REDUCTION OF ANNOYANCE RELATED TO CCU CONSTRUCTION NOISE

University of New Hampshire
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Disclosure

- University of New Hampshire DEMN Capstone Project
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- Preceptor: Matthew Hafen, MS, RN, CNL
- No sponsorship or commercial support was given
Objectives

- To understand the problem of construction specific noise within hospital units and the adverse reaction inflicted upon the staff members.
- To acknowledge the Florence Nightingale rationale for all sounds in a hospital setting, including those short term.
- To appreciate the effectiveness of music within the nursing station to desensitize staff to construction specific noise and enhance focus on work related tasks.
Problem Description

- $97.1 billion invested
- 1,270 health care facilities and offices
- Of the 579 hospitals under construction in November 2015, 163 are renovation projects occurring on campus while patients continue to be seen (Hargrave, 2016).
- Effects of noise:
  - Physical and psychological stress
  - Decrease in ability to concentrate
  - Decrease in communication between staff
  - Increases risk for accidents (OSHA, 2011).
Available Knowledge

- **World Health Organization (WHO) and Environmental Protection Agency (EPA):**
  - Recommend for hospital units: noise levels remain 35dBA with peaks that do not exceed 40dBA
  - An increase in dBA over 45-50; raising one's voice (Konkani & Oakley, 2012).

- **Occupational Safety and Health Administration (OSHA):**
  - Recommend for construction zone work areas: noise levels do not exceed 85dBA (OSHA, 2011).
Available Knowledge

- No available research discussing effects of **construction specific** noise on staff or patients in hospital unit.

- Music has been shown in the literature as having a unique effectiveness to induce anxiety reducing effects and associated stress (Supnet, Crow, Stutzman, & Olson, 2016).

- Ryherd & Waye (2008) research study
  - Questionnaire to measure the (47) nurse perception of general ICU noise
  - Results showed:
    - 91% noise negatively affected them in their routine work environment
    - 43% identified themselves as having concentration issues
    - 96% felt that the noise directly contributed to the development of ICU delirium
Local Problem

- Remodeling local hospital unit by unit.
- CCU is combining with ICU to make a 19 bed critical care unit
- Started CCU: March 9, 2016.
- “Lipstick renovation” for pre-existing CCU
- Complete remodel of old medical/surgical unit R5
Noise Pollution Problem

“I think there is definitely a correlation between the noise pollution and patients recovery” Cathal McMullan, Project Manager
Local Problem

Hammerdrill with Floor Chipper

“Patients appear to have less sleep and resulted in irritability and restlessness” CCU staff member
Construction Specific Noise Levels

- Noise ordinance removed
- Break
- Lunch

[Graph showing sound levels with annotations for Noise ordinance removed, Break, and Lunch]
Rationale

- Florence Nightingale’s Environmental Theory
  - Ten major canons that she believed were the necessary aspects to comfort.
  - Balance is the key, if one of the aspects is out of balance, the patient is stressed.
  - Nurses duty to do what is required to keep the balance (Zborowsky, 2014).

“Florence Nightingale believed that unnecessary noise is the most cruel absence of care, which can be inflicted either on sick or on well” (Choiniere, 2010, p 328).
Specific Aim

The specific aim for this quality improvement project is to decrease the annoyance score of the CCU staff from construction specific noise by 10% before July 30, 2016.
Context

- Previously: 10 bed cardiac Intensive Care Unit
- All patients require intensive care
- Workplace environment for:
  - Nurses (RN)
  - Nursing Assistant (NA)
  - Unit Coordinator (UC)
  - Respiratory Therapist (RT)
  - Medical Doctors (MD)
  - Manager
  - Other
- Also the workplace environment for contractors, construction employees, project managers
Intervention

- Native American Celtic Flute Music in the nurses station
- 0800-1500: Four consecutive days (6/12-6/15)
- Music distraction is targeted for the entire staff, patients, families, and other personnel that consider the CCU their workplace environment.
Study of the Intervention

- Pre/post survey to determine self reported annoyance scale
- Voluntary
Measures: Annoyance

The Genlyd Instrument of Noise Annoyance

- Specific stimulus in specific context
- Obtainable and reliable annoyance analysis
- 11 point scale (0-10)
- Average Score (AS)
- 3 cut points
  - Percent Highly Annoyed (%HA): annoyance scores of 8, 9, 10
  - Percent Annoyed (%A): annoyance scores of 5, 6, 7, 8, 9, 10
  - Percent at least a little annoyed (%LA): annoyance scores of 3, 4, 5, 6, 7, 8, 9, 10 (Pedersen, 2007).
Ethical Considerations

- Staff focused quality improvement project.
- Clinical Inquiry Committee.
- No IRB approval necessary.
Analysis

- Survey ordinal data calculated and compared pre/post:
  - AS
  - %HA
  - %A
  - %LA

- JMP software: Wilcoxon sign rank test

- Total staff
- Each CCU profession
Results

- 75% decrease in average self reported annoyance scores for the total staff
- Wilcoxon sign rank test: significant reduction of annoyance (p < 0.0001)
Results
Staff reported an increased ability to focus and complete a task with the implementation of music in the nurses station.

86% of the staff felt as though the music had an effect on increasing their workplace satisfaction, despite the construction noise.

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Results/Summary

Florence Nightingale theory of unbalanced environmental focused on staff.

- Noise levels far exceed the recommended level by the WHO and the EPA.

- 8 staff responded that they were extremely annoyed from the construction noise pre-implementation.

- Zero staff members were highly annoyed with the construction noise post-implementation.

“The music helps keep my mind off the construction noises most of the time.”

“I was having a cranky morning and then the music really cheered me up, it was very relaxing and allowed me to concentrate.”

“The music is an incredibly pleasant distraction.”

“Staff seems happier with music playing.”

“The music really helps.”
Interpretation

- No available research discussing effects of construction specific noise on staff or patients in hospital unit.

- CCU staff responses pertaining to construction specific noise are consistent with Ryherd & Waye (2008) research study.
  - 66% had a hard time hearing or understanding another member of the staff or patient more than 7 times/week
  - 52% felt the construction noise had greatly affected their patients' ability to rest more than 7 times/week

- Results also agreed with the Supnet et al., (2016) study on music to decrease anxiety.
Limitations

- CCU closures due to low patient census
- Surveys: unequal group
- “In the last week” pre-implementation survey questions
- Professional noise meter malfunction
- Three patient rooms
Conclusion

◦ Study results and conclusion suggest that music at the nurses station will help to reduce annoyance and increase workplace satisfaction despite extraneous noise such as construction noise.

◦ Suggested next steps
  ◦ Future studies should include patient reported annoyance and corresponding satisfaction of hospital stay.

◦ Implications for practice
  ◦ Implement music in overhead speaker throughout the CCU
  ◦ Use data to advise closing future hospital units under construction or implement Native American Celtic flute music in the nurses station.
References

Thank You.

Questions?