



Awareness of Post Operative Complications and Physiotherapy Management in Breast Cancer Survivor's

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Abstract

Background: Breast carcinoma is a disease which is suffered by most of the women in India. The most prevalent cause for deaths in India is breast cancer. The greatest survival rates out of all the types of cancer are of breast cancer. An abundant rise is seen in breast cancer survival rates after there are developments in surgical techniques, radiation and chemotherapy. There are various ways to treat breast cancer like surgical, systemic (include hormonal therapy, chemotherapy) or radiotherapy. In mastectomy, partial or complete removal of breast tissue is done. Also, sometimes tissue surrounding the breast and lymph nodes are also removed. People are unaware or have lack of knowledge regarding risk factors and complications post mastectomy. Post surgical drawbacks can materialized after any surgical procedure; there may be drawbacks namely bleeding, seroma, delayed lesion mending as well as infection. Also pain in muscles and bones can occur with an alteration in range of motion or shoulder dysfunction.

Methods: One fifty women participants were incorporated in the research. A self-made questionnaire was approved and circulated among the population and thus the data was collected. The questionnaire was based on awareness of post-operative complications and their physiotherapy management in breast cancer survivors. The data collected was further evaluated with the help of appropriate statistical methods.

Results: 40.24% participants had knowledge about post operative complications and 25.91% participants were aware about the benefits of physiotherapy after mastectomy. 59.75% participants had no knowledge about post operative complications and 74.08% were unaware about physiotherapy management after mastectomy.

Conclusions: The current research concluded that, the participants in rural area had poor knowledge and awareness regarding post operative complications and their physiotherapy management after mastectomy.

Keywords: Breast cancer, Postoperative complications, Mastectomy, Women, Physiotherapy management.

Introduction

Unusual growth of the cells lining the ducts and lobules in breast causes breast cancer [1]. Worldwide the most frequent type of cancer occurring among women is breast cancer [2]. Yet, there is rise in the number of breast cancer patients worldwide and there is not much awareness about breast cancer in rural areas as



compared to the urban areas [3]. It has become a deadly disease because majority of the women ignore the warning signs like pain, rash, lump and changes in the size of breast. Due to delay in diagnosis of breast carcinoma the mortality rate has increased, mostly in rural areas [4]. Nowadays, a different plan of action in management of breast cancer is developed like surgical management including total mastectomy, modified radical mastectomy, radical mastectomy, partial mastectomy, nipple sparing mastectomy and systemic management including hormonal therapy, chemotherapy and radiotherapy [5]. The aetiology of breast carcinoma depend upon various factors like lifestyle, genetic factors, environmental factors, hormonal factors and heredity [6]. There are other coexisting conditions like hypothyroidism, cardiopulmonary problems, diabetes which may be seen in breast cancer patients [7]. Mutation in gene BRCA1 and BRCA2 can be responsible to cause breast cancer at an early age and it might be inherited to forthcoming generation. Increase in the progesterone and oestrogen levels, prolonged use of oral contraceptives, nulliparous women and obesity after menopause are also at high risk to develop breast cancer [8]. Women who gave birth at early age have a reduced risk of breast cancer and it is inversely proportional to the parity [9]. Also, there are 50% higher chances of risk in women who delivered at an early age than the women who delivered at 35 years and above [10]. Imbalance in reproductive hormones like oestrogen and progesterone, causes uncontrollable cell growth and thus this can progress to irreversible damage to DNA leading to cancerous growth of cell [11]. Increase in consumption of fatty food increases the chance of developing breast carcinoma [12]. An evaluation of insight among breast cancer survivors is an essential part for thorough plan of action in health care, early diagnosis and management that efficiently engrosses the women [13]. Formation of scar tissue may occur along with viable disseminating cancerous cells via stimulation of toll-like receptors (important mediators of inflammatory pathway) after post-surgical infection [14]. Post operative complications are defined as alterations from normal post-surgical healing process [15]. Younger women are being diagnosed with breast cancer, which is one of the most concerning and up to date issue [16]. After receiving treatment, breast cancer survivors are susceptible to various medical, physical and psychosocial sequels that have the potential to affect one's overall health and well-being [17]. One of the major prevalent complications followed by mastectomy is incisional pain, as during the surgery, a transverse incision is made over the chest muscles to remove the breast tissue and the fascia. After which, the suture over the treated area feels tight along the incision. Radiation therapy causes delayed wound healing (of the



incision), this causes further pain in the area of the incision in due course. There is also posterior cervical pain and shoulder girdle pain experienced in post operative patient, which is due to muscle guarding. Due to incisional pain, the patients avoid performing movements of upper extremity which in turn can lead to frozen shoulder and also elevate the probability of lymphedema in hand and arm. Lymphedema can also occur post lymph node dissection. Another complication associated with post mastectomy is chest wall adhesion which in turn leads to post operative pulmonary complication as the patients have limited mobility of the shoulder and also pain in shoulder girdle. These limited movement of shoulder provides a room for weakness of the shoulder muscles. There is also the likelihood of postural malalignment which can be seen as a complication post mastectomy. We can see patients presenting with rounded shoulder and kyphosis followed by pain, skin tightness or psychological aspects. Another complication that is experienced by patients is fatigue. About 60% of cancer patients undergoing treatment experience fatigue. Fatigue is also associated with depression [18].

Being educated or mindful of something is the state or situation of awareness. It may also indicate knowledgeable interest in and worry about current developments.

Patients are unable to do daily activities because of the development of tightness, scar tissue formation, and pain. Delay in physiotherapy treatment can lead to impairments and disabilities in the body after surgery. Physiotherapy plays a crucial role in improving quality of life, reducing pain, and preventing postoperative complications. Therefore, both physiotherapy and operative treatment are significantly helpful in managing breast cancer patients [19]. Physiotherapy helps to improve range of motion (mostly upper body range of motion), increases strength of muscle, improve mobility of joint and correct the posture which is altered after surgery [20].

Due to altered biomechanics of upper body, posture is affected due to the increasing tightness of the chest muscles following surgery [21]. Physiotherapy improves lung capacity and aim of the physiotherapist is to try and prevent complications and if present, to treat the patient's cardiorespiratory and musculoskeletal related problems [22].

In rural areas, women are unaware that physiotherapy can help them reduce these complications. Thus, there is a growing need to make breast cancer survivors in rural areas aware that physiotherapy can help in postoperative management in cancer survivors. Physiotherapy has many benefits post



mastectomy such as increasing range of motion and reducing the complications that can occur post-surgery. This study aims to know about the knowledge of the breast cancer survivors, regarding post-mastectomy physiotherapy and its benefits. It is very crucial to improve their health, minimize complications and improve their quality of life. This study will help to make them aware about the benefits of physiotherapy and thus help them cope up and help with the problems that could have materialized if they were not aware regarding it. This will educate the breast cancer survivors about the importance of compliance with physiotherapy and exercise regimens to ensure the best. This will educate the breast cancer survivors about the importance of physiotherapy and exercise regimens to ensure the best possible recovery and to get better functional outcomes.

This study will make them aware that they can, actively participate in their own recovery and communicate effectively with the other health care workers.

Material and Methods:

The purpose of this study was to find out awareness of post operative complications and physiotherapy management in breast cancer survivors. The study type was observational study and conducted in Krishna Vishwa Vidyapeeth. The study was administered in Karad. Certification was taken from ethical committee (protocol number 134/2023-2024). Patients were selected according to the inclusion and exclusion criteria. The study was administered among 150 women who were diagnosed with breast cancer and underwent mastectomy and were suffering from post-operative complications. The women who underwent mastectomy 10 or more years ago were excluded. A self-made questionnaire was approved and circulated among the patients and thus the data which was collected was used for conducting this study. The questionnaire was split into 2 sections namely, section A and section B. The section A of questionnaire, analyzed knowledge of patients on post operative complications and Section B analyzed awareness of physiotherapy management amongst them. Informed consent was taken from them and the data was collected. A structured questionnaire was circulated among the patients for data collection.

Participants -

One hundred and fifty breast cancer survivors who had undergone mastectomy were selected for this study. According to the inclusion criteria, females who were diagnosed with breast cancer and who had undergone mastectomy and had post operative complications were taken. Patients who had undergone mastectomy 10 years ago were excluded.



These subjects were then selected and given questionnaire to collect the data.

Procedure -

All patients were approached and explained about the research study as well as consent was taken from them. Then a self-made questionnaire was given to them. The questionnaire was split into two parts section A and B. The subjects were informed about section A, which is of knowledge regarding postoperative complications and about section B, which is regarding the awareness of physiotherapy management in breast cancer survivors. Then the subjects were asked to mark an appropriate option according to their knowledge and awareness. The interpretation of the study was done on the basis of comparing knowledge about postoperative complications and awareness of physiotherapy management with the help of statistician.

Outcome measures –

Self-made questionnaire:

The subjects were explained about the questionnaire. It is a self-made questionnaire that was found to be accurate and was approved by the staff and ethical committee. It contains total 16 questions; each section includes 8 questions which assess the knowledge and awareness regarding post operative complications and physiotherapy management in breast cancer survivors. The subjects marked appropriate answers according to their knowledge.

Statistical analysis –

The questionnaire was validated by staff and ethical committee and then was further used for the study. Based on the responses, a pie diagram and bar diagram was constructed for the same.



Results:

Table 1: Responses of participants about knowledge of post operative complications.

Section A: Knowledge of patients about post operative complications					
Sr. No.	Questions	Number		Percentage	
		Yes	No	Yes	No
1	Do you know breast cancer surgery affect your activity of daily living?	32	118	21.33	78.66
2	Are you aware that having a high BMI can increase the risk of post-operative complications in breast cancer survivors?	19	131	12.66	87.33
3	Do you know, after mastectomy shoulder discomfort may occur and this in-turn affect your quality of life?	32	118	21.33	78.66
4	Do you know there can be chances of infection on suture site, if it is not maintained well?	110	40	73.33	26.66
5	Do you know after mastectomy there can be chances of reduction of functional capacity of lung?	24	126	16	84
6	Do you believe stress can affect your overall well-being?	108	42	72	28
7	Do you know most prevalent post operative drawback of breast surgery is swelling in breast / any part of upper limb?	30	120	20	80
8	Are you aware that continuous medical care is required after mastectomy?	128	22	85.33	14.66



Table 2: Responses of participants about post operative physiotherapy management

Section B: Awareness of post operative physiotherapy management in breast cancer survivors					
Sr. No.	Questions	Number		Percentage	
		Yes	No	Yes	No
1	Are you aware of how physiotherapy can help breast cancer survivors manage postoperative complications?	39	111	26	74
2	Have you ever taken physiotherapy as part of your breast cancer recovery?	33	117	22	78
3	Do you know that physiotherapy has benefits in breast cancer survivors?	33	117	22	78
4	Do you know that physiotherapy has role in post operative radical mastectomy?	42	108	28	72
5	If yes, then do you believe that physiotherapy has impacted your recovery and overall well-being as a breast cancer survivor?	42	108	28	72
6	Do you know that physiotherapy can help in improving muscle strength and increase in shoulder mobility?	49	101	32.66	67.33
7	Are you aware that physiotherapy can reduce swelling?	40	110	26.66	73.33
8	Do you know that physiotherapy has role in cardiorespiratory fitness?	33	117	22	78

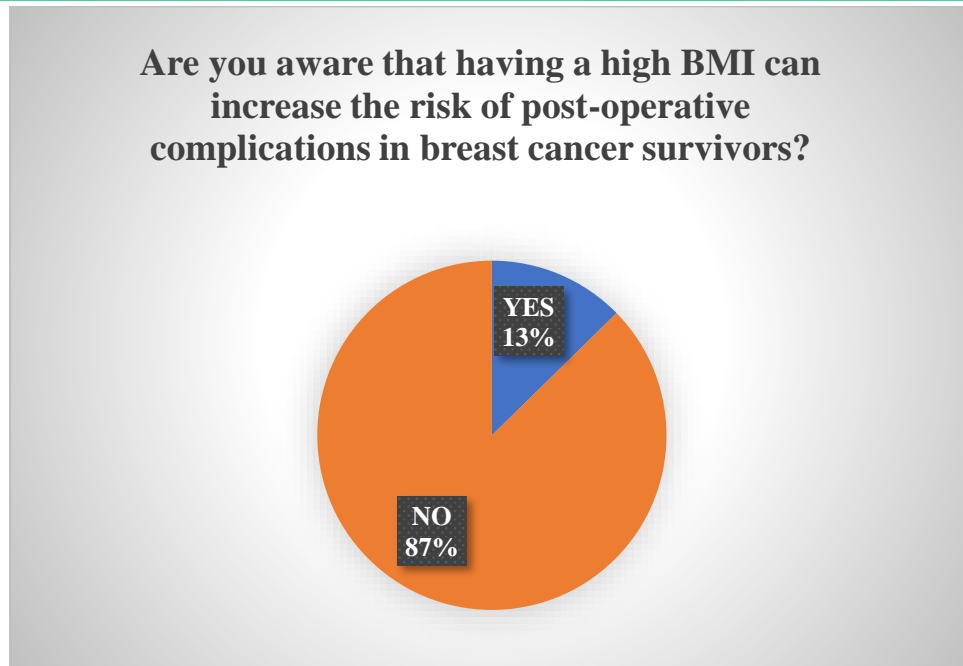


FIG 1: Awareness regarding high BMI effects

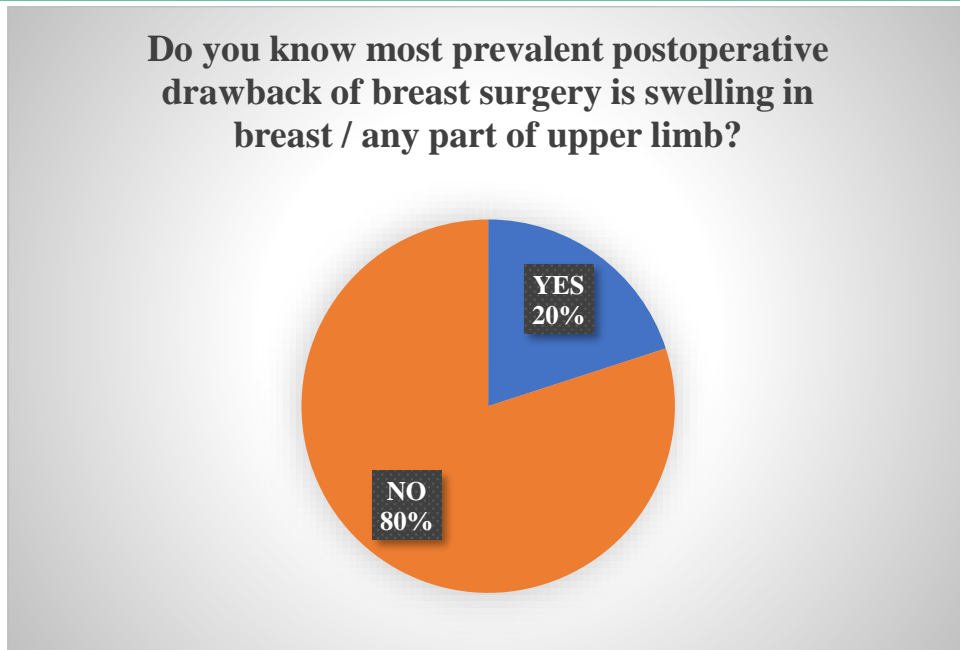


FIG 2: Awareness regarding swelling

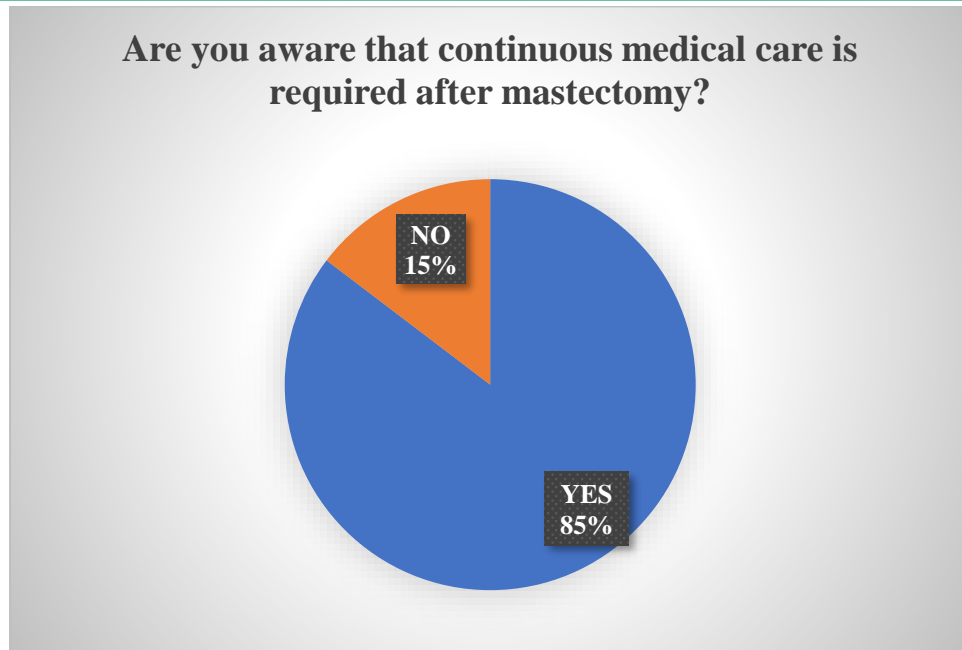


FIG 3: Awareness regarding post mastectomy care

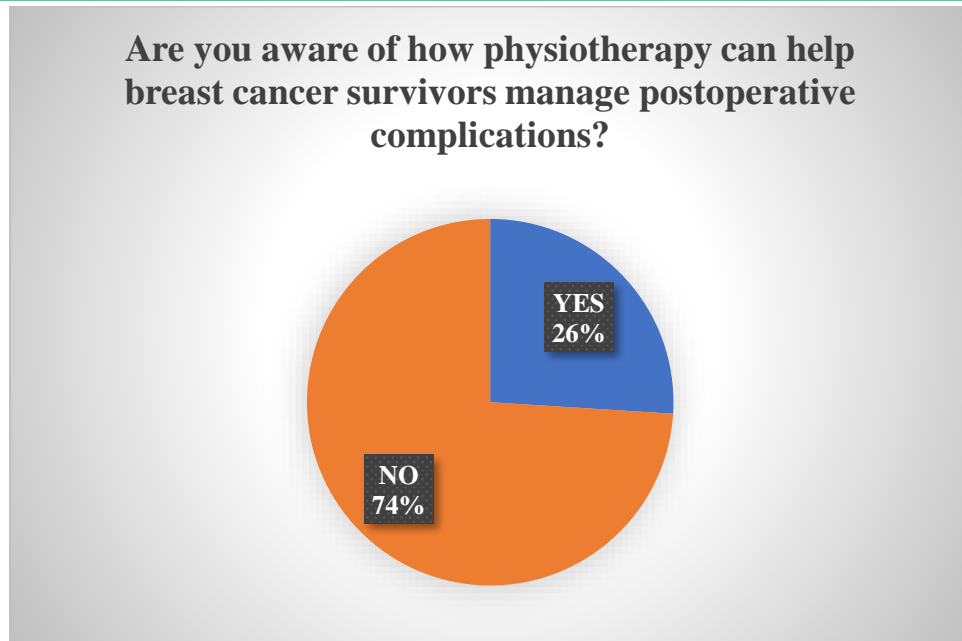


FIG 4: Awareness regarding benefits of physiotherapy for post mastectomy complications

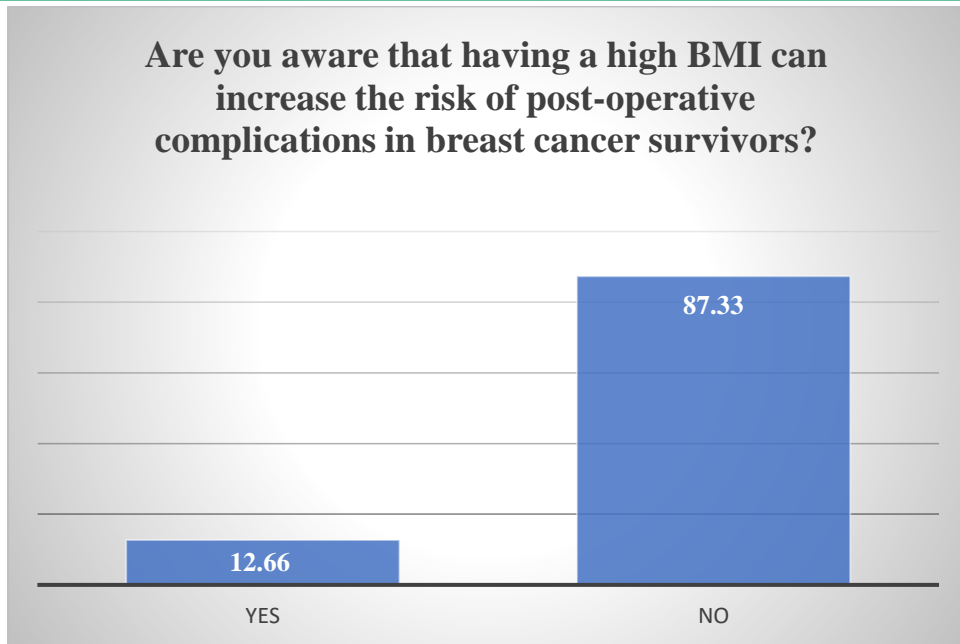


FIG 5: Awareness regarding high BMI effects

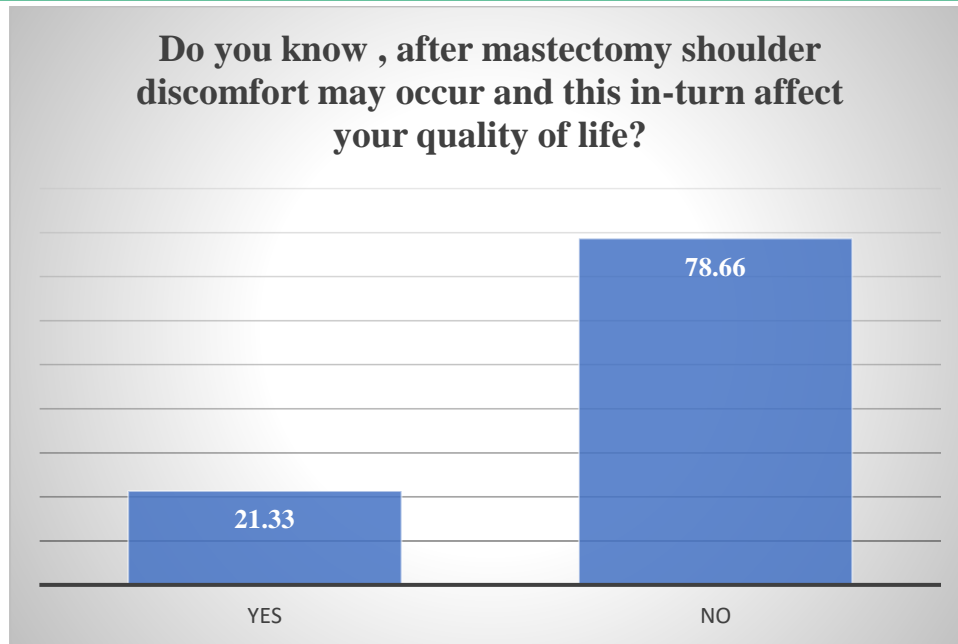


FIG 6: Awareness regarding shoulder discomfort post mastectomy

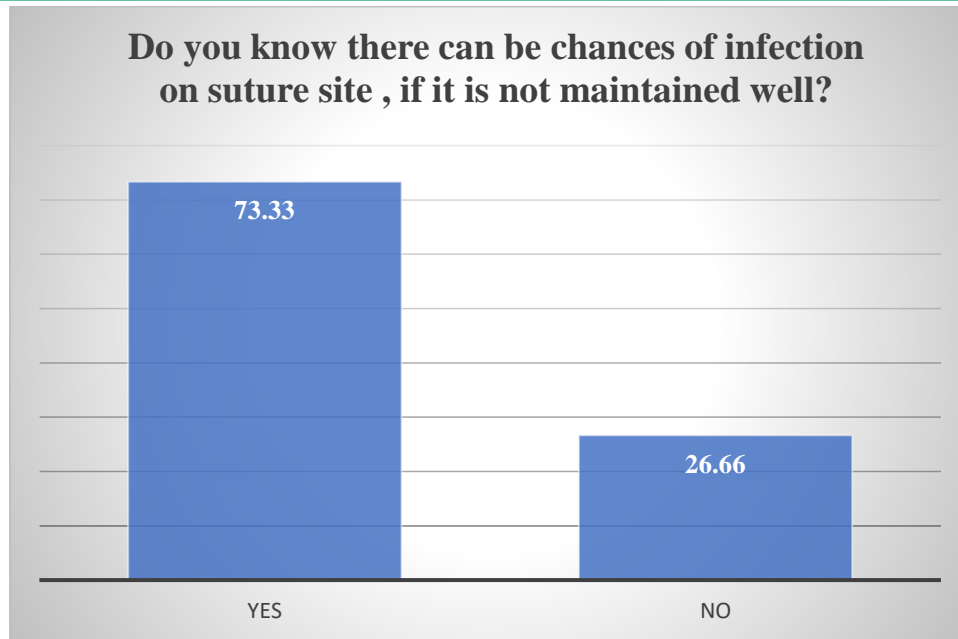


FIG 7: Awareness regarding occurrence of infection post mastectomy

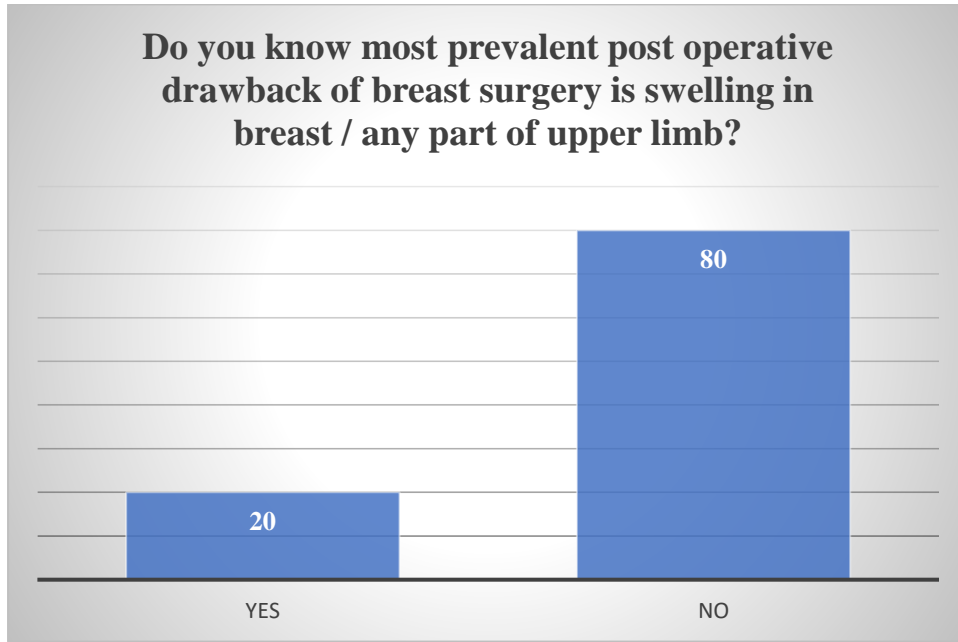


FIG 8: Awareness regarding swelling

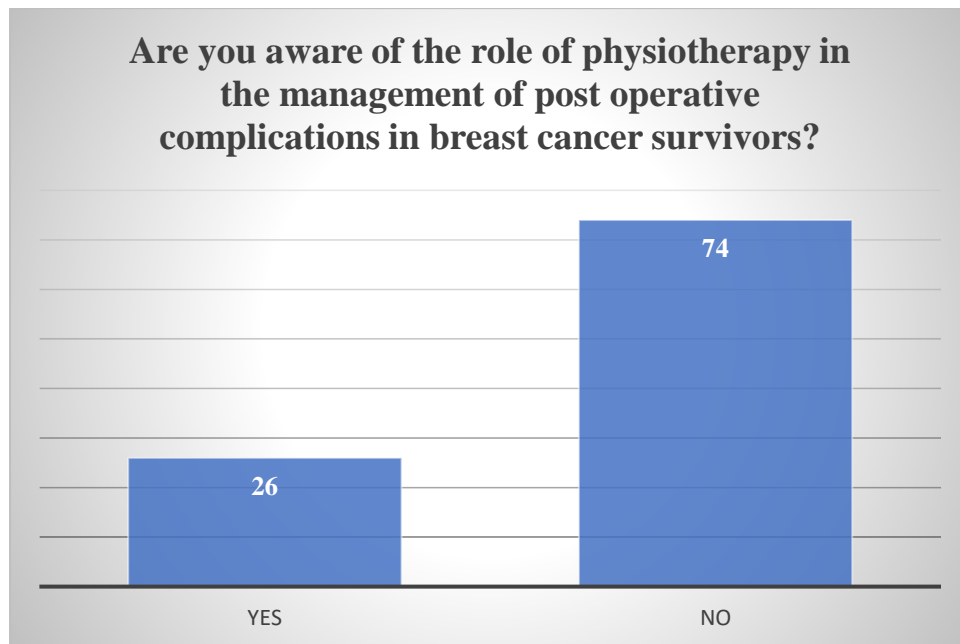


FIG 9: Awareness regarding benefits of physiotherapy for post mastectomy complications

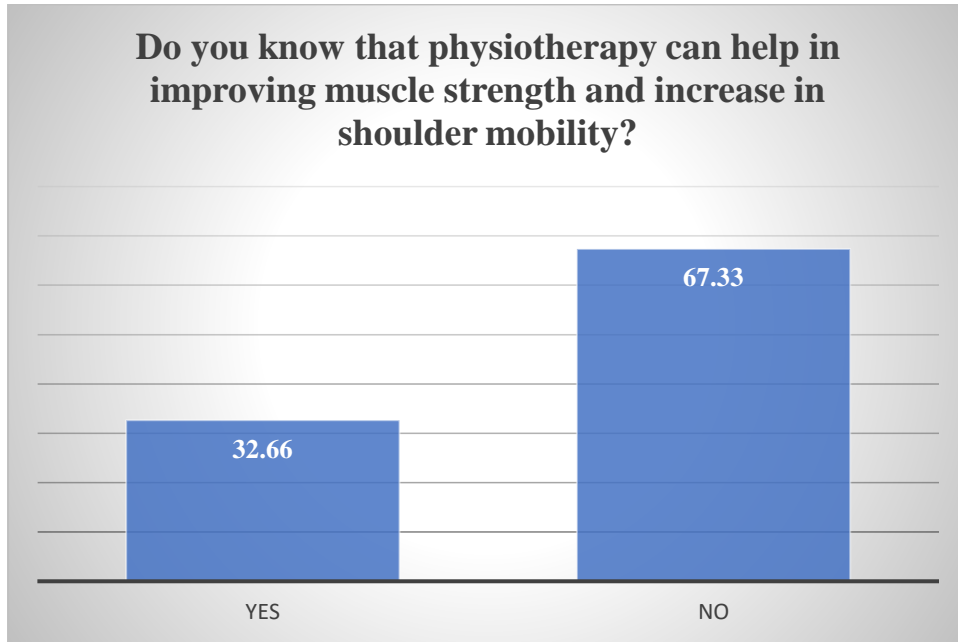


FIG 10: Awareness regarding benefits of physiotherapy for improving strength and shoulder mobility

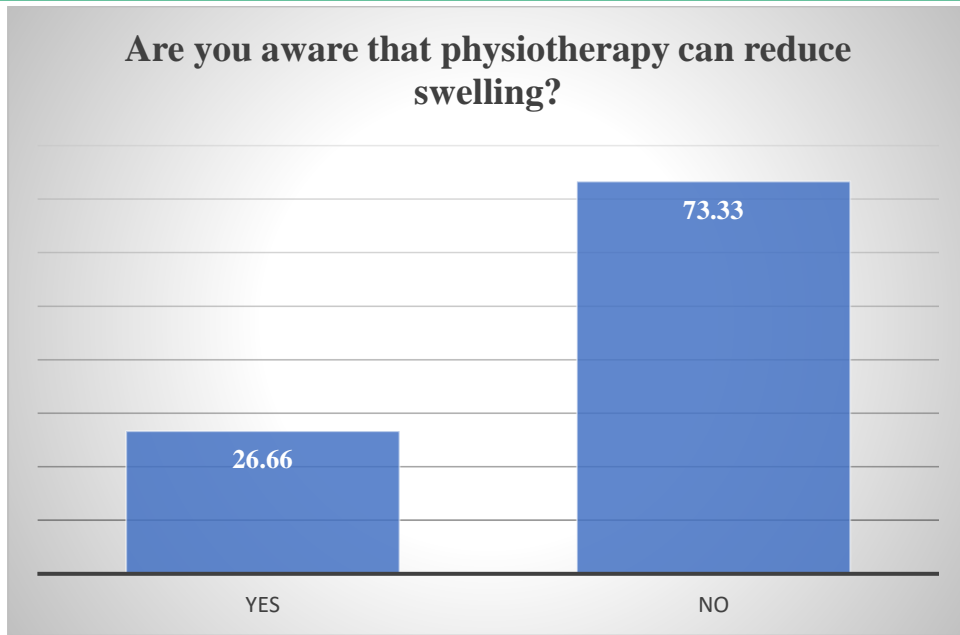


FIG 11: Awareness that physiotherapy can reduce swelling



The purpose of the study is to determine awareness and knowledge about postoperative complications and physiotherapy management in breast cancer patients. The questionnaire was used to find out the same. The research involved 150 individuals. All 150 participants voluntarily participated and answered every question on the survey.

There were total 16 questions, and response were obtained by asking questions. There were two portions in the questionnaire, namely section A and section B, and each of these sections contained eight questions. Section A shows the knowledge of patients about post operative complications and section B shows the knowledge of awareness of postoperative physiotherapy management in breast cancer survivors. The collected data were analysed by a statistician.

In Table 1, shows the response of participants to the questionnaire. Regarding knowledge of post operative complications in breast cancer survivors. 40.24% respondents knew about postoperative complications and 59.75% did not know about it. Therefore significant result was found regarding knowledge of post operative complications in breast cancer survivors.

In section A: 32(21.33%) respondents knew that breast cancer surgery affects activity of daily living.

19 (12.66 %) people knew that high BMI is an element that increases danger. After menopause, women who are overweight or obese have increased amounts of estrogen, which can promote the growth of various breast cancers.

32 (21.33%) respondents knew about shoulder discomfort which can occur after mastectomy. Shoulder discomfort can occur after mastectomy due to swelling, stiffness, reduced range of motion.

110 (73.33%) respondents believed, infection as a postoperative complication. An incision was made during mastectomy and unwanted part is removed, if suture site is not maintained infection will worsen the condition.

126 (84%) respondents were unaware about reduction of functional capacity of lung after mastectomy. Decreased activity and extended time in bed increases venous stasis and risk of pulmonary complication like pneumonia.

108 (72%) respondents believe that stress can affect overall wellbeing and 42 respondents does not believe in it. Patient experiences wide range of emotional and social problems causing them to feel anxious, agitated, angry, depressed and also they may experience mood swings.

30 (20%) respondents had knowledge about swelling as a postoperative complications. The patient who undergo for any level of lymph node dissection can cause swelling.



128 (85.33%) respondents were aware about continuous medical care is required after mastectomy.

However, significant result was found about knowledge of postoperative complications.

In table 2 shows the responses of participants to the questionnaire. Regarding the awareness of postoperative physiotherapy management in breast cancer survivors. 25.91% respondents are aware about physiotherapy management after mastectomy and 74.08% respondents are unaware about it. Therefore, significant result was found regarding physiotherapy management in breast cancer survivors.

In section B: 39 (26%) respondents were aware about the role of physiotherapy after mastectomy.

33 (22%) respondents received physiotherapy after mastectomy.

33 (22%) respondents knew about benefits of physiotherapy in breast cancer.

42 (28%) respondents aware about postoperative role of physiotherapy.

42 (28%) respondents responded that physiotherapy impacted their recovery and over all well-being as breast cancer survivor.

49 (32.66%) respondents believed that physiotherapy can help in improving muscle strength and shoulder mobility.

40 (26.66%) respondents were aware that physiotherapy can reduce swelling.

33 (22%) respondents knew that physiotherapy has role in cardiorespiratory.

However, a significant result was found between knowledge and awareness regarding postoperative complications and physiotherapy managements after mastectomy.



Discussion:

In the past few decades, the number of breast cancer survivors has increased significantly. Women in both urban and rural areas are dealing with breast cancer, and many of them are ignoring the warning signs and symptoms, which leads to major problems.

Also, after mastectomy there are chances of occurrence of post operative complications. We can avoid these complications by giving physiotherapy treatment before and after mastectomy. Many women have lack of understanding regarding postoperative sequelae and the benefits of physiotherapy treatment.

The study, Awareness of Postoperative Complications and Physiotherapy Management in Breast Cancer Survivors, was done to determine awareness of postoperative complications and postoperative physiotherapy management in breast cancer survivors.

In accordance with the study, an assessment of knowledge of cancer and lymphoedema was evaluated. They studied knowledge of breast cancer and lymphoedema among 90 postoperative patients. They concluded that postoperative patients had excellent knowledge about their condition but had less awareness regarding lymphoedema. Our research focused on post operative complications and physiotherapy management in breast cancer survivors. Our investigation revealed a lack of awareness concerning postoperative consequences. Maximum percentage of people 85.33%, were aware that ongoing medical care is required following mastectomy. Also 21.33% of people know that after mastectomy shoulder discomfort can occur. Approximately 20% of the community is aware that limb swelling is a problem that occurs after surgery. Only 12.66% knows about high BMI as a risk factor for breast cancer [23].

The subsequent study looked at the “Awareness of physical therapy rehabilitation among breast cancer patients before and after surgery.” The study was conducted on 318 participants, a self-made questionnaire was used. In this study both pre and postsurgical patients were less aware of the physiotherapy rehabilitation for breast cancer. They have understanding of the physiotherapy profession but were unaware of oncologic physiotherapy rehabilitation in breast cancer.

In our study only 28% of people knew about physiotherapy in a recovery of breast cancer and people believed that physiotherapy had a positive impact on their recovery as a breast cancer survivor [24].



Another study was based on “Awareness of physical therapy rehabilitation among pre and post-surgical breast cancer patients” including 370 participants. They concluded that there is a low level of awareness and significant barriers to accessing physiotherapy among breast cancer patients. The study was based on awareness of physical therapy rehabilitation among pre and post-surgical breast cancer patients. They studied, awareness of physiotherapy rehabilitation among 370 patients. Our findings indicated that numerous breast cancer survivors lack awareness about physiotherapy rehabilitation post-mastectomy and are also uninformed about postoperative consequences. Only 21.33% of people knew about shoulder discomfort as a post operative complication. 20% of people knew about a common postoperative complication after mastectomy is swelling and only 26.66% of people were aware that physiotherapy can reduce the swelling [25].

Obesity is a known risk factor for the development of breast cancer in women. Women with a higher body mass index (BMI) are more susceptible to breast cancer, especially when they have an increased waist-to-hip ratio (WHR), compared to those who maintain a healthy weight. A similar relationship was observed in a study "Epidemiology of Breast Cancer in Indian Women," which identifies BMI, WHR, and obesity as significant factors contributing to the rising incidence of breast cancer. The increased risk is linked to the fact that adipose (fat) tissue produces estrogen. The more fat cells present, the higher the estrogen levels in the body, which can stimulate the growth and development of breast cancer [26].

Lymphedema, a condition where fluid accumulates in the arm, chest, or breast area due to disrupted or removed lymph nodes, is one of the most common and debilitating issues. Despite its known prevalence, many survivors are not fully informed about prevention, early detection and management strategies for lymphedema this information correlates with the study titled “The Importance of Awareness and Education in Patients with Breast Cancer-Related Lymphedema.” The study concludes that only 19% of the population received information and education about lymphedema also 54.4% of the population suffered with grade 1, 44.4% of the population suffered with grade 2 and 1.11% of the population suffered with grade 3 lymphedema [27]. In current study only 20% of the population had knowledge regarding lymphedema as a post operative complication. Despite the significant role of physiotherapy in managing lymphedema, the present study revealed that only 26.66% of the population was aware of its benefits in aiding recovery from lymphedema



complications. This highlights the urgent need for awareness among breast cancer survivors about the importance of physiotherapy in post-operative care."

The current study included 150 women who had been diagnosed with breast cancer, had a mastectomy, and were suffering from postoperative problems. A self-created questionnaire was employed to conduct this study. The questionnaire was divided into 2 sections namely, section A and section B. Section A of the questionnaire, analyzed knowledge of patients on postoperative complications and Section B analyzed awareness of physiotherapy management amongst them. Significant results were found in both the section A and section B. According to this study 74.08% of patients were unaware about physiotherapy management. Informed consent was obtained from them and data was collected.

As a result, the study revealed a lack of information and awareness among survivors about postoperative complications and physiotherapy management.

The existing research revealed that women in rural regions had inadequate information and were unaware of postoperative problems and the administration of physical therapy following mastectomy.

Conclusion:

To improve the quality of life for breast cancer survivors, it is crucial to increase knowledge and awareness regarding post-operative complications and physiotherapy management. The research emphasizes the crucial role of physiotherapy in managing common complications, including lymphedema, discomfort, decreased range of motion, and tiredness/fatigue. With the rising risk of breast cancer among women this study can be valuable in providing them with essential knowledge and a deeper understanding of this crucial topic. The study highlights insufficient knowledge and awareness regarding post operative complications and physiotherapy management. In the context of knowledge, 59.75% of participants exhibit insufficient knowledge regarding postoperative complications and in the context of awareness 74.08% of participants exhibit insufficient awareness regarding physiotherapy treatment after mastectomy. The results highlight a considerable lack of awareness among participants, with only 40.24% knowledgeable about postoperative complications and 25.91% aware of the benefits of physiotherapy after mastectomy.

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Ethical Committee:

This study was authorized by the ethical council of the Krishna Institute of Medical Sciences, deemed to be a university in Karad.

Statement of Conflict of Interest:

We assert that there is no conflict of interest in the content of this study



References:

1. Mehrotra R, Yadav K. Breast cancer in India: Present scenario and the challenges ahead. *World J Clin Oncol.* 2022 Mar 24;13(3):209-18. DOI: [10.5306/wjco.v13.i3.209](https://doi.org/10.5306/wjco.v13.i3.209)
2. Sun YS, Zhao Z, Yang ZN, Xu F, Lu HJ, Zhu ZY, et al. Risk factors and preventions of breast cancer. *Int J Biol Sci* 2017 Nov 01;13(11):1387-97. DOI: [10.7150/ijbs.21635](https://doi.org/10.7150/ijbs.21635)
3. Malvia S, Bagadi SA, Dubey US, Saxena S. Epidemiology of breast cancer in Indian women. *Asia Pac J Clin Oncol.* 2017 Feb 09;13(4):289-95. DOI: [10.1111/ajco.12661](https://doi.org/10.1111/ajco.12661)
4. Linsell L, Forbes LJ, Burgess C, Kapari M, Thurnham A, Ramirez AJ. Validation of a measurement tool to assess awareness of breast cancer. *Eur J Cancer.* 2010 Mar 23;46(8):1374-81. DOI: [10.1016/j.ejca.2010.02.034](https://doi.org/10.1016/j.ejca.2010.02.034)
5. Akram M, Iqbal M, Daniyal M, Khan AU. Awareness and current knowledge of breast cancer. *Biol Res.* 2017 Oct 02; 50:1-23. DOI: [10.1186/s40659-017-0140-9](https://doi.org/10.1186/s40659-017-0140-9)
6. Momenimovahed Z, Salehiniya H. Epidemiological characteristics of and risk factors for breast cancer in the world. *Breast Cancer (Dove Med Press).* 2019 Apr 10:151-64. DOI: [10.2147/BCTT.S176070](https://doi.org/10.2147/BCTT.S176070)
7. Berger AM, Gerber LH, Mayer DK. Cancer-related fatigue: implications for breast cancer survivors. *Cancer.* 2012 Apr 06;118(S8):2261-9. DOI: [10.1002/cncr.27475](https://doi.org/10.1002/cncr.27475)
8. Kelsey JL, Bernstein L. Epidemiology and prevention of breast cancer. *Annu Rev Public Health.* 1996 May;17(1):47-67. DOI: [10.1146/annurev.pu.17.050196.000403](https://doi.org/10.1146/annurev.pu.17.050196.000403)



9. MacMahon B, Cole P, Lin TM, Lowe CR, Mirra AP, Ravnihar B, et al. Age at first birth and breast cancer risk. *Bull World Health Organ.* 1970;43(2):209-21.
10. Coughlin SS. Epidemiology of breast cancer in women. *Adv Exp Med Biol.* 2019 Aug 28;1152:9-29. DOI: [10.1007/978-3-030-20301-6_2](https://doi.org/10.1007/978-3-030-20301-6_2)
11. Suzanne L. *Contemporary Issues In Women's Cancers.* Canada: Jones and Bartlett Publishers; 2009
12. Angahar LT. An overview of breast cancer epidemiology, risk factors, pathophysiology, and cancer risks reduction. *MOJ Biol Med.* 2017 Jul 10;1(4):92-6.
13. Gupta A, Shridhar K, Dhillon PK. A review of breast cancer awareness among women in India: Cancer literate or awareness deficit? *Eur J Cancer.* 2015 Jul 29;51(14):2058-66. DOI: [10.1016/j.ejca.2015.07.008](https://doi.org/10.1016/j.ejca.2015.07.008)
14. de Boniface J, Szulkin R, Johansson AL. Major surgical postoperative complications and survival in breast cancer: Swedish population-based register study in 57 152 women. *Br J Surg.* 2022 Aug 05;109(10):977-83. DOI: [10.1093/bjs/znac275](https://doi.org/10.1093/bjs/znac275)
15. Savioli F, Edwards J, McMillan D, Stallard S, Doughty J, Romics L. The effect of postoperative complications on survival and recurrence after surgery for breast cancer: a systematic review and meta-analysis. *Crit Rev Oncol Hematol.* 2020 Aug 18; 155:103075. DOI: [10.1016/j.critrevonc.2020.103075](https://doi.org/10.1016/j.critrevonc.2020.103075)
16. Bodai BI, Tusso P. Breast cancer survivorship: a comprehensive review of long-term medical issues and lifestyle recommendations. *Perm J.* 2015 Jun 01;19(2):48-79. DOI: [10.7812/TPP/14-241](https://doi.org/10.7812/TPP/14-241)
17. Moore HC. Breast cancer survivorship. *Semin Oncol.* 2020 May 29;47(4):222-28. DOI: [10.1053/j.seminoncol.2020.05.004](https://doi.org/10.1053/j.seminoncol.2020.05.004)
18. Kisner C, Colby LA, Borstad J. *Therapeutic Exercise Foundation and Techniques.* 7th ed. India: Jaypee Brothers Medical Publishers; 2018



19. Johansson K. Is physiotherapy useful to the breast cancer patient? *Acta Oncol.* 2009 Jul 08;44(5):423-24.
20. Lauridsen MC, Christiansen P, Hesselbo IB. The effect of physiotherapy on shoulder function in patients surgically treated for breast cancer: a randomized study. *Acta Oncol.* 2009 Jul 08;44(5):449-57. DOI: [10.1080/02841860510029905](https://doi.org/10.1080/02841860510029905)
21. Ribeiro AP, Maniaes T, Naomi Hamamoto A. The effects of mastectomy and breast reconstruction on body posture and biomechanical aspects. *Women's Health and Biomechanics: Where Medicine and Engineering Meet.* 2018 Jan 10;29:57-69. DOI: [10.1007/978-3-319-71574-2_5](https://doi.org/10.1007/978-3-319-71574-2_5)
22. Vinolo-Gil MJ, Martín-Valero R, Martín-Vega FJ, Rodríguez-Huguet M, Perez-Cabezas V, Gonzalez-Medina G. Respiratory Physiotherapy Intervention Strategies in the Sequelae of Breast Cancer Treatment: A Systematic Review. *Int J Environ Res Public Health.* 2022 Mar 23;19(7):3800. DOI: [10.3390/ijerph19073800](https://doi.org/10.3390/ijerph19073800)
23. Krzywonos A, Ochałek K, Krzywonos-Zawadzka A, Pitala K. Assessment of knowledge of cancer and lymphoedema among breast cancer survivors. *Menopause Review/Prz Menopauzalny.* 2014 Nov 02;13(5):273-9. DOI: [10.5114/pm.2014.45170](https://doi.org/10.5114/pm.2014.45170)
24. Masood S, Ali S, Sayyeda A, Rafique H, Kumar PR. Knowledge and Awareness of Physiotherapy among Cancer Survivors. *Journal of Health and Rehabilitation Research.* 2024 Feb 29;4(1):1036-40. DOI: [10.61919/jhrr.v4i1.577](https://doi.org/10.61919/jhrr.v4i1.577)
25. Kamer GG. Awareness of Physical Therapy Rehabilitation among Pre and Post Surgical Breast Cancer Patients—A Survey. *Int J Innov Sci Res Technol.* 2023 Aug;8(8):1469-76.
26. Malvia S, Bagadi SA, Dubey US, Saxena S. Epidemiology of breast cancer in Indian women. *Asia Pac J Clin Oncol.* 2017 Aug;13(4):289-295. DOI: [10.1111/ajco.12661](https://doi.org/10.1111/ajco.12661)



27. Borman P, Yaman A, Yasrebi S, Özdemir O. The Importance of Awareness and Education in Patients with Breast Cancer-Related Lymphedema. *J Cancer Educ.* 2017 Sep;32(3):629-633. DOI: [10.1007/s13187-016-1026-1](https://doi.org/10.1007/s13187-016-1026-1)