The results of a cross-over placebo-controlled study of the effect of lavender oil on behavioral and psychological symptoms of dementia

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- The prevalence of BPSD is estimated at 75%
- 40% of patients suffer from more than three concomitant types of BPSD
- Signs of BPSD are associated with :

✓negative health outcomes including functional decline

✓increased duration of hospitalization

✓placement in nursing homes

✓caregiver burden

✓increased costs

✓increased mortality rates

- Neuroleptic drugs are often first-line treatment for BPSD
- Over the past decade there has been a growing trend for the use of complementary and alternative medicine, including aromatherapy, to reduce the use of neuroleptic drugs in the treatment of BPSD.
- The results of studies of aromatherapy for the treatment of BPSD are not conclusive as some had positive results ,some had negative results ,and others had mixed results .

Two questions:

- does treatment with the aromatic oil Lavender (Lavandula angustifolia) reduce the rates of BPSD
- does the application of aromatic oil closer to the olfactory system reduce BPSD to a greater degree than its application at other anatomic sites.

Methods

- August to December 2017
- Two psychogeriatric LTC departments at the Center for Mental Health of the Israel Ministry of Health for patients with dementia in Beer-Sheva
- Lavender oil as the active agent and sunflower seed oil as the placebo. (The latter has been shown in the past to have a neutral effect on BPSD)
- Lavender or placebo oil were applied by the nurses on duty in the two departments three times a day,
- Two drops of oil were applied with an applicator on the skin of the face or the foot, in accordance with the group and the intervention phase. The oil was applied to the face above the upper lip in the closest area to the olfactory system. It was applied to the dorsal part of one foot

Table 1. Monthly allocation of active drug or placebo, by department.

Department	Month 1	Month 2	Month 3	Month 4
A	Lavender oil on the face	Lavender oil on the foot	Placebo oil on the foot	Placebo oil on the face
B	Placebo oil on the face	Placebo oil on the foot	Lavender oil on the foot	Lavender oil on the face

Study instrument

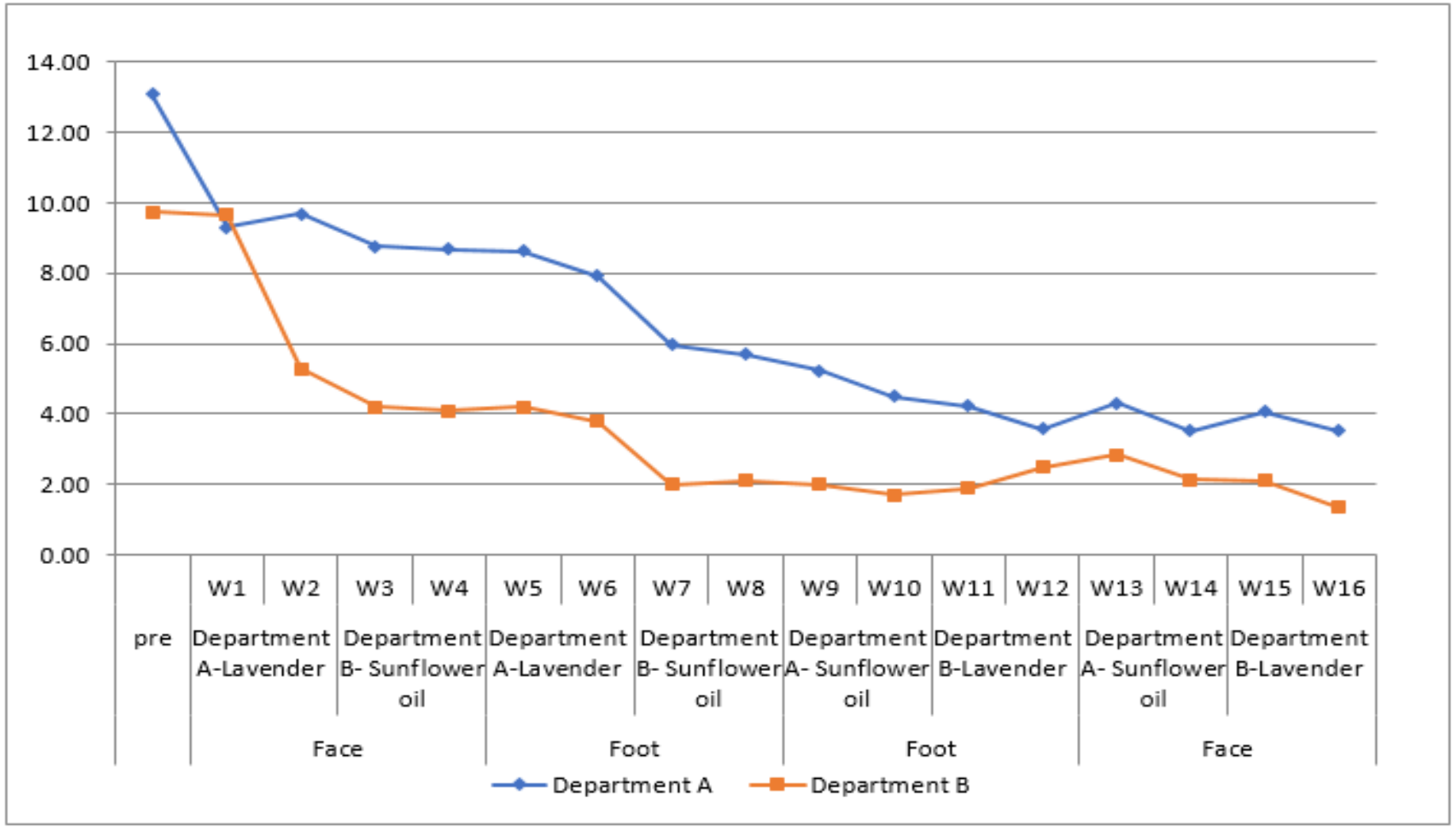
Neuropsychiatric Inventory (NPI)

Subjects were evaluated on 10 items (delusions, hallucinations, agitation/aggression, depression/dysphoria, anxiety, elation/euphoria, apathy/indifference, disinhibition, irritability/lability, and aberrant motor behavior).

NPI scores are in the range 0-120 (with higher scores indicating greater BPSD severity).

- The mean age of the patients was 76.1±11.2 years (range 51-95).
- The mean NPI score for the entire study population before the intervention, was 11.5±9.0 (median=8.0, minimum=0, maximum=32),¬ with a mean score of 13.1±8.3 (12.0; 2-31) in Department A and 9.7±9.6 (6.0; 0-32) in Department B (P=0.234).
- The mean NPI score decreased in both groups between the beginning and the end of the study .In Department A the mean score dropped to 3.5±3.8 (median=2.0; Freidman test: Chi-square=160.4, df=16, P<0.0001) and in Department B to 1.4±2.5 (median=2.0; Frideman test: Chi-square=142.2, df=16, P<0.0001).

גרף 1- שינוי בציון NPI ממוצע לפי מחלקות



- In this 16-week crossover study there was no advantage to lavender oil over sunflower seed oil in reducing BPSD as measured by NPI. While the mean NPI score decreased significantly in both study groups this decrease was not associated with the type of oil or the site of application
- In effect, the greatest change in NPI occurred over the first weeks of the study regardless of whether the patients received the active agent or the placebo (Fig. 1). Furthermore, the only period in which there was a statistically significant decrease in the NPI score in one group (Department A) without a corresponding decrease in the other group (Department B) was when Department A received placebo on the foot and Department B received lavender oil on the foot .
- Thus, the hypothesis that we generated from a previous study (2016) ,to the effect that application of oil closer to the olfactory system would be more effective than its application at a more distant site (the foot), was rejected by the results of this study.

Press-Sandler O, Freud T, Volkov I, Peleg R, Press Y: **Aromatherapy for the Treatment of Patients with Behavioral and Psychological Symptoms of Dementia: A Descriptive Analysis of RCTs.**

There are several possible explanations for the negative results of the present study

- it is possible that sunflower seed oil has therapeutic qualities, similar to lavender oil. This assumption is not reasonable since, in the past, when sunflower seed oil was used in a control group it did not have a positive effect on BPSD

.Lin PW, Chan WC, Ng BF, Lam LC: **Efficacy of aromatherapy (Lavandula angustifolia) as an intervention for agitated behaviours in Chinese older persons with dementia: a cross-over randomized trial**. *International journal of geriatric psychiatry* 2007, **22**(5):405-410.

- we selected patients that were “too healthy” with a mean NPI score of 11.5±9.0 and a median score of 8.0 prior to the intervention. In contrast, in previous studies that evaluated the effect of lavender oil on BPSD the NPI score was higher. The study by Lin et al. included patients with a mean NPI score of 24 before the intervention .In another study the median NPI score was 54 in the intervention group and 33 in the control group .

Turten Kaymaz T, Ozdemir L: **Effects of aromatherapy on agitation and related caregiver burden in patients with moderate to severe dementia: A pilot study**. 2017, **38**(3):231-237.

The use of psychotropic drugs during the study

- Before the start of the study the patients in Department A received 1.9±0.9 (2; 0-3) of all psychotropic drugs and the patients in Department B received 1.3±0.9 (2; 0-2).

- No changes in drug therapy took place during the course of the study and there were no differences between the departments over time
- The fact that there was no change in the use of psychotropic drugs throughout the course of the study, despite the significant decrease in NPI in the two groups, raises an interesting question that needs to be addressed
- In the study by Lin et al. ,despite the significant reduction of the NPI score by 7 points during treatment with the active agent, there was no change in the use of psychotropic drugs, so this may reflect a universal phenomenon of difficulty on the part of the staff to reduce drug therapy despite an improvement in BPSD

- The only change that did occur in the two departments during the course of the study was the attention paid to the patients since a nurse approached the patient and touched him/her to apply the oils.
- So, additional time (no more than six minutes per day) was spent with the patients in the two departments. Yang et al. found that treatment with aroma-acupressure, for up to 15 minutes five times per week over four weeks, had a greater effect than aromatherapy when lavender oil was applied to the same sites, but without acupressure

Yang MH, Lin LC, Wu SC, Chiu JH, Wang PN, Lin JG: **Comparison of the efficacy of aroma-acupressure and aromatherapy for the treatment of dementia-associated agitation**. *BMC Complement Altern Med* 2015, **15**:93.

- Is it possible that the act of touching the patient for more time rather than the oil itself affects the results of the treatment?

- “It is likely that these non-specific elements of the intervention… confer important benefits and probably explain the substantial improvements in the placebo group…There are important implications for clinical practice regarding the impact of relatively simple interventions involving touch and interaction even though these may only last a couple of minutes a day.”

Burns A, Perry E, Holmes C, Francis P, Morris J, Howes MJ, Chazot P, Lees G, Ballard C: **A double-blind placebo-controlled randomized trial of Melissa officinalis oil and donepezil for the treatment of agitation in Alzheimer's disease.** *Dementia and geriatric cognitive disorders* 2011, **31**(2158-:(.164

The present study has several advantages

- The prospective crossover design that enabled us to compare the two types of oil at different times in the same population,
- The meticulous recording of psychotropic drugs that enabled us to rule out an effect of drug therapy on the results of the study,
- The high adherence rate (over 95%) to the application of the oil that reduced the potential effect of adherence rates of the study results.
- The study continued for 16 weeks, which reduced the risk that a negative result could have been associated with a short-term exposure to the active agent.

The study also has limitations

- The sample size
- the NPI score in our study was lower in comparison to other studies that evaluated the effect of lavender oil on BPSD using NPI as a baseline measure
- we could not rule out misclassification of behavior issues when, for example, irritability could be classified as agitation
- the lack of follow-up after the treatment period. Did the NPI score go up or remain low? Were there changes in drug therapy in light of the decreased NPI?
- The absence of masking reduces the quality of the present study, but it is important to note that lavender oil has a unique smell that makes it very difficult to design a study with masking

In summary, in this crossover study there was no advantage to the use of lavender oil, unrelated to the distance from the olfactory system, for the treatment of BPSD. In light of the many study design limitations in the present study there is a place for further research with a larger sample size that would test the assumption that it is not the oil itself that leads to the reduction in BPSD, but **the investment of additional time and direct contact with the patient.**