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The effect of Matricaria chamomile on menstrual related mood disorders

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ABSTRACT

Objective: A significant percentage of reproductive-age women experience mood symptoms during the days before menstruation that can affect different aspects of a person's life, the use of some medicinal plants can be helpful in controlling premenstrual emotional symptoms. The aim of this study was to evaluate the effect of chamomile capsules on menstrual-related mood disorders.

Study design: This clinical trial study was performed on 118 students of Guilan University of Medical Sciences. Participants were divided into two groups of chamomile and placebo. Both groups received one capsule every 8 h for 7 days before the onset of menstrual bleeding. The data collection tool was a Premenstrual Symptoms Screening Tool (PSST). Data analysis was performed using Mann-Whitney, independent t-test, Wilcoxon, and analysis of covariance.

Results: According to the results of the Mann-Whitney test Chamomile capsules were more effective than placebo in reducing menstrual-related mood disorders ($p < 0/001$). The results of the analysis of covariance showed that after controlling the associated variables, the changes in the severity of mood symptoms between the two groups were significantly different ($p < 0/05$).

Conclusion: The results of this study show that the use of chamomile capsules can be an effective treatment in alleviating emotional symptoms related to menstrual cycles.

Introduction

Menstruation is one of the most important indicators of women's health; it starts from puberty and continues until menopause [1]. The menstrual cycle is a series of biophysical and biochemical changes, including hormonal changes, autocrine/paracrine factors that eventually lead to menstrual bleeding [2]. According to studies, about two-thirds of women experience a range of mood swings and psychological symptoms at the end of the menstrual cycle that are associated with natural changes in the levels of sex hormones that are associated with the menstrual cycle [3]. It is estimated that 80 % of premenopausal women are affected by menstrual-related mood and physical symptoms [4]. Symptoms of premenstrual disorder are more common in women over the age of 20, and these symptoms may get worse or better over time [5]. Premenstrual mood disorders vary from person to person; however, the pattern of symptoms for each person is predictable and is constant in almost all cycles [6]. Premenstrual mood swings usually occur against a background of general mood such as depression and anxiety [5], some of the mood symptoms that women suffer from during the menstrual cycle include: irritability and anger, moral instability, anxiety, decreased concentration and efficiency [6]. Premenstrual mood disorders have economic consequences such as decreased efficiency, educational consequences such as the effect on academic performance, family consequences such as disputes between couple and mother and children, and social consequences such as committing aggressive behaviors [7].

The exact etiology of premenstrual mood swings is not yet known, the possible reason could be the reaction between sex hormones and central neurotransmitters such as endorphins and serotonin [8]. A prevailing theory is that some women are more sensitive to the effects of estrogen and progesterone on serotonin levels [9]. Serotonin is a chemical in the brain that plays a key role in regulating mood, appetite, and sleep cycle [10]. Low levels of serotonin lead to feelings of anger, sadness, food cravings, and sleep disorders [11]. There is currently no effective single treatment to control premenstrual mood swings [12]. Studies have reported that prostaglandin inhibitors, Estrogen, progesterone, and oral contraceptives are effective in controlling these symptoms [13].

With regard to the effects of premenstrual mood disorders on women's individual and social life [4], also, considering that this

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disorder is usually achronic condition and usually persists during women of childbearing age, and due to the side effects of chemical drugs [12], it is indispensable to use effective therapies with the least side effects for controlling this disorder. One of the most common treatments for any disease has been the use of medicinal plants [14]. Medicinal plants, due to the natural nature of the raw material of plants and due to their association with other compounds, have a state of bio-balance so that they do not accumulate in the body and are more compatible with the body compared to chemical drugs [15]. In recent years, significant scientific studies and clinical trials have been conducted to investigate the active ingredients in medicinal plants and the effect of these plants in controlling the symptoms of various diseases [16]. Among the medicinal plants that have been widely used in complementary medicine and have been studied in significant clinical studies, we can mention Matricaria chamomile [17]. The reputation of chamomile as a sedative and sedative has a scientific basis, and new research has shown that chamomile affects the central nervous system and has a calming effect [18]. The effect of chamomile on sleep quality, anxiety, and depression, has been investigated and confirmed in several clinical trials [17].

However, studies have shown beneficial effects of chamomile extract, tea, or drops on dysmenorrhea and premenstrual syndrome symptoms [19,20], but, according to our searches, no study has been done on the effect of chamomile capsules on premenstrual mood disorders, this study is the first study done in the human model. Therefore, this study was performed to investigate the effect of chamomile capsules on the control of menstrual-related mood disorders.

Materials and methods

This study was a double-blind controlled clinical trial. In the first stage, the samples were selected by the convenience sampling method from the study population, and then the samples were divided into two groups of intervention and control by the random sampling method. Access and permission to conduct this research study were obtained from the Deputy of Research and Technology of Guilan University of Medical Sciences. The consent forms were provided to Students. Students who gave written consent to participate in the study received the data-gathering tool. After justifying the students on how to carry out the project, the confidentiality of the information, the purpose of the project, and the written consent, the study was started.

In the first stage, the researcher went to each of the dormitory rooms and, based on a questionnaire that contained the inclusion criteria, identified the eligible students, through interviews. Written consent to participate in the study was obtained from individuals who met the inclusion requirements. Then, in order to determine the incidence and severity of PMS symptoms, the PSST questionnaire was distributed among students who met the inclusion criteria. Inclusion criteria of the current study were as follows: age between 15 and 45 years with regular menstrual cycles, having no history of legal marriage, no physical or psychological ill conditions (based on the individual's own statement), not on medication (hormones, vitamins, herbal, anti-depressant, aspirin, or Warfarin) (based on the individual's own statement), no history of allergy to herbal drugs(based on the individual's own statement), no surgical operation during the last six months, not being a professional athlete and willingness to participate in the study. Exclusion criteria were: taking any medication affecting premenstrual syndrome during the study, inadequate and irregular use of medications, unwillingness to continue cooperation during the study, causing allergic reactions to chamomile and any symptoms of lack of drug tolerance (respiratory, gastrointestinal, skin symptoms, etc.) during the study, failure to complete or submit questionnaires. Each participant also gave informed written consent. Based on the results of Sharifi et al. [21] study, the sample size, taking into account the first and second errors, respectively 0.05 and 0.1.was determined to be 53 people in each group, which considering the 10 % sample loss, the appropriate number of samples in each group was 59 people. 118 students were selected as the participants. In the second stage, the research units were divided into two equal groups by random blocking method and through a table of random numbers, which included 59 people in the intervention group and 59 people in the control group. In the intervention group, the participants received 250 mg chamomile capsules every 8 h, and the control group received a 250 mg placebo capsule every 8 h, from 7 days before menstruation to the onset of menstrual bleeding, and Used for one month.

Chamomile capsule contained 250 mg of dried chamomile powder made by Barij Essence pharmaceutical company [22]. Barij Essence pharmaceutical company prepared chamomile and that company turned its dried flowers into powder. It was then placed in 250 mg capsules. The placebo capsules were starch-containing capsules manufactured by Barij Essence pharmaceutical company and were quite similar in color, shape, size, and amount to chamomile capsules. The randomization process and blinding were performed as follows:

An independent researcher made random allocation cards using computer-generated random numbers. He kept the original random allocation sequences in an inaccessible third place and work with a copy. The independent researcher printed it on each sheet. The inside of the envelope was not visible from the outside and printed separately for each one and placed in the envelope after being folded several times. There was a serial number on the outside of the envelopes. Input data, time, participant ID, post-intervention results, etc had recorded on another sheet inside the envelope.

Drugs both were prepared by Barij Essence pharmaceutical company in the form of one-color capsules and were packaged with the same appearance and marked with codes A and B and gave to the researcher for distribution. People in group A received packages with code A and people in group B received packages with code B. The researcher and participants were unaware of the type of capsules until the end of the study and only at the end of the study; the package code was announced to the researcher.

After one month of intervention, questionnaires were collected and the mean severity of premenstrual mood symptoms was calculated. At the end of the study, out of 118 people who received the capsules, five were excluded from the study due to improper use of the capsules, 1 due to unwillingness to continue treatment, and 4 due to incomplete completion of the questionnaires.

Data collection tools based on the objectives of the study included demographic and menstrual characteristics questionnaire (age, age of onset of menstruation) and Premenstrual Symptoms Screening Tool (PSST). PSST is a standard questionnaire designed by Steiner in 2003(Steiner et al., 2003). Siahbazi et al. [23] Translated and validated the Iranian version of this questionnaire in 2011. This questionnaire is a 19-item instrument consisting of two domains: the first domain includes 14 items related to psychological, physical, and behavioral symptoms and the second domain (five items) evaluates the impact of symptoms on women's functioning. Each item is rated on a four-point scale (not at all = 0, mild = 1, moderate = 2, severe = 3). In this study, the content validity method was used to determine the validity of the inclusion criteria questionnaire and the demographic questionnaire. The reliability of this instrument with Cronbach's alpha values of 0.9 was obtained. To evaluate the validity of the questionnaire, both apparent and content methods were used, the content validity

ratio and content validity index of 0.7 and 0.8, respectively, indicate the content validity of this questionnaire.

Data were analyzed using descriptive statistics (mean and standard deviation) and inferential statistics. Wilcoxon test was used for comparison before and after the intervention in each of the chamomile and placebo groups. Mann-Whitney test was used to compare between the two groups of chamomile and placebo. Covariance analysis was used to determine the effect of chamomile and placebo capsules on premenstrual mood symptoms by controlling age and menarche age variables. SPSS version 23 was used to enter the data. Differences with a significance level ($p < 0.05$) were considered significant.

Results

Table 1 has been set up in order to determine and compare the demographic characteristics of the two groups of chamomile and placebo capsules to check the similarity of the two groups in terms of demographic characteristics.

This table shows that most of the participants (27.8 %) in the chamomile group were 24 years old and in the placebo group, most of the participants (20.4 %) were 22 years old. Based on the independent t-test, there was no statistically significant difference between the participants in the two groups of chamomile capsule and placebo capsule in terms of age and the two groups were homogeneous in terms of age ($p > 0.05$).

Menarche age of most participants in the chamomile group (40.7 %) was 12 years and menarche age of most participants (37 %) in the placebo capsule group was 11 years. Based on the independent t-test, there was no statistically significant difference between the participants in the two groups of chamomile capsule and placebo capsule in terms of menarche age and the two groups were homogeneous in terms of menarche age ($p > 0.05$).

Table 2 has been set in order to determine and compare menstrual related mood disorders before and after taking the capsule in two groups: chamomile capsule and placebo capsule.

The Table 2 shows that in both groups of chamomile capsules and placebo capsules, menstrual related mood disorders after taking the capsule compared to before taking the capsule showed a statistically significant difference ($p < 0.05$). In other words, both capsules, chamomile and placebo capsules, reduce the overall severity of premenstrual mood symptoms.

According to the results of Mann-Whitney test, the reduction in the severity of mood symptoms in the chamomile group was significantly greater than the placebo group ($p < 0.001$). In the chamomile capsule group, overeating and hypersomnia did not change after taking the capsule compared to before taking the capsule ($p > 0.05$). In the placebo group, decreased interest in home activities, decreased interest in social activities, overeating, insomnia, oversleeping, after taking the capsule compared to before taking the capsule Did not change ($p > 0.05$).

The Table 3 shows that after controlling the age and menarche age as associated variables, changes in menstrual-related mood disorders were significantly different between the chamomile and placebo groups ($p < 0.05$), and the chamomile group had more changes in the severity of mood symptoms than the placebo group, in other words, the changes in the severity of mood symptoms in the chamomile group were -10.37 and -8/95 units less than the placebo group.

Discussion

According to the results of this study, chamomile was more effective than placebo in reducing menstrual-related mood disorders ($p < 0.001$). Flavonoids, one of the most important compounds in chamomile, increase progesterone levels through their direct effect on the pituitary gland, so this plant can be effective in modulating premenstrual mood symptoms [24], also, the soothing and anti-anxiety effects of chamomile are due to the presence of compounds such as camazoline and flavonoids in this plant [25] can be useful in the effectiveness of this plant in relieving premenstrual mood symptoms. In Sharifi et al.'s study, administration of chamomile extract reduced the severity of PMS symptoms, and compared to mefenamic acid, its effect on the overall severity and psychological symptoms of PMS was greater [21], which was In line with the results of the present study. Also in the Dadfar's study with the aim of investigating the effect of chamomile extract in relieving dysmenorrhea and premenstrual syndrome symptoms, there was a significant reduction in the severity of physical and mental symptoms of the premenstrual syndrome after consuming chamomile extract [26], which is similar to the results of this study. In a study comparing the efficacy of a phytotherapeutic complex (Angelica Sinensis, Dioscorea villosa, Matricaria chamomilla, Viburnum opulus, and Zingiber Officinalis) with homeopathic similimum in the treatment of primary dysmenorrheal, Shang showed that the use of drops containing herbs expressed the severity of dysmenorrhea and physical symptoms significantly reduce [27], which is similar to the results of the present study. In addition, the results of the study of Mao et al., Which aimed to investigate long-term Chamomile (Matricaria chamomilla L.) treatment for generalized anxiety disorder, showed a significant reduction in anxiety in people receiving chamomile extract [28]. This expresses the soothing effects of chamomile on the central nervous system, since some of the monthly mood symptoms in women are included symptoms of anxiety and depression; it is not extravagant to expect that effective treatments for depression and anxiety can be effective in this syndrome.

Conclusions

The chamomile capsule is a natural dietary agent with profound biological and pharmacological properties that ameliorate menstrual-related mood disorders. Our data open up future work for the use and/or additivity synergism of chamomile capsules for the development of more potent therapies with minimal side effects.

Some achievements have been made on the effect of Matricaria chamomile on pre-menstrual syndrome and menstrual-related

Table 1
Demographic characteristics for two groups of chamomile capsules and placebo.

Variables		Chamomile Group	Placebo group	Statistical test*
Age (years)	Minimum	20	19	P = 0.097
	Maximum	28	28	
	Mean± SD	22.81±2.11	23.54±2.36	
Menarche age (years)	Minimum	10	10	P = 0.079
	Maximum	14	14	
	Mean± SD	12.15±0.95	11.81±0.99	

* Independent T-test.

Table 2
Comparison of menstrual related mood disorders in participants before and after the use of capsules.

Variables	Changes	Chamomile Group			Placebo group		
		Number	Average rating	Intragroup comparison**	Number	Average rating	Intragroup comparison**
Anger/irritability	Decrease	41	22.29	P**<0.001	22	11.50	P**<0.001
	Increase	3	25.33		0	000	
	Unchanged	10	–		32	–	
Anxiety/tension	Decrease	38	20.71	P**<0.001	13	8.15	P** = 0.005
	Increase	2	16.50		2	7.00	
	Unchanged	14	–		39	–	
Tearful	Decrease	22	15.95	P** = 0.002	5	10.00	P** = 0.039
	Increase	7	12.00		14	10.00	
	Unchanged	25	–		35	–	
Depressed mood	Decrease	22	15.15	P**<0.001	7	13.00	P** = 0.009
	Increase	7	13.00		20	14.35	
	Unchanged	25	–		27	–	
Interest in work activities	Decrease	21	12.00	P**<0.001	11	7.50	P** = 0.033
	Increase	2	11.00		3	7.50	
	Unchanged	31	–		40	–	
Interest in home activities	Decrease	20	11.60	P**<0.001	7	7.50	P** = 1.000
	Increase	2	10.50		7	7.50	
	Unchanged	32	–		40	–	
Interest in social activities	Decrease	21	12.46	P**<0.001	6	7.50	P** = 0.346
	Increase	3	11.50		9	8.33	
	Unchanged	30	–		39	–	
Difficulty concentrating	Decrease	28	15.16	P**<0.001	2	11.50	P**<0.001
	Increase	1	10.50		22	12.59	
	Unchanged	25	–		30	–	
Fatigue/lack of energy	Decrease	32	17.66	P**<0.001	18	12.00	P** = 0.007
	Increase	2	15.00		5	12.00	
	Unchanged	20	–		31	–	
Overeating/food cravings	Decrease	17	13.26	P** = 0.159	11	11.00	P** = 0.841
	Increase	9	13.94		11	12.00	
	Unchanged	28	–		32	–	
Insomnia	Decrease	16	10.47	P** = 0.002	5	6.00	P** = 782
	Increase	3	7.50		5	5.00	
	Unchanged	35	–		44	–	
Hypersomnia	Decrease	10	12.15	P** = 0.580	12	9.69	P** = 0.309
	Increase	13	11.18		7	10.07	
	Unchanged	31	–		35	–	
Feeling overwhelmed	Decrease	39	20.00	P**<0.001	7	11.00	P** = 0.023
	Increase	0	000		17	13.12	
	Unchanged	15	–		30	–	

** Wilcoxon test.

Table 3
Determining the effect of group after removing the effect of associated variables.

Measure		Mean difference (Placebo-Chamomile)	F	P**
After taking the capsule	Removing the effect of age	−10.37*	0.20	<0.001
	Removing the effect of menarche age	−8.95*	0.08	<0.001

Analysis of covariance**.

mood disorders. However, the understanding of the complex nature of the premenstrual dysphoric disorder behind these processes is still limited, and the following aspects deserve more research works in the future. Future studies can compare the effectiveness of Chamomile capsules with native plants and with other methods suggested by alternative medicines for the treatment of menstrual-related mood disorders.

Also, further investigations with larger sample size, among females from different ages of the community, using different doses of Chamomile capsule for longer periods of time as well as studies without using a placebo, are suggested to achieve more definitive results about the effectiveness and safety of Chamomile capsule for alleviating menstrual-related mood disorders.

Limitations in this study include four-week monitoring of menstrual-related mood disorders, which may indicate that certain trends may have been missed.

There was no attempt to control the diet of the subjects, although all subjects were instructed to maintain all aspects of their usual lifestyles during their participation in this research project.

Ethics committee approval

This paper is taken from the master thesis student of midwifery training with ethics code (IR.GUMS.REC.1395.396). This is a RCT study (clinical trial code: IRCT201705214295N3). We have obtained consent before the participant enters the research. Participants provided written informed consent prior to the study.

Authors' contributions

Z.B. and E.N participated in the Conceptualization, design, and implementation of the intervention, analysis of the findings, and

drafting of the manuscript. T.Z. participated in the design of the study and writing—review and editing of the manuscript. All authors read and approved the final manuscript.

Declaration of Competing Interest

There was no conflict of interest.

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