



# The Effects of Honey and Cinnamon Mixture on Improving the Quality of Life in Breast Cancer

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## Abstract

**Objective:** Improving the quality of life in any patients suffering from cancer is regarded as the main goal of their treatment. In the present study, the effect of honey and cinnamon mixture on the quality of life in patients with breast cancer was investigated.

**Materials and Methods:** The present clinical trial study was performed on 119 women with breast cancer, age range of 20-60, in the pain and palliative care clinic to receive complementary therapy. Initially, the patients' quality of life was specified using the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30) questionnaire. Then, all the patients consumed a mixture of honey and cinnamon powder three times per day for 1 week. At the end of treatment, the patients refilled the questionnaire out again and any improvements in patients' quality of life were analyzed by comparing patients' quality of life before and after intervention. SPSS statistical software was used.

**Results:** The data provided by 117 patients was analyzed, because of refusing 2 patients to participate in the study. The patients' mean age was  $48.58 \pm 7.6$  years old. Their average weight and height were  $52.81 \pm 5.4$  kg and  $159.09 \pm 7.3$  cm, respectively. In 84.6% of cases, a surgical intervention was performed. Assessment of patients' quality of life before and after intervention indicated significant improvements in 23 criteria and, no significant improvements in 7 criteria. Overall health and quality of life improved significantly after treatment.

**Conclusion:** Using honey and cinnamon mixture for one week can improve most of the criteria addressing the quality of life in women with breast cancer.

**Keywords:** Breast cancer, Cinnamon, Complementary therapy, Honey, Quality of life

## Introduction

Breast cancer is considered as the most common cancer among women (1). Not only the breast cancer itself, but also its proposed treatments can produce very unpleasant complications and side effects including fatigue, anxiety, pain, nausea, lymphedema, and dermatitis. The mentioned complications affect the patient's quality of life. The evidence presented in pertinent literature suggests that complementary and alternative medicine (CAM) is effective in modifying these symptoms and alleviating the patients' discomfort (2). However, it has been suggested that complementary medicine should be used in conjunction with conventional medicine as an integrative medicine (3,4). At the present time, there is a worldwide growing interest in the use of CAM in medicine (3). Tas reported that 47.3% of the patients diagnosed with cancer disease had used at least one type of complementary medicine (5). International researches reveal that in comparison with patients suffering from other types of cancer, women with breast cancer are more likely to use CAM and are the heaviest users among cancer survivors (6-8). CAM may help to relieve the symptoms that are inadequately managed by conventional medicine and may improve health-related quality of life (HRQOL) in cancer patients (8-10). The mentioned

point may be due to the fact that there are few approved standard guidelines presented by the conventional therapies to manage the patients' discomfort and dissatisfaction, while patients' sense of well-being may be improved with application of CAM therapy (11).

CAM practices as well as other different methodological approaches vary widely in various countries based on their traditions and disease prevalence (12-16). In this regard, application of CAM therapies, with the exception of prayer and spiritual healings, is not popular in Iran (17).

Biologically-based and natural practices, interventions, and products, categorized as a subgroup of CAM practices, refer to utilization of dietary supplements and include herbal, special dietary, orthomolecular, and individual biological therapies (18). Herbal medicine is utilization of medicinal plants for prevention and treatment of diseases and ranges from traditional and popular medicines of every country to standardized and titrated herbal extracts (19).

Cinnamon has indicated a number of beneficial properties such as antimicrobial and anti diabetic activities, inhibition of cancer cell proliferation, and antioxidant properties exhibited by its extraction (20-23). Honey contains sugars such as glucose and

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fructose, and minerals such as magnesium, potassium, calcium, sodium, chloride, sulfur, iron, and phosphate. Moreover, based on the quality and type of honey, vitamins such as B1, B2, B3, B6, and C can be seen in different quantities (24). Honey flavonoids play a role in vasodilatation, well-being, and a wide range of biological activities such as antibacterial, antiviral, anti-inflammatory, and anti-allergic activities (25-28). Mixture of honey and cinnamon has been traditionally used for centuries. It is believed that their mixture enhances the medicinal properties. However, lack of scientific evidence regarding the effects of honey and cinnamon mixture on cancer is evident, and further studies are required in this regard.

Considering the few available studies and lack of any strong researches in this respect in Iran, the present study was conducted to investigate the effects of honey and cinnamon mixture on improving the quality of life in patients with breast cancer and to present evidence-based reasons in this regard.

### Materials and Methods

This study examined the life quality of 119 women before and after intervention. These patients referred to the only outpatient palliative care clinic, Imam Reza teaching hospital, situated in North West of Iran, during July 2014-November 2015. All patients, with previously diagnosed breast cancer, were 20-60 years old and referred to the clinic to receive pain management services or palliative cares. The purpose and procedures of conducting the study were thoroughly discussed with patients. Then, they were requested to fill out the Persian version of the European Organization for Research and Treatment of Cancer (EORTC QLQ-C30) questionnaire (33,34). The very purpose of the study was to define the patients' quality of life one week before and after taking the honey and cinnamon mixture for one week. The intervention protocol was as follows: a tablespoon of honey (30 g) and a teaspoon of cinnamon (4 g) powder were dissolved in a cup of boiled water, and the patients ate the mixture three times daily for 1 week. The consumed honey and cinnamon powder were all purchased from one local food company. Adequate amounts of them were given to the patients without paying any costs. The patients willing to continue any previously administrated treatments or to receive additional treatments during the week of conducting the study were excluded from the study. Patients with a history of drug allergy and psychopathic disorders, and those who had recently undergone chemotherapy or were candidates of undergoing chemotherapy in the following week of intervention were excluded from the study.

The questionnaire contained 30 items addressing various aspects of patients' quality of life. All items of the EORTC QLQ-C30 questionnaire were translated to Persian. The included items were as follows: Trouble doing strenuous activities, trouble taking a long walk, trouble taking a short walk, need for daily rest in bed, need for help with personal activities, restrictions on performing the job or daily activities, restrictions on pursuing the hobbies or entertainments during the past week, being short of breath during the past week, having pain during the past week, need for rest during the past week, having sleep disturbances during the past week, feeling of weakness during the past week, lack of appetite during the past week, feeling of nausea during the past week, vomiting during the past week, constipation during the past week, having diarrhea during the past week, being fatigue during the past week, interference of pain with daily activities during the past week, difficulty in daily concentration during the past week, feeling of tension during the past week, feeling worry during the past week, feeling of irritability during the

past week, feeling depressed during the past week, difficulty in remembering things during the past week, interference of disease with family life during the past week, interference of disease with social activities during the past week, disease-induced financial difficulties during the past week, overall health during the past week, and overall quality of life during the past week. The overall health and quality of life before and after the intervention were rated by patients on a 7-point Likert scale, and the other items were rated on a 4-point Likert scale (1: Not at all, 2: A little, 3: Quite a bit, and 4: Very much). Finally at the end of study, the patients' quality of life scores before and after intervention was compared with one another.

### Statistical Analysis

The statistical data analysis presented descriptive statistics, namely frequency, percentage, mean, standard deviation (SD), and median. To analyze and compare the before and after intervention data, student t test or Wilcoxon rank-sum test was run for dependent groups. *P* value <0.05 was considered to be statistically significant. SPSS version 16 was used to perform the analyses.

### Results

This study involved 119 patients, all of whom ended the study period, with the exception of two patients, who preferred to leave the study due to their lack of faith in the proposed intervention. The provided data by the remaining 117 patients was analyzed. Demographic and socio-demographic characteristics of these women are presented in Table 1. Only 1 patient had bilateral breast cancer. The mean age of participants was  $48.58 \pm 7.6$  years old (34-60). Their average weight and height were  $52.81 \pm 5.4$  kg (44-62) and  $159.09 \pm 7.3$  cm (148-171), respectively. Among them, 17.1% (*n* = 20) aged 20-39 years, 33.3% (*n* = 39) aged 40-49 years, and 49.6% (*n* = 58) aged 50-60 years. Most of tumors (66.7%) were in stage I, and only 5 (8.3%) tumors were in end-stages. At least one surgical intervention was performed in 84.6% (*n* = 99) of patients. Radiotherapy and chemotherapy were used in most of the patients; however, hormone therapy was only used in 10.3% of patients (Table 1).

Table 2 presents the comparison of the patients' quality of life scores before and after intervention. Most of the criteria, i.e. 23 criteria, showed significant improvements; however, performance and status in strenuous activities, dyspnea, nausea/vomiting, diarrhea, difficulty in daily concentration, difficulty in remembering things, and interference of disease with family life did not improve significantly after intervention.

The overall health and quality of life before and after intervention are presented in Table 3. They both improved significantly after consumption of honey and cinnamon mixture.

### Discussion

Diagnosis and treatment of breast cancer in women expose them to various strains and influence their quality of life. Using nutritional/dietary supplements is one of the commonly used CAMs among women with breast cancer (29). Conventional example of the CAM is ayurvedic medicine that was originated in India more than 5000 years ago. Ayurvedic medicine is based on the belief that health and wellness depend on a meticulous balance between the body, mind, and spirit. Its main goal is to promote good health, not fight with disease, and emphasizes a unique cure for every individual circumstance (18). The combination of honey and cinnamon has been used for many centuries in both traditional Chinese and ayurvedic medicine (30). A number of

**Table 1.** Demographic and Socio-Demographic Factors of the Patients

Variable	Mean $\pm$ SD or No. (%)
Age (y)	48.58 $\pm$ 7.6
Weight (kg)	52.81 $\pm$ 5.4
Height (cm)	159.09 $\pm$ 7.3
Marital status (yes/no)	
Married	92 (78.6)
Single/widowed/divorced	25 (21.4)
Offspring	2.74 $\pm$ 1.1
Education	
Unlettered	10 (8.5)
High school graduate or less	98 (83.8)
College graduate	9 (7.7)
Employment status	
Working	14 (12)
Housewife	84 (71.8)
Disabled	19 (16.2)
Menopausal status	
Premenopausal	44 (37.6)
Postmenopausal	73 (62.4)
Tumor stage	
I	78 (66.7)
IIA	18 (15.4)
IIB	16 (16)
IIIA	3 (2.6)
IIIB	2 (1.7)
Surgical treatment, yes/no	99/18
Adjuvant treatment	
Radiotherapy	77 (65.8)
Chemotherapy therapy	64 (54.7)
Hormone therapy	12 (10.3)

studies have investigated various pharmacologic properties of it; however, the therapeutic potential of this mixture for cancer patients has not been adequately evaluated.

The present study is probably an initiative one assessing the effects of honey and cinnamon mixture as a complementary therapy on the overall health and quality of life in breast cancer women. The present study reports the effects of the mixture of honey and cinnamon on the quality of life among 117 women with breast cancer. In this study, 23 of 30 criteria exhibited significant improvements, and the overall health and well-being were significantly improved after taking the honey and cinnamon mixture. However, patients' performance and status in strenuous activities, dyspnea, nausea/vomiting, diarrhea, difficulty in daily concentration, difficulty in remembering things, and interference of disease with family life did not improve significantly after intervention. Schoene et al showed that the cinnamon extract dramatically reduces the rate of proliferation in all three types of cancer cells over a 24-hour period. The product presented this effect in a dose-dependent manner. At the highest cinnamon concentration, the cell counts, compared with the untreated control cells, were reduced by about 50% (31). On the other hand, water-soluble polymeric polyphenols of cinnamon lead to inhibition of proliferation and alter cell cycle distribution patterns of hematologic tumor cell lines (31). According to the results of a study conducted by Jaafarpour et al, cinnamon in comparison with placebo reduces the amount of menstrual bleeding and pain severity in female students (32). In the present study, the prevalence of pain and its severity score significantly

decreased after intervention. The mentioned findings were consistent with results of other studies (33,34). In the present study, consumption of the mixture improved physical activity and decreased feeling of fatigue. There are a number of similar studies indicating that improved physical activity helps cancer patients' pain management and has positive effects on their quality of life (35). On the other hand, physical activity positively influences the body's internal hormone harmony, which supports restoring harmony in the secretion, and utilization of 2 groups of hormones include the sex hormones (estrogen, progesterone, testosterone, etc.) and the glucose-regulating hormones (insulin, glucagon). The hormone harmony may improve patients' well-being (36). Several studies have revealed that medicinal plants, as complementary treatments, can improve the overall quality or at least some dimensions of life in healthy volunteers or patients with specific diseases (37). In the present study, the overall quality of life score improved significantly after taking the honey and cinnamon mixture, which was consistent with the results of similar studies.

The conspicuous success of herbal therapy in improving the quality of life in breast cancer patients can be attributed to its promising effects on the immune functions (2). Honey is rich in antioxidants such as flavonoids and counteracts with free radicals, which may protect against cancer (36). It also has positive effects on immune system by stimulating antibody production (38). Cinnamon has anti-inflammatory, antimicrobial, antioxidant, antitumor, cardiovascular, cholesterol lowering, and immunomodulatory effects (39). Khaki in a study on rats showed cinnamon has the potential to improve testosterone level and sexual function (40). Pharmacological effects of cinnamon are due to the compounds existing in its essence (volatile oil) or extract. These compounds include cinnamaldehyde, coumarin, cadinene, eugenol, and numerous other compounds and essential oils (39,41-43).

Findings of the present study showed that mixture of honey and cinnamon had positive effects of reducing the feelings of pain, weakness, anorexia, constipation, fatigue, anxiety, irritability, and depression. These findings are compatible with findings of studies addressing the effect of polysaccharide peptide (PSP) on the quality of life in patients with gynecologic malignancies (43). It significantly reduces fatigue level and improves quality of sleep, appetite, bowel movement, and emotion status. The obtained pieces of evidence suggest that relief in symptoms of this disease and symptoms caused by its treatment can improve the quality of life in women with breast cancer (2). In the present study, honey and cinnamon mixture created significant improvements only in anorexia and constipation. These results are probably due to lower incidence of symptoms. In addition, as dyspnea was very prevalent in older people, utilization of honey and cinnamon mixture may not have any significant effects on its treatment.

Increasing levels of stress makes it very difficult for patients with cancer to take care of themselves, causes a lot of psychological and physical problems, and increases health care costs. Herbal therapy plays an important role in controlling the stress and psychological problems in patients with cancer (2). Obvious success of herbal therapy in improving the quality of life of patients with breast cancer can be attributed to its positive effects on functions of immune system (2). In the present study, psychological indicators included feelings of tension, anxiety, irritability, and depression. The obtained results revealed significant improvements in all of the mentioned indicators. Limitations of the present study were lack of information on patients' menstruation status, limited time period of study.

**Table 2.** Comparing the Quality of Life Score (Mean  $\pm$  SD) Before and After Consumption of Honey and Cinnamon Mixture (n = 117)

Criteria of the Quality of Life	Before	After	P	Criteria of the quality of life	Before	After	P
Trouble doing strenuous activities	2.97 $\pm$ 0.92	2.94 $\pm$ 0.92	0.362	Vomiting during past week	1.44 $\pm$ 0.69	1.38 $\pm$ 0.64	0.156
Trouble taking a long walk	2.79 $\pm$ 0.97	2.48 $\pm$ 1.0	0.001	Constipation during past week	2.5 $\pm$ 1.1	2.1 $\pm$ 1.0	0.001
Trouble taking a short walk	2.8 $\pm$ 1.0	1.6 $\pm$ 0.9	0.001	Diarrhea during past week	1.3 $\pm$ 0.5	1.2 $\pm$ 0.5	1.0
The need for daily rest in bed	2.6 $\pm$ 1.0	2.2 $\pm$ 1.0	0.001	Fatigue during past week	3.2 $\pm$ 0.8	2.2 $\pm$ 0.8	0.001
The need for help with personal activities	1.86 $\pm$ 0.9	1.68 $\pm$ 0.8	0.001	Interference of pain with daily activities during past week	2.9 $\pm$ 0.8	2.2 $\pm$ 0.7	0.001
Restrictions on performing the job or daily activities	2.6 $\pm$ 0.9	2.2 $\pm$ 0.8	0.001	Difficulty in daily concentrating during past week	1.9 $\pm$ 1.0	1.8 $\pm$ 1.0	0.317
Restrictions on pursuing the hobbies or entertainments during the past week	2.3 $\pm$ 0.9	2.0 $\pm$ 0.8	0.001	Feeling tension during past week	3.2 $\pm$ 0.7	2.2 $\pm$ 0.9	0.001
Being short of breath during the past week	2.0 $\pm$ 1.1	1.9 $\pm$ 1.0	0.317	Feeling worry during past week	3.4 $\pm$ 0.7	2.6 $\pm$ 0.9	0.001
Having pain during the past week	3.36 $\pm$ 0.61	2.44 $\pm$ 0.61	0.001	Feeling irritability during past week	2.7 $\pm$ 1.0	2.2 $\pm$ 0.9	0.001
The need for rest during the past week	3.1 $\pm$ 0.9	2.3 $\pm$ 0.7	0.001	Feeling depression during past week	2.8 $\pm$ 1.0	2.3 $\pm$ 0.9	0.001
Having sleep disturbances during the past week	3.1 $\pm$ 0.8	2.0 $\pm$ 0.8	0.001	Difficulty in remembering things during past week	2.1 $\pm$ 1.2	2.0 $\pm$ 1.1	0.157
Feeling of weakness during the past week	3.1 $\pm$ 0.6	2.1 $\pm$ 0.8	0.001	Disease's interference with family life during past week	2.1 $\pm$ 0.8	1.9 $\pm$ 0.8	0.180
Lack of appetite during the past week	2.6 $\pm$ 0.9	1.9 $\pm$ 0.8	0.001	Disease's interference with social activities during past week	2.5 $\pm$ 1.1	2.4 $\pm$ 1.1	0.102
Feeling of nausea during the past week	2.0 $\pm$ 1.0	1.9 $\pm$ 1.0	0.317	Disease's induced financial limitation during past week	2.3 $\pm$ 1.2	2.2 $\pm$ 1.2	1.0
Overall health during the past week?	3.5 $\pm$ 1.3	4.3 $\pm$ 1.3	0.001	Overall quality of life during the past week	3.4 $\pm$ 1.5	4.2 $\pm$ 1.6	0.001

**Table 3.** The Overall Health and Quality of Life Before and After Intervention

Variable	Score	Before	After	P Value
Overall health score	1	12 (10.3)	5 (4.3)	0.001
	2	17 (14.5)	6 (5.1)	
	3	19 (116.2)	22 (18.8)	
	4	35 (29.1)	20 (17.1)	
	5	34 (29.1)	49 (41.9)	
	6	0 (0)	15 (12.8)	
	7	0 (0)	0 (0)	
Overall quality of life score	1	16 (13.7)	9 (7.7)	0.001
	2	21 (17.9)	12 (10.3)	
	3	23 (119.7)	17 (14.5)	
	4	27 (23.1)	19 (16.2)	
	5	21 (17.9)	34 (29.1)	
	6	9 (7.7)	26 (22.2)	
	7	0 (0)	0 (0)	

In addition, conducting studies with increasing the length of intervention, and also using more accurate tools for evaluation of its effects will shed more light in this regard.

### Conclusion

In general, this study showed that honey and cinnamon mixture improved the overall quality of life and its subsets including physical and psychological aspects, energy level, and symptoms

such as pain, constipation, and anorexia.

### Ethical Issues

The present study was approved by the Ethics Committee of Tabriz University of Medical Sciences and Iranian Registry of Clinical Trials with the following registry number: IRCT201409081772N16 (<http://www.irct.ir>). Written informed consent was obtained from all of the patients.

**Conflict of Interest**

The authors declare that there are no conflicts of interest.

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