



The effect of tablet containing *Boswellia serrata* and *Melisa officinalis* extract on older adults' memory: A randomized controlled trial

Mohsen Taghizadeh^a, Farzaneh Maghaminejad^b, Mohammad Aghajani^{c,d,*}, Malihe Rahmani^e, Mohaddese mahboubi^f

^a Associate professor, Research Center for Biochemistry and Nutrition in Metabolic Diseases, Kashan University of Medical Sciences, Kashan, Iran

^b Nursing Trauma Research Center, Department of Nursing and Midwifery, Kashan University of Medical Sciences, Kashan, Iran

^c Lecturer, Infectious Diseases Research Center, Kashan University of Medical Sciences, Kashan, IR Iran

^d Phd Candidate, Student Research Committee, Kashan University of Medical Sciences, Kashan, IR Iran

^e Department of clinical psychology, Faculty of Medicine, Kashan University of Medical Sciences, Kashan, Iran

^f Microbiology Department, Medicinal Plant Research Center of Barij, Kashan, Iran

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ABSTRACT

Background: Memory deficits and age-related memory loss are currently two significant concerns in older adults. In Iranian herbal medicine, there are some prescriptions for memory improvement.

Objective: This study was designed to investigate the effect of tablet containing *Boswellia serrata* (BS) extract and *Melissa officinalis* (MO) extract on memory of the older adults.

Method: This is a randomized, parallel, double-blind, placebo-controlled clinical trial that performed among 70 older adults who referred to healthcare centers of Kashan University of Medical Sciences, Iran. Subjects were randomly assigned to receive either tablets (n = 35) or placebo (n = 35) for a month (n = 30). Data were collected using a demographic questionnaire and the Wechsler Memory Scale-Revised (WMS-R). Data were analyzed using Chi-square, independent-samples *t*-tests, paired *t*-test, repeated measure ANOVA, and ANCOVA using SPSS v13.

Result: Participants' baseline characteristics were similar in the two groups. The study was completed by 53 participants. However, as the analysis was based on an intention-to treat approach, all 70 older adults were included in the final analysis. Comparison of the two groups with showed that the total scores of the WMS-R and the subscales, including auditory immediate, immediate memory, visual immediate and working memory, were increased after consumption of the containing BS and MO tablets ($p < 0.0001$).

Conclusion: The BS and MO tablet in older adults can be beneficial on improvement of memory. This is still necessary to investigate effects and durability of the tablets on older adults with memory impairments in future studies.

1. Background

According to WHO, older adults are defined as people over age 65 years (WHO, 2016). The world population is increasingly aging. The number of the older adults in the world is estimated to be 82 million by 2050 (de Rezende, Rey-Lopez, Matsudo, & do Carmo Luiz, 2014). In this group, aging can lead to health problems, such as cognitive impairments, chronic diseases, and physiological disorders (Masoudi Alavi, Safa, & Abedzadeh-Kalahroudi, 2014). The older adults are often associated with changes in the neurocognitive abilities (Canivet et al., 2015). Occurrence rate of memory deficits is approximately 21.5–71.3 per 1000 years in older adults. The prevalence of dementia in the older

adults population is about 1% to 2% per year (Eshkoor, Hamid, Mun, & Ng, 2015).

New techniques have been developed for memory enhancement and prevention from age-related memory loss (Mahboubi, Taghizadeh, Talaei, Takht Firozeh, & Tamtaji, 2016). In General, pharmacological and non-pharmacological treatments are available, especially for impairment of memory. However, they are not effective in all cases and cause side effects, especially in long-term administration. Herbal medicine is commonly used for treating diseases, such as amnesia as well as reinforcing memory (Jalili, Salahshoor, Pourmotabbed et al., 2014). Some of the most common herbs used for improving memory performance are *Elaeagnus Angustifolia* (Hamidpour et al., 2017), *Ficus*

* Corresponding author at: IRAN/Kashan, Ghotb Ravandi Highway, Kashan University of Medical Sciences, Faculty of Nursing and midwifery, Iran.
E-mail address: aghajani_m@kaums.ac.ir (M. Aghajani).

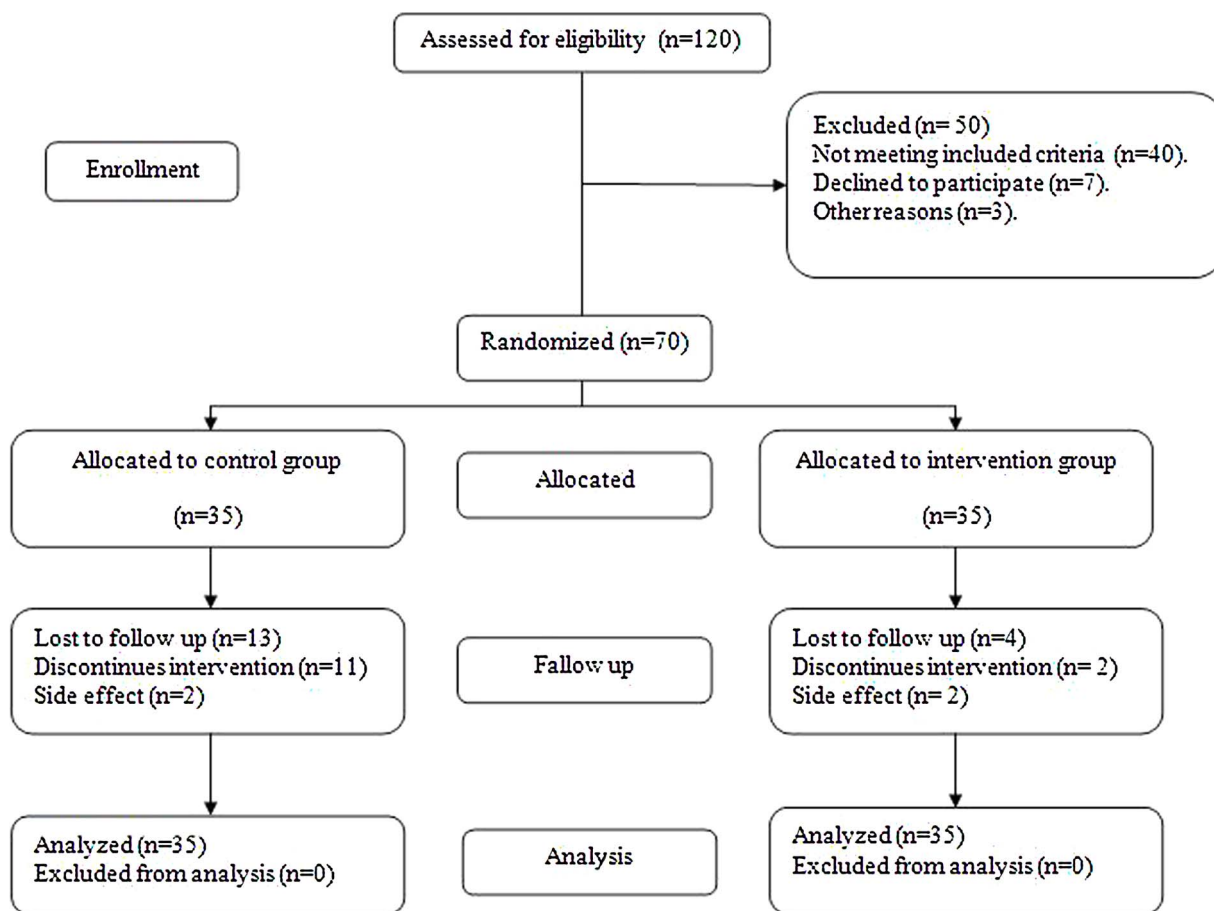


Fig. 1. Consort flow diagram of the study.

Table 1 Demographic characteristics in intervention and control groups.¹

	Intervention group (N = 35)	Control group (N = 35)	p ²
Age	67.14 ± 6.28	65.62 ± 5.33	0.07
Sex			0.31
Female	23 (65.71%)	20 (57.14%)	
Male	12 (34.29%)	15 (42.86%)	
Marital status			0.35
Single	1 (2.86%)	3(8.57%)	
Married	28 (80.00%)	23 (65.71%)	
Widow	6 (17.14%)	9 (25.72%)	
Job			0.74
Self-employment	2 (5.72%)	3 (8.57%)	
Retired	10 (28.57%)	12 (34.29%)	
Homemaker	23 (65.71%)	20 (57.14%)	
Education Level			0.80
Illiterate	21(60.00%)	19(54.29%)	
Elementary	9(25.71%)	10(28.57%)	
Middle school	3 (8.57%)	5 (14.28%)	
Diploma and higher	2 (5.72%)	1 (2.86%)	

¹ Values are means ± SDs or n (%).

² Obtained from a chi-square test, except for age, which was obtained an Independent samples student's t-test.

Carica (Subash et al., 2016), Crous Sativus (Khazdair, Boskabady, Hosseini, Rezaee, & Tsatsakis, 2015), Olive oil (Lehert, Villaseca, Hogervorst, Maki, & Henderson, 2015), Ginkgo (Stackman et al., 2003) and Huperzine (Malkova, Kozikowski, & Gale, 2011). Iranian Traditional Medicine recommends MO and BS for memory improvement

abilities (Mahboubi et al., 2016). In 10th century, Avicenna, the Persian physician, introduced the MO and BS for treating neurological disorder in The Canon of Medicine (The Law of Medicine) (Hosseini-Sharifabad, Kamali-Ardakani, & Hosseini-Sharifabad, 2016).

Few interventional studies have examined the effects of BS on memory. Findings from these studies indicated that memory increased after a period of BS administration (Jalili, Salahshoor, Moradi et al., 2014; Hosseini et al., 2010). BS has a botanical origin and consists of triterpenes (α- and β-boswellic acids and l upeolic acid), essential oils, and polysaccharides (Catanzaro et al., 2015). Also several studies have shown that MO might lead to improvement of memory (Ozarowski et al., 2016; Kennedy et al., 2003; Soodi, Naghdi, Hajimehdipoor, Choopani, & Sahraei, 2014). MO exhibits acetylcholine receptor activity (Akbarzadeh et al., 2015) may treat the cholinergic dysfunction in Alzheimer's disease (Kennedy et al., 2003). An earlier study showed that a joint administration of the BS and MO in animals was more effective than a single BS or MO in memory improvement (Mahboubi et al., 2016). According to the authors' knowledge, there is no study on effects of joint BS and MO on human's memory. This study was conducted to investigate the tablet containing BS and MO on older adults' memory.

2. Methods

The present study was a randomized double-blind parallel controlled trial conducted from August to September 2015. The participants were 70 older adults referred to healthcare centers associated with Kashan University of Medical Sciences, Kashan, Iran. For estimating sample size, we used the standard formula suggested for parallel clinical trials and considered the type 1 error (α) of 0.05 and type 2

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