Sleep Deprivation
A multi-modal multi-disciplinary approach
acknowledgements

- Colleagues at BRI
- Delirium project group- Sam Heaton SSN (light therapy), Bex Russell Acting sister (this is me), Louise Sherratt- SSN (music therapy), Lucy Alford (RN) diaries
- CIS team (formatting care bundles + audit)
- Matthew Martin- SPR- sleep champion
- Dr S Shah ICU consultant (pharmacology and industry)
- Dr K Rooney ICU consultant (universal treatment alg)
- Dr C Bourdeaux- ICU consultant- CIS lead
Symptoms of Sleep deprivation and delirium

**Sleep deprivation**
- Daytime sleepiness
- Lethargy
- Irritability
- Confusion
- Poor short-term memory
- Sympathetic stimulation
- Anger and Frustration
- Restlessness
- Anxiety

**Delirium**
- Lethargy
- Agitation
- Confusion
- Inattention
- Sympathetic stimulation
- Emotional liability
- Restlessness
- Hallucinations
Relation between Sleep deprivation and Delirium

Sleep Deprivation Incidence on our unit 58% UHB data

Delirium Incidence on our unit 14-16% UHB ICU data

DIRECT EFFECT ON BRAIN:
- Medications
- Dementia
- Sepsis
- Head trauma
- Advanced age
- Alcoholism

STRESS RESPONSE:
- Critical illness
- Mechanical ventilation
- Pain
- Sepsis

ICU ENVIRONMENT/ modifiable factors:
- Noise
- Light /Circadian disruption
- Patient care activities
- Stress and sensory deprivation
Clinical Effects of Sleep Deprivation

**Neurological**
- Agitation
- Delirium
- PTSD
- Depression
- Continued sleep disruption
- Reduced pain tolerance
- Neuro cognitive dysfunction

**Immune system**
- Delayed healing
- Reduced ability to fight infection
- Altered tissue repair

**Cardiovascular**
- Arrhythmias
- Nocturnal High Blood Pressure
- Worsening cardiac failure
- Death

**Respiratory**
- Weak upper airway muscles
- Delayed ventilatory weaning
- Apnoea and hypopnoea
- Decreased hypercapnia
- Hypoxia
Health Implications of Disrupted Circadian Rhythms and the Potential for Daylight as Therapy, Brainard et al (2015) Anesthesiology, V 122 • No 5

- Critical illness
- Stress
- Artificial lights
- Anesthetics
- Sleep deprivation
- Surgery
- Pain
- Shift work
- Gene mutations

- Dusk/dawn simulation
- Intense daylight (>4000 LUX)
- No light at night and noise reduction (eye covers/ear plugs)
- Melatonin

Improve health & well-being
Reduce disease severity
Prevention or treatment of myocardial infarction, diabetes, obesity, sepsis, hypertension, arrhythmias & delirium
Factors affecting sleep in ICU patients:

- Frequent interventions
- Noise / Light
- Ventilator Dyssynchrony-
- Medication / Pain-
- Severity of illness
- Decreased quality of life
- Physiologic disturbances
- Psychological disturbances
- Fatigue-
- Cognitive dysfunction,

Sleep disturbances in ICU
• **Sleep hygiene care bundle**
  
  • Cluster nursing activities to allow periods of 4-2 + hours uninterrupted rest
  • Avoid bathing between 22:00 and **06:00**
  • If there are multiple medications scheduled in the middle of the night, ask the team if they can be rescheduled at a more opportune time
  • Ask the patient what helps him / her sleep well at home
  • Assess for presence of pain, dyspnoea and / or anxiety and what would help
  • Offer a warm drink before bedtime ( e.g. small amounts of warm milk )
  • Excellence in pain control and patient comfort / positioning
  • Assist the patient to find a comfortable position for sleeping
  • Decrease environmental noise / restlessness (soft close bins, appropriate alarm settings)
  • Use of sound ears and sleep posters to encourage reduced staff noise
  • Wearing of ear plugs and eye shields for patients
  • Consider using music therapy to shield patient from environmental noise
  • Lights down at 10pm and back on at 7am
  • Mobilize patient as much as possible during dayshift / beginning of night shift
  • Only turn bright lights on for nursing tasks that must have adequate lighting to do safely. Use penlight to check drains, urine, NGT output etc.
Tools of the trade
Delirium prevention care bundle

THINK SPB ED

1. **Screen** for delirium (1B) - CAMICU on safety checks + as indicated with any change in cognitive function, use RASS (Richmond Agitation and Sedation score) and Abbey pain scores +/- VAS for awake cognitively intact patients

2. **Prescribing** - avoidance of Benzodiazepines - (2B), consider Quetiapine 100mg TDS, Haloperidol 2.5mg iv prn or regular up to max 18mg/24 hours - daily sedation pause OD/BD? Or consider awake sedation aiming for RASS 0 to -1/-2-

   Alpha agonists - clonidine and/or dexmetomidine useful adjunct agents

3. **Bed-Space** - reorientation therapy (Who, what, why, intention) - “this is me” (2A), use of diaries (1B), access to own hearing aid, glasses, own clothing, dentures, false teeth, (2A) Early mobilisation (2C) - new rehab plan coming

4. **Environment** - Music therapy (MT) (Cochrane review), Bright light/ daylight therapy - ICU VitL with SOP for use, Noise levels/ LIGHT LEVELS (including sleep/wake cycles) (1C) - use sleep hygiene bundle, use SAD lights (SOP) during the daytime to maintain day/night, Use sound ears, soft close bins,

5. **Day routine**, Reorientation therapy - WWWWi principles - who they are, where they are, why they are in hospital, what the date/time is, Intention - plan of care. Early rehab and mobilisation, lighting and socialising, open visitation 11am-8pm
Door entry posters- SSN Russell- good idea
Richard Campbell sleep questionnaire

<table>
<thead>
<tr>
<th>Measure</th>
<th>Questiona</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Sleep depth</td>
<td>My sleep last night was: light sleep (0) ... deep sleep (100)</td>
</tr>
<tr>
<td>2. Sleep latency</td>
<td>Last night, the first time I got to sleep, I: just never could fall asleep (0) ... fell asleep almost immediately (100)</td>
</tr>
<tr>
<td>3. Awakenings</td>
<td>Last night, I was: awake all night long (0) ... awake very little (100)</td>
</tr>
<tr>
<td>4. Returning to sleep</td>
<td>Last night, when I woke up or was awakened, I: couldn’t get back to sleep (0) ... got back to sleep immediately (100)</td>
</tr>
<tr>
<td>5. Sleep quality</td>
<td>I would describe my sleep last night as: a bad night’s sleep (0) ... a good night’s sleep (100)</td>
</tr>
<tr>
<td>6. Noiseb</td>
<td>I would describe the noise level last night as: very noisy (0) ... very quiet (100)</td>
</tr>
</tbody>
</table>

a Each question is scored by using a 100-mm visual analog scale in which a higher score is better.
b Question 6 is not a part of the original 5-item Richards-Campbell Sleep Questionnaire (RCSQ), but was included in this project for consistency with other studies that used the RCSQ.
Richard Campbell sleep questionnaire Outcome data

- Audit (October 2017 UHB)
- 42% rated sleep in ICU as satisfactory
- 38% inadequate sleep
- 20% little to no sleep
- Hourly sleep wake cycle documentation <60% of our patients
- Disagreement between what we observe and what patients report- observe more sleep report less sleep
- Once patient woken up- 78% reported difficulty returning to sleep within critical care

- Richard Campbell sleep questionnaire relevant to all patients in critical care able to answer questions
- Quality of sleep is subjective
- Observations from end of bed do not accurately capture quality
- No electronic sleep observation tool or monitor except for BIS/EEG and this is not cost effective or achievable for all critical care patients
Pros and cons Richards Campbell sleep questionnaire

Pros

- Captures issues around quality
- Defines and identifies nuisances of sleep you might not capture with a scoring system or observational tool
- Simple awake/asleep scores do not capture issues around latency, awakenings, quality, returning to sleep

Cons

- Time consuming- 15+ mins per patient
- The patient might report what they think they want you to hear “Yes I had a lovely nights sleep thank you nurse”
- Need a non-uniformed, non-identifiable health care professional to undertake the questionnaire- plain clothes-medical student – “Hi I am just wondering if you had a few moments to discuss sleep and how you find sleep during your hospital stay?”
<table>
<thead>
<tr>
<th>Sleep hygiene bundle components - nursing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Jobs: Nursing Tasks</strong></td>
</tr>
<tr>
<td>[q24hr]</td>
</tr>
<tr>
<td><strong>Direct Physician Entry</strong></td>
</tr>
<tr>
<td><strong>04/03/2018 00:00 - 23:59</strong></td>
</tr>
<tr>
<td><strong>05/03/2018 00:00 - 23:59</strong></td>
</tr>
<tr>
<td><strong>06/03/2018 00:00 - 23:59</strong></td>
</tr>
<tr>
<td><strong>Consider Daytime Light Therapy (Every morning)</strong></td>
</tr>
<tr>
<td>Completed @ 08:00</td>
</tr>
<tr>
<td>08:00 - Overdue</td>
</tr>
<tr>
<td>Pending @ 08:00</td>
</tr>
<tr>
<td><strong>Head up &gt;30 degrees (4 hrly)</strong></td>
</tr>
<tr>
<td>Completed @ 01:00</td>
</tr>
<tr>
<td>Completed @ 05:00</td>
</tr>
<tr>
<td>Completed @ 09:00</td>
</tr>
<tr>
<td>Completed @ 13:00</td>
</tr>
<tr>
<td>Completed @ 17:00</td>
</tr>
<tr>
<td>21:00 - Overdue</td>
</tr>
<tr>
<td>Pending @ 13:00</td>
</tr>
<tr>
<td>Pending @ 17:00</td>
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<tr>
<td>Pending @ 21:00</td>
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<tr>
<td><strong>Minimise Light Levels (Every night)</strong></td>
</tr>
<tr>
<td>Completed @ 22:00</td>
</tr>
<tr>
<td>Pending @ 22:00</td>
</tr>
<tr>
<td><strong>Offer Ear plugs &amp; Eye shades (Every night)</strong></td>
</tr>
<tr>
<td>Completed @ 22:00</td>
</tr>
<tr>
<td>Pending @ 22:00</td>
</tr>
<tr>
<td><strong>Protected Catheter Sputum Sample (Twice a week)</strong></td>
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<tr>
<td>Completed @ 14:00</td>
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<tr>
<td>Pending @ 14:00</td>
</tr>
<tr>
<td><strong>Teeth brushing (Twice daily)</strong></td>
</tr>
<tr>
<td>Completed @ 10:00</td>
</tr>
<tr>
<td>22:00 - Held</td>
</tr>
<tr>
<td>Pending @ 10:00</td>
</tr>
<tr>
<td>Pending @ 22:00</td>
</tr>
</tbody>
</table>

Selectable option - activate/deactivate as appropriate - missing - side room door closure on this one.
### Sleep bundle components medical

<table>
<thead>
<tr>
<th>Allergies: No known allergies:</th>
<th>Height (cm): 158 • BSA: 1.52</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>Jobs: Medical Tasks</th>
<th>04/03/2018</th>
<th>05/03/2018</th>
<th>06/03/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>00:00 - 23:59</td>
<td>00:00 - 23:59</td>
<td>00:00 - 23:59</td>
</tr>
<tr>
<td>[Assess previous night's sleep (At 08:00)]</td>
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<td></td>
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<tr>
<td>[Consider Daytime Light Therapy. (At 08:00)]</td>
<td></td>
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<tr>
<td>[Consider Frequency of overnight Observations/ABG's (At 20:00)]</td>
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<tr>
<td>[Consider regular Night Sedation (At 08:00)]</td>
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</tbody>
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Sleep bundle data

- 2018 Feb
- Average 4.5 hours recorded sleep all patients
- Average disturbance interval 1 hour 45 minutes
- Return to sleep limited and prolonged 2-3 hours
- Nursing interventions commonly disruptive

- 2018 Sept
- Average 5 hours 35 minutes
- Average disturbance interval 2 hours 12 minutes
- Return to sleep not as prolonged 1-2 hours
- Nursing interventions commonly disruptive
Outcome data: daily audit
Emerging trends

- Sphere medical inline ABG devices
- Melatonin as a night sedative (melatonin prescriptions increasing now 8% of all ICU level 2 patients / awake level 3 patients on our unit-2% in 2017)
- Some emerging evidence for Dexdor use as a night sedative - REM sleep preservation, quality of sleep seems good. It has been shown that dexmedetomidine more closely resembles natural sleep compared with other GABA (γ-aminobutyric acid) agonists in ICU sedation
- Frequency of interventions - risk vs benefit ratio
- Nocturnal light and sound should be avoided in as much as possible
- Care bundles provide a structure for delivering evidence-based simple interventions
- Sleep quality questionnaires - Leeds sleep evaluation questionnaire
- Observational skills superior to monitoring equipment currently there is no Sleep monitor that works.
Not all about drugs though

- Cochrane metanalysis 2018- Melatonin in ICU
- “We found insufficient evidence to determine whether administration of melatonin would improve the quality and quantity of sleep in ICU patients. We identified sparse data, and noted differences in study methodology, in ICU sedation protocols, and in methods used to measure and report sleep. We identified five ongoing studies from database and clinical trial register searches. Inclusion of data from these studies in future review updates would provide more certainty for the review outcomes”. 
References


Jason Brainard, M.D., Merit Gobel, B.S., Benjamin Scott, M.D., Michael Koeppen, M.D.,Tobias Eckle, M.D., Ph.D. (2015) Health Implications of Disrupted Circadian Rhythms and the Potential for Daylight as Therapy, Anesthesiology, V 122 • No 5, P1170-1175

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ANY

QUESTIONS?