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Determinants of depression and anxiety with knee Pain and activity limitations in knee osteoarthritis patients

Submitted by:

Umme Ammara

B. Sc. in Physiotherapy

DU Roll No: 1531

Registration No: 6269

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Department of Physiotherapy

CRP, Savar, Dhaka-1343,

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We the undersigned certify that we have carefully read and recommended to the Faculty of Medicine, University of Dhaka, for acceptance of this thesis entitled, **"Determinants of depression and anxiety with knee Pain and activity limitations in knee osteoarthritis patients."** Submitted by **Umme Ammara**, for the partial fulfillment of the requirements for the degree of Bachelor of Science in Physiotherapy (B.Sc. in PT).

.....

Prof. Dr. Mohammad Anwar Hossain, PhD
Professor of Physiotherapy, BHPI
Senior Consultant and Head
Department of Physiotherapy, CRP.

.....

Prof. Dr. Mohammad Sohrab Hossain, PhD
Professor of Physiotherapy, BHPI
Executive Director, CRP.

.....

Mohammad Habibur Rahman
Assistant Professor of Physiotherapy
School of Science and Technology
Bangladesh Open University, Gazipur-1750.

.....

Prof. Md. Obaidul Haque
Vice Principal
BHPI, CRP.

.....

Dr. Shazal Kumar Das, PhD
Assistant Professor and Head
Department of Physiotherapy
BHPI, CRP.

Approved Date: 11/08/23

Declaration

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

Name: Umme Ammara **Date:** 11/08/25

Umme Ammara
Bachelor of Science in Physiotherapy (B.Sc. in PT)
DU Roll No: 1531
Registration No: 6269
BHPI, CRP, Savar, Dhaka-1343

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Acronyms

ADL	Activity of Daily Livings
OA	Osteoarthritis
BHPI	Bangladesh Health Professions Institute
CRP	Centre for the Rehabilitation of the Paralysed
IRB	Institutional Review Board
PFOA	Patellofemoral Osteoarthritis
ROM	Range Of Motion
BMI	Body Mass Index
KOA	Knee Osteoarthritis
CBT	Cognitive Behavioral Therapy
SES	Socioeconomic Status
MS	Musculoskeletal
PHQ	Patient Health Questionnaire
GAD	Generalized Anxiety Disorder
WOMAC	Western Ontario and McMaster Universities Osteoarthritis Index
NPRS	Numeric Pain Rating Scale
SPSS	Statistical Package for the Social Sciences
WHO	World Health Organization

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Abstract

Background: Knee osteoarthritis (KOA) is a common degenerative joint disease causing pain, stiffness, and functional limitations, which often co-occur with psychological distress such as depression and anxiety. **Objectives:** This study aimed to explore the relationships between pain intensity, psychological factors, and activity limitations in KOA patients. at the Centre for the Rehabilitation of the Paralysed (CRP), Bangladesh. **Methodology:** A cross-sectional study was conducted with 102 KOA patients aged 40–75 years at the Centre for the Rehabilitation of the Paralysed (CRP), Dhaka. Pain intensity was assessed using the Numeric Pain Rating Scale (NPRS) in various positions (sitting, standing, walking, stair climbing). Depression and anxiety were measured by the PHQ-9 and GAD-7 scales, respectively. Functional limitations were evaluated using the WOMAC index. Data were analyzed using chi-square tests to examine associations. **Results:** Mild depression and anxiety were prevalent (74.5% and 52%, respectively). Moderate to severe pain, particularly during stair climbing (92.2%) and walking (68.6%) among most of them. Depression was significantly associated with pain during sitting ($p < 0.001$) and standing ($p = 0.025$), while anxiety correlated with pain during standing only ($p = 0.012$). Both depression ($p < 0.001$) and anxiety ($p < 0.001$) were linked to greater KOA severity as measured by WOMAC scores. Sociodemographic factors showed limited association with depression, but age ($p = 0.019$), occupation ($p = 0.029$), and comorbidities ($p < 0.001$) were related to anxiety. Dominant limb involvement was associated with higher general pain intensity ($p = 0.045$). **Discussion:** These findings demonstrate that knee osteoarthritis patients experience high pain during weight-bearing activities, with depression and anxiety significantly linked to pain and disease severity. Psychological distress and dominant limb involvement influence symptoms, underscoring the need for integrated mental and physical care.

Key words: *Knee osteoarthritis, Pain intensity, Depression, Anxiety, Activity limitations, Functional impairments.*

Chapter-I Introduction

1.1 Background

Osteoarthritis (OA) is the most common degenerative joint illness and a serious public health issue around the world. It affects any joint that contains hyaline cartilage, with the knees being the most typically affected joints. (Davis M. A.,1988). Knee osteoarthritis can be regarded as one of the most disabling conditions which can be regarded as the most frequent pain-related and functional limitation-related. Knee OA impacts negatively on the quality of life and it involves wearing out of the articular cartilage and subchondral sclerosis of bone due to biomechanical and metabolic factors. (Loeser et al., 2012)

Joint pain and loss of joint mobility are used to identify OA. It is accompanied by absence of joint cartilages and alteration of underlying bone surface are commonly accompanied by either trauma or degenerative change. It is the most frequent reason of discomfort and incapacitation among the population, related to vast reduction of life quality as well as the major condition that leads to hip and knee joint artificial surgery. (Bijlsma, Berenbaum and Lafeber, 2011). The knee is among the most vulnerable joints that are inflicted with worldwide knee OA that is currently a burden to the healthcare system since it involves over 241 million individuals worldwide (Cross et al., 2014).

Knee osteoarthritis (OA) is a degenerative knee joint condition that develops mostly in elderly individuals and causes knee pain, stiffness, and loss of knee performance. It is among the most widespread forms of arthritis whose prevalence grows with age of the population groups involved therein on a higher scale as the population ages on a higher scale too (Litwic et al., 2013). Clinical features of OA in the knee usually comprise chronic pain, decreased range of motion, and functional disability, which has direct and negative on physical health, mental, and general quality of life among the patients. (Hunter & Felson, 2006).

The pain in knee OA occurs with most activity, particularly in conditions of weight bearing (Neogi T, 2013). The presence of extrinsic and intrinsic causes of the joint increase in its mechanical workload increases the intensity of knee pain (Felson DT, 2013). Even physically demanding occupations, habitual and intense physical activities led to significant relationships in knee pain and joint degeneration. people who were over-weight exhibited over two times higher odds of knee OA incidence and obesity

was associated with the likelihood of 24.6 % of new incidence of knee pain. There is therefore argument that not all human beings engage in human trafficking and therefore only a limited number of human beings can be easily claimed or said to practice human trafficking (Silverwood V et al., 2015)

Osteoarthritis (OA) is the most relevant joint disorder in the United States. In patients 60 years or more, symptomatic knee OA occurs in about 10 and 13 percent of men and women respectively. The number of patients with symptomatic OA is projected to increase due to the aging of a population and the obesity epidemic (Lawrence et al., 2008). A prevalence define that women, older 2 adults, as well as those obese or those with a past history of a knee injury have moderate to a stronger increased risk of knee symptoms, radiographic and symptomatic OA. Most knee OA prevalence has demonstrated the associations among risk factors and the outcomes of the knee OA (Silverwood et al., 2015).

Patients with knee OA have anxiety and depression. The prevalence rates of clinically significant depression symptoms in all patients with knee OA reach up to 40 percent, and patients who have some sort of anxiety reach up to 30 percent (Smith et al., 2014). These are not merely comorbidities but compound with the physical manifestation of OA complicating the issue of pain, physical disability and emotional distress (Allen, Golightly and Helmick, 2015). Anxiety and depression are influenced by the experience of chronic pain in OA. Suffering may result into fear of the continuance or augments of injury or health decline, and the restrictions caused by knee OA tend to increase the exposure to social controls, loss of autonomy, and decreased self-efficacy, which all enter into increased danger of psychological discomfort (Hawker, 2011)

Moreover, anxiety and depression have been found to have negative effects on how pain is perceived and will lead to an exacerbation of the feelings of pain and exacerbation of functional deficits. In a study by Von Korff et al.(2005), depressive symptoms among patients with chronic musculoskeletal pain which included knee OA showed that it was linked to increased pain intensity and physical disability. In addition, the patients with depression and anxiety tend to participate less in physical activity, which is essential in the treatment of OA. This failure to engage in physical activity has psychologically-based causes, and it may result in deconditioning, which also causes further disability and pain (Stubbs et al., 2017).

The severity of chronic knee pain is the strongest physical antecedent of anxiety and depression on knee OA patients. Chronic pain, especially pain which affects the normal

day-to-day activities, affects mood and feelings in an immensely adverse way (Turk & Okifuji, 2002). Also, the existence of other comorbidities like obesity, cardiovascular disease, or diabetes can worsen the expression of knee OA and lead to depression and anxiety (Schneider et al., 2017). The extent to which knee OA deteriorates the joints, evaluated in terms of radiographic measurement, also correlates with the level of pain and disability that alter the mental state of these patients (Pereira et al., 2011).

The fear of the pain caused by knee OA is one of the leading factors of limitation of activities, functional disability and decreased health related quality of life. The explanation behind the knee pain in OA patients cannot be known due to the fact that not only the hyaline articular cartilage is lost but remodeling also takes place (bony), which cannot possibly explain the knee osteoarthritis pain. Other structures in the knee affected by the pain fibers include other structures like joint capsule, periosteum, the place where ligaments and muscles insert. Forward, found in synovitis, in some patients, there are induced the flexibility of the ligaments and lesions of the marrow bone that can be a kind of trauma in the body. Due to localized sites of loss of cartilage, focal stress rise is possible in the joint system, which causes subsequent cartilage loss. When the area of cartilage loss is huge 2 or when there is remodelling of bone, then the joint will be tilted and there will be malalignment. The greatest risk factor in structural deterioration of the joint is mal-alignment since this enhances even more the extent of focal stresses causing the structural destruction of the joint thereby leading to joint destruction that ultimately can result to the failure of the joint. Synovial and cartilage local inflammation can be a contributor to pain and joint destruction and as well as that cause of pain in the knee (Felson, 2006; Hunter et al., 2008).

Psychological reasons like catastrophizing, fear of movement (kinesiophobia) and poor coping are closely related to the anxiety and depressions due to knee OA. Catastrophizing means the tendencies to worry about pain and imagine the most terrifying things that may happen that causes even more emotional distress to the disease (Somers et al., 2009). Those with a high catastrophizing proneness have increased pain levels and are more prone to get symptoms of depression. On the same note, fear of movement and re-injury causes constriction of the physical activity to the extent that it induces deconditioning and further feelings of helplessness and depression (Vlaeyen & Linton, 2000).

Social aspects, such as social support, socioeconomic status, and living status also have significant changes on mental health of knee OA patients. Along with the low

socioeconomic status, one may also expect greater stress levels and the lack of the access to health care that might further relate to the physical and psychological conditions of the knee OA (Blalock et al., 2011). Social isolation can lead to the development of anxiety and depression, as well; it may be a result of physical disability or both, and also emotional suffering. Social support on the other hand has been found to protect against the psychological impacts of knee OA such as emotional support and practical support, which can indeed improve both psychological and physical health outcomes (Blalock et al., 2011) and (Rosemann et al., 2007)

Knee pain, limitations related to activity, and mental health have a bidirectional connection. Disability in activities caused by knee pain is also one of the leading causes of less mobility and low quality of life that contribute to psychological distress. People with severe knee OA tend to complain of being frustrated, sad and hopeless because they are unable to move and have lost their independence. Moreover, the lack of strength to be able to engage in fun, or important activities may induce a sense of purposelessness which is a major symptom of depression. (Stubbs et al., 2014; Rosemann et al., 2007)

Conversely, activity restrictions may increase the disturbance of psychologically. Mental health issues such as anxiety and depression may compromise mental and emotional processes so that the individual is in a poorer position to comply with treatment or participate in rehabilitation programs to enhance physical activity. Consequently, such a pattern leads to a vicious cycle of pain, disability and psychological distress which is self-perpetuating where both physical and mental health decline with time. (Bair et al., 2008)

1.2 Justification

Knee osteoarthritis (KOA) is one of the most common musculoskeletal disorders, especially among the middle-aged and elderly population. It is a progressive condition that causes the gradual breakdown of knee joint cartilage, leading to pain, stiffness, swelling, and reduced range of motion. These symptoms significantly affect the patient's ability to carry out everyday activities such as walking, standing, using stairs, or even sitting for long periods. Over time, these limitations reduce independence and can lead to long-term disability. While pain and activity restriction are the most visible aspects of KOA, the emotional and psychological effects often receive less attention.

Many KOA patients experience depression and anxiety as a result of chronic pain, limited mobility, and reduced participation in daily and social life. These mental health conditions not only reduce the overall quality of life but also negatively affect the motivation and response to rehabilitation. Depression and anxiety can further intensify the perception of pain, creating a cycle where the patient's condition continues to deteriorate both physically and mentally. Unfortunately, in Bangladesh, treatment for KOA mostly focuses on physical symptoms, with mental health often neglected in clinical settings. There is currently a lack of local research that explores how psychological issues such as anxiety and depression are related to pain and physical limitations in KOA patients. Identifying these relationships is essential in order to deliver more effective and complete care. A better understanding of the psychological factors involved can help physiotherapists and rehabilitation professionals develop treatment strategies that are not only focused on physical recovery but also support mental well-being.

This study aims to identify the determinants of anxiety and depression in KOA patients, using standardized tools like the PHQ-9, GAD-7, WOMAC index, and the Numeric Pain Rating Scale (NPRS). It will assess how psychological symptoms are related to knee pain and functional limitations. The study is expected to raise awareness among healthcare professionals about the importance of incorporating mental health screening into routine KOA management. Early detection and intervention for depression and anxiety could improve patient participation in rehabilitation and lead to better functional outcomes.

1.3 Research question

What are the determinants of depression and anxiety with knee pain and activity limitations in knee osteoarthritis patients?

1.4 Aim

The study aims to identify determinants of anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis.

1.5 Objectives

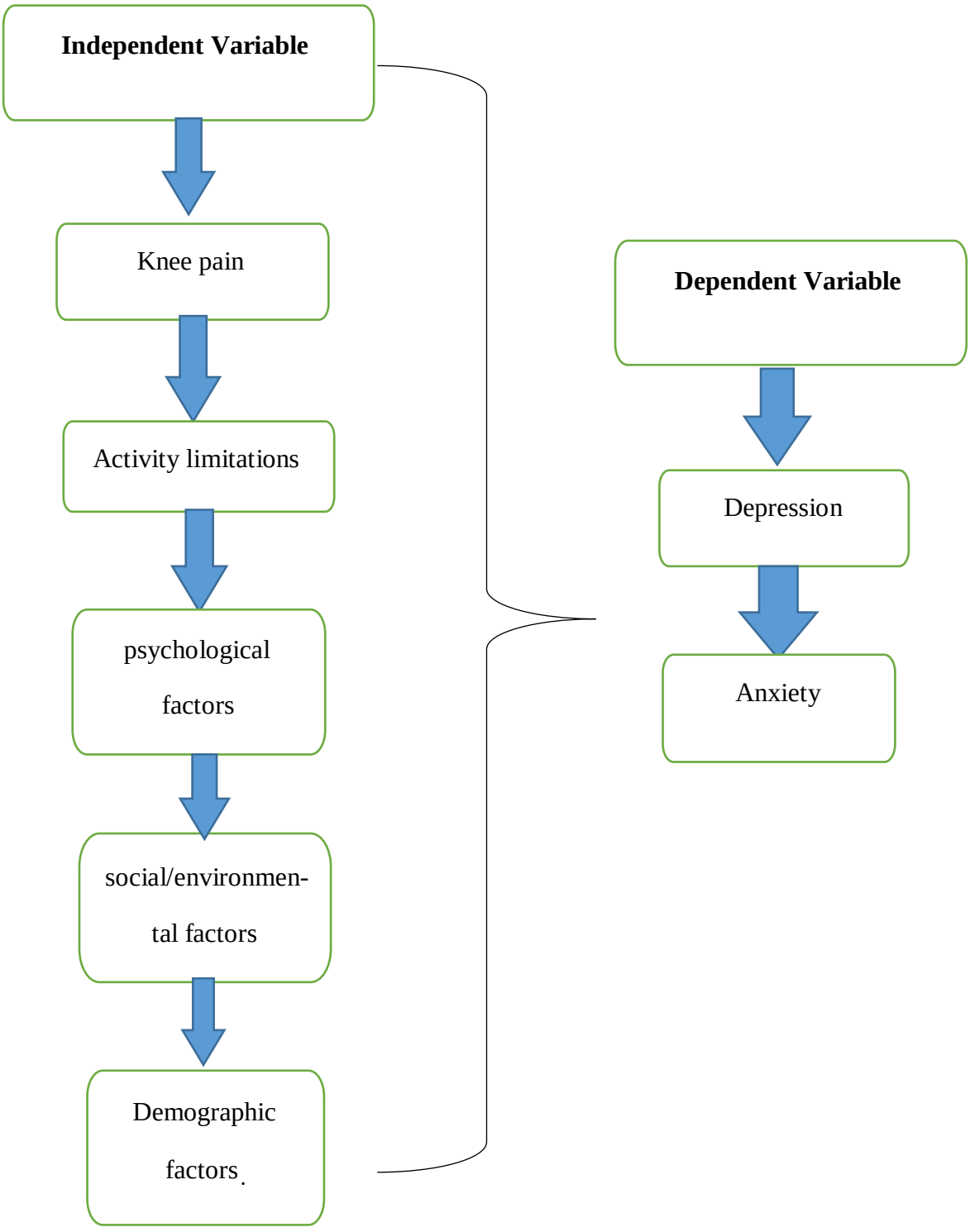
1.5.1. General objective:

To determinants of anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis.

1.5.2. Specific objectives:

- To obtain socio-demographic information
- To assess the intensity of knee pain of the patient
- To identify the depression level of the patient
- To identify anxiety level of the patient
- To detect association among depression and anxiety with knee pain and activity limitations in knee osteoarthritis.

1.6 Conceptual Framework



1.7 Operational definition

1.7.1 Knee OA:

Knee osteoarthritis (OA) is a degenerative joint disease that primarily affects older adults, leading to knee pain, stiffness, and functional impairment. The clinical presentation of knee OA typically includes chronic pain, reduced range of motion, and progressive functional limitations, which directly impact the physical health, psychological well-being, and overall quality of life of affected individuals.

1.7.2 Depression:

It is characterized by persistent sadness and lack of interest or pleasure in previous rewarding or enjoyable activities. It can also disturb sleep and appetite. Tiredness and poor concentration are common.

1.7.3 Anxiety:

Anxiety disorders are characterized by excessive fear and worry and related behavioral disturbance. Symptoms are severe enough to result in significant distress or significant impairment in functioning.

1.7.4 Knee Pain:

Knee pain is pain or discomfort that feel in or around knee joint. Overuse, arthritis and injuries are the most common causes of knee pain.

1.7.5 Activity limitation:

Activity limitations in the knee joint commonly include pain, stiffness, reduced range of motion, and muscle weakness, all of which can restrict a person's ability to perform daily tasks like walking, stair climbing, and getting up from a chair. These limitations can significantly impact participation in work, recreation, and social activities.

Chapter-II Literature Review

Osteoarthritis is named after the Greek words; actually, osteo means of the 'bone' and arthro means, 'joint' and itis means inflammation but this is not actually one of the characteristics of osteo arthritis (Williams et al., 2010). Osteoarthritis is a form of degenerative disease related to old age in that its symptom worsens with old age and is a major factor leading to pain and disability. The harder consideration of osteoarthritis of the knee is an active process which involves loss of cartilage, development of new bone and thickening subchondral bone mainly in terms of its involved extent of cartilage loss and bony structure pathology. The conventional basis of the diagnosis has been the impact of the pathological processes on the radiographic appearance since the radiographic processes such as marginal narrowing of a joint space, bone sclerosis under the cartilage, and formation of osteophytes can be seen on the radiography picture (Cibere et al., 2010).

The most common type of arthritic pain is the hallmark symptom of osteoarthritis (OA). It is this symptom that motivates people to seek medical help and is one of the causes of functional limitations and poor quality of life and the principle cause of pain and most extensive lower extremity OA is well acknowledged as the number one cause of mobility disability. Clinical OA in the adults of the UK and the US is estimated to between 8.5 and 27 million in the adults respectively and is defined by the measures of symptoms and physical findings. Age-related prevalence of OA; 13.9 percent of persons' age 25 years of age and above have clinical OA of at least 1 joint and 33.6 percent of persons 65year age. In major epidemiologic research, OA is regularly exclusive based on standard radiographic evaluation. Symptomatic knee OA was found in 11-19 in UK studies and 5-15% estimates also were reported based on surveys carried out in other nations. In recent times US statistics have shown that diabetic patients with symptomatic knee 9 OA are generally diagnosed with the condition by the age of 55. Lack of quads strength was found in 20 to 70 percent of people with knee OA. The greatest impairment, which was realized, was an inability to squat (Hawker et al., 2008).

In other studies, very high prevalence of radiographic knee OA was reported amongst the adults of 60 years and above; 42.1 in women and 31.2 in men in the American

population. This is because in Japanese patients aged (60-69) years the demonstration of radiographic knee OA in women stands at 57.1 percent and men at 35.2 percent. This is not a surprise because females are vulnerable to having knee OA and functional disabilities more than males. This is especially debilitating in weight bearing joints, knees and hips. Later, pain, stiffness and reduced range of motion culminating in the loss of functional independence to carry out everyday activities including sitting and standing up, walking up the stairs, squatting and walking (Debi et al., 2009). Knee Osteoarthritis (OA) is the most prevalent form of joint diseases and both radiologically and symptomatic. The percentage of female having higher prevalence compared to male (11.4% vs. 6.8). The cause of OA is associated with the repetitive mechanical stresses and aging. The past studies that have distinguished the etiological factors into three significant sub groups are sex, body mass and anatomy. Clinical presentation is pain in joints, joint stiffness, the reduction of joint mobility, muscular weakness of the quadriceps muscles, and disturbance of proprioception (Hafez et al., 2014).

Knee osteoarthritis (KOA) is a common degenerative joint pathology which has a serious effect on the quality of life, of the patient. It is pain, stiffness, and functional limitations, which may result in psychological distress, i.e. anxiety and depression (Hunter and Bierma-Zeinstra, 2019). Depending on the complexities of the physical symptoms and the complexity of mental health in KOA patients, the relationship is multifaceted. The proposed literature review will investigate the determinants of anxiety and depression in patients with KOA on the one hand, and the influence of knee pain and activity limitations on the other hand (Barbour et al., 2017). It constitutes one of the prevalent types of arthritis and about 250 million people are afflicted by it globally (Cross et al., 2014). KOA becomes more common in older people, and it affects women more compared to men (Zhang & Jordan, 2010). The disease comes with a lot of morbidity, such as chronic pain, impaired mobility, and impaired quality of life (Neogi & Zhang, 2013).

KOA is projected to affect 250 million individuals worldwide, which designates it as a substantial public health issue (Cross et al., 2014). Prevalence KOA has been reported to become more prevalent with age with studies reporting that around 10 percent of men and 13 percent of women aged 60 years and above have KOA and the ailment is even more preponderant in individuals over 70 years old (Zhang & Jordan, 2010). KOA

is more prevalent in women compared to men, and even more so after the age of 50 when women are apparently more predisposed due to hormonal changes, anatomical differences of the joints as well as obesity prevalence (Srikanth et al., 2005).

The most common reporting symptom of knee OA is knee pain, limited morning stiffness and functional restrictions are the three signs that are recommended to be used in diagnosis of the knee OA. Along with crepitus swelling can be present either on a continuous basis or periodically, limitation of activity in a joint along with enlargements of bony excess may also be very a promising sign to diagnosis knee OA. The most frequent symptom of knee OA is pain, the primary cause of disability-related chronic impairments, and one of the primary causes of disability due to OA (Guillemin et al., 2011). Pain is either acute or chronic pain Acute pain- last a short period of time, or is anticipate to last a short amount of time. Chronic pain- this type of pain may be explicated as pain that persists after the period of injury healing, and goes on even after months or perhaps years. The pain caused by knee OA usually gets worse with activity and gets better with rest. With the presence of the above signs and symptoms the chances of radiographic OA knee become 99%. Synovitis may occur in the advanced stages and gives rise to pain at rest or night. Short term stiffness is very usual though it tends to be chronic after some time, this comes after a period of inactivity. A primary target of KOA is the patello-femoral and medial tibio-femoral compartments of the knee. OA of the knee mostly occurs on both sides of the body and is symmetrical, mostly in women (Astephen et al., 2008)

Generally the pain in the knee is confined to the front or medial side of the knee and upper tibia. Patello-femoral is that which is ordinarily excruciating to movement such as up and down stairs or grades. When there is poster knee pain, there is complicating popliteal cyst pain. It is hard to walk long distances, stand up out of a chair, get in or out of cars, or bend over to put on shoes and socks. The people with knee OA have a jerky, asymmetric antalgic gait (less time weight bearing on the affected side). Knee OA patient can be found to have a Varus less commonly valgus and / or fixed flexion deformity. Weakness and wasting of muscles is observed at the quadriceps muscle. Occasionally rough crepitus, and limitation of flexion/extension of the knee. Swelling of the bones at the joint line of knees. There is pain around and through the joint. The pain can be in the front of the thigh or even to the ankle. The presence of muscle spasm

in hamstring may occur in which flexion deformity will be found in majority of the cases. The enlargement of the knee joint and the degeneration of the Quadriceps muscle happens because the affected limb becomes less active (Moore et al., 2013)

Overall, the disease is expressed by a gradual decrease in articular hyaline covering metabolism and mechanical, the corresponding discomfort and dysfunction of the joint are likely. The most common changes of knee OA include joint space narrowing caused by a degeneration and wear away of articular cartilage and disappearance, acute incisiveness of articular ends, and intra-articular configuration (e.g., tibial tubercules), bone sclerosis, osteophytes, and marginal lapping, and stone passages in bones (Brandt., 2004). Most often, only the medial compartment is involved and causes a varus deformity (Kumar and Clark, 2002). The increase in osteoarthritis and in particular knee osteoarthritis prevalence has been seen with an increase in the world population aging, and the corresponding increase in individuals above the age of 60 years. Nevertheless, the single greatest impact of the increasing prevalence of knee osteoarthritis is believed to be not the ageing process, but the increasing prevalence of obesity (Lee & Kean., 2012).

Geographic and ethnic differences are also relevant to the demographic of KOA and more so in the case of the African Americans (higher rate of occurrence than in Caucasians), which could be attributed to differing genetic inclinations and lifestyles and access to healthcare (Nelson et al., 2014). We are including obesity as a significant risk factor of KOA because excess weight exerts more mechanical force at the knee joint and can accelerate KOA, and the risk of developing KOA increases by up to four times in obese people as compared to those who have healthy weight (Messier et al., 2004). The growing rates of obesity all over the world, along with an aging population, are likely to continue the escalating trends of KOA in future years (Murray et al., 2012). The KOA prevalence and risk factors are very important aspects that are instrumental in building effective prevention and management strategies to combat the rising threat to the health of people.

Knee osteoarthritis (KOA) is an impervious inflammation that frequently causes depression as a comorbidity which has an adverse influence on the quality of life, treatment effects, and the wellbeing of patients. Depression is significantly more common in people with KOA compared to those without the condition as research

estimates indicatethat 20 to 50 percent of people with KOA have depressive symptoms (Stubbs et al., 2016; Rosemann et al., 2007). KOA-depression association is bi-directional, whereby chronic pain, functional limitations, and low mobility are all factors that cause the onset of depressive symptoms, and conversely, the development of depressive symptoms leads to enhancement in pain during activity and disability leading to the formation of a vicious cycle (Hawker et al., 2011; Smith et al., 2014).

Depression has also been linked with higher risks of disability, poor reactions to surgery such as a total knee replacement (TKR) and mortality rates (Riddle et al., 2011; Sullivan et al., 2009). Moreover, depression may accelerate the development of KOA by leading to sedentary lifestyle, weight gain, and overall inflammation, which aggravate the joint destruction and pain (Miller & Raison, 2016). To manage depression in KOA, there is need to take a holistic approach to the treatment of the condition in both physical and the psychological aspects. Depression symptoms may also be alleviated with the help of antidepressants, and such drugs may have analgesic properties as well, whereas CBT, exercise therapy, and MBSR have been reported to improve the mood and relieve pain, as well as enhance functional performance (Rayner et al., 2016; Thorn et al., 2007; Cherkin et al., 2016).

The hallmark of KOA, chronic pain, is one of the primary contributors to depression because it causes a sense of helplessness, hopelessness and frustration, which are the key characteristics of the depressive disorders (Bair et al., 2003). Moreover, impairment in activities due to KOA like inability to walk, stair climbing or engaging in daily chores may lead to social isolation, loss of independent and engagement in meaningful activities, which in turn intensify depressive symptoms (Murphy et al., 2012; Penninx et al., 2008). The factors associated with mental state, including pain catastrophizing and fear of movement (kinesiophobia), also contribute to the development and maintenance of depression in patients with KOA as they increase the perception of the pain and decrease the willingness to perform physical activity (Sullivan et al., 2001; Vlaeyen & Linton, 2000).

Anxiety is a common and undiagnosed comorbidity problem in individuals with knee osteoarthritis (KOA), which has a significant influence on the quality of life, pain perception, and functional outcomes of these people. It has been reported that 10 to 30 per cent of the patients with KOA develop anxiety, which is more prevalent than in the

general population (Stubbs et al., 2016; Rosemann et al., 2007). Anxiety in KOA is closely related to the chronic pain and functional disability of the condition, fear of movement (kinesiophobia) and the feelings of uncertainty on the part of disease progression (Vlaeyen & Linton, 2000).

Anxiety in KOA patients has serious implication not only to physical but also psychological health. High pain level, poorer functionality, and low patient compliance with treatments occur under anxiety, contributing to poor clinical outcomes and more health care use (Scopaz et al., 2009; Sale et al., 2015). The symptoms of anxiety may also speed up the process of KOA by encouraging sedentary lifestyle, obesity, system inflammation, intensifying joint tissue damage and pain (Miller & Raison, 2016). Moreover, depression is frequently accompanied by the presence of anxiety, similar to establishing a psychological distress double burden, which impairs the process of KOA management even more (Stubbs et al., 2016).

Proper management of anxiety in KOA patients involves both a physical and psychological approach that encompasses all the aspects in the management of the condition. Selective serotonin reuptake inhibitors (SSRI), serotonin norepinephrine reuptake inhibitors (SNRI) are some of the pharmacological treatments that reduce anxiety symptoms and can also act as a pain reliever (Rayner et al., 2016). Cognitive-behavioral therapy (CBT), mindfulness-based stress reduction (MBSR), and exercise therapy are non-pharmacological interventions, which have been found to decrease the anxiety level, manage pain better, and increase functional capacity (Thorn et al., 2007; Cherkin et al., 2016; Fransen et al., 2015). Managing anxiety among KOA patients is a key strategy to stopping the vicious cycle that connects pain and disability into further outcomes of treatment and a better quality of life.

Comorbidities among patients with KOA include anxiety and depression. Much research has led to the results that prevalence of depression in KOA patients is between 20 and 50 percent and prevalence of anxiety is between 10 and 30 percent (Stubbs et al., 2016; Rosemann et al., 2007). The rates are quite high in contrast with the general population, which proves that KOA can be closely related to the psychological distress.

Anxiety and depression in Knee OA patients are linked to poor clinical outcomes which include elevated levels of pain, high functional disability and a diminished reaction to

medical treatment (Sale et al., 2015; Scopaz et al., 2009). Moreover, stress-related mental conditions can accelerate the symptoms of KOA development, which forms a spiral of softening body and mind (Smith et al., 2014).

Pain is also one of the typical manifestations of KOA and one of the most relevant predictors of anxiety and depression. The discomfort experienced on the knee is directly proportional to the degree of psychological distress a patient develops (Hawker et al., 2011). The emotional aspects of chronic pain are the manifestations of hopelessness, feelings of helplessness, which are primary characteristics of depression (Bair et al., 2003). Also expected pain may cause anxiety especially during the activity that involves physical effort (Vlaeyen & Linton, 2000). The exaggerated and detrimining attitude towards real or potential pain is a relevant indicator of depression and anxiety among KOA patients and is called pain catastrophizing (Sullivan et al., 2001). Patients with pain catastrophizing will develop a higher psychological distress level, and they are also more likely to develop chronic pain syndromes (Edwards et al., 2006).

Stair climbing is just the same thing with stance and swing phases as in level walking. OA patients of the knee often report that they experience some pain and problems when climbing the stairs. The performance of stair ambulation is usually employed to represent the functional status in OA patients (Stratford et al., 2006). Male and female patients with knee OA have distinctive gait patterns that are manifested in kinematic and kinetic parameters. The differences that are exhibited regarding the knee flexibility angle, the knee external moments (saggital, frontal and transversal plane) and the knee internal moment (saggital and transversal plane) are depicted to have gender differences (Debi et al., 2009).

Anxiety and depression have a significant association with activity limitation caused by Knee OA as they impede normal activities, like walking and stair climbing (Salaffi et al., 2005). The loss of independence and social isolation can predispose one to psychological distress because they are part causes (Penninx et al., 2008). Upset due to failure to carry out activities that they liked also leads to the feeling of sadness and frustrations which worsen depressive symptoms (Murphy et al., 2012).

Kinesiophobia which can be referred to as fear of movement is a common factor among KOA patients with regards to pain and immobilized functionality (Vlaeyen & Linton, 2000). Such fear may result in avoidance of physical activity, which will cause additional physical deconditioning and more pain (Crombez et al., 1999). This is caused by the cycle of fear, avoidance and deconditioning which may cause and sustain anxiety and depression (Zale et al., 2013).

The study by the patients with knee OA illustrated the fact that women are 1.8 more likely to develop OA as opposed to men (Felson, 2006). At any age, knee arthritis across the board favors women as compared to men. Such gender variations are the most evident in the case of OA involving the knee. In every level of radiographic severity of OA, in which it was reported, the proportion of women to men was higher in knee pain. In the subjects aged above 65 years, symptomatic osteoarthritis of the knee is twice higher among women as compared to men. In one study, they determined that the female gender is an important risk factor in knee OA and depicted that the lowest maximum knee internal extension moments during stair ascending and descending. Female OA subjects also demonstrated the higher knee extension moment peak and emphasizing in the knee flexion (Protopapadaki et al., 2007).

The gait of people with OA on the lower extremities has been shown to exhibit slower walking speed/cadence and larger base of support and poorer motion and moments compared to healthy counterparts (Farrokhi et al., 2013). The vast majority of the studies analyze gait in knee OA adults, since knee OA is a metabolically active and dynamic disorder; this disorder contains both destruction and remodeling processes that can be activated by both mechanical and biochemical assaults. The large weight bearing a joint is knee, and bear load in doing a functional activity and variation on a gait pattern. Over the last decade, the gait analysis has unveiled biomechanical features of knee OA because dynamic loading on the joints has been deemed to be a source of knee OA pathomechanics but the effect of the load on the disease progression is still an open book (Perrot et al., 2008). The improved knowledge of gait will be helpful in quantifying the pathomechanics of the patients who have knee OA. Such patients have pain and it is possible that they might make compensation in order to reduce loading of their joint and pain (Protopapadaki et al., 2007).

Knee OA patients complain of pain and have trouble with functional activities that include sitting on their knees, pushing their knees with their legs (patellofemoral) and moving up and down stairs, walking, squatting, kneeling, getting out of sitting or sitting out of getting something and getting out and getting in car. Such constraints in the end result in functional independence loss and low quality of life (Stratford et al., 2006).

The most apparent and commonly complained symptom of KOA, pain, contributes significantly to the development of avoidance behaviors because patients prefer to shun any actions that increase the discomfort that they feel- like walking, climbing the stairs, or standing in line over a long time- inducing a cycle of avoidance, resulting in physical deconditioning, and subsequent decline in functional status (Hawker et al., 2011; Vlaeyen & Linton, 2000). Restricted movement is further limited because of joint stiffness, especially in the mornings or following a period of inactivity, and muscle weakness, especially that of the quadriceps, limits the stability of the joints and increases the capacity to perform weight-bearing activities.

KOA activity limitations cannot be well managed without a multidisciplinary approach. Low-impact exercises such as swimming, biking, and tai chi, which is a cornerstone of treatment, are offered to treat back pain patients, resulting in improved strength, flexibility, and balance, decreased pain, and stiffness (Fransen et al., 2015). It is also important that weight management also plays an important role because the slightest reduction of weight will reduce the mechanical pressure on the knee joint and will improve functioning capacity (Messier et al., 2004). Pharmacological and non-pharmacological methods of pain management, including NSAIDs or intra-articular corticosteroid injections, and physical therapy can help the patient to be more comfortable in the process of physical activity (Zhang et al., 2008).

Effective psychological treatment such as cognitive-behavioral therapy (CBT) and mindfulness-based stress reduction (MBSR) enables patients to reduce fear of movement and enhance their coping ability in order to deal with pain and functional disability (Thorn et al., 2007; Cherkin et al., 2016). Other modern-day assistive tools, e.g., canes, walkers, knee braces, and knee replacements (through the total knee replacement (TKR) surgery) can help in mobility and the risk of falls, and to tackle seniors that do not respond to conservative treatment methods, surgical treatment may be adopted to ensure that they live a fuller life (Jones et al., 2012; Kurtz et al., 2007).

The treatment of KOA has to aim at prevention of functional constraints because it will lead to better functional results as well as improved quality of life, avoiding the vicious cycle of pain and disability so frequently associated with this disease.

Social support is very important in reducing psychological effects of KOA. Patients who have a good social network are also at a reduced risk of getting anxious and depressed than patients who have low social support (Penninx et al., 1998). Their role can involve providing social support to help to alleviate psychological distress through provision of emotional support, assistance, and encouragement to be physically active (Cohen & Wills, 1985).

The other key determinant of anxiety and depression in KOA patients is the socioeconomic status (SES). The influences of lower SES lead to high psychological distress as there is less access to health care, adverse financial impact, and low social support (Goodman et al., 2003). Also, people who have poor SES are less equipped to deal with the physical and emotional demands of KOA, therefore being more at risk of developing anxiety and depression (Marmot et al., 1991). Recently, Martin et al., 2013 published a cohort study that concluded that the BMI is positively correlated with knee OA in women and there is an inverse relationship between the extent of activity and the chances of knee OA. In the study by Salve et al., 2010, approximately, the prevalence of OA was found to be highest among the lower socioeconomic population as compared to the high socioeconomic population in a house to house survey conducted in 260 peri menopausal women in South Delhi. Knee OA patients may be encouraged to lose weight when this would lead to a benefit with regard to pain not only but also with respect to hindering structural deterioration (Niu et al., 2009). The modifiable exposures identified were categorized into six sub-sections, which are obesity and overweight, (2) comorbidity, (3) occupational factors, (4) physical activity, (5) biomechanical factors, and (6) food exposure (Georgiev & Angelovs., 2019). Main risk factors of getting knee OA are previous trauma, meniscal and cruciate ligament injury and obesity (Kumar and Clark., 2002).

KOA patients with lower socioeconomic status (SES) are linked with higher level of psychological distress (Goodman et al., 2003). Less opportunities regarding healthcare, stress, and poor social support may contribute to a worse prevailing state of KOA and are more commonly experienced by the people with low SES (Marmot et al., 1991).

There is a growing body of evidence that the development of anxiety and depression does relate to inflammation in certain cases of KOA. This is due to the role of chronic inflammation, which is a hallmark of KOA, in changes in brain alterations and brain regulation of mood (Miller & Raison, 2016). Other cytokines including interleukin-6 (IL-6) and tumor necrosis factor-alpha. They have found that (TNF-alpha) affect the hypothalamic-pituitary adrenal (HPA) axis and the neurotransmitter systems and may contribute to the process causing psychological distress (Raison et al., 2006).

There is also the presence of genetic factors which may predispose the KOA patients to anxiety and depression. Research has also discovered other polymorphisms in genes associated with neurotransmitter action like the serotonin transporter gene (5-HTTLPR) that tend to lead to higher vulnerability to depression (Caspi et al., 2003). Moreover, there are genetic differences in inflammations that can affect the degree of the KOA and even psychological symptoms (Valdes et al., 2011).

Longitudinal epidemiological studies documenting natural course of OA are few, and rarely is one able to follow participants of a clinical trial beyond six months. All studies that have been done, as well as other anecdotal reports, indicate that OA varies remarkably in terms of its course. The majority of patients gradually worsen over time, and this is marked by the periodic exacerbations of pain that gradually become more frequent in occurrence and severity, and duration to subsequent muscle weakness and exhaustion, stiffness and decreased functionality of joints. The risk factors that relate to progression have not been indicated (Elahee, 2012).

Treatment modalities can be fitted into four umbrella namely; nonpharmacologic, pharmacologic, complementary and alternative, and surgical. Generally, care should be started off using the least invasive, least hazardous means and in case of failure then other means of treatment should be used. Every osteoarthritis patient is to be provided with at least some treatment of two first categories. Surgical therapy must be left in individuals who fail to improve under the behavioral and pharmacologic management and those who experience intractable pain and loss of recognition (Sinusas, 2012).

Conservative treatment of the knee osteoarthritis relies on a gradual, Nevertheless staged treatment pattern and is to be employed on an individual occurrence relating to the extent and spread of symptoms and any potential underlying condition there may

be. In conjunction, German Society for Orthopedics and Orthopedic Surgery and the German Professional Association of Orthopedists and Trauma Surgeons have issued a guideline on the treatment of osteoarthritis at the knee (Michael, 2010). According to the guideline, the objectives of the treatment are: 1. Analgesia 2. Better living conditions 3. Better locomotion 4. Better walking 5. Slowness of the development of osteoarthritis.

The guideline lacks any kind of evaluation of the conservative measures discussed on an individual basis, as well as specific recommendations on conservative treatment by stage. An abridged review of published literature on the non-pharmacological management of knee osteoarthritis, its outcomes and their level of evidence based on the evidence-based medicine criteria. A full-scale description of any given type of conservative therapy would not be relevant in this paper as this paper is meant to give an overview of the entire range of treatments that may be of interest.

Exercise therapy and physical measures are both involved as part of physiotherapy in knee osteoarthritis and consist of the following:

Application of ultrasound (to reduce pain and help the healing forces of the body)

Electrotherapy, Muscle stimulation, Usage of hot and cold conditions

Transverse friction (a form of massage)

Stretching/walking Traction -Acupuncture.

In a study conducted by Pollard et al., it was revealed that manual therapy is efficient in reducing the pain and improving the functions, (Pollard et al., 2008). It is demonstrated that pain can be eased and improved in regard to functions through either personal or collective therapy (Devos-Comby et al., 2006). There was no specific treatment program that was established to yield better results compared to the others.

Exercise is a core aspect of KOA management, and its influence on physical and psychological processes has a beneficial effect (Fransen et al., 2015). Physical activities can also help in lessening of pain and elevating the functions along with the mood by stimulating the endorphins and other neurochemicals (Craft & Perna, 2004). Also, exercise would reduce fear of movement as well as boost self-efficacy to further improve the psychological well-being (Vlaeyen & Linton, 2000). Some evidence has demonstrated that exercise intervention can be used to alter gait pattern via gait variation, prevent disability, and reduce weight shifting of the legs when walking down the stairs to reduce the external rotation of lower limb joints and speed up the gait cycle and normalize cadence thus reducing the pain severity (Pang et al., 2015). This might

influence the biomechanics of stair ambulation by means of the inclination of the stairs (Protopapadaki et al., 2007). The potential undesirability of faster or slower training speeds than the normal gait speeds should be viewed in terms of possible negative effects on the overall physical performance, everyday life activities, and safety. It is common to recommend gait aids in managing OA. Enhanced weight transfer to the medial one of the sides of the foot that showed a slight decrease during the early-stance phase. Patients with knee OA can be impaired in terms of coordinating and augmentations in trunk lean during stance phase of the gait, as well as poor trunk lean to decrease the load in the knees. Currently, no one can tell how much lean is needed to decrease knee load and in future, this should be done (Simic et al., 2011).

Depression and anxiety are the prominent psychological comorbidities in patients with knee osteoarthritis (KOA) as these psychological disorders go hand in hand with functional limitations and knee pain, which are symptoms of this complication. Knee pain being a defining feature of KOA contributes significantly to psychological distress through its debilitating experience of chronicity and unpredictability, which can predispose a person to develop feelings of helplessness, frustration, and concern about future pain attacks, among other behaviors as central characteristics of an anxious and depressed person (Hawker et al., 2011; Bair et al., 2003).

Mindfulness-based therapies which include mindfulness-based stress reduction (MBSR) are becoming increasingly popular along mental health and are used to treat anxiety and depression in chronic pain conditions and KOA is one such condition (Kabat-Zinn, 2003). The proposed interventions aim at the enhancing the present moment awareness and acceptance, a phenomenon which is more likely to decrease psychological distress and enhance pain management (Zeidan et al., 2011). The preliminary studies indicate that such interventions as mindfulness-based intervention may prove effective in decreasing levels of anxiety and depression in KOA patients (Cherkin et al., 2016).

The above problems can be resolved with a multidisciplinary approach to treat the psychological distress, relieve pain, and improve the functional capacity, including the use of antidepressants and psychological treatments such as cognitive-behavioral therapy (CBT) and physical interventions, such as exercise and weight management (Rayner et al., 2016; Thorn et al., 2007; Fransen et al., 2015). With a combination of the physical and psychological concerns of KOA, medical professionals will be able to enhance the quality of life and the response of patients.

Chapter- III Methodology

3.1 Study design

Cross-sectional studies were carried out at one-time point or over a short period. Cross sectional study was selected by researcher to carry out the research. In this study a cross sectional study design used to find out the mental health status including depression and anxiety among the patient with knee osteoarthritis. This study design was appropriate to find out the objectives. The data was collected all at the same time or within a short time frame. A cross-sectional design provides a snapshot of the variables included in the study, at one particular point in time.

3.2 Study area

The researcher was selected musculoskeletal unit of the Centre for the Rehabilitation of the Paralysed (CRP), savar, Dhaka

3.3 Study Duration

The study was conducted from 1st June 2024 to 31st May 2025, from initial recruitment through to the final dissemination of results.

3.4 Study population

A population is the total group or set of events or totality of the observation on which a research is carried out. In this study the people who had knee osteoarthritis and receiving treatment from CRP were the study population.

3.5 Inclusion criteria

- Both male and female were included. (Jakobsson & Hellberg et al., 2002)
- Patients with knee osteoarthritis who were attending in CRP for treatment.
- Age includes 40-75 years (Jakobsson & Hellberg et al., 2002).
- Subjects who were willing to participate.

3.6 Exclusion criteria

- Patients who were medically unstable.
- Any history of pathological condition (malignancy, heart disease etc).
- Patients were excluded if they had neurological, vestibular, fracture of the lower extremity, rheumatoid arthritis (Gomaa & Zaky, 2016).

3.7 Sample size

Sampling procedure for cross sectional study done by following equation –

$$n = \frac{z^2 pq}{d^2}$$

Where, Here, Z (confidence interval) = 1.96 p is the (estimated) proportion of population which has the attribute in question. If p = 0.5 now let`s say we want 95% confidence, and at least 5% plus or minus precision.

so we get, q = (1-p)

= (1-0.5)

= 0.5 d is the desired level of precision (i.e. the margin of error).

Sample size:

$$n = \frac{z^2 pq}{d^2}$$

$$= \frac{(1.96)2 \times 0.5 \times 0.5}{(0.05)^2}$$

$$= \frac{0.9604}{(0.05)^2}$$

$$= 384.16$$

$$= 384$$

The actual sample size was, n = 384. As it is an academic thesis, self-funding and data was collected from a single specialized hospital by considering the feasibility and time limitation 102 sample were selected conveniently.

3.8 Sampling technique

Sample was selected through convenient sampling method for conducting this study. A convenience sample is a group of individuals who (conveniently) were available for study.

3.9 Data collection tools

The tools that needed for the study were Bengali Consent form and questionnaire and other some necessary materials that were pen, pencil, eraser, clip board, white paper and note book.

3.10 Measurement tools

Numeric pain rating scale: The numeric rating scale (NRS) is a pain screening tool, commonly used to assess pain severity at that moment in time using a 0–10 scale, with zero meaning "no pain" and 10 meaning "the worst pain imaginable". Patients are instructed to circle the number that represents the amount of pain that they are experiencing at the time of the evaluation.

Patient Health Questionnaire(PHQ-9): The PHQ-9 is a multipurpose instrument for screening, Diagnosing, monitoring and measuring the severity of depression. The Patient Health Questionnaire (PHQ) is a self-administered version of the PRIME-MD diagnostic instrument for common mental disorders. The PHQ-9 is the depression module, which scores each of the 9 DSM-IV criteria as "0" (not at all) to "3" (nearly every day).

PHQ-9 score ≥10 had a sensitivity of 88% and a specificity of 88% for major depression. PHQ-9 scores of 5, 10, 15, and 20 represented mild, moderate, moderately severe, and severe depression, respectively.

Generalized anxiety disorder (GAD-7): The Generalized Anxiety Disorder-7 (GAD-7; Spitzer et al., 2006) was developed to identify probable cases of generalized anxiety disorder (GAD) and to assess symptom severity. This is calculated by assigning scores of

0, 1, 2, and 3 to the response categories, respectively, of "not at all," "several days," "more than half the days," and "nearly every day." GAD-7 total score for the seven items ranges from 0 to 21.

0–4: minimal anxiety

5–9: mild anxiety

10–14: moderate anxiety

15–21: severe anxiety

Scores of 5, 10, and 15 are taken as the cut-off points for mild, moderate and severe anxiety, respectively. When used as a screening tool, further evaluation is recommended when the score is 10 or greater. Using the threshold score of 10, the GAD-7 has a sensitivity of 89% and a specificity of 82% for GAD.

WOMAC Osteoarthritis Index: The Western Ontario and McMaster Universities Arthritis Index (WOMAC) is widely used in the evaluation of Hip and Knee Osteoarthritis.

It is a self-administered questionnaire consisting of 24 items divided into 3 subscales.

- Pain (5 items): during walking, using stairs, in bed, sitting or lying, and standing upright
- Stiffness (2 items): after first waking and later in the day
- Physical Function (17 items): using stairs, rising from sitting, standing, bending, walking, getting in / out of a car, shopping, putting on / taking off socks, rising from bed, lying in bed, getting in / out of bath, sitting, getting on / off toilet, heavy domestic duties, light domestic duties

The test questions are scored on a scale of 0-4, which correspond to: None (0), Mild (1), Moderate (2), Severe (3), and Extreme (4).

The scores for each subscale are summed up, with a possible score range of 0-20 for Pain, 0-8 for Stiffness, and 0-68 for Physical Function. Usually a sum of the scores for all three subscales gives a total WOMAC score, however there are other methods that have been used to combine scores.

Higher scores on the WOMAC indicate worse pain, stiffness, and functional limitations.

3.11 Data Collection Procedure

For this study researcher collected data from the participants by following the instructions given on the NPRS, PHQ-9, GAD-7 and WOMAC osteoarthritis index. This data collection tools were permitted from the authors to use this study. Participants who had the reading ability they administered questionnaire own-self. Before collecting data, the study aims and purpose explained to the participants. The participants read (if they can) the information sheet and consent form. Who were unable to read, researcher was explained the information sheet and the consent form. All the participants had the opportunities to ask any study related questions and they could show interest to participate in the study they could sign in the consent form willingly. The researcher was collected data by structured questionnaire, pen, pencil and paper.

3.12 Data analysis procedure

The researcher was analyzed data to find out the level of depression and anxiety, pain intensity and functional impairments. The data was collected and analyzed by using statistical package for social sciences (SPSS). Researcher analyzed the data by descriptive statistics using Frequency, Percentage (%), Pie diagram, Bar diagram, and also shown the association by non-parametric test which was Chi-Square test.

Chi square ($\chi 2$) Test

Chi square (2) Test is the most popular discrete data hypothesis testing method. It is a nonparametric test of statistical significance for bivariate tabular analysis with a contingency

table. In this study Chi square ($\chi 2$) test was done to measure the associations between two variables. It was used to test the statistical significance of results reported in bivariate tables.

Level of significance

The researcher has used 5% level of significant to test the hypothesis. If the p value for the calculated $\chi 2$ is $p<0.05$ conclude that there is significant association between the two variables.

3.13 Ethical consideration

The researcher maintained some ethical considerations: Researcher has followed the Bangladesh Medical Research Council (BMRC) guideline & WHO research guideline. A research proposal was submitted to the physiotherapy department of BHPI for approval and the proposal was approved by the faculty members and gave permission initially from the supervisor of the research project and from the course coordinator before the study. The proposal of the dissertation including methodology was presented to the Institutional Review Board (IRB) of Bangladesh Health Professions Institute (BHPI) for oral presentation defense was done in front of the IRB. Then the necessary information was approved by Institutional Review Board and was permitted to do this research. After getting the permission of doing this study from the academic institute the researcher had been started to do it. The researcher had been taken permission for data collection from the Musculoskeletal unit of Savar, CRP. A written consent form used to take the permission of each participant for the study. Researcher also ensured that the organization (CRP) was not hampered by the study. All kinds of confidentiality highly maintained. The researcher ensured not to leak out any type of confidentialities. The researcher was eligible to do the study after knowing the academic and clinical rules of doing the study about what should be done and what should not. All rights of the participants were reserved and researcher was accountable to the participant to answer any type of study related question.

3.14 Informed Consent

Informed consent relates to a state of affairs in which all potential participants receive and understand all the information they need to decide whether they want to participate.

This includes information about the study's benefits, risks, funding, and institutional approval. In this study a written consent was given to all participants before the completion of the questionnaire. The investigator explains to the participants about their role in this study. He also explained what type of questions they would be asked and also informed that they are free to ignore questions as their wish. He also assured that he didn't foresee any risks or discomfort from their participation. Written consent (appendix) 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 and aim & objectives of this study. The researcher read the informed consent to the participants. Those who were literate was encouraged to sign the form. The researcher received a written consent from every participants including signature. Those who were illiterate, verbally consent was taken from them. Patients who were not that much cooperative, the career were explained the entire process. So that they can understand about the consent from and their participation was on voluntary basic. The aims and objectives of this study must be informed to the subjects verbally. So, gave the consent from to the subject and explained them.

The subjects had the rights to withdraw themselves from the research at any time. It supposed to assured the participants that their name or address would not be used. The information of the subjects might be published in any normal presentation or seminar or writing but they would not be identified. The participants informed by the researcher that the result would not be harmful for them. Ensuring the confidentiality of participant's information, no information has been shared without the research supervisor. At any time the researcher available to answer any additional questions in regard to the study.

Chapter- IV Results

A Cross-sectional study was conducted to achieve the research objectives. About 102 samples were selected for this study. The main objective was to find out depression and anxiety with knee pain and activity limitations in knee osteoarthritis patients.

4.1 Sociodemographic information:

4.1.1 Age group of the participants

In this study, among102 participants with ages ranging from 40 to 69 years. The age range variable was assessed using categorized age groups on a scale from 1 to 6. The mean value for age range was 2.87, with a median of 2.00 and a mode of 2, indicating that the most frequently occurring age group was the second category (likely representing the 45–49 years group). The standard deviation was 1.596, reflecting a moderate level of dispersion across the different age categories. Out of 102 participants, 27.5% of the participants were aged between 45 and 49 years, while 23.5% were within the 40 to 44 years age group. Participants aged 50 to 54 years accounted for 15.7% of the sample, followed by 14.7% in the 60 to 64 years group. Additionally, 11.8% of participants were in the 55 to 59 years age range, and the smallest proportion, 6.9%, belonged to the 65 to 69 years group.

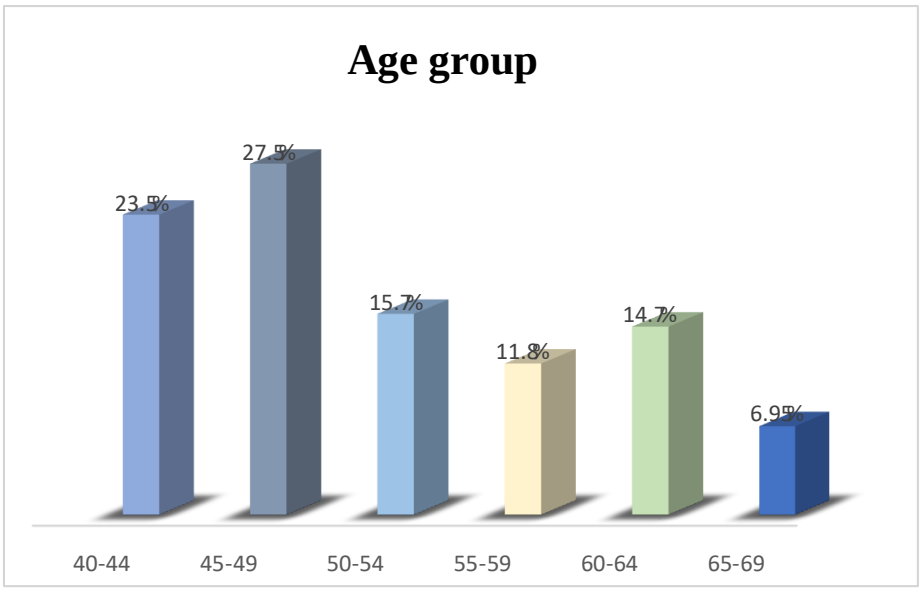


Figure 1: Age group of the participants

4.1.2 Gender of the participants:

Among 102 participants, most of them were female 84.3% (n=86) and male were 15.7% (n=16)

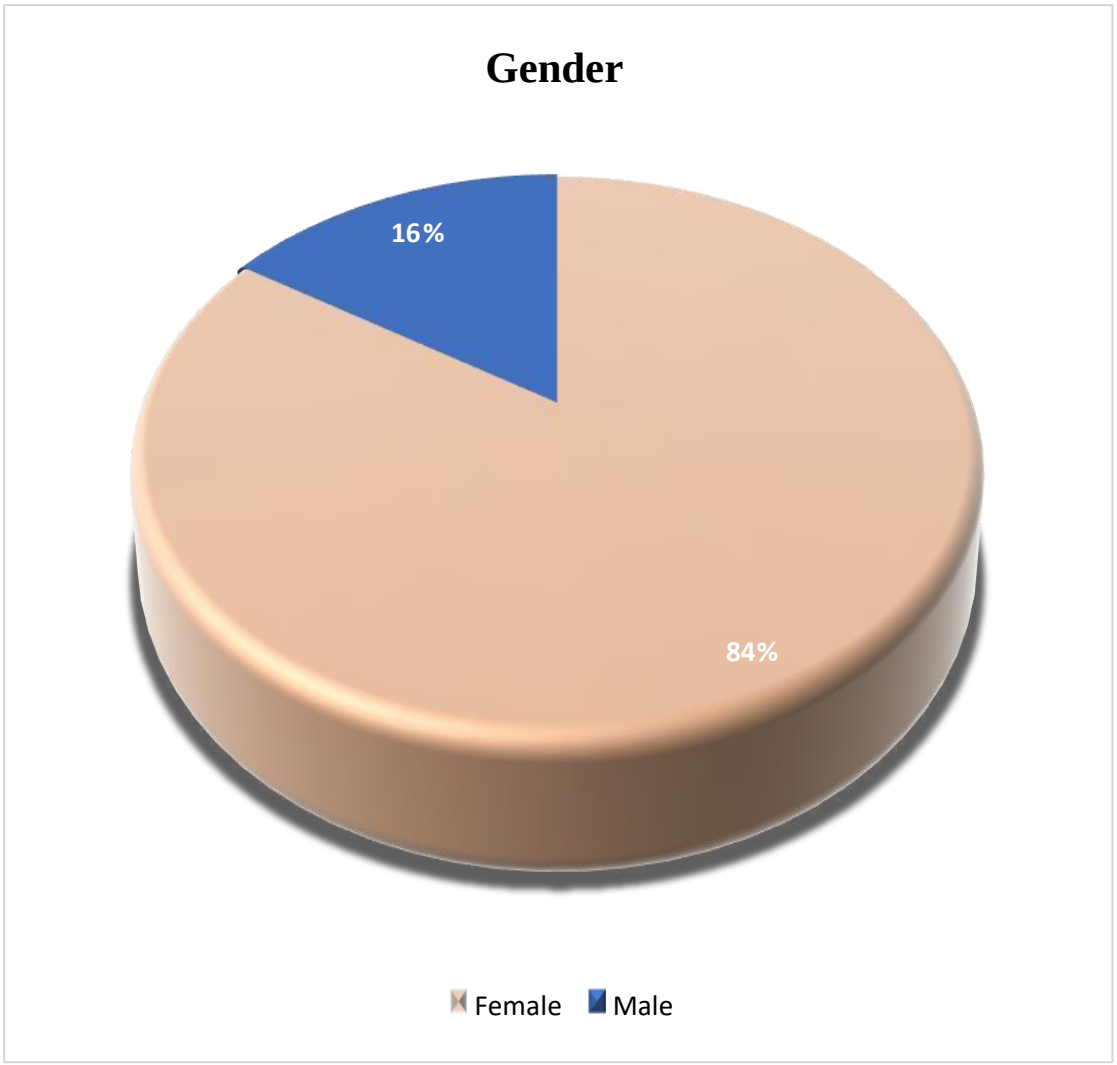


Figure 2 : Gender of the participants

4.1.3 BMI of the participants:

A total of 31 participants (30.4%) were within the healthy weight range, while 10 participants (9.8%) were classified as obese**.** The majority of participants were categorized as overweight**,** accounting for 61 individuals (59.8%)**.**

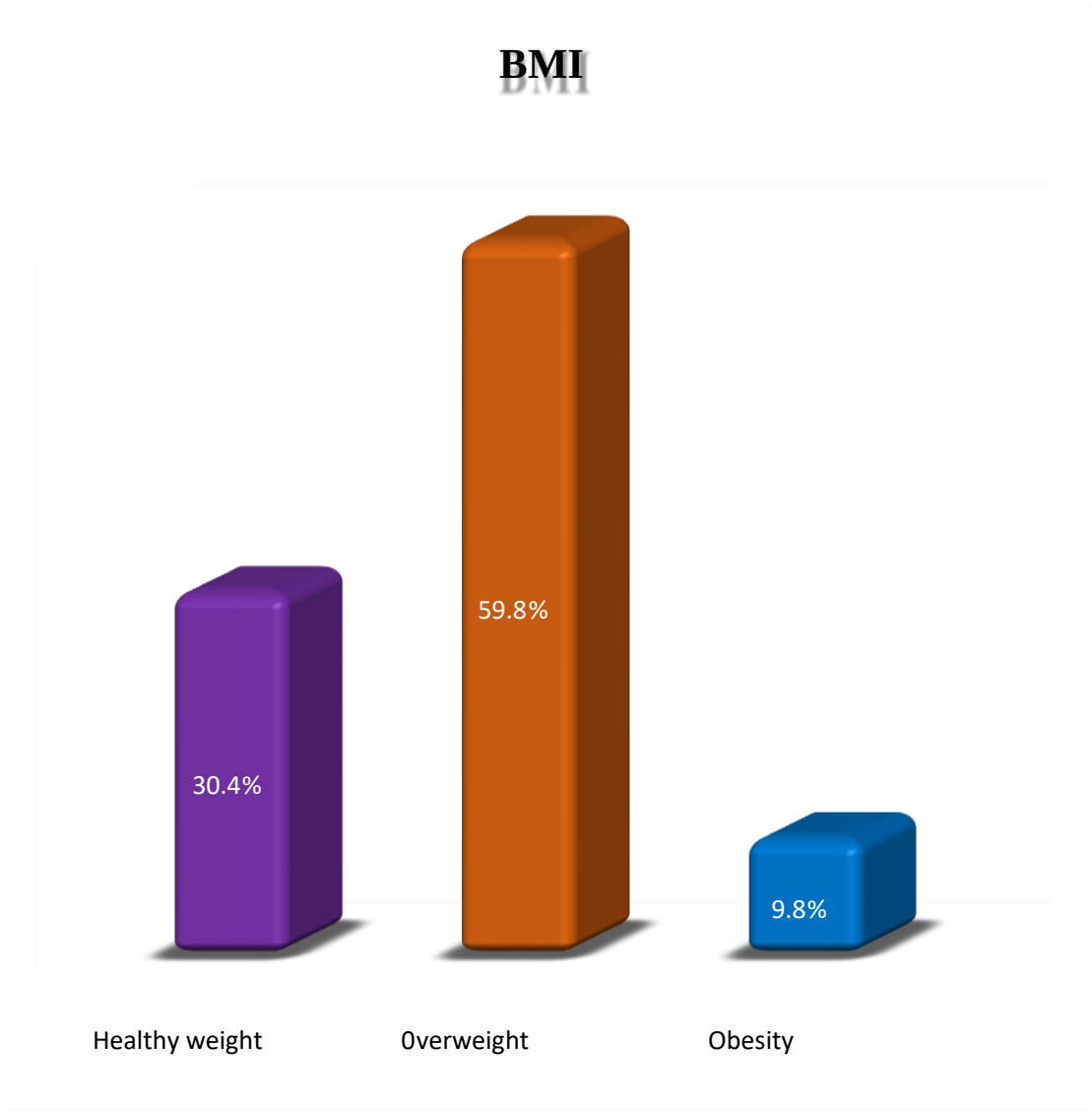


Figure 3: BMI of the participants

4.1.4 Marital status

Among the 102 participants in the study, the majority were married, accounting for 86 individuals (84.3%). In contrast, 16 participants (15.7%) were widowed.

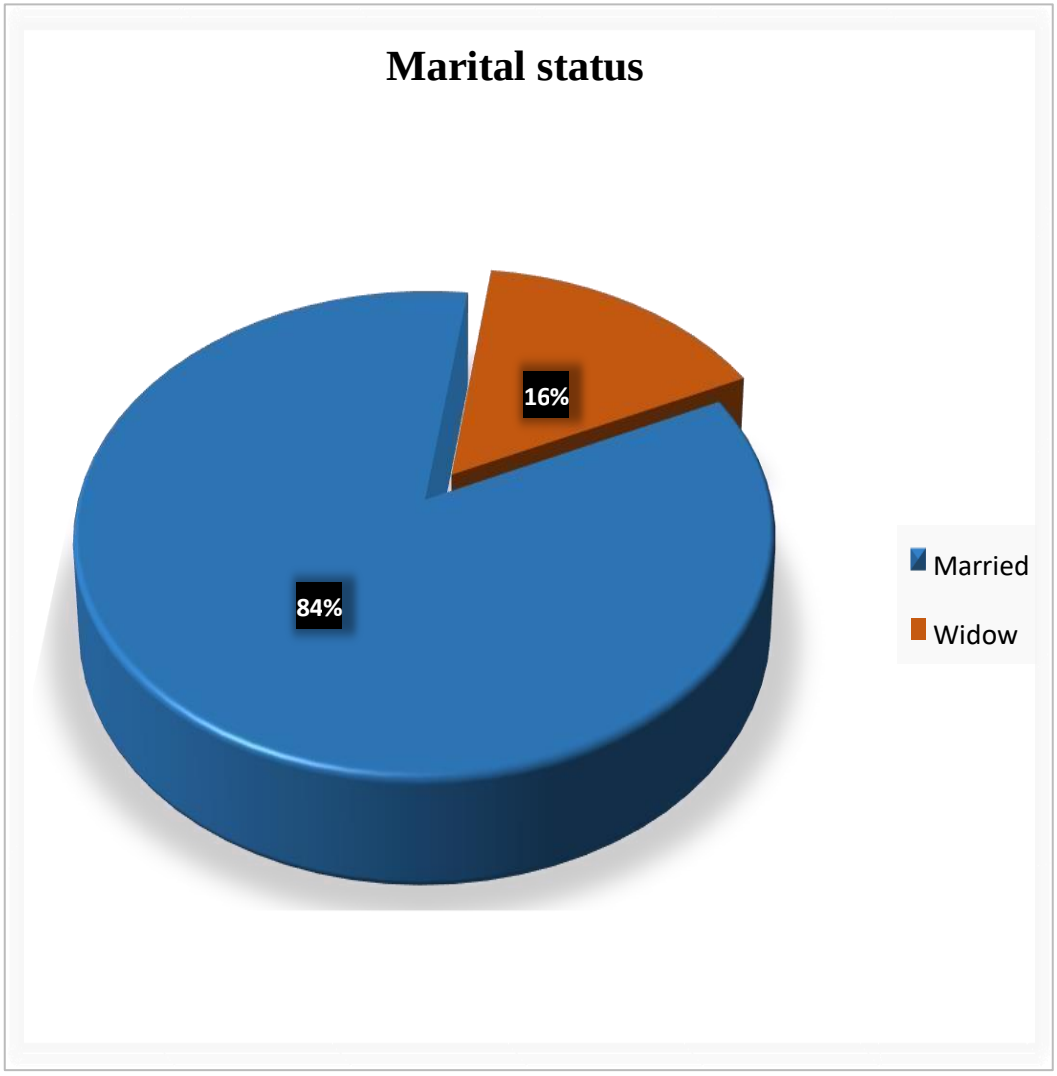


Figure 4: Marital status of the participants

4.1.5 Occupations

Among the 102 participants, the majority were housewives, accounting for 73.5% (n=75) of the sample. Other occupational groups included individuals engaged in business (6.9%, n=7), shopkeepers (2.0%, n=2), service holders (2.0%, n=2), and a small number of farmers (1.0%, n=1). Additionally, 14.7% (n=15) were classified under 'others,' representing various other forms of employment.

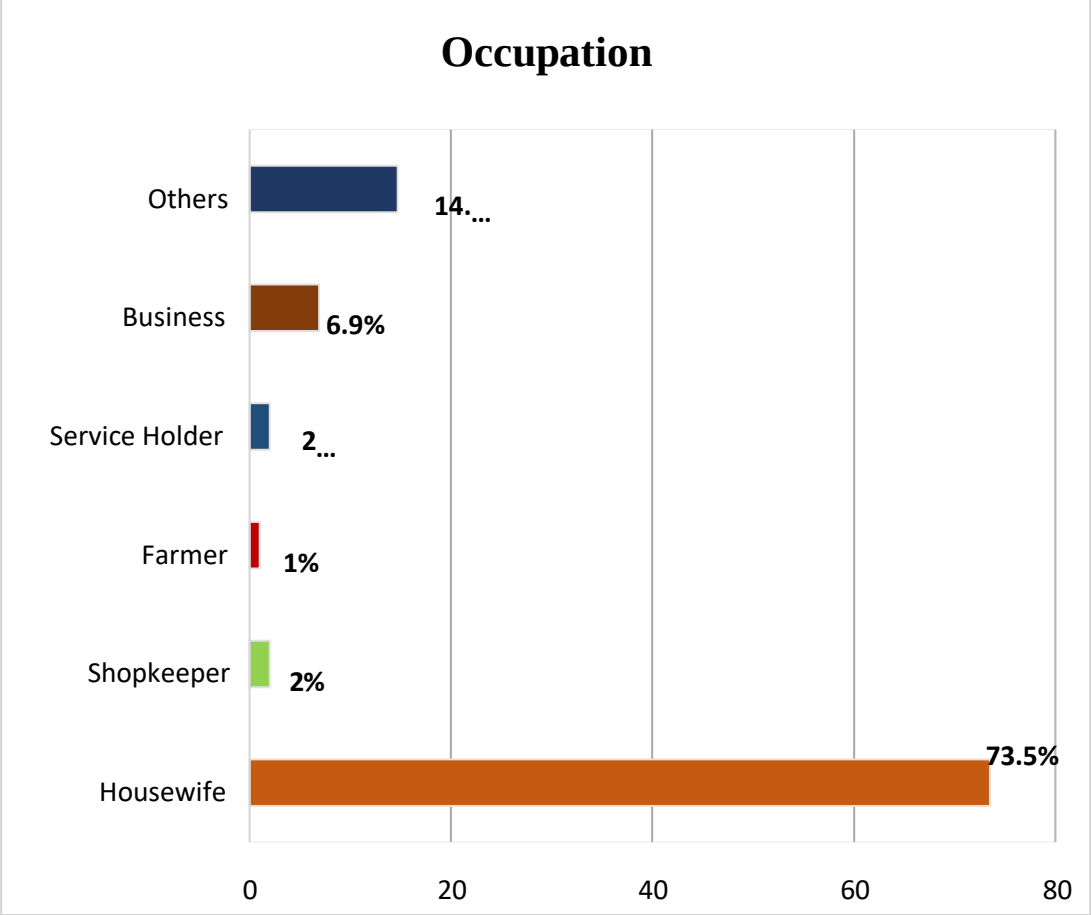


Figure 5: Occupations of the participants

4.1.6 Educational status

In educational qualification, the largest proportion having completed secondary education (45.1%, n=46). This was followed by 33.3% (n=34) who had attained education up to the primary level. A smaller portion of the sample were graduates (9.8%, n=10), while 6.9% (n=7) had no formal education. Only 4.9% (n=5) had completed higher secondary education.

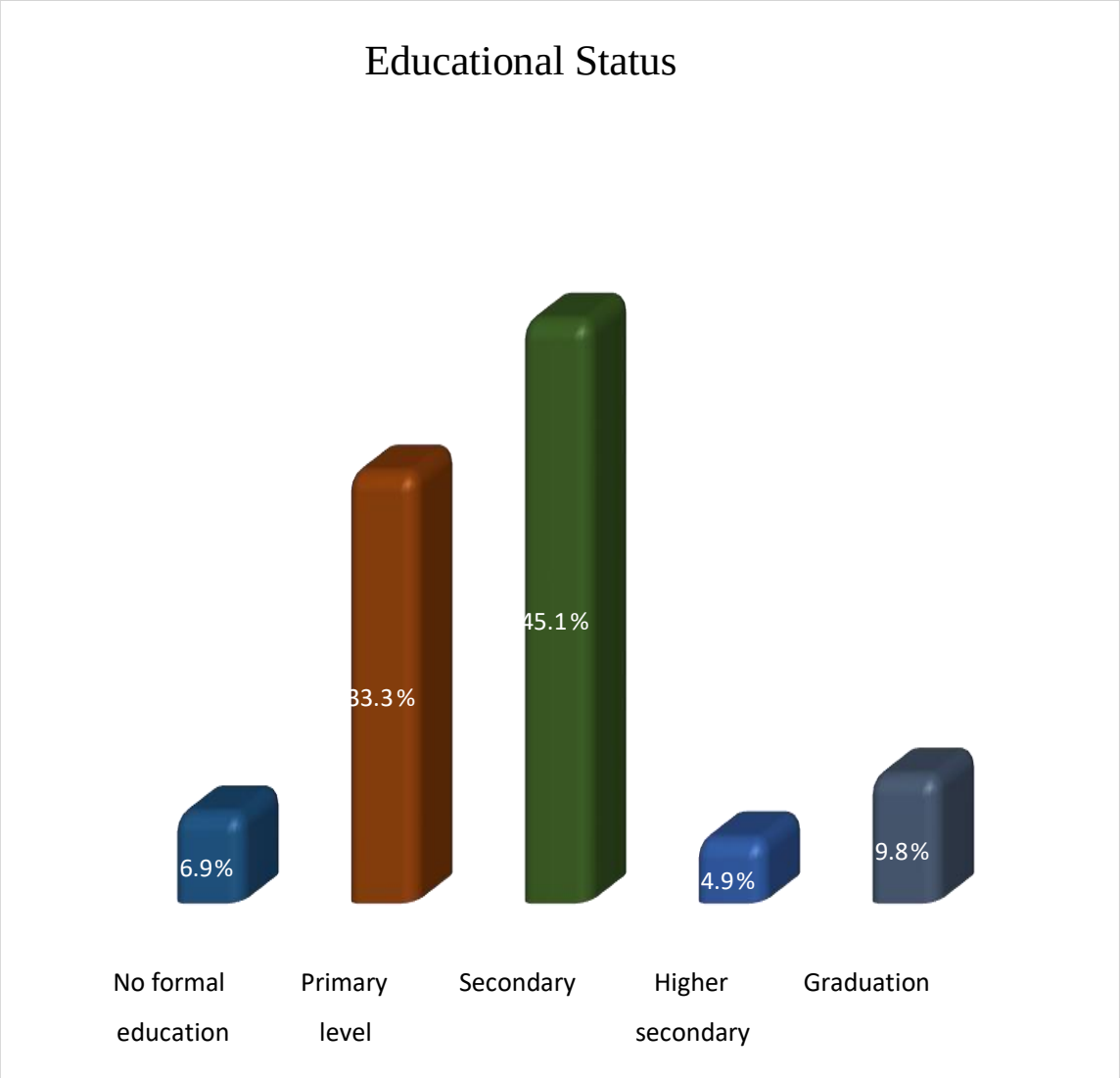


Figure 6: Educational status of the participants

4.1.7 Living areas

The group of participants was composed mostly of people living in semi urban areas which constituted 81.4% (n=83) of the sample. A little more than one in ten participants (9.8%) were in rural areas, compared with 8.8% (n=9) in urban areas.

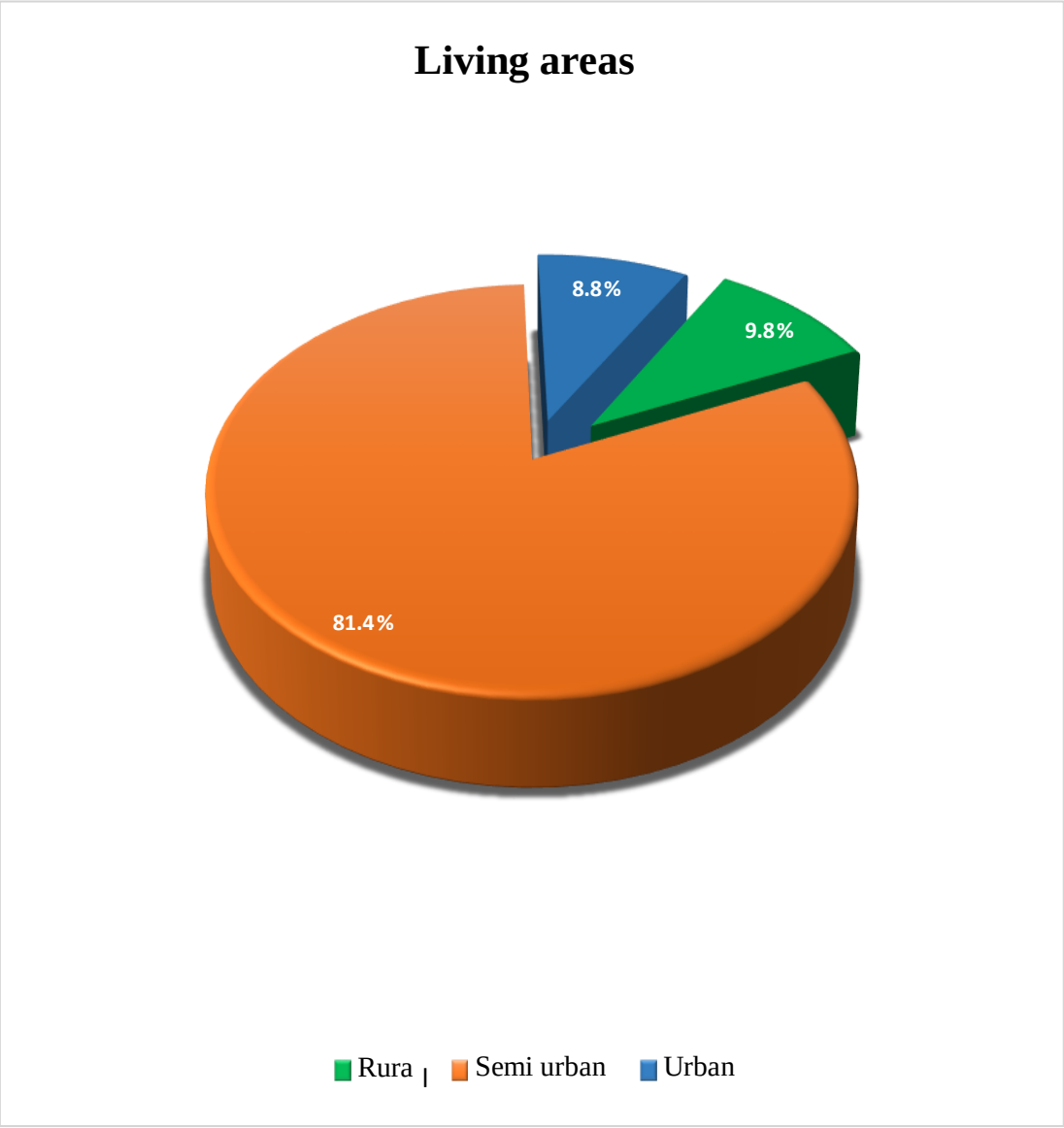


Figure 7 : Living areas of the participants

4.1.8 Comorbidities

Out of 102 participants, 43.1% (n=44) having no comorbid conditions. The most commonly reported single comorbidity was hypertension, present in 24.5% (n=25) of the participants, followed by diabetes mellitus in 12.7% (n=13). A combination of hypertension and diabetes was observed in 9.8% (n=10), while 4.9% (n=5) reported having hypertension, diabetes mellitus, and other conditions concurrently. Other less frequently reported comorbidities included unspecified conditions (2.9%, n=3), hypertension with asthma (1.0%, n=1), and heart disease with stroke (1.0%, n=1).

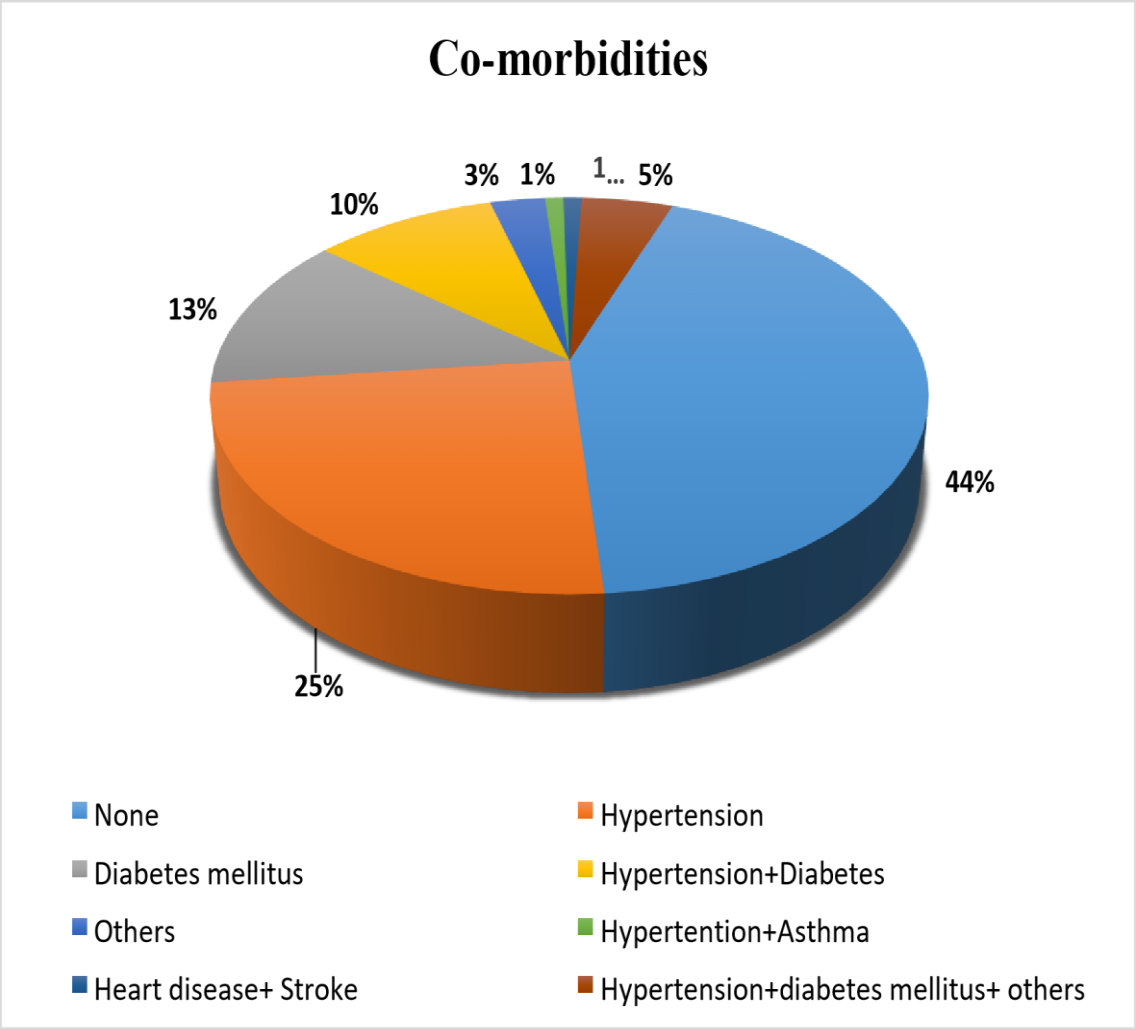


Figure 8: Comorbidities of the participants

4.1.9 Personal habits

Out of 102 participants, 32.4% (n=33) reported having personal habits such as smoking, alcohol consumption, or other lifestyle behaviors, while the majority (67.6%, n=69) reported having no such habits.

Among the 33 participants (32.4% of the total sample) who reported personal habits, the most common was the use of betel leaf, reported by 11.8% (n=12). This was followed by combinations such as betel leaf with zarda (7.8%, n=8), and standalone cigarette smoking (5.9%, n=6). Other reported habits included gul use (3.9%, n=4), betel leaf with gul (2.0%, n=2), and a combination of cigarette smoking and betel leaf (1.0%, n=1). One participant (1.0%) did not specify the type of habit.

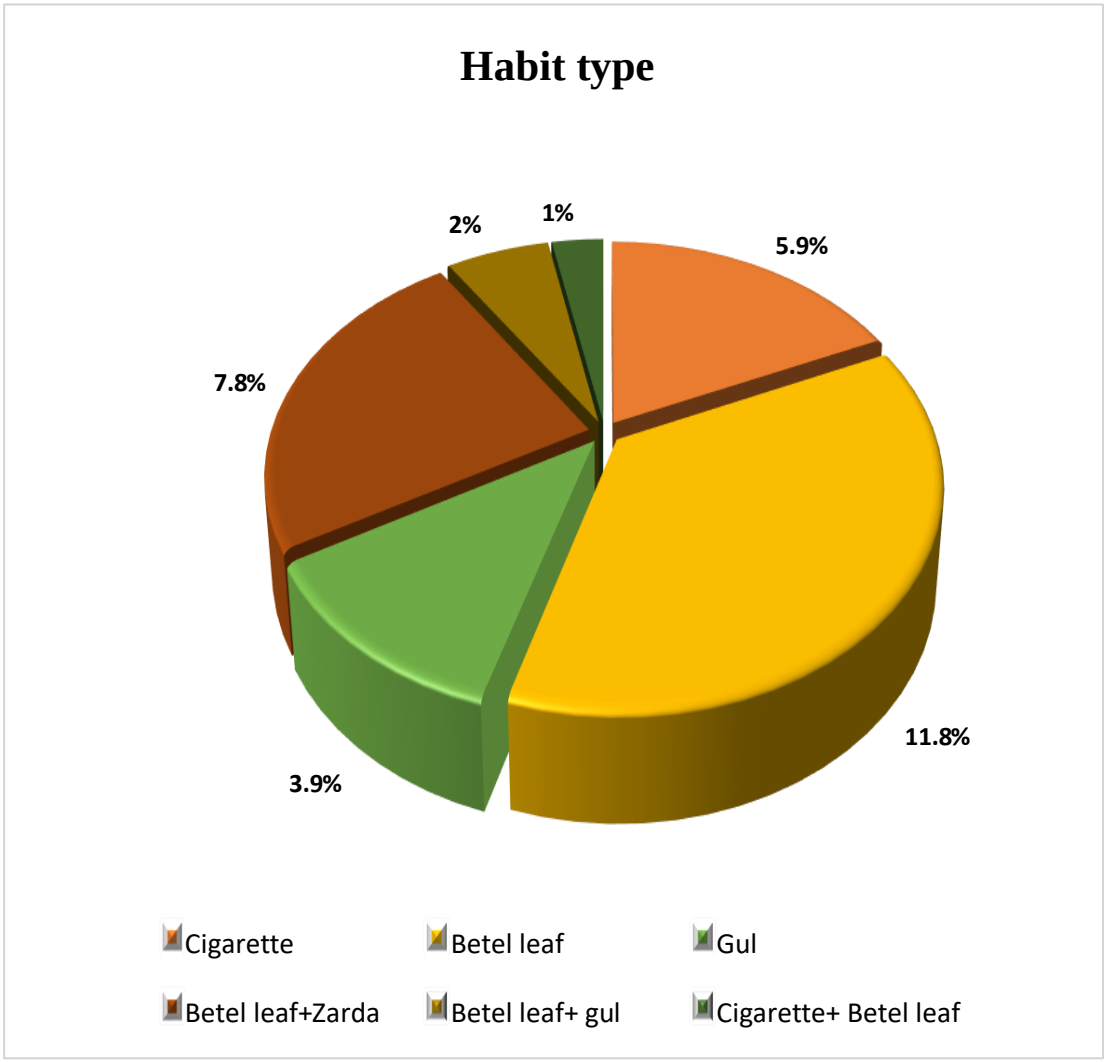


Figure 9: Presence of personal habit of the participants

4.2 Participant Related information:

4.2.1 Dominant side

In this research, among 102 participants, the right knee was the most commonly affected, reported by 42.2% (n=43) of individuals. The left knee was affected in 22.5% (n=23) of cases, while 35.3% (n=36) of participants experienced bilateral knee involvement.

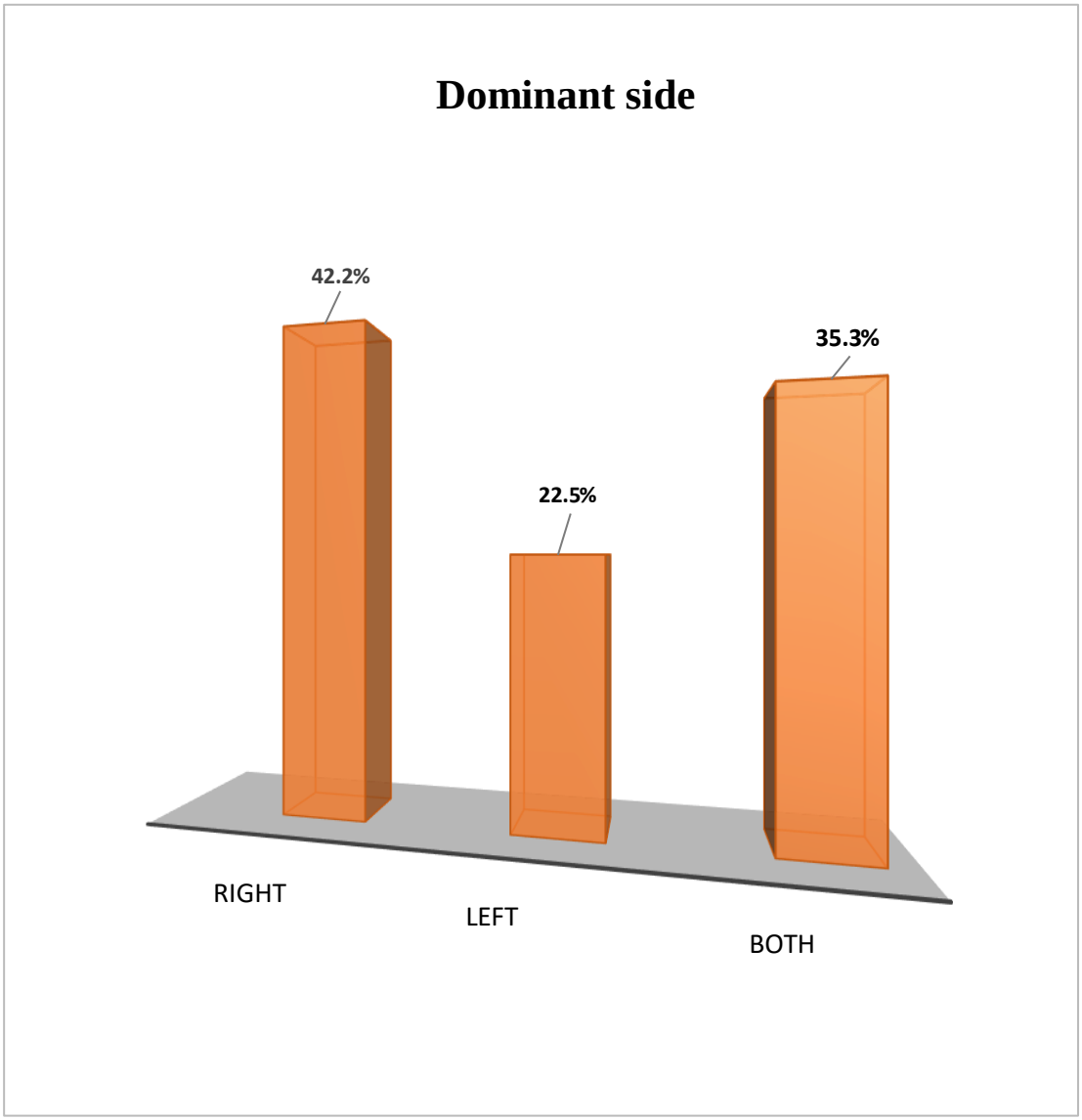


Figure 10: Involvement side of the participants

4.2.2 History of knee trauma

Among the 102 participants, 24.5% (n=25) had a history of knee trauma, while the remaining 75.5% (n=77) had no such history.

Out of 25 participants (24.5% of the total sample) who had a history of knee trauma, the most common cause was falls, accounting for 20.6% (n=21). Road traffic accidents and work-related injuries were each reported by 2.0% of participants (n=2, respectively). The remaining 77 participants (75.5%) had no history of trauma.

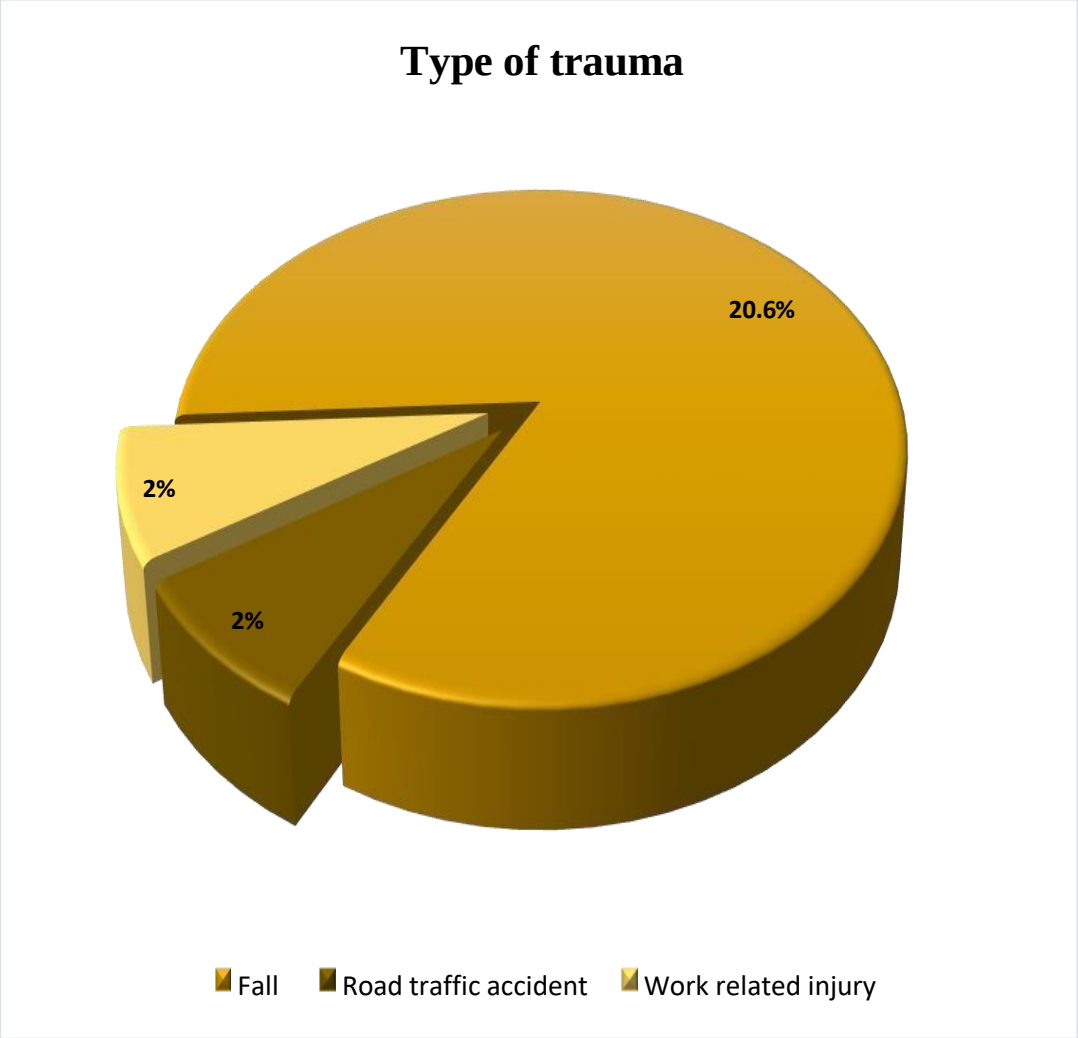


Figure 11: Type of trauma

4.2.3 Onset of arthritis

Among 102 participants, the majority of participants (85.3%, n=87) had experiencing knee osteoarthritis symptoms for less than two years. A smaller proportion (14.7%, n=15) had been living with symptoms for two to five years.

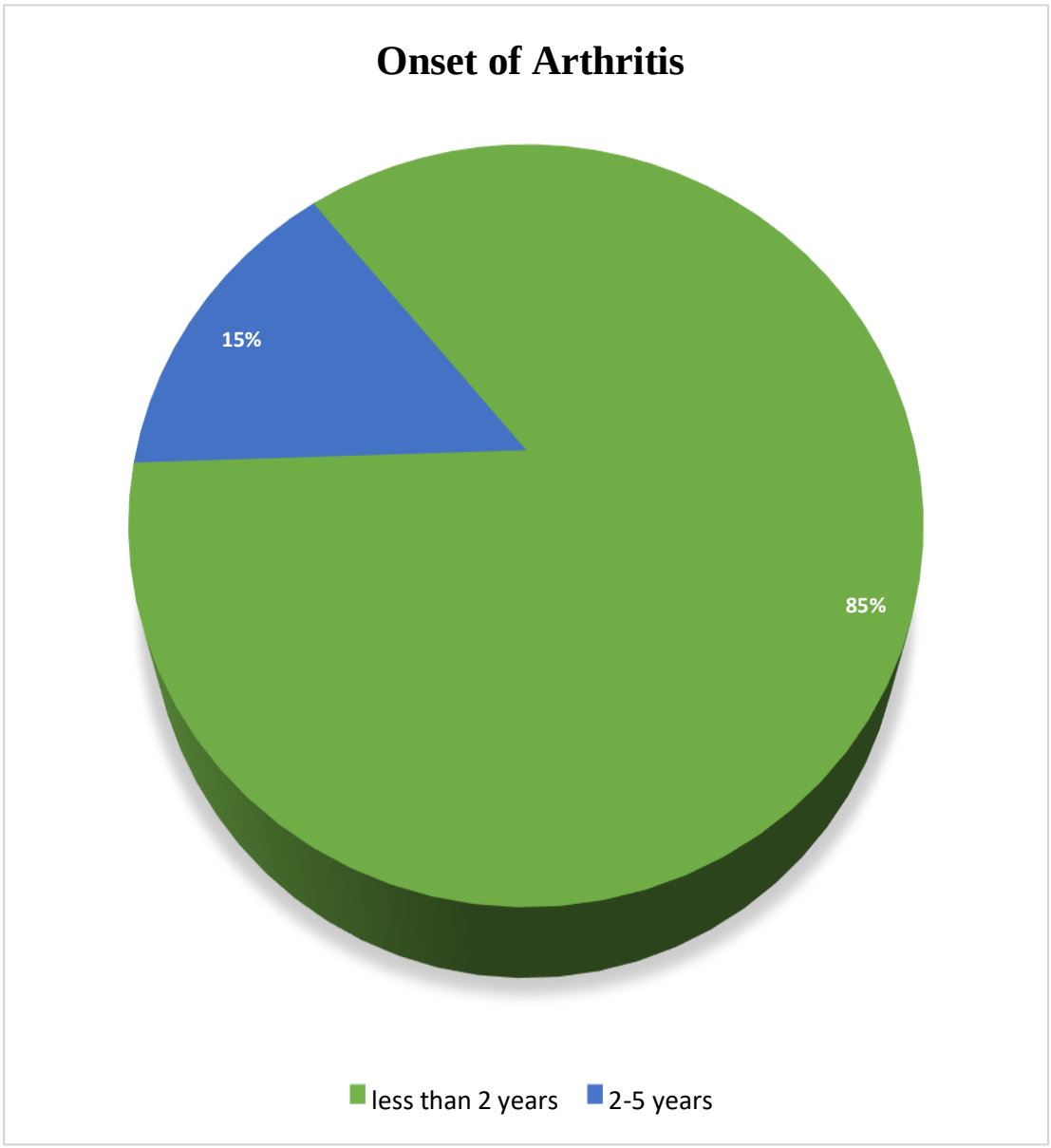


Figure 12: Arthritis onset of the participants

4.2.4 Knee surgery history

Among the 102 participants, only 1.0% (n=1) had a family history of knee osteoarthritis, while the remaining 99.0% (n=101) did not report any such history.

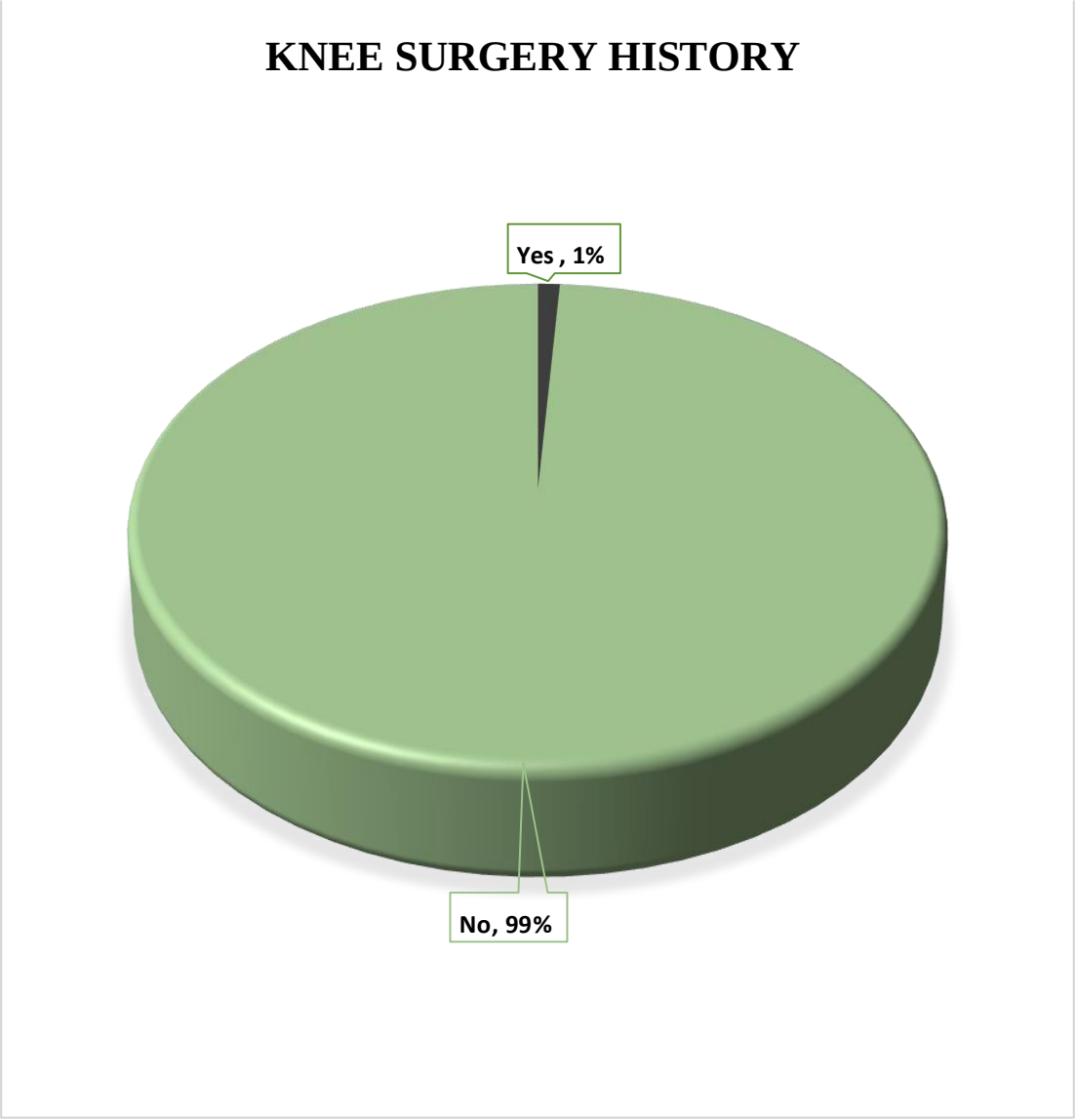


Figure 13: knee surgery history of the participants

4.2.5 Use of assistive device

Out of the 102 participants, 27.5% (n=28) had use of assistive devices, while 72.5% (n=74) had not used any such devices.

Among the 28 participants (27.5% of the total sample) who had used assistive devices, the majority (24.5%, n=25) had used a knee brace, while a smaller proportion (2.9%, n=3) had used crutches.

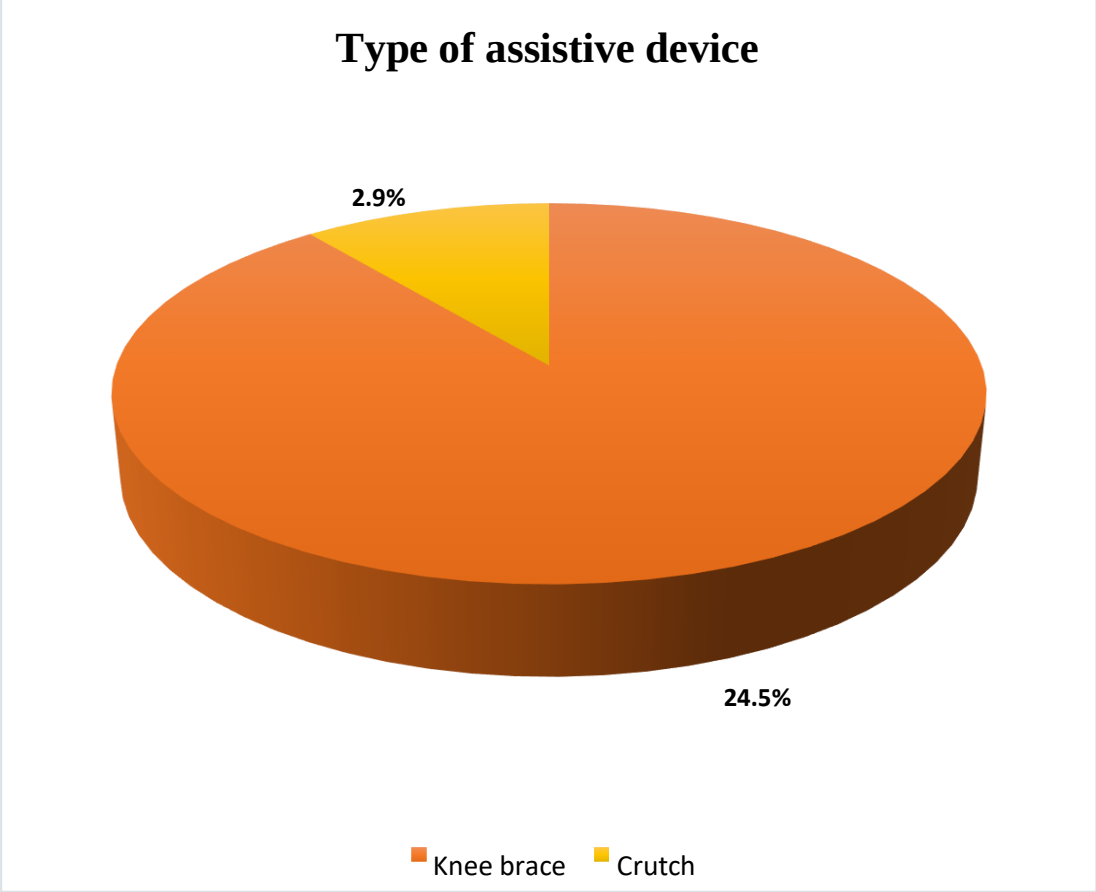


Figure 14: Type of assistive device

4.3 Pain in different position measured by NPRS

Table 1: Distribution of Pain Severity in Different Positions Among Participants (General intensity, during sitting, during standing, during walking and during stair climbing)

Variable	No pain N (%)	Mild pain N (%)	Moderate pain N (%)	Severe pain N (%)
Pain in general intensity	0%	4 (3.9%)	76 (74.5%)	22 (21.6%)
During sitting	0%	1 (1%)	99 (97.1%)	2 (2%)
During standing	0%	0%	71 (69.6%)	31 (30.4%)
During walking	0%	0%	32 (31.4%)	70 (68.6%)
During stair climbing	0%	0%	8 (7.8%)	94(92.2%)

Among 102 participants, pain severity was assessed in various functional positions. For general pain intensity, 74.5% (n=76) experienced moderate pain, while 21.6% (n=22) experienced severe pain. Only 3.9% (n=4) had mild pain, and none had no pain. During sitting, 97.1% (n=99) experienced moderate pain, 2% (n=2) severe pain, and 1% (n=1) mild pain. While standing, 69.6% (n=71) experienced moderate pain and 30.4% (n=31) severe pain; no participants experienced mild or no pain. Pain severity increased during walking, with 68.6% (n=70) experiencing severe pain and 31.4% (n=32) moderate pain. The highest pain levels occurred during stair climbing, where 92.2% (n=94) experienced severe pain and 7.8% (n=8) moderate pain. These findings indicated that activities such as walking and stair climbing were particularly painful and challenging for individuals with knee osteoarthritis.

4.4 Patient Health Questionnaire-9 (PHQ-9)

Table 2: Distribution of Depression Severity Among Participants According to PHQ-9 Scores

Variable (PHQ-9 total score)	Minimal Depression N (%)	Mild depression N (%)	Moderate depression N (%)	Moderately severe depression N (%)	Severe depression N (%)
PHQ-9 total score	16(15.7%)	76(74.5%)	6 (5.9%)	4 (3.9%)	0%

Among 102 participants, depression severity was assessed using the PHQ-9 total scores. The majority, 74.5% (n=76), experienced mild depression, followed by 15.7% (n=16) with minimal depression. Moderate depression was observed in 5.9% (n=6) of participants, while 3.9% (n=4) had moderately severe depression. None of the participants reported severe depression. These findings indicate that mild depressive symptoms were the most common among the study population, with fewer participants experiencing higher levels of depression severity.

4.5 Generalized Anxiety Disorder-7 Scale

Table 3: Distribution of Anxiety Levels Among Participants According to GAD-7 Scores

Variable	Minimal Anxiety N (%)	Mild Anxiety N (%)	Moderate Anxiety N (%)	Severe Anxiety N (%)
GAD-7 Total score	46 (45.1%)	53 (52%)	3 (2.9%)	0

Among 102 participants, anxiety levels were assessed using the GAD-7 total scores. Minimal anxiety was observed in 45.1% (n=46) of participants, while mild anxiety was the most prevalent, affecting 52% (n=53). Moderate anxiety was present in 2.9% (n=3) of participants, and none experienced severe anxiety. These results indicate that mild anxiety symptoms were common in this population, with relatively few participants exhibiting moderate anxiety and no cases of severe anxiety reported.

4.6 Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC)

Table 4: Distribution of Physical Function Limitation Severity Based on WOMAC Total Scores

Variable	Mild symptoms N (%)	Moderate symptoms N (%)	Severe symptoms N (%)	Very Severe symptoms N (%)
WOMAC Total score	0	79 (77.5%)	22(21.6%)	1(1%)

Among 102 participants, physical function limitation severity was assessed using the WOMAC total scores. The majority of participants, 77.5% (n=79), experienced moderate symptoms, followed by 21.6% (n=22) with severe symptoms. Only 1% (n=1) of participants experienced very severe symptoms, and none reported mild symptoms. These findings suggest that most participants faced moderate to severe limitations in physical function related to knee osteoarthritis.

4.7.1 Association Between Pain in different position and Sociodemographic Characteristics

Test assumption: Chi-square test

- Two categorical variable
- "Significant" if p value is < 0.05

Table 5: Association between Pain in different position along with Age, Gender, BMI, Occupation, Comorbidities, Dominant side, Trauma history:

Sociodemographic factor	Pain in different position	Chi-square (x^2) value	P value
Age	General intensity pain	8.875	.544
Gender		.930	.628
BMI		.658[a]	.956
Occupation		2.770	.986
Dominant side		9.736	**.045***
Trauma history		4.134	.127
Comorbidities		3.647	.997
Age	During sitting	8.587	.572
Gender		.575	.750
BMI		5.312	.257
Occupation		1.113	1.000
Dominant side		2.484[a]	.648
Trauma history		1.004	.605
Comorbidities		27.000	**.019***
Age	During standing	5.402	.369
Gender		.261	.610
BMI		3.202	.202
Occupation		3.765	.584

Dominant side		5.243	.073
Trauma history		.040	.841
Comorbidities		13.346	.064

Age	During walking	5.574	.350
Gender		3.139	.076
BMI		.669	.716
Occupation		7.033	.218
Dominant side		.100	.951
Trauma history		3.635	.057
Comorbidities		5.996	.540
Age	During stair climbing	3.038	.694
Gender		0.067	.796
BMI		1.006	.605
Occupation		.859	.973
Dominant side		1.161	.560
Trauma history		.677	.411
Comorbidities		8.758	.270

The association between sociodemographic factors and pain intensity in various positions was analyzed using the Chi-square test. The results showed that dominant side was significantly associated with general pain intensity ($\chi^2 = 9.736$, $p = 0.045$), indicating that limb dominance may affect overall knee pain perception in patients with osteoarthritis. Additionally, the presence of comorbidities was significantly related to pain experienced during sitting ($\chi^2 = 27.000$, $p = 0.019$), suggesting that additional health conditions may exacerbate pain in this position. However, no significant associations were found between pain intensity and other sociodemographic factors such as age, gender, body mass index (BMI), occupation, or trauma history across different positions including sitting, standing, walking, and stair climbing (all $p > 0.05$).

4.7.2 Association Between PHQ-9 Scale and Sociodemographic Characteristics

Table 6: Association between PHQ-9 Scale along with Age, Gender, BMI, Occupation, Comorbidities, Dominant side, Trauma history:

Sociodemographic factor	Depression measurement scale	Chi-square (x^2) value	P value
Age	PHQ-9 scale	19.730	.183
Gender		3.673	.299
BMI		4.400	.623
Occupation		12.813	.617
Dominant side		4.182	.652
Trauma history		5.000	.172
Comorbidities		30.590	.081

The associations between sociodemographic factors and depression, measured by the PHQ-9 scale& the analysis revealed no statistically significant associations between depression levels and any of the sociodemographic variables, including age (χ^2 = 19.730, p = 0.183), gender (χ^2 = 3.673, p = 0.299), body mass index (BMI) (χ^2 = 4.400, p = 0.623), occupation (χ^2 = 12.813, p = 0.617), dominant side (χ^2 = 4.182, p = 0.652), trauma history (χ^2 = 5.000, p = 0.172), and comorbidities (χ^2 = 30.590, p = 0.081).

4.7.3 Association Between GAD-7 Scale and Sociodemographic Characteristics

Table 7: Association between GAD-7 Scale along with Age, Gender, BMI, Occupation, Comorbidities, Dominant side, Trauma history:

Sociodemographic factor	Anxiety measurement scale	Chi-square (x^2) value	P value
Age	GAD-7 scale	21.333	**.019***
Gender		.633	.729
BMI		2.038	.729
Occupation		20.050	**.029***
Dominant side		7.239	.124
Trauma history		.135	.935
Comorbidities		55.668	**.000***

The association between sociodemographic factors and anxiety, assessed using the GAD7 scale, was evaluated through Chi-square analysis. The results indicated statistically significant associations for three variables. Age was significantly associated with anxiety levels ($\chi^2 = 21.333$, $p = 0.019$), Occupation also demonstrated a significant relationship with anxiety ($\chi^2 = 20.050$, $p = 0.029$). Furthermore, comorbidities were strongly associated with anxiety ($\chi^2 = 55.668$, $p = 0.000$). In contrast, no significant associations were found between anxiety and gender ($p = 0.729$), BMI ($p = 0.729$), dominant side ($p = 0.124$), or trauma history ($p = 0.935$). These findings underscore the importance of age, occupation, and comorbid health conditions in contributing to anxiety among individuals with knee osteoarthritis.

4.7.4 Association Between WOMAC Scale and Sociodemographic Characteristics

Table 8: Association between WOMAC Scale along with Age, Gender, BMI, Occupation, Comorbidities, Dominant side, Trauma history:

Sociodemographic factor	Activity limitations measurement	Chi-square (x^2) value	P value
Age	WOMAC osteoarthritis index	14.014	.172
Gender		.304	.859
BMI		1.972	.741
Occupation		7.271	.700
Dominant side		5.653	.227
Trauma history		.227	.581
Comorbidities		16.437	.287

The relationship between sociodemographic factors and activity limitations, as measured by the WOMAC osteoarthritis index, was assessed using the Chi-square test. The analysis revealed that none of the examined sociodemographic variables showed statistically significant associations with activity limitations. Specifically, age (χ^2 = 14.014, p = 0.172), gender (χ^2 = 0.304, p = 0.859), BMI (χ^2 = 1.972, p = 0.741), occupation (χ^2 = 7.271, p = 0.700), dominant side (χ^2 = 5.653, p = 0.227), trauma history (χ^2 = 0.227, p = 0.581), and comorbidities (χ^2 = 16.437, p = 0.287) all demonstrated non-significant associations. These findings suggest that within this study population, activity limitations due to knee osteoarthritis are not significantly influenced by the evaluated sociodemographic factors.

4.8.1 Association Between PHQ-9 and Pain in different position (NPRS)

Table 9: Association between PHQ--9 Scale along with Pain in different position General intensity, Sitting, Standing, Walking and Stair climbing:

Pain in different position	Chi-square (x^2) value	P value	Level of significance
General intensity	1.677	0.947	Not significant
During sitting	25.405	0.000	**Significant**
During standing	9.312	0.025	**Significant**
During walking	4.625	0.201	Not significant
During stair climbing	3.652	0.302	Not significant

The association between depression (as measured by PHQ-9) and pain intensity (as measured by NPRS) was analyzed across different positions and activities using the Chi square test. The findings revealed that there was no significant association between PHQ-9 scores and general pain intensity ($\chi2=1.677$, $p=0.947$), walking pain ($\chi2=4.625$, $p=0.201$) and stair climbing pain ($\chi2=3.652$, $p=0.302$).

In contrast, a significant association was found between PHQ-9 scores and pain experienced during sitting ($\chi2=25.405$, $p=0.000$) as well as during standing ($\chi2=9.312$, $p=0.025$).

4.8.2 Association Between GAD-7 and Pain in different position (NPRS)

Table 10: Association between GAD-7 Scale along with Pain in different position General intensity, Sitting, Standing, Walking and Stair climbing:

Pain in different position	Chi-square (x^2) value	P value	Level significance
General intensity	1.090	0.896	Not significant
During sitting	2.858	0.582	Not significant
During standing	8.818	0.012	**Significant**
During walking	1.654	0.437	Not significant
During stair climbing	1.188	0.552	Not significant

The association between anxiety levels, assessed by the Generalized Anxiety Disorder-7 (GAD-7) scale indicated that there was no statistically significant association between GAD-7 scores and general pain intensity ($\chi2=1.090$, $p=0.896$), pain during sitting ($\chi2=2.858$, $p=0.582$), walking ($\chi2=1.654$, $p=0.437$), or stair climbing ($\chi2=1.188$, $p=0.552$). However, a statistically significant association was observed between GAD-7 scores and pain experienced during standing ($\chi2=8.818$, $p=0.012$). This suggests that higher anxiety levels may be particularly associated with increased pain intensity during upright static positions in patients with knee osteoarthritis.

4.8.3 Association Between WOMAC Scale and Pain in different position (NPRS)

Table 11: Association between WOMAC Scale along with Pain in different position General intensity, Sitting, Standing, Walking and Stair climbing:

Pain in different position	Chi-square (x^2) value	P value	Level of significance
General intensity	4.618	0.329	Not significant
During sitting	4.710	0.318	Not Significant
During standing	11.163	0.004	**Significant**
During walking	14.516	0.001	**Significant**
During stair climbing	0.529	0.767	Not significant

Association between WOMAC Scale along with Pain in different position General intensity, Sitting, Standing, Walking and Stair climbing. The analysis revealed that pain during standing and pain during walking had a statistically significant association with WOMAC scores. Specifically, the chi-square value for standing pain was 11.163 with a *p*-value of 0.004, and for walking pain, the chi-square value was 14.516 with a *p*-value of 0.001, indicating a significant relationship ($p < 0.05$). These findings suggest that greater pain experienced during standing and walking was significantly associated with higher WOMAC scores, reflecting greater activity limitation and functional impairment. In contrast, no significant associations were observed between WOMAC scores and general pain intensity ($\chi^2 = 4.618$, $p = 0.329$), pain during sitting ($\chi^2 = 4.710$, $p = 0.318$), or pain during stair climbing ($\chi^2 = 0.529$, $p = 0.767$).

4.9 Association Between PHQ-9 and WOMAC osteoarthritis index

Table 12: Association between PHQ-9 Scale along with WOMAC osteoarthritis index:

PHQ-9 category	Chi-square (x^2) value/ t value	P value	Level of significance
• (Minimal Depression • Mild depression • Moderate depression • Moderately severe depression • Severe Depression)	44.044	0.000	**Significant**

The relationship between depression levels and osteoarthritis severity revealed a statistically significant association between PHQ-9 categories and WOMAC scores ($\chi 2$=44.044, p=0.000). This indicates that higher levels of depression were significantly associated with increased severity of osteoarthritis symptoms, including pain, stiffness, and functional limitations

4.10 Association Between GAD-7 Scale and WOMAC osteoarthritis index

Table 13: Association between GAD-7 Scale along with WOMAC osteoarthritis index:

GAD-7 category	Chi-square (x^2) value/ t value	P value	Level of significance
• (Minimal anxiety • Mild anxiety • Moderate anxiety • Severe anxiety)	20.605	0.000	**Significant**

The association between anxiety levels, as measured by the Generalized Anxiety Disorder7 (GAD-7) scale, and osteoarthritis severity, assessed using the WOMAC Osteoarthritis Index, was examined using the Chi-square test. The analysis demonstrated a statistically significant association between GAD-7 categories and WOMAC scores ($\chi 2=20.605$, $p=0.000$). This finding indicates that higher levels of anxiety were significantly related to greater osteoarthritis symptom severity, including increased pain, stiffness, and functional limitations.

Chapter-v Discussion

5.1 Discussion

The purpose of the presented study was to explore the interrelationships between sociodemographic characteristics, pain level upon undertaking different functional tasks, psychological status (depression and anxiety), and functional limitations among people who had been diagnosed with knee osteoarthritis (KOA). The study can provide efficient information about the interaction of these multidimensional factors in KOA patients, and how they match and rear with the findings provided in earlier literature.

Pain severity level in this research was measured through Numeric Pain Rating Scale (NPRS) in various postures such as sitting, standing, walking, and ascending stairs. The results pointed to the fact that pain had a high-intensity especially when engaging in weight-bearing activities. The stair climbing (92.2%) and walking (68.6%) reported the highest percentages of severe pain. These results are in line with past records of Alabajos-Cea et al. who also reported high pain levels in KOA patients when exposed to activities that involved joint loading. They fashionably examined their study by using Visual Analog Scale (VAS) but essentially both NPRS and VAS have been used as a validated tool of assessing pain and this study outcome supports the subjective view of compelling pain in KOA especially when the subject involves using lower-limbs.

Anxiety, in turn, was reported widely, as it was measured using the GAD-7 scale, with 52 percent of the participants experiencing mild anxiety and 2.9 percent reporting moderate one. We identified a statistically significant association between the level of anxiety and the intensity of pain only in the standing position ($p = 8.818$, $p = 0.012$), whereas other positions were not associated. This result augments the findings of Sharma et al. who concluded that anxiety was a factor that enhances pain perception among patients with OA. Although Sharma et al. extensively reviewed more data and on all scales and devices (including HADS, CES-D, and PHQ), our NPRS and GAD-7-based study contributes to the argument that anxiety can alter the experience of various types of pain, especially during upright postures that would demand postural control. It is possible that the effect of anxiety is more dramatic in motionless situations when an individual may have stronger cognitive anticipation or fear of pain and therefore fail to associate anxiety with pain.

The relationship between depression and anxiety, and the severity of osteoarthritis with the use of the WOMAC index, proved to be statistically significant. Depression and anxiety showed equal association with larger WOMAC scores, this all implied that the greater the psychological distress the more severe the OA symptoms, including pain, stiffness, and/or functional limitations. The results align with other studies by Wenhao Yang et al., who concluded that depression and anxiety are predictors of deteriorating WOMAC outcomes on a longitudinal design. Their results, and our findings agree to a mutual-reinforcing model of bidirectional effects between psychological distress and the severity of OA symptoms.

In terms of sociodemographic variables, after the analyses, we concluded that there is no correlation between the degree of depression and age, gender, obesity index, profession, prevailing side, trauma experience, and comorbidities. This covers Iijima et al., who found that baseline demographic factors did not have much impact towards psychological distress in populations of KOA. Nevertheless, we were able to find that age, occupation and comorbidities are significantly correlated with levels of anxiety. This result confirms those of Sharma et al., who observed that individuals of specific demographics, especially those with numerous comorbidities or occupational stress, might be more prone to anxiety with regard to OA.

Particularly, it has been found in this study that dominant side had a significant correlation with general pain intensity (2 = 9.736, p = 0.045). However, despite the fact that this variable is not usually emphasized in the literature, it is possible that the dominant limb experiences more significant biomechanical stress affecting increased degenerative changes and increased pain. This unique addition indicates that the further research needs to dwell on limb dominance as a predictor of KOA development and the perception of its symptoms.

A significant clinical observation was the fact that there were no serious correlations between the sociodemographic variables and activity limitations based on the WOMAC index. Age, gender, BMI, occupation, dominant side, trauma history, comorbidities were some of these variables whose p-values were not significant. This is contrary to some of the earlier studies, e.g., Sharma et al. and Yang et al., who identified that the perceived function can be influenced by the social and economic status. One possible reason is the homogeneity of the samples or the culture of the present study where care accessibility and family support can be used to protect against some of these social gaps.

Moreover, this research found comorbidities, which was considerably related to pain in sitting and anxiety levels indicating a burden accumulation of diseases. The given finding is consistent with Alabajos-Cea et al. who noted that patients with comorbid medical conditions often had a high anxiety and depression score. The implication is that OA management needs to focus on the overall health of the patient and needs to incorporate interventions of comorbid conditions as well as joint specific interventions. Depression and anxiety were also correlated in the study which affirmed the interdependent existence and interaction of the two conditions on patient-reported outcomes. This corresponds with the results of Iijima et al. and Wenhao Yang et al. who wrote about feedback loops of pain and physical limitations being triggered by depression and anxiety, as well as to the latter leading to psychological distress exacerbation. Our cross-sectional data-set is not able to establish the causality, but reinforces the need to screen specifically mental health as part of the standard KOA evaluation.

Our positional analysis revealed that pain when sitting was attributed to depression whereas pain when standing was attributed to anxiety. The findings give an in-depth insight into the manner in which various psychological states could affect the perception of pain based on physical posture. The insight applies especially in contexts of rehabilitation psychology, where it is implied that there is often a need to implement posture-directed or activity-directed psychological therapy or behavioral therapy.

When combined with the already extensive body of evidence pointing to an important role of psychological distress in the experience and development of KOA, this study further demonstrates the importance of psychological distress in those with KOA and helps to further illustrate its role in the experience and development of KOA. The results mostly correspond to other studies conducted by Sharma et al. (2016), Iijima et al. (2018), Wenhao Yang et al. (2022), and Alabajos-Cea et al. (2022). In addition, the study has made valuable contributions in quantifying the fact that the result is influenced by the posture of a human who experiences pain and assessing the correlation between pain and anxiety and depression by means of NPRS. The work supports the necessity of such a model as a biopsychosocial approach to the treatment of KOA which incorporates such areas as mental health support, pain managements, and functional rehabilitation.

The future research can be improved with the help of longitudinal research design to learn more about the relationships between psychological factors and OA outcomes as

causal ones. Further, research that includes qualitative data would also clarify the way patients conceptualize their pain and mental health and wellbeing as applied to KOA.

5.2 Limitations

In any research, full accuracy is rarely possible, and acknowledging specific limitations is essential when understanding the findings. This study's cross-sectional design limits causal interpretation between psychological distress, pain, and activity limitations. In this study only 102 participants were included due to the limited academic timeframe, which was below the originally calculated sample size. Since data were collected exclusively from the Musculoskeletal Unit at CRP, Savar, the findings may not reflect the experiences of individuals from other institutions or regions.

Chapter-vi Conclusion and recommendations

6.1 Conclusion

This study carried out by the researcher used 102 participants that focused on the investigation of the complicated interrelationship between anxiety, depression, the intensity of pain, as well as limitation of activities to patients with knee osteoarthritis (KOA). This study, with the assistance of valid psychological assessment instrument e.g. PHQ-9 and GAD-7; and the Numeric Pain Rating Scale (NPRS), shows that this group has been facing a massive burden of psychological distress, which is closely related to physical symptoms and functional limitations. The research also looked at the association that exists between psychological factors (Depression, Anxiety) and socio demographics (such as Age, gender, Occupation, Comorbidities, BMI, Dominant side, Trauma history). These results help in showing that moderate to severe pain is quite excessive during activities such as functional activities, especially when standing, walking, and climbing stairs because of KOA pain disabling functions. Notably, the prevalence of anxiety and depression was quite widespread, with the former estimating above 80 percent of the participants having at least mild depression and the latter exceeding fifty percent revealing depression and mild-to-moderate anxiety. These psychological factors were highly correlated with the higher levels of pain when performing particular activities, such as sitting and standing in the case of depression, and standing in the case of anxiety, which proves that both pain and psychological distress are activity-dependent and specific. Common socio demographic aspects including age, occupation, and comorbidities were found to have an impact on anxiety levels, pain severity in some positions but did not make a significant difference in the level of depression and limitation of activity. This would indicate that although other demographic and health factors are significant in the context of psychological and pain outcomes, others, which are unmeasured, include significant psychosocial and individual parameters that form important influences on the presentation of KOA in a clinical sense. The high correlations found between psychological distress and WOMAC scores (as a reflection of overall severity of osteoarthritis symptoms) confirm the reciprocal and mutually strengthen one another picture of these areas. Depression and anxiety enhance the levels of pain, and functional disability, whereas the physical symptoms that are worsened would probably exaggerate ego distress.

This bidirectional relationship emphasizes the necessity of adopting a biopsychosocial model in understanding and managing KOA.

6.2 Recommendations

Regarding the outcomes of the current research, it is advised that the assessment of psychological distress in the form of mental health testing of depression and anxiety would be an effective intervention that healthcare professionals should perform regularly among the target population of knee osteoarthritis (KOA). Therapeutic plans should focus on a biopsychosocial approach with a combination of physical symptoms and mental disorders in terms of combining pain management, physical activities, and psychological treatment that relies on a counseling session or cognitive-behavioral therapy.

The comorbidities, advanced ages, and existence of physically absorbing occupations are characteristics that this patient group needs to be considered since they predispose patients to anxiety and suffering. The clinicians must note the effect of limb dominance on the severity of pain and make needed adjustments in rehabilitation in order to lessen biomechanical stressors.

Physical activity and psychological support will help to address those barriers associated with anxiety and depression to enhance the treatment adherence and outcome. Moreover, treatment of comorbid conditions need to be handled comprehensively in order to provide a decrease disease burden.

The psychological research must be directed towards bigger and more heterogeneous populations, and the longitudinal designs have to be utilized to learn more about the causal connections between psychological phenomena and KOA development. Such thorough treatment can not only aid patients but also can contribute to the overall life improvement of the patient living with KOA.

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Appendix

Appendix 1

বাংলাদেশ হেলথ্ প্রফেশন্স ইনস্টিটিউট (বিএইচপিআই)
Bangladesh Health Professions Institute (BHPI)
(The Academic Institute of CRP)

Ref: CRP-BHPI/IRB/12/2024/1042

Date: 15/12/2024

To
Umme Ammara
4th Year B.Sc. in Physiotherapy
Session: 2019-20 Student ID: 112190525
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

Subject: Approval of the thesis proposal "Determinants of anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis" by the ethics committee.

Dear Umme Ammara,
Congratulations.
The Institutional Review Board (IRB) of BHPI has reviewed and discussed your application to conduct the above-mentioned dissertation, with you, as the principal investigator and Professor Dr. Mohammad Anwar Hossain (PhD), Senior consultant & Head of the Department of Physiotherapy, CRP, Savar, Dhaka as thesis supervisor. The following documents have been reviewed and approved:

Sl. No.	Name of the Documents
1	Research Proposal
2	Questionnaire (English version)
3	Information sheet & consent form.

The purpose of the study is to determine anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis. The study involves use of a PHQ-9, GAD-7, NPRS and WOMAC osteoarthritis index to explore anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis that may take 20 to 30 minutes to answer the questionnaire any instruction or precaution for collection of specimen and there is no likelihood of any harm to the participants and participation in the study may benefit the participants or other stakeholders. Data collectors will receive informed consent from all participants and collected data will be kept confidential. The members of the Ethics Committee have approved the study to be conducted in the presented form at the meeting held at **9 AM on 15 July 2024 at BHPI (44th 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 in accordance with the Nuremberg Code 1947, the World Medical Association Declaration of Helsinki, 1964 - 2013, and other applicable regulations.

Best regards,

Muhammad Millat Hossain,
Associate Professor & Course Coordinator, MRS
Member Secretary, Institutional Review Board (IRB)
BHPI, CRP, Savar, Dhaka-1343, Bangladesh

সিআরপি-চাপাইন, সাভার, ঢাকা-১৩৪৩, বাংলাদেশ। ফোন: +৮৮ ০২ ২২৪৪৪৫৪৬৪-৫, +৮৮ ০২ ২২৪৪৪১৪০৪, মোবাইল: +৮৮ ০১৭৩০ ০৫৯৬৪৭
CRP-Chapain, Savar, Dhaka-1343, Bangladesh. Tel: +88 02 224445464-5, +88 02 224441404, Mobile: +88 01730059647
E-mail : principal-bhpi@crp-bangladesh.org, Web: bhpi.edu.bd

Appendix 2

Date: December 24, 2024

To

Head

Department of Physiotherapy

Centre for the Rehabilitation of the Paralysed (CRP)

Chapain, Savar, Dhaka-1343

Through: Head, Department of Physiotherapy, BHPI

Subject: Prayer for seeking permission to collect data for conducting a research project.

Sir,

With due respect and humble submission to state that I am Umme Ammara, student of 4th year B.Sc. in Physiotherapy at Bangladesh Health Professions Institute (BHPI). The Ethical committee has approved my research project entitled: **"Determinants of anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis."** under the supervision of Professor Dr. Mohammad Anwar Hossain (PhD), senior consultant & Head of the department of physiotherapy, CRP, savar, Dhaka-1343.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 department of Physiotherapy. So, I need your kind permission for data collection at Musculoskeletal unit of CRP, Savar, Dhaka. I would like to assure that nothing of the study would be harmful for the participants.

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

Sincerely,

Ammara

Umme Ammara

4thYear

B.Sc. in Physiotherapy

Class Roll: 35; Session: 2019-20

Bangladesh Health Professions Institute (BHPI)

(An academic institution of CRP)

Chapain, CRP, Savar, Dhaka, 1343.

Forwarded and Recommended

29.12.2024

Dr. Shazal Kumar Das, PhD
Assistant Professor and Head
Department of Physiotherapy
BHPI, CRP, Savar, Dhaka-1343.

Approved

31/12/24

Prof. Dr. Mohammad Anwar Hossain, PhD
Professor Physiotherapy Department BHPI
Senior Consultant & Head
Physiotherapy Department
CRP, Savar, Dhaka-1343

Appendix 3

Information sheet (English)

Assalamu alaikum,

I am Umme Ammara, student of 4th year, B.Sc. in physiotherapy at Bangladesh Health Professions Institute (BHPI). To obtain my Bachelor degree, I shall have to conduct a research and it is a part of my study. The participants are requested to participate in the study after reading the following.

My research title is **'Determinants of anxiety and depression with knee pain and activity limitations in patients with knee osteoarthritis'**. I would like to know about some personal and other related information regarding knee osteoarthritis. This will take approximately 10-15 minutes.

I would like to inform you that this is a purely academic study and will not be used for any other purpose. All information provided by you will be kept confidential and in the event of any report or publication it will be ensured that the source of information remains anonymous. Your participation in this study is voluntary and you may withdraw yourself at any time during this study without any negative consequences. You also have the right not to answer a particular question that you don't like or do not want to answer during interview.

If you have any query about the study or your right as a participant, you may contact with me or my research supervisor, Professor Dr. Mohammad Anwar Hossain (PhD), Senior consultant & Head of the Department of Physiotherapy, CRP, Savar, Dhaka-1343.

Do you have any questions before I start? So, may I have your consent to proceed with the interview?

Yes ☐ No ☐

Signature of the Patient: ……..Date: …….

Signature of the Data Collector: …… Date: ……

Signature of the Researcher: ……...Date: ……

Questionnaire (English version)

	Part-1: Personal details	
1.1	Name:	Date of Interview:
1.2	Address: Village/house no……. PO……. PS……. District…….	Contact no: Patient ID:
	Part-2: Socio-demographic Information	
2.1	Age	..... Years
2.2	Gender	0= Female 1= Male 2= Others
2.3	Body weight	……KG
2.4	Height	…….m
	BMI	**……**
2.5	Marital Status	0= Married 1= Unmarried 2= Divorced 3= Widow
2.6	Educational status	0= No formal education 1= Primary level 2= Secondary

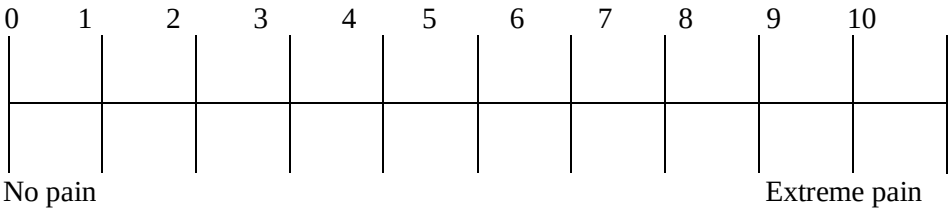
		3= Higher secondary 4= Graduation 5= Post graduation and above
2.7	Living areas	0= Rural 1= Semi Urban 2= Urban
2.8	Occupations	0= Housewife 1= Shopkeeper 2= Farmer 3= Service Holder 4= Business 5= Day-labour 6=Others ……..
2.9	Comorbidities	0=None 1=Hypertension 2=Diabetes mellitus 3=Heart disease 4=Lung disease 5= Others …….
3.0	Personal habit such as smoking	0=Yes If yes then, • Cigarette • Betel leaf • Gul • Zarda • Others 1=No

	Part-3: Participant related Information	
3.1	What is your dominant side?	0= Right 1= Left 2= Both
3.2	Do you have any history of trauma at the knee?	0= Yes If yes then, Type of trauma…….. 1=No
3.3	Onset of arthritis?	0= <2yrs 1= 2-5yrs 2= >5yrs
3.4	History of surgery at knee?	0= Yes 1= No
3.5	Do you use any assistive device for Knee?	0=Yes If yes then, Which assistive device……. 1= No

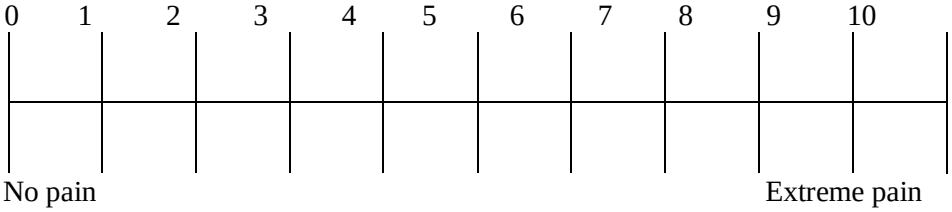
Part-4: Pain intensity measurement (Numeric Pain Rating Scale)

(Please a mark (0) on the line where you feel it shows how much pain you have.)

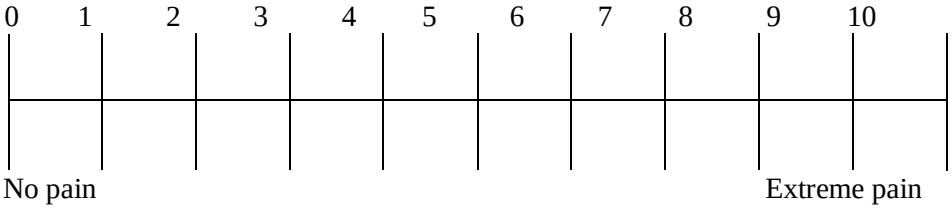
1. How would you describe your pain in general intensity?



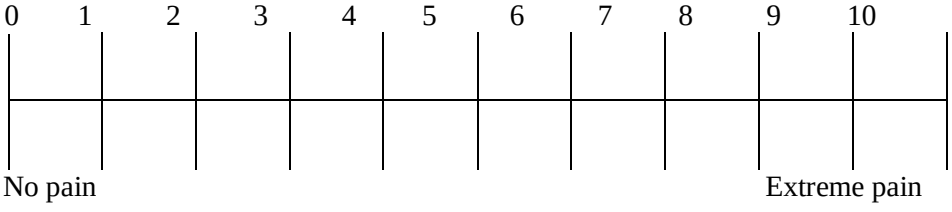
2.How much pain increase during sitting?



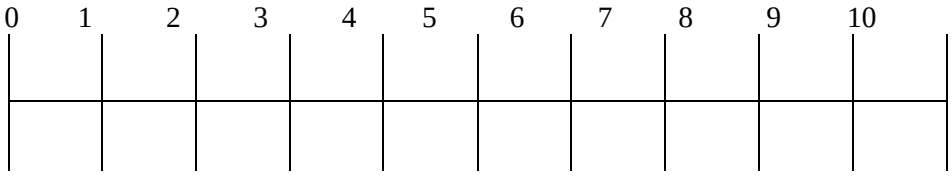
3. How much pain increase during Squatting?



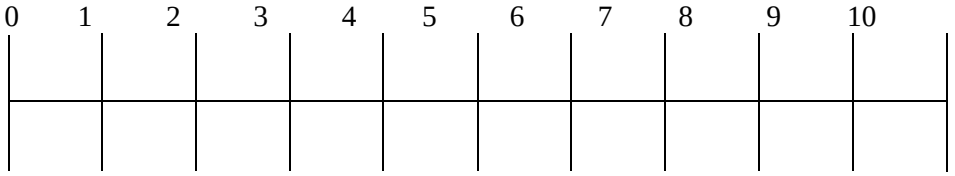
4.How much pain increase during standing?



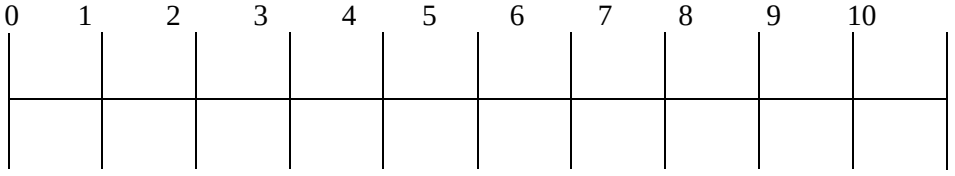
5.How much pain increase during walking?



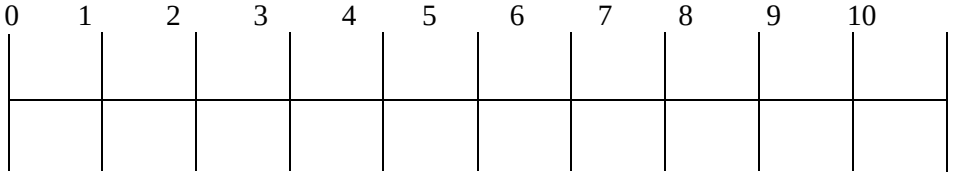
6.How much pain increase during working ?



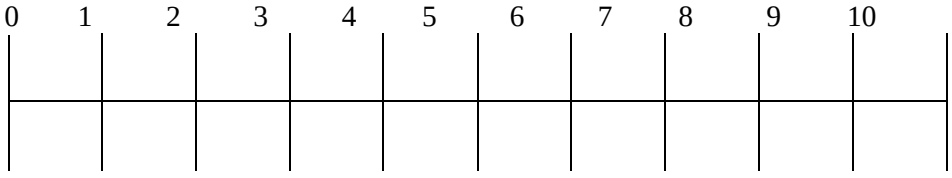
7. How much pain increase during ADLs ?



8.How much pain increase during stair climbing?



9.How much pain during lying?


Part-5:

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

On the last 2 weeks, how often have you been bothered by any of the following problem?	**Not at all**	**Several days**	**More than half the days**	**Nearly every day**
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

Total score _____

Part-6: Anxiety was measured by Generalized Anxiety Disorder(GAD-7)

Over the last 2 weeks, how often have you been bothered by the following problems?	**Not at all**	**Several days**	**Over half the 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's 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……

Part-6: Pain related disabilities

(Western Ontario and McMaster Universities Osteoarthritis Index)

Please rate the activities in each category according to the following scale of difficulty.

0= None, 1= Slight, 2=Moderate, 3= Severe, 4= Extreme

A) Pain:

1. How much pain you feel during walking?	0	1	2	3	4
2. How much pain you feel during climbing on the stairs?	0	1	2	3	4
3. How much pain you feel during sleeping at night?	0	1	2	3	4
4. How much pain you feel while you taking rest?	0	1	2	3	4
5. How much pain you feel during weight bearing	0	1	2	3	4

B) Stiffness:

1. What type of stiffness you feel in your foot muscles during morning?	0	1	2	3	4
2. What type of stiffness you feel in your foot muscles during evening?	0	1	2	3	4

C) Physical Function:

1. What kind of problems you feel during getting down to the stairs?	0	1	2	3	4
2. What kind of problems you feel during climbing up to the stairs?	0	1	2	3	4
3. What kind of problems you feel during rising from sitting?	0	1	2	3	4
4. What kind of problems you feel during standing?	0	1	2	3	4
5. What kind of problems you feel during bending toward the floor?	0	1	2	3	4
6. What kind of problems you feel during walking on flat surface?	0	1	2	3	4
7. What kind of problems you feel during getting in or getting out from a car?	0	1	2	3	4
8. What kind of problems you feel when you going for shopping?	0	1	2	3	4
9. What kind of problems you feel during putting on socks?	0	1	2	3	4
10. What kind of problems you feel while you get out from bed?	0	1	2	3	4
11. What kind of problems you feel during taking off socks?	0	1	2	3	4
12. What kind of problems you feel when you rising from bed?	0	1	2	3	4
13. What kind of problems you feel during getting in getting out of bath?	0	1	2	3	4

14. What kind of problems you feel when you sitting for a while?	0	1	2	3	4
15. What kind of problems you feel when you getting on/ off toilet?	0	1	2	3	4
16. What kind of problems you feel when doing your heavy domestic duties like moving furniture?	0	1	2	3	4
17. What kind of problems you feel when doing your light domestic duties like cooking, dusting?	0	1	2	3	4

Total score- ……

তথ্যপত্র (বাংলা)

আসসালামু আলাইকুম,

আমি উম্মে আম্মারা, বাংলাদেশ হেলথ প্রফেশনস ইনস্টিটিউট (BHPI)-এর ফিজিওথেরাপি বিভাগের ৪র্থ বর্ষের ছাত্রী। আমার ব্যাচেলর ডিগ্রির জন্য একটি গবেষণা করতে হচ্ছে, যা আমার পড়াশোনার একটি অংশ। নিচের বিষয়গুলো পড়ে আপনি যদি রাজি থাকেন, তাহলে গবেষণায় অংশগ্রহণ করার জন্য অনুরোধ করছি। আমারগবেষণারশিরোনাম: **"হাঁটুর অস্টিওআর্থ্রাইটিস রোগীদের হাঁটুর ব্যথা ও কার্যক্ষমতার সীমাবদ্ধতার সাথে উদ্বেগ ও বিষণ্নতার নির্ধারক বিষয়সমূহ।"** এই গবেষণায় আমি আপনার কিছু ব্যক্তিগত ও হাঁটুর সমস্যার সম্পর্কিত তথ্য জানতে চাই। এতে প্রায় ১০-১৫ মিনিট সময় লাগবে। এই গবেষণাটি সম্পূর্ণ একাডেমিক উদ্দেশ্যে পরিচালিত হচ্ছে এবং অন্য কোনো উদ্দেশ্যে ব্যবহার করা হবে না। আপনার দেয়া সব তথ্য গোপন রাখা হবে এবং কোনো প্রতিবেদন বা প্রকাশনায় তা ব্যবহার করা হলেও আপনার পরিচয় গোপন রাখা হবে। আপনি ইচ্ছা করলে যেকোনো সময় এই গবেষণা থেকে সরে দাঁড়াতে পারেন এবং এর জন্য কোনো নেতিবাচক প্রভাব পড়বে না। এছাড়াও, আপনি ইচ্ছা করলে কোনো প্রশ্নের উত্তর না দেওয়ার অধিকার রাখেন। আপনার যদি গবেষণা বা অংশগ্রহণ সম্পর্কিত কোনো প্রশ্ন থাকে, তবে আমার বা আমার সুপারভাইজার অধ্যাপক ড. মোহাম্মদ আনোয়ার হোসেন (পিএইচডি), সিনিয়র কনসালট্যান্ট ও ফিজিওথেরাপি বিভাগের প্রধান, সিআরপি, সাভার, ঢাকা-১৩৪৩-এর সঙ্গে যোগাযোগ করতে পারেন।

গবেষণা শুরু করার আগে আপনার কোনো প্রশ্ন আছে? তাহলে আমি কি আপনার সম্মতি পেতে পারি?

হ্যাঁ ☐ না ☐

রোগীর স্বাক্ষর: ..... তারিখ: .....

গবেষকের স্বাক্ষর:..... তারিখ: .....

প্রশ্নাবলী (বাংলা ভার্সন)

	পার্ট ১: ব্যক্তিগত তথ্য	
১.১	নাম:	সাক্ষাতকারের তারিখ:
১.২	ঠিকানা: গ্রাম/বাড়ি নং ……. ডাকঘর …… থানা ……. জেলা ……	ফোন নম্বর: রোগী আইডি:
	পার্ট ২: সমাজ-জনতাত্ত্বিক তথ্য	
২.১	বয়স:	..... বছর
২.২	লিঙ্গ:	০ = মহিলা ১ = পুরুষ ২ = অন্যান্য
২.৩	ওজন:	…… কেজি
২.৪	উচ্চতা:	……. মিটার
	BMI	**……**
২.৫	বৈবাহিক অবস্থা:	০ = বিবাহিত ১ = অবিবাহিত ২ = তালাকপ্রাপ্ত ৩ = বিধবা

২.৬	শিক্ষাগত যোগ্যতা:	০ = কোনো আনুষ্ঠানিক শিক্ষা নেই ১ = প্রাথমিক ২ = মাধ্যমিক
		৩ = উচ্চ মাধ্যমিক ৪ = স্নাতক ৫ = স্নাতকোত্তর বা তার ঊর্ধ্বে
২.৭	বসবাসের এলাকা:	০ = গ্রাম ১ = আংশিক গ্রামাঞ্চল ২ = শহর
২.৮	পেশা:	০ = গৃহিণী ১ = দোকানি ২ = কৃষক ৩ = চাকরিজীবী ৪ = ব্যবসায়ী ৫ = দিনমজুর ৬ = অন্যান্য……
২.৯	অন্যান্য রোগ (কমরবিডিটি):	০ = কিছুই না ১ = উচ্চ রক্তচাপ ২ = ডায়াবেটিস ৩ = হৃদরোগ ৪ = ফুসফুসের রোগ ৫ = অন্যান্য……

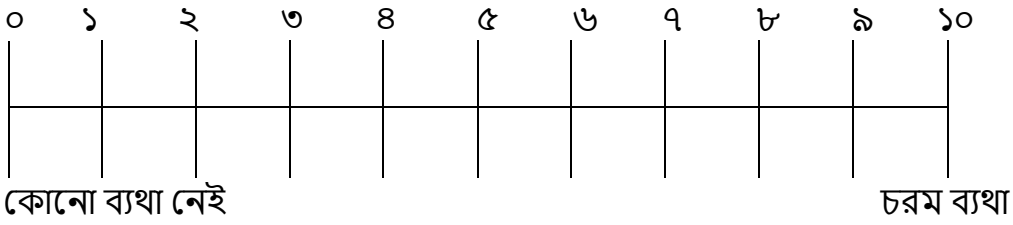
৩.০	ব্যক্তিগত অভ্যাস	০ = হ্যাঁ যদি হ্যাঁ হয়, তাহলে – □ সিগারেট □ পানের পাতা □ গুল □ জর্দা □ অন্যান্য ১ = না

পার্ট ৩: অংশগ্রহণকারীর সম্পর্কিত তথ্য		
৩.১	আপনি কোন পাশকে বেশি ব্যবহার করেন (ডমিন্যান্ট)?	০ = ডান ১ = বাম ২ = উভয়
৩.২	হাঁটুতে কোনো আঘাতের ইতিহাস আছে কি?	০ = হ্যাঁ→ আঘাতের ধরন:…… ১ = না
৩.৩	অস্টিওআর্থ্রাইটিস কবে শুরু হয়েছে?	০ = ২ বছরের কম ১ = ২-৫ বছর ২ = ৫ বছরের বেশি
৩.৪	হাঁটুতে কোনো অস্ত্রোপচার হয়েছে কি?	০ = হ্যাঁ ১ = না
৩.৫	হাঁটুতে কোনো সহায়ক ডিভাইস ব্যবহার করেন কি?	০ = হ্যাঁ → কোন ডিভাইস…… ১ = না

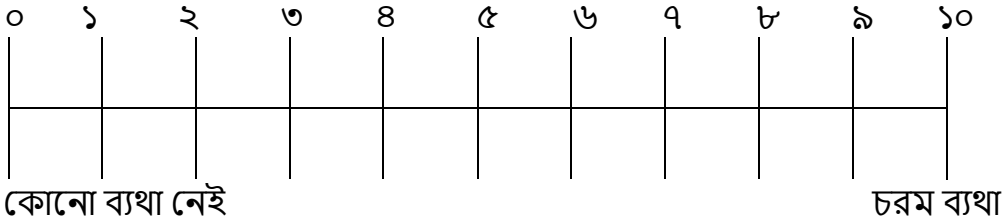
পার্ট ৪: ব্যথার মাত্রা পরিমাপ (Numeric Pain Rating Scale)

(নীচের প্রশ্নগুলোর উত্তরে এমন একটি সংখ্যা চিহ্নিত করুন (০–১০), যা আপনার ব্যথার পরিমাণ বোঝায়।)

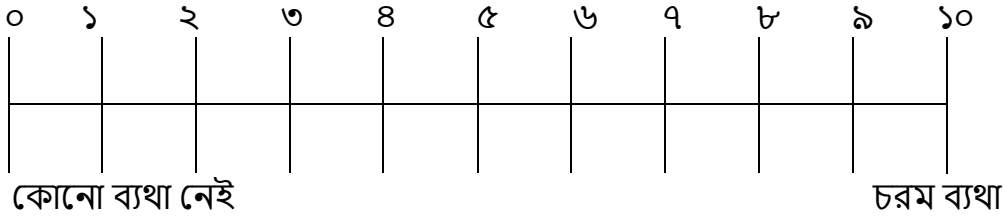
১. সাধারণত আপনার ব্যথা কতটুকু?



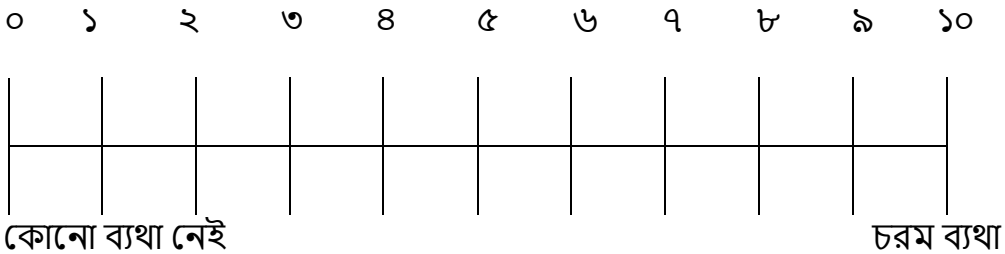
২. বসার সময় ব্যথা কতটা বাড়ে?



৩. বসে থেকে উঠে দাঁড়ানোর সময়?

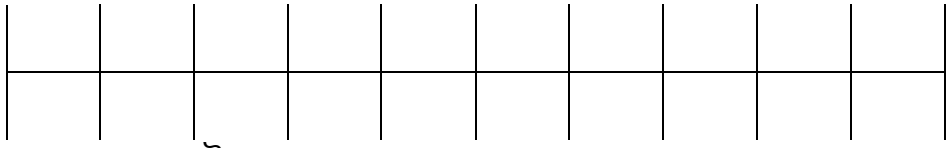


৪. দাঁড়ানোর সময়?



৫. হাঁটার সময়?

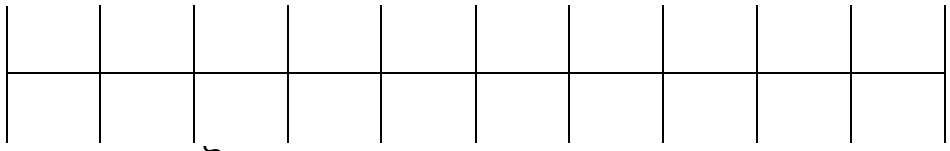
০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



কোনো ব্যথা নেই চরম ব্যথা

৬. কাজের সময়?

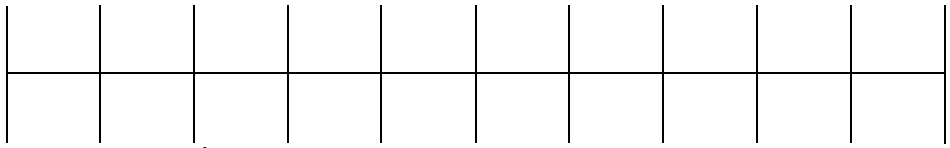
০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



কোনো ব্যথা নেই চরম ব্যথা

৭. দৈনন্দিন কাজের সময় (ADLs)?

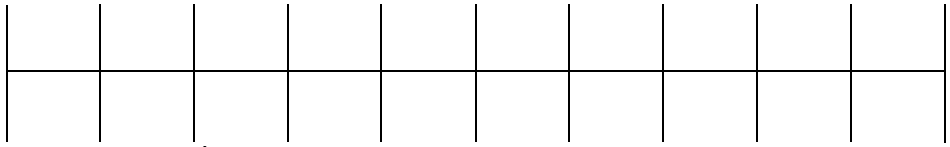
০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



কোনো ব্যথা নেই চরম ব্যথা

৮. সিঁড়ি উঠা/নামার সময়?

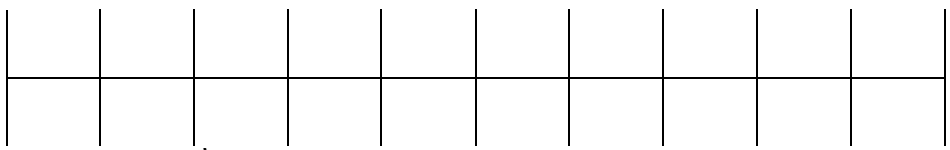
০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



কোনো ব্যথা নেই Extreme pain

৯. শোয়ার সময়?

০ ১ ২ ৩ ৪ ৫ ৬ ৭ ৮ ৯ ১০



কোনো ব্যথা নেই চরম ব্যথা

পার্ট ৫: বিষণ্নতা মূল্যায়ন (PHQ-9)

গত ২ সপ্তাহে, আপনি কতবার নিচের সমস্যাগুলোর সম্মুখীন হয়েছেন?	মোটেই না	কিছুদিন	অর্ধেকের বেশি দিন	প্রায় প্রতিদিন
১. কোন কিছু করার প্রতি আগ্রহ বা আনন্দ কমে যাওয়া	০	১	২	৩
২. মন খারাপ লাগা, বিষণ্নতা অনুভব করা, বা হতাশ লাগা	০	১	২	৩
৩. ঘুমাতে সমস্যা হওয়া, বা মাঝপথে উঠে যাওয়া, অথবা অতিরিক্ত ঘুমানো	০	১	২	৩
৪. ক্লান্ত অনুভব করা বা শক্তিহীন মনে হওয়া	০	১	২	৩
৫. ক্ষুধামান্দ্য বা অতিরিক্ত খাওয়া	০	১	২	৩
৬. নিজের সম্পর্কে খারাপ লাগা – যেমন মনে হওয়া আপনি একজন ব্যর্থ ব্যক্তি অথবা নিজেকে কিংবা পরিবারকে হতাশ করেছেন	০	১	২	৩
৭. কোন কিছুতে মনোযোগ দিতে সমস্যা হওয়া, যেমন খবরের কাগজ পড়া বা টিভি দেখা	০	১	২	৩
৮. এত ধীরে চলাফেরা বা কথা বলা যাতে অন্যরা খেয়াল করেছে? অথবা তার বিপরীত – এত অস্থির বা ছটফট করা যে স্বাভাবিকের চেয়ে অনেক বেশি নড়াচড়া করেছেন	০	১	২	৩
৯. এমন চিন্তা হওয়া যে আপনি মরে গেলে বা নিজেকে আঘাত করলে ভালো হতো	০	১	২	৩

মোট স্কোর: _____

Part-6: উদ্বেগ (Anxiety) মূল্যায়ন করা হয়েছে Generalized Anxiety Disorder (GAD-7) স্কেল দ্বারা

গত ২ সপ্তাহে, নিচের যেকোনো সমস্যায় আপনি কতবার বিরক্ত হয়েছেন?	মোটেই না	কয়েকদিন	অর্ধেকের বেশি দিন	প্রায় প্রতিদিন
১. নার্ভাস, উৎকণ্ঠিত বা উদ্বিগ্ন অনুভব করা	০	১	২	৩
২. চিন্তা থামাতে না পারা বা নিয়ন্ত্রণে রাখতে না পারা	০	১	২	৩
৩. বিভিন্ন বিষয় নিয়ে অতিরিক্ত দুশ্চিন্তা করা	০	১	২	৩
৪. আরাম করতে অসুবিধা হওয়া	০	১	২	৩
৫. এত অস্থির বোধ করা যে চুপচাপ বসে থাকা কঠিন হয়ে পড়ে	০	১	২	৩
৬. সহজেই বিরক্ত বা রাগান্বিত হয়ে পড়া	০	১	২	৩
৭. ভয় পাওয়া যেন কিছু ভয়ঙ্কর ঘটনা ঘটতে যাচ্ছে	০	১	২	৩

মোট স্কোর: .....

Part-6: ব্যথাসংক্রান্ত অক্ষমতা

(Western Ontario and McMaster Universities Osteoarthritis Index)

প্রতিটি বিভাগের কার্যকলাপ অনুযায়ী আপনার অসুবিধার মাত্রা নিচের স্কেলের ভিত্তিতে নির্ধারণ করুন:

০ = নেই, ১ = সামান্য, ২ = মাঝারি, ৩ = তীব্র, ৪ = চরম

ক) ব্যথা:

১. হাঁটার সময় আপনার কতটা ব্যথা হয়?	০	১	২	৩	৪
২.সিঁড়ি বেয়ে ওঠার সময় আপনার কতটা ব্যথা হয়?	০	১	২	৩	৪
৩. রাতে ঘুমানোর সময় আপনার কতটা ব্যথা হয়?	০	১	২	৩	৪
৪. বিশ্রামের সময় আপনার কতটা ব্যথা হয়?	০	১	২	৩	৪
৫. ভার বহনের সময় আপনার কতটা ব্যথা হয়?	০	১	২	৩	৪

খ) জড়তা:

১. সকালে আপনার পায়ের পেশিতে কী ধরনের জড়তা অনুভব হয়?	০	১	২	৩	৪
২. সন্ধ্যায় আপনার পায়ের পেশিতে কী ধরনের জড়তা অনুভব হয়?	০	১	২	৩	৪

গ) শারীরিক কার্যক্ষমতা:

১. সিঁড়ি দিয়ে নিচে নামার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
২. সিঁড়ি দিয়ে উপরে ওঠার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৩. বসা অবস্থা থেকে উঠার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৪. দাঁড়ানোর সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৫. মেঝর দিকে ঝুঁকে কাজ করার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৬. সমতল জায়গায় হাঁটার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৭. গাড়িতে উঠতে বা নামতে গেলে আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৮. বাজার করতে যাওয়ার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
৯. মোজা পরার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১০. বিছানা থেকে নামার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১১. মোজা খোলার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১২. বিছানা থেকে উঠার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১৩. বাথরুমে ঢুকতে বা বের হতে গেলে আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪

১৪. কিছুক্ষণ বসে থাকার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১৫. টয়লেটে উঠা বা নামার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১৬. ভারী গৃহস্থালি কাজ (যেমন: আসবাবপত্র সরানো) করার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪
১৭. হালকা গৃহস্থালি কাজ (যেমন: রান্না, ধুলা মোছা) করার সময় আপনি কী ধরনের সমস্যা অনুভব করেন?	০	১	২	৩	৪

সর্বমোট স্কোর - .....