

Implementing a Visual Noise Warning Device in Intensive Care Unit

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Introduction

Noise:

- Sound that is annoying, or induces distraction (Merriam-Webster, n. d.).
- Recommended noise levels in hospital settings at daytime is 35 decibels (dB) or lower and 40 dB or lower at night (WHO).
- Noise reduction enhances patient experience, improves the well-being of patients and staff, and impacts the survival of the organization (Applebaum et al., 2016).

Background and Significance

- **Patients** - Interrupted rest and sleep result in negative influence in body's metabolism, decrease mental performance, physical and psychological impairments (Guisasola-Rabes et al., 2019, Plummer et al., 2019).
- **Staff** – Noise hinders concentration resulting to increase susceptibility to errors, and increase in stress levels (Delaney et al., 2019).
- **Economy** - Decrease in noise by 5% would lessen the prevalence of coronary heart disease by 1.8% and arterial hypertension by 1.4%, with projected annual savings of \$3.9 billion (Swinburn et al., 2015).
- **Organization** - Patient experience during their hospital stay have financial implications, and influences a hospital's reputation (Medicare, n. d.).
- **Local, state and national agencies** - Noise is ranked as a key reason for neighborhood discontent. Single exposure to noise greater than 120 dB, or continued exposures to noise >70 dB can lead to permanent hearing loss (EPA, 1981).

Reference available upon request

Contact Information

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Clinical Question

Will implementing a visual noise warning device decrease noise in Intensive Care Unit (ICU)?

Aim and Objectives

The aim of this DNP project is to improve the quietness of ICU with the use of a visual noise warning device. The objectives of this project are to:

- provide information to the ICU team members about the impact of noise to patients, staff, and the organization, to engage as partners in the effort to decrease noise.
- install the visual noise warning device.
- measure the pre-implementation noise levels.
- activate the visual noise warning device.
- measure the post-implementation noise levels.
- compare the measured noise levels before and after the implementation of the visual noise warning device.

Methodology

Design: Quality improvement

Setting: 12-bed ICU in an acute care, non-profit institution located in central New Jersey.

Intervention:

- **Pre-intervention:** Without activating the visual noise warning device, noise levels were measured for four weeks, Monday through Friday, once per hour starting at 8:00 am until 1:00 pm, and then 8:00 pm until 1:00 am.
- After the completion of measuring the baseline noise levels, brief information sessions about the importance of noise reduction was conducted among ICU team members during morning huddles from Monday to Friday for one week.

- **Post-intervention:** The visual noise warning device was activated and hourly noise levels were measured for four weeks, Monday through Friday: From 8:00 am until 1:00 pm, and from 8:00 pm until 1:00 am.
- Average noise levels were calculated to determine if noise reduction occurred.

Results

8:00 am through 1:00 pm

- Mean pre-intervention noise level: 64.1 dB
- Mean post-intervention noise level: 57.2 dB
- **Percentage of decrease = 10.76%**

8:00 pm through 1:00 am

- Mean pre-intervention noise level: 58.1 dB
- Mean post-intervention noise level: 49.7 dB
- **Percentage of decrease = 14.45%**

Chart 1: Overall Average for the entire study

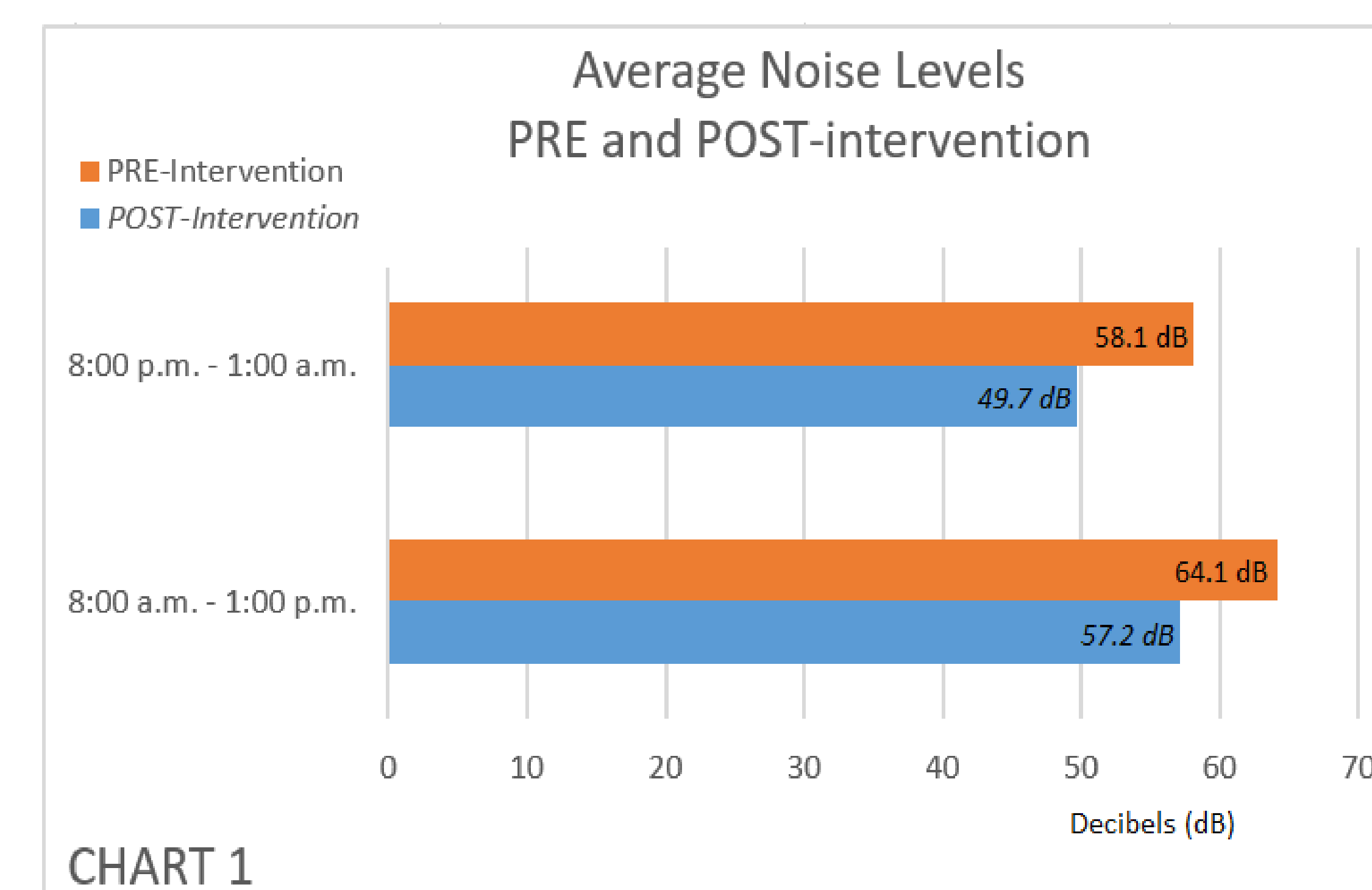
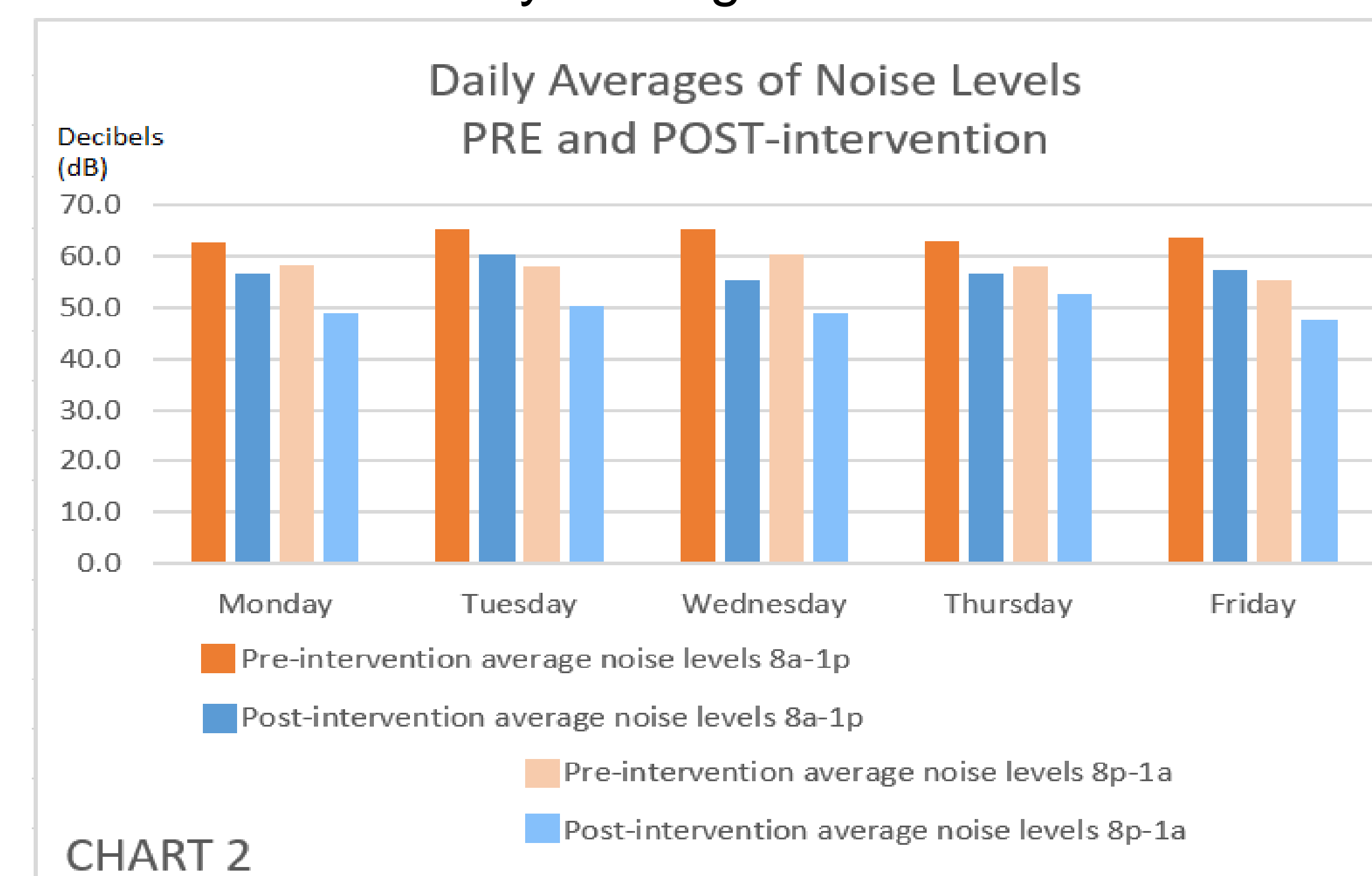


Chart 2: Daily Averages.



Discussion

- 9:00 am - loudest part of day due to interdisciplinary and leadership rounds, nursing and housekeeping activities.
- ICU noise are consistent with reviewed literature: The sources of noise are from a combination of unit activities.
- Higher census often contributes to high noise level because more patients implies more staff, activities and visitors.
- Prompt attention to resolve the sources of alarms helped decrease noise levels.
- Some noise sources are unavoidable: Pneumatic tube system, mechanical floor moppers, Code Blue, admissions
- Findings demonstrated positive result but noise was not reduced to the level recommended by WHO.

Limitations:

- Study was conducted only in one ICU.
- Hawthorne Effect-staff might have modified staff behavior and intentionally decreased noise each time they saw the student measuring noise levels.

Implications

- **Clinical Practice** - Use of visual noise warning device as a hospital-wide initiative to reduce noise.
- **Healthcare Policy** - Include importance of noise reduction in the onboarding process hospital wide; review of hospital policies like equipment repair and maintenance to promote quieter function and operation.
- **Quality and Safety** - Monitor patient/family feedback to determine which aspects of the sound environment need improvement.
- **Education** - Highlight the importance of every employee's accountability for maintaining a healthy sound environment.
- **Economic** - Impact of noise to financial reimbursements, survival of the organization, and reputation in the community.
- **Research** – For the next Doctor of Nursing Practice student who wish to explore noise reduction in a larger scope, this project may be of value as a resource, or serve as a starting point.