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Research Article

Advantage and Disadvantage of Music and Noise in Operating Room and ICU: A Narrative Discussion and Analysis

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Abstract: Background: Prolonged noise exposure causes health problems as patient needs balanced physical parameters like good immunity level, good amount of sleep, rest, etc. On the other hand, mild music or music of choice could create good effect on surgical patient health. **Material and methods**: A systematic literature search of databases-articles, reviews, talks have been done till 31st Dec, 2021. All studies reporting the effect of the noise on surgical patients, surgeons, anesthesiologists and other healthcare provider were included. Talks on subject by eminent surgeon, researcher and therapist are considered along with the universities and hospital's website. **Results**: We found 19 studies meeting our inclusion criteria. We found significant effect of sound on surgical patients including increased rate of complication when noise levels were higher as well as positive effect of light or soothing music on patients' health. **Conclusion**: Higher decibel or noise levels have adverse effect on patients' outcome as well as health care providers or operation room team. Effect of music on surgical team member is dependent on choice of music and nature of healthcare provider.

Keywords: Choice of music, balance physical parameters, higher decibel levels, patients outcome.

Introduction

Prolonged noise exposure causes health problems as patient needs balanced physical parameters like good immunity level, good amount of sleep, rest, etc. On the other hand, mild music or music of choice could create good effect on surgical patient health [1]. In 2011, the WHO released report titled, "Burden of disease from environmental noise", "Noise is unpleasant, unwanted, loud sound, which is disruptive to hearing". During the last few years, noise pollution has been increased in hospitals [Table-1, 2]. Hospital must consider specific sounds and back ground sounds to treat as a noise. Effective communication in operation theatre is crucial and should be very clear. Bigger operation rooms increase the equipment and instrument facilities. However, sound reverberation time increases with room size. During the design of operation rooms, all the parameters and effects must be counted to get maximum acoustic performance without creating adverse effect [2]. Even after the surgery, patients may shift to ICU where various health care services are provided and for continuous monitoring patients special equipment and instrument are needed [3]. These heavily noisy instruments and equipments create high level of noise pollution. WHO recommends that average background noise in hospital should not be exceed by 35 dB (A) and peak should be less than 40 dB (A) [8] [Table-3].

On the other side, research suggests that music can benefit our physical and mental health. Music could decrease stress of the surgical team along with reducing patients' stress and anxiety before surgery and during the surgery [9] [Chart-1]. However, one more study reported negative effect of

slit attention with music decrease surgical procedure performance. [10]. Few other suggest that performance of surgical team can remain unchanged with music as intense concentration required for surgery. In addition, no studies found noise is beneficial. We sought to discuss the advantages and disadvantages of music/noise on surgical team performance, other health care providers' performance, hence indirectly or directly affecting patients' health.

Results

1) Though the hospitals are noisy and not audible operation theatre are good compare to wave and old site.
2) One of the noise component in operation theatre is a conditioner.
3) Almost all cases operation theatre is noisy while instruments and equipments are used.
4) Even empty rooms without air condition, are also noisy. It is at peak when instruments are used.
5) Outside the hospital premises area is quite noisy one of the reason is majority hospitals are on the commercial rood or commercial activities increases at hospital develops.
6) Emergency Centers are too noisy to control.
7) In hospital premises reception and OPD's noise level is highest.
8) Operation theatre and ICUs are comparative let's noisy.
9) Payment window and laboratory are overcrowded and hence they are noisy.

Important points

1) Majority of hospital are nosy according to WHO guideline in Asia.
2) Music at operation theatre or at ICU has both positive and negative effect. It is choice of surgeons and patients.
3) Mild music or choice of music has positive effect. Noise has adverse effect on health care provide or patient.
4) Sleep –driven condition, Loudness may have advantage.
5) Sound may affect unconscious or semi-conscious patient in operation theatre or at ICU.
6) Many surgeons feel, they can focus better with music.
7) May be surgeon feel, Music could affect their concentration. Silence is better for the clear communication.
8) Majority of hospitals have audible operation theatre with average noise level.
9) Majority of the hospital won't take high decibel level as serious concern.

Table 1. Comparative noise level in hospital area

Noise level in hospital area	Percentage (%)
Outside of hospital premises	38.50%
OT	1.50%
ICU	2%
Emergency Room	7%
Patient Rooms	4%
Laboratory and Emergency Center	18%
Reception and OPD	21%

Table 2. Noise Level at Hospital Site

Operation theater Noise level	Indian Condition
While Instruments are used	65.8
During operation	62.2
Introduction to Anesthesia	63.1
On OT Preparation	59
Empty OT With AC	57.2
Without AC empty operation theater	53.2

Table 3. Determination of sound level of various surgery departments

S/N	Surgery department	Sound level	Time interval
1	Neurosurgery and orthopedic surgery [13]	95 dBA	40%
2	Gastrointestinal surgery [13]	65 dBA	50%
3	Cardiology surgery (For brief period of time there is extremely high level of sound)	35 dBA	50%
4	Urology	62	NA

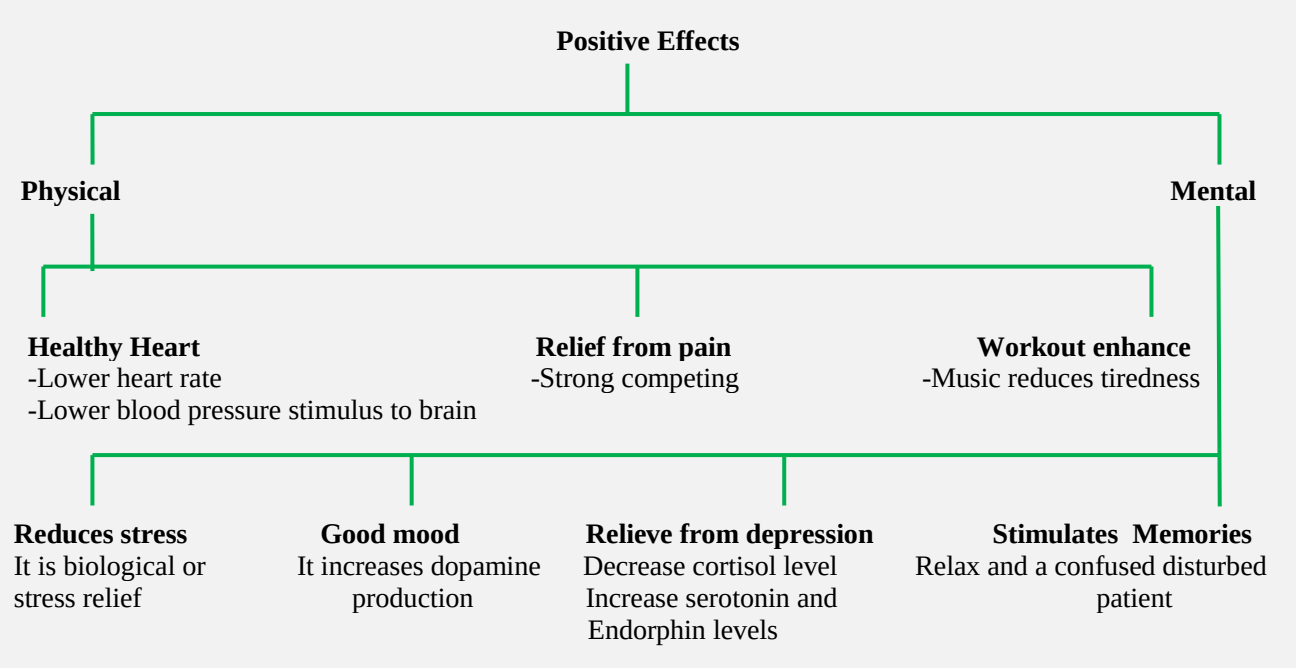

Chart 1. Positive effect of music on health of surgery patient

Discussion

The heavy noise of ventilators and cutters, gamma knife, infusion pump, hiss of oxygen, Cart wheels, monitoring machines including voice of surgeons and other operation theatre staff can't be muted considering these are lifesaving voices. Noise of instruments, equipments and irrelevant verbal communications are found to be harmful to surgical performance and team functioning [4] [Table-3]. There should be good communication among surgeons, anesthesiologists and other healthcare staff. In majority of the cases, operation room is not ideal for such communication because of noise background [5]. The start and termination of surgical procedures are often considered as the loudest phase exceeds the maximal limit of 120 DB [6]. Inattention caused by high level of noise may affect the ability of operating theatre staff to perform aseptic techniques, hence increasing the possibility of SSIs [7].

Do music has positive in impact on unconscious or semiconscious patients?

The subconscious mind is the most complot and mysterious part of the body. Since, it is not control by conscious mind a music might influence subconscious mind. Psychologists, anthropologists, musicologists and neuro scientists have proposed numbers of theories related with positive effect on unconscious or semiconscious mind. Tweet heats have explain or discuss in both theoretical and empirical approaches neurophysiology real studies suggest that music in sliced chills produce reduced activity in brain structure associated with anxiety. Fifth [16] has note that we all have the music we like as something special as something that defines mandate, takes us "out of ourselves", "put somewhere else [14]". Even high frequency non audible sound (<20kHZ) affect brain activity music to these frequency could effect positive on mind alpha-EEG and a CBF are correlated. This may be proud biochemical markers in brain.

Effect of loud noise on unconscious mind

Sound triggers human mind, memories, emotions and signal here physiological reactions. These activities are under the unconscious state of mind shows complete nature of human auditory of system. First sound processes by unconscious level of mind even when person is conscious. Musical background in room could positive effect on unconscious patient in operation theatre EGG is tool to now patient's brain function by using this technique, effect of sound (and loud sound). Researchers found that brain to unconscious patients can react to sound. It has been observed that exposure to noise in influences the central nervous system. In unconscious or semi-conscious state of mind, it noise may affect negatively on vital parameters. Some studies show that noise in proves the performance mainly due to increase arousal [19].

Conclusion

Noise levels measured in operation theatre in majority cases are higher than the WHO recommendation. High noise levels may have import on recovery patient –surgeon, surgeon –nursing staff, surgeon–anesthesiologist communication and sedation. This result in performance of surgery team members in the operation theatre. Though the surgeon may early. "Block out" noise or music because of high level of focus and concentration needed to perform difficult surgery [11]. (SOTOS) the silent operation theatre optimization system shows significant noise reduction in operation theatre and a high acceptance by surgical staff [12]. This shows noise condition for surgeon but not for patient who is under anesthesia. At low to medium volume of classical music can improve performance by increasing both accuracy and speed [9].

Conflicts of interest: There is no conflict of interest of any kind.

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