

## **Mindfulness and its influence on quality of life and immune response in women with breast cancer**

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### **Abstract**

Mindfulness therapy is a psychological process, which main purpose is to concentrate attention on internal and external stimuli in the present moment. Practising mindfulness is correlated with well-being, greater energy and enthusiasm as well as the ability to cope with stressful situations. Breast cancer accounts for 22% of all malignant tumors in women. It is characterized by the highest mortality rate among all malignancies in this group.

Diagnosis, applied treatment and changes in the women's lifestyle may have a negative impact on their psyche. Symptoms such as depression, anxiety and fatigue often appear in patients diagnosed with breast cancer. These can lead to a decreased well-being and lower quality of life. Studies show that Mindfulness-Based Stress Reduction (MBSR) therapy has a positive impact on

the quality of life of patients suffering from breast cancer. What is more, those patients may have a worse immune response and less natural killers cells activity (NKCA) than people who doesn't have a cancer disease.

MBSR can re-establish NKCA and improve immune response. Patients who have noticed an improvement in their well-being during and after MBSR therapy showed higher NKCA. There is no doubt that MBSR therapy reduces the level of fatigue, depression and anxiety. Moreover, patients who undergo MBSR therapy are less afraid of a relapse and have less reactivity to the emotional stress.

**Keywords:** Breast cancer, Mindfulness, Mindfulness-Based Stress Reduction, quality of life, natural killers cell activity

## **Introduction**

Historically, mindfulness originates in ancient eastern traditions of Buddhism over 2500 years ago and its main purpose is to cease personal suffering.[1] In 1979, Jon Kabat-Zinn the founder of the Stress Reduction Clinic creates Mindfulness-Based Stress Reduction (MBSR) program, which is a milestone for the development of modern psychotherapy.[2] He defines mindfulness as “the awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment”. The definition remains unchanged and is still up-to-date.

Mindfulness is an approach or way of being based on practice, exposure and personal engagement. Thus, MBSR is considered as a challenge for patients and complement to their treatment. [3] Standards of MBSR practice include all above and moreover the importance of motivation, bringing each moment into awareness when practising, forgetting about passage of time, devoting a significant time - usually 45 min per day, 6 days a week minimally. Group consists of large number of participants in order to provide a community, cultivate acceptance and belonging, feeling support and having optimal learning environment. [4]

Numerous scientific researches prove that MBSR is an effective method of working with people in various medical and psychological conditions. MBSR is beneficial and used in therapy of chronic pain, asthma, cardiac diseases, diabetes, fibromyalgia, anxiety, eating, mood and sleep disorders. Furthermore MBSR contributes positively to the improvement of health state of people suffering from cancer. [2] Its positive impact is particularly evident in women with breast cancer.

## **Breast cancer epidemiology and screening**

Breast cancer is the most frequent invasive cancer among women. It impacts about 2.1 million women each year and ranks as the first leading cancer-related cause of death among women and the fifth most common cause of cancer death worldwide. [5,6] Data from 2018 year shows that there are 2 088 849 (11,6%) women with newly diagnosed cancer and there is no newly diagnosed male case of breast cancer in the world. 626 679 women died because of breast cancer whereas 49 951 occurred in Central and Eastern Europe. The incidence rate of breast cancer in Central and Eastern Europe is 54.5 per 100 000 people while 46,3 is the average rate for the world.[7] Although, the incidence rate for Poland (51.8) is higher than the average rate for Europe, the mortality rate decrease since lately 90' of the last century. [8]

It is said, that breast cancer is diagnosed more often because of mammography screening programmes. This control is promoted by World Health Organisation and involves prevention, early detection, diagnosis, treatment, rehabilitation and paliative care. Awareness of breast cancer problem is raising in general population, which is a crucial aspect of this programm. [9]

## **Breast cancer risk factors**

A variety of risk factors for developing breast cancer is performed. Well-established factors include geography, age, genetics, reproductive factors and benign breast diseases. [10] One of the most significant risk factor of breast cancer is aging. Women with breast cancer who are older than 50 years accounts for 75%. The older woman is, the higher is the risk of developing breast cancer. [10]

It is also believed, that up to 10% of breast cancer cases have a known genetic predisposition. If a woman is diagnosed with breast cancer, the likelihood of developing the disease by her daughter is 1.8 higher than in women without a family history. The risk increases much more when woman is diagnosed before the age of 35. [11] Genetically determined breast cancer which involve BRCA1 and BRCA2 mutations are responsible for up to 90% of inheritable breast cancer cases. [12] Substantial genetic contribution have also mutations of p53 PTEN, STK11, CHEK2, ATM, BRIP1 and PALB2. [13]

Reproductive factors such as low parity, late age of first pregnancy, late menopause and early menarche are correlated to a higher breast cancer risk. [14] Every 1-year delay at menarche can increase the breast cancer risk and on the contrary, every 1-year delay at menopause can decrease it. [15] The risk is twice higher when having the first live birth is after age of 35 in comparison to women who have their first child before age of 30. As regards nulliparity, it increases three times the risk of breast cancer.

The occurrence of breast cancer varies between races and countries. It is said that those differences may result from genetic differences, lifestyle and health care. Benign breast disease, which includes proliferative disease with or without atypical hyperplasia and lobular carcinoma in situ has also influence on increasing the risk of breast cancer. The biggest impact has lobular carcinoma in situ. Women with this disease have up to 13 times higher risk of breast cancer. [10]

## **Quality of life among women with breast cancer**

Nowadays, quality of life (QOL) is a key aspect of the health care, principally in oncological research. It consists of psychological well-being (anxiety and depression levels), physical functioning and social support. Women with breast cancer may suffer from psychosocial distress and physical symptoms that affect their QOL. Their breast cancer experiences differ, however some phases should be the same (such as diagnosis, genetic risk, primary treatment, its psychological management and other special issues). [16]

Cancer-related distress is expected to diminish over time for the majority of women diagnosed with cancer. Nevertheless, such distress may interfere with comfort, the ability to make reasonable treatment decisions and follow medical recommendations. [17] Breast cancer is marked by negative aspects such as physical, mental and psychological symptoms. The most common psychological symptoms include stress, depression, anxiety and impaired cognitive functioning. As regards physical symptoms, there are pain, sleep disturbance and fatigue, which can lead to fear of death, recurrence, assessing altered body image and lower self-confidence. Fatigue, which is defined as a lack of energy or exhaustion affects from 40% up to 80% of patients and unmotivates them to deal with the disease. [18,19] It is emphasised that there are no pharmaceuticals for cancer-related fatigue. However, there are four studies, which prove that MBSR therapy is beneficial in minimising the symptoms of fatigue. [19]

There is no doubt that MBSR program is associated with better quality of life, diminished stress symptoms and significant improvements in sleep quality in patients with breast cancer. [20] One third of women worldwide decide to take part in such meditation programs to reduce stress, pain, fatigue and anxiety symptoms. [21,19] Studies show that MBSR has also positive influence on changes in fear of recurrence, perceived stress and physical functioning. [22]

## Immune system - Natural killer cells activity

Immune system plays an important role among patients struggling with cancer. Natural Killer (NK) cells are lymphocytes with two types of receptors - activating and inhibitory. Their engagement depends on current health state of a person. Normally, the activity of inhibitory receptors dominates over activating receptors but when having an infection it is the opposite. [10] These lymphocytes are first identified immune cells with their ability to kill cancer cells and many studies show that occurrence of dysfunctional NK cells is more frequent in patients with cancer. [23]

As regards MBSR, one of the researches presents that MBSR may have influence on NK cells activity (NKCA). Patients provided a blood sample before undergoing MBSR treatment (pre-MBSR, baseline) and after two weeks of MBSR (post-MBSR) and also completed psychological assessment. Significant improvements across many domains of QOL were seen from pre-MBSR to post-MBSR. Improvement in mental well-being was associated with increased NK cytolytic activity from baseline to post-MBSR. [24] Patients with breast cancer have lower NKCA because of tumor cells which disturb the natural immune response. Interesting fact, that in the course of MBSR women with breast cancer re-established their NKCA, reduced their level of cortisol and improved QOL, which was not seen in the non-MBSR group. [25]

## Conclusions

Mindfulness-Based Stress Reduction therapy positively influences the quality of life of women suffering from breast cancer. Thanks to the therapy the levels of stress, anxiety and depression are reduced. It has also a positive impact on improvement of sleeping and diminishing fatigue. Women become more self-confident and they are less afraid of cancer recurrence and death. MBSR improves the function of immune system. It increases NKCA among patients with cancer generally and re-establishes NKCA in women with breast cancer. To confirm the positive effect on NKCA, further studies on greater populations are necessary. According to available data, MBSR therapy can be used as an additional treatment in order to maintain high quality of life in breast cancer patients.

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