Noise Pollution in the Operating Room

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Problem

- In operating room personnel participating in surgical procedures (P), how do routine surgical-related noises (I) influence critical thinking (O) during the performance of effective clinical care (T)?
- What are **the current evidence-based practices** for managing operating room noise pollution, as well interventions that may be advantageous in reducing its effect on operating room personnel?

Literature Review

- Noise can be defined as any unwanted sound that interferes with normal hearing, interrupts performance, and is stressful [measured in decibel dB(A) scale]
- Excessive noise levels in the OR can impede the delivery of safe anesthesia care.
- *Occupational Regulations of Noise Limits*
  - Occupational Safety and Health Administration (OSHA): range from 8 hours of exposure at 90 dB(A) to only 15 minutes at 115 dB(A)
  - National Institute for Occupational Safety (NIOSH): peak noise levels no more than 140 dB(A)
  - Environmental Protection Agency (EPA): limit 35 to 45 dB(A) for ambient OR noises
- *Causes of Noise Pollution*
  - Staff Related (95%): reach up to 78 dB(A)
  - Equipment: peak of 120 dB(A), some instruments 131-140 dB(A)
  - Inherent Operating Room Environment: baseline 13 dB(A)
- *Music as a Potential Distractor*
  - Music in the OR is a choice and levels are estimated to be as high as 87 dB(A)
  - Over 60 to 70 percent of personnel report they like to listen to music in the OR
- *Implications for Anesthesia Providers*
  - Noisiest parts of most non-orthopedic surgeries occur during induction and emergence (most critical moments)
  - Distractions such as background noise can impair or delay provider response to alarms from ventilators and monitors
- *Impact on Practice*
  - Behavior modification programs can educate staff members about the potential harm of noise pollution and its sources by bringing awareness to noise-reducing strategies

Methods

- With SRC and IRB approval, an educational PowerPoint presentation based on current literature was presented to the AHU SRNA Cohort of 2019
- Pre-test utilized as a knowledge baseline
- After PowerPoint, identical post-test administered
- Data analyzed by AHU statistician

Analysis and Conclusions

- When comparing pre- and post-test mean percentage scores, the post-test scores increased significantly (**$p < 0.001$**)
- The outcome of this scholarly project was an increase in awareness and knowledge of current noise pollution in the operating room literature among the AHU SRNA Cohort of 2019

Findings

- Operating room noises cannot be managed alone
- Educate staff members about noise pollution
- **Decrease noise levels**
  - **Avoid unnecessary conversations**
  - **Turn off music**
  - Limit telephone usage
  - Minimize entrance and exit of the operating room
  - Be mindful of patient anxiety

Table 1

Sources and Effects of Noise

Intensity dB(A)	Quality	Example	Effect
10-39	Just audible, very quiet	Whisper	Desired for sleep
40-59	Quiet	Average home or light traffic	Desired for work
60	Moderately loud	Normal conversation	
70-89	Loud	Vacuum cleaner, heavy traffic, or telephone ringing	Annoyance
90-119	Very loud	Pneumatic drill, power mower	Hearing loss
120-170	Uncomfortably loud	Nightclub, a shotgun blast	Pain and distress

Note. Adapted from "Noise pollution in the anaesthetic and intensive care environment," by P. C. A. Kam, A. C. Kam, & J. F. Thompson, 1994, *Anaesthesia, 49*(11), p. 982-986.

Table 2. Paired Samples Test

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Pre-Test – Post-Test	-.49048	.21658	.04726	-.58906	-.39189	-10.378	20	.000

Table 3. Paired Samples Test

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test	.2476	21	.16315	.03560
	Post-Test	.7381	21	.19615	.04280

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