

Introduction

Knee replacement operation is the replacement of a severely damaged knee with an artificial joint. Indications for this operation include arthritis, connective tissue disease, failed prior procedures, sepsis, tumor, Paget's disease, trauma and severe varus or valgus deformity (*Mikyoung, 2008*).

Knee replacement operation aims at relieving chronic pain, improving joint motion, correcting deformity and malalignment, and removing intraarticular causes of erosion. The procedure is cost-effective and has been shown to improve health-related quality of life. There is evidence that outcomes are better if operation occurs early in the course of functional deterioration and the patient receive health education before the operation (*Basavanthappa, 2009*).

Over one million total knee replacements are implanted every year in the world (*Fielden & Scott, 2010*). Knee replacement surgery is one of the most important surgical advances of the last century. Today, more than 600,000 knee replacement procedures performed in the United States (*American Academy of Orthopedic Surgeon, 2012*). In Egypt, according to statistics from the information center at El-Demerdash Surgical hospital, it was recorded that, the number of cases admitted to El-Demerdash Surgical hospital for knee replacement operation in the year 2012 was 220 patients (*Statistical records of El- Dmrdash Surgical Hospital, Orthopedic Departments, 2012*).

Patients undergoing knee replacement operation need health care information to participate actively in and assume responsibility for self-care (*Mary & Eileen, 2008*). Health education can help those patients adapt to their condition, prevent complication, carry out prescribed therapy, and solve problems when confronted with new situation and reduce the potential for hospitalization resulting from inadequate information about self-care. The goal of health education is to teach patients to live life to its healthiest that is, to strive toward achieving their maximum health potential (*Urden, Stacy, & Lough, 2014*).

One of the goals of patient education is to encourage patients to compliance with their therapeutic regimen. Compliance is the extent to which a person's behavior aligns with medical or health advice. Most commonly it refers to medication compliance, but can also apply to other medical instructions, use of self care or self directed exercise, pain and stress management strategies (*Hinkle & Cheever, 2014*).

The role of nurse to help patients continually maintain and improve their compliance regarding medical instructions is necessary to modify self image, to revise routines of daily living and to cope with the effects of health deviations based on patient education (*Sandell, 2008*).

Formal educational programs provide patients undergoing knee replacement operation with effective strategies for acquiring knowledge and skills needed for problem solving as well as building self efficacy. Self efficacy plays an important

role in patients' performance to achieve desired outcomes according to their treatment plan (*Stuart & Laraia, 2008*).

Significance of the study:-

Knee replacement operation can cause functional limitation, disability, social and psychological problems for patients. The success of the operation will depend largely on how well patient follow orthopedic surgeons' instructions at home during the first few weeks after surgery (*Romant, Niedringhous, & Towel, 2012*).

From the clinical experience and observation for the actual situation, it is obvious that, patients undergoing knee replacement operation always readmitted to hospital with complications such as dislocation of the knee prosthesis, infection, thromboembolism, excessive wound drainage, leg length inequality, complication associated with immobility, social and psychological problems. Moreover, patients underwent knee replacement operation suffer from low self efficacy that contribute to diminished quality of life, increase morbidity and mortality after operation.

Therefore, it is necessary to develop an educational program for patients undergoing knee replacement in order to empower the patient and family with the needed knowledge and skills necessary for optimal safe performance, and enhancing their compliance and self efficacy.

Aim of the Study

This study aims to determine the effect of educational program on compliance and self efficacy of patients undergoing knee replacement operation through the following:

- 1- Assessment of compliance and self efficacy of patients undergoing knee replacement operation.
- 2- Developing and implementing educational program.
- 3- Evaluating the effect of educational program on compliance and self efficacy of patients undergoing knee replacement operation.

Research hypothesis:

The current study hypothesized that:

The implementation of the educational program will have positive effect on compliance and self efficacy of patients undergoing knee replacement operation.

Knee Replacement Operation

Knee replacement operation, also called knee arthroplasty, involves removing a diseased knee joint and replacing it with an artificial joint, called prosthesis. Knee prostheses consist of femoral component and tibial component, made of metal, ceramic or plastic materials (*Mayo, 2010*).

Knee replacement is reconstruction or replacement of severely damaged knee with an artificial joint. This procedure is usually reserved for the client has severely restricted knee joint mobility and pain at rest. Knee replacement may involve partial replacement of knee joint that is the most common performed either than total knee replacement (*Nettina, 2010*).

Knee replacement is performed to restore motion and function of the joint and its surrounding structures (muscles, ligament, and soft tissues) that control it. There are several types of knee arthroplasty, including replacement of part of the joint (hemiarthroplasty, surgical reshaping of the bones of the joints, and total joint replacement (*Timby & Smith, 2011*).

Indications for knee replacement operation involve; degenerative joint disease (DJD) that refers to chronic osteoarthritis of the knee and that is the most common reason for a knee replacement. Other conditions that can cause destruction of the knee joint include osteonecrosis (loss of the blood supply to the end of the thigh or head of the tibial bone),

rheumatoid arthritis, and trauma (*American Academy of Orthopaedic Surgeons, 2012*).

Contraindications for knee replacement operation include; recent or active joint sepsis except in joint revision due to infection, an inability to cooperate with immediate postoperative requirements or long-term joint rehabilitation. In addition, bad patient's general health that doesn't allow tolerance of anesthesia, blood loss, and surgical stress. As well as unstable heart, lung, and liver functions may be posing the surgery (*White, 2009*).

According to **Mohammed (2009)** factors that should be taken into consideration when taking the decision of knee arthroplasty are; age, patient co- morbidities, knee condition, patient expectation, satisfaction and rehabilitation.

Age: In fact, the elderly accounts for the largest proportion of patients who are undergoing a knee arthroplasty. Among ailments that elderly suffer, activity limitations by arthritis, fractures, and other musculoskeletal conditions are very common. Knee joint replacement patient age average is around 65-70 years old; however patients of all ages have received knee implants (*Parsons & Sonnabend, 2008*).

Patient comorbidities: Patient with fewer comorbid conditions is more likely to be recommended for knee replacement as it tends to report fewer complications. Stabilization of all patient comorbidities preoperatively before consideration or recommendation of knee joint replacement

should be undertaken by patient's primary care physician. Also knee joint condition is considered an important factor in patient outcome, because it will affect the success of operation (*Center of disease control & prevention, 2010*).

Patient expectation and satisfaction: psychological factors have been found to be very important predictors in the success of operation and patient satisfaction. Patient with realistic expectation of the potential outcome reported greater satisfaction. Therefore, the potential postoperative problems and complications must be discussed thoroughly with patient before the conversion to surgery (*Lewis, Heitkemper, Dirksen, Brien, & Bucher, 2007*).

Ideally, *rehabilitation* of the patient should begin preoperatively through general physical conditioning and education. Patients should understand before going into the surgery that knee function after knee replacement is not that of a normal knee (*Joint Reconstruction Center of Georgetown University, 2011*).

An organized approach to diagnosis is essential to differentiated osteoarthritis (OA) from other degenerative joint diseases which include but are not limited to rheumatoid arthritis, psoriatic arthritis, gout, bursitis, and tendinitis (*Mahmoud, 2010*). To increase sensitivity and specificity of the OA diagnosis, the American college of rheumatology recommended that data should be gathered before joint

replacement operation includes clinical, laboratory, and radiographic examination (*Sloan & Ruiz, 2009*).

Clinical data should be established from a complete history and musculoskeletal physical examination of the lower extremities. The patient history should include characteristics of pain, onset and duration of joint stiffness, incidence of knee locking or giving away, prior joint injuries, and occupational or lifestyles demands placed on knees. Any familial osteoarthritis, medications use and alleviating or aggravating factors should also be noted (*Jacobsen & Myerscough, 2008*).

Physical examination of the patient should not be limited solely to the knee joint. Radiating pain from other areas including the lower back, hip, ankle, should be considered. Both knee joints should be compared for symmetry, size, shape, color, appearance, movement, and pain. The physician should inspect the surrounding soft tissue and bursal areas as well, to exclude periarticular disease (*Lewis, Dirksen, Heitkemper, Bucher, & Camera, 2011*).

Physical examination of the affected area may demonstrate tenderness, bony enlargement, limited range of motion, misalignment, joint instability and gait disturbance. Difficulties in rising from a chair and climbing stairs, as well as reduced

ambulation speed, are often observed in patients with knee disorders (*Lemone & Burke, 2008*).

Palpation of the knee can elicit significant findings such as; crepitus during passive range of motion, especially extreme flexion. Almost of patients with atrophy in knee joint have varus deformities due to cartilage loss in medial compartment (*Sloan & Ruiz, 2009*).

Radiographic examination: Electrocardiogram is usually done 2-4 weeks before the surgery so that abnormalities can be further evaluated and treated. X-rays are taken to allow the surgeon to see if there is a problem with bony structure of knee joint, show cyst formation or sclerosis and also used to help the surgeon plan the knee replacement surgery (*Creasey, 2007*).

Arthroscopy of the knee is a minimally invasive, outpatient procedure that is relatively uncommon. The doctor may recommend it if the knee joint shows evidence of torn cartilage or loose fragments of bone or cartilage (*Center for Joint Preservation & replacement, 2007*).

Ultrasound computed tomography, and magnetic resonance imaging (MRI) may show more extensive joint details. Although, changes in soft tissue and cartilage are better

visualized by MRI than by radio graphs and MRI is more sensitive for picking up early bone changes, it remains too costly for routine use (*Felson & Mclaughlin, 2011*).

Laboratory examination: Complete blood count, kidney, liver function and serum electrolytes should be assessed before joint replacement surgery. Also cross matching of blood may be required for a possible transfusion (*Anderson, 2009*).

Surgical procedures: knee implants usually lasts about 2 hours. The patient is placed in a supine position with knees slightly bent. A 4" to 6" inches midline incision is made to access the knee joint. Part of the kneecap is removed; tendons and leg muscles are moved to the side. Sometimes the surgeon must cut into the knee tendon or muscle. Damaged cartilage and bone from the femur and tibia are removed and rough knee areas are smoothed (*Truner, 2011*).

Next, the implant parts are measured and prepared for placement. The upper part fits into the femur; the lower part fits into the tibia. The resurfaced kneecap fits over the front of the implant and may be secured with screws or cement (*Coughlin, 2008*).

Then knee muscles and other tissues around the joint are moved back into place. A plastic liner is inserted between the femur and tibia to help the parts move smoothly. A drainage tube may be placed to drain blood and fluids away from the knee, because accumulation may lead to infection. Typically, the tube is removed 24 hours after surgery. Finally, the incision is closed with staples (to be removed in 10 to 14 days) and covered with a bulky dressing (*American association of hip & Knee Surgeons, 2011*).

Components of the knee implant consist of the distal (lower) end of the femur and proximal (upper) end of the tibia are excised. The tibial and femoral components are metal with a plastic tray (*Nancy, 2007*). Each part comes in various sizes depends on many factors, including; patient's age, weight, bone quality, activity level, and health (*Karen, (2008)*).



Figure (1): Artificial knee joint. Adapted from: **American Academy of Orthopedic Surgeons, 2012**

Types of artificial joint may be cemented or cementless depending on type of fixation used to hold the implant in place. All of them have likelihood of success or failure. Cemented knee prostheses over the past 40 years, there have been many improvements in both the materials and the methods used to hold the femoral and tibial components in place. Today, the most commonly used bone cement is an acrylic polymer called polymethylmethacrylate (*William, 2012*).

A patient with a cemented knee can put full weight on the limb and walk without support almost immediately after surgery, resulting in a faster rehabilitation. It is more commonly recommended for the following patients: elderly, rheumatoid arthritis, and younger with compromised health or poor bone quality and density (*Taylor, Lillis, & Lemon, 2009*).

Although cemented implants have a long and distinguished track record of success, they are not ideal for everyone. In the cement that occurs over time causing the prosthetic stem to loosen and become unstable. This occurs more often with patients who are very active or heavy. So the patients are less likely to put stresses on the cement that could lead to fatigue fractures (*Linton, 2009*).

Cementless knee prostheses include new implant designs were introduced to attach directly to bone without the use of cement. In general, these designs are larger and longer than those used with cement. They also have a surface topography that is conducive to attract new bone growth. Cementless implants depends on new bone growth for stability and requires a longer healing time than cemented replacements (*Aorn, 2008*).

Although some orthopedic surgeons now using cementless devices for all patients. Cementless knee prostheses are most often recommended for younger, active patients with good bone quality where bone in growth into the components can be predictably achieved. Although certain cementless stem designs have excellent long-term outcomes. But cementless stems can loosen if a strong bond between bone and stem is not achieved (*Louise, 2006*).

Medical management for patients undergoing knee replacement operation varies according to the anatomical patterns of the disease and the degree of joint deformity. The guide lines divide the treatment strategy into pharmacological and non pharmacological modalities (*Doherty & Lanyon, 2011*).

Non-pharmacological therapies, including reduced activity, weight reduction if the patient is overweight, therapeutic exercises, and joint protection guidelines are important initial steps in managing patients (*Marshall & Waddell, 2008*).

Pharmacological management must be individualized to fit the circumstances and needs of each individual patient. It should be based on careful assessment of symptom severity, comorbid conditions (e.g. hypertension, diabetes mellitus or kidney disease), concomitant therapy, side effects, and costs of therapy, and patient preferences (*Grainger & Cicuttini, 2010*).

Anti-inflammatory Medications: arthritis pain is primarily caused by inflammation in the knee joint. Reducing inflammation of tissue in the knee can provide temporary relief from pain and may delay the surgery (*Doherty & Lanyon, 2011*).

Prophylactic antibiotics before surgical procedure of knee replacement, are recommended, also antibiotics are appropriate for patients at risk of experiencing hematogenous joint infection, such as those with immunocompromised status (e.g., rheumatoid arthritis, systemic lupus erythromtosis) and those with comorbidities (e.g., previous prosthetic joint infection,

malnourishment, hemophilia, human immunodeficiency virus infection) (*American Collage of Physicians, 2013*).

Immunosuppressive medications which are used around the time of surgery are preferred for some patients undergoing knee replacement, because they suppress the immune system to prevent rejection of artificial joint (*Anderson, 2009*).

Complications of knee replacement: the most common postoperative complication is subluxation (partial or total dislocation). Dislocation occurs when the femoral component becomes dislodged from the knee cup. The patient experiences increased knee pain, shortening and possible rotation of the surgical leg (*Williams & Hopper, 2011*).

Another potential complication is *infection* at the incision site which characterized by a dull ache or unusual or persistent pain. Early signs include fever, redness, swelling, or drainage at the surgical site and increased pain (*Foerg & Repp, 2009*).

Thromboembolic complications; thromboembolic disease is one of the most common and most dangerous of all complications occurring in the postoperative orthopedic patients undergoing knee replacement surgery. Elderly patients are especially at risk because of compromised circulation.