Appendix. Studies that Used Lavender for Sleep: Review Criteria

#	Authors, year, and country	Title, journal, database	Design	Sample	Intervention	Control/comparison	Sleep outcome measures	Results	Quality Appraisal
1.	Cho, EH et. All (2017). Republic of Korea	The Effects of Aromatherapy on Intensive Care Unit Patients' Stress and Sleep Quality: A Nonrandomized Controlled Trial. Evidence-based Complementary and Alternative Medicine **2017**.	A Nonrandomized Controlled Trial. Pretest post-test design	Adult patients in ICU with >2 nights stay N=30/30	Aromastone with 3 drops of lavender oil – inhalation through deep breathing and then the stone is place on the side rail of bed for the night within 10 cm) for 2 nights	No intervention, standard care	The Verran & Snyder-Halper (VSH) sleep quality measurement Tool Stress index measured with Canopy9 professional 4.0 (IEMBIO, USA), an automatic nervous system measuring device	Significant difference in perceived stress objective stress index and sleep quality between the groups. Significant improvement in sleep quality for the experimental group p<0.001.	Small sample size. Study measured stress index, perceived stress, Blood pressure, heart rate and sleep quality.
2.	Karadag, E., et al. (2017). Turkey	Effects of aromatherapy on sleep quality and anxiety of patients. Nurs Crit Care **22**(2): 105-112. Anxiety primary, secondary outcome sleep	A randomized controlled study	60 patients in coronary ICU	Intervention group -2% lavender essential oil via inhalation for 15 days administered the same scales before and after to evaluate the sleep quality and anxiety.	No inhalation, same measures.	questionnaire, Pittsburgh Sleep Quality Index (PSQI) and the Beck Anxiety Inventory (BAI) scale SPSS	Significant differences in the change in favor of the intervention group (p < 0·05). Conclusion: Lavender essential oil increased quality of sleep and reduced level of anxiety in patients with coronary artery disease.	Well conducted study; two third of the subjects were males. Homogeneity in all other demographics between the two groups.
3.	Lytle, J., et al. (2014). USA	Effect of lavender aromatherap	RCT	N=50 in IMCU Age >21	The treatment group had	Received Standard care	All patients completed the Richard	Blood pressure was	Pilot study. Two third of the

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		y on vital signs and perceived quality of sleep in the intermediate care unit: A pilot study. <u>American Journal of Critical Care</u> **23**(1): 24-29.		years	3 mL of 100% pure lavender oil in a glass jar in place at the bedside from 10 PM until 6 AM. Vital signs were recorded at intervals throughout the night.		Campbell Sleep Questionnaire to assess quality of sleep. Also Vital signs, mainly mean arterial blood pressure monitored during the night	significantly lower between midnight and 4 AM in the treatment group than in the control group (P = .03) No significant changes in sleep quality between the two groups.	participants were females. Subjective reporting of the quality of sleep using a non-validated tool. Only one measure after I night of hospital stay
4.	Otaghi, M., et al. (2017). Iran	Investigating the Effect of Lavender Essential oil on Sleep Quality in Patients Candidates for Angiography. <u>Biomedical & Pharmacology Journal</u> **10**(1): 473-478.	RCT	N=60 (each group, n = 30) in CCU patients scheduled for angiography	The case group received 15 drops of lavender essential oil solution aromatherapy 24 hours prior to angiography and every 8 hours thereafter	Received 15 drops of placebo with the same shape and appearance 3 times	St. Mary's Hospital Sleep Questionnaire, completed before and after the intervention. Descriptive and inferential statistical tests using SPSS statistical software v19.	no statistically significant difference before and after the intervention in sleep quality (P 0.6 vs. 0.87)	There was homogeneity between the two groups. Convenience sample. However, Method not clear-how the intervention and placebo were administered. Was it as a solution/drops applied to an object etc.
5.	Mahdavikian, S., Rezaei, M., Modarresi, M., & Khatony, A. (2020). Iran	Comparing the effect of aromatherapy with peppermint and lavender on the sleep quality of cardiac patients: a randomized controlled trial. Sleep Science and Practice, 4(1), 1-8	RCT	N=105 35 each in each group. 18-65 years age, hospitalized with heart disease in CCU	3 drops of lavender or peppermint oil 100% smeared in a napkin attached to a collar for 20 minutes at 9 pm, for 7 nights.	Received aromatic distilled water	PSQI before the intervention and on the 8th morning after the intervention for each group	Sleep quality scores before and after- 14.8 ± 1.5 vs. 4.8±2.1. Significant difference in the sleep scale score before and after	Homogenous between the three groups External variables such as light & noise were not considered along with sleep habits and other individual

							intervention for both lavender and peppermint oils compared to control group p<0.001	stressors
6.	RAFI, N., KHODADADIZADEH, A., NEMATABAD, M. S., & REZA, A. Iran (2020)	The Evaluation of the Effect of Aromatherapy with Lavender Essential Oil on the Quality of Sleep of Cardiac Patients Candidate for Angiography. P J M H S Vol. 14, NO. 2, APR – JUN 2020 (1143)	RCT-non-blinded	70 angiographic patients in cardiac ICU between 40-60 years age	Cotton swab with 15 drops of 20% lavender essential oil pinned to patient's pillow	Cotton swab impregnated with 15 drops of water pinned to the patient's pillow.	St. Mary's Hospital Sleep Questionnaire- completed the questionnaire before and after intervention. Analysis- SPSS 18, paired t-test, chi-square test, independent t-test, and Fisher's exact test	Significant difference between the pre and post intervention on sleep quality p<0.00001. In control group the difference was p=0.08	High homogeneity between the two groups. Only one day of measurement post intervention. Not clear whether the study was conducted on day of admission or not.
7.	Moeini, M., Khadibi, M., Bekhradi, R., Mahmoudian, S. A., & Nazari, F. (2010). Iran	Effect of aromatherapy on the quality of sleep in ischemic heart disease patients hospitalized in intensive care units of heart hospitals of the Isfahan University of Medical Sciences. Iranian journal of nursing and midwifery research, 15(4), 234.	RCT single blinded	N=64 ICU patients with ischemic heart disease < 65 years	Two drops of lavender oil in a cotton swab places in a small box near the patient's pillow within 20 cm for 3 nights 9 pm-6 am	Received standard care	SMHSQ completed before and 3rd day after the intervention.	Significant difference in sleep quality in the intervention group p <0.001.	Questionnaires completed by a research assistant for both groups (blinded). Though 3 nights of intervention done, sleep was measured only on the 3rd night.
8.	Hamzeh, S., Safari-Faramani, R., & Khatony, A. (2020).	Effects of Aromatherapy with Lavender	RCT	N=120 40 each in each group.	3 drops of lavender or peppermin	Received distilled water with 1% lavender	PSQI before the intervention and on the 8th	All three group had improved	Homogeneity between the three

| Iran | and Peppermint Essential Oils on the Sleep Quality of Cancer Patients: A Randomized Controlled Trial. Evidence-Based Complementary and Alternative Medicine, 2020. | 18-65 years age, hospitalized with cancer | t oil 100% dropped in a cotton ball attached to a collar for 20 minutes at 9 pm, for 7 nights. | oil | day morning after the intervention for Control, Lavender and peppermint group on sleep. ANOVA test | sleep after intervention though there was significant improvement in the duration of sleep in both Lavender and peppermint group (p-0.0001) | groups; Sleep scale measurement only once in 7 days post intervention. Varied Cancer diagnosis and stages of the disease; type and number of medications the patients used not controlled |