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Physical and Psychological Complications of Mastectomy: The Role of Physiotherapy

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ABSTRACT

Breast cancer affects a large number of women worldwide. Surgical management has evolved towards mastectomies and breast-conserving surgeries. The complications following a mastectomy can be physical and/or psychological. The physical complications include pain, scarring, lymphedema, limitation in range of motion at the shoulder, muscle weakness, change in body posture, etc. Some of the psychological complications are negative body image, anxiety, depression and depressive disorders, negative body image. Appropriate management requires a multi-disciplinary team of which the physiotherapist is a part of. Literature has shown that there is a better improvement in physical function if physiotherapy is commenced early. Therefore, physiotherapy should be incorporated pre- and post-mastectomy. Physiotherapy management should focus on lymphatic drainage, soft tissue mobilization, range of motion exercises, strengthening exercises and postural correction. Increased physical activity and recommendation of support groups can help to improve psychological outcomes. It is the role of the physical therapist to deal with the physical and psychological complications of a mastectomy to improve the quality of life of the patients.

Keywords: Mastectomy, physical complications, breast cancer, psychological complications, physiotherapy

1. INTRODUCTION

Cancer is one of the main causes of mortality worldwide (Momenimovahed and Salehiniya, 2017). Breast cancer originates from breast tissue, mostly from the inner lining of milk ducts or the lobules that supply the ducts with milk. Cancers originating from ducts are known as ductal carcinomas, while those originating from lobules are known as lobular carcinomas (Sariago, 2010). Breast cancer is one of the leading types of cancer in women (Ferlay *et al.*, 2008; Mathew and Perez, 2011).

There are an estimated 2.09 million cases of breast cancer with the death of 627,000 individuals in 2018 (WHO, 2018) and it is estimated to reach 3.2 million by the year 2050 (Hortobagyi *et al.*, 2005). Breast cancer constitutes the most frequent cancer in women between 35 and 54 years old, and the ratio of men to women with it is 1 to 150, and its incidence continually rises (American Cancer Society, 2005). The incidence rate of breast cancer is higher in developed countries and it varies with race and ethnicity (DeSantis *et al.*, 2014). The incidence rate of breast cancer ranges from 19.4 per 100,000 people in East Africa to 89.7 per 100,000 in West Europe, .27 cases per 100, 000 in East Africa and 92 cases per 100,000 in North America (Bray *et al.*, 2018).

The primary treatment for breast cancer is based on the clinical extent and pathological state of the tumour, age of the patient, biological prognostic factors, other diseases of the patient, as well as the desire and psychological state of the patient (Greene *et al.*, 2002; Karki, 2005). Treatment for breast cancer may include breast-conserving surgery, modified radical mastectomy, radiation therapy, induction chemotherapy, prophylactic drugs, etc (Maughan *et al.*, 2010). Through the years, the management of breast cancer has evolved towards mastectomies and breast-conserving surgeries (Franceschini *et al.*, 2015; Al-Gaithy *et al.*, 2019). In the lower stage of advancement of the carcinoma, breast-conserving therapy is used, while in higher stages of advancement of locoregional cancer, a mastectomy is applied (Kamusińska, 2014).

A mastectomy is a surgical procedure that involves the removal of all or part of the breast tissue (Goethals and Rose, 2018). Mastectomy is the surgical treatment of breast cancer which can result in a permanent change in appearance in women (Cebeci *et al.*, 2011). It is considered as a frequently employed surgical choice for patients with the initial or recurring disease. The breast is considered in many cultures to be a representation of femininity, beauty, sexuality, motherhood (Cebeci *et al.*, 2011) thus a mastectomy is considered by many professionals to have physical and psychological complications (Rostkowska *et al.*, 2006). The physical and psychological consequences of mastectomy are well documented ranging from pain and major scarring to psychological distress and sexual dysfunction (Yurek, 2000; Arora *et al.*, 2001; Wilmot, 2001). Women with mastectomy tend to experience mental stress attributable to physical weakness and the potentially lethal prognosis (Harcourt *et al.*, 2003).

Several types of mastectomy procedures are available ranging from Halsted's radical Mastectomy, modified radical (Patey) mastectomy, total or simple mastectomy, skin-sparing mastectomy or nipple- sparing mastectomy among others (Lazaraviciute and Chaturvedi, 2017). A radical (Halsted) mastectomy is a type of mastectomy, where breast tissue, pectoralis major and minor muscles, and all axillary tissues are removed while a modified radical (Patey) mastectomy is a type of mastectomy, where breast tissue and pectoralis minor muscle are removed, together with axillary nodes; It is performed on more invasive tumours (Sweetland , 2006).

A total or simple mastectomy is a type of mastectomy, where breast tissue and involved skin are removed with or without axillary surgery and a skin-sparing mastectomy is on the rise and it is a type of mastectomy where the breast tissue is removed, but skin envelope is preserved (Sweetland, 2006). Complications of mastectomy can be physical, psychological or others.

Upper limb lymphedema, decreased shoulder mobility, neural tissue injuries causing sensory and motor impairments, the pain of the upper body and limb are common post-treatment physical impairments (Gosselink *et al.*, 2003; Rietman *et al.*, 2004). One of the major physical complications of mastectomy is lymphedema of the ipsilateral (affected) arm. Lymphedema is defined as the swelling of the arm which is caused by insufficient lymphatic drainage into lymph nodes. It can result in “cosmetic deformity, loss of functional ability, physical discomfort, recurrent episodes of erysipelas and psychological distress” (Andersen, 2000). It is caused by a defect in the lymphatic system and characterised by an abnormal increase in tissue proteins, oedema, chronic inflammation and fibrosis (Purushotam *et al.*, 2007; Martin *et al.*, 2011). It affects about 30% of those who undergo breast cancer treatment and results in excess fluid accumulation in the interstitial space, detrimental tissue changes, limb swelling and quality of life issues (Williams *et al.*, 2005).

Lymphedema can be divided into 3 stages. During the first ‘reversible’ stage protein-rich oedema is present; in Stage 2, the ‘spontaneously irreversible’ stage, there are fibro sclerotic alterations and an increase in the number of keratinocytes and connective tissue cells. Stage 3, ‘elephantiasis’, is characterized by massive hyperkeratosis and by a tremendous increase in the volume of the limb (Foldi, 1998). It may occur almost subsequently to surgical treatment, during radiotherapy or many months or years after treatment (Kisner and Colby, 2005). Lymphedema can be acute or chronic, depending on whether the onset of symptoms is within 18 months of the surgery. Chronic lymphedema is often difficult to treat (Golshan and Smith, 2006). Symptoms may include swelling, fibrosis, restricted joint mobility and pain (Sleigh and Manna, 2019). Lymphedema following a mastectomy presents a detrimental effect on both physical and psychological health as it lasts for a long time (Armer *et al.*, 2009; Bernas *et al.*, 2010).

Another complication of lymphedema is limited shoulder function following surgery (Budd, 1978). About 7 out of 8 people who undergo any form of surgery for breast cancer experience shoulder and arm problems (Hidding *et al.*, 2014). Around 17 to 32% of people who have undergone a mastectomy have impaired shoulder movement (Box, 2002). A study by Nesvold *et al.*, 2008 shows that women who undergo mastectomy were more likely to experience a restricted range of motion (ROM) compared to women submitted to breast-conserving therapy. The limitation in arm function may be due to the presence of the lymphedema in the affected arm and stiffness after the surgery. Post-mastectomy pain of the thoracic wall limits the mobility of the shoulder directly after surgery and may persist for longer periods. Also, there could be muscle atrophy of the shoulder muscles due to intraoperative damage to the nerves can lead to a limitation in shoulder function (Ashikari, 1984).

Radical surgical treatment of patients with breast cancer may contribute to a change in body posture. A significant complication of mastectomy is changing in body posture due to the limitation of movements and soreness of the spine (Rostkowska E *et al.*, 2006). Damaged muscle weakness, pain associated with extensive postoperative wound, a reflexive attempt to compensate for the absence of the breast as well as soft tissue fibrosis as a result of radiotherapy are the direct causes of negative changes in the posture of women after mastectomy (Al Ghazar *et al.*, 2000; Janni *et al.*, 2001).

Lymphatic oedema also contributes to the intensification of disorders in body posture (Vaças and Ryan, 2003). Bąk and Cieśla (2009) showed the presence of posture defects in 82.3% of women after breast amputation compared with only 35.1% in apparently healthy women. Women after mastectomy have an increased tendency to exhibit kyphotic posture and to tilt the trunk forward (Bąk and Cieśla, 2012). The significant alterations include a greater trunk inclination angle, greater symmetry of scapula position, a greater angle of pelvis twisting, greater forward-leaning of the trunk, greater total value of angles of spinal curvatures, etc. (Rostkowska E *et al.*, 2006).

Axillary Web Syndrome/ lymphatic cording is another physical complication that can arise in patients following treatment for breast cancer. Axillary Web Syndrome is a ropelike structure that develops mainly under the axilla but can extend to involve the medial aspect of the ipsilateral arm down to the antecubital fossa (Tilley *et al.*, 2009). It is described as the appearance of a palpable cord that begins at the axilla and spreads down the arm even at times as far as the thumb (Moskovitz *et al.*, 2001). It tends to develop after axillary surgery for breast cancer. Lymphatic cording can also be associated with pain and limitation of shoulder movement (Tilley *et al.*, 2009). The incidence of this syndrome has been described to be between 6-72% among various authors (Tengrup *et al.*, 2000; Moskovitz *et al.*, 2001; Leidenius *et al.*, 2003).

Other complications may include pain, scar tissue, musculoskeletal issues, brachial plexus injury, deconditioning and endurance deficits, fatigue, balance and falls (Silver and Gilchrist, 2011). Pain and scar tissue is due to the mastectomy. It can further lead to pain syndromes (Rietman *et al.*, 2003). The surgical procedure may lead to transient or permanent damage to the nerves in the surgical area thus a brachial plexus injury (Kim *et al.*, 2016). Radiotherapy following breast surgery may also have a considerable effect on brachial plexus injury (Eyüp and Ethem, 2018). Impairments may be manifested by the loss of all types of sensation (pain, touch, temperature), flaccid paralysis of muscles, and atrophy of muscle groups on the surgical side, paraesthesia, tingling sensation, and perspiration (Mika, 2005).

Some psychological problems can occur after a mastectomy. The removal of a woman's breast can lead to perceived losses by the woman consequently leading to psychosocial problems (Gumus, 2006). Literature has shown that patients with breast cancer, who lose part of all of their breast tissue, can experience changes in body image, self-concept, emotions, behaviour, family dynamics, and the roles of patient and family (Ozbas, 2006). Negative body image among breast cancer survivors among those who have undergone a mastectomy includes dissatisfaction with appearance, perceived loss of femininity and body integrity, reluctance to look at one self's naked, feeling less sexually attractive and self-conscious about appearances (Fobair *et al.*, 2006). Another psychosocial complication of mastectomy is depression and depressive disorders (Meyerowitz, 1980).

Another troublesome phenomenon is experiencing anxiety and fear overtime of the diagnosis and treatment of breast cancer. (Yi and Syrjala, 2017). Anxiety is the most expected response for patients affected by a malignant disease and facing a surgical procedure (Montebarocci *et al.*, 2007).

Fears and concerns regarding death and reoccurrence of breast cancer and also a form of change in femininity, sexuality, and attractiveness are important issues that need to be dealt with (Baucom, 2006). Anllo (2000) and Bakwell (2006) revealed that shock of being recognized for cancer and its treatment can exert a major effect on physical and mental states of the patients' sexual relationships.

It is also likely the patient to become deeply dependent on others, as a result of undergoing mastectomy. The psychological complications of lymphedema can decrease patients' abilities and efficacy at work and home (Abbasi *et al.*, 2018). Change in occupational status is another aftermath that may happen, such a change has the potential to affect the relationship between the patient and her family or society (Kraus, 1999). Crouch and McKenzie (2000) revealed that patients that have undergone mastectomy suffer from a feeling of not having body balance which is the main factor in physical attractiveness, and lack of mental peace as an indicator in mental attractiveness because of fear from disease recurrence and death hazard. Both factors result in a reduction of quality of life to a great extent (Crouch and Mckenzie, 2000). It is important that a woman in such difficult moments is provided with support and help of the closest relatives as well as professional, comprehensive care of medical personnel (Lewicka *et al.*, 2015) to improve their quality of life (Fouladi, 2013). However, the rehabilitation of the psyche is less commonly reported leading to poor coping strategies (Loh and Musa, 2015).

Patients often require complete medical and psychological support with a multi-disciplinary team that includes doctors, nurses, psychiatrists, physical therapists, psychologists, dieticians, and pharmacists (Chirgwin *et al.*, 2010). This team would be used to aid the healing process of the patient and further push the acceptance of their body (Montebarocci *et al.*, 2007).

Physiotherapy is a very important part of the team and should be incorporated pre and immediately post-operation. A comprehensive physiotherapy program should be individualised according to the presenting complaints of the patient. Pre-operatively, education should be carried out for exercises applied after surgery, as well as education of patients concerning the code of conduct in daily life (Kamusińska *et al.*, 2014).

Physical therapy is a way to manage lymphedema. According to the International Society of Lymphology, the treatment protocol of reduction of breast cancer lymphedema includes manual lymphatic drainage (MLD), compression bandaging, active exercises, and skincare. Manual lymphatic drainage uses massage techniques to encourage the removal of excess interstitial fluid, increase lymphatic transport into lymph nodes and soften fibrotic tissues (Foldi *et al.*, 2003). Limb exercises can be progressive, resistive, free or isometric and can help to improve the lymphatic drainage of the affected limb (Johansson *et al.*, 2004). The patient is also recommended and fitted with a compression garment (Bernas *et al.*, 2010). A phase of management called the Complex Decongestive Physical Therapy (CDPT) is used to effect this protocol. It covers the following two subsequent phases of therapy; the first one is an intensive phase, aimed at a maximum reduction of oedema by daily use of manual lymphatic drainage therapy, multi-layer compression bandaging, and exercises improving lymph outflow (Ograczyk *et al.*, 2004; Dos *et al.*, 2004). The second phase is a maintenance-optimization phase, which is aimed at fixation and maintenance of the effects of therapy obtained during the first phase. It includes self-massage, compression therapy in the form of elastic compression materials, and exercises improving lymph outflow. This phase usually covers the entire life of the patient due to the chronic character of the problem (Pyszora, 2010).

The literature revealed that there is significantly better shoulder function following early physiotherapy in patients who have had a mastectomy. Physical therapy treatment for upper extremity complications can include soft tissue mobilizations, range of motion exercises, strengthening exercises, postural assessment among others (DeGroef *et al.*, 2015; Cho *et al.*, 2016). Mobilization of scars can also be done using massage techniques (Zanier and Bordon, 2015). It is also necessary for the patient to undergo rehabilitation to minimise the changes in body posture (Kopański *et al.*, 2003, Rostkowska *et al.*, 2006).

Properly selected exercises such as learning the correct way of breathing as well as monitoring the changes of posture during the rehabilitation process will not only enable a woman to avoid wrong compensation but also to considerably improve the posture (McAnaw and Harris, 2002).

Physical therapy is also useful for better psychological complications of mastectomy. Rehabilitation in the form of physical therapy following a mastectomy can help to improve the self-image of women who underwent a mastectomy and have a positive effect on their minds (Moyer and Salovey, 1999). Physical activity generally is of benefit for cancer patients including reduced fatigue, nausea, body fat, anxiety and depression and increased muscle strength, lean body mass, aerobic capacity, enhanced immune function, and improved quality of life (Galva and Newton, 2005).

Aerobic exercises have shown to be beneficial for cancer patients who are undergoing treatment. Mock *et al.* reported that home-based walking at a moderate intensity (50-70% of maximum heart rate), performed for 10 to 45 minutes per day, 4 to 6 days per week, for one to six months, during chemotherapy and radiation treatment for breast cancer reduced cancer-related fatigue, sleep disruption, depression, and anxiety while improving cardiopulmonary function and Quality of Life. The aerobic training also increases the patient's self-confidence and independence (Pattanshetty and Chopde, 2016). Low resistance training can also be performed with the aid dumbbells, resistance bands, or even bodyweight (Pattanshetty and Chopde, 2016). Resistance training performed 3 days per week for 12 weeks has been shown to improve cancer-related fatigue, cognitive function, Quality Of Life, and muscular strength (Pattanshetty and Chopde, 2016).

In patients with complete mobility and without oedema, self-massage, respiratory exercises, general fitness exercises, and active recreation are recommended (Kamusińska, 2014). Health education about behaviour in daily living, prevention of secondary lymphoedema can also be done by a physiotherapist (Kamusińska, 2014).

Health professionals such as a physiotherapist may refer a client to see a psychologist or psychiatrist. A physical therapist may also recommend support groups that can provide information on how to cope with the breast cancer situation (Zhi *et al.*, 2017). Literature shows that exercise in the form of physical activity can help to improve mood, anxiety, and depression (Pinto and Maruyama, 1999). Properly selected exercises can help to improve posture. This can then help to improve the better image of oneself and the improvement of the quality of life (McAnaw and Harris, 2002). Relaxation techniques can be used to reduce psychological distress and improve the mood in breast cancer patients (Tatrow and Montgomery, 2006). Also, the satisfaction gained from the results achieved during exercises and physical fitness necessary for the performance of various social roles translates into restored self-esteem and fulfilment in professional as well as family life (Zyznawska *et al.*, 2015).

2. CONCLUSIONS

A mastectomy is a surgical procedure that can cause many changes in a woman's life. It has many physical dysfunctions and psychological consequences as time goes by. Rehabilitation is a major part of the process of treatment of breast cancer, and its primary goal is the limitation of selected physical, psychological, and social consequences of the disease. An interdisciplinary team should be focused on achieving rehabilitation goals.

Rehabilitation for women who have undergone a mastectomy should be broader and more proactive to include physical and psychological. It is the role of the physiotherapist to not only aid with the physical symptoms but also the psychological to improve the quality of life of the woman.

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