Patients' Perception of Noise in the Operating Room—A Descriptive and Analytic Cross-Sectional Study

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Purpose: *Noise is a general stressor that affects the cardiovascular system, resulting in increased blood pressure and heart rate, both of which can be problematic for the patient preparing for anesthesia and surgery. The purpose of this study was to investigate the patient's perception of noise in the OR before anesthesia, the correlation between the actual noise levels and the patient's perception of noise, and if there are particular patient subgroups that are especially vulnerable to noise.*

Design: *This cross-sectional study was performed within a mixed descriptive and analytical design, including 120 patients (60 acute/60 elective) undergoing general anesthesia for orthopaedic surgery.*

Methods: *Data collection consisted of registration of demographic variables and measurements of noise levels in the OR combined with a questionnaire.*

Findings: *Results showed that 10% of the patients perceived noise levels in the OR as very high and experienced the noise as annoying, disruptive, and stressful. There was no correlation between the actual noise levels to which patients were exposed and their perception of noise. Acute patients perceived significantly more noise than elective patients ($P < .01$), although they were actually exposed to less noise. Of the acute patients, those undergoing major surgery perceived more noise than patients undergoing minor surgery ($P < .01$), although actually exposed to less noise. There was a significant correlation between patients' sense of coherence (SOC) and their perception of noise ($P < .01$). Most patients who perceived noise levels as very high had a SOC below 50 (scale: 13-91).*

Conclusions: *Perianesthesia nurses need to maintain their focus on keeping noise levels in the OR as low as possible. When caring for acute patients, patients undergoing major surgery and patients with a low SOC perianesthesia nurses should be particularly aware, as these patients might be more vulnerable to noise.*

Keywords: *noise, operating room, patient perspective, sense of coherence, research, perianesthesia.*

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NOISE IS A GENERAL stressor that can affect the cardiovascular system, resulting in increased blood pressure and heart rate, also known as the "startle effect." This physical stress reaction provokes psychological stress responses.[1-4] As such, noise in the operating room (OR) should be avoided as much as possible, particularly in the period between the patient's arrival in the OR and until they are fully anesthetized. Patients are especially vulnerable to external stress stimuli during this period.

Noise in the OR was first described in the 1970s, when Shapior and Baland[5] registered noise levels in the OR and found that they equaled the level of noise on a freeway. They defined noise in the OR as "the third pollution," equating noise with air and water pollution. In the Guidelines for Community Noise issued by the World Health Organization (WHO),[6] it is pointed out that patients in hospital settings are particularly vulnerable to noise as their situation reduces their capacity to cope with stress. The WHO recommends that sound levels do not exceed 30 dB(A). Nevertheless, sound levels in ORs have been shown to be very high [average 50-75 dB(A), max peak 80-120 dB(A)] and in excess of the recommended levels.[7] From our experience, noise is also a frequently discussed topic in clinical practice among OR staff.

A literature review published in 2010[7] showed the topic of noise in the OR to be widely described with regards to noise levels in excess of the recommended levels,[3,8-19] identifying noise sources as being related to equipment and staff behavior[3,12,15,17] and identifying negative effects of noise on staff performances, mainly in relation to impaired communication.[15,17,19] The review, however, revealed a lack of knowledge and understanding of the patient's perspective. The literature on the patient's perspective is sparse and contradictory.[7] A previous study performed by Lui and Tan[8] surprisingly revealed no correlation between patients' perception of noise and the actual noise levels to which they were exposed. This could be explained by the fact that sound is perceived individually, and the degree to which a sound is perceived as noise not only depends on the character and the level of the sound but also on the person exposed to the sound and the context in which the sound is perceived. Patients in a particularly vulnerable situation, such as those facing acute surgery that they have not been able to prepare themselves for owing to the sudden need for surgery, might be more sensitive to the sound in the environment than patients experiencing more planned and predictable situations. Some patients might be more sensitive because their capacity to cope with stress stimuli in general is limited. According to the theory of salutogenesis, developed by the medical sociologist Antonovsky,[20,21] people with a low sense of coherence (SOC) are more vulnerable to stress stimuli because they have limited general resistance resources to cope with stressful situations. According to this theory, patients' SOC might therefore influence their perceptions of noise in the OR.

Purpose

The purpose of this study was to investigate if patients undergoing general anesthesia perceive noise in the OR in the period from their arrival until they are fully anesthetized, if there is any correlation between the actual noise levels to which patients are exposed and their perception of noise, and if subgroups particularly vulnerable to noise could be identified.

Hypotheses

Based on a previous study conducted by Lui and Tan,[8] we hypothesized that ***(1)*** approximately 50% of the patients undergoing general anesthesia for orthopaedic surgery perceive noise in the OR in the preanesthesia period, and ***(2)*** there is no correlation between the actual noise levels to which the patients are exposed and their perception of noise. We also hypothesized that ***(3)*** acute patients perceive more noise than elective patients, and owing to the context of their situation, they are more vulnerable to noise. Additionally, we hypothesized that ***(4)*** patients with a low SOC experience more noise than patients with a high SOC.

Design

This cross-sectional study was performed using a mixed descriptive and analytical design. Three types of data were collected, namely demographic variables available on the anesthesia record, noise levels in the OR, and a post recovery patient questionnaire.