Designing to Support Health and Wellbeing

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MISSION:
The SimTigrate Design Lab explores the full ecology of designed systems that impact our health and wellbeing, including the built environment, services, devices and policy in partnership with vulnerable populations. We bring our 10-year history of working with researchers, organizations, and end-users to this collaborative process to help implement evidence-based designs and solutions.

VISION:
Vulnerable populations deserve to have an active role in creating design solutions that support their health, wellbeing and happiness.
Light and Circadian Rhythm

Exposure to bright light during the day and to darkness during the night regulates the circadian rhythm in our body, helps patients to remain in synchrony with external environmental time and have a regulated sleep/wake cycle.

How a bad night's sleep is as big a risk to your health as smoking: Chances of stroke or heart attack increase if a person gets less than seven hours of shut-eye

- Study finds sleep disorder is as bad for triggering heart attacks as smoking
- The study involved 687 men with no history of heart attack in the recent town
- Those that take and turn are four times more likely to suffer a stroke than people who regularly sleep well

Research shows that people who sleep more than seven hours a night or less than five hours a night are four times more likely to suffer a stroke than those who regularly get seven hours of sleep.

Some people find it less than 10 hours of sleep and some find it more than 10 hours of sleep. Those who sleep more than 10 hours a night are more than likely to have a heart attack as those who sleep less than 10 hours.

The study, by the National Health Organisation, suggests that a sleep disorder might be as bad for triggering a heart attack or stroke as smoking or failing to exercise.

Professor Sir Colin O'Doherty said: "Sleep is not a trivial issue. Sleeping disorders were associated with greatly increased incidence of both heart attack and stroke.

Poor sleep should be considered a modifiable risk factor for cardiovascular disease along with smoking, lack of exercise and poor diet."
Opportunities for Sleep Management: The Role of the Ecosystem of the Inpatient Room

Nursing Interrupters of Sleep

**DRIVER**
The most important factor driving nursing events today: Need for increased documentation of all aspects of patient care and safety measures due to Reimbursement Requirements and Litigation.

**EVENT**
Check Vital (i) (i) (i) (i)
(Include post surgery peripheral pulses: pedal pulses & radial brachial pulse checks)

Hygiene - Bath and weighing
Bio Needs: Incontinence

**DISRUPTOR**
EM: In Med-Surg takes check every 2 or 3 hours. In ICU, hourly. Significant more disruptive of sleep (2) in SCI, as many as 9 to 12 checks/patient/night (6)

EM: Patients must be turned every 2 hours. In SCI, turn every hour. In SCI study, significantly more disruptive of sleep (2)

EM: Must be re-ordered every day. Between 3-4 AM. No coad with other events. (11)

EM: ICU study significantly more disruptive of sleep (2)

**TOUCH**
body sensation/handling

EM: No consistent schedule
EM: Every 2 hours

Nursing determines whether to wake up patient or not
Personal choice. (11)

EM: Must be re-ordered every day. Between 3-4 AM. No coad with other events. (11)

**PAIN**

EM: ICU study significantly more disruptive of sleep (2)

**SLEEP**
interference/misalignment

LM: Impact modified by bed mechanism or lift.

Patient perception of comfort impacted by degree of control over body position and bed adjustments (6)

Sleep latency impacted by lowered light levels

In SCI, less disruptive than the mean of other factors (2)

**TEMP**

Providing patient with the ability to control their environment (lighting, controls) may help alleviate their feelings of anxiety (6)

EM: Biventricular pacing
EM: CVA

**NOISE**

EM: Biventricular pacing
EM: CVA

EM: Lack of patient control of temp. in room is usually the issue

EM: ICU: P02
EM: Non-ICU

**PSYCH**

EM: Lack of patient control of temp. in room is usually the issue

EM: ICU: P02
EM: Non-ICU

**ORGANIZ. CULTURE**

EM: Biventricular pacing
EM: CVA

EM: Lack of patient control of temp. in room is usually the issue

EM: ICU: P02
EM: Non-ICU

**PHYSICAL ENVIRONMENT**

Incl. Building/Equipment/Purm.

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EM: Non-ICU

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Sleep Challenges for People with MCI

Codesign workshop (March 2023)

Community members with MCI and design specialists worked together to identify ways to improve sleep

Needs

• Reducing anxiety before bed
• Create routines that support good sleep hygiene
• Winding down with an activity before bed

Deliverable

• Series of educational videos on how to change your home to make it better for sleep

Key Collaborator: Leandro Tonetto, PhD, Associate Professor of Industrial Design
Ongoing/Under Review Proposals

PCORI

Title: Behavioral and Environmental Interventions for Better Sleep for Low-Income Older Adults

NIH

Title: Conceptual Framework to Identify the Underlying Mechanisms and Built Environment Factors that Impact Sleep Health and Cognitive Aging from Normative to MCI or AD/ADRD in Low SES Communities

Led by Eunhwa Yang, PhD, Assistant Professor in Building Construction

Key Collaborator: Arthi Rao, PhD, Senior Research Scientist CQGRD
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