CHARACTERISTICS OF AMPUTEE PATIENTS IN BANGLADESH

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

CHARACTERISTICS OF AMPUTEE PATIENTS IN BANGLADESH

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

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Declaration

I declare that the work presented here is my own. All 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 Department of Physiotherapy of Bangladesh Health Professions Institute (BHPI).

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Acronyms

BHPI	Bangladesh Heath Professions Institute
CRP	Center for the Rehabilitation of the Paralyzed
NITOR	National Institute Of Tramatology and Orthopedic Rehabilitation.
CDD	Centre For Disability in Development.
NGO	Non-Government Organization
LLA	Lower Limb Amputation
PVD	Peripheral Vascular Diseases
DM	Diabetic Mellitus
SD	Standard deviation
SPSS	Statistical Package of Social Science
UK	United Kingdom
USA	United states of America

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Abstract

Purpose: To find out the Characteristics of amputee patients in Bangladesh.

Objectives: To explore socio demographic status of amputee patients in Bangladesh. To find out the major causes of amputation in different levels and to find out the sites of amputee patients after amputation in Bangladesh.

Methodology: A cross sectional study design was used to conduct the study. About 100 patients were selected through simple purposive sampling technique from CRP, Savar, Dhaka, Bangladesh, NITOR at Shere-Bangla Nagar, CDD, Savar. The data were collected by using a questionnaire which developed by pilot study and were analyzed by using SPSS software version 20.0.

Results: 100 participants were included as sample. Among them most of the participants were age range from (41-50) years including male and female. Male (70.6%) are predominantly higher than female (30.0%). The major cause of amputation were trauma related (65%) and below knee (70%) amputations were most common site than upper limb.

Conclusion: The results of this study provided more insight into the causes of amputation among amputee patients in Bangladesh. More research is needed to evaluate the characteristics and cause of amputee patients in Bangladesh.

Key words: Amputation, Cause, Label, Site.

CHAPTER:I INTRODUCTION

1.1 BACKGROUND

Limb loss is one of the most physically and psychologically devastating events that can happen to a person (Bosker et al., 2008).Limb amputation causes major disfigurement, it renders people less mobile and at risk for loss of independence (Gitter et al., 2005). Despite advances in medicine and surgery, amputation continues to be a large problem in the world, predominantly for older adults. It has been estimated that there were 664,000 persons living with major limb loss in developed countries in 2005 and more than 900,000 with minor limb loss (Ziegler et al., 2008). "Major" limb loss is defined as amputation above the elbow, below the elbow, above the knee, below the knee, or the foot. "Minor" limb loss is defined as amputation of the hand or digits. Lower limb amputations are much more frequent than upper limb and are most commonly the result of disease followed by trauma. (Van Houtum et al ., 2012).

Amputation receives very little attention and resources in countries where survival is low ,worldwide prevalence estimates of amputation is difficult to obtain(Aleccia et al., 2010). The overall rates of amputation due to trauma or malignancy are decreasing while the incidence of dysvascular amputations is rising (Dillingham et al., 2008). Amputations due to dysvascular disease accounts from roughly 54% of limb loss cases in developed countries while traumatic amputations account for 45% of loss (Aleccia et al., 2010). The number of lower limb amputations is expected to increase in the developing countries to 58,000 per year by 2030 , with nearly 75% occurring in those aged 45 and older persons (Clark et al., 2008).

Amputation is the removal of a limb by trauma, medical illness, or surgery. As a surgical measure, it is used to control pain or a disease process in the affected limb, such as malignancy or gangrene. In some cases, it is carried out on individuals as a preventative surgery for such problems (Connel et al.,2016). A special case is that of congenital amputation, a congenital disorder, where fetal limbs have been cut off by constrictive bands. In some countries, amputation of the hands, feet or other body

parts is or was used as a form of punishment for people who committed crimes(Ahmed et al.,2016).

Amputation has also been used as a tactic in war and acts of terrorism, it may also occur as a war injury. In some cultures and religions, minor amputations or mutilations are considered a ritual accomplishment. Unlike some non-mammalian animals (such as lizards that shed their tails, salamanders that can regrow many missing body parts, and hydras, flatworms, and starfish that can redraw entire bodies from small fragments), once removed, human extremities do not grow back, unlike portions of some organs, such as the liver. A transplant or a prosthesis are the only options for recovering the loss(Amputee coaliting.org.2012).

The word amputation is derived from the Latin amputare, "to cut away", from ambi- ("about", “around") and putare ("to prune"). The Latin word has never been recorded in a surgical context, being reserved to indicate punishment for criminals. The English word "amputation" was first applied to surgery in the 17th century, possibly first in Peter Lowe's A discourse of the Whole Art of Chirurgerie (published in either 1597 or 1612); his work was derived from 16th-century French texts and early English writers also used the words "extirpation" (16thcentury French texts tended to use extirper), "disarticulation", and "dismemberment" (from the Old French desmembrer and a more common term before the 17th century for limb loss or removal), or simply "cutting", but by the end of the 17th century "amputation" had come to dominate as the accepted medical term.(kennedy et .,2004).

Below knee amputations are the most common amputations those are representing 81% of trauma related amputations, there 47% expected increases in below knee amputation from 1995 to 2004 (Van Hountam et al., 2012).There are more than 1 million annual limb amputations globally….one every 30 seconds is even more troubling , particularly since the International Diabetes Federation (IDF) predicts that current global prevalence of diabetes will burgeon from 285 million to reach 435 million by 2030,(Advanced Amputee Solutions,2016).

The world-wide prevalence has been estimated that at 3–10% increasing to 15–20% among developed countries. Age is an important factors related with

amputations,such as aged over 70 years can be risk factor for amputation with diabetics neuropathy. It classically presents as intermittent claudication and can lead to ulcers, gangrene and amputation(Patel et al.,2015). The ratio of symptomatic to asymptomatic disease is up to one in three with as many as 50% never consulting a doctor. Over 90% of the annual 5000 major leg amputations undertaken in England can be attributed to arterial disease(Neher et al.,2016)

Major lower limb amputation, that is, above the ankle, is a devastating consequence of both diabetes and peripheral arterial disease (PAD). Peripheral arterial diseases affects the lower limbs and has the same underlying pathology as coronary heart disease and classically presents as intermittent claudicatings but can lead to foot ulcers, gangrene and ultimately amputation (Lento et al.,2009). While diabetes is a major cause of all amputations (major and minor) in England, the vast majority (over 90%) of the 5000 major amputations undertaken in England every year, in people over 50 years are related to Peripheral arterial disease.(Thomas et al,2016).

Trauma is the major cause of major lower limb amputations in one of the sites and of minor amputations is currently increasing day by day.(Pooja et al.,2013).Other studies stated that , major amputation associated with trauma in females were up to 15 percent and 16 percent respectively.(Gujral et al.,2005) .Among males the percentage of major amputation associated with peripheral vascular disease (PVD) ranged from 51% in one study site to 93% in another. This percentage was similar in females with the exception of 30% associated with PVD at a single study site.(Hoffsated et .,2015).

The proportion of lower limb amputations as a result of PVD was found to be lower in minor amputations and the proportion of LLAs as a result of trauma was high in minor amputations(Thomas et al.,2016). Complications of diabetes such as upper and lower limb amputation are likely to occur not only late in life considering the early onset of diabetes in today's youth (Abou-Zamzam et al., 2008) .

Amputation is one of the most ancient of all surgical treatments, its history dating back as far as the 16th century. Ambroise Pare´ was the first to use ligatures to

control bleeding after amputation and also designed relatively sophisticated prosthese(.kim et al.,2012) The increase in the number of amputees seen today has resulted from improvements in transportation methods the development of mechanical civilization, and the prolongation of life. Epidemiological research on amputees is being extensively carried out in many countries all over the world.(Hennis et al.,2010).

The most common cause of amputation in the developed country is vascular disease, while in wartorn countries of the world such as Cambodia, Iran, and Afghanistan, 80 to 85 percent of amputees are land mine survivors(Dillingham et al.,2008). These mines are responsible for 26,000 amputations per year and have produced 300,000 amputees worldwide. Land mines have claimed more lives and caused more injury in the second half of the 20th century than both nuclear devices exploded in Hiroshima and Nagasaki combined (Berry et al., 2009).

Other causes of amputation in these war-torn countries include industrial or environmental accidents, terrorist attacks, and the lack of basic public health which often leads to diabetes, gangrene, and infection. All of these causes are adding to the number of amputations at an alarming rate (Ephraim et al.,2009).Due to the increasing rate of amputations, there is an ever-growing demand interface between the limb and the mechanical support system, the extension which replaces the length for prosthetic limbs. Not only is there an immediate need for a person's initial prosthetic limb, but also multiple replacement limbs and repairs are necessary over a lifetime(Cheng et al., 2005).

Incidence of amputation was significantly increased in patients with high systolic blood pressure, high diastolic blood pressure, high pulse pressure, severe retinopathy, high pack years smoked (Moss et al,2009).So smoking consumsion is an important factor for neuropathy. Other research shows that the major causes of lower limb amputation were vascular (83%), traumatic (12%), malignancy (3%), infection (2%) and congenital limb defects constituted 0.2%.(Boulton et al.,2005).

In South-East Asia, the prevalence of disability ranges from 1.5% to 21.3% of the total population, depending on the definition and severity of disability(Cheng et al.,2005).Despite the increase in prevalence of disability worldwide not much attention has, for various reasons, been paid to its evaluation, management, and prevention(WHO Geneva 2002.)

Amputation may involve a single limb (unilateral), both the upper or lower limbs (bilateral), or a combination of upper and lower limb amputations (multiple amputations). Amputation may be performed at various anatomical levels (Desmond et al.,2010). Lower limb amputation may involve removal of one or more toes, part of the foot, ankle disarticulation (disarticulation is the amputation of a body part through a joint), transtibial (below the knee) amputation knee disarticulation, trans-femoral (above the knee) amputation, hip disarticulation and hemi-pelvectomy (removal of half of the pelvis). In high income countries, dysvascularity is the foremost cause of amputation; as a corollary the majority of amputations involve the lower limbs (Ziegler et al.,2008).

Providing a satisfactory, functional prosthesis following lower-limb amputation is a primary goal of rehabilitation. The objectives of this study were to describe the rate of successful prosthetic fitting; describe prosthetic use after amputation; and determine factors associated with greater prosthetic fitting, function, and satisfaction (Webster et al., 2012). A relationship between the level of activity and prosthetic components prescription was not found. The study shows that an agreement could not be found in the prescription criteria for any of the investigated prosthetic components. The lack of guidelines that indicate the criteria for prescribing each prosthetic component could be the sole for those findings (Malaheem & Basher, 2013).

Researcher found that, males consistently out-numbered females for all causes of amputation. LLA was similar findings for subjects amputated due to infection and malignancy, the primary causes were meningococcal septicemia and osteogenic sarcoma. The most commonly reported comorbidities were hypertension, chronic obstructive airway diseases, hemiplegia, ischemic heart disease (Henry et al.,2009).

Lower limb amputation (LLA) is performed for a variety of reasons that range from disease to trauma (Wong et al., 2005). Lower limb amputation (LLA) results in a wide range of outcomes. Amputation generally results in poor physical function, physical role performance, social function, vitality, general health, and more pain compared to population norms (Ficke et al.,2012). Everyday competence tends to decrease with age for both males and females following lower limb amputation but males usually have better physical function than females (Desmond et al., 2010). People who have the following features also tend not to be able to live independently in their homes after the amputation: over the age of 70, a high anatomical level, dementia or those who had a homebound ambulatory status preoperatively (Taylor et al., 2010).

Mobility and daily living are important elements of Health-Related Quality of Life (HRQOL). Therefore diminishing mobility may push a greater negative impact on HRQOL than any other different diseases (Graham et al., 2008). Therapeutic effects cannot be compared based only on functional recovery resulting from the use of a prosthetic device but should also be based on the fulfillment of a new and highly important criterion parameter, namely "quality of life (QOL). Another significant aspect of amputee health is that of psychological well-bein(Ficke et al.,2012). People with lower limb amputation experience anxiety and depression following amputation of the lower extremity. These psychological reactions correlate significantly with age and marital status, and there is no correlation with level of amputation, mode of ambulation and indication for amputation (Moss et al., 2009).

Lower limb amputation is also associated with morbidity and mortality .The survival rate varies across countries but mortality rate is generally high (Patel et al., 2015). Old age and higher anatomical level of amputation are associated with poor survival and the mortality rate is higher in both people with diabetes and people who do not have diabetes (Neher et al.,2016).

However, the totality of the rehabilitation experience and the entire rehabilitation team can impact on the patient's psychological and social wellbeing. Working within the limits of their professional competencies, team members, including the patient

and their family, share responsibility for attending to psychosocial health across the continuum of care (Wang et al., 2016).This information may be different for a developing country such as Bangladesh therefore the aim of my study was to find out the cause of amputation, the site of amputation, the distribution of amputee among the different age groups

1.2 RATIONALE

Estimates of amputee population is that there is world population about 6.7 billion and incidence of amputation among worldwide is 1.5 per 1000.World population of amputee about 10 million. In developing country the amputation rate is about 5.6 million.(Maerice et al.,2008).

According to Limb For Life ….every weak 2996 thousand people lose a limb. Among those living with limb loss the main causes are Diabetes, Trauma, PVD, Congenital anomalies. Diabetes affects 25.8 million people among the world. The number of amputation caused by diabetes increased 24% from 1988 to 2010.(Gilter et al.,2005).

Upper and lower extremity amputation is seen in clinical practice. Most of the cases have injuries caused by various disease or trauma. In recent years, disability caused by amputation has increased every year with the development of our country. Due to the improvement of clinical treatment, the survival rates of the patients will increase. This study shows the features of upper and lower limb amputation of different level and sites of amputee patients in Bangladesh.

The aim of the study was to find out the major causes and different levels of amputation in Bangladesh. There is no relevant research has been conducted in ihis field yet in Bangladesh. This study will be helpful for the physiotherapist to make awareness about the major causes of amputation in Bangladesh and will know their sociodemographics status after amputation, It will also help other health professionals such as prosthetics and orthotics, social workers, psychiatrist on this topic. So it will be helpful for physiotherapist in this area for delivering treatment.

1.3 Research question

What are the characteristics of amputee patients in Bangladesh?

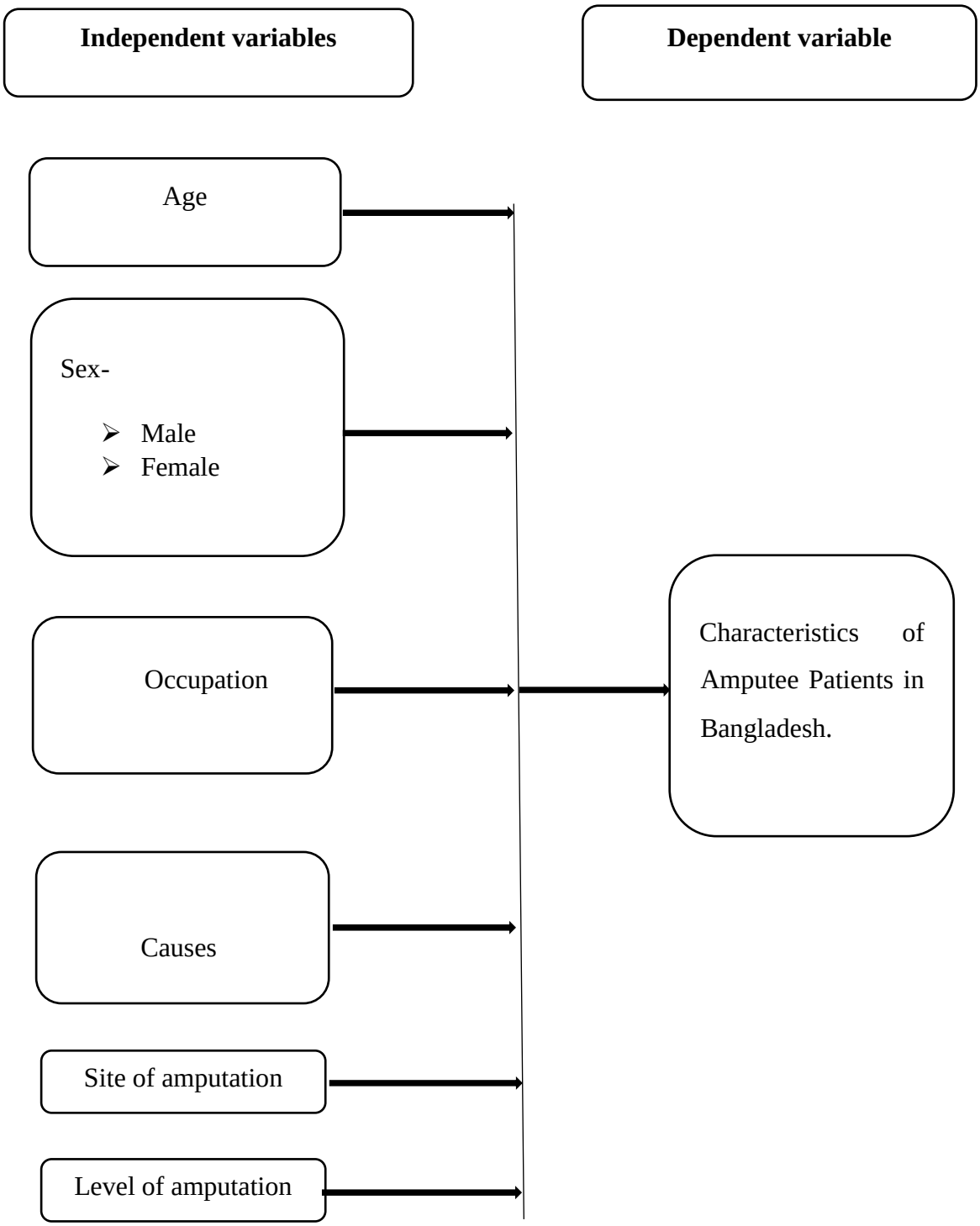
1.4 Aim of study

Identify the characteristics of amputee patients in Bangladesh.

Objectives

1. To identify the socio demographic status of amputee patients.
2. To identify the major causes of amputations.
3. To identify the major area of amputations at various limb levels.

1.5 Conceptual framework



1.6 Operational definition

Amputation

Amputation is the surgical removal of all or part of a limb or extremity such as an arm, leg, foot, hand, toe, or finger.

Peripheral Vascular Disease

In PVD, blood vessels become narrowed and blood flow decreases. This can be due to arteriosclerosis, or "hardening of the arteries," or it can be caused by blood vessel spasms. In arteriosclerosis, plaques build up in a vessel and limit the flow of blood and oxygen to organs and limbs. As plaque growth progresses, clots may develop and completely block the artery. This can lead to organ damage and loss of fingers, toes, or limbs, if left untreated.

Diabetic Neuropathy: It can lead to amputation. Uncontrolled diabetes can causes damage to nerves and reduce sensation. Injuries can develop without notice or pain and develop into ulcers infections, and cause tissue death.

CHAPTER-II Literature Review

Limb amputation which occurs as a result of a wide range of diseases and trauma is associated with significant morbidity, mortality, and disability. An amputation is not merely the loss of a limb- it can mean, disability, joblessness, high insurance payments and a poor quality of life (Spichler et al.,2010).

International research and publications are extensive in this field. Epidemiology and follow up studies have been conducted in various parts of the world. The Global Lower Extremity Amputation (LEA) Study Group is one example of a giant project studying the epidemiology of lower limb amputations throughout the world (The Global LEA Study Group). Various other studies have been conducted by other researchers. Physiotherapists in South Africa do not have easy access to the available literature hence this review.(Hennis et al.,2010).

Awareness about the global trends in the incidence of LLA will allow physiotherapists to compare their experiences and exposures to LLA in South Africa with that globally and plan their roles for their contexts more effectively. These roles may range from preventative to health promotion to rehabilitation and improving quality of life.(Wrobel et al.,2011).

Traumatic extremity amputation is the last resort for patients who have sustained severe, irreversible limb injury (Parmaksizoglu et al,2009) Numerous studies have analyzed the injury patterns and amputation rates of injured military service members (Fieke et al, 2012)However, the current literature does not adequately address the characteristics of major traumatic extremity amputation among civilians. To the best of our knowledge, only a few such reports have been published in India and Korea (Pooja et al, 2013).

Since the mid 2000, 6 reports have been published on the incidence of trauma-related amputations. In the United States, the incidence of traumatic limb loss among Maryland nonfederal hospital admissions decreased between 2002 and 2004, from 1.3 to 0.6 per 10,000 persons (Robin et al.,2011)

The rate of major amputation, defined as amputation through and proximal to the foot and/or hand, decreased slightly from 0.2 per 10,000 to 0.1 per 10,000 (Gujral et al.,2005).

Likewise, the rate of minor amputation, defined as amputation of the hand, finger, and/or toe, declined from 1.2 per 10,000 to 0.5 per 10,000. Among full-time workers in the United States (The LEG 2006).The average annual incidence of traumatic amputation between 2006 and 2010 in Minnesota was 3.9 per 10,000 persons, with rates varying from 0.5 per 10,000 in the service industry to 7.5 per 10,000 in workers employed in the manufacture of stone, clay, glass, and concrete. Similarly, among civilian workers in New Jersey, the incidence of finger amputation was estimated to be 0.9 per 10,000 between 2006 and 2009 (Eskelinen et al.,2010).

The incidence of traumatic amputation among the Scandinavian countries was somewhat lower than that of the United States, with an average annual reported incidence of traumatic lower-extremity amputation of 0.1 per 10,000 persons in Denmark between 2003 and 2006 and an average annual rate of upper-extremity amputation, including both work-related and non–work-related injuries, of 0.1 per 10,000 in Sweden between 2005 and 2008.(Tunis et al.,2009).

There are nearly two million people living with limb loss in USA. Among those living with limb loss the main causes are vascular disease 54%, Trauma 45%. Approximately 185K amputation occurs in US each year. In 2009 hospital cost associated with amputation total more than $8.5billion (Ziegler et al., 2008) The amputee collation of USA estimates that there are 185K new lower extremity amputation each year just within USA and an estimated population of 2 million amputees. It is projected that the amputee population will more than double by the year 2050 to 36 million (Limb-loss statistics 2016).

Diabetes is one of the leading causes of severe morbidity and mortality. The number of people with diabetes in the world is expected to double between 2000 and 2030. The greatest absolute increases in the number of people with diabetes will be in the world (Worber et al.,2011). Foot problems are important contributory factors to the high morbidity and mortality observed in diabetic patients, and the economic impact

of foot disease is substantial. It has been estimated that up to 50% of all non-traumatic lower limb amputations are performed on diabetic patients (Schoppen et al.,2007)

Diabetic foot disease is exacerbated by sociocultural factors such as the prevalence of walking barefoot, lack of knowledge regarding diabetic foot complications, and the socioeconomic status of patient(Clark et al.,2008). Diabetic foot infection constitutes 10%of diabetes-related hospital admissions. In a study from Southern India ,it was found that patients without foot problems spent 9.3%oftheir total income towards treatment, whereas patients with foot problems had to spend upto32.3%of their total income on treatment(Lento et al.,2009).This huge challenge imposed by diabetic foot problems calls for prevention and effective management at the initial stages of disease. There are no studies from eliciting the outcome of cost-effective intensive management of diabetic foot complications in our country.(De Goday et al.,2005).

In the US, the majority of new amputations occur due to complications of the vascular system (the blood vessels), especially from diabetes. Between 2006 and 2008, there were an average of 133,735 hospital discharges for amputation per year in the US.(Kneedy et al.,2014).

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

Consistent with results reported previously for all-cause lower-extremity amputation, there was considerable variation in the incidence of diabetes-related lower-extremity amputation within and between nations. (Mayfield et al.,2010).

Among the European nations, the crude incidence ranged from 57.0 per 10,000 diabetics in the United Kingdom between 2003 and 2005 to 66.0 per 10,000 diabetics in Germany in 2005(Resnick et al,2008).The incidence of major amputation, however, was much lower, with a crude incidence of 10.1 per 10,000 diabetics in the United Kingdom between 2000 and 2002 and 25.2 per 10,000 diabetics in Germany in 2008 (DIlligham et al.,2008). The rate of major amputation in Germany declined slightly between 2000 and 2005, from 25.2 to 21.6 per 10,000 diabetics. (Connel et al.,2006).

In the Netherlands, considerable variation existed among regions, ranging from an average annual age-adjusted incidence of 14.2 per 10,000 diabetics in the Breda health region to 44.6 per 10,000 diabetics in Leiden (Feinglass et al.,2012). In the single report from a Scandinavian country, Swedish researchers showed a decline in the diabetes-related incidence of first amputation between 2000 and 2008, from 19.1 to 9.4 per 10,000 diabetics. In the United States, the incidence of diabetes-related amputations increased between 2001 and 2007, from an adjusted incidence of 63.0 per 10,000 diabetics to 81.0 per 10,000, respectively.(Gujral et al.,2005).

The most recent estimate using hospital discharge data shows that the age-adjusted incidence was 54.0 per 10,000 diabetics in 2007(Tunis et al, 2009).State-specific rates varied from 76.8 per 10,000 diabetics in New Jersey in the early 2008 to 51.0 per 10,000 diabetics in Washington in 2010. The incidence among racial and ethnic groups was significantly greater than that of the general population in the United States. (Tumeat et al.,2015).

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

(Feinglass et al,20008) relied on an exclusion approach whereby persons with amputation not caused by trauma or neoplasm were assumed to have amputation secondary to peripheral vascular disease. On the other hand, developed and implemented an elaborate algorithm that, in addition to the amputation procedure code, stratified persons according to their likelihood of having peripheral vascular disease by using other diagnosis codes such as arteriosclerosis of the aorta" or "gangrene." focusing on the US population indicate that the incidence of dysvascular amputation ranged from 2.0 and 4.0 amputations per 10,000 persons. (Tunis et al.,2009).

The outlier is the study which reported age-adjusted rates of 8.2 per 10,000 men and 5.4 per 10,000 women (Feingless et al.,2012). The single study from Japan, using welfare records for the Okayama Prefecture, showed a much lower rate of lower-limb amputation than other industrialized countries, the overall incidence of first major amputation was only 0.1 per 10,000 inhabitants (Kim et al.,2009). Many studies suggest that the risks for major lower-limb amputation increases dramatically with age, with the highest rates seen in persons over the age of 70 years. Men are at consistently greater risk than women for dysvascular limb loss (Tumer et al,2008).

In the United States, the risk of amputation among blacks is 3 times that of nonblack individuals, with rates among blacks ranging from 5.0 per 10,000 population between 2008 and 2010 to 15.5 per 10,000 population (Wang et al,2016).

The birth prevalence of limb deficiency originated from the Swedish national registry, with rates of 4.5 per 10,000 births with a single malformation and 8.3 per 10,000 births with multiple malformations between 2008 and 2009 (Viswanath et al,2005). More recent reports from the United States show that there has been little change in the birth prevalence of limb deficiency, with rates ranging from 3.8 per 10,000 births in New York between 2010 and 2012 to 5.3 per 10,000 births in the metropolitan Atlanta(Connel et al.,2006).

Although a similar rate was found in Canada during the period 2000 to 2008 (6.0/10,000 births),Various number of note was a peak in the birth prevalence of 8.1 and 8.6 per 10,000 births in 1970 in Alberta and British Columbia, respectively.(Worber et al.,2011).

Likewise, birth prevalence rates among the European nations were comparable to those found in North America, with the exception of France with a rate of 10.4 per 10,000 births during the period 2002 to 2004.(Moss et al,2009). Reports from large registries encompassing several nations range from 4.9 per 10,000 births during the period 1967 to 1992 in Latin America to 7.1 per 10,000 births in Europe between 2000 and 2003..(Pirie et al.,2005).

In the United States, however, the prevalence of upper-limb deficiency varied by region, with California exhibiting significantly greater rates (4.7/10,000 births in whites, 5.0/10,000 births in blacks) than those of the metropolitan Atlanta region (3.7/10,000 births in whites, 2.8/10,000 births in blacks) between 2000 and 2008.(Shing et al.,2016).Amelia, the complete absence of both the upper and lower limbs, occurred at a significantly lower rate (0.2/10,000 births) than upper- or lower-limb deficiency. However rates of Amelia among stillbirths were reported to be 30 to 40 times greater than those among live births.(Temor et al.,2005).

Limb deficiency occurs in association with other major congenital anomalies in 12% to 33% (Malaham et al.,2014).Between 2000 and 2012, the birth prevalence of limb deficiency associated with major congenital anomalies from a registry encompassing 11 nations was 1.3 per 10,000 births, 0.7 per 10,000 live births, and 0.6 per 10,000 stillbirths.(Resnick et al.,2008).

The birth prevalence of Amelia among children with major congenital defects was 0.8 per 10,000 births. In summary, when examining rates reported across different countries by different investigators, there appears to be marked similarity in rates of congenital limb deficiencies, in contrast to diabetic and dysvascular limb loss rates(Moss et al,2009). The majority of these reported rates fall within 2 to 7 per 10,000 live births. Additionally, there are no time trends with respect to this type of limb deficiency.(Bouker et al.,2005).

Iran is a Country where the physical consequences of war are all too apparent in thousands of victims who have lost their arms and legs because of landmines or other explosive remnants of war. It is estimated that almost 4000 hectares of land in the five western provinces of Iran are infested with about 16 million landmines and other unexploded ordnances(Wegner et al.,2005). Globally, an estimated 800 persons die each month and 1200 persons sustain nonfatal injuries from landmine-related injuries. However, those who have survived from injuries often have complicated, severe, and debilitating physical damage (.Calle et al.,2011).

Severe limb injury or traumatic amputation produces different levels of tissue damage within the limb; skin, fat, and muscle have variable resilience to injury. Children are more likely to die from landmine injuries than adults, because their smaller size means that their vital organs are closer to the blast of detonating mine. In accordance with well-established indications, amputations are performed because of severe trauma to the limb; lower limb amputation is more common than upper limb amputation.(Robin et al.,2011).

Amputees received initial rehabilitative treatment and prosthetic fitting at the general hospital to which they were assigned when they arrived in the United States after having been injured(Steward et al.,2005).Treatment and rehabilitative services were not necessarily consistent among all facilities. At most hospitals, amputees were assigned to a general orthopedic service that managed all categories of orthopedic patients.(Samsam et a.,2009).

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

Currently, antipersonnel land mines are of much concern throughout the world because vast tracts of mines remain planted in Asia, Africa, and the Balkans. Although the exact number of land mines remaining in place is unknown, estimates

range between ninety and 110 million**.** Amputations resulting from land-mine injuries remain a problem for those who live in these areas as well as for peacekeepers assigned to the region.(Bowers et al.,2005)

In previous conflicts, the United States Army and Navy designated hospitals as amputee centers to ensure consistency of care**(**Kumar et al.,2016). During the Vietnam War, members of the United States Army who had sustained an amputation were given care at other general hospitals, but only Valley Forge Army General Hospital in Phoenixville, Pennsylvania, provided a designated amputee service for the Army. This service was established on February 1, 1969, to consolidate the efforts of therapists, nurses, prosthetists, and surgeons to provide more consistent and structured care**.** The surgeons also explored the use of the Ertlosteoplasty, in which a synostosis is created between the distal aspects of the tibia and fibula**.(**Amosun et al.,2005).

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

Amputation may involve a single limb (unilateral), both the upper or lower limbs (bilateral), or a combination of upper and lower limb amputations (multiple amputations). Amputation may be performed at various anatomical levels(Berry et al.,2009). Lower limb amputation may involve removal of one or more toes, part of the foot, ankle disarticulation (disarticulation is the amputation of a body part through a joint), transtibial (below the knee) amputation knee disarticulation, trans-

femoral (above the knee) amputation, hip disarticulation and hemi-pelvectomy (removal of half of the pelvis).(Mayfield et al.,2010).

Upper limb amputation may involve the removal of one or more fingers, wrist disarticulation, below elbow amputation, elbow disarticulation, above elbow amputation, shoulder disarticulation and forequarter amputation(Steward et al.,2005).In high income countries, dysvascullariyy is the foremost cause of amputation; as a corollary the majority of amputations involve the lower limbs (Ziegler-Graham et al., 2008).Some idea of the most frequent sites of amputation can be obtained from the 4,584 new lower limb amputations referred to the English prosthetic service in 2000-2006, which fell into the following categories such as Transtibial 50.6%, Trans femoral 8.8%, Knee disarticulation 2.8%, Partial foot 0.7%, Ankle disarticulation 0.6%, Hip disarticulation 0.2%.(Hennis et al.,2010).

Double lower amputation such as amputation of both lower limbs 3.9%.(British limbless ex-service association 2008).These figures reflect amputations performed with later referral for prosthetic replacement; no accurate national figures for the total number of amputations are available. However, about 60% of those with trans femoral amputation are too infirm for fitting.(Kubheka et al.,2012)s This is usually due to the amputee being insufficiently robust for prosthetic use. Those with transtibial amputations fare better, with over 80% achieving a successful prosthetic fitting. From a functional point of view, the level of amputation is extremely important.(Worber et al.,2008).

The transtibial amputee requires about 30% more energy to walk, compared with a nonamputee. These patients also retain the knee joint, which enables them to walk more efficiently, with limb strength and proprioception below the knee being retained(Pernot et al.,2010). The trans femoral amputee uses over 70% more energy to walk. The stump is more difficult to fit comfortably and the resulting gait is less cosmetic, requiring a mechanical knee joint, as well as a prosthetic foot .(Stewrard et al.,2005).

Younger amputees have a higher fitting rate and subsequently greater prosthetic use than older subjects. This is due to the fact that they are physically fitter and usually

do not suffer from additional medical problems. The traumatic amputee may however have associated injuries and these may affect the final outcome, both from a prosthetic fitting viewpoint and psychological acceptance(De Goddy et al,2005). Amputation level also has a significant effect on the psychological acceptance of the surgery by the amputee. The lower the amputation level, the less detrimental the psychological effect. It can be seen that the lower the level of amputation, the better the overall wellbeing of the subject.(Patel et al., 2015).

Deep vein thrombosis. In all surgical situations deep vein thrombosis can occur. This is the clotting of blood in the deep veins of the leg and sometimes those of the abdomen(Engstram et al.,2008) This occurs when the subject is immobilized for a prolonged period, for example post-operatively, when pain and sedation reduce the subject's ability to move about. Without appropriate management, the condition may have fatal consequences.(Connel et al.,2006).

Immediate post-operative pain management is no different from that following any surgery and is usually in the form of opiate medication. Once the initial trauma of the surgery is over, less powerful analgesics may be used. Most patients are free of the requirement for pain relief within 4-6 weeks of surgery. There is one issue that is unique to amputation surgery, and that is the phantom limb phenomenon described below. (Kashani et al.,2008).

Pain can occur at any time, can vary in its severity and duration and may make prosthetic fitting difficult as the socket has to fit the stump accurately. The pain may become chronic and this is much more difficult to manage (Graham et al.,2006). Pain clinics to have a range of strategies to help these patients, and for many, considerable success is possible. For some (and there are no figures to say how many, but in the author's opinion it may be up to 5% of amputees) the problem is significantly difficult and directly affects the well-being of the person.(Naraynsingh et al.,2012)

However, the pain may be mild and cause no problem at all to the amputee. It can disappear totally or return in a different form some considerable time after the initial injury(Dsmond et al.,2010). The author had one amputee who developed intractable

pain in his stump more than 20 years after the initial road traffic accident that resulted in him losing his leg just below the hip joint. There is no method of predicting the future pain problem of an individual; however, it is not usually a severe difficulty, and successful management is usually possible.(Singh et al.,2016).

Phantom pain occurs in about 30%-50% of amputees. The pain can manifest as an occasional stab of mild pain or any degree up to severe, intractable, excruciating, ontinuous pain. There is some evidence that traumatic amputees experience more phantom feelings than vascularly compromised subjects.(Viswanath et al.,2005).

The typical dysvascular patient with an amputation is older than 60 years of age and commonly experiences comorbidities; postoperative morbidity and mortality rates are high (Dillingham et al.,2008).

Patients with amputation secondary to diabetes have elevated morbidity (Schophen et al., 2007). The patient's overall health status complicates the challenge of amputation rehabilitation. Traumatic amputation (associated with mechanical, chemical, thermal and/or electrical injuries), is more common amongst working-age adults who are otherwise in good health. Trauma is the most common cause of acquired upper limb amputation and the most common cause of all-level amputations in non-industrialized countries (Eskelien et al., 2010).

In the field of prosthetics, there is an increasing acknowledgement by practitioners, clinicians and therapists of the need to measure the outcomes of their practice . The goals of assessing health outcomes are to improve the quality of care, the quality of health, and thus ultimately the quality of life of patients(Lento et al,2009).s As the aim of providing people with more effective body functioning is central to the fitting of a limb prosthesis most outcomes research is concerned with ensuing physical adjustment (Ahmed et al. , 2016).

Amputation leads a person to a permanent disability. It brings a dramatically change in the life, function and movement of the victims. These changed situations are experienced more by lower limb amputees than by upper limb amputees. The incidence of lower limb amputation is also higher than that of the upper lim(Calle Passcul et al.,2011). In developed countries, vascular complications are the major

contributors to lower limb amputations. On the other hand the developing countries are more likely to traumatic accidents as the major cause of amputation. Vascular complications and diabetes are burgeoning health issues in developing countries, and diabetic ulcers are precursors of lower limb amputation.(Spincler et al.,2010). Many people with abnormalities, deformities, or missing body parts can be helped with orthotics and prosthetics. Orthotics and prosthetics are pieces of medical equipment that can help replace or improve body parts. They include braces, inserts, artificial limbs, and many other medical equipment fabrications. (kim et al.,2012)

Prosthetics are artificial extensions of the body. They are used to replace body parts that are missing from birth, lost through an injury or disease, or which require removal for medical purposes. Prosthesis can also supplement an existing but defective body part. Some prosthetics include artificial lungs, knees, eyes, hearts, hips, limbs, heart valves, ankles, dentures, and gastric bands (Spinchler et al., 2010).

Recent years have seen an exponential rise in the level of chronic, long-term health problems in many western societies – with increased levels of disability, loss of function, and soaring costs(Tunis et al.,2009). The Department of Health estimates that care of people with long term conditions accounts for 70% of the money spent on health and social care in England (Department of Health, 2013). The number of people who have been lower limb amputees for a long time is increasing with increased survival due to improved surgical and acute management techniques over the years. There is also an increase in casualties from warfare who are expected to have a similar life expectancy to their peers in the absence of other conditions (Stewart et al., 2005).

Some people with a lower limb amputation remain independent despite infrequent use of their prostheses and outdoor ambulation (Neher et al., 2016). Despite all the challenges faced by people following lower limb amputation some remain independent in activities of daily living and use their prostheses (Moss et al., 2008). The preoperative status of people with lower limb amputation can also determine the functional outcome of the amputee postoperatively(Bowers et al.,2005).

Non ambulatory status preoperatively, having an above-knee amputation, being home bound preoperatively, dementia, being over 60 years of age, having end-stage renal failure and having a coronary artery disease may be associated with not wearing a prosthesis (Eskelien et al.,2010)s People over the age of 70 and those with a bilateral lower limb amputation might not walk after the amputation (Taylor et al., 2005). Other physical problems associated with amputation include phantom sensations and phantom pain (Moss et al., 2009)

Another problem is that importing components from industrialized countries to build prosthetic limbs are not only costly, but these parts are designed for very different lifestyles and usually do not hold up to the challenges which nature presents in rural environments. These countries have a farm-based economy and a tropical climate. In these harsh environments, conventional limbs made of wood are only have a lifespan of about 18 months.(Steward et al.,2005).

The costs of prosthetic limbs vary substantially by country, but a typical prosthetic limb made in a developing country costs approximately $125 to $1,875 USD, depending upon the region in which they are made(Connel et al,2006). When the costs to make a limb in a developing country can be cut to as little as $41 USD (well below the $5,000-$15,000 USD average cost for a prosthesis in the United States), the costs over a lifetime of replacements and maintenance can still amount to thousands of dollars. This presents a major problem since the average family income in rural areas is typically around $300 USD annually. Bartering for goods is a natural aspect of their lives, but getting a prosthetic limb requires cash. It can take victims a decade or more to earn the money for an initial prosthesis (Wang et al,2016).

In the UK artificial limbs are provided without charge to all those eligible for free NHS treatment. The provision is undertaken at designated Limb Fitting Centers all over the country. They are NHS-run with NHS medical consultant personnel, physiotherapists, occupational therapists, nurses and other healthcare professionals available, usually on site(Dudgeon et al.,2006). There are a few private prosthetic companies. For prosthetic fitting to be successful, the rehabilitation has to be fully coordinated, with a team of dedicated healthcare professionals. The team often

includes: the medical rehabilitation specialist and the surgeon, nursing staff, physiotherapist, occupational therapist, the prosthetist, social worker, chiropodist for the care of the sound foot, the amputee counsellor/psychologist and other amputees.(Hennis et al.,2011).

Initial prosthetic assessment is often undertaken jointly both by the physiotherapist, the prosthetist, and the rehabilitation consultant. The use of an early walking aid is frequently used to help the team decide the suitability of the subject for fitting. It is also used in the commencement of early walking training. The prosthesis can be fitted as soon as the stump is healed, and in some circumstances earlier. This can be as early as three weeks post-surgery. However, it can be some considerable time later. This is especially true when there is delayed stump healing or other associated injuries, as well as psychological trauma.(Graham et al.,2008).

Transtibial Between 90% and 60% fitting rates depending on the center providing the rehabilitation service • Trans femoral Between 70% and 40%. Walking aids in the form of stick or crutches are often used, for a limited period in some cases, in others indefinitely (Tumer et al, 2005).Multiple amputations do limit the ability to use an artificial limb. The fittings are individually no different, but to use more than one limb is difficult. The energy required is greater and the gait achieved, if both limbs are fitted, is not very efficient or cosmetic.(Wang et al.,2006).Relatively few bilateral trans femoral amputees use their prostheses as their sole means of mobility. Most do use a wheelchair for some of the day. However, there are exceptions and a few are very mobile. Those with bilateral transtibial amputations frequently do manage to walk remarkably well. However, these amputees do not walk as much as those with single amputation.(Berry et al.,2009).

Between 84% and 95% of fitted amputees use their prosthesis for part of the day but it is known that on average elderly amputees do not walk as much as their peers. Wheelchairs are often provided to augment the overall mobility of the subject.(Feingless et al.,2012).

It should be remembered that those in less well-developed countries have a greater problem in being mobilized. There are often limited prosthetic services, less community support and potentially significant social stigma. This frequently results in a far from satisfactory outcome and greater morbidity. (Cheng et al.,2010).

CHAPTER-III METHODOLOGY

Study design

The study was a non-experimental cross-sectional survey design. Cross sectional studies (also called a prevalence survey) aim at describing and quantifying the distribution of certain variables in a study population at point of time. It provides a snapshot of the health experience of a population at a given time (Hannan,2007). I used this method so that the aim and objectives of the study can be fulfilled.

Study settings

Following organizations were my study areas which were in Dhaka, Bangladesh:

- Prosthetics and Orthotics Department at Center for the Rehabilitation of the Paralyzed (CRP), Savar, Dhaka-1343.
- National institute of Traumatology Orthopedic Rehabilitation (NITOR, Sher-e-Bangla Nagar , Dhaka).
- Center for Disability Of Development (CDD, Savar)

The researcher collected data from these areas from 28th August 2016 to 20th October 2016.

Study population:

The study populations were people with amputation and sample population were those who came to CRP, NITOR and CDD to receive treatment.

Sampling technique

In the study where used convenient sampling technique because considering the inclusion – exclusion criteria .it would be difficult to find the expected number of subjects. This technique was more feasible, less time consuming and expensive to obtain relevant information.

Sample size:

100 sample was collected as my target data because that number was easy for me to collect and analyse data.So I selected those number.If the number was 384 it was better for me to compare this study**.**

The equation of sample size calculation are given below-

$$n = \{\frac{z\left(1-\frac{\alpha}{2}\right)}{d}\}^2 \times pq$$

Here,

$z(1-\frac{\alpha}{2})$ = 1.96

P= .5

q= (1-p)

=1-.5

=0.5

d= Sampling errors which is 5%=0.05

According to this equation the sample should be more than 384 people but due to lack of opportunity the study is conducted with 100 patients selected according to inclusion and exclusion criteria.

Inclusion Criteria

- People with amputations with upper or lower limb.

  Among all lower limb amputation cases, below-knee amputations were the most common, followed by above-knee amputations (Pooja & Sangeeta, 2013).

- People of all ages were selected.
- Both male and female were selected.

There were more male amputees than female ones, with 86% of all amputees being male (Pooja & Sangeeta, 2013).

- People who were willing to participate in the study.

Exclusion Criteria

- Those who were not interested to attend the program at the time of data collection.
- People who had mental illness.

Data collection: The base of any study was data collection. This study had followed all rules of data collection including method of data collection, materials and procedure used for data collection.

Data collection method and tools:

The face to face interview technique was used to collect data. A structured questionnaire for collecting information related to the study was used.. Before collecting data, researcher provided information sheets along with consent forms to the participant after fulfilling their queries regarding the procedure signed inform consent is taken. Then data is collected through a questionnaire from the participants by a face to face conversation. In this way questionnaire is presented and data is completed. In the questionnaire, there was participant's demographic information including age, sex, cause of amputation, level of amputation etc.

The duration of data collection was 15 min for every individual patient. For this the materials to successfully complete the interview session and collect the valuable data from the participants were used such as- question paper, consent from, pen, file, clip, board etc.

Questionnaire:

For data collection a s structured questionnaire was used to find out the characteristics of amputee patients in Bangladesh.

Pilot study:

Pilot study is a preliminary run of the main study to highlight any problem which can be corrected and it is always important to run some pilot study before beginning the main study. Before researcher could undertake final study, the researcher performed a pilot study because this helped the researcher to refine the data collection plan. The aim of this pilot study was to find out the way to do this research. Researcher selected 1 week foe pilot study and was visited the physiotherapy department of prosthetics and orthotics unit in CRP, Savar and saw was there and modified needed of the data collection procedure or tool.

Data analysis:

After completing the initial data collection every questionnaire had been checked again to find out any mistake or unclear information. Data were numerically coded and captured in Microsoft Excel to show the results using in Statically Package of Social Science (SPSS) version 20 software program for analyzed data as descriptive statistics. Descriptive statistics will be used to attain research objectives.

Ethical Consideration:

A research was submitted for approval to the department of physiotherapy of health profession institute (BHPI) and proposal was approved by the faculty members. After the proposal was approved to carry on with the study researcher had moved the study. The researcher took permission from the participants before that every participants were informed about the aim and objective of the study. Researcher had ensured the confidentiality of all participants like, it was ensured that, the actual name of the participant was hidden from others. It was being explained to the entire participant that their personal identity will be kept confidential.

Inform-consent:

The participants were informed verbally about the title, aims and purpose of the research project and also given consent form mentioned in appendix. They had received a clear description of the study and aware that the research is the part of the study process, they would take part as the volunteer. Before participating in the study the researcher had provided them a written consent form to sign, responsible physiotherapist sign as a witness. The researcher had also signed the consent form. The participant informed clearly that their information might be published but their personal identity would be kept confidential. In addition it was explained that there would be no direct benefit as a participant in the study but there might be some changes in service delivery system of physiotherapy gait training, which might be helpful for them. The participants were informed also that they have the right to withdraw consent and discontinue participation at any time without any prejudice.

The study conducted with 100 patients as subjects in CRP (Prosthetics and orthotics) dept. CDD (Savar), NITOR hospital provided the following statistics for the amputation related cases.

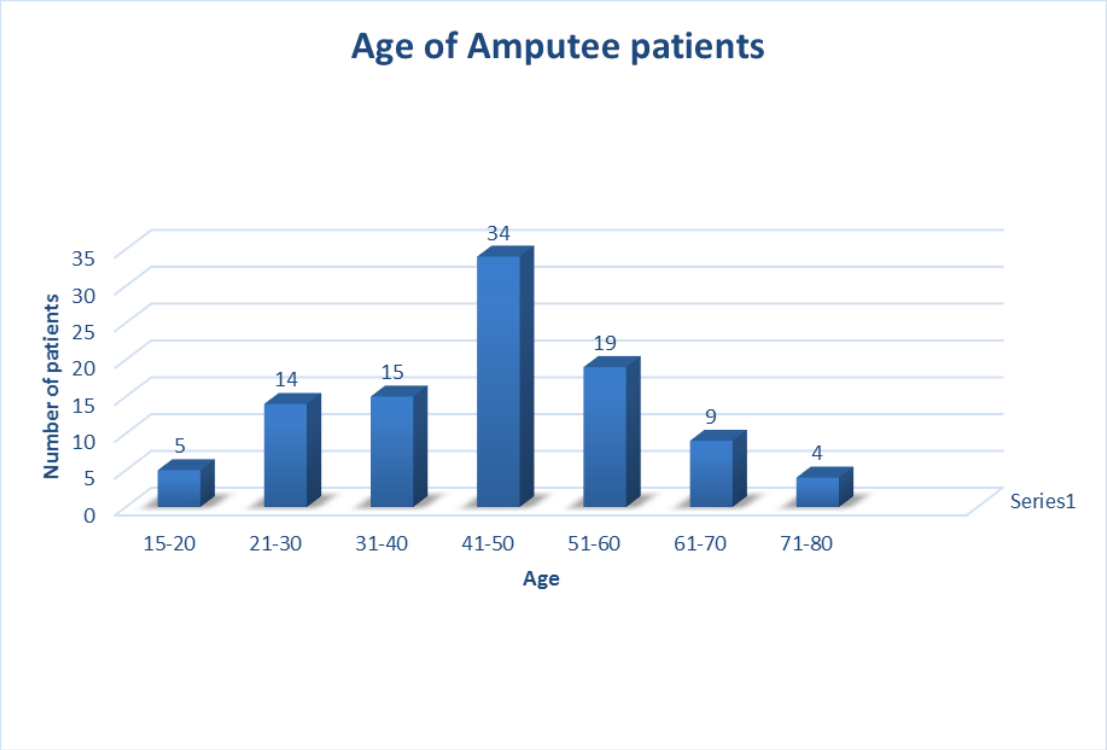


Fig: 1 Age of amputee patients.

In this study conducted 100% patients underwent limb amputation. Maximum number of the patients were in age group 41to 50 years with mean age being 41.4 years. Here minimum age of the patients was 15 years old and maximum age of the patients was 80 years old.

Among 100 patients 70% of them being male and 30% female.

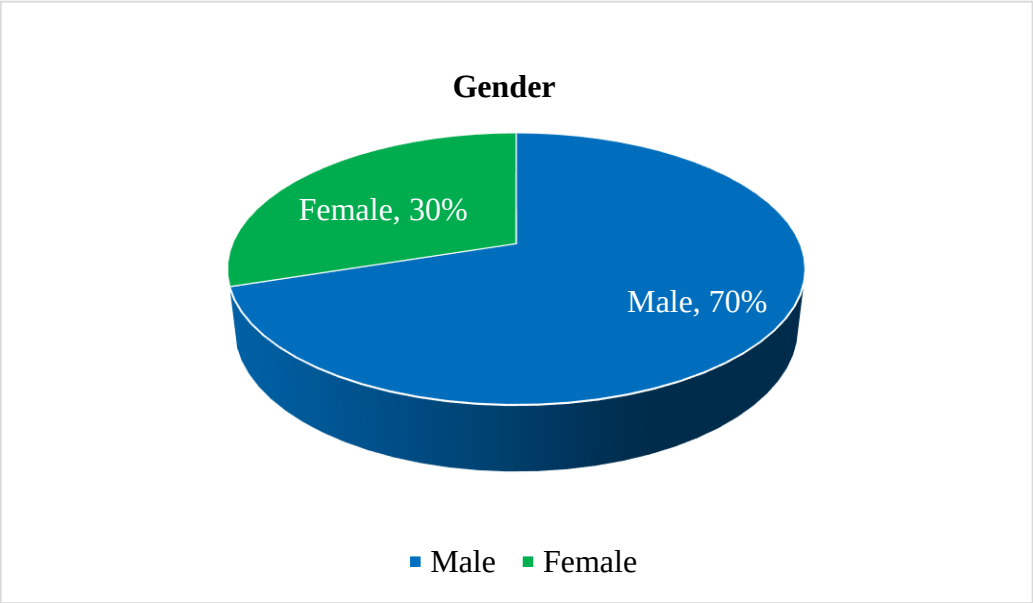


Fig: 2 Male and Female Ratio among amputee patients

About 41% patients had secondary educational status among 100 amputee patients. Among 10% patients had no formal educational level.

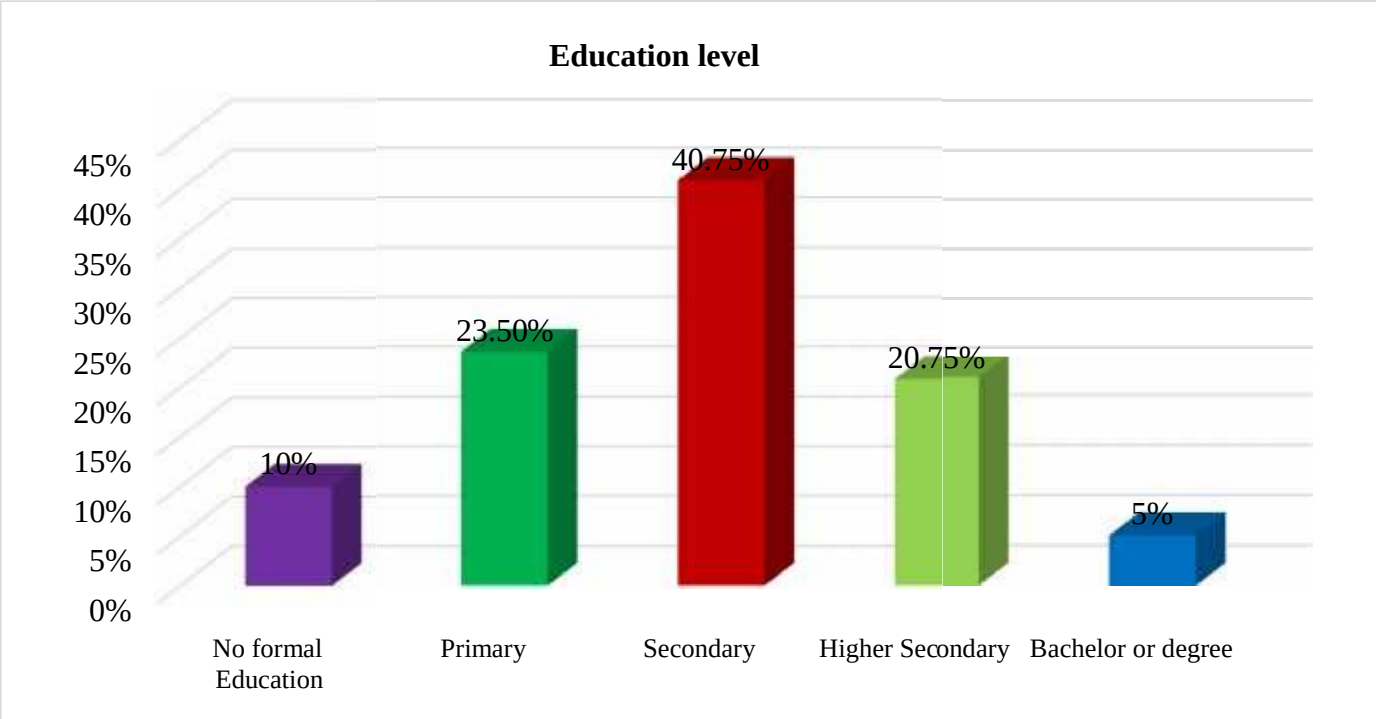


Fig:3 Educational Level of amputee patients.

Researcher found that about 75% patients had job before amputation.

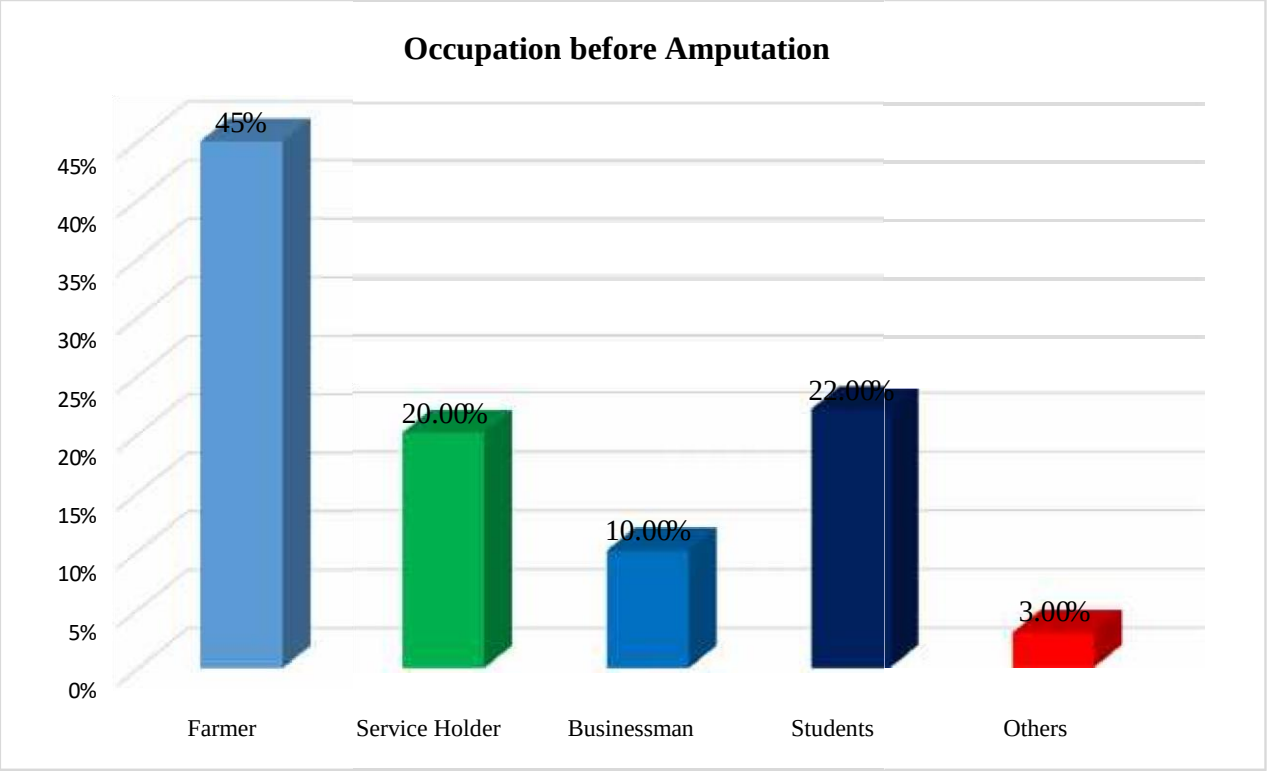


Fig:4 Occupation before Amputation

This study found that 90% patients became jobless after amputation.

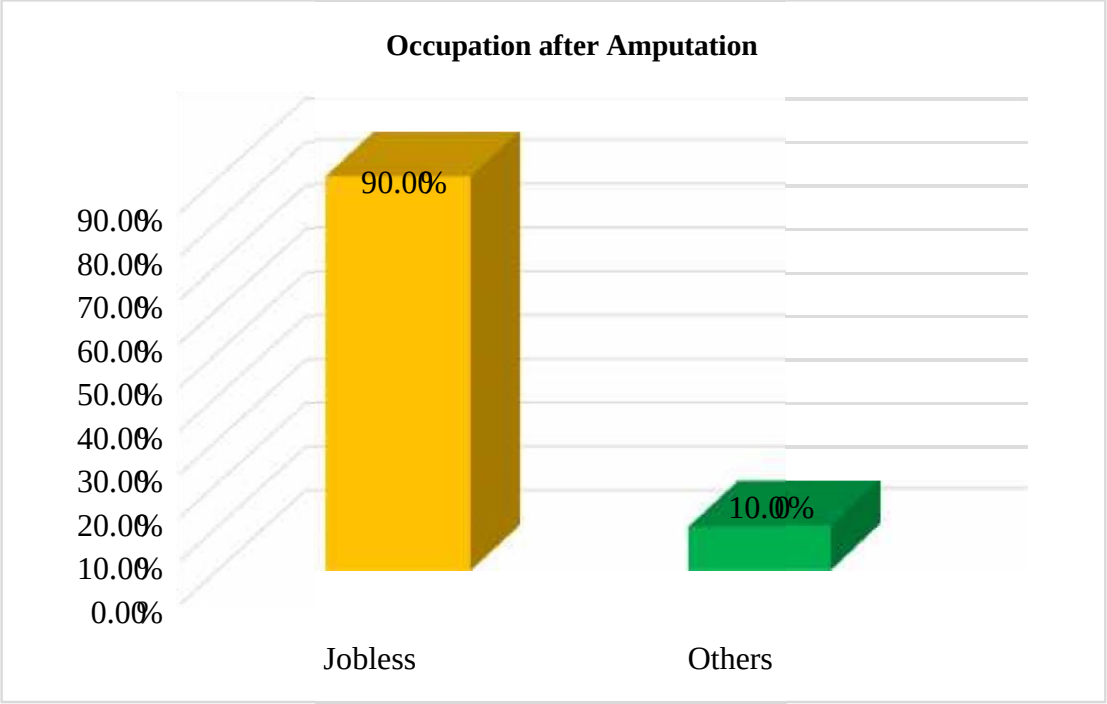


Fig:5 Occupation after Amputation

Among 100 patients about 80% of patients were married and 20% patients were unmarried.

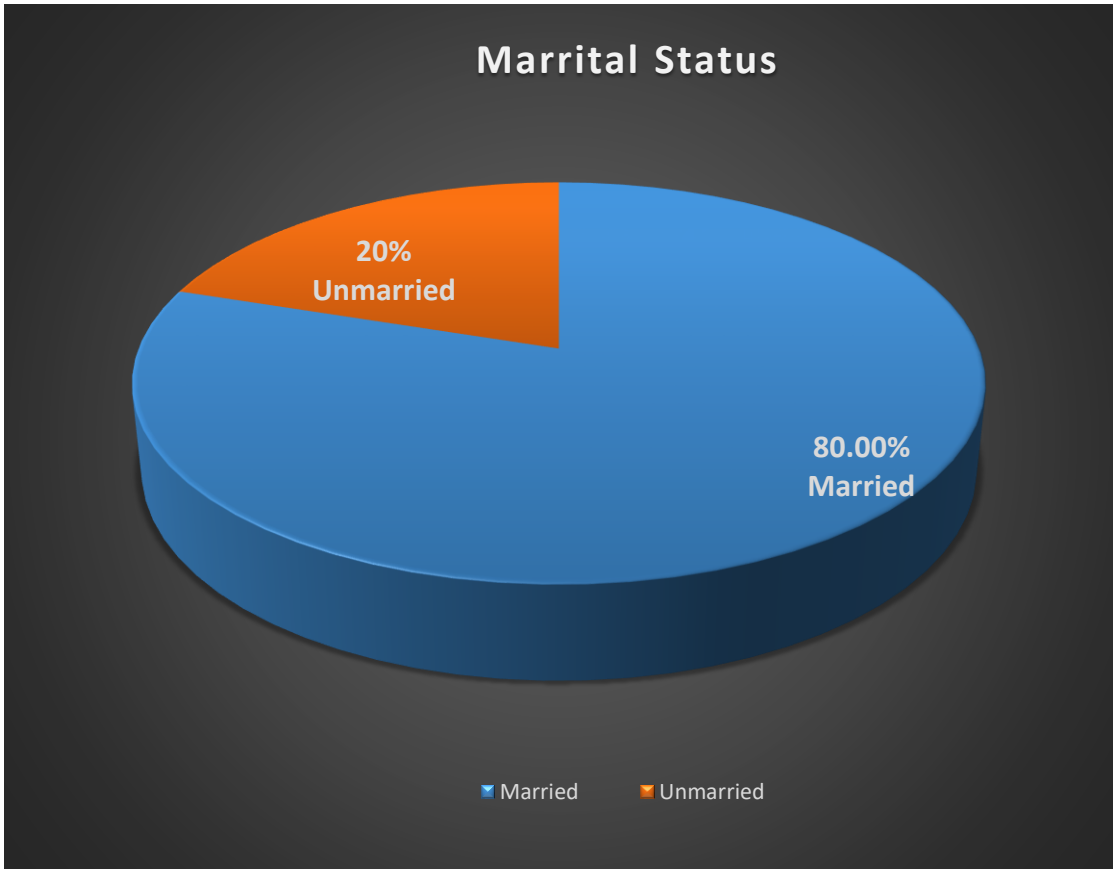


Fig:6 Marital Status of amputee patients

Among 100 amputee patients ,60% patients were smoker.

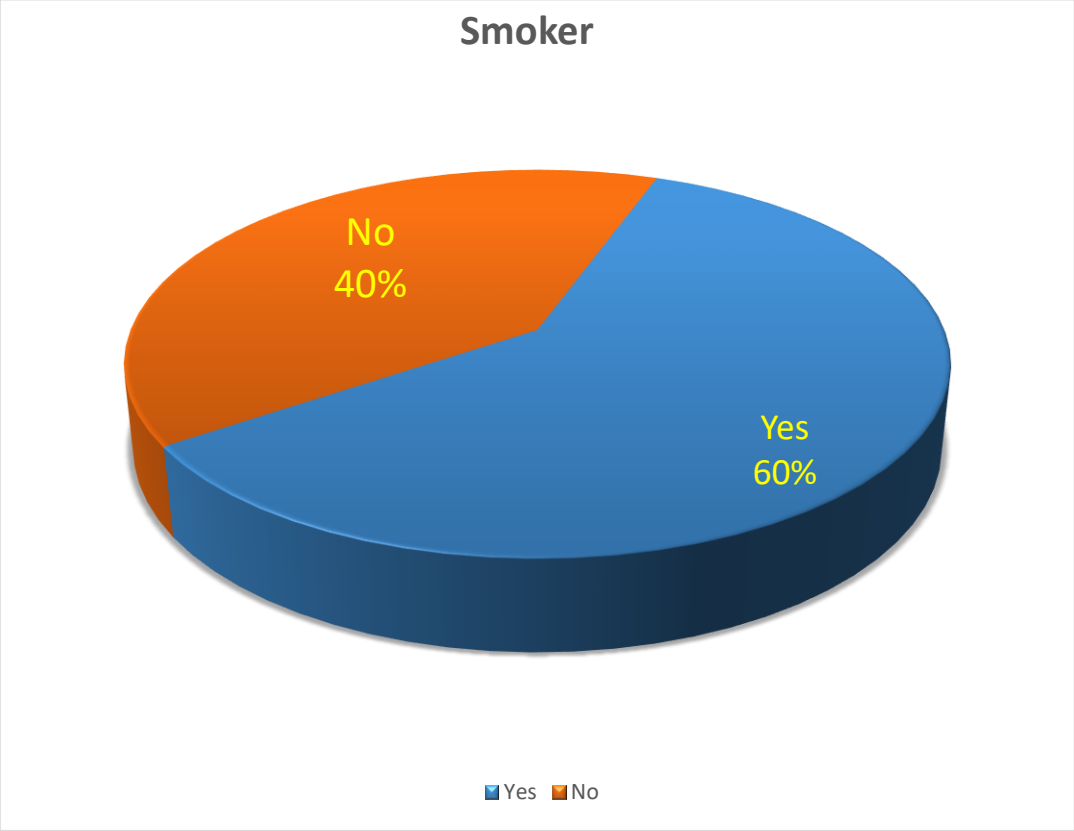


Fig:7 Smoker among amputee patients

Lower limb amputation were much more common than upper limb -amputation. Here 96% patients had below knee amputations and rest of them were upper limb amputations.

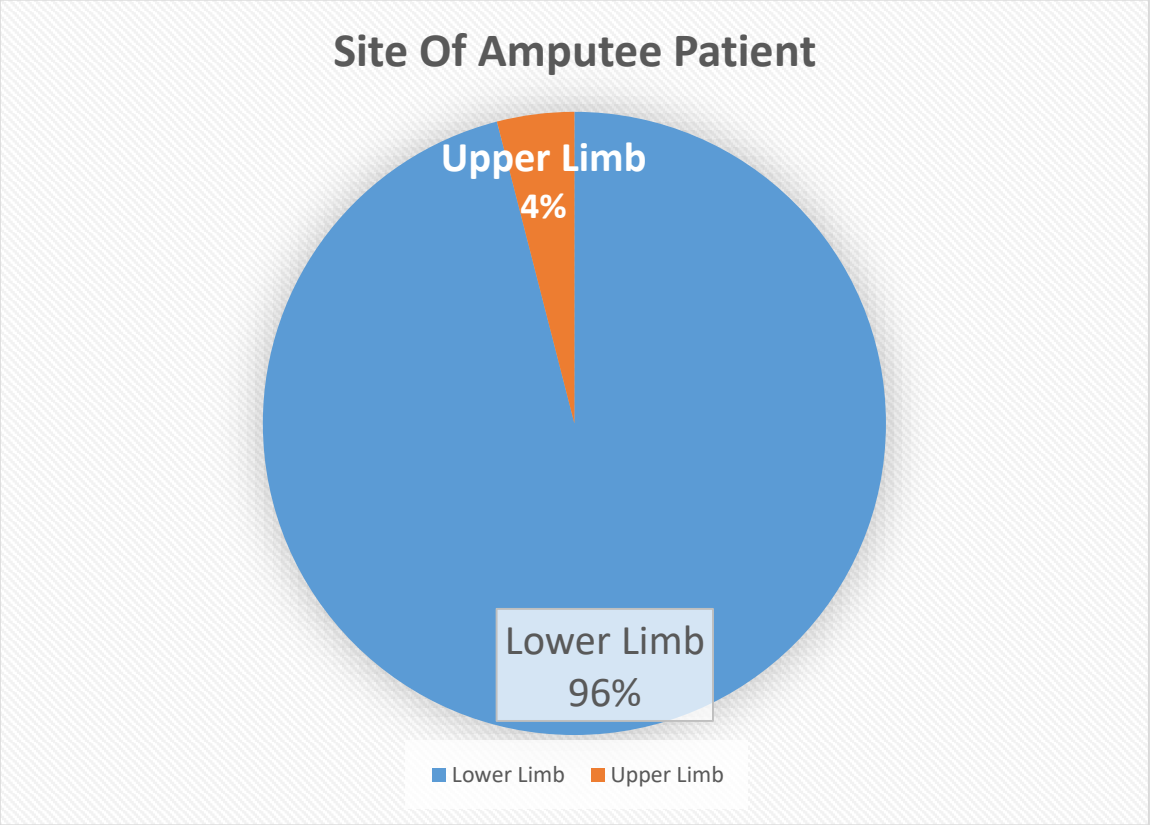


Fig:8 Site of Amputation

Lower limb amputation were far more common than upper limb. Among lower limb below knee amputation was most common type of amputation. Here 70% patient had below knee amputation and 28% patients had above knee amputation.

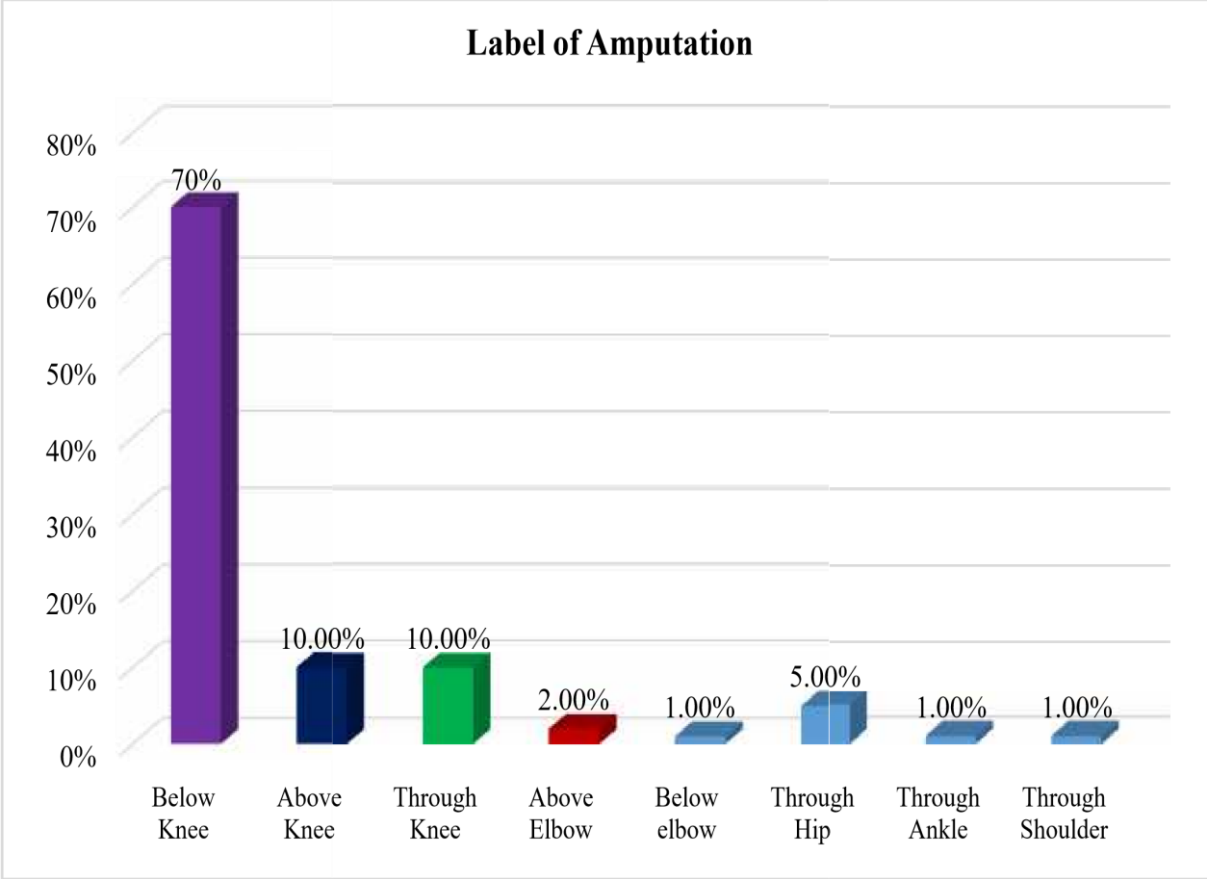


Fig:9 Label of Amputation

In my study conducted 98 patients underwent major lower limb amputation for varying indications. Maximum number of amputation were performed for trauma. In the study 65 both male and female underwent major lower limb amputation for trauma. Diabetic was second among the indicators for lower limb amputation amounting 18% of total lower limb amputation. PVD accounted for 11% of total lower limb amputation rest of 6% patients were in congenital anomalies amputee patients.

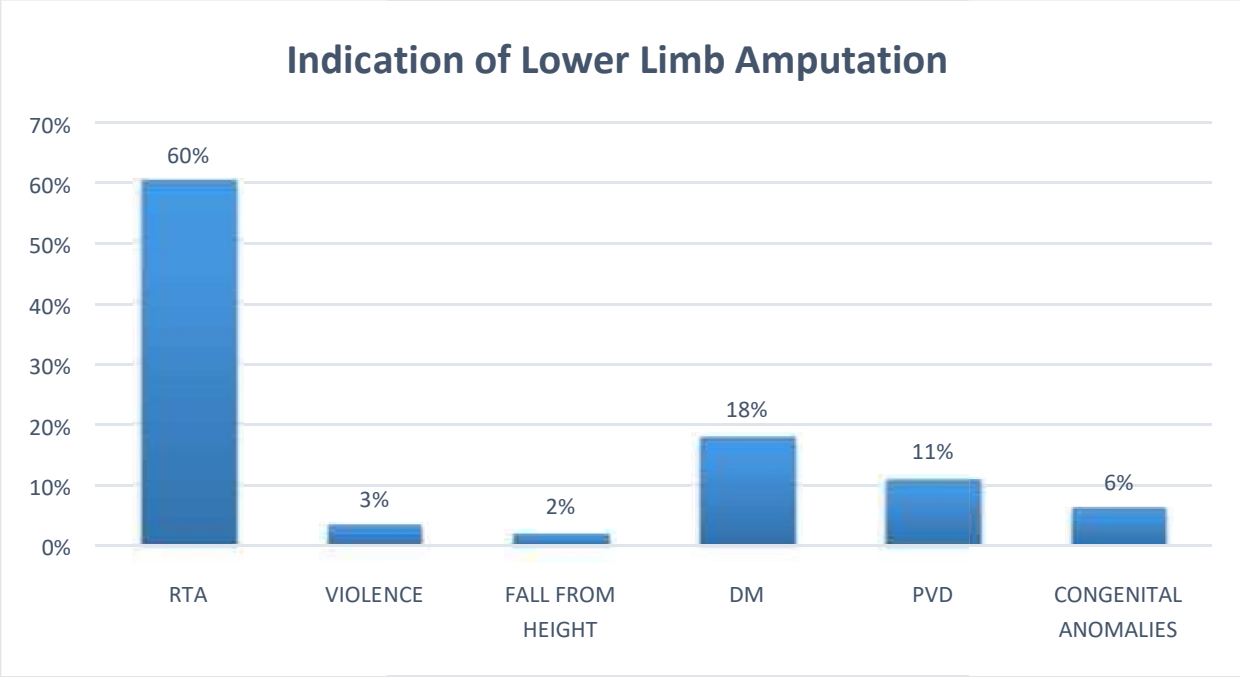


Fig:11 Indication of lower limb amputation

RTA: Road Traffic Accident.

PVD: Peripheral Vascular Disease.

DM: Diabetes Maliatas.

About 85% patient had trauma related amputation. 10% had PVD. 3% patients were in Congenital Anomalies. Here DM related amputee patients only 2% among 100% which was far distance rat from lower limb amputation.

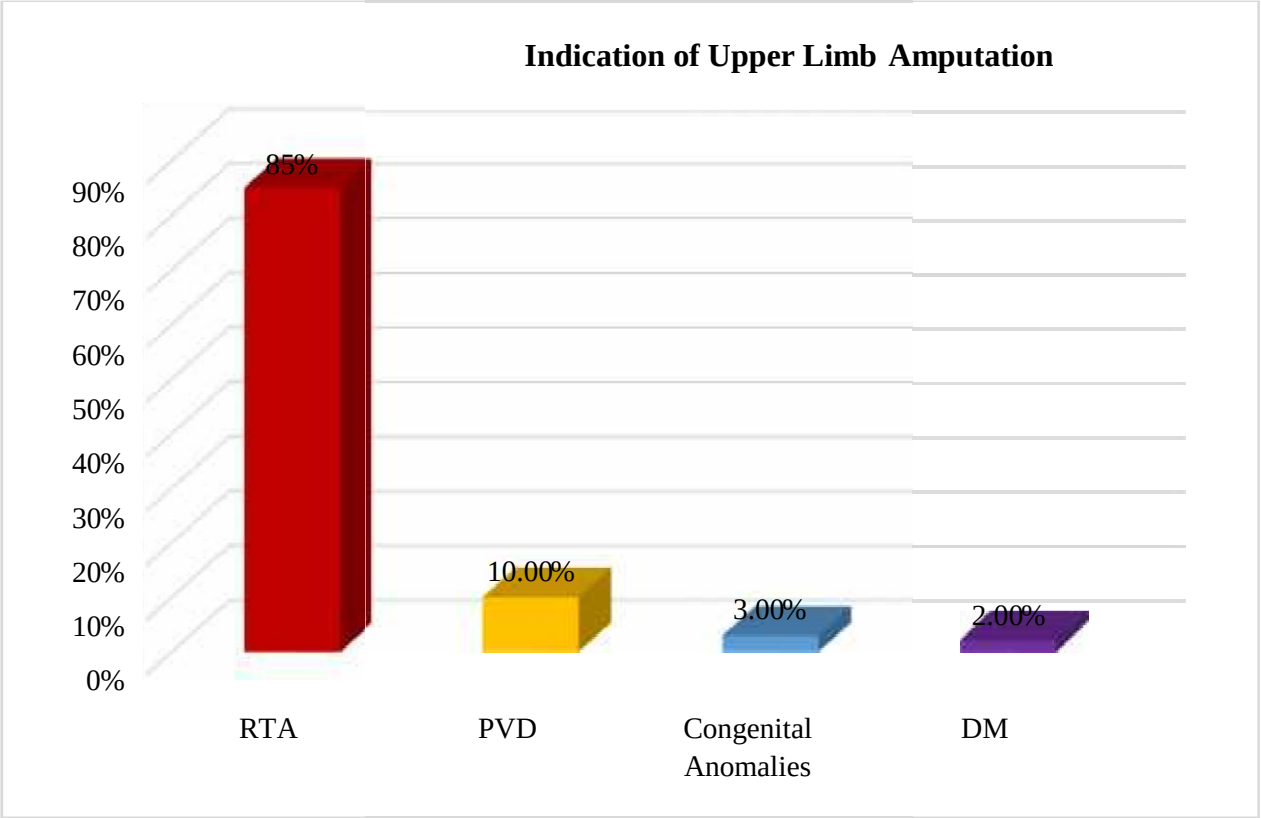


Fig: 4 Indication of upper limb Amputation

RTA: Road Traffic Accident.

PVD: Peripheral Vascular Disease.

DM: Diabetes Maliatas.

Table No: 1-Complication of limb amputations

Complication	No of patients	% of total
Pain	70	70
Contracture	9	9
Phantom limb sensation	13	13

DISCUSSION

The aim of this study was to find out the characteristics of amputee patients in Bangladesh. In ths study there was about 100 amputee patients were taken. The data that were collected by the researcher through questions, analyzed and discussed below.

Here researcher found mean age is 41.4 years. We can see that the demographics in Bangladesh. According to the latest WHO data published in 2015 life expectancy is in Bangladesh, male 70.6, female 71.8 years. The present study shows predominance of male sex, with 70% of patients undergoing amputations being male and 30% female. Most patients who undergo traumatic amputation are male and most range in age from 41-50 years, these patients accounted for 70% of all patients in this study. The reason for this trend was related to the various job specifications among patients of different sex and ages. Physical and dangerous war is always undertaken by man in developing countries like Bangladesh (Unal et al, 2012). So the incidents of injury was much higher than in female patients group. On comparison, the study at (Michal et al, 2011) put the male patient percentage undergoing amputation at 72% and female at 28%, while the study at (Lento et al, 2009) showed figures of 58% for males and 42% females.

Now find the case of amputation according to age (Lento et al, 2009) reported that peripheral vascular disease occurred mainly in the senior age group, especially in those aged 60 years or above. These reports are not consistent with this study, which shows that amputation because of accidents occurred relatively more often in the middle age groups, while cases due to peripheral disease were more frequent in the 60s and older age group. A look at the age distribution of amputated patients shows a peak at the age group of 41-50 years, with 28 male patients and 6 female patients in this age group undergoing amputations. Now look at the cause of amputation in our country. Here researcher found that trauma was the major cause of amputation in Bangladesh. There has been an alarming rise in road accidents, significantly highway accidents, in Bangladesh over the past few years. According to a study conducted by the Accident Research Centre (ARC) of BUET, road accidents claim on average 12,000 lives annually and lead to about 35,000 injuries. According to World Bank statistics, annual fatality rate from road accidents is found to be 85.6 fatalities per

10,000 vehicles. Hence, the roads in Bangladesh have become deadly.(World Bank Group 2016).

Recent studies claim that the annual urban growth rate in Bangladesh stood at 4% in 2010, whereas the present growth in motor vehicles stands at 8%. Consequently, the road systems are experiencing greater congestion, physical deterioration and safety problem. According to World Bank Group only 40% of the main roads (National Highways and the Zila Roads) are in good state.

As citizens, we too have a role to play in ensuring road safety. While travelling in public transports, passengers should protest and stop speeding and reckless driving by bus and taxi drivers. Owners of motor vehicles should ensure that employed drivers have genuine licenses, are properly trained and drive responsibly. Road safety education to pedestrians, especially children, within the communities by community leaders is also a good way to promote road safety. (World Bank Group For Safety Issue,2012).

For a developing country like Bangladesh, allowing its citizen to perish to road accidents is not only tragic but unacceptable. So road traffic accident is an important factor for related amputation in Bangladesh. In this study I found that 65% trauma related amputation in our country. The leading causes of amputation in different countries are influenced by the degree of industrialization, the transportation system, and the medical care available. In Bangladesh it seems that trauma is the leading cause of amputation because of its rapid development into a more industrial and mechanized state and the increase of the volume of traffic, along with its increased speed (World Bank Group 2016).

This is similar to the findings (Lento et al, 2009) who found that traumatic amputation was more frequent than vascular amputations in developing countries compared with developed countries, likely because of the lower incidence of obesity and resultant diabetes in such countries, as well as the higher exposure to farming equipment, which frequently causes limb amputations. Traumatic amputations can result from the use of power saws and other heavy machinery, as well as electrocution or burns. Motor vehicle collisions (including motorcycles), gunshot

wounds from violence, and animal attacks also contribute to traumatic limb amputations.

There are various reports on the causes of amputation differ from country to country.(Sansam et al 2009 reported that trauma accounted for the majority of amputations in India, and dys-vascularity was the predominant cause in most developed countries. Another study stated at the Government Institute of Rehabilitation Medicine, K.K.Nagar in Chennai, that the majority of patients lose their limbs due to road accidents. Amputation due to complications resulting from diabetes was ranked second.

This study compared from another study that from Punjab and Andhra Pradesh and found that the results were consistent. Another study seen similar findings in Kolkata, where amputation caused by trauma accounted for 70.3% of all cases, while peripheral vascular disease accounted for 27.7%, making trauma the undoubted primary cause of amputation in developing country. Trauma related amputation is the major cause of amputation in Bangladesh which is similar of those study.

The other major causes had been Diabetes which leading to ischemic gangrene About 18% patients are related to this cause of amputation.

Another major cause of amputation is PVD leading to non-healing Ulcer and it is about 11% among 100% amputee patients. Congenital anomalies accounted for a lower limb amputation rate of 6% in present study.
This study shows that major lower limb amputation accounts for below knee 70 % and above knee 28% of all amputations. This is similar to the figures reported by (Obalum et al, 2009) and (Lento et al, 2011), which found that lower limb amputations were found more commonly than upper limb amputations.

Now percentage of below- knee amputations with 90% of total lower limb amputations being below knee and 70% of total major lower limb amputations being above –knee leading to Below Knee TO Above Knee amputation ratio of 1.27:1.Similar studies showed a 63% above –knee and 37% below –knee amputation rate at (Naraynsingh et al, 2012).

According to the guidelines and gazette notification issued by Ministry 0f Social Justice and Empowerment on June 13, 2011 , Permanent Physical Impairment (PPI) for various levels of amputation is as follows: below-knee amputation, 70%; through-knee amputation, 75%; above- knee amputation, 85%; below-elbow amputation, 70%; above-elbow amputation, 85%; through-hip amputation, 90%; through-shoulder amputation, 90%; and through-ankle amputation 55%.

Among these amputation there were findings some upper limb amputation. Upper extremity amputations were caused by machinery injuries while lower extremity amputations were caused by trauma. This is similar findings from (Unal et al, 2012).

Among those lower limbs amputations, the most frequent site of amputation was transtibial. This may be because the distal portion of a limb is generally more likely to be injured, and surgeons tend to amputate as distally as possible to enhance functional activity. In amputation cases due to malignancy, however, trans-femoral amputation was most common.(Henry et al,2010).

A look at the statistics of upper limb amputations where major cause or amputation being performed for trauma related cause. The rest of the causes of upper limb amputations were diabetic, PVD, and congenital anomalies each contributing equally towards the total no of upper limb amputations.
Pain occurred in 70% of patients undergoing various amputations. All in all 40 patients had minor wound infection which responded to daily dressing and antibiotics followed by either secondary closure/split skin grafting. 9 patients had contracture of the amputation stump.13 patients had phantom limb sensation.

In the present study, the percentage of the amputation population affected by traumatic cause was 65%, the majority belonging to the age group above 40 years of age. Therefore the functional activity of this age group would be much more reduced than that of the other cause of amputees. Furthermore, it can be said that since the amputation caused by trauma occurred after the age of 40 years, that is, at middle age or working age which create the economic burden caused by amputation would therefore be much less than that related to amputation in patients in their less 20 age

according to the life expectancy to the various developing countries(Henry et al,2016)

For people with limited mobility, environmental barriers include not only physical and structural barriers, such as uneven pavements or poorly lit areas, but also societal and psychological barriers such as discrimination and attitudes, which limit a person's ability to do the things they want to do and therefore drastically reduce the functional competence of the amputation population. In the present study, it was found that trauma was the leading cause of amputation among the middle age group. Hence, productivity at work as well as sense of wellbeing would affect the middle age group more than the younger amputee population. This conclusion was again similar to that of the researchers at Johns Hopkins University (Kumar et al, 2011).

According to the result 90% patients become jobless after amputation like as another developing country (kumar et al.,2014). So it creates a negative effect on their family. Most of amputee patient do not have the knowledge or facilitation of this device. Some patients know this facilitation but had economical problem to get this facilitation.

Hence, it can be concluded that lower limb amputation not only affects people's ability to walk, but may affect their participation in valued activities, their body image perception, and their quality of life, which is significantly associated with mobility. The reduced ability to walk with prosthesis is associated with lower activities of daily living scores and a lower level of social activity

LIMITATIONS

This study has some limitations. Firstly researcher used a structured questionnaire which developed by pilot study. Secondly this study covered only three organizations at Dhaka with relatively small sample sizes. Thus it may not be representative of all amputee patients in Bangladesh. However a larger sample size and better sampling method might result in more conclusive characteristics of amputee patients in Bangladesh.

CHAPTER-VI: CONCLUSION & RECOMMENDATION

6.1 Conclusion

Putting the results of this study together, statistics similar to those from other developing countries were found in this study. Trauma was the leading cause of amputation. A large number of working-age amputees reported being retired due to disability, thus reducing their daily activity mainly in their middle age of life

The functional competence of a large proportion of the population consisting of the middle age group in their which was reduced in either their daily or social activities, which might lead to an increase in the economic burden on the State.We hope that this study on amputees in Bangladesh will shed light on the need to implement more stringent road and rail safety measures. It is important to realize that most amputations occurring as a result of trauma can be avoided. Developing awareness programs for early rehabilitation as well as early prosthetic fitting can prevent the amputee population from becoming a burden on the state.

6.2 Recommendation

The aim of the study was to find out the characteristics of amputee patients Bangladesh. The researcher recommended the following things: Investigator use only 100 participants as the sample of this study, in future the sample size would be more. In this study, the investigator took the participants only from the three selected areas of Bangladesh as a sample for the study. So for further study investigator strongly recommended to include the amputee patient from all over the Bangladesh to ensure the generalizability of this study. Should take more samples for pilot study to establish the accuracy of the questionnaire.

As an undergraduate study it was very limited for much information and further study at graduate level in same title will give more accurate output. It was some limitation of the study mentioned at relevant section. It is recommended by researcher to overcome those limitations during further study.

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Appendix

Consent Form

Assalamualaikum

I am Sharmin Rima, 4th Professional, B.Sc. in Physiotherapy student at Bangladesh Health Professions Institute (BHPI) under the Faculty of Medicine, University of Dhaka. To obtain my Bachelor degree, I have to conduct a research project and it is a part of my study. My research title is "Characteristics of Amputee patients in Bangladesh". I want to find out the economic, social and family status of amputee patients in Bangladesh. To fulfill my research project, I need to collect some information. So, you can be a respected participant of this research hand the conversation time will be 10-15 minutes. I would like to inform you that this is a purely academic study and will not to be used for any other purposes. I assure that all data will be kept confidential. Your participation will be voluntary. You may have the rights to withdraw consent and discontinue participation at any time of the experiment. You also have the rights to reject a particular question that you don't like to answer.

If you have any query about the study, you may contact with my supervisor Firoz Ahmed Mamin**,** Dept. Of Physiotherapy, BHPI, CRP, Savar, Dhaka-1343**.**

Do you have any questions before I start?

So, I can proceed with the interview.

Yes: ☐ No: ☐

Signature of the participant and Date…….

Participants address…… Contact number……..

Researcher signature and date……

Signature of the witness…….

Questionnaire –English

Title: Characteristics of Amputee patients in Bangladesh.

Part-1: Patient's Identification	
1.1	Patient code:
1.2	Date of data collection:
1.3	Patient's Age:

Part-2:Socio Demographic Information

QN	Questions	Responses	Code
2.1	Gender?	Male	01
		Female	02
2.2	Living area	Urban	01
		Rural	02
		Suburb	03
2.3	Educational level	No formal education	01
		Primary	02
		Secondary	03
		H.S.C	04
		Bachelor degree or other	05
2.4	Number of family member		
2.5	Number of earning member		

2.6	Who is the earning member?		

2.7	Employment (Before amputation)		
2.8	Employment(After amputation)		
2.9	Monthly earning(Before amputation)		
2.10	Monthly earning (After amputation)		
2.11	Marital status	Yes	01
		No	02
2.12	Smoker:	Yes	01
		No	02
2.13	Cause	Road traffic accident	01
		Fall from height	02
		violence	03
		Vascular	04
		Diabetic neuropathy	06
		Congenital anomalies	07
		Others	08
2.14	If there any accidental cause?	Yes	01

		No	02
2.15	Date of accident		
2.16	Since your surgery how many days have been passed?		

2.17	Why do you come too late to take this prosthetics device?	Unknown Poverty Family problem Others.	01 02 03 04
2.18	Expenditures of this prosthetics device	12-20 Thousand 20-30 Thousand 30-50 Thousand	01 02 03
2.19	Who is bearing the cost of device?		
2.20	Level of amputation:	Upper limb	01
		Lower limb	02
2.21	Area of amputation		
		Above elbow	01
		Below elbow	02
		Through shoulder	03

		Through hip	04
		Above knee	05
		Below knee	06
		Through knee	07
		Through ankle	08
2.22	Type of amputation	Unilateral	01
		Bilateral	02
2.23	Is there any complication present?	Yes	01
		No	02
2.24	Which type of Complication?	Pain Contracture Adhesion Phantom pain Loss of sensation	01 02 03 04 05

		Decrease muscle power	06
2.25	Treatment received after amputation	Doctor/Surgeon	01
		Therapist	02
		Prosthetist and orthotist	03
		Traditional hiller	04
		Others	05
2.26	Who suggested you to keep this prosthetics device?	Self	01
		Doctor	02

		Surgeon	03
		Therapist	04
		Others	05
2.27	Exercise received after amputation	Yes	01
		No	02
2.28	Any rehabilitation programme received	Yes	01
		No	02

আসসালামু আলাইকুম,

আমি শারমিন রীমা , ৪র্থ পেশাগত,weGmwm Bb wdwRI‡_ivwc এবং evsjv‡`k †nl_ cÖ‡dmÝ BÝwUwUDU(weGBPwcAvB),ঢাকা বিশ্ববিদ্যালয়ের মেডিসিন অনুষদের অধীনে একজন ছাত্রী।আমার ব্যাচেলর ডিগ্রীপ্রাপ্তীর জন্য, আমার একটি গবেষণা প্রকল্প পরিচালনা করতে হবে এবং এটা আমার পড়াশুনার একটি অংশ।আমার গবেষণা প্রকল্পটির শিরোনাম Òবাংলাদেশে অ্যামপুটি রোগীর বৈশিষ্ট্য Ó।এই গবেষণার মাধ্যমে আমি Òবাংলাদেশে অ্যামপুটি রোগীর পারিবারিক ও সামাজিক এবং অর্থনৈতিক অবস্থা পর্যবেক্ষন করব।আমার গবেষণা প্রকল্প পূরণ কল্পে, আমার কিছু তথ্য সংগ্রহ করা প্রয়োজন।সুতরাং, এই গবেষণার জন্য অংশগ্রহণকারীর সম্মতি প্রয়োজন এবং ত¨ সংMÖ‡ni Rb¨ M‡elK AskMÖnbKvixi KvQ †_‡K ১০-১৫ wgwbU mgq †b‡e।আমি আপনাকে অবহিত করছি যে এটি একটি একাডেমিক গবেষণা এবং অন্যকোন উদ্দেশ্যে ব্যবহার করা হবেনা।আমি আশ্বস্ত করতে চাইযে,সব তথ্য গোপন রাখা হবে।AskMÖnbKvix †h †Kv‡bv gyn~‡Z© m¤§wZ cÖZ¨vnvi Ki‡Z cv‡ib, এছাড়াও আপনি যেটি পছন্দ করেন না সেটা উওর না দেওয়ার অধিকার আছে।আপনি গবেষণার একজন অংশগ্রহণকারী হিসেবে কোনো প্রশ্নে থাকলে, তাহলে আপনি আমার সুপারভাইজার ফিরোজ আহমেদ মমিন,(সহকারি অধ্যাপক ফিজিওথেরাপি বিভাগ;evsjv‡`k †nl_ cÖ‡dkÝ BÝwUwUDU, wmAviwc,সাভার , ঢাকা-১৩৪৩) এর সঙ্গে যোগাযোগ করতে পারেন ।।

শুরু করার আগে আপনার কি কোন প্রশ্ন আছে?

সুতরাং, আমরা ইন্টারভিউর দিকে এগিয়ে যেতে পারি। 22

হ্যাঁ ☐ না ☐

অংশ গ্রহণকারী স্বাক্ষর ও তারিখ .....

অংশহগ্রহনকারীর ঠিকানা.....

অংশহগ্রহনকারীর যোগাযোগ নং.....

গবেষকের স্বাক্ষর ও তারিখ .....

স্বাক্ষীর স্বাক্ষর.....

প্রশ্নাবলী- বাংলা

শিরোনাম: বাংলাদেশে অ্যামপুটি রোগীর বৈশিষ্ট্য

অংশ -১: রোগীর পরিচয়	
১.১	রোগীর কোডঃ
১.২	সাক্ষাতকার গ্রহন তারিখ :
১.৩	রোগীর বয়স:

অংশ২ : সামাজিক ও জনসংখ্যা ভিত্তিক তথ্যবলী

প্রশ্ন নং	প্রশ্ন	উত্তর	কোড
২.১	লিঙ্গ	ছেলে	০১
		মেয়ে	০২
২.২	বাসস্থান	শহর	০১
		গ্রাম	০২
		উপশহর	০৩
২.৩	শিক্ষাগত যোগ্যতা	নিরক্ষর	০১
		স্বাক্ষরজ্ঞান	০২
		প্রাইমারি	০৩
		উচ্চ মাধ্যমিক শিক্ষা	০৪
		এইচ .এস. সি	০৬
		ডিগ্রী/øvZ‡KvËi	০৭
২.৪	পরিবারের সদস্য সংখ্যা		
২.৫	পরিবারে উপার্জন ক্ষম ব্যাক্তির সংখ্যা		

২.৬	উপার্জনকারী ব্যাক্তি কে?		
২.৭	পেশা (অঙ্গহানির আগে)		
২.৮	পেশা (অঙ্গহানির পরে)		
২.৯	মাসিক আয়(অঙ্গহানির আগে)		০১
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		না	০২
২.১২	ধূমপায়ী	হা	০১
		না	০২
২.১৩	কারণ	সড়ক দূর্ঘটনা	০১
		উপর থেকে পড়া	০২
		মারামারি	০৩
		রক্তনালী জনিত সমস্যা(ভাস্কুলার)	০৪
		স্নায়ুবিক সমস্যা(ডায়াবেটিক নিউরোপ্যাথি)	০৫
		অন্যান্য	

২.১৪	কোন দূর্ঘটনা ঘটেছিল কি?	হা	০১
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২.১৫	দূর্ঘটনার তারিখ		
২.১৬	সার্জারীর কতদিন পর আপনি কৃত্তিম অঙ্গ সংযোজন এর জন্য এসেছেন?		
২.১৭	এতদেরি করে কৃত্তিম অঙ্গ সংযোজন এর জন্য আসার কারন কি?	জানা নেই দারিদ্রতা পারিবারিক সমস্যা অন্যান্য	০১ ০২ ০৩ ০৪
২.১৮	কৃত্তিম অঙ্গটি প্রতিস্থাপন এর খরচ কত	১২-২০ হাজার ২০-৩০ হাজার ৩০-৫০ হাজার	০১ ০২ ০৩
২.১৯	কে খরচ বহন করছে কৃত্তিম অঙ্গটি সংযোজন এর জন্য		
২.২০	আমপুটেশন এর অংশ	শরীরের উপরের অংশ শরীরের নিচের অঅংশ	০১ ০২

২..২১	আমপুটেশন এর ক্ষেত্র	কনুই এর উপরে	০১
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২.২৩	কোন জটিলতা আছে কিনা?	হা	০১
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২.২৪	কোন ধরনের জটিলতা?	ব্যাথা সংকুচিত হয়ে যাওয়া অস্বাভাবিক কোষ বেড়ে যাওয়া (এডহেশন) অনুপুস্থিত অঙ্গ অনুভব করা অনুভূতি অনুপস্থিত	০১ ০২ ০৩ ০৪ ০৫ ০৬

		মাংশপেশির শক্তি কমে যাওয়া	
২.২৫	চিকিৎসা যার কাছে নিয়েছেন অজ্ঞানির পরে?	চিকিৎসক/ সার্জন	০১
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		কবিরাজ	০৪
		অন্যান্য	০৫
২.২৬	কৃত্তিম অঙ্গটি সংযোজন এর জন্য কে পরামর্শ দিয়েছেন	নিজে থেকে	০১
		চিকিৎসক/ সার্জন	০২
		থেরাপিস্ট	০৩
		অন্যান্য	০৪
২.২৭	অ্যামপুটেশন এর পর কোন থেরাপি নিয়েছেন কিনা	হা	০১
		না	০২
২.২৮	কোন পুনার্বাসন প্রকল্পে ছিলেন কিনা	হা	০১
		না	০২