

**Supplemental Table 1 Comparison of studies assessing the efficacy of ear plugs and eye masks to improve sleep quality and quantity**

Authors	Design	ICU	Patients	Treatment arms & duration	Sedation	Sleep Measure	Outcome
Studies assessing ear plugs alone							
Scotto, <i>et al</i> <sup>[152]</sup> , 2009	Single centre, quasi-experimental, open-label, parallel-group study	2 units: General ICU Cardiac ICU Floorplan: Not described	Enrolled: 100pts Mech. vent: 0	EP alone vs usual care (1 night)	Not permitted	VSHSS	Significant improvements in VSHSS sleep satisfaction with EP. Mean difference between groups 3.3 ( $P = 0.002$ )  Twelve patients did not complete study: EPs fell out or uncomfortable in 7 patients, drop out due to clinical deterioration in 5 patients.

Van Rompaey, <i>et al</i> <sup>[204]</sup> , 2012	Single centre, parallel-group, open-label, assessor-blinded, randomised control trial	1 unit: General and Cardiac ICU Floorplan: Single rooms	Enrolled: 136pts Mech. vent: Not reported	EP alone vs Not permitted	(5 nights)	Original questionnaire developed by investigators <sup>a</sup>	Precise values not reported. From figures sleep better than control on night 1 ( $P = 0.04$ ), but numerically worse than control by night 3 ( $P = 0.44$ ) Four patients unable to complete sleep assessment due to delirium
Litton, <i>et al</i> <sup>[203]</sup> , 2017	Single centre, parallel-group, open-label, randomised pilot trial	1 unit: Cardiac-surgical ICU Floorplan: Not described	Enrolled: 40pts Mech. vent: All post-cardiac surgery	EP alone vs Permitted	usual care (Continuous while intubated; first night in ICU only if extubated)	RCSQ	No significant benefit with EM/EP RCSQ sleep summary scores, median [IQR]: EP 43 [20-58]; control 45 [29-64]; (median difference, 2; 95%CI, -21 to 25) ( $P = 0.58$ )

Studies assessing earplugs and eye masks together

Richardson, <i>et al</i> <sup>[211]</sup> , 2007	Single centre, quasi-experimental, open-label, assessor-blinded, parallel-group study	1 unit: Cardiac ICU Floorplan: Not described	Enrolled: 64pts Mech. vent: 0	EM/EP vs usual care (1 night)	Not permitted for > 24 h prior	Original questionnaire developed by investigators <sup>b</sup>	No statistically significant benefit with EM/EP Sleep > 4 h: EM/EP 44%; usual care 36% Two patients missing data sets
Jones, <i>et al</i> <sup>[212]</sup> , 2012	Single centre, prospective, open-label, unblinded, pre- and post-study	1 unit: General ICU Floorplan: Open plan	Enrolled: 100pts Mech. vent: 0	EM/EP (1 night)	Not permitted for > 24 h prior	Original questionnaire developed by Richardson <sup>b</sup>	No statistically significant benefit with EM/EP Sleep > 4 h: Pre-intervention 46%; post-intervention 48%
Yazdannik, <i>et al</i> <sup>[205]</sup> , 2014	Randomised cross over trial	Number and type of ICUs not reported	Enrolled: 50pts Mech. vent: Not reported	EM/EP vs usual care (1night each)	Analgesia permitted	VSHSS	Statistically significant improvements with EM/EP Difference in sleep effectiveness with

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								EM/EP, mean (SD): 14.5 (11.5)
		Floorplan: Not described						Difference in sleep effectiveness with EM/EP, mean (SD): 25.8 (16.9)
Demoule, <i>et al</i> <sup>[210]</sup> , 2017	Single-centre, parallel- group, open- label, randomised control trial	1 unit: General ICU Floorplan: Single rooms	Enrolled: 51pts Mech. vent: Control 19% Intervent 10%	EM/EP <i>vs</i> usual care (every night until discharge)	Not permitted night for > 24 h prior	PSG on first night	No statistically significant benefit with EM/EP PSG: - Unable to be scored in 7/32 EP/EM group and 3/32 control group due to poor signal - No significant difference in sleep efficiency, arousal index or self-assessed sleep quality	

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						Withdrawals: 3 patients withdrew consent; intervention (2), control (1). Compliance: 21/32 pts wore EPs all night and 18/21 wore EP+EM. 9/32 wore EPs part of night
Kamdar, <i>et al</i> <sup>[195]</sup> , 2013	Sequential period study	1 unit: Medical ICU Floorplan: Not described	Enrolled: 300pts Mech. vent: Control 64% Intervent 47%	Multicomponent quality improvement bundle, inc. - EM/EP - Pharmacologic sleep aids (every night until ICU discharge)	Permitted RCSQ	Low use of EM/EP and no significant effect of quality improvement bundle Earplugs offered and accepted by non- sedated patients on 1% of patient days Eye mask offered and accepted by non-

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							sedated patients on 2% of patient days
							Pharmacological sleep aids administered on 13% of occasions
							RCSQ sleep quality score, mean (SD): Intervention 54.5 (27.1); control 53.2 (27.3) (p=0.46)
Hu, <i>et al</i> <sup>[213]</sup> , 2015	Single centre, parallel-group, open-label, randomised control trial	1 unit: Cardiac SICU Floorplan: Not described	Enrolled: 45pts Mech. vent: Not reported	EM/EP+ 30 min relaxing music <i>vs</i> usual care (2-3 nights)	Permitted	RCSQ	Statistically significant improvements with EM/EP RCSQ sleep efficiency, mean (SD): EP/EM 21.7 (20.9); control 63.4 (21.9) RCSQ perceived quality, mean (SD): EP/EM 23.7 (20.6); control 54.0 (25.5)

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								Five patients withdrawn from EM/EP group due to post-op complications (2), refusal (3)
Bajwa, <i>et al</i> <sup>[207]</sup> , 2015	Single centre, parallel-group, open-label, randomised control trial	Number and type of ICUs not reported	Enrolled: 100pts Mech. vent: Not reported	EM/EP vs usual care (2 nights)	Not reported	VSHSS	Statistically significant improvements with EM/EP	Sleep quality, mean (SD): EM/EP 10.5 (2.5); control 2.1 (2.3)
Dave, <i>et al</i> <sup>[206]</sup> 2015	Single centre, randomised cross over trial	Number and type of ICUs	Enrolled: 50pts Mech vent: 0	EM/EP vs usual care (1 night each)	Not reported	RCSQ	Statistically significant improvement in RCSQ sleep summary score with EM/EP	Sleep length, mean (SD): EM/EP 11.8 (3.2); control 2.4 (2.5)

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		not reported						
		Floorplan:						
		Not described						
Chaudhary, <i>et al</i> <sup>[215]</sup> , 2020	Single centre, randomised cross over trial	1 unit: Medical ICU Floorplan: Open plan	Enrolled: 68pts Mech. vent: 0	EM/EP vs 30 minutes 'ocean sounds' (1 night each)	Not reported	Modified PSQI	Statistically significant improvements in sleep quality score with the use of EM/EP Eight pts excluded after randomisation due to discharge (5) and clinical transfer (3)	
Arttawejkul, <i>et al</i> <sup>[214]</sup> , 2020	Single centre, parallel group, open-label, randomised clinical trial	1 unit: Medical ICU Floorplan: Not described	Enrolled: 20pts Mech. vent: Not reported	EM/EP vs usual care (maximum of 5 nights)	Not reported	PSG on first night Daily RCSQ	No significant statistically benefit with EM/EP PSG results: Arousal index 1st night, mean (SD): EM/EP 21.1 (14.6); control 42.1 (18.2)	

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							Total sleep time 333 (112) vs, 319 (174); RCSQ summary score, mean (SD): EM 58.5 (5.3); control 56.4 (5.2) Three patients excluded from analysis due to poor quality data or discharge
Obanor, <i>et al</i> <sup>[209]</sup> , 2021	Single centre, parallel group, open-label, randomised clinical trial	1 unit: Surgical ICU Floorplan: Not described	Enrolled: 87pts requiring hourly post-op assessments Mech. vent: 0	EM/EP vs usual care (1 night)	Analgesia permitted	RCSQ	Statistically significant improvements with EM/EP RCSQ sleep summary score, mean (95%CI): EM 64.5 (58.3-70.3) vs. control 47.3 (40.8-53.8) Three excluded after randomisation and data missing for 9, with

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Akpinar, <i>et al</i> <sup>[208]</sup> , 2022	Single centre, parallel group, open-label, randomised clinical trial	1 unit: Coronary ICU Floorplan: Not described	Enrolled: 84pts Mech. vent: 0	EM/EP vs usual care for (2 nights)	Not permitted for > 24 h prior	RCSQ	RCSQ data available for 78 participants Statistically significant improvements with EM/EP RCSQ sleep summary score, mean (SD) Night 1 = 64 (14) <i>vs</i> , 47 (9) Night 2 = 72 (12) <i>vs</i> 47 (12)
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EP: Ear plugs; EM: Eye mask; VSHSS: Verran Snyder-Halpern Sleep Scale; RCSQ: Richards-Campbell Sleep Questionnaire; PSQI: Pittsburgh Sleep Quality Index; PSG: Polysomnography; *n*: Number of patients; IQR: Interquartile range; SD: Standard deviation; 95%CI: 95% confidence interval; NSD: Not statistically different; Mech. vent: mechanical ventilation

<sup>a</sup>Sleep perception was assessed using five dichotomous questions on the self-reported sleep quality of the patient: 1) Did you sleep well? 2) Did you sleep better than expected? 3) Did you sleep better than at home? 4) Were you awake for a long time before falling asleep? 5) Do you feel sufficiently rested? The score on question four was reversed. A higher total sum score on the five questions showed a better sleep perception. The scores were categorized as bad sleep (sum < 2), moderate sleep (2 ≤ sum < 4) and good sleep (4 ≤ sum).

<sup>b</sup>Sleep was assessed using two five-point Likert scales: 1) Rate perceived sleep duration as: 0-2 hours, 2-4 hours, 4-6 hours, 6-8 hours, more than 8 hours, 2) Rate sleep in comparison to your average sleep as: Much less than average, less than average, Average, More than average, Much more than average.