



The Effect of Coffee Aromatherapy on Reducing Fatigue and Stress Levels of Female Caregivers Caring for the Elderly in Hospitals

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Abstract

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BACKGROUND: The exploration of coffee as an aromatherapy in the health service has not been widely carried out. In many cases, aromatherapy has been shown to reduce stress and fatigue.

PURPOSE: The purpose of the study was to analyze the effect of coffee aromatherapy on the fatigue and stress levels of female caregivers caring for the elderly at the University of Sumatera Utara Hospital (USU Hospital), in Medan.

METHODS: This is a quasi-experiment one group pre-test post-test design. The research involved 16 caregivers were given a treatment of coffee oil by inhalation for 15 min for 3 consecutive days, without coffee oil inhalation and 10% of coffee oil concentration on the 1st day, 20% on the 2nd day, and 30% on the 3rd day. Each sample received a pre-test and post-test in the form of stress and fatigue instruments. The data analysis performed was univariate in order to describe the properties of each variable examined and analyze the mean score. Similarly, bivariate analysis with the analysis of variance (ANOVA) statistical test was used to determine the effect of coffee aromatherapy on reducing the fatigue and stress level.

RESULTS: The result showed that most caregivers were elderly children with an average age of 38 years, 81.3% assisted in caring for the elderly, and actively working outside the home. Based on the ANOVA test, the data showed that the administration of coffee aromatherapy for 3 consecutive days has no effect on female caregivers' fatigue and stress level. However, the mean score showed a decrease in fatigue and stress level before and after coffee oil inhalation in 3 days.

CONCLUSION: It is necessary to provide coffee oil aromatherapy intervention with a longer duration to have an effect on reducing caregiver fatigue and stress in the future, so the results are expected to form the basic data for the design of nursing interventions based on complementary therapies in order to reduce the fatigue and stress of caregivers while providing care to the hospitalized elderly.

Introduction

Coffee is one of the most important commodities in Indonesia, but unfortunately its use in the preparations for health therapy has not been further investigated. It produces a beneficial aroma that helps overcome many health problems, such as fatigue [1]. The research shows that the use of essential oils affects the brain and body [2], while they are absorbed into the body through the digestive tract, mucosa, skin, and olfactory system. This absorption then affects the behavior and motivation of individuals during recovery process.

One of the uses of coffee as a therapeutic commodity is the manufacture of coffee oil for aromatherapy, which is an intervention using essential oils, that are volatile concentrates [3]. It is administered through massage, topical ointments, steam baths,

or inhalations occasionally [4], which are primarily aimed at relieving pain [5], and providing comfort to the individual's psychological condition [6], [7], [8]. Many researches have shown that aromatherapy intervention is able to reduce anxiety [9], symptoms of depression [10], and fatigue [11].

Fatigue is one of the terminologies of nursing diagnosis defined as a condition in which an individual feels that their energy is physically and psychologically depleted [12]. Stress, on the other hand, is a subjective feeling with physiological symptoms in response to an existence-threatening stimulus [13]. These two symptoms are normal and natural as long as they do not last for a long time [13], because it affects the quality of life and cause clinical symptoms of anxiety and depression [14].

In terms of physical health, many researches have shown that female caregivers caring for the

elderly during hospitalization are prone to psychological problems worsening their health status [15], such as fatigue and stress due to caring process [16]. Moreover, it leads to the poor quality of elderly care and generally have a poor quality of life [14]. In addition, many caregivers losing the support system, which is very important in strengthening their role in everyday life and support the caregiver's health status [17]. Ultimately, essential tasks and responsibilities as well as the psychological impact of the caring process for the elderly, indirectly affect the quality of care provided [18].

Although Thorson-Olesen *et al.* [19] states that not all impacts of care are negative, the findings of this research need to be supported by several factors such as the support system available and the willingness of caregivers to take responsibility during caring process [20], in such a way that it will not become a burden causing stress. Consequently, several supportive factors need to be considered in order to reduce the burden on the caregiver's and the stress felt during caring for family members for long duration [21]. Therefore, several interventions are need to carry out, such as time to rest, complementary, and relaxation therapy.

The research conducted by Empeño *et al.* [22] suggests the importance of providing free time interventions to caregivers to reduce the stress resulting from the caring process. Furthermore, massage found effective to reduce stress and fatigue of caregivers with terminal illnesses patients [23]. In some cases, the use of aromatherapy in clinical conditions is being carried out. The research conducted by Yamato *et al.* [24] reported that coffee consumption is able to reduce stress among women. However, coffee aromatherapy is not widely identified in reducing fatigue and stress for female caregivers in Indonesia. Therefore, it is important that further research on interventions to reduce fatigue and stress in female caregivers optimize care for the elderly in hospitals [25].

The previous research entitled, "Stress of female caregivers in caring for the elderly with chronic diseases at USU Hospital, Medan (Tumanggor *et al.*, 2020) obtained several themes, which have become a burden and stress for the caregivers. One of these themes is fatigue. Subsequently, it is necessary to have a nursing intervention to reduce the fatigue level of female caregivers while caring for the elderly physically and emotionally. According to Navarro *et al.*, 2018, coffee not only stimulates the body but also reduces depression to a certain extent. However, since not everyone likes to drink coffee as an ingredient for beverages, this research extracts coffee powders into an essential oil used as aromatherapy. Therefore, as a stimulant, it also has the same effect as coffee preparations as a beverage.

Objective

This study purpose was to analyze the effect of coffee aromatherapy on the fatigue and stress levels of

female caregivers caring for the elderly at the University of Sumatera Utara Hospital (USU Hospital), in Medan – Indonesia.

Methods

Design

This is a quasi-experiment one group pre-test post-test design.

Setting/samples

The population consists of female caregivers caring for the elderly. Due to the unknown population of caregivers in the USU Hospital, sampling was carried out using the Quota Sampling technique and 16 caregivers participated voluntarily. The inclusion criteria include, caregivers are children, wives, daughters-in-law, grandchildren, or sisters. The caregivers are the individuals caring for and are responsible for meeting basic needs and living with the elderly. The caregivers are able to speak Indonesian well, are cooperative, and do not suffer from respiratory problems [26], [27], nor asthma [2]. The research conducted from June to December 2020. Due to COVID-19 pandemic, the hospitalized patients in the hospital were drop significantly. Therefore, the data collection took months to get the research samples.

All research samples participated voluntarily and provided the aromatherapy treatment with coffee oil for three consecutive days, namely, coffee oil concentration of 10% on the 1st day, 20% on the 2nd day, and 30% on the 3rd day. Each caregiver received coffee oil aromatherapy with a duration of 15 min per day in the morning [8], and assessed for vital signs/TTV before and after intervention as a preventive measure for undesirable events. All caregivers were explained the research objectives and written consent was given to participate in the intervention.

Instruments

The instruments used are demographic data, as well as fatigue and stress instruments. The fatigue and stress instruments were adopting from Nursing Outcome Classification, fifth edition, for fatigue and stress level with yes and no option. Fatigue level has 19 questions and stress level has 35 questions. After validity and reliability test, it revealed that only 17 questions on fatigue level and 31 items of stress level found valid and distribute to the research samples. According to the validity test for both instruments, it is found that $r_i > r_t$ based on the significance test 0.05. The reliability test showed that the value of Cronbach Alpha

was 0.908 for fatigue level and 0.938 for stress level, meaning all items were reliable.

Procedure

The aromatherapy administration with coffee oil was conducted in a 4 × 5-meter room. The aromatherapy given was coffee oil extracted at the Faculty of Pharmacy Laboratory of the Universitas Sumatera Utara with the support of a laboratory assistant. The researchers follow the steps of the administration are as below (8,27):

- a. Testing the essential oil on the respondent's skin to check for allergic reactions to the preparation
- b. Cleaning the respondent's skin with cotton and adding little oil on the hand and waiting for 3–4 min to see if there is redness, itching, or swelling. If there are signs of allergy, the affected area will be rubbed with coconut oil, and the prospective samples will be excluded.
- c. Two diffusers were installed in every corner of the room with a room temperature of 20–25°C 30 min before the intervention. The diffusers were placed near the sofa where the caregiver lies during the inhalation of coffee oil. The room was cleaned and there were no other odors that can interfere with the process of the aromatherapy administration.
- d. Before entering the room, samples had provided informed consent and assessment of nausea, allergic reaction, blood pressure, and heart rate as well as fatigue and stress levels. Caregivers were also asked to fill demographic data.
- e. After the initial assessment and the instruments fill, the samples are guided to enter the room and dripping 2 drops of coffee oil (2 cc), into 100 cc of water in the diffuser. The sample is allowed to exit the room if the samples experience some physical or psychological symptoms.
- f. Monitoring the occurrence of asthma and other respiratory disorders related to the use of essential oils before and after administration of aromatherapy.
- g. After 15 min inhalation, the samples were checked for blood pressure as well as fatigue and stress levels for post-test.

Data analysis

After the data collection, an analysis was carried out, and was divided into two, namely: univariate analysis to describe the characteristics of each variable studied, and bivariate analysis using the Analysis of Variance (ANOVA) statistical test to determine the effect of coffee aromatherapy on reducing the fatigue

and stress level of female caregivers in caring for the elderly at USU Hospital, Medan.

Ethics

This research passed the ethical test process with letter number: 169/KEP/USU/2020 by the Research Ethics Commission of the Universitas Sumatera Utara, June 30, 2020.

Results

The research showed that most caregivers are elderly's children with an average age of 38 years, acting as the main caregiver and breadwinner. About 50% caregivers are single, 75% has provided care for the elderly less than a year. During caring for the elderly, about 81.3% of caregivers received assistance from other family members with duration of care almost 20 h/day. Further information regarding, the respondent characteristics are presented in Table 1.

Table 1: Demographic data

Demographics	n (%)
Relationship with the elderly	
Wife	2 (12.5)
Children	10 (62.5)
Grandchildren	1 (6.3)
Sister	1 (6.3)
Niece	1 (6.3)
Daughter in law	1 (6.3)
Duration of care	
≤1 year	12 (75)
>1 year	4 (25)
Marital status	
Single	8 (50)
Married	7 (43.8)
Widow	1 (6.3)
Educational level	
Elementary school	2 (12.5)
Junior high school	-
Senior high school	3 (18.8)
Diploma 3/Bachelor	9 (56.3)
Master	2 (12.5)
Occupation	
Unemployment/Housewife	3 (18.8)
Employed	13 (81.3)
The availability of assistance	
Yes	13 (81.3)
No	3 (18.8)
History of falls in the elderly	
No	13 (81.3)
Yes	3 (18.8)
Barthel index of the elderly	
Independent	4 (25)
Partial	8 (50)
Total	4 (25)
Total	16 (100)
Demographics	Mean ± SD
Age	38.75 ± 10.93
Number of children	1.69 ± 1.92
Number of caring hours	19.75 ± 7.08

Based on the normality test of fatigue and stress, it showed four groups (the group without aromatherapy, group with 10% coffee oil inhalation, group with 20% coffee oil inhalation, and group with 30% coffee oil inhalation), with $p > 0.05$ as shown in Table 2.

According to the homogeneity test on fatigue and stress revealed that all four groups with P Value

Table 2: Normality test of fatigue and stress

Groups	p-value*	
	Fatigue	Stress
Day 1 (Without aromatherapy)	0.661	0.476
Day 1 (10% Coffee Oil)	0.166	0.600
Day 2 (20% Coffee Oil)	0.618	0.296
Day 3 (30% Coffee Oil)	0.885	0.241

> 0.05 and it had a homogen data on fatigue and stress as revealed in Table 3.

Table 3: Homogeneity test

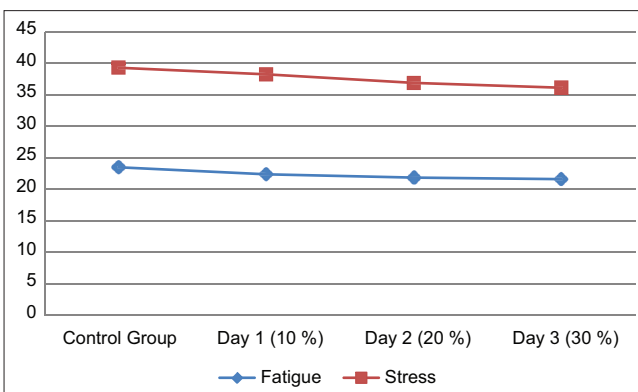
Variables	p-value*
Fatigue	0.823
Stress	0.537

According to the ANOVA test, it revealed that there is no difference among four groups with the fatigue variable has $p = 0.801 > 0.05$ and the stress variable has $p = 0.738 > 0.05$, meaning there is no significance difference among the four groups as shown in Table 4.

Table 4: ANOVA test

Variable	Mean	SD	95% CI	p-value*
Fatigue				
Day 1 (Without aromatherapy)	23.50	7.127	19.70–27.30	0.801
Day 1 (10% Coffee Oil)	22.38	5.340	19.53–25.22	
Day 2 (20% Coffee Oil)	21.88	5.136	19.14–24.61	
Day 3 (30% Coffee Oil)	21.63	5.162	18.87–24.38	
Stress				
Day 1 (Without aromatherapy)	39.31	10.150	33.90–44.72	0.738
Day 1 (10% Coffee Oil)	38.25	9.356	33.26–43.23	
Day 2 (20% Coffee Oil)	36.88	7.702	32.77–40.98	
Day 3 (30% Coffee Oil)	36.13	7.500	32.13–40.12	

However, there is a reduction in stress and fatigue level based on mean score analysis in three consecutive days with the escalation of coffee oil inhalation from 10 to 20%. This is shown in Figure 1.

**Figure 1: Mean score of fatigue and stress level**

Discussion

The majority of female caregivers are elderly children with an average age of 38 years. According to the research conducted by Lashewicz and Keating [28] revealed that the elderly children are the primary caregivers on parent care, and shared responsibilities among siblings. This is in line with the research result

showed that the caregivers received care support from others family members during caring process. In this research result, the respondents provide care for the elderly almost 20 h/day with 81.3% received support. In terms of Indonesian culture, parent care is part of the women's responsibility in the family [29]. This is due to several factors, namely, due to obligations as daughters, wives, and emotional ties [30]. Many researches show that women are most responsible for household affairs for taking care of sick family members [31]. Women also have dual roles as breadwinners, mothers, wives, and daughters in case of caring for chronically ill family members [32].

Research indicates that 50% of elderly patients are partially in need of care and require services to meet their daily needs, such as eating, drinking, bathing, getting dressed, and using the toilet. This is a burden for the caregiver during the caring process causing psychological problems [32], and physical fatigue that leads to the deterioration of the caregiver's quality of health [21]. It is similar with the research found by Tumanggor *et al.* [33] who showed a significant correlation between fatigue and stress among caregivers during caring hospitalized elderly. Even though, the result of this study showed no reduction in stress and fatigue among female caregivers with aromatherapy coffee oil for three consecutive days, but the mean score revealed a decrease in two variables with the coffee oil inhalation.

According to some researches, Hur *et al.* [34], Genç *et al.* [35], Karadag and Samancioglu Baglama [36] related to the effectiveness of aromatherapy found that aromatherapy reach the potential impact on reducing psychological symptoms, sleep problems, and fatigue. In addition, a research conducted by Karadag and Samancioglu Baglama [36] found that the aromatherapy delivery in 30 days among hemodialysis patients found effective to reduce fatigue. Therefore, the aromatherapy should be delivered in more than a week to give a good impact on psychological status of the caregiver. This is because the provision of a coffee aroma reduces the stress-inducing enzyme [37]. Coffee is known as anti-anxiety, anti-depressant, and anti-pain. There are several types of chemical compounds that affect psychological conditions when inhaled [38]. The aroma produced has an impact on psychological conditions, improves memory, and increases patient awareness [26]. The administration of coffee oil in aromatherapy has volatile properties, and therefore it is recommended to be carried out as often as possible to reduce the hormone cortisol in the blood [24]. Cortisol is known to be a stress hormone that is released in the body when it is stressed. Certain interventions are needed to reduce the amount of cortisol in the blood, both medical interventions and complementary therapies such as in this research, which shows significant results in reducing stress and fatigue of female caregivers caring for the hospitalized elderly.

The use of coffee oil inhalation in long-term duration

Aromatherapy with essential oil inhalation found effective in alleviating mental health status after a while of inhalation [39]. In case of coffee oil inhalation, research shown that the ingestion of coffee daily related to the stress reduction among women with some conditions such as, the amount of coffee consumption and the stress measurement after coffee ingestion [24]. Since these two factors affect the sample's salivary concentration after coffee consumption and should be considered for the next research project. In this study, the caregivers were assessed for stress and fatigue directly after intervention without any time interruption. In addition, there is no assessment whether the samples consume coffee routinely as beverages or not. Therefore, these might contribute to the research result with no reduction of stress and fatigue after coffee oil inhalation.

According to Bhadra and Parida [40] coffee oil has some advantages such as anti-depressant and boost immunity. However, the benefit of coffee oil inhalation for fatigue remains unclear [41]. Research found that aromatherapy with specific essential oil effective in reducing the issue in sleep problem as well as fatigue among hemodialysis patients [42]. The intervention conducted in 7 days with 2–3 times in a day. In this research, the intervention is only delivered once a day in 3 consecutive days. Hence, it is not enough to alleviate some psychological symptoms as the research conducted by Han *et al.* [41].

Therefore, according to the previous research related to essential oil inhalation towards some mental health issues, it is concluded that the effectiveness of the intervention depend on some factors. First, the time interruption after intervention should be provided before post-test. Second, the intervention should deliver more than once in a day. Thirdly, in case of coffee oil inhalation, the samples should be assessed whether familiar with coffee consumption or not. Hence, the next research project related to coffee oil inhalation should consider these factors.

Conclusion

The results provide some important data regarding female caregivers that are 38 years old on average and have multiple roles as caregivers, wives, and family breadwinners. The elderly as recipients of care experience partial dependence, and therefore need more support in daily care, such as eating, bathing, using the toilet, and dressing. The results showed that the administration of coffee oil aromatherapy has no changes in the stress and fatigue levels experienced by female caregivers during the caring process at USU

Hospital. However, the mean score showed a reduction of two variables during three day experiment. Therefore, it is need to add more days for a randomized controlled trial with coffee oil inhalation in the future as a comparison to this study result.

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