Use of Ambient Lighting in Creating a Healing Environment for an Inpatient Psychiatric Unit

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Two Medical Centers

Alvin C. York Campus
Murfreesboro, TN

Nashville Campus
Nashville, TN

14 Community Based Outpatient Clinics (CBOC) located in TN and 2 in Western KY
Components of Health: Surroundings

- Environment directly affects you and your health.
- Pay attention to what might influence your life and health, and improve what you can.
- It matters to have safe, comfortable, and healthy spaces.
VHA Mental Health Care is built around the concept of recovery

Specific principles for Mental Health (MH) care should:

- Be recovery-oriented
- Provide a therapeutically enriching environment.
- Provide a safe and secure environment
- Be integrated and coordinated
- Provide respectful and healing surroundings
- Accommodate a diverse range of patient populations and care needs. (OC & FM, 2010).

Office of Construction & Facilities Management is an element of the Department of Veterans Affairs
Changing the Inpatient Mental Health Environment

In an effort to provide a holistic, healing environment in the Inpatient Mental Health (MH) unit, it is important to identify the evidence-based literature on this physical environment. Lighting is an important element of the physical environment in an MH unit where staff work and patients live their lives while hospitalized.
Unit design should consider the spirit and sensibilities of both patients and care providers (OC & FM, 2010).

Lighting in mental health units has to maintain a safe and secure facility while creating a therapeutic environment (OC & FM, 2010).
Unit Design Recommendations from OC & FM

1. Design to provide daylight in all feasible areas in appropriate quantities.

2. Distribute daylight uniformly where possible, with no significant dark spots.

3. Provide daylight sensitive controls for the artificial lighting fixtures so they will automatically turn off when not needed.

4. Sun control is essential to avoid excessive temperature exposure and maintain privacy.
Human Response to Light Exposure

Light impacts human health and performance by four main mechanisms:

1. Enabling performance of visual tasks
2. Controlling the body’s circadian system
3. Affecting mood and perception
4. Facilitating direct absorption for critical chemical reactions within the body (Joseph, 2006).

Human Circadian System

Light transmitted to the hypothalamus controls the body’s circadian rhythm (Joseph, 2006).

The human circadian system has 3 components (Joseph, 2006):

1. An internal oscillator
2. External oscillators
3. Melatonin hormone

Melatonin levels in the body determine a person’s activity and energy level (Joseph, 2006).

Melatonin Hormone

Light exposure in healthcare settings reduces depression in patients, decreases length of hospital stay, improves sleep, reduces agitation in dementia patients, and eases pain (Joseph, 2006).

Provide a safe, secure and therapeutic environment

Control the body’s circadian system

Affect mood and perception

Melatonin hormone
Serotonin
Vitamin D photosynthesis

Environmental Lighting Impact on Physical and Emotional Wellbeing

Systematic Review Objectives

Perform a literature review using CINAHL and Medline databases to answer the following PICO question:

“What is the patient’s response to alternative lighting in an Inpatient Psychiatric Unit and does it produce different or better outcomes for patients when compared to standard hospital lighting?”
Systematic Review Objectives

The “P” in the PICO acronym stands for populations/people/patient/problem, in this case, representing the Veterans and families seen on the Inpatient Psychiatric Unit.

The “I” represents interventions that could be implemented focusing on patient-centered or patient-friendly environments shown to provide improved outcomes for patients.

The “C” represents comparison Bright Light Therapy and Standard Lighting for improvement in circadian rhythm and mental health symptoms.

The “O” stands for outcome of the research and how it can be applied to enhance the patient’s experience.
Start Inpatient Psychiatric Unit EBP Design Project

Perform Literature Review

Evaluate Articles using JHEBR Toolkit

Compare Literature Review Findings with Preceptor

Enough Evidence found?

No

Build Table of Evidence and Research Outcome Data Elements

Compare Research Outcome Data Elements to my System Data Elements and Extract Data

Create PowerPoint Presentation and share with EBP project team

End EBP Project
32 articles reviewed & 18 relevant to PICO question

<table>
<thead>
<tr>
<th>Research articles</th>
<th>Non-research articles</th>
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<tr>
<td>Systematic review with meta-analysis</td>
<td>Literature reviews</td>
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## Study Description

66 older persons with dementia participated in 338 three-week intervention periods.

Participants were evaluated on the effect of ambient bright light therapy (BLT), 2000-3000 lux: AM bright light, PM bright light, Comparing all day bright light versus standard light.

## Outcomes

In no comparison was agitation significantly lower under any therapeutic condition in comparison to standard lighting, 400-600 lux (industry minimum standard for tasks).

Ambient bright light is not effective in reducing agitation in dementia and may exacerbate this behavioral symptom (Barrick et al., 2010).
## Study Description

A different but similar study evaluated 66 older adults with dementia

Exposed to 4 lighting conditions (2,000 to 2,500 lux and 500 to 600): a) morning bright light, b) evening bright light, c) all-day bright light, and d) standard light.

Exposures occurred over multiple 3-week periods.

## Outcomes

Findings did not support the use of ambient bright light therapy as a treatment for depressive symptoms in persons with dementia.

Subpopulation of persons with dementia may benefit from this intervention and should be considered on an individual level (Hickman et al., 2007).
Lighting Intervention Outcomes

A convenience sample of 23 women and 17 men, all inpatients, were monitored for 72 hours to observe light exposure, sleep-wake patterns, mood, and pain.

The light intensity was low, mean daytime was 104.80 lux.

Sleep time was fragmented and low, mean 236.35 minutes of sleep per night.

Light levels were insufficient for circadian entrainment

Low light exposure significantly predicted fatigue and total mood disturbance.

Higher light exposure was associated with less fatigue and lower total mood disturbance in participants with pain (Bernhofer et. al, 2013).
Length of Stay

174 admissions with a total group average of 18.1 days length of stay with SD=11.88, range 6 to 86 days.

The rooms in one psychiatric inpatient unit were placed so that half were bright and sunny and the rest were not.

Bright light room exposure measured 500 to 5000 lux.

Dull light room exposure measured 200 to 300 lux.

In length of stay comparisons of patients coping with depression, those in sunny rooms had an average stay of 16.9 days compared to 19.5 days for those in dull rooms (Beauchemin & Hays, 1996).
Meta-Analysis of Lighting Therapy

20 randomized controlled trials were reviewed comparing bright light with inactive placebo treatments for non-seasonal depression.

Most of the studies applied bright light as adjunctive treatment to drug therapy, sleep deprivation, or both.

The treatment response in the bright light group was better than in the control treatment group, but did not reach statistical significance.

The result was mainly based on studies of less than 8 days of treatment.
Meta-Analysis of Lighting Therapy

11 trials to determine light impact on cognition, ADLs, sleep, challenging behavior, and psychiatric symptoms associated with dementia.

Theoretically, changes in sleep patterns for people with dementia might be reversed by stimulation of light.

Light sources varied with no effect from BLT on cognitive function, sleep, agitation, or psychiatric symptoms associated with dementia.

There is insufficient evidence to recommend the use of bright light therapy in dementia.

Results from a single study, which found a beneficial effect on ADLs, should be regarded with caution and need to be replicated before supporting a recommendation for the use of bright light therapy (Forbes et al., 2014).
## Outcomes Measured

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<thead>
<tr>
<th>Subjective</th>
<th>Objective</th>
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<tbody>
<tr>
<td>Profile of Mood States Brief Form</td>
<td>Plasma samples for melatonin</td>
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<tr>
<td>Subjective Pain Scores</td>
<td>Direct observation by research personnel</td>
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<tr>
<td>Cornell Scale for Depression in Dementia</td>
<td>Length of hospital stay</td>
</tr>
<tr>
<td>Completion by staff caregivers of 14 item Cohen-Mansfield Agitation Inventory</td>
<td>Light exposure and sleep-wake patterns</td>
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## Outcomes measures at TVHS

<table>
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<tr>
<td>Generalized Anxiety Disorder Scale</td>
<td>Pittsburgh Agitation Scale</td>
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<tr>
<td>Short Form Health Survey (SF-36)</td>
<td>Direct observation by research/caregiver personnel</td>
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<tr>
<td>Patient Satisfaction Scores</td>
<td>Medical Record review</td>
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<td>Geriatric Depression Scale Short Form</td>
<td>Length of hospital stay</td>
</tr>
<tr>
<td>Patient Health questionnaire-9 (PHQ-9)</td>
<td>Light exposure and sleep-wake patterns</td>
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Common Study Limitations

In general, the quality of reporting was poor, and many reviews did not report adverse effects systematically.

Due to limited data and heterogeneity of studies, these results need to be interpreted with caution.

True blindness was very difficult to achieve because studies were from various settings, short and medium term only, and very heterogeneous in treatment methods, patient groups, and outcomes (Tuunainen, A., Kripke, D., & Endo, T., 2009).

Differentials for severity of symptoms prior to bright light therapy and quality of improvement were not regularly expressed.
**Summary**

### Positive Effect

- Depression outcomes
  - Less fatigue and lower mood disturbance in participants with pain
- Length of stay
  - BLT appears to have modest but measureable effect on sleep in geriatric especially if exposed for 2 hours in AM.

### No Effect

- Not effective in reducing agitation in dementia and may worsen symptoms
- There was no effect of bright light therapy on cognitive function, agitation, or psychiatric symptoms associated with dementia.
Summary

Research on ambient lighting’s impact on psychiatric units is limited. Overall, data reviewed suggests benefit from ambient lighting in subsets of patients, however the mixed results suggests cautious use.
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References


References


References


QUESTIONS???
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