

CHAPTER 2

LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

Literature review

The literature related to quality of life among traumatic amputees was reviewed and presented in the following categories:

1. Amputation
 - 1.1 Traumatic amputation
 - 1.2 Level of amputation
 - 1.3 Complications of amputation
2. Quality of life
 - 2.1 Definition of quality of life
 - 2.2 Measurement of quality of life
 - 2.3 Factors affecting the quality of life
3. Impact of amputation on the quality of life

Amputation

Amputation is the surgical removal of all or part of a limb which is damaged or diseased beyond repair (Patric, Wood, Roskosky, Bruno & Graves, 1991). The destruction of a limb can be caused by many factors, yet the majority of causes are the following five factors: (1) peripheral vascular diseases such as Buerger's and Raynaud's disease (2) external force or traumatic injury such as motor-vehicle accidents, fall, war injury, explosions; (3) malignant tumors

(4) long-standing infections of bone and tissue that prohibit restoration of function such as diabetes mellitus
(5) congenital disorders such as deformity of a limb.

However no matter what causes amputation, to most people, amputation has a very negative implication (Patric, Wood, Roskosky, Bruno & Graven, 1991). It has a significant impact on all aspects of the life of the amputees (Medhat, Patricia & Mobaneed, 1990). Nevertheless different causes may have different impacts on different aspects of quality of life. The traumatic amputation usually occurs suddenly. Such amputees may have more problems compared with other kinds of amputees. So for this study the researcher focuses on traumatic amputation.

Traumatic amputation

Traumatic amputation is usually life threatening. It is caused by a variety of incidents including motor-vehicle accidents, crush accidents, falls, burns, war injuries, gunshot wounds, frostbite, and explosions (Brown, 1990). In a partial amputation, this injury may incur extensive bleeding; traumatic amputation is sustained when a limb becomes completely detached from the body. Depending on the location and mechanism of injury, up to 1 liter of blood may be lost following total amputation (Brown, 1990). Traumatic amputation frequently happens to men than women due to trauma (Verdell, 1992).

Level of amputation

The level of amputation for either lower or upper extremities should never be higher than absolutely necessary. Because the percentage of energy expenditure by the amputee increases with each higher level of amputation (Luckmann and Sorensen, 1980). Specific amputation levels for lower extremities are as follows:

1. Hip disarticulation: means amputation through the hip or pelvis due to massive injuries, bone or soft tissue tumors. Flaps are fashioned so that they will come together anteriorly and the posterior flap is constructed so that it forms a unit of skin.

2. Above knee amputation: this level has been selected when lesion extends above the level of the malleoli. The site of amputation is usually in the mid or distal thigh. Either a circular skin incision or equal anterior and posterior flaps are developed. Bone division is performed at a level proximal enough to permit a transverse fascial and skin closure.

3. Knee disarticulation: means the bones separated at the knee. This is most commonly employed in children in whom there is a reason for maintaining the epiphysis for bone growth. It provides maximal length and good end bearing and lends itself to a good fit between stump and socket.

4. Below knee amputation: major functional advantages of below knee amputation over the above knee level are the ability to provide a more functional prosthesis for complete rehabilitation. It constitutes the level of choice that does not extend above the malleoli. The

amputation should be performed proximal to the lower third of the tibia.

5. Syme amputation: this procedure is performed when most of the foot has been destroyed by trauma. It represents an excellent level for amputation since it maintains the length of the extremity, preservation of the heel skin provides an excellent weight-bearing stump (Schwartz, Shires, and Spencer, 1989).

The most commonly employed procedures are above-knee and below knee amputation (Schwartz, Shires, and Spencer, 1989). Amputations of the lower extremities are performed more frequently than amputations of the upper extremity (Verdell, 1992). The most frequent indication for amputation of the lower extremity is disease. The most common indication for amputation of the upper extremities is severe trauma (Luckmann and Sorensen, 1980).

Amputation levels for the upper extremities are as follows:

1. Wrist disarticulation: means the bone separated wrist. This level preserves greater length and provides better prosthesis control than amputation that is proximal to the wrist joint.

2. Below-elbow amputation: means the arm is amputated below the elbow. For this procedure, skin flaps should not be dissected extensively from the fascia in order to avoid excessive scarring and immobility of skin. Skin should be incised with the level of bone section and skin flaps should be formed with bone and muscle section.

3. Elbow disarticulation: The flaps are created as in the way of below elbow amputation so that the closure of skin and fat will not lie directly over the fascial incision. The epicondyles are removed, and the cartilage is excised from the end of the bone. All the muscles are sutured over the end at rest length.

4. Above elbow amputation: means the arm amputated above the elbow. Every attempt should be made to preserve as long a stump as possible. Since the longer the stump, the greater the applicability of subsequent cine plastic procedures for functional prosthesis (Schwartz, Shires, and Spencer, 1989).

Complications of amputation

There are many complications from amputation such as hemorrhage, hematoma, stump edema, skin complication, infection, leg stump breaking, stump swelling, wound pain, phantom limb sensation and phantom pain, and contracture of the joint (Medhat, Patricia, and Mohaneed 1990).

The majority of new amputees experience the peculiar sensation that their amputated limb is still present. This sensation may or may not be painful. The pain can be stump pain and phantom pain. Stump pain and phantom pain is an obstacle to the use of an artificial limb, and are the cause of refusing or limiting stump movement. This problem affects functional ability (Danaidutsadeekul, 1999).

Phantom pain is pain that occurs in nonexistent limbs (Rounseville, 1992). This pain is like a cramping, crushing, burning, or shooting pain. It may disappear within

hours following amputation or may continue for years. There is no cure or treatment for phantom limb sensation and pain because the true cause of this can not be clearly identified (Ignatavicius, Workman, and Mishler, 1995). Some reports explained that it was the result of activities of the central nervous system, but in general mental status was believed to be the cause (Banerjee, 1982). It is also believed from some reports that severe pain and phantom pain have a relationship with severity and duration of pain before amputation (Livingston, Keenan, Kim, and Elcavage 1994). However it is helpful to warn patients about phantom limb sensation prior to amputation and to reassure them that these sensations are normal (Luckmann and Sorensen, 1980). The possibility of an operative wound infection is present for any type of amputation procedure.

Stump pain is the pain in tissues adjacent to the amputation which is often associated with phantom pain. However, it is not necessarily related to phantom pain. Patients who have phantom pain usually experience some stump discomfort with their phantom pain, but some patients have phantom pain without stump pain.

Contracture of leg stump is a complication found at hip and knee joints in below knee and above knee amputees. It can be caused by imbalance of muscle tension caused by some muscle dissection and wrong position in lying, sitting, standing and general movement. It is an obstacle for putting on prosthesis.

Serious complications may also develop because of rigid dressing and early ambulating program such as skin

breakdown and wound disruption, which will limit putting on the prosthesis. Amputees may experience different complications at different times. In the early stage, the complications that are more severe and cause more suffering are pain, wound infection, phantom sensation and pain, and contracture of the joint. However amputees may have skin breakdown, phantom pain, stump infection which may cause a reamputation due to unhealed wound. These complications may occur even after several months or years after amputation.

In summary, traumatic amputation is a crisis event of life, although it is necessary to save life and remove the destroyed limb. Traumatic amputation accounts for the bulk of all amputation. Limbs can be amputated by using different procedures and at different levels. However no matter what cause the amputation, and what the level is, amputation is permanent, it has significant impact on an individual's life on physical, psychological and social aspects which strongly influence the quality of life of amputees.

Quality of life

Definition of quality of life

The term quality of life and its various synonyms have been widely discussed in social science, psychological, medical and nursing literature. Since the 1970s, quality of life has emerged as a common term in literature (Flanagan, 1982).

The concept of quality of life can be traced back to the ancient western philosopher Aristotle. He described "Happiness as a certain kind of virtuous activity of the soul". Happiness was a God given blessing; therefore, a happy man lives well and does well (McKeon, 1947; cited in Zhan, 1992). Quality of life is viewed as well-being and life satisfaction (Hicks, Larson, and Ferrans, 1992; Anderson, 1995; cited in Zhang, 1998). It has commonly been defined in term of happiness or satisfaction. Quality of life is defined as a person's sense of well being that stems from satisfaction or dissatisfaction with the areas of life that are important to him /her (Ferrans and Power, 1992). Zhan (1992) defined quality of life as the degree to which a person's life experiences are satisfying.

Quality of life has been viewed as either unidimensional or multidimensional. In the unidimensional view people are asked to evaluate their quality of life by using one global indicator of well being, this indicator being valid and reliable (Frank-Stromborg, 1992). The multidimensional view states that people evaluate their quality of life based on a number of criteria. Zhan (1992) viewed concept of quality of life as multi-dimensional and context-related since human experiences are dynamic and complex.

The concept of quality of life has been defined in purely objective terms by measuring such items as income, employment, education, physical function, housing and purity of air (Frank-Stormborg, 1992). However many research findings suggest the necessity measuring quality of life

from the individual themselves to capture the subjective sense of well-being (Campbell, Converse, and Rodgers, 1976). Ferrell, Grand and Rhiner (1990) explained that quality of life was an individual's subjective evaluation of the positiveness and negativeness of attributes that characterize one's life. Several researchers have attempted to measure both the objective and subjective dimensions that bear on the quality of life (Campbell, Converse, and Rodgers, 1976; Crandall and Putnam, 1980). However Ebersole (1995) stated that quality of life must be personally defined.

In summary, quality of life is defined differently in different studies. For this study, amputation is perceived as one kind of disability, causing a change of life style, change of role, change of level of independence which affects a person's ability to meet personal responsibilities involved in work, social interaction, daily living and personal needs. All these affect life satisfaction and economic income. Thus Zhan's concept will be appropriate because it captures all the dimensions of life that amputees may experience. Thus, quality of life refers to the degree to which a person's life experiences are satisfying that can be assessed by self-evaluation.

Measurement of quality of life

In modern history, the assessment of quality of life came into the research field in the early 1960s; and health related quality of life assessments became popular a decade

later (Flanagan, 1982). There are several instruments for measuring quality of life as follows:

Early attempts to measure quality of life in patients focused on one dimension of the patient's life, the ability to perform activities of daily living (ADL). Karnofsky and Burchenal (cited in Frank-Stormborg, 1992) developed a scale that rates physical activity from 1 percent in increments of 10 percent. Although designed as an objective measure of quality of life, one researcher used this scale as a subjective tool, and with it patients evaluated their own physical status. This instrument is not suitable for this study because it just rates physical activities for conclusion of the quality of life that does not cover all the dimensions of life experience the amputees have.

Quality of Life Index developed by Spitzer et al (1981, cited in Frank-Stormborg, 1992) measures health but also family support, activities of daily living and outlook. The range of scale is 0 to 10, and it takes about 1 minute for the health professional to complete. This instrument left out the psychological, social, economic aspects which are important for amputees' life, so this instrument is not appropriate for this study.

Padilla, Ferrell, Grand and Rhiner (1980) developed a subjective self-evaluation quality of Life index questionnaire (QLI). It was composed of 14 linear analog scale items. Quality of life was viewed as a broad concept, and divided into three general areas: psychological well-being, physical well-being, and symptom control. The QLI was tested

with four subject groups: oncology outpatients receiving chemotherapy or radiation therapy, oncology inpatients receiving chemotherapy, and non-patient volunteers. However this instrument does not include social, economic and family dimensions which does not capture all the dimensions of the life the amputees experience.

Ferrans and Power Quality of Life Index (1993) was developed to measure the quality of life of healthy people as well as those who are experiencing an illness. There was 35 items on this instrument that assess 18 areas, including life goals, general satisfaction, stress, physical health. The instrument consisted of two sections. One section measures satisfaction with various domains of life, and the other measures the importance of the domain to the subject. This instrument was mainly used to assess the quality of life of cancer patients. It focused on satisfaction and importance of the life people experienced. However it left out self-concept which is very important for the amputees with the body-image alternation.

Zhan (1992) described four important dimensions which were essential for assessing quality of life:

1. Life satisfaction: referred to life as a whole rather than to specific domains of life experience. Life satisfaction was responsive to changes in external conditions.

2. Self-concept: defined as the composite of beliefs and feelings that one holds about oneself at a given time. These beliefs and feelings were primarily formed from perceptions, particularly of others' reactions.

3. Health and functioning: one of the most commonly measured domains in quality of life research in nursing and medicine. Physical well being was viewed as an objective indicator of the quality of life.

4. Socio-economic factors: this dimension was important to the quality of life because it determined people's places in the operational structure. Socio-economic status may be related to psychological well-being. Socio-economic status was defined in terms of a standard sociological paradigm consisting of three components: occupation; education; and income.

According to Zhan, Quality of Life Questionnaire included four dimensions: life satisfaction, self-concept, health and functioning and social-economic factors was developed by Uppalabut in 1994. It was a 60 item five point rating scale, divided into 15 items in each domain. This instrument was used to measure quality of life of 120 leukemia patients in Thailand. The validity and reliability were checked. The Cronbach's alpha was .85. Zhang (1998) modified Uppalabut's Quality of Life Questionnaire to measure the quality of life of chronic renal failure patients who received hemodialysis in China. The modified quality of life questionnaire (MQLQ) was a 52 items five point rating scale that included the same dimensions as Uppalabut. The internal consistency reliability coefficient was .75 which reached an acceptable level (Polit and Hungler, 1999).

For this study, a 52 item Modified Amputee Quality of Life Questionnaire (MAQLQ) was modified from Zhang (1998).

Factors affecting quality of life

Quality of life is an imprecisely defined concept that is subjective, individualistic, and dynamic over time. It is based upon the physiologic, psychological, social and spiritual characteristics of what gives life value to the individual (Monahan, 1990). Many factors are found to be able to affect the level of quality of life.

1.Cause of amputation

Amputation can be caused by many different factors. No matter what causes amputation, it has a significant impact on all aspects of the life of the amputee (Medhat, Patricia , and Mobaneed, 1990). However different cause may have different impacts on different aspects of quality of life. The patients whose amputations are caused by diabetic disease live with their illness for a long period of time. The serious complication that leads to the need for amputation is severe infection of foot wounds. They can become gangrenous and spread to become life threatening. The other serious issue is pain. For this group of patients, amputation is in a sense analogous to pain alleviation. The patients are usually prepared physically and psychologically in advance to accept the amputation (Danaidutsadeekul, 1999). Nonetheless, the continuing problem of these amputees is the inability to revive the competency of the remaining parts. Their quality of life is poor simply secondary to

restricted mobility (Pell, Donnan, Fowkers, and Ruckley, 1993).

However patients who have an amputation after an accident, whether traffic related or work related, the amputation often occurs in a sudden, unanticipated manner, meaning they lack the proper psychological and mental preparation to accept the condition of being an amputee. The most important effect of amputation in this group is the psychological effect. According to Boyle's (1982) study of the psychological effects on amputation caused by cancer and trauma, the results showed that patients who have amputations due to cancer differ from traumatic amputees in their adjustment to amputation. The majority of cancer amputees adjust better to their circumstance and lead fuller and more productive lives than traumatic amputees. Their quality of life is reduced secondary to the poor adjustment to amputation (Boyle, Tebbi, Mindell, and Mettlin, 1982).

2. Level of amputation

Level of amputation is a factor which affects the quality of life. The study of Medhat, Patricia and Mobaneed (1990) supported this evidence. Among the 327 patients with lower extremity amputation, the persons with above knee amputation showed more problems in daily living, social participation, and sexual functioning and athletic participation than the person with below knee amputation.

3. Number of the amputated limbs

The number of amputated limbs is an important factor that affects the quality of life among the amputees. An amputee who has lost two limbs will lose more functional

ability than someone with one limb amputated. An amputee who has one limb amputated will lose the ability to perform activities that require two arms (Danaidusadeekul, 1999).

4. Functions of arms or legs before amputation

The functions of arm(s) or leg(s) before amputation are special factors that affect quality of life among amputees. For example, an amputated arm is a significant organ for a driver's career. The loss of arm will affect their lives extremely as they can not do their previous work. The conclusion is that if an amputee loses a limb which is necessary for his/her work, then he/she can not return to that work, whereas if the amputee has a job which does not require the use of the limbs, such as the legs for office staff, then after amputation they are able to return to work. In contrast, if the person who works in an office, loses his/her hand, then he/she will have the same severity of disability as the driver who loses a leg (Danaidutsadeekul, 1999).

Impact of amputation on quality of life of amputees

According to Zhan, amputation is perceived as a crisis for life that affects an individual's life in the dimensions of life satisfaction, self-concept, health and functioning and social economic status.

Life satisfaction: life satisfaction refers to life as a whole rather than to specific domains of life experience. Life satisfaction is responsive to changes in external conditions. It is influenced by personal background, characteristics, environment and health

functioning status. A report of life satisfaction is a cognitive assessment of one's progress toward desired goals, implying a judgment based on cognitive experience (Zhan, 1992). Amputation is a dramatic change for the amputees from independence to dependence (Brown, 1992). So amputation will undoubtedly influence the life satisfaction of the amputees (Tate, Riley, Perna, and Roller 1997).

Osberg, McGinnis, DeJong and Seward (1987) made an investigation for the predictor of life satisfaction and quality of life among disabled elderly adults in 97 patients. The results showed that function capacity was the most important predictor.

Hammound and Grindstaff (1992) reported that physically disabled people who were older, female and single had lower satisfaction in life. The factors associated with dissatisfaction are likely to be economic, health, job, personal relationship and life in general.

Tate, Riley, Perna and Roller (1997) made a study to assess quality of life and life satisfaction with physical disabilities (amputation and spinal cord injury) in 216 patients. The results indicated that gender was not significantly different with respect of life satisfaction. Functional and emotional well-being were the strongest predictors of overall quality of life for both men and women, self-perceived general health significantly predicted quality of life for woman ($p < .05$) and social well-being significantly predicted QOL for men ($P < .01$). Among men, life satisfaction was best predicted by marital status ($P < .05$), general health ($P < .05$) and social well-being ($P < .01$). Life

satisfaction for women was best predicted by age, education, spiritual well-being and functional ability.

Self-concept: self-concept is defined as the composite of beliefs and feelings that one holds about oneself at a given time. These beliefs and feelings are primarily formed from perceptions, particularly of others' reactions. Life events and life experiences themselves are insufficient in capturing a total perspective of quality of life which appears to be useful indicators of subjective measures of quality of life. Therefore, self-perception and self-evaluation are consciously available and can be reported by the individual. It focuses on the individual's assessment and evaluation of himself or herself as an object in the life experience.

The loss of limbs in most cultures and societies means not only loss of a body part, and loss of function, but also the loss of health, disfigurement and disgrace (Smitherman, 1981). Moreover physical attractiveness is presented in all media as being essential for survival in a competitive world. The youthful, beautiful, intact body is upheld as ideal to the public (Luckmann and Sorensen, 1980). So amputation, especially by traumatic injury, has a strong impact on psychological well-being. Emotional difficulties for amputees seem to be due in part to issues of reduced self-esteem, reduced self-image, loss of body integrity and uncertain prognosis (Frierson and Lippmann, 1987). Smitherman (1981) stated that amputees experience a loss of the sense of wholeness and of being an intact person. Postma, Kingma, Deruiter and Schrafforde (1992) researched on quality

of life in bone tumor patients comparing limb salvage and amputation in 33 samples. The amputees showed a trend toward lower self-esteem due to their disability and both groups felt diminution of quality of life.

Diogo (1993) reported that self-image, and sentiments related to self-image, showed by the patients submitted to amputation less than 10 days before were different from those showed by patients which had suffered amputation over a month before.

The change in appearance can also interfere with self-perception. Amputees believe themselves to be handicapped persons and so are too embarrassed to keep any social contacts for fear that society will devalue and dispel them. They finally become isolated from society. Several researches reported that amputees felt social isolation (Postma, Kingma, Deruiter and Schrafforde, 1992; Denaidetsadeekul, 1999). This physical alteration interfered with the image of a person as a whole.

Health and functioning : health and functioning is one of the most commonly measured dimensions in quality of life research in nursing and medicine. Physical well being is viewed as an objective indicator of the quality of life. Thus, this concept has been operationalized in terms of activity in daily life, mobility or absence of disease, based on the individual's functioning ability in

doing and achieving. Health is a major and important concept of the quality of life (Zhan, 1992).

Being an amputee causes changes in the ability of body functions. They are disabled in working and daily

living, and there are changes in ability and skills from before amputation (Smitherman, 1981). These may comprise activities such as getting out of bed, bathing, dressing, eating, drinking, evacuation of bladder and bowels, and locomotion, transportation, vocational problems, homemaking and recreation (Danaidutsadeekul, 1999).

In Medhat's study (1990) of the factors that influence the level of activities in persons with lower extremity amputation, results showed that the activities for daily living were rated problematic. This is not surprising because yard care, showering and gardening, all require a degree of physical stamina to master balance. Pell, Donnan, Fowkes, and Ruckley (1993)'s study on quality of life following lower limb amputation for peripheral arterial disease in 149 patients indicated that mobility was the only significant independent factor. Social isolation and emotional distress lost their significance after adjustment for mobility. Quality of life was poor secondary to the restricted mobility.

Alber, Fratezi and Deluccia (1996)'s study of walking ability and quality of life as outcome measures showed that the amputees' walking ability was poorer and quality of life was lower compared with arterial reconstruction patients.

Physical status of amputees also interferes with amputees' role in family and society (Drench, 1994). The expected roles both in family and society must be adapted so that they can be performed with less difficulty. The housewife will find it difficult to perform the same

household tasks after the loss of an arm. After losing limbs, the amputees need to change their duties and responsibilities.

Socio-economic factors : socio-economic factors are important to the quality of life because they determine people's places in the operational structure. Social economic factors have been assessed subjectively in terms of perceived adequacy of income and satisfaction with financial resources. This could be viewed as an objective measurement of one component of quality of life. Various theories in social sciences delineate the contribution of socioeconomic status (SES) to the quality of life (Zhan, 1992). SES consists of three components: occupation, education and income (Zhan, 1992). Amputees are people with different social status, occupation and income. For the persons with a low income, the cause of amputation is usually an accident. Accidents result from a lack of security knowledge and protection regulation, carelessness and low education (Denaidsadeekul, 1999). In these accidents the victims lose their arms and legs, which are necessary to perform their work. Their work role changes and they can not go back to do their previous jobs. Amputees after losing an arm or leg may have to end their career. It is then very difficult to find a new job because of their physical status and their education. If amputees have no job, they have no income for their family. While this is not a problem for a dependent, for the leader of the family, the problem of poverty makes living more difficult. Denaidsadeekul (1999) reported that

amputees seemed to be less productive. The subsequent result is revenue loss for himself and his family.

Economic difficulties are major problems for amputees with low socio-economic status; they can not maintain a social role and live happily in society. Amputees of high socio-economic status usually work in non-labor jobs, such as teachers, executives, and company owners. When they lose a limb they are able to work with their remaining organ or use recompensed physical equipment easily in their work role. The effect on the family income is not severe. They can adapt to the new environment and live in society without too much difficulty.

For educational level, there is a study showing that it has a direct relationship to the quality of life (Kanjanaarungsri, 1995; cited in Danaidetsadeekul, 1999) and has a positive relationship to the health status of the amputee (Danaidetsadeekul, 1999). Several professionals think that the individual who has a high level of socio-economic status has a better chance of receiving support from social networks (Chip and George, 1990). While an individual with a moderate level of socio-economic status tends to receive support from social networks, the lower socio-economic status person receive less support from society (Wood, Lafferey & Duffy, 1988). So socio-economic status is an important factor for maintaining the quality of life.

Conceptual framework

The study of quality of life among traumatic amputees is based on Zhan's concept in which quality of life is the degree to which a person's life experiences are satisfying in four dimensions: life satisfaction, self-concept, health and functioning, and socio-economic factors.

Amputation is a crisis of life that can cause a strong impact on physical, psychological and social well-being. It changes an individual's activities of daily living, life style, roles in the family and society and level of independence. Amputation means loss of part of the body and its function which damages the patients' body image, and self-concept. Amputees regard themselves as handicapped persons and so are too embarrassed to keep any social contacts for fear that society would disparage and devalue them. They finally become isolated from society. They lost their arms and legs which are necessary to perform their work. The limited physical function will undoubtedly affect economic income by changing amputees' work role and their career. So all of these impacts will overall have a strong influence on an amputee's perception of their life satisfaction and might eventually affect their quality of life.