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DEPRESSION AND ANXIETY AMONG KNEE AMPUTEE PATIENTS BEFORE AND AFTER REHABILITATION AT CRP

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

Depression and Anxiety among knee amputee patients before and after rehabilitation at CRP.

Submitted by **Chowdhury Muhsinin Mosharofy,** for the partial fulfillment of the requirement for the degree of Bachelor of Science in Physiotherapy (B.Sc. PT).

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DECLARATION

I declare that the work presented here is my own. All sources used have been cited appropriately. Any mistakes or inaccuracies are my own. I also declare that any publication, presentation or dissemination of information of the study. I would oblige to take consent from the department of Physiotherapy of Bangladesh Health Profession Institute (BHPI).

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CONTENT

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Acronyms

BHPI: Bangladesh Health Professions Institute.

CRP: Centre for the Rehabilitation of the Paralyzed.

BMRC: Bangladesh Medical and Research Council.

PHQ-9: Patient Health Questionnaire-9.

GAD-7: General Anxiety Disorder-7.

P&O: Prosthetics and Orthotics.

PTSD: Post traumatic stress disorder.

IRB: Institutional Review Board.

WHO: World Health Organization.

SPSS: Statistical Package of Social Science.

APA: American Psychological Association.

ICRC: International Committee of the Red Cross**.**

TTA: Trans Tibial Amputation.

TFA: Trans Femoral Amputation.

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Abstract

Purpose: The aim of the study was to screen the level of depression and anxiety among knee amputee patients before and after rehabilitation at CRP**.** *Objectives:* To explore the effectiveness of rehabilitation program at CRP to reduce depression and anxiety level among the knee amputated patients. *Method:* The study design was quazi experimental. 12 samples were conveniently selected from Prosthetics and Orthotics Department at CRP. Out of 12 participants 91.70% (n=11) were male and 8.30% (n=1) were female. Data was collected by PHQ-9 and GAD-7 scales and it was analyzed by SPSS software version 20.0. *Result:* After analyzing data result was found the level of depression and anxiety among knee amputee patients before and after rehabilitation at CRP. Out of 12 participants 41.70% (n=5) were Adults (20-39aged). 33.30% (n=4) were Middle adults (40-59 aged). And remaining 25.0% (n=3) were senior adults (60+ aged). Male was predominantly higher than female. Out of 12 participants 91.70% (n=11) were male and 8.30% (n=1) were female. The mean difference between pre-test and post-test depression is 3.58 and P value is 0.002 which is <0.05. This result means depression among the knee amputee patients was decreased significantly after completing 2 weeks of rehabilitation program at CRP. Again the mean difference between pre-test and post-test anxiety was 1.92 and P value was 0.006 which was <0.05. This result means depression among the knee amputee patients decreased significantly after completing 2 weeks of rehabilitation program at CRP. *Conclusion:* In conclusion it can be said that depression and anxiety are major mental illness among knee amputee patients and the rehabilitation program at CRP is significantly effective to reduce the depression and anxiety among them.

Key words: Depression, Anxiety, Amputation, CRP, Rehabilitation.

CHAPTER I INTRODUCTION

1.1 Background

Depression is a widespread mental illness that affects over 264 million individuals around the world. It's marked by a chronic sadness and a lack of interest or pleasure in formerly rewarding or pleasurable pursuits. It can also cause sleep and appetite disturbances, as well as fatigue and impaired focus. Depression is a primary cause of disability worldwide, and it contributes significantly to the global illness burden. Depression's consequences can be long-lasting or recurrent, and they can have a significant impact on a person's capacity to function and live a fulfilling life. (WHO, 2021).

WHO (2021) stated that Depression is a prevalent illness that affects 3.8 percent of the world's population, with 5.0 percent of adults and 5.7 percent of persons over 60 years suffering from depression. Around 280 million people worldwide suffer from depression. Mental health disorders affect about a quarter of the world's population. In Bangladesh, almost 7 million people suffer from anxiety and depression. (Arusha et al., 2020)

During the period shortly after amputation, depression has been reported by some patients as being the reason for decreased use of their prosthesis and lower levels of mobility. Amongst people with long-term amputations, depression has also been associated with higher levels of activity restriction, increased feelings of vulnerability, and poorer self-rated health (Horgan et al., 2004)

Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure. People with anxiety disorders usually have recurring intrusive thoughts or concerns. They may avoid certain situations out of worry. They may also have physical symptoms such as sweating, trembling, dizziness or a rapid heartbeat (Brown et al., 1994). Anxiety disorders are the most prevalent psychiatric disorders. According to epidemiological surveys, one third of the population is affected by an anxiety disorder during their lifetime. These disorders are associated with a considerable degree of impairment, high health-care utilization and an enormous

economic burden for society. According to large population-based surveys, up to 33.7% of the population are affected by an anxiety disorder during their lifetime (Bandelow et al.,2015).

Amputation is defined as ―the surgical or spontaneous partial or complete removal of a limb or projecting body part covered by skin. Limb loss is one of the most physically and psychologically devastating events that can happen to a person. Losing a limb evokes many of the same emotions that accompany bereavement (Manoj et al., 2017). An amputation is that the exclusion of a limb or alternative limb outgrowth of the body; Amputation is outlined because the surgical or spontaneous partial or complete removal of a limb or protruding piece lined by skin and is one amongst the foremost common developed disabilities (Kohler et al., 2009).

Approximately 7,000 people undergo limb amputation in the UK every year (Robinson et al.,2010). Amputation, one of the oldest known surgical procedures, was performed historically to remove gangrene or damaged limbs and to save lives (Manring et al.,2009)

The most common causes of surgical amputations are the complications caused by diabetes (diabetic foot) including a number of vascular complications in the form of ischemia and peripheral artery disease (Feinglass et al., 2012). Trauma was the leading cause of amputation in all age groups. The common traumas reported were road traffic accidents, railway accidents, and burns due to fire, electrocution, and chemical injuries (VanWagner et al., 2012). Diabetes is one of the leading causes of severe morbidity and mortality. The number of people with diabetes in the world is expected to double between 2000 and 2030. The greatest absolute increases in the number of people with diabetes will be in the world (Worbel et al.,2011). Foot problems are important contributory factors to the high morbidity and mortality observed in diabetic patients, and the economic impact of foot disease is substantial. It has been estimated that up to 50% of all non-traumatic lower limb amputations are performed on diabetic patients (Schoppen et al.,2007). Diabetic foot disease is exacerbated by sociocultural factors such as the prevalence of walking barefoot, lack of knowledge regarding diabetic foot complications, and the socioeconomic status of patient(Clark et al.,2008). Diabetic foot infection constitutes 10%of diabetes-related hospital admissions. In a study from

Southern India ,it was found that patients without foot problems spent 9.3%oftheir total income towards treatment, whereas patients with foot problems had to spend upto32.3%of their total income on treatment(Lento et al.,2009).This huge challenge imposed by diabetic foot problems calls for prevention and effective management at the initial stages of disease. There are no studies from eliciting the outcome of cost-effective intensive management of diabetic foot complications in our country.(De Goday et al.,2005).

The next most common cause of amputation was peripheral vascular disease (27.7%). Cases of amputation for peripheral vascular disease tended to increase in parallel with age. In the group aged over 60 years, peripheral vascular disease (34.9%) was a more common cause of amputation than trauma (3.6%) (Pooja et al., 2013).

Bangladesh is a lower middle-income country in South Asia region and has a population over 167 million, with almost 60% of that participating in the labour force. The majority of labour is physical, such as agriculture or construction, and as such workplace injuries (and motor vehicle injury) are common, often resulting in lower limb amputation. In Bangladesh the majority of lower limb amputations occur in young, working age otherwise healthy males. The culture dictates that men are usually the sole income providers for multigenerational households. When incapacitated by injury or disability, their income is affected as is their role as a man in a patriarchal country (Stuckey, 2020).

Witso et al. (2001) argued that There are many levels of lower extremity amputations, and with each one comes a different method of rehabilitation as well as a different type of prosthesis. Levels of Lower Extremity Amputations include:

- Foot, including toes or partial foot
- At the ankle (ankle disarticulation)
- Below the knee (transtibial)
- At the knee (knee disarticulation)
- Above the knee (transfemoral)
- At the hip (hip disarticulation)

The impact of amputation in the experience of any individual translates into changes in his body image, beyond that, it infers on the psychosocial adjustment of individuals

who experience the phenomenon, with influence on their self-esteem and the possible emergence of psychopathological symptoms and on social functioning (Padovani et al., 2015)

There are various types of psychological complications that have been seen in the patient who had amputation. The amputees may experience body images disturbances, anxiety, depression, and post-traumatic stress disorder (PTSD). Depression is associated with higher levels of activity limitation, easily having vulnerable feelings, and poorer self-related health. Risk factors for depression among amputees include higher levels of pain as well as anxiety. Up to 64% amputees experienced anxiety symptoms following the amputation. When depression is accompanied by anxiety disorders, such as post-traumatic stress disorder (PTSD), higher levels of symptomatic distress and higher rates of suicidal behavior are reported (Iqbal et al., 2009)

Lower limb amputation is carried out for a variety of reasons including peripheral vascular disease, diabetes, trauma, tumor, or secondary infections. Most patients who lose a limb as a result of traumatic or surgical procedures encounter a series of complex psychological responses. Many people successfully use these responses to adjust to amputation, but others develop psychiatric symptoms. As many as 50% of all amputees require some sort of psychological intervention. Depression is the most common psychological reaction among amputees. Psychological reactions to amputation depend on a number of factors, which include age and sex, type and level of amputation, lifelong patterns of coping with stress, value placed on the lost limb, and expectations from the rehabilitation program (Hawamdeh et al., 2008)

CRP provides medical treatment, rehabilitation and support services focusing on physical, emotional, social, psychological and economic aspects. It promotes the development of skilled personnel in health care and rehabilitation in the country. The priority of P&O department of CRP is its clients' care and wellbeing throughout the process of delivering world class prosthetic devices, rehabilitation programs and orthotic solutions. The P&O team renowned for outstanding customer service, providing personalized care that best suits each client's needs and lifestyle goals (CRP, 2019)

1.2 Justification of the study:

Although some studies have deal with depression and anxiety among the lower limb amputated patients in other countries. But there are hardly some studies which are specific about depression and anxiety of knee amputee patients. Moreover, the exact nature and depth of depression, anxiety has not been studied before in Bangladesh. There are lacking Of researches that found out the level and comparison of depression anxiety before and after rehabilitation program in CRP. As CRP provides medical treatment, rehabilitation and support services focusing on physical, emotional, social, psychological and economic aspects, this study will help to evaluate the treatment and rehabilitation process of CRP. According to Biopsychosocial model, mental health must be sound as well as one's biological health and sociological matters. This research result will show how the rehabilitation program of CRP will treat an amputee patient physically and mentally. This study will help the researcher to find out depression and anxiety level among knee amputee patients. This research will arise awareness about depression and anxiety among the knee amputee patients that will helps to improve their physical rehabilitation and psychological state. To minimize the impact of depression and anxiety among knee amputee patients, it must be correctly identified and successfully treated. By this study, Physiotherapist and other professionals will aware about the depression and anxiety of knee amputee patients and treat them as well.

1.3 Research Question

What are the comparisons between the level of depression and anxiety among knee patients before and after rehabilitation at CRP?

1.4 Hypothesis

The rehabilitation program of CRP may reduce the level of depression and anxiety among the knee amputated patients.

1.5 Null-Hypothesis

The rehabilitation program of CRP may not reduce the level of depression and anxiety among the knee amputated patients.

1.6 Objectives

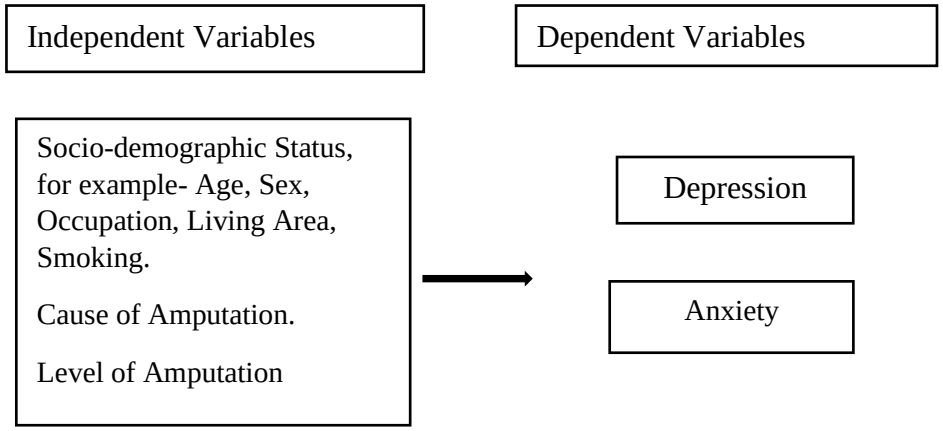
1.6.1 general Objectives

To explore the level of depression and anxiety among knee amputee patients attended in CRP and the effectiveness of rehabilitation program at CRP to reduce depression and anxiety level among the knee amputated patients.

1.6.2 Specific Objectives

1. To identify the common socio-demographic pictures of the patients with knee amputation before and after rehabilitation at CRP.
2. To find out the most common depressive symptoms among the patients with knee amputation before and after rehabilitation at CRP.
3. To find out the severity of anxiety and depression among the patients with the knee amputation before and after rehabilitation at CRP.
4. To find out the specific anxiety and depression in patients with knee amputation attended in CRP before and after rehabilitation.

1.7 List of Variables



1.8 Operational Definition

Depression: Depression is a common mental disorder that presents with depressed mood, loss of interest or pleasure, feelings of guilt or low self-worth, disturbed sleep or appetite, low energy, and poor concentration.

Anxiety: Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increase blood pressure.

Amputation

An amputation is the exclusion of a limb or other limb outgrowth of the body. Amputation is defined as the surgical or spontaneous partial or complete removal of a limb or projecting body part covered by skin and is one of the most common developed disabilities.

Lower limb amputation

Lower-limb amputation is the removal of a part or multiple parts of the lower limb. Though there is some discrepancy in literature regarding exact distal boundaries, it is generally accepted that “major” amputations include those which are at or proximal to the ankle.

Trans-femoral

Across or through the femur.

Trans-tibial

An amputation of the lower leg between the ankle and knee.

CHAPTER II LITERATURE REVIEW

An amputation is the elimination of an organ or other limbs in the body. Amputation is defined as synthesis or spontaneous partial or completely removable portable or part of the processing body, which is covered by skin and is one of the most disabilities. It is a common late stage sequel of peripheral vascular disease and diabetes or a sequel of accidental trauma, civil unrest and landmines (Pooja & Sangeeta, 2013).

Amputation leads a man to endless disability. It carries an affectedly alteration in the life, function and mobility of the sufferers. These transformed situations are experienced more by lower limb amputees than by upper limb amputees. The frequency of lower limb amputation is also higher than the upper limb (Ziegler-Graham et al., 2008).

Amputation may possibly include a single limb (unilateral), both upper and lower limbs (bilateral), or a combination of upper and lower limb amputations (multiple amputations). Amputation may be performed at different functional levels. Lower limb amputation may comprise amputation of one or more toes, part of the foot, ankle disarticulation (disarticulation means amputation of a body part through a joint), trans-tibial (below the knee) amputation, knee disarticulation, trans-femoral (above the knee) amputation, hip disarticulation and hemipelvectomy (removal of half of the pelvis). Upper limb amputation may include the removal of one or more fingers, wrist disarticulation, below elbow amputation, elbow disarticulation, above elbow amputation, shoulder disarticulation and forequarter amputation. Dysvascularity is the foremost cause of amputation in high income countries (Ziegler-Graham et al., 2008). Lower limb amputation is a common chronic health condition and a cause of long-term disability. Lower limb amputation has a major impact on almost every aspect of a person's life. The numerous clinical studies and research reports on function and health related quality of life following amputation describe a wide range of outcomes. There are multiple interactive variables that contribute significantly to the functional outcome, including medical co-morbidities, the surgical level of amputation, cognition, age, pre-morbid level of function, personal coping style, level of social support environmental factors and financial resources available (Asano et al., 2008). There are many possible

reasons of amputation. The four primary etiological aspects requiring these - vascular disease and infection, trauma, tumors and congenital abnormalities (National Amputee Statistical Database, 2009). Dysvascularity follow on cardiovascular disease (CVD) and diabetes mellitus is the leading cause of amputation in most developed countries, followed by trauma. (Ziegler-Graham et al., 2008). The typical dysvascular patient with an amputation is older than 60 years of age and commonly experiences co-morbidities, postoperative morbidity and mortality rates are high (Dillingham et al., 2008).

The most common cause of surgical amputations are the complications caused by diabetes (diabetes foot) including a number of vascular complications in the form of ischemic and peripheral artery disease (Feinglass et al, 2012). Trauma was the leading cause of amputation in all age group. The common trauma reported were road traffic accidents, railway accidents and burns due to fire, electrocution and chemical injuries (VanWagner et al., 2012). Diabetes is one of the leading causes of severe morbidity and mortaly. The number of people with diabetes in the world is expected to double between 2000 and 2030. The greatest absolute increase in the number of the people with diabetes will be the world (Worberl et al., 2011). Foot problems are important contributory factors to the high morbidity and mortality observed in diabetic patients, and the economic impact to of foot disease is substantial. It has been estimated that up to 50% of all non-traumatic lower limb amputations are performed on diabetic patients (Schoppen et al., 2007).

Diabetic foot is a major medical, social and economic problem among worldwide. In most developed countries, the annual incidence of foot ulceration amongst people with diabetes is about 2% and in these countries diabetes does the most common cause of non -traumatic amputation with approximately 1% of people with diabetes have to undergo a LLA (Boulton et al., 2005). In developing countries, foot ulcers and amputations are sadly very common. Often poverty, lack of sanitation and hygiene, and barefoot walking interact to compound the impact of diabetic foot damage. Diabetic complications such as neuropathic foot ischemic foot, peripheral vascular disease, trauma, malignancy, infection and congenital lower limb defects have been seen to result in lower limb amputation at varying rates (Spinchler et al.,2001). Consistent with results reported previously for all-cause lower-extremity amputation, there was considerable variation in the incidence of diabetes-related lower-extremity amputation within and between nations. (Mayfield et al.,2010). Across all studies, the risk of non-

traumatic amputation was considerably greater for diabetics than for nondiabetics, especially among diabetic racial and ethnic minority groups in the United States. Among Native Americans between the ages of 15 and 44 years, the risk of first amputation was 157 times that of nondiabetics of the same age. (Kashani et al.,2008).

Lower limb amputation (LLA) is done for a variety of reasons that change from disease to trauma. Lower limb amputation (LLA) results in a wide range of consequences. Amputation generally results in reduced physical function, poor physical performance, lack of social gathering, liveliness, general health, and more pain compared to population standards. Amputation is devastating factor for both males and females but males usually have better physical function than females. People who consume the following features are usually not able to live independently in their homes after the amputation (Robinson et al., 2010). Lower limb amputation is also associated with morbidity and mortality. The survival rate varies across countries but mortality rate is generally high (Patel et al., 2015). Old age and higher anatomical level of amputation are associated with poor survival and the mortality rate is higher in both people with diabetes and people who do not have diabetes (Neher et al.,2016).

Transtibial amputation is the most common type of major amputation seen in war and peace. Wartime amputations in battle usually occur as the result of trauma in young, healthy individuals and thus differ from those seen in civilian life**.** Since World War II, explosive munitions such as land mines, artillery, mortars, grenades, and bombs have been the most common cause of transtibial amputations (Van Hountum et al.,2012).

(Eskelinen 2010) also reported that burns, sepsis and cellulitis can lead to lower limb amputation . Another study shows that Geographical site, male gender, duration of diabetes, presence of co-morbidities, and lack of high school education is associated with the high incidence of amputation. In studies on reported that smoking was not associated with the risk of lower limb amputation, although excessive alcohol consumption and smoking have been associated with neuropathy (Resnick et al 2008). In comparison to these findings, amputation may be associated with hypertension, coronary arterial disease, tobacco and end stage renal failure (AbouZamzam et al.,2008). In 2000 the Global lower extremity amputation study shows that, in 90% of the centers studied, trauma in males accounted for less than 10% of major LLA.(Worberl et al.,2011).

In south-East Asia, the prevalence of disability ranges from 1.5% to 21.3% of the total population, depending on the definitive and severity of disability (Mont, 2007). Using a standard protocol for data collection, the Global Lower Extremity Amputation Study Group assessed the incidence of lower limb amputation in ten different locations worldwide and reported marked differences among test sites in their annual rates of lower limb amputation (Yari et al., 2008). According to newest statistics in the United State of America, about 1.7 million people live with amputations and the number has increased in recent years (Mousavi et al., 2012). Comparison of all-cause amputation rates during the 1995-1997 period, revealed lowest age-adjusted rates of first major lower limb amputation in Madrid, Spain (0.5 per 100,000 women, 2.8 per 100,000 men) while highest rates were reported in the Navajo region of the United States (22.4 per 100,000 women, 43.9 per 100,000 men) (Moxey et al., 2010). In the United States it is estimated that one out of every 190 persons has lost a limb; the number of persons living with amputation in the U.S. is projected to increase over two-fold to 3.6 million by the year 2050 if current trends continue (Ziegler- Graham et al., 2008). Some 82.9% of those with lower limb amputation in Scotland lose a limb due to peripheral vascular disease, with 38.6% of this group having amputation due to diabetes (Deans et al., 2008). Another important factor is the average age of the lower limb amputee population; the Scottish amputee population is predominantly elderly with around 80% of primary amputees over 60 and more than 20% over 80. On those attending a sub-regional English limb center, with trans-tibial amputation accounting for 50.5% and trans-femoral 49.5% of the vascular or diabetic cases (87.5% of the total amputee population) (Deans et al., 2008). These demographics give an indication of the low preoperative activity levels likely in this group, and suggest that post-operative activity levels may also be reduced (Van Eijk et al., 2012). Following on from this, found that physical mobility was the only independent factor which significantly affected quality of life in amputees as measured by the Nottingham Health Profile and when compared with their nondisabled counterparts (Chin et al., 2016). Based on this novel research, one can speculate that creation of pre-operative and post-operative personalized activity programs will ultimately reduce the incidence of amputation by the reduction of metabolic disorders such as diabetes (Vrieling et al., 2008). By comparison, the evidence for superior walking ability after more distal and unilateral amputation levels is strong. This is likely to be related to the increased energy requirements to walk with above knee and bilateral prostheses (Sansam et al., 2009). The rates of success were

similar: 31% and 33% with trans-tibial amputation (TTA) and trans-femoral amputation (TFA), respectively, achieved mobility success when seen in a comprehensive inpatient rehabilitation unit (Czerniecki et al., 2012). The importance of an intact knee joint for providing the TTA patient with the ability to return to high-level mobility activities following rehabilitation. The majority of studies reported better walking ability and greater ability to achieve ADLs after distal and unilateral amputations compared with more proximal or bilateral amputations (Obalum & Okeke, 2009). Incidence of amputation was significantly increased in patients with high systolic blood pressure, high diastolic blood pressure, high pulse pressure, severe retinopathy, high pack years smoked (Moss et al,2009). So smoking consumsion is an important factor for neuropathy. Other research shows that the major causes of lower limb amputation were vascular (83%), traumatic (12%), malignancy (3%), infection (2%) and congenital limb defects constituted 0.2%.(Boulton et al.,2005). In South-East Asia, the prevalence of disability ranges from 1.5% to 21.3% of the total population, depending on the definition and severity of disability (Cheng et al.,2005). Despite the increase in prevalence of disability worldwide not much attention has, for various reasons, been paid to its evaluation, management, and prevention(WHO, 2002.)

Depression may be described as feeling sad, blue, unhappy, miserable, or down in the dumps. Most of us feel this way at one time or another for short periods. True clinical depression is a mood disorder in which feelings of sadness, loss, anger, or frustration interfere with everyday life for weeks or longer (Zieve & Merrill 2011). Some people describe depression as “living in a black hole” or having a feeling of impending doom. However, some depressed people don't feel sad at all they may feel lifeless, empty, and apathetic, or men in particular may even feel angry, aggressive, and restless (Parashar et al., 2012). There are some factors that may play a role in depression such as, alcohol or drug abuse, certain medical conditions, including underactive thyroid, cancer, or long-term pain, certain medications such as steroids, sleeping problems, stressful life events, such as death or illness of someone close, divorce, childhood abuse or neglect, Job loss, social isolation (Zieve & Merril l2011). About one in ten of the population will suffer from depression and women are twice as likely to be affected as men. The prevalence is higher in young women and tends to decrease with age, while the opposite pattern is found in male, where the prevalence is lower in young men and increase with age. Depression occurring as an unusually prolonged or intense reaction to loss is called reactive or exogenous depression is classified as a neurosis, that is often called neurotic

depression. Particularly severe depression may also arise without any discernible cause in external events, seems to arise from 'within' the patients. This type of depression is called endogenous depression and classified as a psychosis. In endogenous depression genetic and biochemical factors are important, as opposed to environmental events. Endogenous depression may be part of an overall disorder of mood in which depression alternates with mania (Lyttle 1986).

Depression is a mood disorder accompanied by low self-esteem, feeling of inadequacy, lack of self-sufficiency, and unfavorable self-impression. It is a painful experience that depends either on a violent blow or expectation of coming danger from an unknown source (Pashang et al., 2012).

Depression varies from person to person, but there are some common signs and symptoms. It's important to remember that these symptoms can be part of life's normal lows. But the more symptoms it has, the stronger they are, and the longer they've lasted (Parashar et al., 2012).

Common symptom of depression includes agitation, restlessness, and irritability, dramatic change in appetite, often with weight gain or loss, very difficult to concentrate, fatigue and lack of energy feelings of hopelessness and helplessness, feelings of worthlessness, self-hate, and guilt, becoming withdrawn or isolated, loss of interest or pleasure in activities that were once enjoyed, thoughts of death or suicide, trouble sleeping or excessive sleeping (Zieve & Merrill 2011).

American Psychiatric Association (2020) stated that Depression symptoms can vary from mild to severe and can include:

Feeling sad or having a depressed mood.

Loss of interest or pleasure in activities once enjoyed.

Changes in appetite — weight loss or gain unrelated to dieting.

Trouble sleeping or sleeping too much.

Loss of energy or increased fatigue.

Changes in appetite — weight loss or gain unrelated to dieting.

Trouble sleeping or sleeping too much.

Loss of energy or increased fatigue.

Increase in purposeless physical activity (e.g., inability to sit still, pacing, handwringing) or slowed movements or speech (these actions must be severe enough to be observable by others).

Feeling worthless or guilty.

Difficulty thinking, concentrating or making decisions.

Thoughts of death or suicide.

Types of depression

There are many types of depression. Common types include:

 Major depression: Major depression is characterized by a severely depressed mood that persists for at least two weeks. Major depressive disorder is specified as either "a single episode" or recurrent", depending on whether period of depression occurs as discrete events or recur within an individual's life span.

 Minor depression: It also called "subclinical" or "subsyndromal" depression because it does not meet the full criteria for major depression. For example, the person has some symptoms (4 or 5) of depression. Like major depression, minor depression is associated with disability and reduced quality of life, and responds well to the same treatments that are used with major depression (Abraham et al., 2003).

Treatment in depression may be physical or non-physical.

A. Physical treatment: There are three major groups of drugs used in the treatment of depression. They are tricyclic anti-depressant, monoamine oxidase inhibitors and lithium salts.

B. Non-physical treatment: A variety of psychotherapeutic approaches have been used effectively in the treatment of depression. They are –

- Group psychotherapy.
- Relaxation therapy.
- Behavior modification.
- Social skills training.
- Social, occupational, Industrial, music and therapies.
- Psychodrama.
- Various leisure activities training.

A diagnosable depressive syndrome refers to a constellation of observable symptoms that may surround tearfulness, apathy, irritability, loss of appetite, disturbed sleep, lack of energy, death thoughts etc. in addition to depressed mood; For an individual, a depressive syndrome is recognized when the behavioral characteristics deviate from the norm in several state of functioning (Elliot, 2011). A recent study shows that up to 26% of individuals meeting the criteria for Major Depressive Disorder (MDD) (Kraft & Dorstyn., 2015).

One measure of psychosocial adaptation to amputation that has been used extensively is depression. During the period shortly after amputation, depression has been reported by some patients as being the reason for decreased use of their prosthesis and lower levels of mobility. Amongst people with long-term amputations, depression has also been associated with higher levels of activity restriction, increased feelings of vulnerability, and poorer self-rated health (Horgan et al., 2004).

Anxiety is a feeling of unease, such as worry or fear, that can be mild or severe (Appukuttan and D.P., 2016). Bandelow et al., 2015 stated that, there are several types of anxiety disorders, including:

- Generalized anxiety disorder (GAD).
- Panic disorder.
- Phobias.
- Separation anxiety. Other mental health conditions share features with anxiety disorders. These include post-traumatic stress disorder and obsessive compulsive disorder.

Videbeck (2010) stated that Common anxiety signs and symptoms include:

- Feeling nervous, restless or tense.
- Having a sense of impending danger, panic or doom.
- Having an increased heart rate.
- Breathing rapidly (hyperventilation)
- Sweating.
- Trembling.
- Feeling weak or tired.
- Trouble concentrating or thinking about anything other than the present worry.

Mayo chinic (2018) stated that Risk Factors of Anxiety are,

These factors may increase your risk of developing an anxiety disorder,

Trauma: Children who endured abuse or trauma or witnessed traumatic events are at higher risk of developing an anxiety disorder at some point in life. Adults who experience a traumatic event also can develop anxiety disorders.

Stress due to an illness: Having a health condition or serious illness can cause significant worry about issues such as your treatment and your future.

Stress buildup: A big event or a buildup of smaller stressful life situations may trigger excessive anxiety — for example, a death in the family, work stress or ongoing worry about finances.

Personality: People with certain personality types are more prone to anxiety disorders than others are.

Other mental health disorders: People with other mental health disorders, such as depression, often also have an anxiety disorder.

Having blood relatives with an anxiety disorder. Anxiety disorders can run in families.

Drugs or alcohol. Drug or alcohol use or misuse or withdrawal can cause or worsen anxiety.

The association between exercise and anxiety has received comparatively less attention, and the majority of studies have examined the transient psychological outcomes of single exercise sessions. The general finding is that state anxiety is significantly reduced following bouts of exercise, both for subjects with normal or elevated levels of anxiety. These reductions are statistically significant within 5 to15 min after the cessation of exercise and remain decreased for the following 2 to 4 h, before gradually returning to pre-exercise values. In contrast, the influence of long-term exercise programs on trait anxiety is less consistent (Martinsen and E.W., 2008)

Depression and anxiety are commonly reported after lower limb amputation and previously thought to remain high for up to 10 years. We have found that levels of both depression and anxiety resolve rapidly. It is possible that a period of rehabilitation teaching new skills and improving patient independence and mobility may modify the previous bleak outlook of amputees. This positive finding may be useful in the rehabilitation of even the most distressed of amputees (Singh et al.,2007).

Centre for the rehabilitation of the Paralyzed (CRP)

CRP is a national voluntary organization for the development of health care services through treatment and rehabilitation for person with disabilities. CRP was established in 1979 as an NGO to provide treatment and rehabilitation for the patients with paralysis, by a British physiotherapist with the help of two Bangladeshi therapists and a Bangladeshi social worker. CRP is the only institute of its kind in Bangladesh. The

quality of CRP and its importance for people with disability is widely recognized, both in Bangladesh and abroad. CRP has an out patient services held 3 times a week. The patient can take the help who are predominantly paralyzed by stroke, GBS, Parkinson, cerebral palsy etc. other facilities include physiotherapy, occupational therapy, social welfare department, special needs school for children with cerebral palsy, pediatric, children with cerebral palsy unit, operating facilities and a multipurpose hall. CRP also provides social welfare after care, vocational training and follow up visits at home.
CRP has been involved in a Community Based Rehabilitation (CBR) program since 1994. The CBR program is now working in 61 Upazillas of 8 Districts throughout Bangladesh. CRP also provides stage training to the paralyzed people as a production unit for making furniture, wheel chair and tricycle prototypes (Claque and Sym, 2004).

CRP 2019 stated that the P&O department manufacture custom made prostheses for all levels of amputees to suit a person's needs and goals. The P&O department combine technological innovation with anatomical design and medical science to create beautiful, functional and comfortable prostheses. Professionals of P&O department collaborate closely with each client to produce a customized and personal result. The technical staff are masters in the field of contemporary prosthetic manufacture and pride themselves on creating devices of the highest quality.

Knee amputation and Rehabilitation:

An amputation does not only have an impact on a person's physical functioning but can result in poor quality of life, dependence and exclusion from societal participation. Rehabilitation and prosthetic interventions are known to facilitate those with a lower limb amputation to return to independence in activities of daily living, improved quality of life and inclusion in society. For optimal and patient-centred outcomes, rehabilitation services are of paramount importance. Due to the challenges with providing services in rural areas, community-based rehabilitation is the ideal model for providing rehabilitation to persons with lower limb amputation in rural settings. In order to plan an appropriate community-based approach to rehabilitation, establishing the prevalence of disability and patient-specific needs are imperative (Manig and S.M., 2018)

Morvan et al., (2014) stated that **The Treatment Protocol for Lower limb amputation patients**:

Pre Prosthetic:

1. Proper Bandaging.
2. Isometric strengthening exercise of hamstring and quads.
3. Strengthening exercise with sand bag
4. Bridging exercise.
5. Balance practice.
6. Exercise in parallel bar.
7. Group exercise.

Prosthetic Training:

a) Weight bearing and Balance Practice:
    1. Partial weight bearing (Two hand support).
    2. Partial weight bearing (One hand support).
    3. Partial weight bearing (Fingertip support).
    4. Partial weight bearing (without support).
    5. Partial weight shifting (Two hand support).
    6. Partial weight shifting (One hand support).
    7. Partial weight shifting (without support).
    8. Partial weight shifting -forward and backward (two hand support).
    9. Partial weight shifting -forward and backward (one hand support).
    10. Partial weight shifting -forward and backward (without support).
    11. Pelvic rotation.
    12. Sideward walking.
    13. Full weight shifting (two hand support).
    14. Full weight shifting (without support).
    15. Heel strike (with or without support).
    16. Handball- place sound leg on a raised object (with or without support).
    17. Balance board.
    18. Obstacle stepping (with or without support).
    19. Football (with or without support).
    20. Handball.

b) Special Gait Training:
    1. Sound leg step forward (two hand support).

2. Sound leg step backward (one hand support).
3. Sound leg step through (two hand support).
4. Sound leg step through (one hand support).
5. Sound leg step through (without support).
6. Prosthetic leg step forward (two hand support).
7. Prosthetic leg step backward (one hand support).
8. Prosthetic leg step through (two hand support).
9. Prosthetic leg step through (one hand support).
10. Prosthetic leg step through (without support).
11. Walking between the parallel bars (one hand support).
12. Walking between the parallel bars (without support).

c) Advance Exercise:

1. Bouncing a ball (stationary position).
2. Bouncing a ball (walking).
3. Balancing a stick.
4. Balancing on the prosthesis
5. Walking on an uneven surface.
6. Going up and down a slope.

d) Functional Exercise:

1. Rising from chair.
2. Climbing a staircase.
3. Descending a staircase.
4. Sitting down and getting up from the floor.
5. Weight carrying.

CHAPTER III METHODOLOGY

3.1 Study Design:

The Quasi experimental quantitative design was used for the study design. An experimental design that was not meet all requirements necessary for controlling impacts of extraneous variables. Quasi-experimental research was similarities with the traditional experimental design or randomized controlled trial. Since quasi-experimental designs was used when randomization will impractical and or unethical, they are typically easier to set up than true experimental designs, which require random assignment of subjects. Here researcher was chosen the Single-Group as the subjects in the experimental group was act as their own control. The subjects were given a pretest, followed by intervention and a post test. But this also keeps many challenges for the investigator. This lack of randomization makes it harder to rule out confounds and introduces new threat to internal validity. Utilizing quasi-experimental designs minimizes threats to external validity. Since quasi- experiments are natural experiments, findings in one may be applied and setting, allowing for some generalizations to be made about population.

The pre-post experimental design could be shown by:

One group pretest –post test design:

O X O

The pretest-posttest design is valuable in describing what occurs after the introduction of the Independent variable.

3.2 Target Population

A population is the total group or set of event or totality of the observation on which a research is carried out. In this study, sample population were selected from the participant of Prosthetics and Orthotics department of Centre for the Rehabilitation of the paralyzed (CRP), Savar. Dhaka.

3.3 Study Site

The research was conducted at the Centre for the Rehabilitation of the paralyzed (CRP), Savar. Dhaka.

3.4 Study Area

The study is conducted at Prosthetics and Orthotics department of Centre for the Rehabilitation of the paralyzed (CRP), Savar, Dhaka.

3.5 Sample Size Calculation:

The equation of sample size calculation are given below-

$$n=\frac{Z^2 P\,(1-P)}{d^2}$$

here, Z = Z statistic for a level of confidence,

P = expected prevalence or proportion

(in proportion of one; P = 0.05 as Prevalence is 0.5%) (Korovessis et al., 2012)

And d = precision (in proportion of one; if 5%, d = 0.05).

n= 72.96

According to this equation the sample should be 73 people but due to covid 19 pandemic the availability of the sample was not enough, the study is conducted with 12 lower limb amputee participants are selected according to the inclusion and exclusion criteria.

3.6 Subject Inclusion Criteria

- Patients with knee amputation (above and below knee).
- Both male and female.
- Patients who are 20-60 years old.
- Voluntary participant.

3.7 Subject Exclusion Criteria

- Patient with others mental or physical illness.
- Patients who are <20 years old and >60 years old.
- Patients with cognitive disorders.
- Not able to give consent.

3.8 Sampling Techniques

Simple random sampling technique is used for this study. In this technique each number of the population has an equal chance of selection. It is therefore more representative. It is also called unrestricted random sampling.

3.9 Data Collection Procedure

The researcher followed the time schedule of the setting for data collecting data. Researcher has chosen two scales for collecting data. In this study there were 12 samples which were participating in this study and taken treatment from P&O department at least 2 weeks. The researcher used pen, pencil, white page, data collection form with PHQ-9 (Patient Health Questionnaire) for depression measurement and GAD-7 (General Anxiety Disorder-7). Data was collected from August to October, 2021.

Firstly, the researcher assessed the patients to confirm inclusion and exclusion criteria.

ii. At the first day of data collection the researcher introduced with the patients. Then given a consent form to the patients and explained the subject of research and objective of the research project to the patients.

iii. When the participant permitted to collected data then started the interview with the form.

3.10 Data Analysis

Statistical Package for Social Science (SPSS) version 20.0 will be used for data analysis.

3.11 Informed consent

Written consent was given to all participants prior to completion of the questionnaire. The researcher explained to the participants about his or her role in this study. The researcher received a written consent form every participants including signature. So the participant assured that they could understand about the consent form and their participation was on voluntary basis. The participants were informed clearly that their information would be kept confidential. The researcher assured the participants that the study would not be harmful to them. It was explained that there might not a direct

benefit from the study for the participants but in the future cases like them might get benefit from it. The participants had the rights to withdraw consent and discontinue participation at any time without prejudice to present or future treatment at the Prosthetics and Orthotics department at CRP. Information from this study was anonymously coded to ensure confidentiality and was not personally identified in any publication containing the result of this study.

3.12 Ethical consideration

A research proposal was submitted for approval to the administrative bodies of ethical committee. The researcher will take permission from Bangladesh Health Profession Institute and Clinical department of physiotherapy in CRP, Saver. Patient permission will be taken. The participants were explained the purpose and goal of the study. Subjects have participated voluntarily and they were also told that confidentiality would be maintained. Furthermore the researcher would be available to answer any questions in regard to the study. All information kept in secure. Ensure about patient safety.

CHAPTER IV RESULT

4.1 Sociodemographic information

4.1.1 Age: Out of 12 participants 41.70% (n=5) were Adults (20-39aged). 33.30% (n=4) were Middle adults (40-59 aged). And remaining 25.0% (n=3) were senior adults (60+ aged).

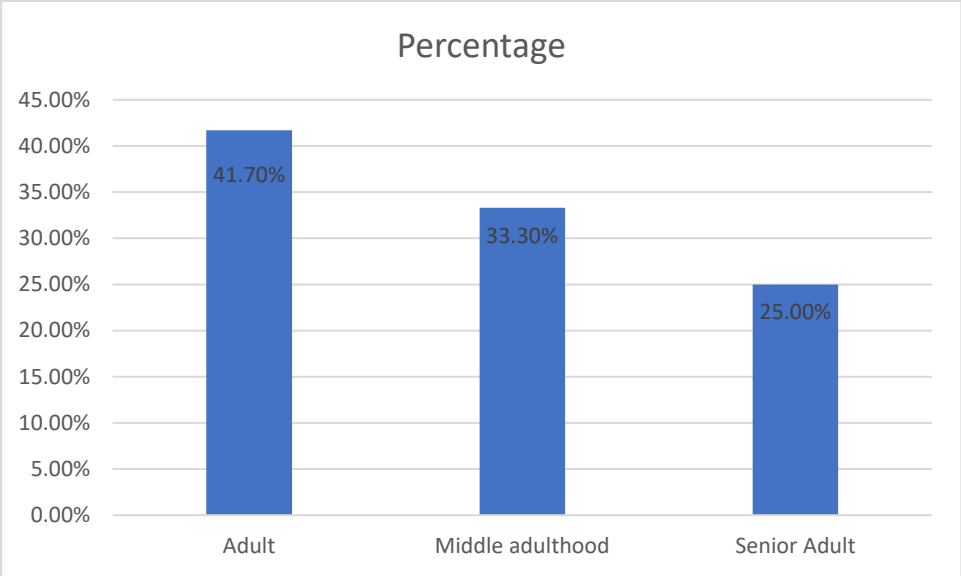


Fig 1: Age distribution of the respondents

4.1.2 Gender

Male was predominantly higher than female. Out of 12 participants 91.70% (n=11) were male and 8.30% (n=1) were female.

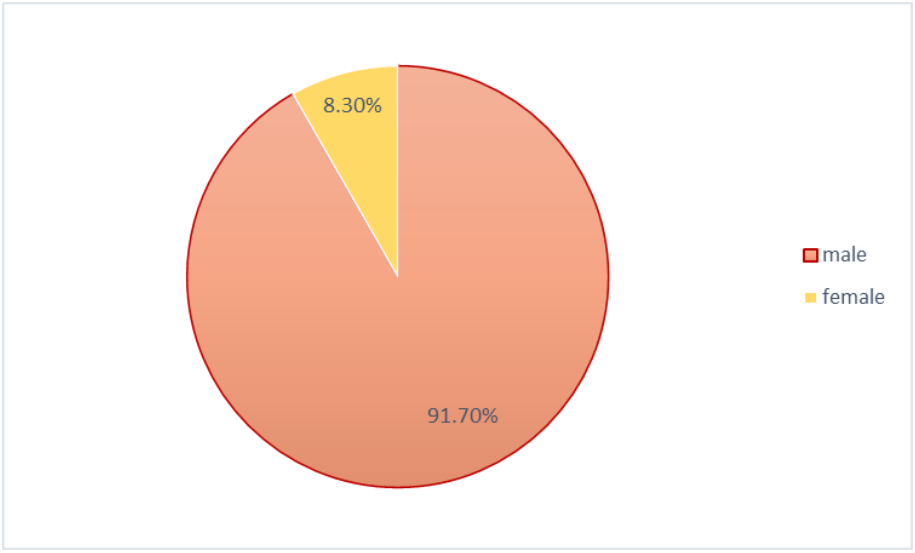


Fig 02: Gender distribution of the respondents

4.1.3 Occupation

The chart shows that the number of farmer are more than other profession 25% (n=3). Survice Holders are 16.70% (n=2). Driver, Businessman, Mason, Housewife, Students 8.30% (n=1) and other occupations are 16.70% (n=2).

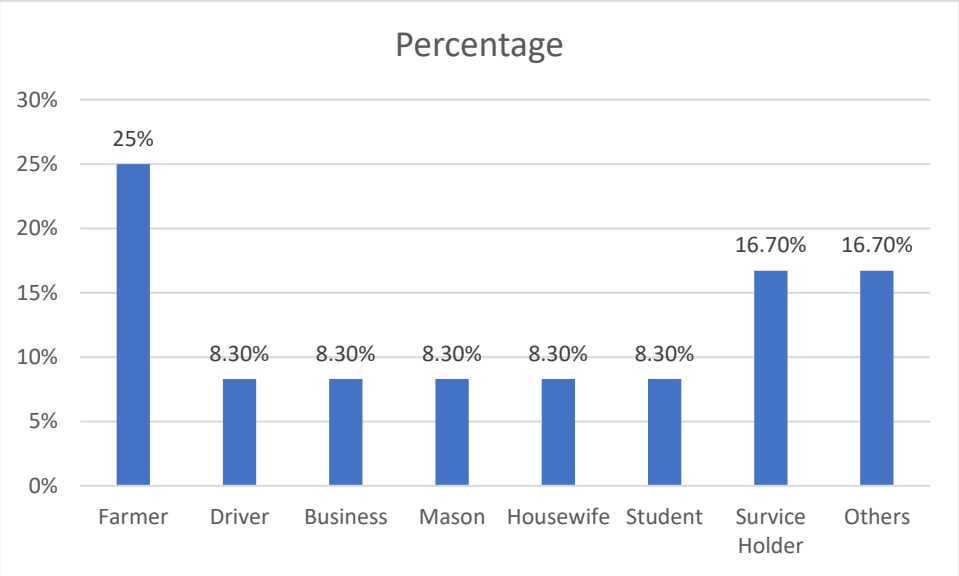


Fig 03: Occupation of the participants

4.1.4 Living Area

Most of the respondents were from rural areas. Only 33% (n=4) were from urban area and rest of them from semi urban area 17% (n=2).

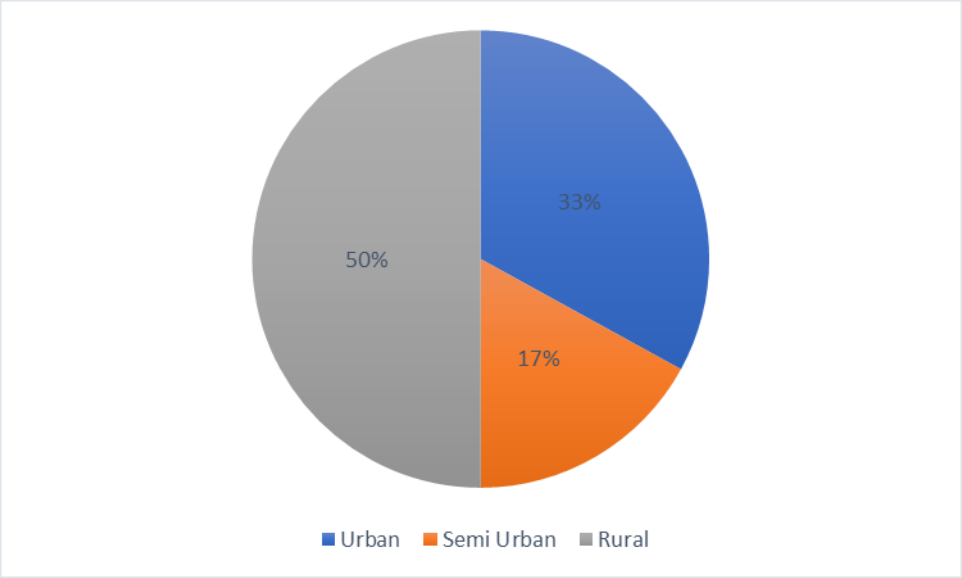


Fig 04: Living area of the participants

4.2 Patients Personal Physical Information

4.2.1 Smoking

Out of 12 participants, 66.70% (n=8) participants said they didn't do smoking. And rest 33.30% (n=4) participants did smoking.

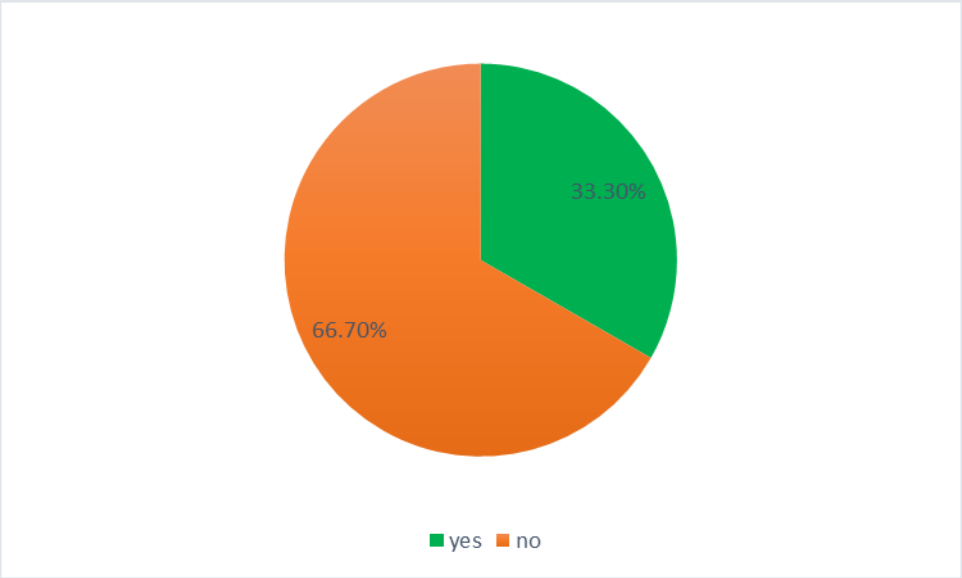


Fig 5: Smoking

4.2.2 Cause of Amputation

Out of 12 participants from knee amputee patients, most of them (58.30%) had RTA (Road traffic accident), here (n=7). And the second most common cause of amputation is Infection 25% (n=3). 8.3% participants (n=1) had to do amputation because of Bone tumor. Rest 8.3% (n=10) participants got electrical shock and had to do amputation. Figure 6 shows the details information of the causes of amputation of the respondents.

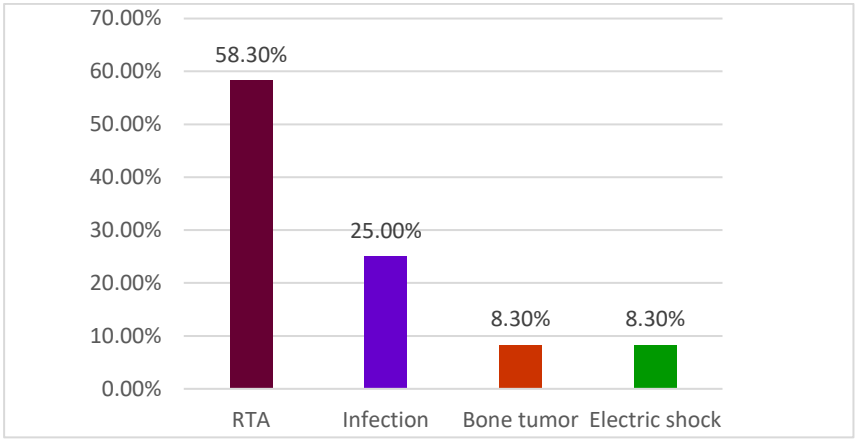


Fig 6: Causes of Amputation

4.2.3 Level of Amputation

Out of 12 participants, 58.3% (n=7) had above knee (trans femoral) amputation And 41.7% (n=5) participants had below knee (trans tibial) amputation.

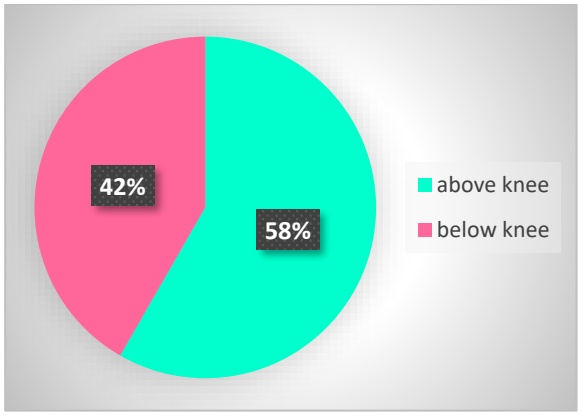


Figure 7: Level of Amputation

Table 1: Subjects Age, Sex and Level of Amputation.

Subjects	Age	Sex	Amputation Level
1	43	Male	Above knee
2	49	Female	Above knee
3	26	Male	Above knee
4	24	Male	Above knee
5	28	Male	Above knee
6	28	Male	Below knee
7	27	Male	Above knee
8	60	Male	Below knee
9	42	Male	Above knee
10	60	Male	Below knee
11	46	Male	Below knee
12	60	Male	Below knee

Table 2: Pre-test and post-test score of the subject:

Subjects	Pre-test depression score	Post-test Depression score
1	13	7
2	6	3
3	2	1
4	16	11
5	9	10
6	14	5
7	12	5
8	4	0
9	4	2
10	16	11
11	9	6
12	7	8

Table 3: Difference between pre-test and post-test score of depression level:

Subjects	**Pretest score X1**	**Posttest Score X2**	**Difference between Pretest and posttest (*d*=X1-X2)**	***d*²**
1	13	7	+6	36
2	6	3	+3	9
3	2	1	+1	1
4	16	11	+5	25
5	9	10	-1	1
6	14	5	+9	81
7	12	5	+7	49
8	4	0	+4	16
9	4	2	+2	4
10	16	11	+5	25
11	9	6	+3	9
12	7	8	-1	1
	ΣX1=112 X1=9.33	ΣX2=69 X2=5.75	Σ*d*=43	$\Sigma d^{2=}257$

Mean score of pre-test and post-test

Mean score of depression level before rehabilitation=9.33
Mean score of depression level after rehabilitation=5.75

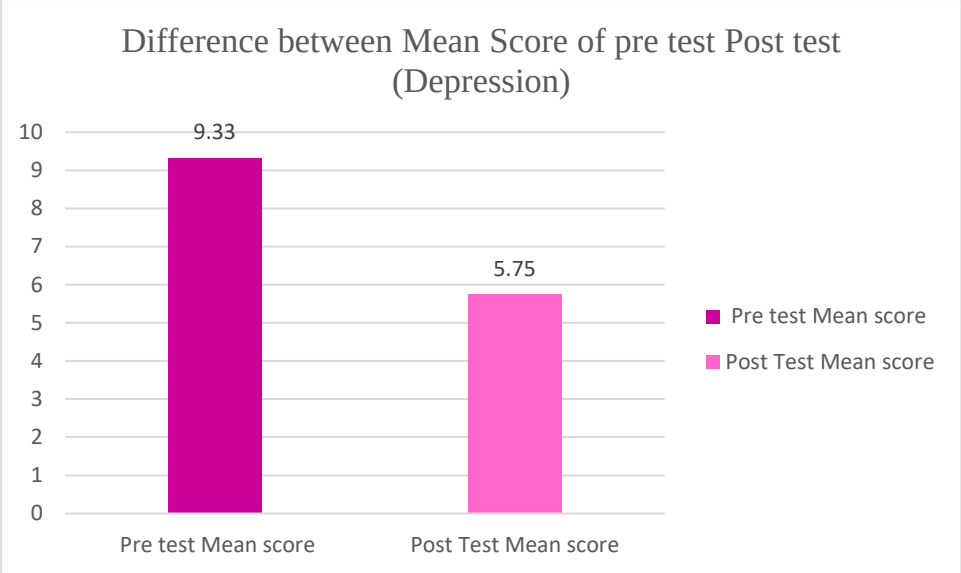


Figure 8: Difference Between Mean score of pre test & post test (depression)

Table- 4 shows paired t test result for depression

Mean difference	SD of mean difference	95% confidence interval of the difference		df	t	P-value
3.583	3.059	Lower	upper	11	4.058	.002
		1.640	5.527			

The level of significance for two tailed hypothesis

P value for the study is .002, which is <0.05

Variable	**'t' value**	**P value**	**Remark**
Improvement of depression level	4.58	.002	Significant

Interpreting the results,
The results have an associated probability of less then 0.05, which means that the chances of random error accounting for the outcome of this experiment are less than 5 in 100. Because the usual cut-off point for claiming that the result is significant is 5%, we can conclude that our result is significant, at less than the 5% level.

After knee amputation patients faces a lot of complications. Psychological complications are one of them. Depression and Anxiety are the major problems among them. A mark reduction of depression as sadness, hopelessness, feeling down, guilt, poor appetite or overeating, feeling bad about own, loss of interest, thoughts of death are seen. Physical disabilities are the major cause for those symptoms of knee amputee patients. The rehabilitation program of CRP can reduce those effects of disability and also the effects of depression of knee amputee patients.

Table 5: Pre-test and post-test score of anxiety:

Subjects	**Pretest score**	**Posttest score**
1	1	1
2	6	4
3	4	1
4	2	2
5	2	2
6	3	1
7	9	6
8	4	0
9	1	1
10	8	3
11	5	2
12	3	2

Table 6: Difference between pre-test and post-test score of anxiety level:

Subjects	**Pre test X1**	**Post test X2**	**Difference between Pretest and posttest (*d*=X1-X2)**	d^2
1	1	1	0	0
2	6	4	2	4
3	4	1	3	9
4	2	2	0	0
5	2	2	0	0
6	3	1	2	4
7	9	6	3	9
8	4	0	4	16
9	1	1	0	0
10	8	3	5	25
11	5	2	3	9
12	3	2	1	1
	$\sum$X1=48 X1=4	$\sum$X2=25 X2=2.08	$\sum d$= 23	$\sum d^2$= 77

Mean score of pre-test and post-test

Mean score of anxiety level before rehabilitation= 4

Mean score of anxiety level after rehabilitation= 2.08

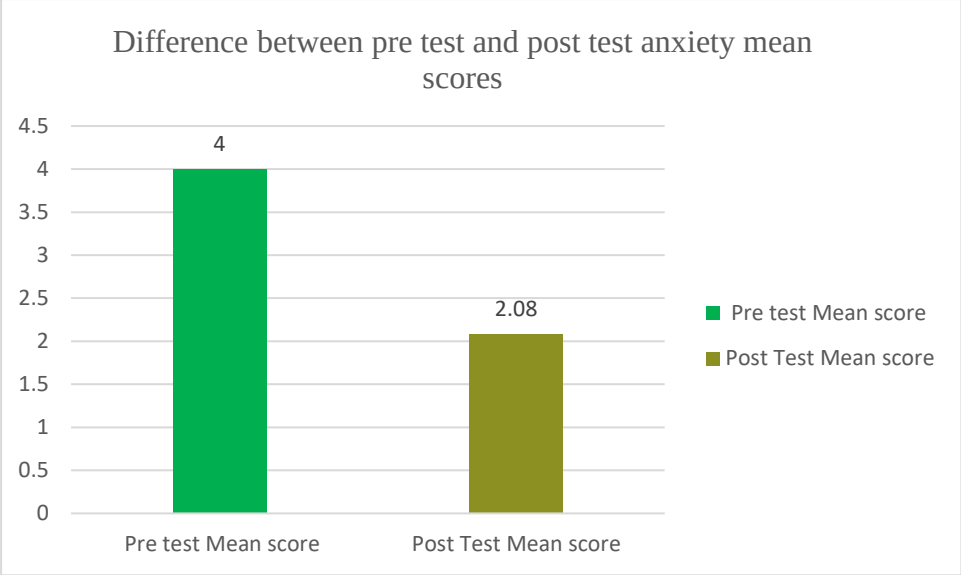


Figure 9: Anxiety mean scores difference pre test and post test

Table 7 shows paired t test result for anxiety

Mean difference	SD of mean difference	95% confidence interval of the difference		df	t	P-value
1.917	1.730	Lower	upper	11	3.838	.003
		.818	3.016			

P value for the study is .003, which is <0.05

The level of significance for two tailed hypothesis

Variable	't' value	'P' value	Remark
Improvement of anxiety level	3.839	.003	Significant

Interpreting the results,

The results have an associated probability of less then 0.05, which means that the chances of random error accounting for the outcome of this experiment are less than 5 in 100. Because the usual cut-off points for claiming that the result is significant is 5%, we can conclude that our result is significant, at less than the 5% level.

After knee amputation patients faces a lot of complications. Psychological complications are one of them. Depression and Anxiety are the major problems among them. A mark reduction of anxiety as feeling nervous, anxious, not being able to stop or control worrying, worrying too much about different things, trouble relaxing, being so restless, becoming easily annoyed or irritable, feeling afraid as if something awful might happen are seen. Physical disabilities are the major cause for those symptoms of knee amputee patients. The rehabilitation program of CRP can reduce those effects of disability and also the effects of anxiety of knee amputee patients.

The purpose of this study to find out the effectiveness of rehabilitation program of CRP for knee amputee patients to reduce the depression and anxiety and the level of depression and anxiety among them of knee amputation patients and to see the improvement rate.

In this Pre experimental study 12 subjects with knee amputation were conveniently allocated to treatment group. This group participates in rehabilitation program of CRP and also takes other treatments. Each subject of the group had participated two weeks of prosthetics treatment session at Prosthetics and Orthotics department in CRP. The outcome of depression was measured by depression scale PHQ-9 (Patients Health Questionnaire-9). And the outcome of anxiety was measured by anxiety scale GAD-7 (General Anxiety Disorder-7).

The experimental hypothesis was that the rehabilitation program of CRP can reduce depression and anxiety level of knee amputation patients. It is a two tailed hypothesis. From this hypothesis three variables were found, one was rehabilitation program of CRP that was independent variable and other was changes in depression level which is dependent and anxiety levels are dependent variables. The dependent variables that mean, the outcomes of rehabilitation of CRP for reducing depression and anxiety of knee amputee patients were measured by depression scale PHQ-7 and anxiety scale GAD-7 which are realistic and measurable. It can be said that experimental hypothesis was realistic and testable.

The study represents that, the depression score of the subjects before starting rehabilitation program in P&O departments at CRP mean score was 9.33 and after participating in two weeks of treatment of P&O Department at CRP mean score was

5.75. There-fore the mean score of depression level is reduced that means participating in two weeks of treatment of P&O Department at CRP mental status is improved.

Same as, the anxiety score of the subjects before starting rehabilitation program in P&O departments at CRP mean score was 4 and after participating in two weeks of treatment of P&O Department at CRP mean score was 2.08. There-fore the mean score of anxiety level is reduced that means participating in two weeks of treatment of P&O Department at CRP mental status is improved.

In this study, using a same- subject group, where subjects were conveniently allocated to the treatment program group. The same subjects are used for each level of the independent variable. Since the subjects are the same for all levels of the independent variables, they are their own controls (that is, subject variables are controlled). Outcomes were measured by collecting the scores of different variables and the scores are considers of ordinal data. The pretest-posttest comparison group design is one of the most extensively used methods to evaluate clinical research. Common method of analyzing data from a pretest-posttest research design are paired ‘t’ test on the difference score between pretest and posttest. This study used parametric ‘t’ test to calculate the significance level of the study. The paired ‘t’ test is used to find out whether the ‘t’ value represented a significance difference between the results from before received treatment and after received treatment of the same group of subjects. So, Significant positive chances are found dependent variables after participating rehabilitation program in P&O Department of CRP. P value for both Depression and Anxiety were <0.05 which is considered as significant. It means. Depression and Anxiety level significantly decrease after two weeks of rehabilitation program in P&O department at CRP.

CHAPTER V DISCUSSION

This quazi experimental pre-test post-test study result showed that the level of depression and anxiety decreased after 2 weeks of rehabilitation program at CRP. The purpose of the study to evaluate the sociodemographic information (age, sex, living area, education, occupation, causes of amputation, level of amputation) and to find the level of depression and anxiety and the effectiveness of Rehabilitation program of CRP for the knee amputee patients. Quasi experimental design was selected for this study due to unavailability of the patients.

Many studies have investigated the depression and anxiety among individuals with lower limb amputations. Most patients who lose a limb as a result of traumatic or surgical procedures encounter a series of complex psychological responses. Psychological reactions to amputation depend on a number of factors, which include age and sex, type and level of amputation, lifelong patterns of coping with stress, value placed on the lost limb, and expectations from the rehabilitation program. The individuals affected by the traumatic loss of a limb are required to face a redefined body and self as well as a new reality (Hawamdeh et al., 2008). In this study, the level of depression and anxiety in each participating patient was assessed by the Hospital Anxiety and Depression Scale (HADS). The result of this study shows that, the prevalence of anxiety and depressive symptoms were 37% and 20%, respectively. Factors associated with high prevalence of psychological symptoms included female gender, lack of social support, unemployment, traumatic amputation, shorter time since amputation, and amputation below the knee. These findings were confirmed by a significant reduction of anxiety and depression scores in patients who received social support, patients with amputation due to disease, and patients with amputation above the knee. Presence of pain and use of prosthesis had no effect on the prevalence. This study took 80 amputated patients, out of which, 68 were male (85%), 12 were females (15%), people with Left sided limb amputated were 42.5%, Right limb amputation were 46.3% and bilateral limb amputation consisted of 11.3%. Based on level of amputation most people have undergone below knee amputation (57.5%) followed by above knee amputation (27.5%). Most amputations were done after trauma followed by vascular causes. Females showed high scores on HADS total compared to males. Anxiety was found more in females than males than depression. Most studies have found no

difference in psychosocial outcome between men and women. The data from their study revealed that females suffered from more reactive depression and anxiety symptoms than males. People whose amputation followed by trauma showed higher scores of HADS Anxiety and depression were found slightly higher among this group though not significant statistically. They were poorly adjusted in comparison to people amputated due to other causes. Young adults with traumatic amputation may be at higher risk of major depression compared with individuals with disease-related amputations. Unemployed people showed higher scores of HADS. Within the groups of occupation, significant variation was found in HADS with F= 5.581 and P=0.001 within socioeconomic status, only HADSD showed significant variance (0.028). Unmarried people have shown higher scores of HADS total. Higher rates of anxiety and depression was found among unmarried people as compared to married people HADS Total showed significant variation with F value 5.50 and significance 0.006. My study result showed, out of 12 participants 91.70% (n=11) were male and 8.30% (n=1) were female. Farmer are more than other profession 25% (n=3). Survice Holders are 16.70% (n=2). Driver, Businessman, Mason, Housewife, Students 8.30% (n=1) and other occupations are 16.70% (n=2). Most of the respondents were from rural areas. Only 33% (n=4) were from urban area and rest of them from semi urban area 17% (n=2). Out of 12 participants from knee amputee patients, most of them (58.30%) had RTA (Road traffic accident), here (n=7). And the second most common cause of amputation is Infection 25% (n=3). 8.3% participants (n=1) had to do amputation because of Bone tumor. Rest 8.3% (n=10) participants got electrical shock and had to do amputation. Out of 12 participants, 58.3% (n=7) had above knee (trans femoral) amputation and 41.7% (n=5) participants had below knee (trans tibial) amputation. And my study result found a significant reduction of depression and anxiety of knee amputee patients after taking treatment from CRP.

Singh et al., 2009 mentioned that Depression and anxiety are common after lower limb amputation but resolve during inpatient rehabilitation. The incidence then rises again after discharge. Of the 68 responding patients, 12 (17.6%) and 13 (19.1%) had symptoms of depression and anxiety respectively. This compared to an original incidence of 16 (23.5%) for both on admission and 2 (2.9%) on discharge. This rise in incidence from time of discharge was highly significant for both depression (P50.001) and anxiety (P50.001). Depression at follow-up was correlated to depressive symptoms

at admission (P ¼ 0.03) and to having other significant comorbidities (P ¼ 0.02). Anxiety symptoms were commoner in younger patients (P ¼ 0.03). There was no association with age, gender, living in isolation, vascular cause for amputation, wearing a limb prosthesis or length of original inpatient stay. In this study, the level of depression and anxiety in each participating patient was assessed by the Hospital Anxiety and Depression Scale (HADS). At admission, 28 (26.7%) and 26 (24.8%) patients had symptoms of depression and anxiety respectively. This dropped to 4 (3.8%) and 5 (4.8%) by time of discharge, a mean of 54.3 days later. These reductions were statistically significant, as was the association between patients having symptoms of both depression and anxiety ($P < 0.001$). Patient stay was longer in those with symptoms (depression, $P < 0.03$; anxiety $P < 0.001$). There was no association with level of amputation, success of limb-fitting, age or gender. Depressive symptoms were associated with presence of other medical conditions ($P < 0.01$) and anxiety scores with living in isolation ($P < 0.05$). Depression and anxiety are commonly reported after lower limb amputation and previously thought to remain high for up to 10 years. They have found that levels of both depression and anxiety resolve rapidly. It is possible that a period of rehabilitation teaching new skills and improving patient independence and mobility may modify the previous bleak outlook of amputees. This positive finding may be useful in the rehabilitation of even the most distressed of amputees.

The amputees have a large number of psychosocial concerns which need to be addressed to provide a holistic care and a better QOL. It is essential to sensitize the community, the health care providers and the patient's family to the additional psychosocial needs of the amputee (Bhutani et al., 2016). This cross-sectional study included subjects who had undergone traumatic amputations. Fifty subjects participated in this study. The mean anxiety and depression scores were 9.10±5.7 and 3.44±3.42, respectively. The length of original inpatient stays, people at hand for help, number of hospitalizations, number of follow ups per year, type of family (nuclear versus joint), pain perception, optimism, rehabilitation satisfaction and lower limb amputations correlated significantly with anxiety levels in the patients. The depression levels correlated significantly only with perception of pain. It is essential to sensitize the community, the health care providers and the patient's family to the additional psychosocial needs of the amputee. Measures need to be taken to provide proper education and counseling of such patients. Provisions should be made to provide

prostheses, counsel the amputees and to provide adequate physiotherapy and multidisciplinary pain relief to make the rehabilitation easier.

My study result is significant because it is prospective unlike much of the previous literature. It allows us to explore the level of depression and anxiety before and after receiving rehabilitation program at CRP. No previous study provided us any clear discussion about this.

Study Limitation:

The current study had some potential limitations. The main limitation of this study was its short duration and unavailability of the patients due to covid 19 pandemic and long period of lockdown. The study was conducted with 12 lower limb amputee patients which was a very small number of samples. The data collection was challenging in clinical side because of safety issues. As the study was conducted at selected area of Center for the Rehabilitation of the Paralysed (CRP) in Prosthetics and Orthotics department which might not represent the whole population with knee amputation in the context of Bangladesh. As a first researcher, may be the lack of knowledge and experience. In this type of relevant study are not available in Bangladesh so the research related information is limited.

CHAPTER VI CONCLUSION AND RECOMMENDATON

Conclusion:

Amputation is a devastating and life threatening incident of a person's life. This leads a man to a whole new challenging stages of life. It is one of the leading causes of poor functioning, hampered daily living activities and a socioeconomic challenge. This is particularly true for developing countries like Bangladesh, where health support system including the rehabilitation system is not within the reach of ordinary people. It is clear that, this destructive condition not only affect the patient physically but also mentally. Bangladesh is a developing country with low socio-economic condition health services are not sufficient in the Government and non-government sector. As in some conditions amputation cannot be subsided, it is important to take some preventive measures to overcome depression and anxiety of them. after amputation, individuals have severe mental problems such as anger, introversion, helplessness, and decreased self-esteem. Depressions and Anxiety are the major mental illness among them. Negative attitude of their families, who are expected to be supportive during this period, negatively affect the adaptation process of the individuals. A notable point is that the individuals stated that they could talk and feel relieved and get support if they had access to a mental health professional. According to this study results, after amputation, in addition to their physical recovery, individuals must undergo an extensive evaluation of their mental status in routine follow-ups, necessary support must be provided, appropriate family members must be invited to the follow-ups and share their feelings. In addition to these, training the society regarding the view of and attitude toward the amputees and its consequences can play a significant role in raising awareness.

Recommandation

The aim of the study was to find out the level of depression and anxiety among the knee amputee patients after rehabilitation at CRP. And the result which found from the study has fulfilled the aim of this research project. The following recommendations are-

- Should find out the factors causing depression and anxiety among knee amputee patients.
- Should find out effective treatment protocol to reduce depression and anxiety among knee amputee patients.

- Should take more samples for generating the result and make more valid and reliable.

- Should do pilot study to establish the appropriateness of the questionnaire.
- Sample should collect from different hospital, clinic, institute and organization in different district of Bangladesh to generalize the result.

This is an undergraduate study and doing the same study at graduate level will give more precise output. There were some limitation of this study mentioned at the relevant section; it is recommended to overcome those limitations during further study. So for further study it is strongly recommended to increase sample size with adequate time to generalize the result in all of the knee amputee patients in Bangladesh for better results and perspectives.

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Appendix

BANGLADESH HEALTH PROFESSIONS INSTITUTE

বাংলাদেশ হেল্‌থ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)

Bangladesh Health Professions Institute (BHPI)

(The Academic Institute of CRP)

Ref: CRP/BHPI/IRB/06/2021/465 Date: 16/06/2021

To
Chowdhury Muhsinin Mosharofy
4th Year B.Sc. in Physiotherapy
Session: 2015-2016, Student's ID:112150297
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal **"Depression and Anxiety among the knee amputee patients before and after rehabilitation at CRP"** by ethics committee.

Dear Chowdhury Muhsinin Mosharofy,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above mentioned dissertation, with yourself, as the principal investigator and Muhammad Millat Hossain as thesis supervisor. The Following documents have been reviewed and approved:

Sr. No.	Name of the Documents
1	Dissertation/thesis/research Proposal
2	Questionnaire (English & / or Bengali version)
3	Information sheet & consent form.

The purpose of the study is to screen the depression and anxiety among the knee amputee patients before and after rehabilitation at CRP. The study involves use of the questionnaire PHQ-9 and GAD-7 that may take 10 to 15 minutes to answer 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 10:00 AM on 1st March, 2020 at BHPI 23rd IRB Meeting.

The institutional Ethics committee expects to be informed about the progress of the study, any changes occurring in the course of 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,

Muhammad Millat Hossain
Assistant Professor, Dept. of Rehabilitation Science
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

CRP-Chapain, Savar, Dhaka-1343, Tel : 7745464-5, 7741404
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd, www.crp-bangladesh.org

Permission letter

17. 08. 2021

The Head of the program

Prosthetics and Orthotics

Centre for the Rehabilitation of the Paralysed (CRP),

Chapain, Savar, Dhaka-1343.

Subject: Seeking permission for data collection of 4th year physiotherapy research project.

Respected Sir,

With due respect and humble submission to state that I am Chowdhury Muhsinin Mosharofy, student of 4th Professional B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI).The ethical committee has approved my research project entitled on "Comparison of Depression and Anxiety among the knee amputee patients before and after rehabilitation at CRP' under the supervision of Mohammad Millat Hossain, Assistant Professor, Dept. of Rehabilitation Science, CRP, Savar,Dhaka-1343,Bangladesh. Conducting this research project is partial fulfillment of the requirement for the degree of B.Sc in physiotherapy. I want to collect data for my research project from the patients of Prosthetics and Orthotics department, CRP-Savar. So, I need permission for data collection from Prosthetics and Orthotics department of CRP-Savar. I would like to assure that anything of my study will not be harmful for the participants.

May I, therefore pray and hope that you would be kind enough to grant my application & give me permission for data collection and oblige thereby.

Recommended & Forwarded
17/08/2021
Muhammad Millat Hossain
Assistant Professor
Project & Course Coordinator
Dept. of Rehabilitation Science
CRP, Savar, Dhaka-1343, Bangladesh

Yours obediently,

Chowdhury Muhsinin Mosharofy
4th professional B.Sc in Physiotherapy
Roll: 26, Session: 2015-16

Bangladesh Health Professions Institute (BHPI)

(An academic Institute of CRP)

CRP, Chapain, Savar, Dhaka-1343.

She may allow to take data from pre dept as per policy.
17.08.2021

CONSENT FORM

(Please read out to the participants)

Assalamualaikum, my name is Chowdhury Muhsinin Mosharofy. I am 4th year student of B.Sc. in Physiotherapy program at Bangladesh Health Professions Institute (BHPI). For my study purpose I am conducting a study on stroke patients and my study title is "Depression and Anxiety among knee amputee patients before and after rehabilitation at CRP."

I would like to know about some personal and other related information regarding stroke. This will take approximately 10-15 minutes. This is an academic study and will not be used for any other purpose. The researcher is not directly related to P&O unit, so your participation in the research will have no impact on your present or future treatment in P&O department. Researcher will maintain confidentiality of all procedures. Your data will never be used without your permission. Your participation in this study is voluntary and you may withdraw yourself at any time during this study therefore any type of remuneration will not be provided. No additional intervention will be provided.

If you have any query about the study or your right as a participant, you may contact with me or my research supervisor, Muhammad Millat Hossain, Assistant Professor, Department of Rehabilitation Science, Bangladesh Health Professions Institute (BHPI), CRP Savar, Dhaka-1343.

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

Yes / No

Signature of the Participant ……Date……

Signature of the Interviewer …… Date ……..

Signature of the Researcher ……Date……

সম্মতিপত্র

(অংশগ্রহণকারীকে পড়ে শুনাতে হবে)

আসসালামু আলাইকুম, আমার নাম চৌধুরী মুহছিনীন মোশারফী। আমি বাংলাদেশ হেলথ প্রফেশনস ইনস্ট্টিউট এর ফিজিওথেরাপি বিভাগের একজন ছাত্রী। আমার গবেষণা কাজের জন্য আমি প্রস্থেটিক্স এবং অর্থসিস রোগীদের ওপর একটি গবেষণা পরিচালনা করছি এবং আমার অধ্যায়ন শিরোনাম "সি আর পি তে পুনর্বাসন এর আগে এবং পরে হাটু এম্পুউটি রোগীদের বিষন্নতা এবং উদ্বেগের তুলনা"। এক্ষেত্রে আমি আপনার প্রস্থেটিক্স এবং অর্থসিস সম্পর্কে আনুষাঙ্গিক কিছু তথ্য জানতে চাচ্ছি। এতে প্রায় 10 থেকে 15 মিনিটের মত সময় লাগবে। এটি একটি শিক্ষাগত গবেষণা যা অন্য কোন উদ্দেশ্যে ব্যবহার করা হবে না। আপনার বর্তমান বা ভবিষ্যৎ এর চিকিৎসায় কোন প্রভাব ফেলবে না।গবেষক গবেষণার প্রতিটি ধাপে গোপনীয়তা বজায় রাখবেন। আপনার তথ্য আপনার অনুমতি ছাড়া কোথাও ব্যবহৃত হবে না। এই গবেষণায় আপনার অংশগ্রহণ সম্পূর্ণ ইচ্ছাকৃত এবং অধ্যায়নের যেকোনো সময়ে আপনি নিজেকে প্রত্যাহার করতে পারবেন।

অংশগ্রহণকারী হিসাবে আপনার এই অধ্যায়ন সম্পর্কে কোন প্রশ্ন থাকলে আমার সাথে অথবা আমার শিক্ষক মিল্লাত হোসেন (ফিজিওথেরাপি বিভাগ-বিএইচপিআই) এর সঙ্গে যোগাযোগ করতে পারবেন।

আমি আপনার অনুমতি নিয়ে এই সাক্ষাৎকার শুরু করতে চাচ্ছি?

হ্যা/না

অংশগ্রহণকারীর স্বাক্ষর .....

তারিখ .....

উপাত্তসংগ্রহকারীর স্বাক্ষর...................................

তারিখ..............................

গবেষকের স্বাক্ষর...

তারিখ..............................

Questionniare (English)

1. Respondent Identification:

Name of Respondent:……
ID.……..
Address:…….....
Contact number where possible: …….

2. Patients socio-demographic information

	Question	Response
2.1	Age	Year
2.2	Sex	Male female
2.3	Marital status	1=Married 2=Unmarried 3=Widow/widower 4=Divorcee
2.4	Educational status	1= No formal education 2=Primary education 3=Secondary education 4=Higher secondary 5=Bachelor degree or above
2.5	Occupation	
2.6	Living area	1=Rural 2=Semi Urban 3= Urban

3. Patients Personal physical information

3.1	Alcohol consumption	1=No 2=Yes
3.2	Smoking	1=No 2=Yes
3.3	If yes, number of cigarette per day / year	
3.4	Past medical history	1=Hypertension 2=diabetes mellitus 3=heart disease 4=lung disease
3.5	Reason of amputation	
3.6	Level of amputation	1=above knee 2=below knee
3.7	Previous mental illness	1=yes 2=no

Depression was measured by The Patient Health Questionnaire (PHQ-9)

Nine symptoms list

Over the last 2 weeks, how often have you been bothered by any Not at all Several of the following problems?	Not at all	Several days	More than half days	Nearly everyday
1. Little interest or pleasure in doing things	0	1	2	3
2. Feeling down, depressed, or hopeless	0	1	2	3
3. Trouble falling or staying asleep, or sleeping too much	0	1	2	3
4. Feeling tired or having little energy	0	1	2	3
5. Poor appetite or overeating	0	1	2	3
6. Feeling bad about yourself-or that you are a failure or have let yourself or your family down	0	1	2	3
7. Trouble concentrating on things, such as reading the newspaper or watching television	0	1	2	3
8. Moving or speaking so slowly that other people could have noticed? Or the opposite-being so fidgety or restless that you have been moving around a lot more than usual	0	1	2	3
9. Thoughts that you would be better off dead or of hurting yourself in some way	0	1	2	3
(For office coding: Total score_=_+_+_)				

Anxiety was measured by Generalized Anxiety Disorder-7

Over the last 2 weeks, how often have you been	Not at all	Several days	More than half days	Nearly every day
1. Feeling nervous, anxious or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

Total Score=

প্রশ্নপত্র বাংলা

পর্ব ১-অংশগ্রহণকারীর ব্যক্তিগত বিবরণ

রোগীর নামঃ.....

আইডিঃ.....

ঠিকানাঃ.....

যোগাযোগ নাম্বার(যদি থাকে).....

পর্ব ২-রোগীর আর্থ জনতাত্ত্বিক তথ্য

পর্ব ২-রোগীর আর্থ জনতাত্ত্বিক তথ্য

ক্রমিক নং	প্রশ্ন	অংশগ্রহনকারীর উত্তর
২.১	বয়স	বছর
২.২	লিঙ্গ	• পুরুষ • মহিলা
২.৩	বৈবাহিক অবস্থা	• বিবাহিত • অবিবাহিত • বিধবা/বিপত্নিক • বিবাহ বিচ্ছিন্ন
২.৪	শিক্ষাগত যোগ্যতা	• কোনো প্রাতিষ্ঠানিক শিক্ষা নেই • প্রাথমিক শিক্ষা • মাধ্যমিক শিক্ষা • উচ্চ মাধ্যমিক শিক্ষা • স্নাতক/স্নাতকোত্তর • অন্যান্য

২.৫	পেশা	
২.৬	বসবাসের স্থান	• গ্রাম • শহর • উপশহর

পর্ব ৩-রোগির ব্যক্তিগত শারীরিক তথ্য

৩.১	মদ্যপান	• হ্যাঁ • না
৩.২	ধুমপান	• হ্যাঁ • না
৩.৩	যদি হ্যাঁ হয় তাহলে দৈনিক/বছরে কতটি গ্রহন করেন?	
৩.৪	পূর্বে সংঘটিত কোনো রোগের ইতিহাস রয়েছে কি?	• উচ্চরক্তচাপ • বহুমূত্র রোগ • হৃদরোগ • ফুসফুসের রোগ
৩.৫	অ্যাম্পুটেশনের কারন	
৩.৬	অ্যাম্পুটেশনের লেভেল	• হাঁটুর উপরে • হাঁটুর নীচে
৩.৭	আগে কোন মানসিক সমস্যা ছিল কি ?	• হ্যাঁ • না

Depression was measured by The Patient Health Questionnaire (PHQ-9)

নয়টি লক্ষণের তালিকা:

নাম ……. তারিখ:.....				
গত ২ সপ্তাহের মধ্যে আপনি নীচের যে কোনও সমস্যার দ্বারা কতবার বিরক্ত হয়েছেন ?	একদমই না	বেশ কিছু দিন	দিনের অর্ধেকেরও বেশি	প্রায় প্রতিদিন
১. কাজ করতে খুব আগ্রহ বা আনন্দ				
২. হতাশ , হতাশা বা নিরাশা				
৩. পড়ে যাওয়া বা ঘুমিয়ে থাকতে সমস্যা বা খুব বেশি ঘুমানো				
৪. ক্লান্ত বোধ করা বা অল্প শক্তি আছে				
৫. কম ক্ষুধা বা অতিরিক্ত খাওয়া				
৬. নিজের সম্পর্কে খারাপ লাগা বা নিজেকে ব্যর্থ মনে করা অথবা নিজেকে বা আপনার পরিবারকে হতাশ করেছেন মনে হওয়া				
৭. সংবাদপত্র পড়া বা টেলিভিশন দেখার মতো বিষয়গুলিতে মনোনিবেশ করতে সমস্যা				
৮. এত আস্তে আস্তে চা বা কথা বলা যাতে অন্য লোকেরা খেয়াল করতে পারে ? বা বিপরীতে এতটা অধৈর্ষ বা অস্থির যে আপনি স্বাভাবিকের চেয়ে। অনেক বেশি এলোমেলোভাবে ঘুরছেন				
৯. আপনি মরে যাওয়াই ভালো বা কোনওভাবে নিজেকে আঘাত করাই ভাল এমন ধারণা				
(অফিস কোডিংয়ের জন্য মোট স্কোরঃ _=_+_+_)				

Anxiety was measured by Generalized Anxiety Disorder-7

গত ২ সপ্তাহে আপনি কতবার নিম্নলিখিত সমস্যাগুলি নিয়ে বিরক্ত হয়েছেন?	মোটেও নিশ্চিত নয়	বেশ কিছু দিন	অর্ধেক দিন ধরে	প্রায় প্রতিদিন
১. বিচলিত, উদ্বিগ্ন বা প্রান্তে অনুভব করা	০	১	২	৩
২. উদ্বেগ থামাতে বা নিয়ন্ত্রণ করতে সক্ষম না হওয়া	০	১	২	৩
৩. বিভিন্ন জিনিস নিয়ে খুব বেশি চিন্তিত	০	১	২	৩
৪. আরাম নিতে সমস্যা	০	১	২	৩
৫. এত অস্থির হওয়া যে চুপ করে বসে থাকা কঠিন	০	১	২	৩
৬. সহজে বিরক্ত বা খিটখিটে হয়ে উঠা	০	১	২	৩
৭. ভয় লাগছে যেন ভয়ঙ্কর কিছু ঘটতে পারে	০	১	২	৩
মোট স্কোর (আপনার কলামের স্কোর যোগ করুন) =				

Statistical Calculation (t test for depression)

The 't' formula

Formula of related 't' test:

$$t = \frac{\sum d}{\sqrt{\frac{N\sum d^2 - (\sum d)^2}{N-1}}}$$

$$= \frac{43}{\sqrt{\frac{12\times257-(43)^2}{12-1}}}$$

=4.058

Where,

Σd = The total of the difference

(Σd)2 = The total of the difference squared

Σd2 = The total of the squared difference

N = Number of subjects.

Calculating the degree of freedom (df) from the formula,

df =N-1

=12-1

=11

Now 't' value for significance,

The 't' value =4.058, df=11

Statistical Calculation (t test for Anxiety)

The 't' formula

Formula of related 't' test:

$$t = \frac{\sum d}{\sqrt{\frac{N\sum d^2 - (\sum d)^2}{N-1}}}$$

$$= \frac{23}{\sqrt{\frac{12\times 77 - (23)^2}{12-1}}}$$

=3.839

Where,

Σd = The total of the difference

$(\Sigma d)^2$ = The total of the difference squared

Σd^2 = The total of the squared difference

N = Number of subjects.

Calculating the degree of freedom (df) from the formula,

df =N-1

=12-1

=11

Now 't' value for significance,

The 't' value =3.839, df=11