**Supplemental Table 44. Results from studies that evaluated the outcomes of sleep in the ICU**

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| **Author, Year** | **Study** **Design** | **N** | **Patient Characteristics** | **Type and time of data collection** | **Findings** |
| Combes, 2003[1] | Prospective observational | 347 | ICU survivors on MV ≥ 14 days | Questionnaire 3 years | Sleep scores were worse that general population |
| Eddleston, 2000 [2] | Prospective, observational | 136 | All ICU survivors | Questionnaire 3 months | Sleep disturbances women 30/68 (44.1%) and men 19/75 (25.3%)Distressing flashbacks, hallucinations, and “bad” dreams were reported |
| Elliot, 2013 [3] | Prospective observational | 53 | Patients able to self-report. Some on MV, some extubated | 24 hour PSG QuestionnaireDuring ICU | 24 hour PSG:Median TST = 5 hrs; median duration of sleep without awakening = 3 minutes;Median arousal index 27.Median RCSQ score in ICU 57.50 (poor) |
| Granja, 2005 [4] | Prospective, observational | 236 | All ICU survivors | Questionnaire 6 months | 38% of pts did not remember any of their ICU staySleep in ICU was rated as “good and enough” by 73%51% experienced dreams and nightmares during their ICU stay |
| Higgins, 1998 [5] | Prospective observational | 20 | Patients on MV ≥7 days and were weaning. Patients able to communicate | Questionnaire During ICUVisual analogue scale used to measure fatigue | Correlations between VSH scales and fatigue were weak and statistically nonsignificant. Sleep disruption and fatigue (r=0.09 and p=0.35); sleep supplementation and fatigue (r=0.09 and p=0.35); moderately strong inverse relationship between patient perception of sleep effectiveness and fatigue (r=-0.36, p=0.06) |
| Hurel, 1997 [6] | Prospective, observational | 223 | All ICU survivors | Questionnaire 6 months | Severe alterations in sleep compared to general population noted |
| Lee, 2009 [7] | Prospective, observational | 7 | ARDS survivors who reported difficulty sleeping at 6m | Questionnaire PSG6 months | Decrease in TST and sleep efficiency due to prolonged sleep latency in 2pts, and prolonged wakefulness after sleep onset in 1pt; sleep latency short in 2 pts REM latency mildly reduced in 4 pts; 4 pts had mild PLMS; sleep architecture fairly well preserved |
| McKinle, 2012 [8] | Prospective, RCT to evaluate 8wk home-based rehabilitation | 195 |  | QuestionnaireWeeks 1,8,26 | pts reporting mod/severe sleep problems declined from 50% at week 1 to 31% at week 26 |
| McKinley, 2013 [9] | Prospective, observational | 222 | All ICU survivors | QuestionnaireDuring ICU, ward2 months, and 6 months | 52% of pt reported poor sleep quality during ICU and the ward62% reported poor sleep quality at 2 months post hospital d/c57% reported poor sleep quality at 6 months post hospital d/c |
| Orwelius, 2008 [10] | Prospective, observational | 723 | All ICU survivors ≤ 74 y/o | Questionnaire6 months12 months | The clinical data (APACHE II, ICU-LOS, diagnosis) did not differ for the group that reported sleep disturbances at 6months vs those with no reported sleep disturbances (OR = 3.61 at 6 months; OR 3.62 at 12 months).Concurrent illness were strongly associated with sleep disturbances |
| Parsons, 2012 [11] | Prospective, observational | 40 | Mechanically ventilated acute lung injury survivors  | Questionnaire6 months | No baseline or ICU factors associated with post-discharge insomnia.The association between insomnia symptoms and mental QOL were not significant after adjusting for PTSD and depression.Subjects with insomnia had significantly worse physical QOL.  |
| Ringdal, 2006 [12] | Prospective, observational | 239 | ICU trauma survivors | QuestionnaireBetween 6 and 18 months  | The whole ICU stay was clearly recalled by 30%.Pts with no clear memories were more likely to have had a longer ICU-LOS and been treated with sedatives or opoids.83% of pts had factual memories. 70% had emotional memories. 61 patients reported delusional memories (nightmares (62%) and dreams (48%) most common)Age < 50 and renal failure were associated with significant increase in delusional memories. |
| Roberts, 2004 [13] | Observational | 31 | ICU survivors from a prior quality improvement project | Telephone interviewBetween 12 and 18 months | 23 pts (74%) reported one or more dreams.No association between agitated ICU behavior and recollection of dreams.18 (78%) reported that dreams occurred only in the ICU or day of discharge from ICU; 5 (22%) had dreams that recurred up till time of interview; 4 (17%) had dreams that would occur as they were falling asleep; 6 (26%) felt that presence of relatives and staff helped them cope with dreams while they were in the hospital; 2 (9%) had ongoing psychological problems at time of interview. |
| Roberts, 2006 [14] | Observational | 41 | ICU survivors from a prior incidence of delirium study | Telephone interview18 to 24 monthsafter ICU discharge | 20/41 (49%) had only factual memories of the ICU; 14/41 (34%) recalled both ICU dreams and memories; 4/41(10%) had no recollection of dreams or of the admission.No relationship between delirium status and dream recall; ICU-LOS and ventilation status were the only factors that lead to significant increase in dream recall. |
| Rotondi, 2002 [15] |  | 96 | ICU survivors on MV ≥ 48 hours who remembered ICU experience | Questionnaire During ward  | Sleep questions:“remember trouble falling asleep” (n=96)Yes 34 (35.4%)Yes (none or little) 6 (17.6%)Yes (mod or extreme) 28 (82.4%)“remember nightmares” (n=96)Yes 17 (17.7%)Yes (none or little) 2 (11.8%)Yes (mod or extreme) 15 (88.2%) |
| Rundshagen, 2013 [16] | Prospective, observational | 289 | Surgical patients who were mechanically ventilated and sedated during ICU stay | 48-72 hours after ICU discharge | 61 (21.1%) remembered dreams; 27 (9.9%) reported unpleasant dreams /nightmares; 19 (6.6%) reported unpleasant hallucinations; 9 reported very frightening true-to-life delusions.ICU-LOS was best predictor for occurrence of recall or dreams. |
| Tembo, 2013 [17] | Observational | 12 | Mechanically ventilated and undergoing daily sedation interruption | Face-to-face interview 2 weeks after ICU discharge | Sleep during ICU admission described as “being in limbo,” “longing for normal sleep,” being tormented by nightmares.”Difficulty sleeping persisted after discharge |
| Wu, 2016 [18] | Prospective, RCT | 60  | ≥ 65 y/oPost-op day 1 after noncardiac surgery Not on MV | PSG from 5pm to 8am Post-op day 1.Used 11 point scale to assess sleep (lower score indicates better sleep) | Pt on dex noted to have: decreased N1, increased N2 (15.8% vs 43.5%), increased sleep efficiency (p=0.033)increase TST 130min placebo vs 213min dex (p=0.028)improved subjective sleep quality on the night of the infusion (no difference on subsequent nights 2 and 3)N3 sleep present in 16.7% of placebo pts vs 25.8% dex ptsREM sleep absent both groups.Subjective sleep quality better with infusion. |

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