The effect of chamomile tea on dyspnoea and anxiety among patients with heart failure

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SUMMARY

- Dyspnoea and anxiety are common problems that can lead to frequent hospitalizations and outpatient clinic visits and reduce the quality of life in patients with chronic heart failure (CHF). The aim of this study was to examine the effects of chamomile tea together with drugs on dyspnoea and anxiety among patients with CHF.
- A four-week controlled trial that was carried out among 60 patients with CHF who visited Honari clinic in Iran in 2014. The intervention group consumed chamomile tea together with medical treatments for 4 weeks. The levels of dyspnoea and anxiety were measured by the visual analogue scale for dyspnoea and Beck Anxiety questionnaire, respectively.
- After the four-week intervention, the severity of dyspnoea reduced from (25.13 ± 13.22) to (16.76 ± 5.76) in the intervention group, but increased from (21.00 ± 11.02) to (29.43 ± 13.10) in the control group. The anxiety level in the intervention group was 24.6 at baseline, and reduced to 12.06 at the end of the fourth week; while the anxiety level in the control group rose from 17.6 at baseline to 20.0 after intervention. Repeat measurement analysis of variance showed significant differences in dyspnoea and anxiety between groups (both p values < 0.001).
- Chamomile tea may possibly reduce the severity of dyspnoea and levels of anxiety in patients with CHF.

INTRODUCTION

Heart failure (HF) is a major public health problem, affecting around 37.7 million adults worldwide (Ziaeian & Gregg 2015). It is often referred to congestive heart failure (CHF), a clinical syndrome that occurs when there is inadequate systemic perfusion to meet the body's demand due to impaired cardiac pump function. In high-income countries, heart failure (HF) is the most common cause of hospitalization in people over 65 years (Braunwald 2015) and is the second most common reason for physician visits (Cho et al. 2013). In 2012, the economic burden of HF was estimated to be more than U$ 108 billion, of which 60% was spent on medical costs (Cook et al 2014). Therefore, it is highly important to optimize cardiac medications as well as new palliative treatment in order to control symptoms of heart failure (Gersh et al., 2010).

HF is characterized by symptoms of dyspnoea, anxiety and fatigue. Peripheral edema and pulmonary edema due to the buildup of excess fluid are also commonly seen in this group of patients (Salemi & Jamee, 2007). Dyspnoea has a variety of causes and is the one of the leading cause of hospitalization among those patients with left ventricular ejection fraction less than 50% (Salemi & Jamee, 2007). Dyspnoea is often associated with marked pleural effusion of the lung (Salemi & Jamee, 2007). A recent study showed that only a small proportion of patients (40-60%) had improved dyspnoea condition during the first day of hospitalization, and 10-20% of patients had recurrence of dyspnoea or died during the early days of admission (Metra et al. 2010). Various medical and non-pharmacological treatments are used to treat dyspnoea in patients with CHF (Gaziano et al., 2010). However, disappointing results were observed even with full implementation of the standard treatments.

Anxiety is also a prevalent symptom and is experienced by 63 % of the patients with HF (Franco et al., 2011). Given the effects that anxiety affects the well-being of these patients, it can adversely affect their quality of life (Vongmany et al., 2016). Among the elderly people and people living with chronic diseases, anxiety has also been reported to be associated with depression (Currow et al., 2007; Franco et al., 2011). Mild to moderate anxiety can worsen symptoms, including ineffective breathing, increased heart rate and blood pressure, which delay the process of recovery. In addition, anxiety can cause airway spasms which can further deteriorate dyspnoea. Anxiolytic was commonly used to treat these problems (Dam & Saduk, 2006).

Chamomile is one of the most ancient herbs that have been well-documented for its medicinal properties. It is a flowering plant, whose herbal properties are extracted from the dried flowers. Its strong smell had drawn peoples' attention since long ago and was used for many therapeutic purposes. The therapeutic properties of this plant can be categorized as diaphoretic and diuretic drugs because of Azulene and hydrophilic compounds (Srivastava et al., 2010). Since mid-15th century, this plant has been gradually recognized for its essence. Azulene in this plant has antihistamines property which

has been proven to decreases dyspnoea in patients with asthma and anxiety.

Chamomile is currently available in Iran as a key component of chamomile tea. This herbal medicine nourishes the nerves, and reduces the levels of stress and anxiety associated with CHF. Drinking chamomile tea is effective to treat asthma, sleep disorders, chronic fatigue syndrome, and depression. Chamomile is also useful in patients with edema caused by renal problems. German pharmacist has accepted chamomile as a standard medicinal tea to dilate coronary atherosclerosis and to reduce triglycerides (Newman et al., 2003). This herb has been found to be contraindicated in pregnant women since it could cause atopic dermatitis (Oxberry & Johnson, 2008).

Chamomile has sedative effect due to the flavonoid apigenin which binds to benzodiazepine receptors, and therefore provides a molecular mechanism to alleviate some parts of the central nervous system in animal and human (Srivastava et al., 2010). A randomized double-blind study by Amsterdam, et al (2013) employed chamomile extract among patients with anxiety disorders and showed a decreased level of anxiety. The above mentioned studies provided references to apply chamomile to alleviate the physical and psychological problems among patients with HF. Moreover, drinking chamomile tea may remind the HF patients that they are able and competent to take care of themselves. Therefore, this study was conducted to examine the effects of taking chamomile tea in reducing dyspnoea, anxiety in HF patients.

METHODS

This was a double-blind stratified randomized control trial with pre-and-post measurement (Friedman et al., 2010). Patients with CHF were randomly selected based on the CHF classification. Patients with classes I or II CHF were selected and assigned to either the control group or the intervention group. Written consent was obtained from each participant prior to entering the study. Inclusion criteria for the study included:

- Patients who were mentally alert and able to perform self-care activities.
- Ability to continue treatment for four weeks.
- Patients aged 18-80 years with underlying HF of class I and II
- Renal function: with a 60-120 ml/min of glomerular filtration rate (GFR)
- No history of asthma or chronic obstructive pulmonary disease
- No history of allergy to chamomile tea

Exclusion criteria included patients who were allergy to chamomile tea, pregnant, or with left ventricular ejection fraction less than 30% (Mendis et al., 2011). Confounding variables, such as sex, age, and class of CHF, were stratified and matched between groups with the assistance of statistical experts. The participants with matched characteristics between groups, in terms of age, gender, and class of HF were recruited.

Patients in the intervention group received the chamomile tea. The method of making chamomile tea was performed by the researcher and a pharmacologist. Necessary instruction concerning amount, procedures, and duration of using the tea were given by the researcher after baseline data collection. The method of using chamomile tea was directed by a specialist as following: placing one tea bag (20 grams) of chamomile in 50 ml of boiling water and seeping for five minutes to desired temperature. The patients in the intervention group used the chamomile tea three times per day for four weeks at home.

In addition to the standard therapy of angiotensin enzyme inhibitors and beta blockers, diuretic dose were prescribed by the doctor, and anxiolytics such as conventional diazepam and midazolam were prescribed by the physician based on the clinical condition of the patient. The medications were used by the patients at home with a follow-up phone call and at the clinic by the research assistant.

A structured questionnaire was employed as the study instrument. The questionnaire included demographic data, patient's vital signs, underlying diseases, medication, severity of dyspnoea and anxiety, results of blood and urine tests. The class of CHF was assessed based on guidelines of the New York Heart Association. The severity of dyspnoea and anxiety in these patients were examined at baseline, the second week, and at the fourth week with the visual analogue scale (VAS) for dyspnoea (Wilkinson et al., 1999) and Beck Anxiety questionnaire (Friedman et al., 2010). The VAS for dyspnoea evaluated the severity of dyspnoea based on patients' selections on a 100 millimeter ruler. Beck Anxiety questionnaire was a 21-item instrument with 5 choices for each item. The patients would select the choice based on their actual experiences when feel anxiety. Validity of the scales was established with a Cronbach's alpha coefficient of 0.9.

Initial tests included blood urea nitrogen (BUN), creatinine and echocardiography, which had been done in the recent months as requested by the patients' physician. According to the recommendation of the physician, the results of these tests were sufficient as baseline data before the intervention. The 24-hour urine was collected in a sealed container. A phone call was provided to each participant by the research assistant during the first week to remind the consumption of chamomile, and to question the severity of dyspnoea and anxiety. During the data collection at the second week, a phone call was delivered to assess the severity of dyspnoea and anxiety for record. During the data collection at the fourth week, arrangements were made for the patients to visit physician to measure heart rate, respiratory rate, blood pressure, and to collect the final set of data.

This study employed a double-blind design. The patients in control group were not informed there was another group which drinks tea. The person who was responsible for data collection was not aware of the group allocation. One research assistant who coded the questionnaires did not know the group allocation. The researcher who conducted data analyses was unaware of the group allocation. Only the research assistant who called the patients and conducted clinic follow up could figure out which patient used the tea. The data collection of the four-week study was summarized in Table 1.

Table 1. Implementation steps of the four-week study

Task	Day 1	Day 2	Day 3-7	Week 2	Week 3	Week 4
Collecting demographic information	*					*
Assessing the severity of the patient's dyspnoea	*			*		*
Assessing the patient's anxiety level	*			*		*
Respiratory rate (per minute), heart rate (per minute), blood pressure (mmHg)	*					*
Collecting the 24-hour urine		*				*
Estimating glomerular filtration rate		*				*
All patients: standard medical therapy	*	*	*	*		*
The intervention group: drinking chamomile tea of 50 ml for three times a day		*	*	*		*

RESULTS

Sixty patients (with 30 in each group) participated in the study, including 30 (50%) males and 30 (50%) females. The mean age of the participants was 60.4 years with a standard deviation (SD) of 10.81. As to the HF class, there were 12 (40%) and 14 (46.7%) patients with class I in the intervention and the control group, respectively. The respiratory rate and heart rate in the intervention group was 15.9 (SD = 4.7) and 77.3 (SD = 13.4), while the data in the control group was 16.3 (SD = 4.4) and 74.9 (SD = 13.7). The baseline severity of dyspnoea and anxiety level was similar in the two groups. The characteristics of the participants were presented in Table 2. No significant difference was revealed between groups in gender, class of HF, heart rate, respiratory rate, level of GFR, severity of dyspnoea and anxiety (all p values > 0.05).

Table 2. Baseline characteristics of the participants (n = 60)

Characteristics	Intervention (n = 30)	Control (n = 30)	p value
# Heart Failure Class I	12 (40.0%)	14 (46.7%)	0.6
# Heart Failure Class II	18 (60.0%)	16 (53.3%)	
Respiratory rate	15.9 ± 4.7	16.3 ± 4.4	0.70
Heart rate	77.3 ± 13.4	74.9 ± 13.7	0.50
Severity of dyspnoea	25.1 ± 13.2	21.0 ± 11.2	0.29
Anxiety level	24.5 ± 19.5	17.5 ± 12.6	0.52

 # presented as n (%), and examined by Chi-square test; the others are presented as (mean±standard deviation), and examined by t test.

Table 3 summarizes the results of dyspnoea and anxiety in the two groups at each measurement time. The severity of dyspnoea at baseline was (25.13 ± 13.22) and (21.00 ± 11.02) for the intervention and control group, respectively. After the four-week intervention, the severity of dyspnoea got reduced to (16.76 ± 5.76) in the intervention group, but increased to (29.43 ± 13.10) in the control group. The anxiety level in the intervention group was 24.6 at baseline, and reduced to 12.06 by the end of the fourth week; while the anxiety level in the control group rose from 17.6 at baseline to 20.0 after intervention. The effects of chamomile tea on dyspnoea and anxiety were examined by repeat measurement analyses of variance (ANOVA). The results of ANOVA revealed significant group by time differences in the severity of dyspnoea ($p < 0.001$) and levels of anxiety ($p < 0.001$).

Table 3. Changes in severity of dyspnoea and levels of anxiety (n = 60)

Characteristics		Intervention (n = 30)	Control (n = 30)	# p value
Severity of dyspnoea	Baseline	25.1 ± 13.2	21.0 ± 11.2	p < 0.001
	Week 2	15.9 ± 6.7	21.0 ± 11.2	
	Week 4	16.7 ± 5.8	29.4 ± 13.1	
Anxiety level	Baseline	24.5 ± 19.5	17.5 ± 12.6	p < 0.001
	Week 2	16.13 ± 6.94	17.56 ±12.65	
	Week 4	12.06 ± 6.08	20.00 ± 6.02	

tested by the repeat measurement analysis of variance.

DISCUSSION

This study showed that chamomile tea was effective in reducing the severity of dyspnoea and anxiety in patients with CHF. The results of this study were consistent with a previous study in which the use of chamomile extract was effective in patients with mild to severe anxiety disorders (Amsterdam et al., 2009). Another study conducted by Wilkinson et al (1999) examined the effects of aromatherapy as a palliative treatment among 103 patients with anxiety disorders. In Wilkinson et al's study, the control group received usual massage therapy and the treatment group received massage therapy with chamomile oil. The treatment lasted for two weeks. Anxiety was examined before the intervention and two weeks later. The results indicated that anxiety levels in the treatment group had decreased significantly (Wilkinson et al., 1999). Similar with the current study, Wilkinson et al's study also employed the design of two-armed randomized control trial and recruited a relatively large sample. The differences between the two studies lied in the formats of chamomile (tea or oil) and the duration of treatment (4-week or 2-week). However, both studies revealed the significant effects of chamomile product in reducing anxiety.

Cho and the colleagues conducted a study, entitled as "The effects of aromatherapy on anxiety, quality of sleep and the vital signs of patients undergoing percutaneous coronary artery surgery in patients with heart failure." in Korea (Cho et al., 2013). That study recruited 56 patients who underwent angioplasty due to acute coronary artery disease. All participants received conventional nursing care. In addition, the intervention group received aromatherapy with essential oils including roman chamomile for ten days before surgery. The intervention group demonstrated lower levels of anxiety ($p < 0.001$) and better sleep quality ($p = 0.001$), compared with the control group. Moreover, the respiratory rate, blood pressure, and anxiety in patients using aromatherapy also improved after angioplasty surgery. The findings in Cho et al's study were also consistent with the current findings that chamomile product was effective in reducing anxiety.

However, the results of this study should also be interpreted with cautions due to the small sample size, lacking of randomization in group assignment, and the short-term use of chamomile tea. The longer term effects of chamomile tea on anxiety and dyspnoea should be evaluated in future studies.

CONCLUSION

The results of this study indicated that chamomile tea may possibly reduce the severity of anxiety and dyspnoea in patients with CHF. Since dyspnoea and anxiety are common in patients with CHF, chamomile tea could be recommended as complementary treatment. No side effect was observed at the current dosage in the study. The results could be supported by a study with bigger sample size and longer duration of taking chamomile tea in the future. The application of chamomile tea could be promoted to further reduce the hospitalization and medical expenses in patients with CHF.

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