

REVIEW ARTICLE

A Review on Conventional and Alternative Treatments for Breast Cancer

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ABSTRACT

Breast cancer is the most prevalent form of cancer among women globally and is the second leading cause of cancer-related deaths. There are two primary approaches to treating cancer: conventional and alternative treatments. An estimated half of cancer patients utilise alternative treatments as their initial treatment, thus this review aimed to determine the conventional and alternative treatments for breast cancer. Conventional treatments for breast cancer typically include chemotherapy, radiotherapy, and surgery. The most commonly used regimen is doxorubicin combined with cyclophosphamide. Breast cancer at an early stage is a very treatable disease, with current conventional treatments such as surgery combined with radiation and adjuvant drugs. Alternative treatments for breast cancer encompass a wide range of healthcare practices that are not part of conventional medicine and are not fully integrated into the dominant healthcare system. These may include herbs, acupuncture, and detoxification diets. The combination of complementary and alternative medicine is effective in improving physical and mental recovery, boosting the immune system, and reducing the adverse effects of conventional treatment. In conclusion, conventional treatments have shown higher survival rates, while alternative treatments may alleviate side effects. Further research is required to validate the efficacy and safety of alternative treatments.

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INTRODUCTION

Breast cancer is defined as a disorder where abnormal cell growth within the breast leads to tumor formation, which, if left untreated, can spread throughout the body and be fatal (1). Breast cancer is the most prevalent form of cancer among women globally and the second highest cause of cancer-related deaths. Although less common, men can also develop breast cancer, accounting for around 1% of all breast cancer cases, and it is typically estrogen-receptor positive (2). The mortality rate for women with invasive breast cancer is 3%, while the rate for all breast cancer cases is 13% (3). Breast cancer is one of the top five causes of death in Malaysia, along with other leading causes (4). The Malaysia National

Cancer Registry (MNCR) data from 2012 to 2016 reveals that the majority of breast cancer diagnoses were at stages III and IV (4). Cancer remains a major global health challenge, ranking as the second leading cause of death worldwide with an estimated 9.7 million deaths reported in 2022. In Malaysia, the burden of cancer has similarly intensified, becoming the third most common cause of death in 2022 with 15.2 thousand recorded cases, an increase from its position as the fourth leading cause in 2021. Between 2017 and 2021, breast cancer represented the most frequently diagnosed cancer in Malaysia, accounting for the highest incidence among women. Its predominance places it ahead of all other malignancies in the national cancer profile, underscoring its significant impact on population health (5) .

There are two primary approaches to treating cancer: conventional and alternative treatments. Conventional treatment for breast cancer refers to evidence-based medical approaches that have been scientifically tested

and approved through rigorous clinical trials. These include surgery (lumpectomy, mastectomy), radiation therapy, chemotherapy, hormone therapy, targeted therapy, and immunotherapy. Such treatments are widely recommended in clinical guidelines and are administered by oncologists to control tumour growth, prevent recurrence, and improve survival outcomes. Alternative treatment, by contrast, encompasses non-mainstream practices that are used instead of conventional medicine and generally lack sufficient scientific validation. On the other hand, the World Health Organization (WHO) defines alternative treatments for breast cancer as a wide range of healthcare practices that are not part of a country's traditional or conventional medicine and are not fully integrated into the dominant healthcare system (6). These may include herbs, acupuncture, and detoxification diets. It is estimated that one-third to one-half of cancer patients worldwide use alternative treatments as their initial treatment, which can lead to a fivefold increase in death compared to those who receive conventional treatments (5, 6). Breast cancer can be further classified into five molecular subtypes: luminal A, luminal B, HER-2 positive non-luminal, basal-like, and special histological types (2).

BREAST CANCER

Cancer refers to the uncontrolled growth of a specific type of cells in a particular region of the body. Breast cancer is a condition in which cancerous cells in the breast grow uncontrollably and develop into tumors (1). It can be frequently spreads to distant organs such as the liver, brain, lung, and bone (5). Two genes, BRCA1 and BRCA2, play a significant role in the development of breast cancer. They are located on chromosomes 13q12 and 17q21, respectively (7). Loss of function of BRCA1 resulted in centrosome duplication, genetic instability, disruption of the cell cycle checkpoint, and ultimately apoptosis. Breast cancers associated with BRCA2 are more likely to have a luminal phenotype, but they are also high-grade invasive ductal carcinomas (7). Several factors can increase the risk of developing breast cancer, including older age, female sex, late menopause, nulliparity, not breastfeeding, positive family history, thick breast tissue, hormone therapy, and a history of chest radiation therapy (7). The common symptoms of breast cancer are breast lumps, changes in breast shape, and nipple discharge (4). However, in a community-based study, the most common symptoms of breast cancer were breast colour changes such as redness or scaly skin (48.3%), new lumps in the breast or armpit (42.8%), changes in breast size and shape, including an inverted nipple (40.3%), and nipple discharge other than breast milk, including blood and pus (29.8%) (8). Since breast cancer often presents without noticeable symptoms, especially during its early stages when the cancer is small and difficult to detect, it emphasizes the importance of annual mammograms for prompt identification and treatment (4).

Early detection of breast cancer cells through various diagnostic methods can significantly decrease the long-term death rate associated with the disease. Mammograms, which involve low-radiation X-rays can detect clinically unsuspected breast cancer cells, especially non-invasive carcinomas like Ductal Carcinoma in situ (DCIS) (9). Breast ultrasound, which uses mechanical periodic compression waves and medium sound waves, is another non-radiation technique that can create images of body structures and differentiate between solid breast lumps and cysts (10). Computed Tomography (CT) scans are also used to identify distant metastases in a single exam, and they are particularly useful in staging locally progressed and inflammatory breast cancer (10). Additionally, breast magnetic resonance imaging (MRI) scans use radio waves and magnets to capture cross-sectional images of the body, making them a valuable tool for detecting breast cancer. Finally, biopsy is a method of verifying whether a mass is malignant, and if so, removing it for further investigation (9).

CONVENTIONAL BREAST CANCER TREATMENTS

There have been evolutions in the development of the conventional treatments used in treating breast cancer, and hence, patients are now offered a wider array of treatments. The term chemotherapy was introduced by German scientist Paul Ehrlich, who studied the use of medications to treat infectious diseases (11). Chemotherapy drugs work by interfering with the cell cycle and mitotic process (11). The purpose of chemotherapy is to inhibit cell growth and tumour multiplication, thus reducing the spread of cancer and metastasis (3). Cytotoxic chemotherapy is a therapy that has shown its effectiveness in treating women who are at risk of systemic relapse (12). Women, typically younger than 60 years old, with primary tumours greater than 1 cm in diameter or with lymph node involvement, as well as women older than 60 years old with lymph node involvement or tumours larger than 1 cm in diameter and hormone receptor negativity or tumours larger than 2 cm with hormone receptor positivity, are considered suitable candidates for chemotherapy (13). In breast cancer treatments, the most commonly used regimen is doxorubicin combined with cyclophosphamide, which is determined by the patient's medical condition and tumour characteristics. Common side effects of chemotherapy include hair loss, nausea, reduced blood cell count, mouth and digestive tract inflammation, and an increased risk of a second blood cancer (14). Generally, chemotherapy has consistently been associated with increased survival rates in breast cancer patients. Conventional treatments have been used in hospitals for a long time and have been continuously evaluated to improve their effectiveness in treating breast cancer (13).

Radiotherapy can be defined as a type of cancer

treatment that utilizes high-energy radiation to eliminate cancer cells and shrink tumors (15). This treatment is considered essential to be performed systematically after surgery procedures to decrease the rate of recurrence and specific mortality (15, 16). Radiotherapy alone without surgery is only used in specific cases, such as when surgery is not possible for elderly female patients with inflammation or controlled metastatic diseases (17). There are several types of radiotherapy treatments, including radiation after lumpectomy, which is divided into either whole-breast radiation or partial-breast radiation. Partial-breast radiation typically requires 5-7 weeks of daily whole-breast radiation and has shown no local recurrences or toxic survival with long-term follow-up (18). Post-mastectomy radiotherapy is recommended for patients with high-risk pathologic features or at risk of cancer recurrences. It results in a significant decrease in locoregional recurrence in the lymph nodes or breast (17). Radiation for locally advanced breasts is used in cases where surgery is not possible, such as inflammatory breast cancer. The risk factors for this treatment include swelling of the exposed area, fatigue, and skin irritation (18).

Surgery is widely regarded as the primary treatment option for breast cancer, particularly in its early stages, and the type of surgery depends on the cancer type, stage, and grade (19). There are two main surgical procedures used in breast cancer treatments: Lumpectomy, which involves removing only the tumour and some surrounding healthy tissue to evaluate the risk of cancer recurrence, and is often used for early-stage breast cancer, followed by radiotherapy to remove any remaining cancer cells. This procedure offers survival benefits similar to modified radical mastectomy in both overall and disease-free survival (19). While levels I and II axillary dissection can help in appropriately staging the axilla and reducing the risk of axillary recurrence, they are linked to arm pain in roughly 33% of patients and lymphedema in 20% of patients (20). Although breast-conserving therapy appears to be comparable to mastectomy in terms of marital adjustment, global adjustment, and fear of recurrence, it may be superior in terms of body image, psychological, and social adjustment (20).

Mastectomy a procedure that involves removing the entire breast, along with the nipple. The Latin phrase *ectomia*, which means "excision of," and the Greek word *mastos*, which means "woman's breast," are the sources of the term (21). Among the indications for this procedure are compromised patients with advanced disease such as either multicentre or multifocal disease and inflammatory breast cancer, classified as T4 disease, chest wall involvement, or T2 (larger than 5 cm) tumours as well as those with Paget disease where their tumour cells are in the nipple-areolar complex's epidermis (22). A survey was done to 152,755 patients with stage I, II, or III breast cancer, and 4,969 selected contralateral

preventive mastectomies with 3.3% incidence for all surgically treated individuals and 7.7% for mastectomy patients. The total rate increased drastically from 1.8% in 1998 to 4.5% in 2003. Similarly, the prevalence of contralateral prophylactic mastectomy in patients undergoing mastectomy grew drastically from 4.2% in 1998 to 11.0% in 2003 (23). A lymph node biopsy usually follows up this procedure to ensure that the cancer has not spread to the lymph nodes, otherwise a more extensive axillary removal will be done to remove the affected lymph nodes (21).

ALTERNATIVE BREAST CANCER TREATMENTS

Alternative cancer treatments encompass homeopathy, high-dose vitamins, specific herbs and supplements, and special diets. According to the American Cancer Society, many practitioners of alternative medicine recommend to combine these therapies (24). The primary drivers of the complementary and alternative medicine (CAM) trend are the potential for improving quality of life through physical and mental recovery, bolstering the immune system, and reducing the adverse effects of conventional treatment. Breast cancer is typically treated with hormone therapy, surgery, chemotherapy, and radiotherapy (4). However, due to severe side effects and multidrug resistance, these approaches are becoming increasingly ineffective. In Malaysia, the use of complementary and alternative medicine among breast cancer patients ranges from 25 to 88.3%. Other Asian countries with high CAM utilization include Indonesia at 75.0%, Korea at 67%, Thailand at 60.9%, Singapore at 55.0%, and Turkey at 47.3% (25). Despite the popularity of CAM, there is no evidence to suggest that it is superior to traditional medicine. However, CAM is increasingly gaining popularity among the public. While it is known that CAM is frequently used by breast cancer patients, its implications for conventional medicine's effectiveness remain unclear. In Malaysia, the health beliefs of breast cancer patients suggest that CAM is just as effective as allopathic medicine (25). Additionally, CAM has been found to contribute to the advanced stage of presentation, where patients with stage III and IV breast cancer account for 30-50% of cases (25).

Natural products showed potent anti-cancer and anti-tumor properties, and these compounds are less toxic and exhibit fewer recurrent resistances to hormonal anti-cancer drugs used in conventional medications (26). They have been found to diminish the aggressiveness of breast cancer, halt the proliferation of cancerous cells, and alter pathways associated with cancer. With further modifications and clinical research, these compounds could prove even more effective against breast cancer (26). The use of herbal remedies among cancer patients varies, with estimates ranging from 60-80%, depending on how herbal medicine is defined and the study location (27). According to a survey in

the United Kingdom, about 25% of cancer patients have consulted an herbal medicine practitioner, although the authors suggest that this figure may be understated. In Canada, 20% of breast cancer patients have used herbal medicine, while American studies show rates of over 65%, which are considerably higher than those reported in the general population or other cancer diagnostic groups (28). Nonetheless, herbal or botanical agents have complex biological activities that can influence many aspects of cancer development, such as cell growth, apoptosis, immune function, and host-tumor interactions (26). The effectiveness of Chinese herbal medicine such as ginseng in treating cancer is increasingly being recognized as a viable alternative to conventional treatments. This is particularly true for breast cancer patients, where Chinese herbal products are the most commonly used form of complementary and alternative medicine (29). The potential synergistic benefits of using dang qui (*Angelica sinensis radix*) and ginseng (*Panax ginseng-radix*) was reported for breast cancer patients (30). Traditional Chinese medicine such as Kushen injection is a popular choice in China for treating multiple malignant tumours, with its primary active ingredients including matrine, oxymatrine, sophocarpine, and sophoridine (31). Kushen injection has been shown to have a range of pharmacological activities, including a good synergistic antitumor effect, and inhibiting breast cancer cell proliferation, invasion, and migration via various mechanisms (31). Curcumin has been reported to inhibit breast cancer cell growth through modulation of NF- κ B and PI3K/AKT signaling pathways. However, the clinical translation of these findings remains limited due to poor bioavailability, lack of standardized dosages, and variability in herbal preparations, which pose significant hurdles to their integration into mainstream therapy (31).

Acupuncture is derived from traditional Chinese medicine, and is currently a popular adjunctive therapy. An acupuncture therapy involves inserting needles into the body to stimulate the sensory nerves in the muscles and skin (27, 29). This may help treat bodily diseases such as persistent pain. Acupuncture is a traditional medicine that is used to treat pain and other health issues. Some very thin steel needles are inserted into the skin at various acupoints by an acupuncturist (29). An open label study was carried out at the Mayo Clinic Hospital, Methodist and Saint Marys Campus in Rochester, Minnesota. A total of 20 adult breast cancer patients were recruited and given daily acupuncture treatment beginning on postoperative day 1 and continuing throughout their hospital stay. Acupuncture has been discovered to be an effective treatment option for postoperative breast cancer patients. Additionally, it has been shown to significantly reduce anxiety ($p = 0.0065$), tension/muscular discomfort ($p = 0.001$), and pain ($p = 0.023$). The relationship between acupuncture and relaxation was found to be statistically borderline ($p = 0.053$) (32). Despite these benefits, challenges remain, including

heterogeneity of study designs, small sample sizes, and the difficulty of establishing appropriate sham controls, which complicates the interpretation of efficacy (32).

Detoxification is defined as distinct from relapse prevention in that it refers to the safe withdrawal from a substance of dependence (29, 32). Detoxification normally takes a few days to a few weeks, depending on the substance misuse, the depth of dependence, and the assistance offered to the user (33). Detoxification diet is one of methods to prevent a worst condition by taking some detox diet (33). However, further research into how gut bacteria interact with breast cancer treatment via overlap with herbal and vegetable detox juices and water should be done. This has a significant role in stimulating the normal gut flora. This flora is crucial in reducing the size of breast cancer (34). These plants have immune-stimulating and anti-tumor properties. Furthermore, the volatile oils and extracts of these herbs and plants inhibit mevalonate production, which slows cancer growth. Carotenoids, flavonoids, ligands, polyphenolics, terpenoids, sulfides, and plant sterols have all been found in herbs. They have all been proven to either stimulate or inhibit glutathione transferase, a protective enzyme-like glutathione transferase (26, 35). The phytochemical naringenin, which is mostly present in citrus fruits and tomatoes, is a staple of the detoxification diet and is becoming more well-known for its positive health effects on both cancer and non-cancerous illnesses (32). In recent years, significant progress has been made in studying the biological effects of naringenin at the cellular and molecular levels.

CONCLUSION

In summary, conventional treatments are generally considered to be more effective than alternative treatments for breast cancer patients due to their higher survival rates. Nevertheless, alternative treatments often have fewer side effects, but their efficacy and safety have not been adequately validated. While herbs, acupuncture, and dietary interventions have shown potential as supportive modalities in breast cancer management, their current application is limited by inconsistent clinical evidence, lack of standardization, and methodological challenges. Future research should prioritize large-scale, rigorously designed clinical trials to validate efficacy and safety, alongside efforts to standardize herbal preparations, optimize dosage, and clarify mechanisms of action. Acupuncture warrants further investigation through well-controlled studies to strengthen its evidence base for symptom relief. Similarly, dietary interventions should be explored through longitudinal studies that account for confounding factors and adherence issues, with the aim of developing evidence-based nutritional guidelines for breast cancer patients. Integration of these approaches into conventional care, when supported by scientific validation, may enhance patient outcomes by improving

quality of life, managing side effects, and potentially contributing to long-term survivorship. More research is necessary to examine the potential of alternative treatments to complement current conventional treatments for breast cancer.

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