

Effects of pomegranate on breast cancer

Abbreviations: ER, estrogen; MIF, migration inhibitory factor; VEGF, vascular endothelial growth factor; PR, progesterone

Mini review

Each person knows about Breast cancer these days, due to the fact that humankind witnesses countless organizations working for this sole purpose diligently every day. Periodically we meet or hear individuals struggling with this devastating category of cancer, which is particularly prevalent in women. According to the recent facts and figures from American Cancer Society about the number of deaths from breast cancer in US in 2013, among all ages, is approximately 39,620.¹ The rate had increased 0.4% from 1975-1990. Nevertheless analyzing the mortality trend from 1990-2010, the death rate has been decreased to 34%.¹ Consequently, the known reason behind this decline is attributable to the improvements in our health care system in terms of treatment and in conjunction with the early detection of breast cancer. Discussing about the risks of having breast cancer, there are certain factors which cannot be modified that comprises sex, family history, age, early menarche, and late menopause. However, there are several factors which can be taken care of for instance abstinence from smoking and alcohol consumption, use of combination oral contraceptives, avoiding obesity, and increase the usage of vegetables and fruits in your diet.¹ Nevertheless, when populaces mention the dietary changes that can give an enormous benefit against cancer, the aforementioned will find a vast amount of natural products that have anti-cancer components. Numerous factors can halt the growth of the tumor inside our body; handful can prevent its spread. The emphasis and highlight will be benefits of pomegranate and its effects on breast cancer. A normal cell has a tendency to divide numerous times and subsequently stop by programmed cell death (apoptosis) when they are no longer needed. Conversely, a cancer cell loses its tendency to stop dividing, to attach to other cells, and to die by apoptosis. One of the reasons of breast cancer is the mutation in particular genes in our body which are linked to estrogen exposure. Multiple medical treatments have been used so far which were targeted towards the presence of estrogen(ER), progesterone (PR) and Her2/neu receptors on the cancer cells. These receptors are used to predict the prognosis of breast cancer treatment. Patients expressing these receptors have a promising prognosis, while those without them have an extremely poor prognosis.¹⁻⁸ Pomegranate has been utilized for years in traditional medicine in Indians' ancient Ayurveda.³ It was implemented for traditional remedy against diarrhea, dysentery, intestinal parasites, and it was acknowledged regarding its antioxidant effects.^{2,3} Although there are few researches that have been done on the impact of its effects on breast cancer, I will attempt to cover the essentials of those researches. The antioxidant effect of pomegranate is due to the presence of 3 major anthocyanidins components which are delphinidins, cyanidin, and plargonidin. Analogously, the seed oil from the pomegranate has several anti-cancer fatty acids agents, for example puniic acid, lutiolin, and ellagic acid. One of the study done by the University of California, Riverside, on two different concentrations of pomegranate juice(1% and 5%) by using two breast cancer cell lines MDA-MB-231 cells(ER(-)) and MCF7 (ER(+)), and a healthy cell line MCF10A.⁵ These constituents were used together and it was found that 1% concentrated juice was able to inhibit the cancer cell growth completely in both cell lines.⁵ However,

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Faiza Khalid, Khalid Wahid
University of Chicago, USA

Correspondence: Faiza Khalid, University of Chicago, 5801 South Ellis Avenue, Chicago, IL 60637, USA, Tel 8474431193, Email ujalamahmood@yahoo.com

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the 5% was also able to kill the significant amount of cancer cells in addition.^{4,5,9-11} Furthermore; the 1% concentrated juice was also able to show that it decreases the cancer cell migration towards the bone, which is attracted by a chemokine called SDF1 α .⁵ The seed oil possesses anti-estrogenic effects by inducing estrogen-induced functions.^{4,5} This is the mainstay of breast cancer to proliferate and invade the deeper tissues and causes devastating invasive cell breast cancer, the worst of all types of breast cancer. In another study named "Preliminary studies on the anti-angiogenic potential of pomegranate fractions in vitro and in vivo", which was executed by measuring the VEGF (Vascular Endothelial Growth Factor), that is responsible for making new vessels to feed cancer cells.^{4,10} This VEGF was down regulated in MCF10A and MCF7. However, the migration inhibitory factor (MIF) was up regulated in MDA-MBA-231 which keeps the cancer cell at one place and does not let them metastasize to other areas of the body.^{4,10,11} Several Other studies were done, that also show the significance of other components and their functions in terms of preventing or reappearance of breast cancer.¹²⁻¹⁷ Although these studies were done to show an alternative way to cure breast cancer, but still the trials should be further conducted on a larger scale to assess the efficacy of the proposed treatment. Granting information from multiple studies appears persuasive, but thoroughly aimed clinical trials in humans are needed to establish whether pomegranate can become part of our defense against breast cancer or not.

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Conflicts of interest

Author declares that there is no conflict of interest.

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