Researching rhythms of daily life: The role of sleep and daily activity in entraining circadian cycle in persons with dementia

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#DementiaCareSummit

What we know:
Disruption in circadian cycle common

- 70% of persons with dementia have sleep-wake disturbance\textsuperscript{1,2}
- Relationship between sleep-wake disturbance and dementia complex and bi-directional\textsuperscript{3}
  - Daytime sleepiness/insomnia & dementia risk = 1.76 (95% CI=1.49−2.02)\textsuperscript{4}
  - Sleep apnea & dementia risk = 1.35 (95% CI= 1.11-1.65)\textsuperscript{5}
  - U-shaped association with either short (≤6 hours/night) or long (≥8 hours/night) sleep\textsuperscript{6}
What we know:
Multiple potential pathways to circadian disruption in dementia

– Reduced neuronal connectivity in hippocampal area CA1
– Degeneration of suprachiasmatic nucleus
– Accumulation of amyloid β
– Oxidative stress and neuroinflammatory response
– Cortical thinning/atrophy

What we know:
Mixed evidence for interventions to entrain “normal” circadian pattern

– Medical
  • Melatonin
– Photic Interventions
  • Ambient light interventions
– Non-photic Interventions
  • Physical activity
  • Timed activity
  • Not tested in dementia: Meal timing
What we don’t know:
Role of optimally timing activity to entrain circadian patterns

Cognitive activity
  Sustained attention\textsuperscript{19}
Physical activity
  Exercise \textsuperscript{20}
  Dance
Sensory/passive activity
  Music\textsuperscript{21}
  Massage\textsuperscript{21}

Gaps in knowledge:
Future research recommended

1. Pathophysiology and biomarkers linking circadian disruption and pathogenesis of dementia
   • Role of circadian changes as marker of early pathogenesis

2. Testing of combinations of photic and non-photic environmental modifications (e.g., lighting, meals, activity)
   • Mechanisms regarding optimal timing
   • Attention to potential for scaling into routine care
References


