# Effect of Home-Based Exercise on Lymphedema among Post-mastectomy Patients: an Integrative Review

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# EFFECT OF HOME –BASED EXERCISE ON LYMPHEDEMA AMONG POST-MASTECTOMY PATIENTS: AN INTEGRATIVE REVIEW

**Alaa Bsoul[1*], Amal Ababneh[2], Yasmeen Abu Sumaqa[3]**

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**ABSTRACT:**

Cancer is a major public health problem worldwide. Breast cancer considered to be the most common cancer among females in the world and in Jordan as well. The first choice to treat breast cancer is surgery. Lymphedema is considered the most common complication may face females after mastectomy. There were different modalities to manage lymphedema. Therefore the purpose of this study was to review studies that address the effect of home based exercise on lymphedema among post mastectomy Jordanian females. A literature search was started using computerized databases of Google scholar, CINAHL, MEDLINE, and PubMed. The key words used to find the related articles were: Lymphedema, exercise, post-mastectomy and physical activity. The results of this studies give a clear evidence about the effectiveness of the home based exercise on lymphedema reduction, which may increase attention of health care providers to the importance of the home based exercise and to consider it as one of lymphedema treatment modalities.

**Keywords:** Exercise, Physical Activities, Lymphedema, Post Mastectomy.

[1]RN, MSN, Zarqa University College, Al-Balqa Applied University, P.O. 206, Al-Salt, Jordan.
[2]RN, MSN, School of Nursing, Jerash University, P.O.26150, Jerash, Jordan.
[3]RN, Ph.D, Assisstent Professor, Faculty of Nursing, Zarqa University, P.O. 2000, Al-Zarqa –Jordan.
Emails: alaa.Bsoul@bau.edu.jo, amal.ababneh@jpu.edu.jo, yabusumaqa@zu.edu.jo
Corresponding Author: Alaa Bsoul, Email: alaa.Bsoul@bau.edu.jo

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## Introduction

Cancer is a major public health problem worldwide and the second leading cause of death globally (WHO, 2017). In 2015 cancer was responsible for 8.8 million deaths in the world (WHO, 2017). Among all cancer types, breast cancer considered to be the most common cancer among females in the world where nearly 1.7 million cases diagnosed in 2012 ( Torre, Bray, Siegel, Ferlay, Lortel- Tieulent & Jemal, 2015).

Breast cancer could be treated in different treatment regimens depending on the stage of breast cancer such as chemotherapy, radiotherapy, surgery, hormonal therapy, and targeted therapy (American Cancer Society, 2018). Among these types of treatment, surgery is considered the first choice to treat breast cancer, with the goal to remove the tumor and may involve the resection some of the lymph nodes under the arm (Bonisson et al., 2017). Most surgeries have some possible complications such as wound infection, hematoma, seroma, lymphedema, and phantom breast pain (Rocco et al., 2013).

Lymphedema is considered the most common complication may face females after mastectomy (Zou et al., 2018). Lymphedema is characterized by an accumulation of protein-rich tissue fluid in interstitial spaces that lead to develop edema, chronic inflammation with pain, and tightness and heaviness being felt in the affected arm (Chan, Lui & So, 2010; Finnane, Anna, -8+

55Janda & Hayes, 2015). Lymphedema affects 15-28 % of breast cancer survivors post mastectomy (Oncology Nursing society, 2017). Lymphedema can cause physical discomfort, psychological distress, cosmetic defects, and functional disability in the affected arm (Alande et al., 2017). Also lymphedema is associated with feelings of discomfort and heaviness, functional limitation, and an elevated risk of recurrent infection (Li et al., 2016). Lymphedema management still form a major concern for patients and health care providers (Fu, 2014). There were different modalities to manage lymphedema include intermittent pneumatic compression pump, low- level laser therapy, weight reduction, exercise, acupuncture, surgery, and other (Li et al.,2016).

Exercise is defined as "physical activity that causes an increase in energy expenditure, and which involves a planned or structured movement of the body that is performed in a systematic manner in terms of frequency, intensity, and duration and is designed to maintain or enhance health-related outcomes" (American College of Sports Medicine,2005; Mishra,2012).

Exercise has many benefits, it helps in improving circulation, lowering blood pressure, maintaining healthy body weight through reducing body fat, strengthening muscles and bones, improving memory, improving quality of life, and decreasing stress (Vina, Sanchis- Gomar, Martinez-Bello & Gomez- Cabrera, 2012). It has been proven that the effectiveness of aerobic exercise on preventing the onset of diabetes induced peripheral neuropathy (DPN), as well as modifying the natural history of DPN (Balducci et al, 2006). Furthermore, exercise could reduce fatigue among females with gynecologic cancers (Al Maqbali et al, 2019).

Few research articles have been studied the effect of home based exercise on lymphedema among post mastectomy. Therefore this review aimed to investigate the effectiveness of home based exercise on lymphedema among postmastectomy patients.

## Methodology

A comprehensive search was conducted to look for articles related to the main topic "Effect of Home – Based Exercise on Lymphedema among Post Mastectomy Patients". A literature search was started using computerized databases of Google scholar, CINAHL, MEDLINE, and PubMed.

The key words used to find the related articles were: Lymphedema, exercise, post-

mastectomy and physical activity. The term "lymphedema" was used in combination with other terms such induced by mastectomy.

Computerized articles from Google, CINNAHL, MEDLINE, and PubMed contained 22, 20, 13, and 11 research articles, respectively. The search process yielded many articles but not all of them relevant to the phenomenon of interest, so that after excluding the duplicated and irrelevant articles the total numbers of the articles were reduced to 8 according to specific inclusion criteria.

Inclusion criteria for this integrative literature review were the following: (1) The articles were written in English language. (2) They were published between 2011 and 2020. (3) All articles in full text. (4) They were contained information about effect of exercise on lymphedema in post mastectomy patients. Based on this inclusion criteria, these eight articles were formed the basis for this integrative review. The majority of articles were published in different medical and exercise sciences journals, all articles were focus on the effect of exercise on lymphedema induced by mastectomy. These eight articles were four randomized control trials and four systematic reviews.

The sample size for the relevant articles ranged from 23- 951 women with lymphedema induced by mastectomy, different types of exercises included in these articles such as; resistance, aerobic, gravity resistive isotonic, Pilates exercises, stretching, water exercise and others.

## Findings

One controlled clinical trial conducted in 2015 has studied and compered effect of water – based exercise, land – based exercise and standard care among 88 women cancer survivors with lymphedema. After dividing them to 35 women as water exercise group, 29 women as land exercise group, and 24 women as stander care group. They found that lymphedema volume decreased among those women within water – based exercise group compared with lymphedema volume among women in the other groups (Lindquist, Enblom, Dunberger, Nyberg &Bergmark, 2015).

In the same year, a systematic review included 9 articles with a total of 957 breast cancer survivor with lymphedema, which conducted to determine the effects of resistance exercise on lymphedema. In all these included articles, resistance exercise intensity was described as moderate – high. They reported that resistance exercise had a little effect on lymphedema among all these articles (Keilani, Hasenoehrl, Neubauer & Crevenna, 2015).

Another systematic review of 11 randomized controlled trials that included 458 women with breast cancer who developed lymphedema, with aim to assess the effects of different types of exercise (aqua lymph training, swimming, resistance, yoga, aerobic, and gravity-resistance exercise). These articles measured the effect of exercise on lymphedema based on arm volume and significant subjective improvements. Furthermore they found that exercise in its different types could improve subjective parameters such as (decrease pain severity, arm disability, and degree of sensation) and objective parameters such as (decrease swelling and reduce lymphedema based on reduction of arm volume), in patients with lymphedema (Baumann et al., 2018).

## Conclusion

The results of this studies give a clear evidence about the effectiveness of the home based exercise on lymphedema reduction, which may increase attention of health care providers to the importance of the home based exercise and to consider it as one of lymphedema treatment modalities. Also the results of this study will participate in decreasing readmission to the hospitals. As well as, it may be helpful in knowledge expansion related to exercise benefits among the patients with lymphedema. But also health care providers may make it one of the effective methods in

the health practice to prevent and manage lymphedema. In addition, it may decrease burden of lymphedema management, and encourage conducting further researches in the future to form clear evidence to practice.

## References


1. Alande, A. A., Sagar, J. H., & Shinde, S. B. (2017). Effect of Early Physiotherapy in Post-Operative Radical Mastectomy for Lymphedema. *Indian Journal of Physiotherapy and Occupational Therapy*, *11*(2), 2190.
2. American Cancer Society. (2018). Treatment of Breast Cancer by Stage. Retrieved from https://www.cancer.org/cancer/breast-cancer/treatment/treatment-of-breast-cancer-by-stage.html
3. American College of Sports Medicine. *ACSM's Guidelines for Exercise Testing and Prescription*. 7th Edition. Philadelphia: Lippincott Williams & Wilkins, 2005.
4. Baumann, F. T., Reike, A., Reimer, V., Schumann, M., Hallek, M., Taaffe, D. R., ... & Galvao, D. A. (2018). Effects of physical exercise on breast cancer-related secondary lymphedema: a systematic review. *Breast cancer research and treatment*, 1-13.
5. Bickley, L., & Szilagyi, P. G. (2009). *Bates' guide to physical examination and history-taking*. Lippincott Williams & Wilkins.
6. Borman, P., Yaman, A., Yasrebi, S., & Özdemir, O. (2017). The importance of awareness and education in patients with breast cancer-related lymphedema. *Journal of Cancer Education*, *32*(3), 629-633.
7. Box, R. C., Reul-Hirche, H. M., Bullock-Saxton, J. E., & Furnival, C. M. (2002). Physiotherapy after breast cancer surgery: results of a randomised controlled study to minimise lymphoedema. *Breast cancer research and treatment*, *75*(1), 51-64.
8. Chan, D. N., Lui, L. Y., & So, W. K. (2010). Effectiveness of exercise programmes on shoulder mobility and lymphoedema after axillary lymph node dissection for breast cancer: systematic review. *Journal of Advanced Nursing*, *66*(9), 1902-1914.
9. Cohen, J. (1992). A power primer. *Psychological bulletin*, *112*(1), 155.
10. Dimitrov, D. M., & Rumrill Jr, P. D. (2003). Pretest-posttest designs and measurement of change. *Work*, *20*(2), 159-165.
11. DiSipio, T., Rye, S., Newman, B., & Hayes, S. (2013). Incidence of unilateral arm lymphoedema after breast cancer: a systematic review and meta-analysis. *The lancet oncology*, *14*(6), 500-515.
12. English Oxford Living Dictionaries. Age. Retrieved from https://en.oxforddictionaries.com/definition/age
13. English Oxford Living Dictionaries. Weight. Retrieved from https://en.oxforddictionaries.com/definition/weight
14. Executive Committee. (2013). the Diagnosis and Treatment of Peripheral Lymphedema: 2016 Consensus Document of the International Society of Lymphology. *Lymphology*, *49*(4), 170-184.
15. Finnane, A., Janda, M., & Hayes, S. C. (2015). Review of the evidence of lymphedema treatment effect. *American journal of physical medicine & rehabilitation*, *94*(6), 483-498.
16. Fu, M. R. (2014). Breast cancer-related lymphedema: Symptoms, diagnosis, risk reduction, and management. *World journal of clinical oncology*, *5*(3), 241.

17. Gautam, A. P., Maiya, A. G., & Vidyasagar, M. S. (2011). Effect of home-based exercise program on lymphedema and quality of life in female postmastectomy patients: pre-post intervention study. *Journal of Rehabilitation Research & Development*, *48*(10).
18. Gerritsen, J. K., & Vincent, A. J. (2015). Exercise improves quality of life in patients with cancer: a systematic review and meta-analysis of randomised controlled trials. *British Journal of Sports Medicine*, bjsports-2015.
19. Gosselink, R., Rouffaer, L., Vanhelden, P., Piot, W., Troosters, T., & Christiaens, M. R. (2003). Recovery of upper limb function after axillary dissection. *Journal of surgical oncology*, *83*(4), 204-211.
20. Harris, S. R., & Niesen-Vertommen, S. L. (2000). Challenging the myth of exercise-induced lymphedema following breast cancer: a series of case reports. *Journal of Surgical Oncology*, *74*(2), 95-98.
21. Harris, S. R., Hugi, M. R., Olivotto, I. A., & Levine, M. (2001). Clinical practice guidelines for the care and treatment of breast cancer: 11. Lymphedema. *Canadian Medical Association Journal*, *164*(2), 191-199.
22. Hilfiker, R., Meichtry, A., Eicher, M., Nilsson, B. L., Knols, R. H., Verra, M. L., & Taeymans, J. (2017). Exercise and vother non-pharmaceutical interventions for cancer-related fatigue in patients during or after cancer treatment: a systematic review incorporating an indirect-comparisons meta-analysis. *British Journal of Sports Medicine*, bjsports-2016.
23. Keilani, M., Hasenoehrl, T., Neubauer, M., & Crevenna, R. (2016). Resistance exercise and secondary lymphedema in breast cancer survivors—a systematic review. *Supportive Care in Cancer*, *24*(4), 1907-1916.
24. Khanna, S., Gupta, A. K., Cherian, A. J., Yadav, B., & Jacob, P. M. (2017). Post Mastectomy Lymphedema—a Prospective Study of Incidence and Risk Factors. *Indian Journal of Surgery*, 1-7.
25. Kummerow, K. L., Du, L., Penson, D. F., Shyr, Y., & Hooks, M. A. (2015). Nationwide trends in mastectomy for early-stage breast cancer. *JAMA surgery*, *150*(1), 9-16.
26. Lane, K. N., Dolan, L. B., Worsley, D., & McKenzie, D. C. (2007). Upper extremity lymphatic function at rest and during exercise in breast cancer survivors with and without lymphedema compared with healthy controls. *Journal of Applied Physiology*, *103*(3), 917-925.
27. Larson P.J., Carrieri-Kohlman V., Dodd M.J. et al. A Model for Symptom Management. *Journal of Nursing Scholarship. 1994;26* (4):272–276.
28. Li, L., Yuan, L., Chen, X., Wang, Q., Tian, J., Yang, K., & Zhou, E. (2016). Current treatments for breast cancer-related lymphoedema: A systematic review. *Asian Pacific journal of cancer prevention: APJCP*, *17*(11), 4875.
29. Lindquist, H., Enblom, A., Dunberger, G., Nyberg, T., & Bergmark, K. (2015). Water exercise compared to land exercise or standard care in female cancer survivors with secondary lymphedema. *Lymphology*, *48*(2), 64-79.
30. Miller, C. L., Colwell, A. S., Horick, N., Skolny, M. N., Jammallo, L. S., O'Toole, J. A., ... & Smith, B. L. (2016). Immediate implant reconstruction is associated with a reduced risk of lymphedema compared to mastectomy alone: a

prospective cohort study. *Annals of surgery*, *263*(2), 399.

31. Mishra, S. I., Scherer, R. W., Snyder, C., Geigle, P. M., Berlanstein, D. R., & Topaloglu, O. (2012). Exercise interventions on health-related quality of life for people with cancer during active treatment. *Cochrane Database Syst Rev*, *8*.
32. National Center for Education Statistics. Fast Facts. 2017. Retrieved from https://nces.ed.gov/fastfacts/display.asp?id=27
33. Oncology Nursing Society, 2017 .retrieved from (https://www.ons.org/practice-resources/pep/lymphedema) updated on May 25, 2017.
34. Passik, S. D., & McDonald, M. V. (1998). Psychosocial aspects of upper extremity lymphedema in women treated for breast carcinoma. *Cancer*, *83*(S12B), 2817-2820.
35. Polit, D. F., & Beck, C. T. (2012). *Nursing research: generating and assessing evidence for nursing research*. London: Lippincott Williams & Wilkins
36. Rocco, N., Rispoli, C., Pagano, G., Rengo, G., Compagna, R., Danzi, M., ... & Amato, B. (2013). Breast cancer surgery in elderly patients: postoperative complications and survival. *Bio Med Central surgery*, *13*(2), S25.
37. Steindorf, K., Wiskemann, J., Ulrich, C. M., & Schmidt, M. E. (2017). Effects of exercise on sleep problems in breast cancer patients receiving radiotherapy: a randomized clinical trial. *Breast cancer research and treatment*, *162*(3), 489-499.
38. Torre, L. A., Bray, F., Siegel, R. L., Ferlay, J., Lortet-Tieulent, J., & Jemal, A. (2015). Global cancer statistics, 2012. *CA: a cancer journal for clinicians*, *65(*2), 87-108.
39. Vieira Bonisson, P. L., Fu, M. R., de Matos, S. S., Rezende Simino, G. P., de Paula Lima, E. R., & Ercole, F. F. (2017). Lymphedema in women undergoing breast cancer surgery. *Revista da rede de enfermagem do nordeste*, *18*(3), 329-336.
40. Vina, J., Sanchis-Gomar, F., Martinez-Bello, V., & Gomez-Cabrera, M. C. (2012). Exercise acts as a drug; the pharmacological benefits of exercise. *British journal of pharmacology*, *167*(1), 1-12.
41. Zou, L., Liu, F. H., Shen, P. P., Hu, Y., Liu, X. Q., Xu, Y. Y., ... & Tian, Y. (2018). The incidence and risk factors of related lymphedema for breast cancer survivors post-operation: a 2-year follow-up prospective cohort study. *Breast Cancer*, *14* (2)1-6.
42. Balducci, S., Iacobellis, G., Parisi, L., Di Biase, N., Calandriello, E., Leonetti, F., & Fallucca, F. (2006). Exercise training can modify the natural history of diabetic peripheral neuropathy. Journal of diabetes and its complications, 20(4), 216-223.
43. Al Maqbali, M., Hughes, C., Dunwoody, L., Rankin, J. P., Hacker, E. D., & Gracey, J. (2019, January). Exercise Interventions to Manage Fatigue in Women With Gynecologic Cancer: A Systematic Review. In Oncology nursing forum (Vol. 46, No. 1).