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
Sleep deprivation

“Sleep deprivation is the condition of not having enough sleep which adversely affects the brain and cognitive functions”

Sleep deprivation depletes the individual of the necessary energy to maintain or regain integrity and itself becomes a stressor. It is common in critically ill patients and may have long-term effects on health outcomes and patients morbidity. Sleep deprivation has been directly linked to onset and maintenance of delirium in critically ill patients.

Delirium

“An acutely disturbed state of mind that occurs in fever, intoxication and other disorders and is characterized by restlessness, illusions and incoherence of thought and speech”
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

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

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

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

**Sleep Deprivation Incidence on our unit 58% UHB data**

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

**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

**Sleep Deprivation**

**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

Circadian rhythms

- Per2
- Myocardial Infarction
- Sepsis
- Cry-1
- Hypertension
- Per2
- Bmal1
- Arrhythmias
- Clock
- Diabetes
- Obesity
- Metabolic syndrome

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—when you deliver this slide you need to state how you propose resolving each point!

**Sleep disturbances in ICU**

- **Frequent interventions**
  - Cluster nursing activities to allow +2-4hrs uninterrupted rest, ABG decision tree

- **Noise / Light**
  - SAD lights 10,000 Luxe during daytime/ lights off 10p-7am as per SOP

- **Ventilator Dyssynchrony**
  - Senior medic/nurse review to ensure comfort/sedation and vent settings correct

- **Medication / Pain**
  - Aim Abbey 0-2, VAS 0-2

- **Physiologic disturbances**
  - CVS/Respiratory

- **Psychological disturbances**
  - Increased risk of anxiety, depression, psychosis and delirium

- **Fatigue**
  - Early mobility during day- sleep hygiene at night- avoiding ICU acquired weakness

- **Cognitive dysfunction**
  - Delirium and LTCl

- **Severity of illness**
  - APACHE2 acuity scores indicate increased risk of delirium and sleep disturbances

- **Decreased quality of life**
  - Difficult to define—although outcome and follow-up data might reflect this—ICU patients known to suffer sleep disturbances for up to 24 months after discharge
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 SPBED

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

Welcome to the
Adult Critical Care Unit

Shhh!
Please remember that our patients are sleeping.

Many thanks
## 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>Tasks</th>
<th>04/03/2018</th>
<th>05/03/2018</th>
<th>06/03/2018</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Consider Daytime Light Therapy</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Completed @ 08:00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] 08:00 - Overdue</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>[ ] Pending @ 08:00</td>
<td></td>
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<tr>
<td><strong>Head up &gt;30 degrees</strong></td>
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<tr>
<td>[ ] Completed @ 01:00</td>
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<td>[ ] Completed @ 05:00</td>
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<td>[ ] Completed @ 09:00</td>
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<td>[ ] Completed @ 13:00</td>
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<td>[ ] Completed @ 17:00</td>
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<td>[ ] 21:00 - Overdue</td>
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<td>[ ] Pending @ 13:00</td>
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<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</strong></td>
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<tr>
<td>[ ] Completed @ 22:00</td>
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<tr>
<td>[ ] Pending @ 22:00</td>
<td></td>
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<tr>
<td><strong>Offer Ear plugs &amp; Eye shades</strong></td>
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<tr>
<td>[ ] Completed @ 22:00</td>
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<tr>
<td>[ ] Pending @ 22:00</td>
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<tr>
<td><strong>Protected Catheter Sputum Sample</strong></td>
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<tr>
<td>[ ] Completed @ 14:00</td>
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<tr>
<td><strong>Teeth brushing</strong></td>
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<tr>
<td>[ ] Completed @ 10:00</td>
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<tr>
<td>[ ] 22:00 - Held</td>
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</tr>
<tr>
<td>[ ] Pending @ 22:00</td>
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</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>
</tr>
</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>[Assess previous night's sleep (At 08:00)]</td>
<td>Direct Physician Entry 00:00 - 23:59</td>
<td>Direct Physician Entry 00:00 - 23:59</td>
<td>Direct Physician Entry 00:00 - 23:59</td>
</tr>
<tr>
<td>[Consider Daytime Light Therapy. (At 08:00)]</td>
<td>Pending @ 08:00</td>
<td>Pending @ 08:00</td>
<td>Pending @ 08:00</td>
</tr>
<tr>
<td>[Consider Frequency of overnight Observations/ABG's (At 20:00)]</td>
<td>Pending @ 20:00</td>
<td>Pending @ 20:00</td>
<td>Pending @ 20:00</td>
</tr>
<tr>
<td>[Consider regular Night Sedation (At 08:00)]</td>
<td>Pending @ 08:00</td>
<td>Pending @ 08:00</td>
<td>Pending @ 08:00</td>
</tr>
</tbody>
</table>
Outcome data: daily audit
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?