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Honey, Crocus-Sativus-Linnaeus, and Clitoria-Ternatea Improve the Elderly's Quality of Life and Sleep Quality in Yogyakarta

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Abstract

Older adults have sleep disorders that lead to decreased quality of life and risk of chronic disease complications. Older adults need to improve their sleep quality to gain a better quality of life. They aimed to investigate the effectiveness of Crocus-sativus-Linnaeus and Clitoria-Ternatea in enhancing the quality of life and sleep of older adults. The quasi-experiment with a control group design was used. The 40 elder adults with hypertension, without dementia, severe cardiovascular disease, and hypersensitivity to compounds; were recruited. The tools were PSQI and WHO-QL. Analysis used t-test and Wilcoxon test. Crocus-sativus-Linnaeus and Clitoria-Ternatea were insignificant in improving sleep quality p = 0.264 (p<0.05) and physical domain in quality-of-life p = 0.075. It significantly improved the quality of life in the psychological, social relationships, and the environment, with p = 0.007, p = 0.003, and p = 0.041. For Future research increasing the number of samples is needed.

Introduction

Sleep disorders are a collection of symptoms in the form of disturbances in the amount, quality, or sleep in individuals. The older adults often experience sleep disorders. This is because older adults experience a decrease in physical and psychological conditions, such as arthritis, decreased hearing and vision, decreased memory, reduced muscle mass, stress, and other infectious diseases (Warseno & Sukmawati, 2019). It will have an impact on older people's sleep time. He will experience a longer time to sleep and a shorter time to fall asleep soundly (Luo *et al*., 2013). Whereas according to WHO the number of older adults is expected to continue to increase from 12% to 22% between 2015 and 2050. In 2050 the older adult will reach 2 billion and 80% of the older adult will be in low- and middle-income countries. In Indonesia, the number of older people in 2022 is around 31(WHO, 2023).

One of the efforts to improve the quality of life and empowerment of older adults is to enhance the sleep quality of older adults. The older adult needs 6.5 - 7 hours of sleep per day. The impact of lack of sleep experienced is fatigue, excessive daytime sleepiness, metabolic disorders, endocrine disorders, and disruption of the immune system. In addition, sleep apnea is also found in this age group. Sleep apnea is a recurrent episode of reduced or no airflow during sleep. This condition is a result of airway obstruction, such as snoring, or due to the influence of drugs and narcotics (Rodriguez *et al*., 2015; Yang *et al*., 2012).

One of the physical conditions that can affect sleep quality in older adults is hypertension. As many as 94.9% of older adults with hypertension have poor sleep quality (Warseno & Sukmawati, 2019). The lower a person's sleep duration, the risk of hypertension increases. This is because sleep quality affects individual systolic and diastolic

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pressure (Gulia & Kumar, 2018). The increase in blood pressure is accompanied by vascular dysfunction and inflammatory activity. This is also related to changes in sympathetic nerves and an increased release of catecholamines. Furthermore, cardiac output is insignificant at night (Liu *et al*., 2016).

Method

This study was a Quasi-Experiment study using a pre-test and post-test control group design to analyze Honey, Crocus-sativus-Linnaeus, and Clitoria-Ternatea, called Sahdu Tea in patients with hypertension. The study population was the older adults who attended Posyandu. The number of samples was 40 people with a composition of 22 intervention groups and 18 placebo groups. The intervention group was the older adult who got a tea bag of Crocus-sativus-Linnaeus and Clitoria-Ternatea with honey. However, the placebo was for the older adult who got Wedhang Uwuh, a traditional Javanese drink. Inclusion criteria are: 1) At least 55 years old (pre-older adult); 2) Hypertension medical diagnosis; 3) Independent ADLs; 4) Good verbal communication. Exclusion criteria are: 1) Moderate to severe dementia; 2) Severe cardiovascular disease; 3) Allergy to the components. The questionnaires used were The Pittsburgh Sleep Quality Index (PSQI) and WHO-QL(Bangun *et al*., 2020). Furthermore, there was a physical assessment to determine the blood pressure and health history of the older adult. Data collection was done by giving a teabag containing Crocus-sativus-Linnaeus and Clitoria-Ternatea, then the elderlies were asked to drink before bed. The research assistant gave 3 doses at once for 3 days (1 dose/day). Furthermore, therapy continued for up to 3 weeks. At the end of the 3rd week, a post-test was conducted as the final evaluation of the therapy. Put in a tea bag dried bay flowers (300 mg) and saffron (14 mg). Then, soak dried bay flowers and saffron in 800 C hot water for 15 minutes in 200 mL mineral water. Finally, add 20 ml of honey (assuming the patient's weight is 60 kg) (The density of honey is 1.36 g/ml; so, the volume of honey = mass of honey (30 g): density of honey). The research protocols were approved by The Research Ethics Committee on Faculty of Health Universitas Jenderal Achmad Yani Yogyakarta with the approval number SKep/148/KEP/V/2023.

Result and Discussion

Based on the data, most have primary education, namely elementary and junior high school by 60%, and 90% of respondents are not actively working. Respondents also did not understand that they had hypertension. This can be seen from the data that 50% of respondents admitted that they did not know that they had the disease and did not carry out routine controls. In addition, most (65%) respondents also did not apply 30 minutes of exercise as an effort to implement a healthy lifestyle.

Table 1. Frequency Distribution of Respondents

Variables	Mean ± SD	n (N=40)	%
Age	65.65 ± 8.91		
Gender			
1. Male		20	50
2. Female		20	50
Education			
1. Elementary School		16	40
2. Junior High School		8	20
3. Senior High School		13	32.5
4. Diploma/ College		3	7.5
Jobs			
1. Housewife		31	77.5
2. Labor		1	2.5
3. Private		2	5
4. Retired		5	12.5
5. Self-employed		1	2.5
Duration of Hypertension		23	57.5
Diagnosis		1	2.5
1. Don't know		12	30
2. 0 - 1 year		4	10
3. 2 - 5 years			
4. >5 years			
Doctors' Visit			
1. Monthly routine		22	55
2. Not Routine		18	45
Length of Doctors' Visit			
1. Don't know		23	57.5
2. 0 - 1 year		3	7.5
3. 2 - 5 years		10	25
4. >5 years		4	10
Exercise 30 minutes per day		26	65
1. Yes		14	35
2. No			
Has Comorbidities			
1. Yes		13	32.5
2. No		27	67.5

Primary Data Source 2023

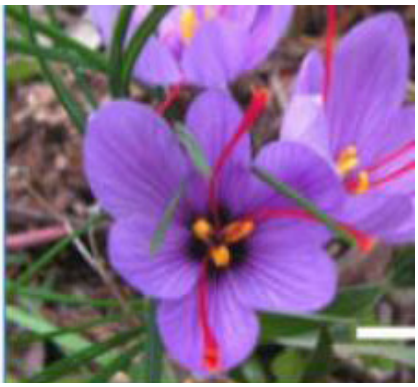
Tabel 2. The Effect of Plasebo (Wedang Uwuh) and Tea "Honey; Crocus sativus Linnaeus; and Clitoria Ternatea"

Group	Variables	Mean ± SD	df	Sign. (p<0.05)
Control	Pre Sleep Quality	6.11 ± 2.95	17	0.264
	The post Sleep Quality	5.44 ± 2.62		
	Physical Domain Pre	69.22 ± 15.44		0.202
	The post Physical Domain	71.39 ± 13.76		
	Psychological Domain Pre	60.44 ± 10.29		0.225
	The post-Psychological Domain	58.33 ± 13.11		
	Social Relationship Pre-Domain	62.11 ± 17.34		0.201
	The post-Social Relations Domain	59.00 ± 20.16		
	Environment Pre Domain	65.00 ± 11.26		0.317
	The post-Environmental Domain	63.61 ± 12.94		
Intervention	Pre Sleep Quality	6.41 ± 3.38	21	0.075
	The post Sleep Quality	5.05 ± 2.82		
	Physical Domain Pre	66.95 ± 11.88		0.76
	The post Physical Domain	72.27 ± 12.94		
	Psychological Domain Pre	50.32 ± 11.37		0.007
	The post-Psychological Domain	59.00 ± 20.16		
	Social Relationship Pre-Domain	49.41 ± 11.85		0.003
	The post-Social Relations Domain	65.86 ± 15.36		
	Environment Pre Domain	61.27 ± 10.37		0.041
	The post-Environmental Domain	69.73 ± 11.23		

Primary Data Source 2023

Based on the data, it is known that in the control group, the traditional drink from Java, called *wedhang uwuh*, both for psychological well-being and sleep quality, there is no difference between before and after giving *wedhang uwuh* for three weeks (p> 0.05). The number of samples in the control group was 18 respondents. These results differ from the intervention group, tested using 22 older adult people. Based on the table, only the psychological well-being of the physical domain does not affect the tea p = 0.76 (p> 0.05).

Saffron is the dehydrated stigma of the flower of Crocus sativus Linnaeus, which is native to Iran (Maggi *et al*., 2020). Saffron has components of hydrophilic carbohydrates, amino acids, proteins, minerals, mucilage, starch, gums, vitamins (riboflavin and thiamine), pigments (crocin, alpha and beta-carotene, mangicrocin, xanthone-carotenoid glycosidic conjugate, anthocyanin, lycopene, flavonoids, and zeaxanthin), alkaloids, saponins, saffranal (aromatic essence terpene) and picrocrocin (bitter flavor). Based on several studies, it is known that saffron has benefits for laxatives, antidepressants, decongestants, diaphoretics, dysminor, skin, liver, and kidney disorders. In addition, it helps penetration in ascites, wounds, headaches, bronchitis, pharyngitis, nausea, vomiting, asthma, eye disorders, and memory impairment, reduces pain during childbirth, and strengthens the heart (Shahi *et al*., 2016).



Picture 1. Saffron (Crocus-sativus-Linnaeus)

Clitoria ternatea L. is a plant from tropical Asia, but other sources say this plant comes from central South America. Telang flowers have a butterfly-like shape that is purplish blue, known as Butterfly pea. Chemical compounds contained in Clitoria

ternatea flowers from various studies are 21 items, including flavonoids, anthocyanins, flavonol glycosides, kaempferol glycosides, quercetin glycosides, myricetin glycosides, tannins, flobatanins, carbohydrates, saponins, glycosides, triterpenoids, phenols, flavonoids, proteins, alkaloids, steroids, anthraquinones, palmitic acid, stearic, oleic lonoleic, and linoleic (Oguis *et al*., 2019).

White, J W (1978) describes honey as a natural substance produced by honeybees (Apis mellifera) from flower nectar that is sweet, thick, and flavorful (Ashagrie, 2021). Di In honey, there is a carbohydrate content of 80-85% (Alreshidi *et al*., 2021), It consists of fructose (41%), glucose (34%), and sucrose (1%-2%) (Cummings & Stephen, 2007). Other contents are amino acids and proteins. Protein is obtained from nectar and pollen. However, the amino acid and protein content in honey is still relatively small at 0.3 % - 0.7 % (Alreshidi *et al*., 2021; Ashagrie, 2021). The amino acid, proline, in honey assesses the authenticity of the honey, a value below 180 mg/kg indicates that the honey has been added with sugar (Ashagrie, 2021). In addition, phenols, pigments, and vitamins are around 0.2% (Bogdanov *et al*., 2008; Miguel *et al*., 2017). In addition, minerals such as potassium, calcium, chlorine, copper, iron, magnesium, phosphorus, potassium, sodium, and zinc. Research shows that each has levels as in Table 3 (Ashagrie, 2021).

Based on the study's results, the control group obtained p = 0.264 and the intervention group p = 0.075 (p> 0.05). It means that both groups do not affect improving the quality of sleep of older adults with hypertension. Some things that affect sleep quality are gender, pain, environmental stimuli, daily physical activity, and menopausal problems (Aliabadi *et al*., 2017). More than 50% of elderlies have moderate pain levels (Nugraha & Aprillia, 2020). Women tend to have problems with sleep compared to men, Thichumpa *et al*. (2018) also confirmed that the quality of older adult sleep is influenced by education and psychological disorders, such as depression and poor communication with family members (Thichumpa *et al*., 2018). Based on the PSQI questionnaire, some older adult people complain of pain in the knees and back. Pain in the knees experienced by the older adult increases the intensity of pain in the physical function of the older adult even with light activities (Alburquerque-García *et al*., 2015). It is in line with the research results that pain can reduce sleep quality in older adults (Alburquerque-García *et al*., 2015; Morelhão *et al*., 2022; Nugraha & Aprillia, 2020).

Based on the results, it is known that Honey, Crocus Sativus Linnaeus, and Clitoria Ternatea Tea, called Sahdu Tea, is not practical in improving the quality of life of the physical dimension, p = 0.76 (p> 0.05). Based on the WHO-QL questionnaire, the physical domain is found in Q3, Q4, Q10, Q16, Q17, and Q18, namely about physical pain during daily activities; how often you need medical therapy; having enough energy for activities; sleep satisfaction; daily activity ability satisfaction; and work satisfaction. Based on the questionnaire, the average value of Q3 is 2.39, Q4 = 1.94, Q10 = 4, Q16 = 3.83, Q17 = 4.06, and Q18 = 4.06, it can be seen that the lowest value is Q4. However, the fewer Q4 statements, the better the score. In contrast to Q3 which examines older adult pain. The

Table 3. The Composition of Honey

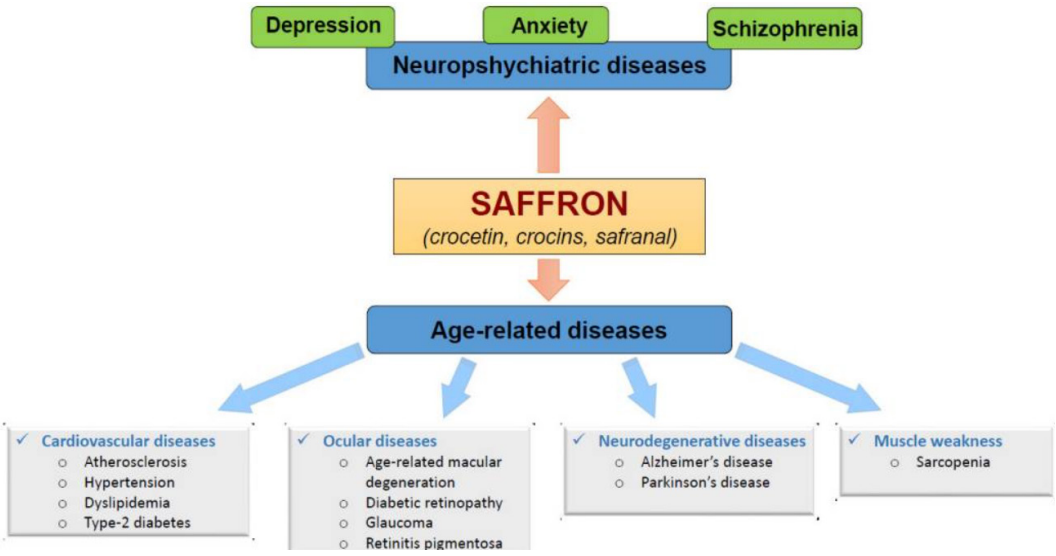
Minerals	Unit	Average amount/100 grams of honey	Daily Recommendations
Calcium	mg	4 - 30	1000
Chlorine	mg	2 - 20	
Copper	mg	0.01 - 0.1	2
Iron	mg	1 - 3.4	18
Magnesium	mg	0.7 - 13	400
Phosphorus	mg	2 - 60	1000
Potassium	mg	10 - 470	-
Sodium	mg	0.6 - 40	-
Zink	mg	0.2 - 0.5	15

average older adult person answers Q3, a little and in moderate amounts. Research states that older adults often feel persistent pain which is strongly related to the disease, the older adult's disability, social isolation, and the cost of care, as well as fatigue in the healthcare system (Domenichiello & Ramsden, 2019). However, the results of other studies differ, the anti-nociceptive and anti-inflammatory content of saffron can reduce pain. The dose used in the study was 30 mg/kg and given by injection, which was observed for 14 days (Safakhah *et al*., 2016). Other studies also mention that saffron has a positive impact on pain reduction. Oral administration of saffron as an analgesic is 2000 mg/ kg (Ait Tastift *et al*., 2022). In this study, saffron used was 15 mg/ person by brewing and taken once a day. Differences in results can be due to several factors including the type or quality of saffron used, the dose of saffron, and the method of administration of saffron. The quality of saffron depends on the color, taste, and aroma contained in crocin, picrocrocin, and safranal (Ait Tastift *et al*., 2022).

However, based on the table data, it can be seen that sahdu tea has a positive impact on improving quality of life in the psychological domain, $p = 0.007$ ($p < 0.05$). This study is in line with several studies that saffron has a positive impact on neuropsychological problems, prevention of age-related diseases, as an antidepressant, and a decrease in depressive symptoms (El Midaoui *et al*., 2022; Maggi *et al*., 2020; Shafiee *et al*., 2018). Saffron contains crocin which is a good anti-inflammatory. Crocins are not recommended to be given orally. This is because crocin will be converted to crocetin in the small intestine, but the amount of crocetin in the blood is meager. The crocetin is distributed to various tissues because the interaction weakens when it binds to albumin. Crocetin will pass through the blood vessels of the brain and reach the central nervous system through passive transcellular diffusion, making it effective in neurodegenerative disorders. If the amount of crocin is excessive, it will be excreted through feces (El Midaoui *et al*., 2022).

Safranal and crocin are antidepressants that activate serotonergic, noradrenergic, and dopamine systems. Saffron with 50 mg can significantly reduce Beck Depression and anxiety compared to the control group (El Midaoui *et al*., 2022; Yaribeygi *et al*., 2019). In addition, safranal also has a positive effect, like diazepam, in reducing anxiety. This is possible due to the interaction of benzodiazepines with GABA receptor A. In addition, saffron also has a positive impact on reducing symptoms of social isolation and improving memory (El Midaoui *et al*., 2022; Pitsikas, 2016).

In this study, not only saffron was administered, but also blue pea (Clitorea ternatea) or butterfly pea flower, which has antioxidants that are good for the body. Antioxidants regulate oxidation stress in the body's biological system. The antioxidant



Picture 2. The Advantages of Saffron (Crocus-sativus-Linnaeus) in Neuropsychiatric Disease

content contained in blue telang flowers can reduce malondialdehyde (MDA), such as flavonoids and anthocyanins (Putri *et al*., 2023). Clitorea ternatea increases norepinephrine in the synapse. This study used 50 mg of fresh Clitorea ternatea flowers, dried, and produced 35 mg of dried flowers. Then extraction was carried out using the Soxhlet extraction method. The extracted flowers contained flavonoids - kaempferol and apigenin, and triterpenoids - α, β-amyrin which are antianxiety. This is because the extraction from Clitorea ternatea is likely to bind to benzodiazepine receptors as an agonist that increases the level of ascorbic acid in the brain, inhibits butyric acid transmission, and inhibits monoamine oxidase. So it can be concluded that triterpenoids or flavonoids are responsible for antianxiety activity (Mittal *et al*., 2021). Here is the algorithm of the saffron effect in psychology (El Midaoui *et al*., 2022)

Based on the study's results, the social and environmental relationship domains on older adult well-being are also significantly different with $p = 0.003$ and $p = 0.041$ ($p < 0.05$). Based on research psychological improvements in the older adult have a positive impact on the socialization of the older adult in their environment (Ruiz-Comellas *et al*., 2021). Social relationships make physical and emotional connections with other people and communities. Good social relationships can reduce negative experiences, and avoid conflict, and the community and environment can make the older adult more able to think positively and have great forgiveness (Rook & Charles, 2017).

Conclusion

Crocus sativus Linnaeus and Clitoria Ternatea have a practical effect on improving the quality of life of older adults in the psychological, social relations, and environmental domains. We suggest that future research can increase the number of samples and modify the method of administration and the amount of Crocus sativus Linnaeus and Clitoria Ternatea content.

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