syndrome: It is a disease condition that affects median nerve. The causes are pain, numbness, tingling, and weakness in the hand and wrist. CTS can affect anyone, but it is more common among people who perform repetitive wrist and hand movements such as office workers who use computers frequently.

Office workers: They are at the high risk of developing carpal tunnel syndrome due to prolonged repetitive hand and wrist movements, such as typing, mouse use and poor ergonomic practices.

Body Mass Index (BMI): <18.5 is considered as underweight, $18.5-24.9$ is considered as normal, $25.0-29.9$ considered as overweight, and ≥ 30.0 considered as obese.

Work related stress: Stress associated with work or professional responsibilities that may contribute to physical tension. It can be caused by various factors such as workload, work environment, interpersonal relationships at work, job insecurity, and the balance between work and personal life.

Tinel's sign: In Tinel's test the doctor lightly taps over the median nerve at the wrist to see if it generates a tingling sensation.

Phalen's test: In this test the patient is asked to press the backs of their hands together and hold together and hold for 30-60 seconds. A positive sign is tingling in the fingers within 60 seconds.

Boston Carpal Tunnel Questionnaire (BCTQ): often referred to as the Boston Carpal Tunnel Syndrome Questionnaire, is a self-administered tool designed to assess the severity of symptoms and functional status in individuals with carpal tunnel syndrome (CTS). It consists of two scales-1) Symptom severity scale 2) Functional status scale

Carpal tunnel syndrome is the all-time not to be concerned topic among the people of this society. This was the common condition among the people who do repetitive work (Hulkonen et al. 2016, pp. 43-49). Carpal tunnel syndrome is the compression of the median nerve. To avert carpal tunnel syndrome, it is suggested that given force and practice hand grip should be effective for both treatments (Morlein et al. 2015, p. 32). On the other hand, it should be treatable before its lasting conditions. Quality of life effect the most related to the carpal tunnel syndrome. The symptoms also including like numbness is the most noticeable point (Eden et al. 2022, p.7).

The prevalence of carpal tunnel syndrome (CTS) and the risks associated with carpal tunnel syndrome within the fourth line worker is the aim of the study that they attend to done. Klang Valley telecom business company arranged cross sectional survey around with one hundred frontline counter employees (Tamrin & Zakaria, 2019, p. 2890-3890). The participants choose the stratified random selection technique. ROSA (Rapid Office Strain Assessment) was chosen by the office work environment to measuring the tools. From this survey they found out so many cases with the carpal tunnel syndrome among the counter employee of the telecom business. Moreover, having an incidence which is significant carpal tunnel syndrome did not abide or correlate with the counter worker's workstation assessment (Neo et al. 2020, p. 67).

It is uncertain that the relationship between computer uses and carpal tunnel syndrome (CTS) very poor. It contributes the computer users depend to carpal tunnel syndrome and this must be noticed in meta-analysis which is aimed to determine the condition. The smooth multiple databases conducted from literature review which taken up to May 2018. Meta analysis selected by the twelve studies with random effect meta-analysis. It also conducted with publication assessed to avoid bias. As same way each and every one reduced likelihood of developing CTS compared to those using it for less time (Coggon et al. 2019, pp. 1-8).

In a meta-analyzed study, it shows that there are some tests which are used for carpal tunnel syndrome. These are Tinel's sign, Phalen's test, Carpal compression test, Motor

exam, Sensory exam. In Phalen's test the patient is asked to press the backs of their hands together and hold together and hold for 30-60 seconds. A positive sign is tingling in the fingers within 60 seconds. And in carpal compression test pressure is applied with the thumbs over the median nerve within the carpal tunnel, located just distal to the wrist crease. The test is positive if the patient responds with numbness and tingling within 30 seconds. In Tinel's test the doctor lightly taps over the median nerve at the wrist to see if it generates a tingling sensation. (Leshner, 2018, p. 5).

However, another study wants to show the correlation between carpal tunnel syndrome and typewriter. Typewriter normally do their job very efficiently and that came out so perfectly like positive correlation. Typewriters normally occupied with long-term using of computer that doesn't even helpful for their condition and this must be noted. We already knew that frequent mouse use, prolong wrist movement, prolong computer using or long-term use of computer affect the function of median nerve. It needs to readjust able for some point (Rameen et al. 2023, p. 9).

Researchers assessed on combining instrument-assisted soft tissue mobilization (IASTM) along with stretching works for people with idiopathic bilateral carpal tunnel syndrome (CTS), mainly on those who had surgery on one hand. The study contained 43 people and allocated into two groups. One group did stretch first then IASTM, while the other group started with IASTM and then did stretching. Starting 30 days post-surgery, rehabilitation lasted for 4 weeks, with a week off in between each change during the therapy. The participants were monitored again after three to six months following the treatment. The results showed huge increases in all areas especially in the non-operated hand (NH), on which the subjects had the biggest gains in grip strength as well as discomfort levels. The order of the therapies done in the experiment was also a vital part. For example, starting with IASTM and then stretching worked in favor for both pain management and mental wellness. Overall combining IASTM with stretching seemed beneficial for treating CTS patients following surgery. It worked well with the only section but not only the during the treatment but also several months of post-surgery (Georgeto et al. 2023, pp. 1654-1663).

The most useable tool for carpal tunnel syndrome was tool (BCTQ) and it also composed of two subscales, the Symptom Severity Scale (SSS) and Functional Status

Scale (FSS). The symptom Severity Scale showed pain, numbness, weakness, tingling, and difficulty with fine motor tasks on a typical day in the past 2 weeks. And Functional Status Scale considers the relationship between symptoms and function, including activities such as buttoning, writing, ADL tasks evaluated for a typical day in the past two weeks and it must be calculated regularly (Heyde & Droege, 2014, pp. 2109-2322). With conservative treatments like splints, massage, mobilization can affect the quality of life in many ways. Neurodynamic mobilization is the best treatment option for the carpal tunnel syndrome which is non-invasive treatment option. Neurodynamic mobilization also affect the peripheral nerve disorder in good way and shown promise to reduce wrist pain with improving function. But all of this the evidence is mixed by their effectiveness (Beddaa et al. 2022, pp. 1-8).

Recent most of the studies highlight or identify the significant improvement in severity status and functional status. This all could be helpful for neurodynamic related treatment plans. From this grip strength results are normally less definitive to prove the condition. With the comparison of the neurodynamic mobilization techniques with elbow joint mobilization aims to evaluate their roles in CTS management which was clarifying their therapeutic value and offering insights for better treatment strategies with more concern movement. A review assesses the effectiveness and safety of physical therapy for adult shoulder pain. Physiotherapy, which provides a variety of choices, is typically the first line of treatment for shoulder discomfort. Pain alleviation, healing promotion, muscle strengthening, joint range enhancement, and muscle spasm reduction are among the objectives (Ratul et al. 2016, pp. 32-80).

Carpal tunnel syndrome (CTS) involved with the treatments that include surgical and non-surgical options. In Surgery, like as carpal tunnel release, has little amount of failure rate with fifteen and sixteen percent and also have to face potential complications. It explains that normally conservative methods like splints, anti-inflammatory drugs, and steroid injections which offer to relief pain but there has so many risks. On the other hand, exercise related to nerve gliding show promise, which is help to improving nerve functions in over seventy percent to (Wolny, 2022, pp. 263-272). More over less normally physiotherapy focuses on the symptoms more than other things while manual therapy r carpal bone manipulation needs the most attention in this field. The changes related to the degenerative in connective tissues and the transverse

carpal ligament may contribute to restricted wrist movement. In this occupation and field current studies face limitations which is really unexpected for this field and highlighting the need for high-quality research to enhance evidence-based carpal tunnel syndrome treatment approaches (Tuffle et al. 2022, p. 90). In this study general practitioners (GPs) and physiotherapists rated the following treatments as effective: corticosteroids, non-steroidal anti-inflammatory drugs (NSAIDs), transcutaneous electric nerve stimulation, acupuncture, ultrasound therapy, strengthening exercises, stretching, movement exercises, superficial heat or ice therapy, and workplace accessibility modifications. Moreover, this could be findings more and more effective approves the main function and contamination to combined treatment that doesn't even tolerable for the upcoming field which is develop for industrial limitations. Carpal tunnel syndrome (CTS) is a condition in which pain, numbness, tingling, and weakness in the hand and wrist are noticed. The common cause of carpal tunnel syndrome is the pressure on the median nerve due to repetitive use of wrists, and the anatomy of the hand or other underlying condition. Talk about the risk factors which is not that much important but also needed include anatomic factors, occupational factors, nerve damaging conditions such as diabetes inflammatory conditions such as rheumatoid arthritis, obesity, hypothyroidism, gender, tumors such as lipoma or ganglion that protrude onto the carpal tunnel, pregnancy, trauma, and a hereditary condition called Charcot-Marie-tooth disease (Palmer et al. 2016, pp. 57-66).

Most of the treatment and related treatment should be started as early as possible otherwise symptoms become worse, and it leads to surgery which is not good for patient because its costly and reason of anxiousness. Most of the study show that women are normally more affected than men. They done so many repetitive works normally. There are other causes we can tell that there are secondary causes like endocrine system diseases, infiltrative lesions in the carpal tunnel, tumoral formations, traumatic events, connective tissue and rheumatic disease and pregnancy. This all cause the most effective side that affect most of them. Though there are many diseases that cause CTS, about half of the cases are Idiopathic (Danial et al. 2020, pp. 98-56).

Carpal tunnel syndrome is the most common condition with nerve involvement although there was little amount of research that could be published about that topic like carpal ligament stretching which is limited. This study examined by the self-

myofascial stretching on carpal tunnel syndrome with the symptoms and nerve conduction that conducted by the solo version of this (wailsome et al. 2021, p. 5).

Different occupational populations are involving with some risk factors that may acceptable or allow to development Carpal tunnel syndrome. The prevalence of Carpal Tunnel Syndrome which is related to work with different occupational studies that varies, spanning from 1 to 61% (Fitch et al. 2021, p. 89).

In this study normally a double blinded and randomized and placebo-controlled trial with eighty-three participants were assigned either a same treatment or within a stretching group. They normally performed four times for six weeks. From this in total thirty-six successfully complete the study. On the other side, ANOVA analyses the most variant documents with in convulsive which effect the past hoc analysis which showed significant improvements in numbness, tingling, and symptom severity in none other than stretching group. Further studies must be, including other treatments like splinting, are needed to confirm these findings (Shem K. et al. 2019, p. 65).

This could be cleared that people are becoming hurt at work because they use computers more. Carpal Tunnel Syndrome (CTS) is one of the most common injuries, especially among bank workers. A study conducted from very early stage of the condition like carpal tunnel syndrome and it analyzed by 422 bankers from both commercial and public institutions to ascertain the prevalence and risk factors of CTS. The analysis used clinical testing and multivariable logistic regression. The study revealed that 11.7% of individuals were afflicted by CTS, with notable risk factors are normally comprising smoking, over five years of job experience, repetitive motions, and inadequate ergonomic training. To find out the assessment they done some test which help to reduce CTS cases, the banking industry is being told to use preventive measures and give ergonomic training (Demissie et al. 2016, p.80).

Wrist splints are particularly effective, reducing symptoms in 67% of cases, while physiotherapy can improve pain, range of motion, and strength. Combined approaches, such as splinting with neurodynamic, and neurodynamic is one of the best treatments, have been shown to be more effective than isolated treatments (Shabbir et al. 2022, pp. 230-260). This study showed the incidence, prevalence, and surgical treatment that examined to trends in carpal tunnel syndrome. It was considered an incident case if the

person had not been diagnosed with CTS in the last two years, and the number of surgeries was counted as a percentage of the total cases each year. The median age of diagnosed persons, regardless of gender, rose over time. The rates of occurrence likewise went up. At first, the number of procedures for CTS rose up, but after a while, the percentage of patients who had surgery started to decrease down and eventually returned to prior levels. The study indicated that both the number of people with CTS and the number of new cases of CTS increased over time. At first, more people had surgery to treat CTS, but this number dropped noticeably later off (Smonis, 2017, p. 6).

Carpal tunnel syndrome (CTS) is a proven that it's an occupational health which is major concern among office workers, often resulting from repetitive strain and inadequate ergonomic practices. This study showed that prevalence of Carpal Tunnel Syndrome within this work should be examined by the ergonomic and psychological factors. A cross-sectional study was applied by the software way to process the investigation with 200 office workers from various corporate sectors. Participants were assessed for CTS symptoms through clinical examinations and a standardized questionnaire evaluating ergonomic habits, workplace stress, and awareness of preventive strategies (Burton et al. 2018, p. 77-98). Data analysis included descriptive statistics, chi-square tests for categorical variables, and logistic regression to control for potential confounders. The findings show that of participants had carpal tunnel syndrome which commonly occurred due to ergonomic factors which showed significant correlation ships among them and carpal tunnel syndrome. All of these we can say that the awareness must be prevented by measures highly and their implementation must be lacking the source of them informed individuals regularly taking the schedule breaks. The study highlights the most occurrence which is the main issue to widespread among carpal tunnel syndrome among office workers and it's a strong association with suboptimal ergonomic conditions and the workplace should be strifeful. To lower the risk of CTS, we need better ergonomic designs for workplaces and full stress management programs right now. Employers can also work on making preventive measures more effective in daily life and also for daily work to improve the health of their staff members (Chen. 2017, p. 4).

Doctors also check if the motor and sensory functions are all right or not. In this term the strength of the abductor pollicis brevis muscle, which is solely innervated by the median nerve, is tested. Acute and overuse injuries are common in the shoulder area

due to the large volume of throws and passes as well as hard body tackles that frequently go straight to the shoulder. That means it also causes carpal tunnel syndrome. It also a musculoskeletal problem due to overuse. The sensory distribution of the median nerve is assessed (Basotho, 2018, p. 21). The risk factors for carpal tunnel syndrome are including obesity, monotonous wrist activity, pregnancy, genetic heredity, and rheumatoid inflammation. The symptoms may vary across patients because it classified differently (Genova et al. 2020, p. 22). Sometimes the pain radiating towards the shoulder and they also examine and study on it. A review assesses the effectiveness and safety of physical therapy for adult shoulder pain. Physiotherapy, which provides a variety of choices, is typically the first line of treatment for shoulder discomfort. Pain alleviation, healing promotion, muscle strengthening, joint range enhancement, and muscle spasm reduction are among the objectives. If we look overall into the condition, it must be amplifying its effect on condition carpal tunnel syndrome is more prevalent amongst women as compared to men and mostly affected elderly population individuals aged between 40 and 60 years (Chammas et al. 2014, p. 768).

Carpal tunnel syndrome (CTS) is a common condition caused by compression of the median nerve at the wrist, leading to pain, numbness, and tingling in the hand. Risk factors include repetitive wrist movements, obesity, pregnancy, genetics, and rheumatoid inflammation. Exercise or sports activity may cause sports-specific injuries. And this always not the reason to be carpal nerve compression but sometimes they face it. Overtraining, inadequate fitness, and abnormal form or technique can all lead to sports-related injuries. Without a warm-up, injuries are more likely to occur. Bruising, strains, sprains, rips, and fractures are all possible outcomes of sports-related injuries. Soft tissues including bursae, tendons, ligaments, muscles, and fascia may sustain injury (Timene et al. 2023, pp. 3-9). Diagnosis involves medical history, clinical assessments, and electrophysiological tests, with idiopathic CTS being the most common form. The condition results from mechanical trauma, increased pressure, and ischemic damage to the median nerve. Treatment options include non-surgical methods like wrist splinting, ergonomic adjustments, and medication, while severe cases may require surgical interventions such as open or endoscopic release. This review covers CTS anatomy, prevalence, risk factors, diagnosis, and management strategies among this (Genova et al. 2020, P. 54).

Therapist-led pathways help manage surgical waitlists for carpal tunnel syndrome (CTS) by shifting initial patient care from surgeons to therapists, reducing surgery rates and wait times. This study normally agrees with the therapists and orthopedic surgeons for the further investigation. This study was occupied by the 105 participants which have large number of effective ways They taking decision based on independently with the statistical measures. They also experienced some issues that related to the surgeons. Experienced therapist showed the perfect results for the agreements which was fair among therapists. The result mention that skilled therapist can easily affect the surgical needs among therapist and similar orthopedic surgeon (Lewis et al. 2020, P. 342).

This randomized clinical trial compared the effectiveness of manual physical therapy, including Hyeon firmid with the randomized control trial which is aimed to compare the effectiveness and it also including some major techniques like desensitization techniques which is used for central nervous system, manual therapy and the effectiveness is broad. They do this study onto the women. It already intended that carpal tunnel syndrome is the common musculoskeletal condition which is caused by medium never compression et the wrist which leading to symptoms like pain, numbness, weakness in the hand and sometimes radiating to the arm. Carpal tunnel syndrome decompressed by the two groups. One was manual therapy, and the other was surgical with the 120 participants who are women and had clinically and electro physiologically designed program (Penas et al. 2015, pp.1087-1094).

The level of pain getting worst and looking for both study objectives was primary. They evaluate the different pain intensity by the functional status scale (FSS) and measure the severity with symptom severity scale (SSS) which is the sub class of the Boston carpal tunnel questionnaire and the self-perceived improvement assessed within the Global rating of change scale (GROC). Participants assessed as a baseline and this was counting process to follow up. Functional improvement and reduction of pain terms to physical therapy group which is exhibited superior outcomes in the short time. The surgical group was compared with the decreased in both groups which was reported significantly and surprisingly the find the great change in hand function. It showed that it had the best gliding techniques this section to treatment (De Barros et al. 2022, p. 9).

3.1 Study design:

The study design was descriptive type of cross-sectional carried out with objective of determining the prevalence for carpal tunnel syndrome among the computer operators.

3.2 Study area:

Data for the present study were collected from the -

- a) Accortex Sourcing
- b) Center for Development communications Devcom Ltd.
- c) Shahara Multipurpose Co-operative Society Limited

3.3 Study place:

The researcher is a student of 4th year B.Sc. in Physiotherapy of SAIC Collage of Medical Science and Technology, Mirpur, Dhaka. Therefore, the study was carried out at the researcher's collage.

3.4 Study period:

The study period was one year from June 2024 to July 2025

3.5 Study population:

The study population consisted of computer operators residing in Dhaka city. This population will select due to high prevalence of Carpal Tunnel Syndrome associated with the physical demands of location.

3.6 Sample size:

The Sample for the present study was calculated by the following statistical formula.

We know that-

$$n = \frac{(Z^2 p q)}{d^2}$$

Here,

n = required sample size

Z= confidence level at 95% (standard value of 1.96)

P= P is the prevalence taken as 11.7 % (Demissie et al. 2016, p.80)

Q=1-P

d=margin of error at 5% (standard value of 0.05)

So, Sample size is

$$N = \frac{(1.96 \times 1.69) \times 0.07 \times (1 - 0.117)}{(0.05 \times 0.05)}$$

$$= \frac{3.84 \times 0.103311}{0.0025}$$

$$= \frac{0.396}{0.0025}$$

$$= 158$$

So, the researcher aims to focus his study by 158 sample following the calculation above initially.

The actual sample size for this study is calculated as 158. As this performs as a part of the academic research project and there are time frame limitations, the higher number of samples is difficult to achieve. So, 138 computer operators were taken as the sample for this study.

3.7 Sampling technique:

To ensure the study population convenience sampling technique was applied to select the participants from the study population.

3.8 Eligibility criteria:

3.8.1 Inclusion criteria:

- Computer operators aged 20 to 65 years older. (Pauda et al. 2023, p. 220)
- Working on computer in office for at least 6months. (Sato et al., 2020, p.246)
- Using a computer about 4hours per day. (Sato et al., 2020, p.246)
- Participants willing to provide informed consent for participation in the study.
- Participants able to understand and respond to the questionnaire.

3.8.2 Exclusive criteria:

- Computer operators who have previous history of surgery for median nerve unrelated to CTS.
- Computer operators with any medical condition affecting wrist function unrelated to CTS.
- Computer operators who are unwilling to provide informed consent.
- Computer operators with wrist pain caused by non-working related condition or injury.

3.9 Method of data collection:

3.9.1 Technique of data collection:

The required data for the research were collected from the participants by Face-to-face formal interview.

3.9.2 Instrument and tools of data collection:

Instrument of Data Collection:

- A pre-tested semi-structured questionnaire and demographic information chart used as a data collection.
- BCTQ (Boston Carpal Tunnel Questionnaire) scale for rating the functional activity.
- The English questionnaire was converted into Bengali to ask the participants during interviews.

Tools of Data Collection:

- Weight matching.
- Measuring tape.

3.9.3 Procedure of Data collection:

The researcher submitted his research protocol to the Ethical Review Board of SAIC College of Medical Science and Technology for approval to carry out the study. Permission was granted by the Ethical Review Board in due time. The researcher then visited Offices and decided to conduct the study there. Permission was obtained from the federation authority to carry out the research. Following this, computer operators were approached by the researcher. The aims and objectives of the study were explained in detail to the participants, and it was clarified that they had the right to refuse to answer

any question during the questionnaire. Participants were also informed that they could withdraw from the study at any time. Those who agreed to participate were included in the study. After obtaining written informed consent from the participants, the researcher began the interviews. A cordial environment was maintained during the interviews, and the responses were recorded accordingly. Once the data were collected, the researcher thanked the respondents for their cooperation.

3.10 Management of data:

3.10.1 Data editing:

It is characterized by reviewing and cleaning the collected data to identify and correct errors, inconsistencies, or missing information. The primary goal of data editing is to ensure the accuracy, reliability, and completeness of the data before proceeding with data analysis. Proper data editing helps to produce valid and meaningful research results.

3.10.2 Data entry:

Data entry is the process of converting raw data from various sources into a digital format or a data management system, such as a spreadsheet, database, or data entry software. It is a fundamental step in research, business, and other domains where data needs to be organized, analyzed, and utilized efficiently. Data entry involves carefully inputting information from paper documents, questionnaires, surveys, or other sources into a computer or electronic system.

3.10.3 Data analysis:

Data were analyzed with the Statistical Package for Social Sciences (SPSS) Version 20 software. Descriptive statistics, such as frequency, distribution, and percentage, were performed. Inferential statistics was used to analyze the relationship between independent and dependent variables.

3.10.4 Result:

The findings of the study have been presented with the tabulations, charts, graphs and description in the result section of the thesis.

3.10.5 Ethical consideration:

The research proposal was submitted to the Ethical Review Board (EBR) of SCMST, and approval was obtained from the Board. The investigator obtained written permission from the ethical review board (SCMST). Bangladesh Medical Research Council (BMRC) and World Health Organization (WHO) guidelines were also followed to conduct the study. This study will adhere to ethical principles of respect, integrity, and confidentiality. Informed consent will be obtained from all participants before data collection, and they will be assured of their right to withdraw at any time without consequence. All personal information will be kept confidential, and the data will be stored securely. Ethical approval will be obtained from an appropriate ethical review board prior to commencement of the study.

The purpose of this research was to find out prevalence of carpal tunnel syndrome among the computer operators in Dhaka city. A questionnaire was used to collect the data for a sample size of 158 computer operators work in Dhaka city. Data were numerically coded and analyzed the data by using SPSS 20 version software program and the result captured in Microsoft Excel and calculated as percentage and presented by using tables and graphs.

4.1. Socio-Demographic Information

Table 1. Frequency distribution of the respondents by Age Group (n=138)

Age groups by years	Frequency	
	N	%
20-24	12	8.7
25-40	88	63.8
41-65	38	27.5
Total	138	100.0
Mean \pm Std. Deviation = 36.203, \pm 10.8360		

Regarding frequency distribution of the participants by age, 12(8.7%) participants belonged to the age group of less than 25. It was also found that, 88(63.8%) participants were in the age group of 25-40 years. Equal number participants 38(27.5%) were in the age group more than 40 years. The mean age of the computer operators was 36.203 and SD was 10.8360 (Table 1).

4.1.2. Gender of the participants

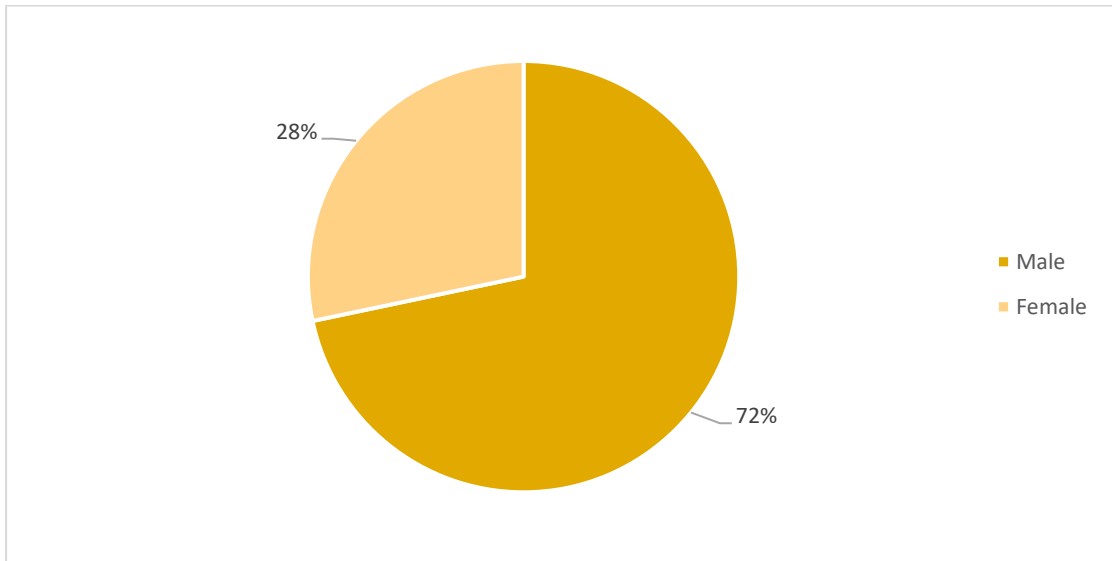


Figure no-1: Frequency distribution of the respondents by gender

In this pie chart it showed that there were 28% participants were female and 72% were male. The study done where 99 participants are male and 39 are female among 138 participants. (Figure 1)

4.1.3. Living area of the participants:

Table no 2: Frequency distribution of participants by living area (n=138)

Living Area	Frequency	
	N	%
Urban	138	100
Semi urban	0	0
Rural	0	0
Total	138	100

Regarding frequency distribution of the participants by living area, 138(100%) participants lived in urban area. No one living in semi urban or rural area. (Table no 2)

4.1.4. Marital Status of the participants

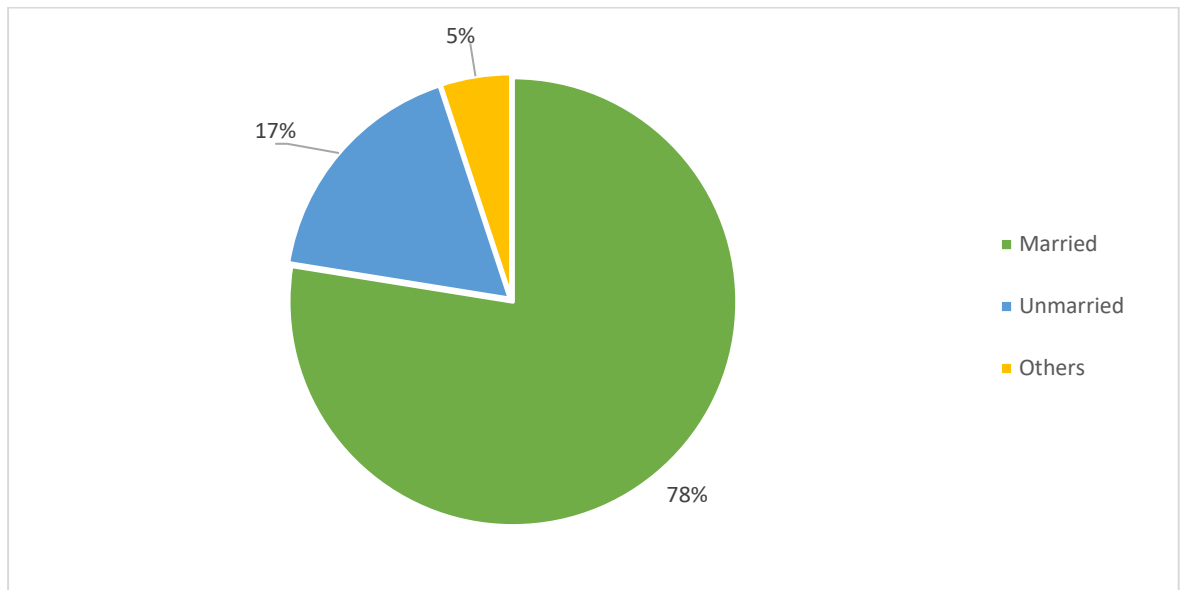


Figure no 3. Frequency distribution of the respondents by marital status

Regarding marital status, it was found that 107 were married, which showed 78% and 24 was unmarried and the percentage was 17 and others were 7(5%). So, the number of married incredibly large. (Figure no-3)

4.1.5. Educational Status of the participants:

Table no 3: Frequency distribution of the participants by educational status (n=138)

Educational Status	Frequency	
	N	%
Illiterate	0	0
Primary education	9	6.2
Secondary education	35	25.4
Graduation and above	94	68.1
Total	138	100.0

The study showed that, educational level of 9(6.2%) participants was primary educated, 35(25.4%) participants was obtaining secondary education, 94 (68.1%) participants was complete graduation and above (Table no 3).

4.1.6. Family Income of the participants:

Table no 4: Frequency distribution of the respondents by family income (n=138)

Family Income in groups	Frequency	
	N	%
Lower class (<12500)	1	0.7
Middle class (12500-21500)	28	20.3
Upper class (>21500)	109	79.0
Total	138	100.0
Mean \pm Std. Deviation = 40794.928, \pm 20514.9912		

About monthly income of the participants, it was found that, 28(20.3%) participants had Taka 12500-21500 which indicate that they belong in Middle class. There was also founded that 109(79%) participant's monthly income was Taka more than 21500 which indicate that they are Upper class and 1(0.7%) founded in less than 12500 that indicate that they belong to Lower class. The Mean is 40794.928 and Standard deviation is 20514.9912. (Table no.4)

4.1.7. Comorbidities of the participants:

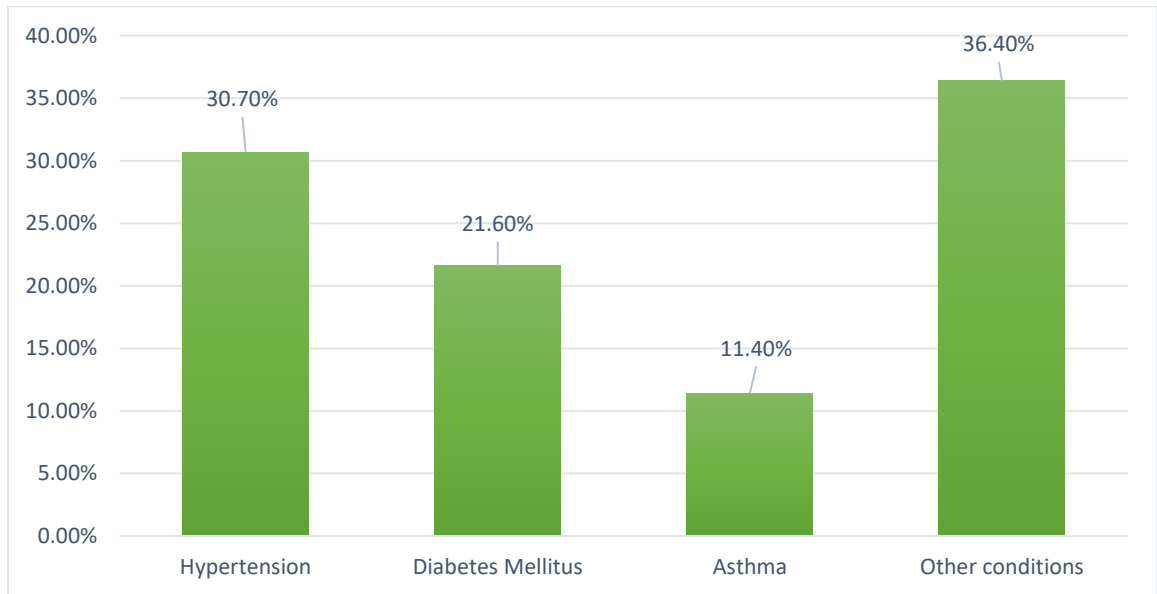


Figure: 3 Frequency distribution of the respondents by Co-Morbidities

In this graph chart we can see that there were 27(30.7%) participants who had hypertension. Regarding we can see there were 19 (21.6%) participants who had diabetes mellitus and 10 (11.4%) participants had asthma. 32 (36.4%) participants had other conditions. (Figure-3)

4.1.8. BMI of the participants

Table no 5: Frequency distribution of the participants by BMI (n=138)

BMI Groups	Frequency	
	N	%
Underweight (<18.4)	1	0.7
Normal (18.5-24.9)	76	55.1
Overweight (25.0-39.9)	61	44.2
Obese (> 40)	0	0
Total	138	100.0
Mean \pm std. Deviation = 24.798, \pm 3.1487		

About BMI of the participants, it was found that 1(0.7%) participant had underweight (<18.4). The further showed that 76(55.1%) participants had normal weight (18.5-24.9) and 61(44.2%) participants were overweight (25.0-39.9). The Mean BMI of participants was 24.798 and standard deviation was 3.1487 (Table no 5).

4.2.1. Diagnosis

4.2.1. Pain in wrist of the participants

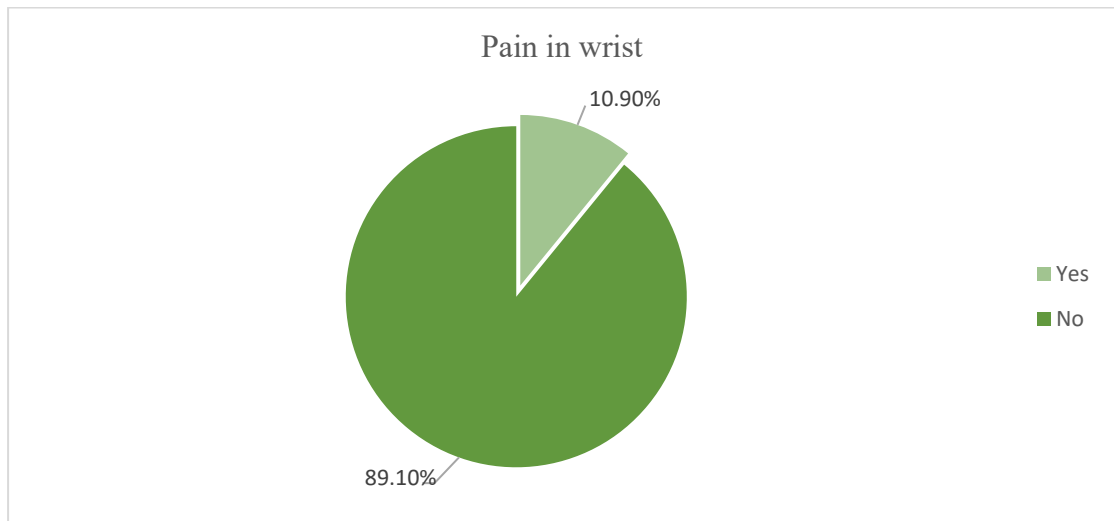


Figure no-4: Frequency distribution of participants by pain in wrist

In this pie chart shows that out of 138 participants, 15 individuals (10.9%) experienced wrist pain. The remaining 123 participants (89.1%) reported no pain in the wrist. (Figure-4)

4.2.2. Site of the pain of the participants

Table no 6: Frequency distribution of the participants of site of the participants (n=138)

Site of the pain	Frequency	
	N	%
Palm side	8	5.8
Thumb side	5	3.6
Central wrist	2	0.7
Little finger	1	0.7
No pain	123	89.5
Total	138	100.0

In this table we can see that, out of 138 individuals, 89.5% (123 people) reported no pain. The most common pain site was the palm side with 5.8% (8 people), followed by the thumb side at 3.6% (5 people), and central wrist at 0.7% (2 people). Little finger pain was reported by 1 (0.7%) (Table no 6).

4.2.3. Nature of the pain of the participants

Table no-7: Frequency distribution of the respondents by nature of the pain (n=138)

Nature of pain	Frequency	
	N	%
Numbness	8	5.8
Tingling	6	4.3
Pin or needles	1	0.7
Throbbing	0	0
No pain	123	89.1
Total	138	100.0

The data shows that the vast majority of participants (89.1%) reported no pain. Among those who did experience discomfort, numbness was the most common (5.8%), followed by tingling (4.3%). A very small number reported pins and needles (0.7%), and notably no participants reported throbbing pain at all (Table 7).

4.2.4. Type of pain of the participants:

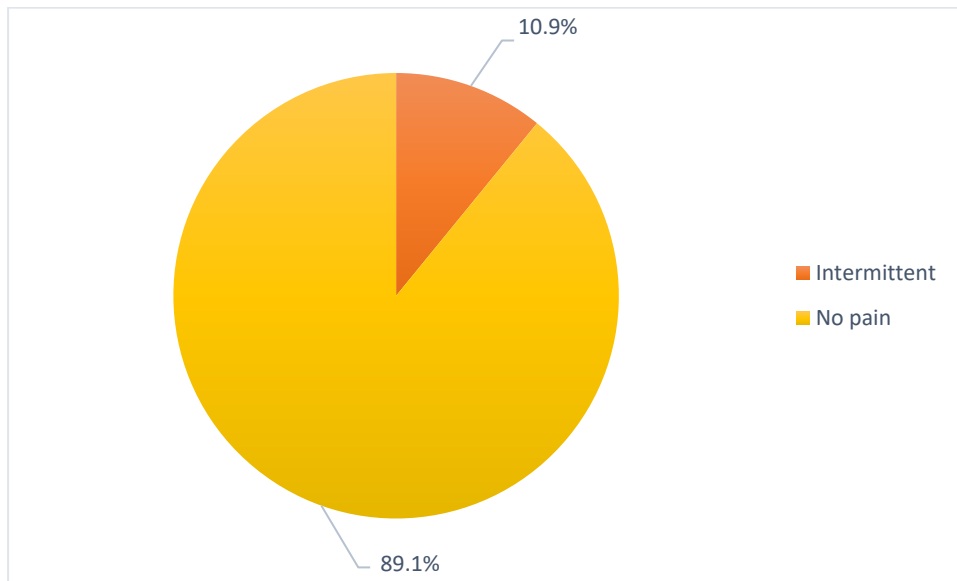


Figure.5: Frequency distribution of the respondents by type of pain

This pie chart shows that 89.1% of participants reported no pain, indicating a predominantly symptom-free group. The remaining 10.9% experienced intermittent pain, which normally suggests occasional discomfort compare to constant suffering. No one suffer from constant pain. (Figure-5)

4.2.5. Treatment for the pain of the participants

Table-8: Frequency distribution of the respondents by treatment for the pain (n=138)

Treatment procedure	Frequency	
	N	%
Medication	11	73.3
Physiotherapy	4	26.7
Surgery	0	0
Total	15	100.0

In this table it shows that 11 participants take medication who have CTS and the percentage is 73.3%. On the other hand, 4 participants take physiotherapy and the percentage is 26.7% and we can see that no one have to do any surgery. (Table-8)

4.2.6. Prevalence of the Carpal Tunnel Syndrome

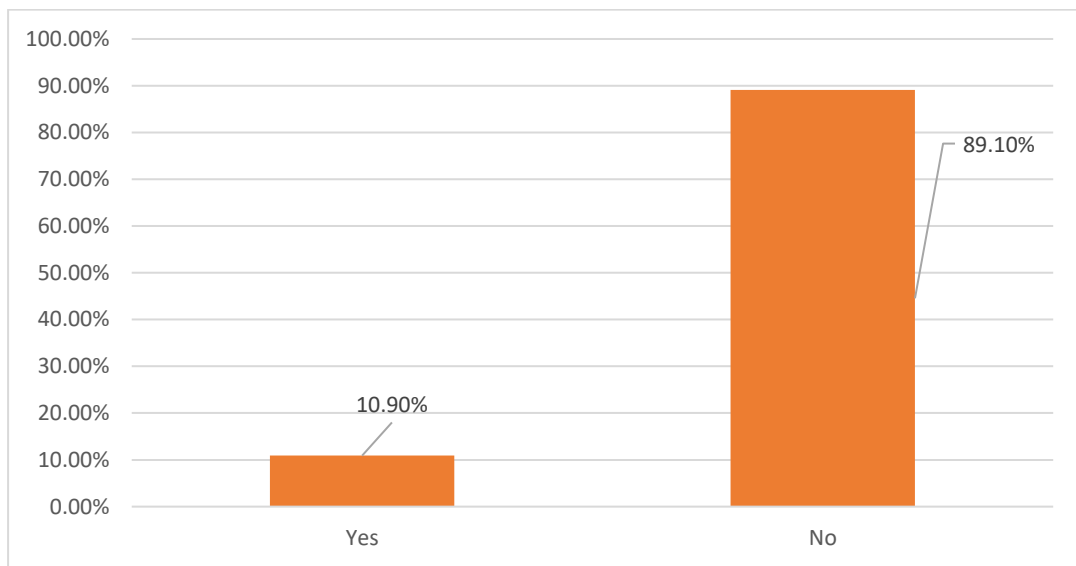


Figure-6: Frequency distribution of the respondents by Carpal Tunnel Syndrome

In this bar chart we can see that only 10.90 percent have diagnosed for Carpal Tunnel Syndrome and the number is 15 from total 138 participants. Most of respondents do not have Carpal Tunnel Syndrome and the amount is 123 (89.10%). (Figure 6)

4.2.7. Symptom Severity for the Carpal Tunnel Syndrome

Table-9: Frequency distribution for the respondents by Symptom Severity (n=138)

Symptom severity Scale	Frequency	
	N	%
Normal (11)	1	0.7
Slight (12-22)	10	7.2
Medium (23-33)	2	1.4
Severe (34-44)	2	1.4
Very Severe (45-55)	0	0
Total	15	10.9%

Regarding this table 1 person had got 11 (Normal) point in symptom severity scale which is 0.7%. 10 (7.2%) persons got between 12 to 22 points in symptom severity scale which indicate slight severity. 2 (1.4%) persons got between 34 to 44 points in symptom severity scale that indicate medium severity. 2 (1.4%) persons got 45 to 55 points in symptom severity scale which indicates severe condition. There is no finding in condition with very severe. (Table 9)

4.2.8. Functional Status Scale for the participants who have CTS

Table.10: Frequency distribution of the respondents by Functional status scale (n=138)

Functional Status Scale	Frequency	
	N	%
Minimal (8-12)	10	7.2%
Mild (13-20)	2	1.4%
Moderate (21-28)	3	2.2%
Severe (29-36)	0	0%
Very severe (37-40)	0	0%
Total	15	10.9%

Regarding to this table we saw that 10 persons got point between 8 to 12 that indicates minimal functional status and the percentage is 7.2%. We also saw that 3 persons got point between 21 to 28 which indicates moderate functional status and 2 persons got between 12 to 20 point that indicates mild functional status and that percentage is 1.4%. There were no persons with severe and very severe functional status. (Table 10)

4.3.1. Association between Carpal Tunnel Syndrome and Age of the participants

Table 11: Frequency distribution of the respondents by Carpal Tunnel Syndrome and Age of the participants (n=138)

Age of the participants	Carpal Tunnel Syndrome				Total	
	Yes		No		N	%
	N	%	N	%		
<25	0	0	12	8.7	12	8.7
25-40	9	6.5	79	57.2	88	63.8
>40	6	4.3	32	23.2	38	27.5
Total	15	10.9	123	89.1	138	100.0

$$\chi^2 = 2.450, df = 2, p = 0.294$$

This table showed that Carpal Tunnel syndrome associated with age of the participants. We can see that there is no person who has the age of less than 25 years with carpal tunnel syndrome. On the other hand, we saw that in the age group of 25 to 40 there was 9 persons who had carpal tunnel syndrome and the percentage was 6.9%. The age group of more than 40 years 6 persons who had positive carpal tunnel syndrome and the percentage was 4.3%. So total number of participants who had carpal tunnel syndrome was 15 (10.9%).

There is no statistically significant difference between age of the participants and carpal tunnel syndrome ($p=0.294$). The degree of freedom is 2 and the value of chi square test is 2.450. (Table 11)

4.3.2. Association between Carpal Tunnel Syndrome and BMI

Table no-12: Frequency distribution of the respondents between Carpal Tunnel Syndrome and BMI (n=138)

BMI of the participants	Carpal Tunnel Syndrome				Total	
	Yes		No		N	%
	N	%	N	%		
Underweight (<18.4)	0	0	1	0.7	1	0.7
Normal (18.5- 24.9)	6	4.3	70	50.7	76	55.1
Overweight (25.0- 39.9)	9	6.5	52	37.7	61	44.2
Total	15	10.9	123	89.1	138	100.0

$$\chi^2 = 1.766, df = 2, p = 0.413$$

The table showed the distribution of Carpal Tunnel Syndrome (CTS) with across different Body Mass Index (BMI) of 138 participants. It showed that in underweight (<18.4) there was no one, 6 persons had normal weight (18.5–24.9) and the percentage was 4.3, and while 9 individuals were overweight (25.0–39.9) and the percentage was 6.5%. No CTS cases were reported in the underweight group. The majority of the participants are in the group of didn't, Overall, 15 participants had Carpal Tunnel Syndrome, and 123 had not.

The p-value 0.413 showed that there is no significant difference between Carpal Tunnel Syndrome and Body Mass Index (BMI). The degree of freedom was 2 and the value of chi square was 1.766. (Table 12)

4.3.3. Association between Carpal Tunnel Syndrome and gender

Table no-13: Frequency distribution of the respondents between Carpal Tunnel Syndrome and Gender (n=138):

Gender of the participants	Carpal Tunnel Syndrome				Total	
	Yes		No		N	%
	N	%	N	%		
Male	5	3.6	94	68.1	99	71.7
Female	10	7.2	29	21.0	39	28.3
Total	15	10.9	123	81.1	138	100.0

$$\chi^2 = 12.244, df = 1, p = 0.001$$

This table shows the relationship between gender and the presence of Carpal Tunnel Syndrome (CTS) among 138 participants. Out of 99 males, only 5 (3.6%) were diagnosed with CTS, while 94 (68.1%) did not have the condition. In contrast, among 39 females, 10 (7.2%) had CTS and 29 (21.0%) did not. This indicates that CTS was more common among females than males in this sample.

15 participants (10.9%) had CTS, while 123 (89.1%) did not. The chi-square test result ($\chi^2 = 12.244, df = 1, p = 0.001$) shows a statistically significant association between gender and CTS. (Table-13)

4.3.4. Association between Carpal Tunnel Syndrome and co-morbidities

Table 14: Frequency distribution of the respondents between Carpal Tunnel Syndrome and Co-morbidities (n=138)

Co-morbidities		Carpal Tunnel Syndrome		Total	Chi-square Test	
		Yes	No		P value	χ^2
HTN	Yes	2.9%	16.7%	19.6%	0.49	0.53
	No	8.0%	72.5%	80.4%		
Diabetes Mellitus	Yes	1.4%	12.3%	13.8%	1.00	0.003
	No	9.4%	76.8%	86.2%		
Asthma	Yes	2.9%	4.3%	7.2%	0.13	9.44
	No	8.0%	84.8%	92.8%		
Other conditions	Yes	2.9%	20.3%	23.2%	0.74	0.11
	No	8.0%	68.8%	76.8%		

This table shows the relationship between Carpal Tunnel Syndrome (CTS) and various co-morbidities conditions among the study participants. 19.6% have hypertension, 13.8% have diabetes mellitus, 7.2% have asthma and 23.2% have other conditions. The chi square test for hypertension is 0.53, diabetes mellitus is 1.00, asthma is 0.13 and other condition is 0.74. Only diabetes mellitus, were found to have CTS.

We saw that only Diabetes mellitus association was statistically significant ($p = 0.001$). Because others didn't have the significant value of the p . (Table-14)

4.3.5. Association between Symptom severity scale and age of the participants

Table no-15: Frequency distribution of the respondents by Symptom severity scale and Age of the participants (n=138)

Age of the participants	Symptom Severity Scale										Total	
	Normal (11)		Slight (12-22)		Medium (23-33)		Severe (34-44)		Very severe (45-55)			
	N	%	N	%	N	%	N	%	N	%	N	%
<25	0	0	0	0	0	0	0	0	0	0	0	0
25-40	1	6.7	5	33.3	2	13.3	1	6.7	0	0	9	60
>40	0	0	5	33.3	0	0	1	6.7	0	0	6	40
Total	1	6.7	10	66.7	2	13.3	2	13.3	0	0	15	100

$$\chi^2 = 2.500, df= 3, p=0.475$$

The table showed the relationship between age of the participants and symptom severity scale. In this table we saw that less than 25 years old participants had no symptom severity. On the other hand, the age group of 25-40 had 1 participants with normal, 2 participants had slight, 2 participants had medium symptom severity level. No severe or very severe level found. The percentage was 6.7% for normal symptom severity with age group less than 25, 33.3% for slight symptom severity, 13.3% for medium. Total 9 persons were into the age group 25 to 40. Other hand, 5 persons had slight severity, and 1 person had severe severity level for the age group more than 40. In total 6 person had diagnosed with symptom severity level who had the age group more than 40.

We saw that there was no statistically significant value based on p value 0.475. The degree of freedom was 3 and the value of chi square test is 2.500. (Table 15)

4.3.6. Association between Symptom severity and BMI

Table no-16: Frequency distribution of the respondents between Symptom severity scale and BMI (n=138)

BMI	Symptom Severity Scale										Total	
	Normal (11)		Slight (12-22)		Medium (23-33)		Severe (34-44)		Very severe (45-55)			
	N	%	N	%	N	%	N	%	N	%	N	%
Underweight <18.4	0	0	0	0	0	0	0	0	0	0	0	0
Normal 18.5-24.9	0	0	4	26.4	2	13.3	0	0	0	0	6	40
Overweight 25.0-39.9	1	6.7	6	40	0	0	2	13.3	0	0	9	60
Total	1	6.7	10	66.7	2	13.3	2	13.3	0	0	15	100

$$\chi^2 = 5.000, df = 3, p = 0.172$$

In this table we saw the relationship between BMI and symptom severity scale. There were no participants who have symptom severity in the BMI of underweight. With normal BMI level 18.5 to 24.9 we saw that 4 participants had slight symptom severity, 2 participants have medium symptom severity. Again, if we saw that with overweight BMI level 25.0 to 39.9 had slight symptom severity with 6 participants and 1 participant had normal symptom severity. In total 6 participants were with normal BMI and 9 participants with overweight. The percentage was 40% and 60%.

The result was not statistically significant because p value is more than 0.05 (p=0.172). The degree of freedom was 3 and the value of chi square test was 5.000. (Table 16)

4.3.7. Association between symptom severity scale and gender

Table no-17: Frequency distribution of the respondents between Symptom severity scale and Gender (n=138)

Gender	Symptom Severity Scale										Total	
	Normal (11)		Slight (12-22)		Medium (23-33)		Severe (34-44)		Very severe (45-55)			
	N	%	N	%	N	%	N	%	N	%	N	%
Male	0	0	4	26.4	1	6.7	0	0	0	0	5	33.3
Female	1	6.7	6	40	1	6.7	2	13.3	0	0	10	66.7
Total	1	6.7	10	66.7	2	13.3	2	13.3	0	0	15	100.0

$$\chi^2 = 1.950, df = 3, p = 0.583$$

Regarding this table we saw that 4 participants who were male had slight symptom severity level, 1 participant who was male had medium symptom severity level and in female we saw that 1 participant had normal symptom severity level and 6 participants had slight symptom severity level, 1 had medium and 2 had severe symptom severity level. In total 5 participants who were male find symptom severity level with 33.3% and 10 participants who were female find symptom severity level with 66.7%.

The result was not statistically significant because the p value is more than 0.05 (p=0.583). The degree of freedom was 3 and the value of chi square test was 1.950. (Table 17)

4.3.8. Association between symptom severity scale and co-morbidities

Table no-18: Frequency distribution of the respondents between Symptom severity scale and Co-morbidities (n=138)

Comorbidities		Symptom Severity Scale						Chi square test	
		Normal (11)	Slight (12-22)	Medium (23-33)	Severe (34-44)	Very Severe (45-55)	Total		
		(%)	(%)	(%)	(%)	(%)	(%)	χ^2	p
Hyper tension	Yes	6.7	0	6.7	13.3	0	26.7	12.44	0.006
	No	0	66.7	6.7	0	0	73.3		
DM	Yes	6.7	0	0	6.7	0	13.3	10.67	0.14
	No	0	66.7	13.3	6.7	0	87.7		
Asthma	Yes	0	13.3	6.7	6.7	0	26.7	1.705	0.63
	No	6.7	53.3	6.7	6.7	0	73.3		
Others	Yes	0	26.7	0	0	0	26.7	2.72	0.43
	No	6.7	40.0	13.3	13.3	0	73.3		

In this table we saw the relationship between symptom severity scale and co-morbidities. Participants with hypertension had the 6.7% normal level, 0% slight level, 6.7% medium level, 13.3% severe level. The participants with diabetes mellitus had 66.7% slight level of severity, 6.7% medium level of severity. The participants with asthma had the 13.3% slight level of severity, 6.7% medium level of severity and 6.7% of severe level of severity. Other condition had 26.7% slight level of severity.

The result in this table showed that only hypertension was the statistically significant because the p-value was 0.006 and if we saw the other it showed that p-value of diabetes mellitus was 0.14, asthma was 0.63 and others was 0.43. The value of chi square test was 12.44 for hypertension, 10.67 for diabetes mellitus, 1.705 for asthma and 2.72 for others. (Table 18)

Table no-19: Frequency distribution of the respondents between Functional Status Scale and Age of the participants (n=138)

Age group of participants	Functional Status Scale										Total	
	Minimal (8-12)		Mild (13-20)		Moderate (21-28)		Severe (28-36)		Very severe (37-40)			
	N	%	N	%	N	%	N	%	N	%	N	%
<25	0	0	0	0	0	0	0	0	0	0	0	0
25-40	1	6.7	5	33.3	2	13.3	1	6.7	0	0	9	60
>40	0	0	5	33.3	0	0	1	6.7	0	0	6	40
Total	1	6.7	10	66.7	2	13.3	2	13.3	0	0	15	100

$$\chi^2 = 1.806, df = 2, p = 0.405$$

In this table we saw the relationship between functional status scale and age group of the participants. The age group less than 25 there were no one who have functional level. In the age group of 25 to 40 there were 1(6.7%) person with the minimal (8-12) functional status activity, 5(33.3%) of the participants had the mild level of functional status level, 1(6.7%) of participant had the severe level of the functional status level. On the other hand, the age group over than 40 had 5(33.3%) participants got the mild level of functional level, 1(6.7%) participant got the severe level of functional status.

The result was not statistically significant for this p value (0.405), the value of the chi square was the 1.806 and degree of freedom was 2. (Table19)

Table no-20: Frequency distribution of the respondents between Functional Status Scale and Gender (n=138)

Gender	Functional Status Scale										Total	
	Minimal (8-12)		Mild (13-20)		Moderate (21-28)		Severe (28-36)		Very severe (37-40)			
	N	%	N	%	N	%	N	%	N	%	N	%
Male	0	0	0	0	0	0	0	0	0	0	0	0
Female	1	6.7	5	33.3	2	13.3	1	6.7	0	0	9	60
Total	1	6.7	10	66.7	2	13.3	2	13.3	0	0	15	100

$$\chi^2 = 1.950, df = 3, p = 0.583$$

In this table showed the relationship between functional status scale and gender. The participants who were male there is no relation with the functional status scale. In female participants there was 1(6.7%) participant who had minimal functional status level, 5(33.3%) participants had the mild level of functional status, 2(13.3%) participants had the moderate level of functional status and 1(6.7%) had the severe level of functional status scale.

The result is not statistically significant because of the p value (0.583). The degree of freedom was 3 and the value of the chi square test was 1.950. (Table 20)

Table no-15: Frequency distribution of the respondents between Functional Status Scale and BMI(n=138)

BMI	Functional Status Scale										Total	
	Minimal (8-12)		Mild (13-20)		Moderate (21-28)		Severe (28-36)		Very severe (37-40)			
	N	%	N	%	N	%	N	%	N	%	N	%
Under weight <18.4	0	0	0	0	0	0	0	0	0	0	0	0
Normal 18.5- 24.9	1	6.7	5	33.3	2	13.3	1	6.7	0	0	9	60
Overw eight 25.0- 39.9	0	0	5	33.3	0	0	1	6.7	0	0	6	40
Total	1	6.7	10	66.7	2	13.3	2	13.3	0	0	15	100

$$\chi^2 = 5.000, df = 2, p = 0.082$$

In this table we saw the relationship between BMI and functional status scale. The BMI level normal had 1(6.7%) minimal functional status, 5(33.3%) had the mild level of functional status, 2(13.3%) participants had the moderate level of functional status, 1(6.7%) participant had the severe level of the functional status. We also saw that in the overweight category of the BMI there was 5(33.3%) participants had the mild level of the functional status; 1(6.7%) participant had the severe level of functional status.

The result was not statistically significant because of the p value (0.082). The degree of freedom was 2 and the value of the chi square test was 5.000. (Table 21)

Table no-22: Frequency distribution of the respondents by Functional Status Scale and Co-morbidities (n=138)

Comorbidities		Functional Status Scale						Chi square test	
		Minimal (8-12)	Mild (13-20)	Moderate (21-28)	Severe (29-36)	Very Severe (37-40)	Total	χ^2	p
		(%)	(%)	(%)	(%)	(%)	(%)		
Hypertension	Yes	6.7	6.7	13.3	0	0	26.7	4.4	0.109
	No	60	6.7	6.7	0	0	73.3	3	
DM	Yes	6.7	0	6.7	0	0	13.3	1.4	0.4
	No	60	13.3	13.3	0	0	86.7	4	86
Asthma	Yes	13.3	6.7	6.7	0	0	26.7	0.8	0.6
	No	53.3	6.7	13.3	0	0	73.3	5	53
Others	Yes	26.7	0	0	0	0	26.7	2.7	0.2
	No	40	13.4	20	0	0	73.3	2	56

In this table we saw the relationship between functional status scale and co-morbidities. Participants with hypertension had the 6.7% minimal level, 6.7% mild level, 13.3% moderate level, 0% severe level. The participants with diabetes mellitus had 6.7% minimal level of functional level, 6.7% mild level of functional status. The participants with asthma had the 13.3% minimal level of functional status, 6.7% mild and 13.3% of moderate level of functional status. Other condition had 26.7% minimal level of functional status. (Table16)

The result was not statistically significant because no condition had the significant p value like hypertension had 0.19, diabetes mellitus had 0.48, asthma had 0.85 and others had 0.25. The value of chi square test for hypertension was 4.43, diabetes mellitus was 1.44, asthma had the 0.85 and others had 2.7. (Table 22)

5.1. Discussion

This study sought to determine the prevalence of Carpal Tunnel Syndrome (CTS) among computer operators in Dhaka city, Bangladesh. The findings highlight significant information regarding the socio-demographic characteristics, symptom severity, and the overall impact of CTS in the target population. A total of 158 participants, predominantly male (72%), were surveyed. Notably, the study found that 10.9% of the respondents reported CTS, with a higher incidence observed in females (7.2%) compared to males (3.6%).

This is in line with what global studies have found, which show that the rate of CTS among office workers and computer operators has been between 5% and 20%, depending on ergonomic practices and personal characteristics (Padua et al. 2023, p. 219). One of the most important things that came out of the study was that CTS was more common in women (7.2%) than in men (3.6%). This finding aligns with many research indicating that women are at an elevated risk of acquiring CTS. This may be attributed to physiological variations, including narrower carpal tunnels, hormonal influences, and disparities in professional roles. For example, (Chammas et al. 2014, p. 768) found that women are more likely to get CTS because hormonal fluctuations can damage the ligaments and tendons in the wrist.

Moreover, research indicates that physiological disparities between men and women, including hand size and grip strength, may potentially play a role in the elevated prevalence of CTS in women (Shiri & Hassani, 2015, p. 453). The statistically significant correlation between gender and CTS ($\chi^2 = 12.244$, $p < 0.001$) substantiates the notion that gender is an essential determinant in assessing the probability of CTS. (Burton et al. 2018, p. 80) confirm this by showing that women are more likely to get CTS, which can lead to higher rates of impairment and missed work. Interventions customized to gender, such as ergonomic modifications and customized treatment approaches, could alleviate this difference, particularly in office settings where women may be inadequately represented in ergonomics-oriented design choices (Padua et al. 2023, p. 221). The analysis indicated no statistically significant link between age and CTS prevalence ($\chi^2 = 2.450$, $p = 0.294$). This is different from other studies that found

that CTS is more common in people over 40 years old. For example, (Shiri et al. 2016, p. 158) discovered that individuals aged 40 and above are more predisposed to acquire CTS due to age-related alterations in the musculoskeletal system and nerve health. Nonetheless, this study indicates that numerous younger individuals (ages 25–40) who do lengthy repetitive wrist movements, typically linked to computer usage, may still be susceptible to acquiring CTS. This indicates that age alone may not be a robust predictor of CTS development; instead, the intensity and length of repeated tasks in the workplace may be more significant (Wolny, 2022, p. 34).

This research highlights the increasing apprehension regarding work-related musculoskeletal disorders (WMSDs) among younger demographics in contemporary, technology-oriented workplaces. As reliance on computers and digital gadgets grows, workers of all ages are at greater risk for CTS, especially those who don't pay attention to ergonomics or don't take breaks often enough (McCallum et al 2019, p. 908).

Subsequent research should investigate the impact of lifestyle factors, including sedentary behaviors and occupational practices, on the prevalence of CTS across various age demographics. The study indicated a marginally elevated prevalence of CTS in overweight individuals concerning Body Mass Index (BMI), while this finding was not statistically significant ($\chi^2 = 1.766$, $p = 0.413$). Prior studies have demonstrated that obesity and excess body weight may exacerbate carpal tunnel syndrome by elevating pressure on the median nerve in the wrist. (Wolny, 2022, p. 40) also said that being overweight is a known risk factor for CTS since having too much fat around the carpal tunnel can make nerve compression more likely. This aligns with research indicating a favorable link between elevated BMI and the onset of CTS (Shiri & Hassani, 2015, p. 455).

Even while this study didn't find any statistically significant results, workplace wellness initiatives that focus on obesity and encourage people to be more active could be a good way to lower the risk of CTS, especially in offices. (Lee et al. 2019, p. 65) found that losing weight was linked to less severe CTS symptoms. This means that managing your weight could be an important part of preventing CTS. The study identified a strong correlation between diabetes mellitus and carpal tunnel syndrome ($p = 0.001$), corroborating current literature that associates metabolic disorders such as diabetes with an elevated risk of nerve entrapment syndromes. Diabetes is known to contribute to

peripheral neuropathy, which might worsen the symptoms of CTS (Shiri & Hassani, 2015, p. 455). Diabetes damages nerve function and lowers blood flow to the median nerve, which makes people with diabetes more likely to have nerve compression in the carpal tunnel. This underscores the significance of controlling chronic illnesses like as diabetes to avert or alleviate CTS symptoms. Interestingly, although this study did not find a statistical link between hypertension and CTS, previous investigations have suggested a possible connection between cardiovascular disorders and CTS. For instance, research by (Wolny, 2022, p. 45) indicated that persons with hypertension had an elevated chance of developing CTS, potentially attributable to circulatory complications impacting nerve health. With the surge in the number of people with long-term illnesses like diabetes and high blood pressure around the world, it is important to think about these things when making plans to prevent and treat CTS. In terms of the severity of CTS symptoms, most of the participants (66.7%) said they had mild symptoms. This is in line with what (Pubnat, 2023, p. 44) found, which said that many people with CTS have symptoms that get worse over time, so early symptoms like tingling, numbness, and discomfort may not make it hard to do everyday tasks right away. But if the symptoms get worse, they might make it hard to do things like hold things, feel weak in the hand, and feel a lot of discomfort. We also looked at how CTS affected people's daily lives, and most of them (60%) said it didn't have much of effect. This is in line with what (Shem et al. 2019, p. 67) found, which said that early-stage CTS might not have a big effect on job or personal activities, but if it isn't treated, it can get worse and have a big effect on quality of life. This underscores the significance of prompt diagnosis and management, since conservative measures like physiotherapy and ergonomic modifications can avert the progression of the ailment.

The study revealed that 75% of individuals favored medicine for the management of their CTS symptoms, whereas merely 25% choose physiotherapy. This is in line with what is happening in the therapy of CTS as a whole, when pain and inflammation are often treated with corticosteroids or nonsteroidal anti-inflammatory medicines (NSAIDs). (Beddaa et al. 2022, p. 240) point out that physiotherapy, especially neurodynamic mobilization methods (NMT), is becoming more well-known for its ability to relieve symptoms and enhance function without the need for invasive therapies. NMTs work on moving the median nerve, which can help ease pain and make it easier to use your hands, especially when used alongside ergonomic therapies.

Studies have shown that combining physiotherapy with medication may be a better treatment plan because it has a greater effective than treating each condition alone (Shiri et al. 2016, p. 158).

6.2. Limitation of the study:

1. The research focused on a particular computer operator in Dhaka, potentially lacking representation of the wider community of office workers in Bangladesh.
2. Participants self-reported their symptoms and ergonomic practices, which could introduce bias, as individuals may under report or over-report their experiences, thereby compromising the trustworthiness of the findings.
3. The study's singular data collection restricts its capacity to ascertain causal links.
4. This study conducted by my own fund. So, they might have some limitation and financial aspects with in study.
5. The results may not be entirely generalizable to other regions or cultures owing to variations in employment practices and environmental conditions, as the study concentrated exclusively on Dhaka, Bangladesh.

6.1. Conclusion:

In conclusion, this study offers significant insights into the prevalence and risk factors related to Carpal Tunnel Syndrome (CTS) among computer operators in Dhaka city, emphasizing a health issue that is increasingly pertinent in the digital era. The findings unequivocally indicate that Carpal Tunnel Syndrome (CTS) is not merely a localized medical concern but an occupational risk associated with repetitive tasks, extended computer usage, and insufficient ergonomic standards. The results show that gender is quite important, with women being more likely to get CTS than men. This is comparable to what other studies have found. This gender imbalance may be ascribed to anatomical variances, hormonal impacts, and variations in work-related ergonomics. Furthermore, comorbidities like diabetes significantly contribute to the prevalence of CTS, underscoring the necessity of viewing CTS not merely as a workplace-related problem but also as one affected by overarching health concerns. The study also showed that CTS is common, but many of the cases that were recorded had only a small effect on how well people could function. This means that the disease often starts with mild symptoms that can be treated efficiently if they are caught early enough to stop the disease from getting worse. This shows how important it is to find and treat CTS early, such as by giving office workers health checks, teaching them about the signs of CTS, and holding training sessions on how to use ergonomic tools. These kinds of preventive measures can have a big effect on workers' health, productivity, and quality of life in the long run. To lower the danger of lasting nerve damage and impairment, it is important to make sure that employees know about early signs and are urged to get medical help as soon as possible. This study's results show even more how important ergonomic interventions are. Simple things like setting up your desk correctly, using wrist supports, taking breaks often, and doing stretching exercises can greatly minimize the risk of CTS in people who work on computers. Physiotherapy also came up as a possible non-invasive treatment, however most of the people in this survey said they relied on medication more. Encouraging businesses to include physiotherapy and ergonomic support in their workplace health plans could help people rely less on medicine, which usually only gives short-term relief without getting to the source of the problem. The global incidence of CTS further underscores the importance of our

findings. As more and more people rely on digital technologies and work on computers in many fields, CTS has become a frequent problem for workers around the world. But in undeveloped nations like Bangladesh, where people don't know much about occupational health and there aren't good systems in place to protect workers, it's even more important to do something about it. This study contributes to the global research corpus by offering localized data, underscoring the critical necessity for workplace interventions specifically designed for the socio-economic and health contexts of Bangladesh. Ultimately, this study emphasizes the significance of incorporating occupational health into comprehensive public health initiatives. CTS has an impact on both individual workers and the productivity of organizations and the economy as a whole because it leads to absenteeism and worse work efficiency. So, treatments that focus on prevention, education, and whole-person treatment will help not only workers but also employers and society as a whole. Because CTS is becoming more common around the world, it is important to keep doing research, especially in office settings, to find new and cheap ways to make this condition less of a problem. By putting early intervention and health promotion at work first, we can make the workplaces of the increasing digital workforce safer, healthier, and more sustainable.

6.2. Recommendation:

1. Expand the research to include a diverse range of office workers from different regions across Bangladesh to improve representativeness and generalizability.
2. Incorporate objective measures, such as observational studies or wearable devices, to reduce bias in self-reported data and enhance reliability.
3. Use a longitudinal study design to establish causal relationships between ergonomic practices and symptoms.
4. Seek additional external funding and resources to broaden the scope, sample size, and access to advanced tools or technology.
5. Include diverse regional or cultural contexts to examine the influence of varying employment practices and environmental conditions on ergonomic issues.

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APPENDIX- A

Verbal Consent Form

Assalamuaalaikum,

I am **Noor-E-Ishnad** a student of B.Sc. in Physiotherapy, Saic College of Medical Science and Technology (SCMST), affiliated with Faculty of Medicine, University of Dhaka. For the partial fulfillment of my bachelor degree, I have to conduct a research t project and it is a part of my study. **My Research title is “Prevalence of Carpal Tunnel Syndrome among the computer operators in Dhaka City”**

I do expect that the interview will take 20-30 minutes. I also offer you to ask any sort of questions when you fell it is necessary to get insight.

I would like to inform you that this is a purely academic study and will not be used for any other purposes. I assure you that all the data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw your consent and discontinue from the study at any point of time. You also have the right not to answer any other question that you don't like of this questionnaire.

If you have any query about the study, you may contact with me **(01302691035)** or my supervisor **Md Billal Hossain**, Lecturer of Physiotherapy, Saic College of Medical Science and Technology (SCMST)

So, may I have your consent to proceed with the interview? Yes..... No.....

Signature of the participant & Date.....

Signature of the researcher & Date.....

Signature of the witness & Date.....

**Prevalence of Carpal Tunnel Syndrome among the computer operators in Dhaka
City**

Questionnaire

Part 1: Personal Information

1.1 Patient's Name	
1.2 Address	
1.3 Mobile Number	

Part 2: Sociodemographic information

Question	Answer
2.1 Age (In year)
2.2 Sex	1 = Male 2 = Female
2.3 Where do you live in?	1 = Urban 2 = Semi urban 3 = Rural
2.4 What is your marital status?	1 = Married 2 = single 3 = Others
2.5 What about your education level?	1 = Illiterate 2 = Secondary 3 = H.S.C 4 = Graduation & above
2.6 How much your family income?In BDT/Month

Part 3: Anthropometric Measurement

3.1 What is your Height? cm
3.2 What is your Weight? kg
3.3 BMI	1 = Underweight

	2 = Overweight 3 = Normal weight 4 = Obesity
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Part 4: Comorbidities

4.1 Comorbidities	1 = Hypertension 2 = Diabetes Mellitus 3 = Asthma 4 = Others
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Part 5: Diagnosis

5.1 Do you have pain in wrist?	1 = Yes 2 = No
	If yes, mention the site of pain – 1 = Volar (Palm side) 2 = Radial side (thumb side) 3 = Central wrist 4 = Ulnar side (little finger)
5.2 What is the nature of pain?	1 = Tingling 2 = Throbbing 3 = Pins or needles
5.3 Physical test-	5.3.1. Phalen's test 1 = Positive 2 = Negative
	5.3.2. Tinel's sign 1 = Positive 2 = Negative
5.4 What is the type of your pain?	1 = Constant 2 = Intermittent

5.5. Do you take any management for wrist pain?	1.Medication [] 2.Physiotherapy [] 3. Surgery []
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Part 6: BCTS Scale

Boston Carpal Tunnel Syndrome Scale

To calculate score, add together the scores for all 11 questions in part 1 to give a total out of 55.

Part-1 of 2: Symptom severity scale (11 items)

	1	2	3	4	5
1.How severe is the hand or wrist pain that you have at night?	Normal	Slight	Medium	Severe	Very serious
2. How often did hand and wrist pain wake you up during a typical night in the past two weeks?	Normal	Once	2 to 3 times	4 to 5 times	More than 5 times
3. Do you typically have pain in your hand or wrist during day time?	No pain	Slight	Medium	Severe	Very serious
4. How often do you have hand or wrist pain during daytime?	Normal	1 to 2 times/Day	3 to 5 times/Day	More than 5 times	Continued
5. How long on average dose an episode of pain last during the daytime?	Normal	< 10 mins	10-60 mins continued	>60mins	Continued
6. Do you have numbness (loss of sensation) in your hand?	Normal	Slight	Medium	Severe	Very serious
7. Do you have weakness in your hand or wrist?	Normal	Slight	Medium	Severe	Very serious

8. Do you have tingling sensations in your hand?	Normal	Slight	Medium s	Severe	Very serious
9. How severe is numbness (loss of sensation) or tingling at night?	Normal s	Slight	Medium	Severe	Very serious
10. How often did hand numbness or tingling wake you up during a typical night during the past two weeks?	Normal	Once	2 to 3 times	To 5 times	More than 5 times
11. Do you have difficulty with the grasping and use of small objects such as keys or pens?	Without difficulty	Little difficulty	Moderate difficulty	Very difficult	Very difficult

Part 2 of 2: Functional status scale (8 items)

	No difficulty	Little difficulty	Moderate difficulty	Intense difficulty	Cannot perform the activity at all due to symptoms
1. Writing	1	2	3	4	5
2. Buttoning of clothes	1	2	3	4	5
3. Holding a book while reading	1	2	3	4	5

4. Gripping of a telephone handle	1	2	3	4	5
5. Opening of jars	1	2	3	4	5
6. Household chore	1	2	3	4	5
7. Carrying of grocery basket	1	2	3	4	5
8. Bathing and dressing	1	2	3	4	5

মৌখিক সম্মতিপত্র

আসসালামু আলাইকুম,

আমি, নুর-ই-ইশনাদ ঢাকা বিশ্ববিদ্যালয়ের মেডিসিন অনুষদের অধিভুক্ত সাইক কলেজ অফ মেডিকেল সায়েন্স অ্যান্ড টেকনোলজি (এসসিএমএসটি) এর ফিজিওথেরাপিতে বি.এসসি. -এর ছাত্রী। আমার স্নাতক ডিগ্রির আংশিক পরিপূর্ণতার জন্য, আমাকে একটি গবেষণা প্রকল্প পরিচালনা করতে হবে এবং এটি আমার গবেষণার একটি অংশ। আমার গবেষণার শিরোনাম হল “ঢাকা শহরে কম্পিউটার অপারেটরদের মধ্যে কার্পাল টানেল সিনড্রোমের (হাতের কজির মধ্যবর্তী স্নায়ুর চাপে সৃষ্ট ব্যথাজনিত অবস্থার) প্রাদুর্ভাব”

আমি আশা করি যে সাক্ষাৎকারটি ২০-৩০ মিনিট সময় নেবে। আমি আপনাকে যে কোনো ধরনের প্রশ্ন জিজ্ঞাসা করার প্রস্তাব দিচ্ছি যখন আপনি পড়ে যান, অন্তর্দৃষ্টি পাওয়া প্রয়োজন।

আমি আপনাকে জানাতে চাই যে এটি একটি সম্পূর্ণ একাডেমিক গবেষণা এবং অন্য কোনও উদ্দেশ্যে ব্যবহার করা হবে না। আমি আপনাকে আশ্বস্ত করছি যে সমস্ত তথ্য গোপন রাখা হবে। আপনার অংশগ্রহণ স্বেচ্ছায় হবে। আপনার যেকোনো সময় আপনার সম্মতি প্রত্যাহার করার এবং অধ্যয়ন থেকে বিরত থাকার অধিকার আপনার থাকতে পারে। এই প্রশ্নাবলীতে আপনার পছন্দ না হওয়া অন্য কোনো প্রশ্নের উত্তর না দেওয়ার অধিকারও আপনার রয়েছে।

এই গবেষণা সম্পর্কে আপনার যদি কোন প্রশ্ন থাকে, তাহলে আপনি আমার সাথে
(০১৩০২৬৯১০৩৫) অথবা আমার সুপারভাইজার মোঃ বিল্লাল হোসেন, লেকচারার অব
ফিজিওথেরাপি, (এসসিএমএসটি) এর সাথে যোগাযোগ করতে পারেন।

তাহলে, সাক্ষাৎকারটি এগিয়ে নেওয়ার জন্য কি আপনার সম্মতি পেতে পারি? হ্যাঁ

..... না

অংশগ্রহণকারীর স্বাক্ষর এবং তারিখ

গবেষকের স্বাক্ষর এবং তারিখ

সাক্ষীর স্বাক্ষর এবং তারিখ

ঢাকা শহরে কম্পিউটার অপারেটরদের মধ্যে কার্পাল টানেল সিনড্রোমের (হাতের কজির মধ্যবর্তী স্নায়ুর চাপে সৃষ্ট ব্যথাজনিত অবস্থার) প্রাদুর্ভাব"

প্রশ্নাবলি

ধাপ-১: ব্যক্তিগত তথ্য

রোগীর নাম	
ঠিকানা	
মোবাইল নাম্বার	

ধাপ-২ : সামাজিক ও জনসংখ্যাগত তথ্য

প্রশ্ন	উত্তর
বয়স
লিঙ্গ	১ = পুরুষ ২ = মহিলা
আপনার বসবাসে এলাকা কোথায়	১ = শহরে ২ = উপ শহরে ৩ = গ্রামীণ
বৈবাহিক অবস্থা	১ = বিবাহিত ২ = অবিবাহিত ৩ = অন্যান্য
শিক্ষাগত যোগ্যতা	১ = আনুষ্ঠানিক শিক্ষা নেই ২ = প্রাথমিক বিদ্যালয় ৩ = মাধ্যমিক বিদ্যালয় ৪ = স্নাতক বা যে উচ্চ শিক্ষার যোগ্যতা
আপনার পরিবারের মাসিক আয় কত?

ধাপ-৩ : দেহ মাত্রা গত পরিমাপ

আপনার উচ্চতা কত? সে.মি.
আপনার জন কত? কেজি
বিএমআই	১ = ওজন হীনতা ২ = অতিরিক্ত ওজন ৩ = স্বাভাবিক ওজন ৪ = স্থূলতা

ধাপ-৪ : সহযোগী রোগসমূহ

সহযোগী রোগসমূহ	১ = উচ্চ রক্তচাপ ২ = ডায়াবেটিস মেলিটাস ৩ = শ্বাসকষ্ট ৪ = অন্যান্য
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ধাপ-৫ : রোগ নির্ণয়

আপনার কি কজিতে ব্যথা হয়?	১= হ্যাঁ ২ = না যদি হ্যাঁ হয়, তবে ব্যথার স্থান উল্লেখ করুন – ১ = তালুর দিকে ২ = আঙ্গুলের পাশে ৩ = কজির মধ্যভাগ ৪ = কনিষ্ঠের পাশে
ব্যথার ধরন কি?	১ = ঝিঝি অনুভূতি ২ = স্পন্দন অনুভূতি ৩ = কাটা বা সুচ ফুটানোর মতো অনুভূতি
শারীরিক পরীক্ষা	ফেনেল'স টেস্ট ১ = ধনাত্মক

		২ = ঋণাত্মক
	টিনেল'স সাইন	১ = ধনাত্মক ২ = ঋণাত্মক
আপনার ব্যথার প্রকৃতি কি?		১ = স্থায়ী ২ = থেমে থেমে হওয়া

আপনি কি কজির ব্যথার জন্য কোনো চিকিৎসা বা ব্যবস্থাপনা গ্রহণ করেছেন?	১ = মেডিকেশন ২ = ফিজিওথেরাপি ৩ = অস্ত্রপাচার/অপারেশন
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ধাপ-৬: বিসিটিএস স্কেল

বোস্টন কার্পাল টানেল সিনড্রোম স্কেল

স্কোর গণনা করতে অংশ ১ এর ১১ টি প্রশ্নের প্রতিটি স্কোর যোগ করে সর্বমোট স্কোর নির্ধারণ করুন যা সর্বোচ্চ ৫৫ পর্যন্ত হতে পারে।

পর্ব ১ : উপসর্গের মাত্রা পরিমাপক স্কেল

	১	২	৩	৪	৫
১. আপনার হাতে বা কজিতে রাতে ব্যথা কতটা গুরুতর?	স্বাভাবিক	সামান্য	মাঝারি	গুরুতর	অত্যন্ত গুরুতর
২. গত সপ্তাহে আপনি হাতে ব্যথার কারণে কতবার রাতে ঘুম থেকে জেগে উঠেছেন?	স্বাভাবিক	একবার	দুই থেকে তিন বার	চার থেকে পাঁচ বার	পাঁচ বারের বেশি

৩. দিনে আপনার হাতে বা কজিতে ব্যথা হয় কি?	কোন ব্যথা নেই	সামান্য	মাঝারি	গুরুতর	অত্যন্ত গুরুতর
৪. আপনার দিনে কতবার হাত বা কজিতে ব্যথা হয় ?	স্বাভাবিক	দিনে এক থেকে দুই বার	দিনে তিন থেকে পাঁচ বার	পাঁচ বারের বেশি	স্থায়ী
৫. দিনের বেলা গড়ে একবার ব্যথা কতক্ষণ স্থায়ী হয়?	স্বাভাবিক	< ১০ মিনিট	১০-৬০ মিনিট স্থায়ী থাকে।	> ৬০ মিনিট	স্থায়ী
৬. আপনার হাতে অসাড়ভাব আছে কি?	স্বাভাবিক	সামান্য	মাঝারি	গুরুতর	অত্যন্ত গুরুতর
৭. আপনার হাত বা কজিতে দুর্বলতা আছে কি?	স্বাভাবিক	সামান্য	মাঝারি	গুরুতর	অত্যন্ত গুরুতর
৮. আপনার হাতে ঝিকি অনুভূতি হয় কি?	স্বাভাবিক	সামান্য	মাঝারি	গুরুতর	অত্যন্ত গুরুতর
৯. রাতে অসাড়ভাব বা ঝিকি অনুভূতি তীব্র হয় কি?	স্বাভাবিক	সামান্য	মাঝারি	গুরুতর	অত্যন্ত গুরুতর
১০. গত দুই সপ্তাহে সাধারণত রাতে হাতের অসাড়ভাব বা ঝিকি অনুভূতির কারণে আপনি কতবার ঘুম থেকে জেগে উঠেছেন?	স্বাভাবিক	একবার	এক থেকে দুই বার	তিন থেকে পাঁচ বার	পাঁচ বারের বেশি
১১. আপনার কি চাবি বা কলমের মত ছোট বস্তু ধরতে বা ব্যবহার করতে অসুবিধা হয়?	কোন অসুবিধা ছাড়াই	সামান্য অসুবিধা	মাঝারি ধরনের অসুবিধা	খুব বেশি অসুবিধা	খুব বেশি অসুবিধা

পর্ব- ২: কর্ম ক্ষমতা মূল্যায়ন স্কেল

	কোনো অসুবিধা নেই	সামান্য অসুবিধা	মাঝারি ধরনের অসুবিধা	তীব্র অসুবিধা	উপসর্গের कारणे একেবারেই কাজটি করতে অক্ষম।
১. লেখা	১	২	৩	৪	৫
২. জামার বোতাম লাগানো	১	২	৩	৪	৫
৩. পড়ার সময় বই ধরে রাখা	১	২	৩	৪	৫
৪. টেলিফোনের হ্যান্ডেল ধরা	১	২	৩	৪	৫
৫. জার না বয়াম পোলা	১	২	৩	৪	৫
৬. গৃহস্থলীর কাজ	১	২	৩	৪	৫
৭. মুদির ঝুড়ি বহন করা	১	২	৩	৪	৫
৮. গোসল বা পোশাক পড়া	১	২	৩	৪	৫

SCMST-BPT/IRB/... 02-10/18/24

To,
Noor-E-Ishnad
4th Year Student of B.Sc. in Physiotherapy
Session: 2019-20, Reg No: 8809
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Subject: Approval of the thesis proposal “Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city” by ethics committee.

Dear Noor-E-Ishnad
Congratulations.

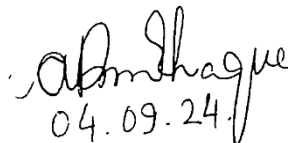
The Institutional Review Board (IRB) of SCMST has reviewed and discussed your application to conduct the above-mentioned dissertation, with yourself, as the principal investigator. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Research proposal.
2	Structured Questionnaire (English & Bangla version)
3	Information sheet & consent form.

The purpose of the study is to determine the prevalence of carpal tunnel syndrome among the computer operators in Dhaka city. The study involves face to face interview by using structured questionnaire to determine the prevalence of carpal tunnel syndrome among the computer operators in Dhaka city that may take 30 to 40 minutes to fill in the questionnaire and there is no likelihood of any harm to the participants. The members of the Ethics committee have approved the study to be conducted in the presented form at the meeting held at 09.00 AM on 4th September 2024 at SCMST.

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

Best regards,



Dr. Abul Kasem Mohammad Enamul Haque
Principal, SCMST & Chairman, Institutional Review Board (IRB)
SAIC College of Medical Science & Technology (SCMST)
Mirpur-14, Dhaka-1216, Bangladesh

Date: 03/09/2024

To

The Chairman,

Institutional Review Board (IRB)

SAIC College of Medical Science & Technology (SCMST)

Mirpur-14, Dhaka-1216.

Subject: **Application for review and ethical approval.**

Dear Sir,

With due respect, I am Noor-E-Ishnad, student of 4th year B.Sc. in Physiotherapy Program at SAIC College of Medical Science & Technology (SCMST), affiliated by the University of Dhaka. As per the course curriculum, I have to conduct a research project that entitled “**Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city**” under the supervisor Md. Billal Hossain, Lecturer (Physiotherapy) of SCMST.

The purpose of the study is to determine the Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city. The study involves face to face interview by using structured questionnaire to determine the Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city that may take 30 to 40 minutes to fill the questionnaire and there is no likelihood of any harm to the participants. Related information will be collected from the patient’s guidebook. Data collectors will receive informed consent from all participants: any data collected will be kept confidential.

Therefore, I look forward to having your kind approval for the thesis proposal and to start data collection. I can also assure you that I will maintain all the requirements for study.

03.09.24

Sincerely,

Noor-E-Ishnad

Student of 4th Year B.Sc. in Physiotherapy

Session:2019-2020 Reg: 8809

SCMST, Mirpur-14, Dhaka-1216, Bangladesh



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST - BPT/Data/12-03/25/10

Date :

To
The General Secretary
New Shahara Multipurpose Co-operative Society Limited
Dhaka-1000, Bangladesh

Subject: Prayer for permission to collect data from New Shahara Multipurpose Co-operative Society Ltd., Dhaka, Bangladesh to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of medical science and technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city" and the aim of the study is to determine the prevalence of carpal tunnel syndrome among computer operators in Dhaka city. This is a cross-sectional study under the supervisor Md. Billal Hossain, Lecturer (Physiotherapy) of SCMST. I have chosen the New Shahara Multipurpose Co-operative Society Ltd., Dhaka, Bangladesh to collect data from the computer operators.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully

Noor-E-Ishnad
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.


M. Noorul Islam
Managing Director
New Shahara Multipurpose
Co-operative Society Ltd

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web: www.saicmedical.edu.bd



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST- BPT/Data/12-03/25/10

Date :

To
The Director
Accortex Sourcing
Dhaka, Bangladesh

Subject: Prayer for permission to collect data from The Accortex Sourcing, Dhaka, Bangladesh to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at Saic College of Medical Science and Technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city" and the aim of the study is to determine the prevalence of Carpal Tunnel Syndrome among computer operators. This is a descriptive type of cross-sectional study under the supervisor Md Billal Hossain, Lecturer (Physiotherapy) of SCMST. I have chosen Accortex Sourcing, Dhaka, Bangladesh to collect data from the computer operators.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully

Noor-E-Ishnad
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020 Reg: 8809
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.

ACCORTX SOURCING
Noor-E-Ishnad
Partner
26/5/25

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web: www.saicmedical.edu.bd



SAIC COLLEGE OF MEDICAL SCIENCE AND TECHNOLOGY

Approved by Ministry of Health and Family Welfare
Affiliated with Dhaka University

Ref: SCMST - BPT/Daka/12-03/25/10

Date:

To
The General Secretary
Devcom Ltd.
Dhaka-1000, Bangladesh

Subject: Prayer for permission to collect data from Devcom Ltd., Dhaka, Bangladesh to conduct a research project.

Sir,

With due respect and humble submission to state that I am a student of B.Sc. in Physiotherapy at SAIC College of medical science and technology (SCMST). As a part of our course curriculum, we have to conduct a research project for the partial fulfillment of the requirement for the degree of B.Sc. in Physiotherapy. My research title is "Prevalence of Carpal Tunnel Syndrome among computer operators in Dhaka city" and the aim of the study is to determine the prevalence of carpal tunnel syndrome among computer operators in Dhaka city. This is a cross-sectional study under the supervisor Md. Billal Hossain, Lecturer (Physiotherapy) of SCMST. I have chosen the Devcom Ltd., Dhaka, Bangladesh to collect data from the computer operators.

So, I, therefore, pray and hope that you would be kind enough to give permission for data collection that will help me to complete my study.

Yours Faithfully

Noor-E-Ishnad
B.Sc. in Physiotherapy (4th Year)
Session: 2019-2020
SCMST, Mirpur-14, Dhaka-1216, Bangladesh.


Hassan Imam
Managing Director
for Development & Communication
DEVCOM Ltd.
26.05.2025

Address: Saic Tower, M-1/6, Mirpur-14, Dhaka-1206. Mobile: 01936005804
E-mail: simt140@gmail.com, Web: www.saicmedical.edu.bd