The Effectiveness Saffron Tea on Reducing Stress Level Among Nursing Student

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ARTICLE INFO	ABSTRACT
Keywords: Stress, Nursing Student, Saffron	Globally, around 60% of college students perceived stress. Untreated stress will have a negative impact on students' quality of life, moreover, it can trigger students to consume drugs and alcohol, or commit suicide. Students' reluctance to seek help, expensive treatment cost, and long treatment times to reduce stress encouraged us to assess the effects of saffron as an alternative treatment on reducing stress among students. The aim of this study was to evaluate the effect of saffron on students who perceive stress. We conducted an un-blinded experimental study. We recruited 78 nursing students who perceive stress, divided into two groups, the saffron group (n=42) and control groups (n=36). Treatment protocol was: saffron group received saffron as brewed drinks, while control group drinks regular tea. The treatment duration is two weeks. Using the DASS 21 Checklist, we assessed the students at baseline, and after 2 weeks completed therapy to measure the outcome. Finally, the data were analyzed using t test statistical analysis. Saffron had a more significant impact on the stress level among the intervention group. The mean stress scores decreased from 15.4 ± 6.1 to 10.8 ± 5.8 for the saffron group ($p < .0001$) and from 15.6 ± 5.7 to 14.7 ± 6.4 for the control group ($p < .01$). Our findings suggest that saffron is as effective to reduce stress level among nursing students
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1. INTRODUCTION

Research show that university is a place where many students struggle with mental illnesses. Based on research, many college students have mental problems. Students' mental issues have increased after the Covid 19 pandemic. The incidence of mental illness in students in various countries is relatively high. According to WHO study, 31% of students experience depression and anxiety, and stress[1]. It is estimated that 17.3% of students experience depression, 4.1% experience panic attacks, 7% experience anxiety[2], and 60% of students experience stress[3]. Recent study concerning healthcare-related fields and stress has indicated that nursing students students perceive higher stress levels compared to other majors. Based on meta-analysis, the prevalence of stress among nursing student in each field, reported as follows : low-level stress was at 0.24%, middle-level stress was at 0.35%, high-level stress was at 0.10%[4][5]. In Indonesia, as many as 52.3% of students experience stress disorders[6], while the prevalence of stress among nursing students at one of nursing school recorded at 84%[7]. Stress has an impact on the student's quality of life. As many as 18% of students commit suicide, 27% consume alcohol, and 20% have suicidal ideation[8].

Stress can be effectively treated with many method, either pharmacotherapy or psychotherapy. Increasing evidence has shown the efficacy of Internet-based interventions in the treatment of student's mental health, including stress [9]. A meta-analysis study focused on psychological improvement among college students recommended a digital mental health intervention approach. There were 71 studies conducted on web-based Cognitive Behavioral Therapy via smartphone and offline computer delivery[10]. Those represented interventions were claimed as an effective interventions at producing a beneficial change in the psychological outcomes.

Although effective treatments are available, many students who perceive stress tend to ignore and disclose their condition and do not seek professional help due to the negative stigma of seeking mental health services[8]. For other reason, many students have low mental health literacy and do not recognize a need for treatment. Students who do recognize a need for mental health services often face multiple barriers to accessing care, perceive the care available to them as inconvenient and are skeptical about the efficacy of care[11]. Therefore students reluctance to seek help for many reasons such as an expensive treatment cost and long treatment times. According to those factors, students attempt to overcome and cope with their stress-perceived symptoms through the negative mode of action such as consuming alcohol, marijuana, smoking, and drug abuse[12]. Eventually, those negative actions resulted in a destroyed student's life in the future.

An affordable self-administered therapy that is simple, easily and quickly prepared is necessary to sustain user engagement for resulting better outcomes. Plant extracts commonly known as herbal are some of the attractive sources of new treatment and have shown promising results for supplementation on mental health parameter[13]. Therefore, saffron as an herbal might be considered as an alternative natural therapy for improving mood alleviation and psychological wellbeing[14]. Current evidence suggests saffron's beneficial effects on mental health[14][15]. Considering the efficacy of saffron as a psychological treatment agent and the extent to which saffron is a safe and easily prepared product for mental health treatment, this study aims to investigate the potential effects of using saffron as an alternative therapy to treat stress among college students. With a concern for the feasibility and affordability of the prepared product, this study modifies the saffron preparation as well as saffron-brewed drinks, similar to saffron tea.

2.   METHOD

This quantitative study uses an experimental pretest-posttest design with the control group. This study was conducted in July until August 2022 in one of the nursing schools in Yogyakarta. The participant of this study was 78 nursing college students. The inclusion criteria was: students who perceived any stress symptoms and were interested in participating in the study. Eligible students were screened by completing DASS 21 Questionnaire. After completing the assessment, participants who perceived any stress symptoms were divided into two groups (saffron group n=42 and control group n=36) and underwent treatment for two weeks.

The treatment protocol for the saffron group was: each day, the participant had to consume the saffron (twice a day, morning and evening) at home, as prepared as a brewed drink. In order to produce saffron brewed drink, it can be made by soaking 5 strands of dried saffron in 2 hundred ml cup of warm water for 5-10 minutes or until the water turns yellow. Furthermore, the saffron-brewed drink is ready to drink. For the control group, participants have to drink tea twice a day (morning and evening) and reported their activity through whatss application group. We followed this treatment for two weeks.

At the end of study, we recorded the study outcome, consisted of general information such as demographic variables, academic stressors, and interpersonal stressors. We also measured the main outcome, the stress scale, using DASS 21 questionnaire. The questionnaires had been filled out before the interventions and after two weeks of intervention to measure the efficacy of treatments.

The collected data were entered into the Statistical Package for Social Sciences (version 25, IBM Corporation). The descriptive data were presented in mean and standard deviation, absolute numbers, and percentages. For inferential data, Chi Square, Fisher Exact, Paired T-test and Independent T-test were used. The $P < 0.05$ was considered a statistically significant level.

3.   RESULTS AND DISCUSSION

According to the research that has been carried to determine the effectiveness saffron consumption on the stress level on nursing students, the authors presenting the results of the research in the exposure below:

Characteristics of respondents

The results showed that the distribution of the age frequency of respondents can be described as follows

Table 1. Comparison of Respondent's Characteristic Between the Saffron Group (n=40) and the Control Group (n=31)

Variable	Saffron (n=40)		Control (n=31)		p
	f	(%)	F	(%)	
Gender					
Male	9	(21,4)	4	(11,1)	0,22[a]
Female	33	(78,6)	32	(88,9)	
Residence					
Living with family	22	(52,4)	24	(66,7)	0,20[a]
Living with friends	20	(47,6)	12	(33,3)	
City of Origin					
West Java	0	(0,0)	3	(8,3)	
Middle Java	6	(14,3)	9	(25,0)	0,89[b]
Yogyakarta	26	(61,9)	13	(36,1)	
Outside Java	8	(19,0)	10	(27,8)	
Academic Stressor					
Thesis issue	18	(42,9)	7	(19,4)	
Financial issue	9	(21,4)	3	(8,3)	0,01[a]
Coursework load	3	(7,1)	8	(22,2)	
General academic load	12	(28,6)	18	(50,0)	
Interpersonal Stressor					
Problem with friends	26	(61,9)	15	(41,7)	
Problem with family	10	(23,8)	12	(28,2)	0,19[a]
Problem with partner	6	(14,3)	9	(25,0)	
General Stressor					
Dealt with failure	14	(33,3)	15	(41,7)	
Dealt with loss	12	(28,6)	6	(16,7)	0,65[a]
Break up with partner	7	(16,7)	7	(19,4)	
Physical health issue	9	(21,4)	8	(22,2)	
TOTAL	**42**	**(100)**	**36**	**(100)**	**78**

a Chi Square test　　　* Significantly Different
b Fisher Exact test

This study included 78 participants at a baseline until 2 weeks follow-up There are 42 participants in the saffron group and 36 in the control group. Table 1 presents the characteristic of the participant at a baseline, consisting of demographic characteristics, the presence of academic stressors, interpersonal stressors, and general stressors. There were no significant differences between participants' demographic data in the two study groups ($P>0,05$). The majority of the participant in both groups were female (saffron 78,6% while control 88,9%), and came from Yogyakarta (saffron 61,9%, control 36,1%), and live within a family (saffron 50%, control 66,7%). Within academic stressors, an issue with the thesis was the primary stressor perceived by participants in the saffron group (42,9%), while control groups struggled with general academic load (50,0%). Most of the participants in both groups have problems with friends (saffron 61,9%, control 41,7%) and struggle to deal with their failure (saffron 33,3%, control 41,7%).

Comparison of Stress Score

Table two illustrate the comparison of the stress scores at the beginning and at the end of the treatment among two groups.

Table 2. Comparison of Stress Scores Between The Saffron Group and the Control Group at a Baseline and after 2 Weeks of the Treatment

Stress	Saffron (n=42)	Control (n=36)	Independent T- test	P
	Mean+(SD)	Mean+(SD)		
Stress Pre	15,48 (6,1)	15,67 (5,7)	-0,14[a]	0,88
Stress Post	10,86 (5,8)	14,75 (6,2)	-2,84[a]	0,00*
Total	**42 (100)**	**36 (100)**		

*Significantly different

According to table two, in the baseline condition, there was no difference on the stress scores between the saffron group and the control group (p>0.05). The mean of stress scores between the two groups remain equals. By the end of the study, after two weeks of saffron administration, the mean of stress score was significantly different among both groups (p 0.00). The stress scores of the saffron group was significantly lower than the control group (saffron group was 10.86, while control group was 14.75). The saffron extract appears to improve subclinical stress symptoms.

Table 3. Comparison of Mean Stress Score After 2 Weeks Treatment

Depression	Pre	Post	Paired T-test	p	N
	Mean+SD)	Mean+(SD)			
Saffron Group	15,48(6,1)	10,86(5,8)	4,45	0,000*	42
Control Group	15,67(5,7)	14,75(6,2)	1,48	0,148	36
Total					78

*Significant

Table 3 provide information about comparison of the students' stress scores at baseline and after 2 weeks of saffron treatment. At a saffron group, a reduction in the stress scores from the baseline showed significant differences by the end of the study (p < 0.05). Between the baseline and week 2, the mean of stress scores decreased from 15,48 to 8.35 for the saffron group (p < .000). It was revealed that there is a significant difference between stress score at the beginning of the study and the end of study within saffron group.

DISCUSSION

Stress, one of mental health problem, are common phenomenon among nursing students. According to this study, in the baseline conditions, the mean student's stress score are at 15,48 -15,67, which categorized as mild stress level according to DASS 21. Many respondents experienced stress symptoms such as tended to over-react to situations and getting agitated. These result is consistent to a previous study, which shows that most of nursing students experience stress at mild to moderate level[5]. The other study, reported the similar result, that majority of nursing students perceived moderate level[4]. Several factors have contributed to the stress incidence in college students. In previous studies, students perceived stressors such as high academic pressure, course workload, and academic competition[16]. According to this current study, some of the similar stressors perceived by students such as academic stressors such as writing scientific papers, final exams (thesis), and course load. In addition, problems with friends and experiencing failure are other perceived stressors.

Our study revealed that daily consumption of saffron for 2 weeks significantly reduced the severity of stress and alleviated students' moods and emotions. Based on our study, saffron is prepared as a brewed-drinks, which is made by soaking 5 dried saffron strands into 200 ml of warm water. These saffron-brewed drinks were consumed 2 times a day (morning and evening) to get a therapeutic effect. Following this treatment, students reported the therapeutic effect of saffron as well as a mood stabilizer. The majority of students reported that while consuming saffron, their mood was more stable and their emotion was more positive. Furthermore, students revealed alleviation of stress symptoms (relaxed). This result has in agreement with other studies which conducted saffron supplementation in healthy adults with a similar result that saffron has a beneficial effect on subjective mood and emotional well-being[14]. Stress condition increased feelings of tension, total mood disturbance, salivary cortisol and heart rate[17]. Therefore, relieving mood was indicator of improvement in stress symptoms. Our study finding reflects a growing body of evidence supporting the use of saffron as an stress treatment with no adverse effects.

The mechanism of action of saffron as an anti-stress is explored through in-vivo studies on mice [17]. Several studies state that stress activates the hypothalamus-pituitary-adrenal (HPA) axis, which leads to plasma corticosterone release as a response. Scientifically evident, traditional uses of saffron as a stress reliever proposed that saffron exerts its stress reliever through an interaction mechanism with a decrease in plasma corticosterone in the Hypothalamus-Pituitary-Adrenal (HPA). Corticosterone has a cell-damaging effect because it triggers pro-inflammatory and pro-apoptotic effects. In studies on mice, when given saffron, saffron is compound that binds to HPA and suppresses corticosterone production in mice. Saffron may likely interact with the HPA axis and reduce the stress-induced corticosterone increase. It can be concluded that saffron inhibits corticosterone secretion, thereby inhibiting stress. In line with the above results, saffron was indicated to cause anti-stress effects in the mice through the process of inhibiting N-methyl-D-aspartate (NMDA) and sigma, St. Louis, MO, USA, opioid receptors (18). The latter is important since NMDA and sigma receptors can regulate corticosterone release from the adrenal cortex in rats [21]. It can be concluded that saffron may inhibit corticosterone secretion in stressed mice via blockade of NMDA and/or sigma opioid receptors located in the adrenal cortex(18). Our study shows that administering saffron for two weeks lowers stress rates and relieves stress symptoms among nursing students.

4. CONCLUSION

Based on the results of study, it can be concluded that The stress level among nursing students is at mild levels. It concluded that stress is a significant health problem that requires ongoing management. According to the study result, saffron consumption for two weeks effectively treats stress in nursing students. Available evidence suggests that saffron may be a safe alternative treatment that can reduce symptoms of stress.

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