Curtailing Noise in the Operating Room to Enhance Patient Safety During the Critical Phase of Anesthetic Induction Utilizing a No Interruption Zone

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PROBLEM DESCRIPTION

- Disruptions and distractions hindering communication and cognition of anesthesia provider (Keller, 2020)
- Causes: music, case irrelevant conversation, doors opening and closing, presence of non-essential personnel, limit traffic , pagers, cell phones and noise from equipment Van Harten, 2020)
- Delayed speed of response, medication errors, failure to communicate miscommunication accuracy (Gui, 2021)

AVAILABLE KNOWLEDGE

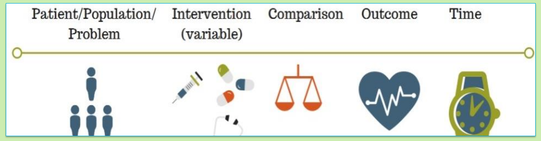
- Disruptions and distractions impair ability of anesthesia provider to multitask during high task load time period (Arabaci, 2020)
- Intrusive ambient noise impairs cognition, clinical reasoning and speech intelligibility (Fu, 2020)
- Ameliorating anesthesia providers' stress, anxiety, and fatigue during Anesthetic induction with noise mitigation diminishes potentially deleterious effects that may ensue (Keller, 2018)
- Noise can be mitigated by simple, inexpensive and effective measures Standardized behavioral modification (Riutort, 2020)
- Education to noise and its negative effects on patient safety (Mackemzie, 2020)
- No Interruption Zone (NIZ) limits case irrelevant conversation, music turned off, limiting traffic, turn off electronics (Wright,2016)

RATIONALE/THEORETICAL FRAMEWORK

- Noise in the OR has been found to cause anesthesia providers increase stress, impair cognition and enhance error hindering patient safety particularly at high task load intervals
- Kurt Lewin's Theory of change was utilized for this EBP to elicit change and enhance patient safety during anesthetic induction
- To change a process, current behavior must be unfrozen via education, change/new process is implemented, new behavior is refrozen into a new process, utilize NIZ refreeze the new process for sustenance reinforce team-work placement of signs reiterate during huddle
- Unfreeze the status quo-education via pre/post intervention comparison-need for change=new process frozen= patient safety

PICOT QUESTION

- Amongst operating room personnel, how does the implementation of a no interruption zone during induction of anesthesia compared to current practice, affect decibel readings over a 6-week time period?



SPECIFIC AIMS/PURPOSE

- Institute a new process/practice during anesthetic induction
- Decrease dB readings in the OR during the critical time of anesthetic induction
- Enhance patient safety by limiting noise and its associated distractions

CONTEXT

- Atlantic Coast Level I pediatric trauma center
- QI, EBP implemented over 6-week period in Level 1 pediatric trauma center
- All surgical specialties included
- Exclusion criteria, crying patient, parental presence, traumas, COVID cases
- Preintervention data collection time-period patient entrance to OR until anesthesia ready
- Preintervention dB readings recorded with Reed Instrument and number of people present counted manually and recorded
- Quality improvement evidence-based project implemented over 6-week period
- Pearson correlation coefficient evaluate relation between variables
- Minimal budget no outside funding required

INTERVENTION

- **Surgical services staff educated about NIZ initiative**
- **Posters, laminated signs, review of NIZ at patient care huddle**
- **Baseline dB readings every 10 seconds recorded and counting number of people present from patient entrance to anesthesia ready during NIZ initiative**
- **Compare preintervention data to NIZ implementation data**

DATA ANALYSIS

- **Mean median mode descriptive statistics Analysis of variants and co-variants, ANOVA**
- **Nominal data surgical specialty**
- **Ordinal and interval data occupants, duration, volume/dB**
- **Descriptive statistics mean, median, mode, minimum and maximum value decibels and number of people present**
- **Standard deviation, paired t-test utilized to compare pre and post data**
- **Shapiro Wilk normality test**

P value

RESULTS

Decrease in dB readings after NIZ intervention statistically significant

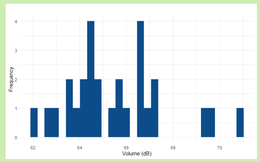
1.Histogram of volume normally distributed baseline data

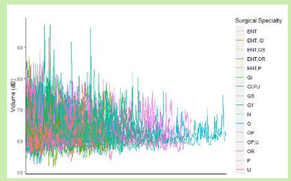
2.Spaghetti diagram all specialties over time

3.Boxplot of volume by intervention

4.Difference in volume before and after intervention

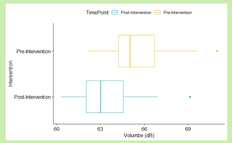
The results were significant, $t = 4.43$ (80), $p < .001$. Pre-intervention volume (mean = 65.54) significantly reduced following an intervention (mean = 63.41).

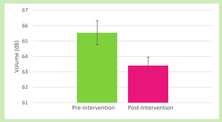




Volume (dB)		
Min	62.16	60.28
Max	70.98	69.14
Mean (SD)	65.54 ± 2.12	63.41 ± 2.03

Number of Occupants		
Min	6	4
Max	16	13
Mean (SD)	8.11 ± 2.13	7.00 ± 1.84





DISCUSSION

ETHICAL CONSIDERATIONS

- CITI Training
- HSRC Approval
- IRB Exemption, deemed not research
- Data Protection

LIMITATIONS

- COVID causing staff shortages, cancellation of elective cases
- Staff and patients COVID +
- Reduced number of operating room cases
- Hawthorne effect team members obtaining data
- Limited to specific operating rooms secondary to consistency in size

PLAN FOR SUSTAINABILTY

Random monitoring

Use of signs by staffCommunication with OR management

Patient safety director

Potential for process change

IMPLICATIONS FOR ADVANCED NURSING PRACTICE

Advocacy for patient safety

Continued use of NIZ

Education of staff

Sustain NIZ using signs

Random monthly decibel readings

Respect as research initiators

Process and policy creation

Instrumental in communication with other departments

CONCLUSIONS

NIZ statisticall significant in reducing noise in the operating room

No effect on number of people in the operating room

NIZ inexpensive

Simple method to educate staff on noise and its impact on all providers