

# Noise levels in obstetric theatres: Is it really that loud?

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## INTRODUCTION

“Unnecessary noise is the most cruel absence of care which can be inflicted either on the sick or well”  
(Florence Nightingale in 1858)



The detrimental impact of noisy environments on physical and psychological wellbeing has been well documented, including in healthcare and surgical environments. The World Health Organisation (WHO) first published guidelines aimed at protecting human health from the impact of noise in 1980, with major updates in 1999 and 2018 specifically addressing noise within healthcare environments.<sup>[1]</sup> Despite this, noise levels have continued to increase in the hospital environment,<sup>[2]</sup> and the impact of this on healthcare providers and the provision of safe patient care is an area of increasing concern.

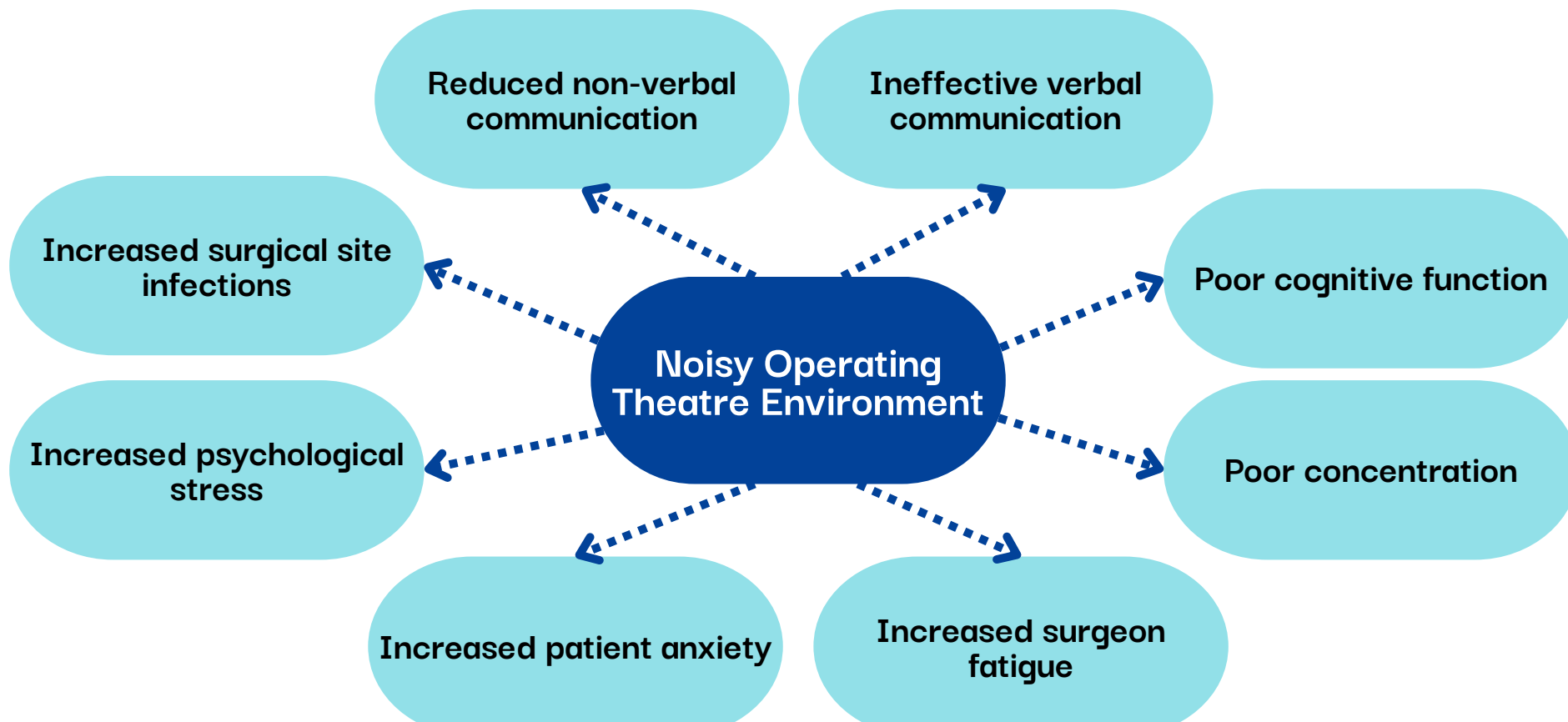


Figure 1: Impact of increased noise levels within the operating theatre environment

Noisy environments impair communication and team functioning, and in the operating theatre setting impact upon surgical performance and patient outcomes (fig.1). Within the operating theatre, WHO guidelines recommend that sound levels should not exceed an average of 35 decibels (dB)<sup>[3]</sup> (fig.2).

Studies conducted within general surgical and orthopaedic theatres have shown that average noise levels regularly exceed this, with orthopaedic procedures averaging over 85dB (the level associated with potential for hearing damage). However, there is a paucity of data specific to noise levels within the obstetric operating environment.<sup>[5]</sup>

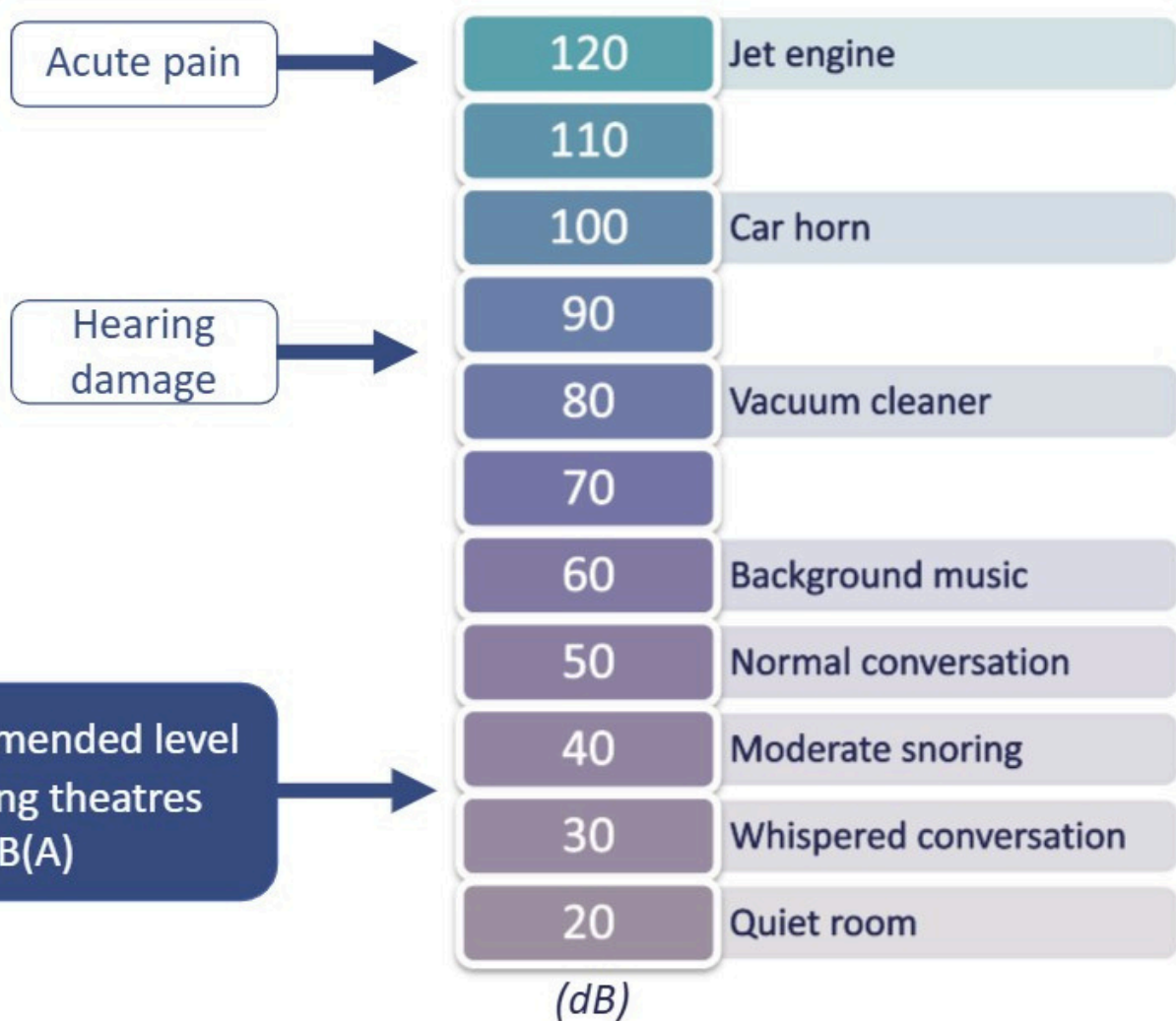


Figure 2: WHO guidelines for noise levels in healthcare setting and real-world examples [4]

## AIMS

**Primary:** To determine if noise levels in obstetric theatres meet WHO recommendations

**Secondary:** To understand the causes of noise in obstetric theatres and to identify potential areas to reduce noise in obstetric theatres

## DESIGN

Cross-sectional study of 33 Caesarean sections performed within obstetric theatres at a consultant-led unit within a 4-week period in September-October 2023.

## METHOD

Sound levels were recorded using a Curconsa® sound level meter placed within the obstetric theatre. To ensure consistency, the sound meter remained in the same location for the duration of the study.

Noise levels were measured at 5 set points throughout the procedure; surgical sign in, anaesthetic induction, knife to skin, birth, and closure. Total duration where noise levels exceeded the 35dB WHO-recommended level were also recorded for each case.

Short-lasting, louder noises were documented by recording all occurrences of noises loud enough to trigger an involuntary physiological startle response (determined as background noise level pre-procedure + 20dB, approximately 60dB for each case), noting their frequency and recording the cause of noise where possible.

## RESULTS

**Demographics:** All cases were elective C-sections, performed across 3 operating theatres. 31 cases (93.9%) were performed under regional anaesthesia, 2 cases (6.1%) were carried out under general anaesthetic.

For all 33 cases, noise levels were above the WHO recommendations throughout the entire procedure. Average noise levels reached a maximum at surgical sign in (average 56.49 dB(A)) followed by birth (54.16 dB(A)). Overall, the loudest point on average was at surgical sign-in (56.49 dB(A)), followed by time of birth (54.16dB(A)). The quietest point was at skin closure (47.76dB(A)), therefore after the birth of the infant.

The cause of noise greater than the startle response threshold was identified as resulting from surgical equipment (69.7%, n=774) and communication (22.6%, n=251). Infant crying was the cause of these ‘startle events’ in only 7.5% occasions (n=84). On average, for each case there were 33 occasions where noise levels exceeded the startle response threshold, indicating that these events are very common occurrences.

|                       | Average noise level (dB(A)) |
|-----------------------|-----------------------------|
| Anaesthetic induction | 51.74                       |
| Sign in               | 56.49                       |
| Knife to skin         | 49.14                       |
| Birth                 | 54.16                       |
| Closure               | 47.76                       |

Table 1: Average noise levels at set points in procedure

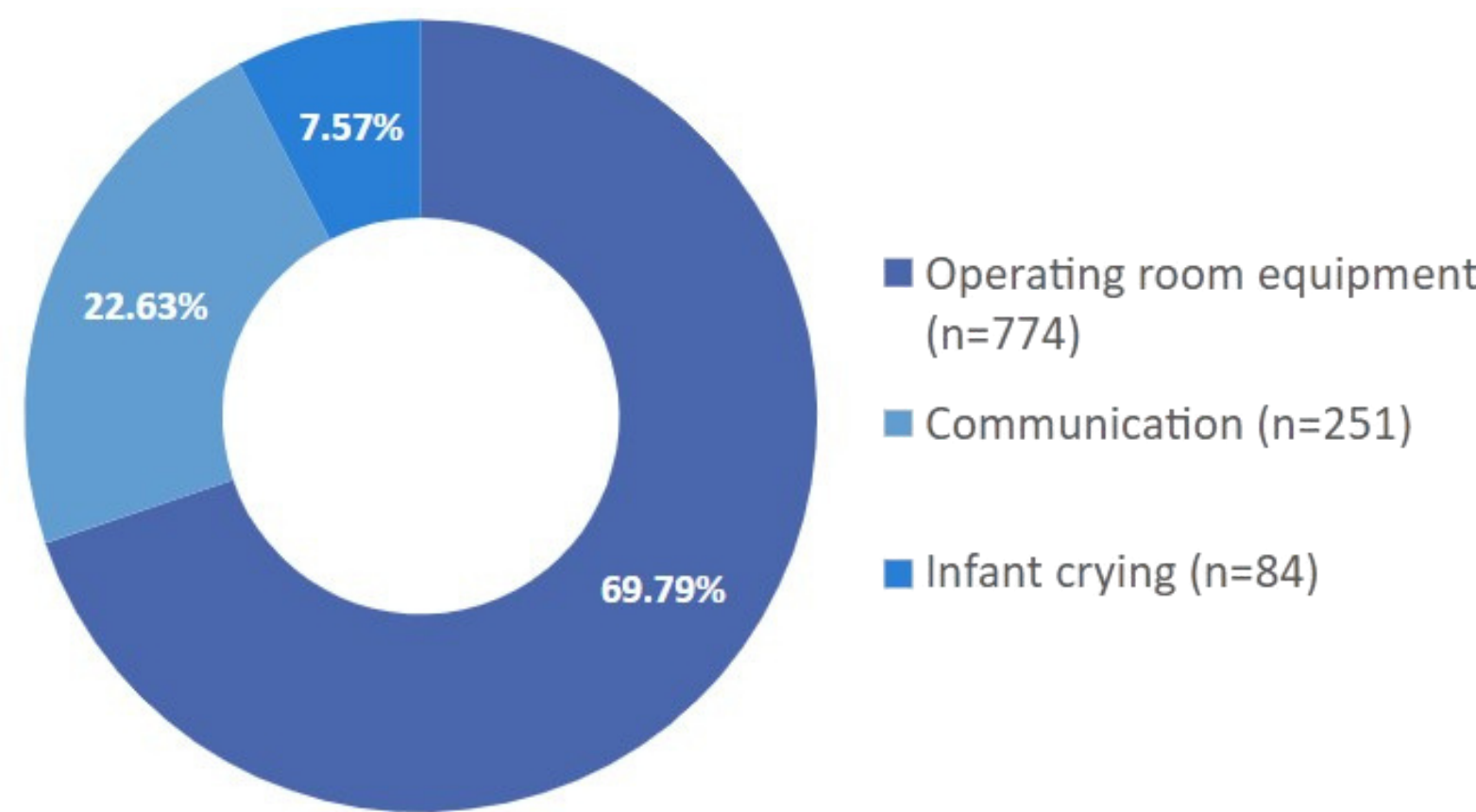


Figure 3: Cause of noise greater than startle response threshold

## DISCUSSION

These results indicate that similar to other surgical environments, obstetric operating theatres are noisy environments, and for all cases in this study sound levels exceeded the WHO-recommended level of 35dB(A) throughout the entire case.

Interestingly, whilst it may initially be thought that infant crying or communication to patients would be responsible for increased noise levels, review of the cause of events exceeding the startle response threshold clearly indicate that equipment-related sounds and staff communication is significantly more common.

These ‘startle events’ can also be classified according to potential for noise-reduction strategies (fig 5), which provides several points for intervention in order to both reduce the frequency of overall noises exceeding the startle response threshold, and potentially also reducing the average noise levels in the obstetric operating environment.

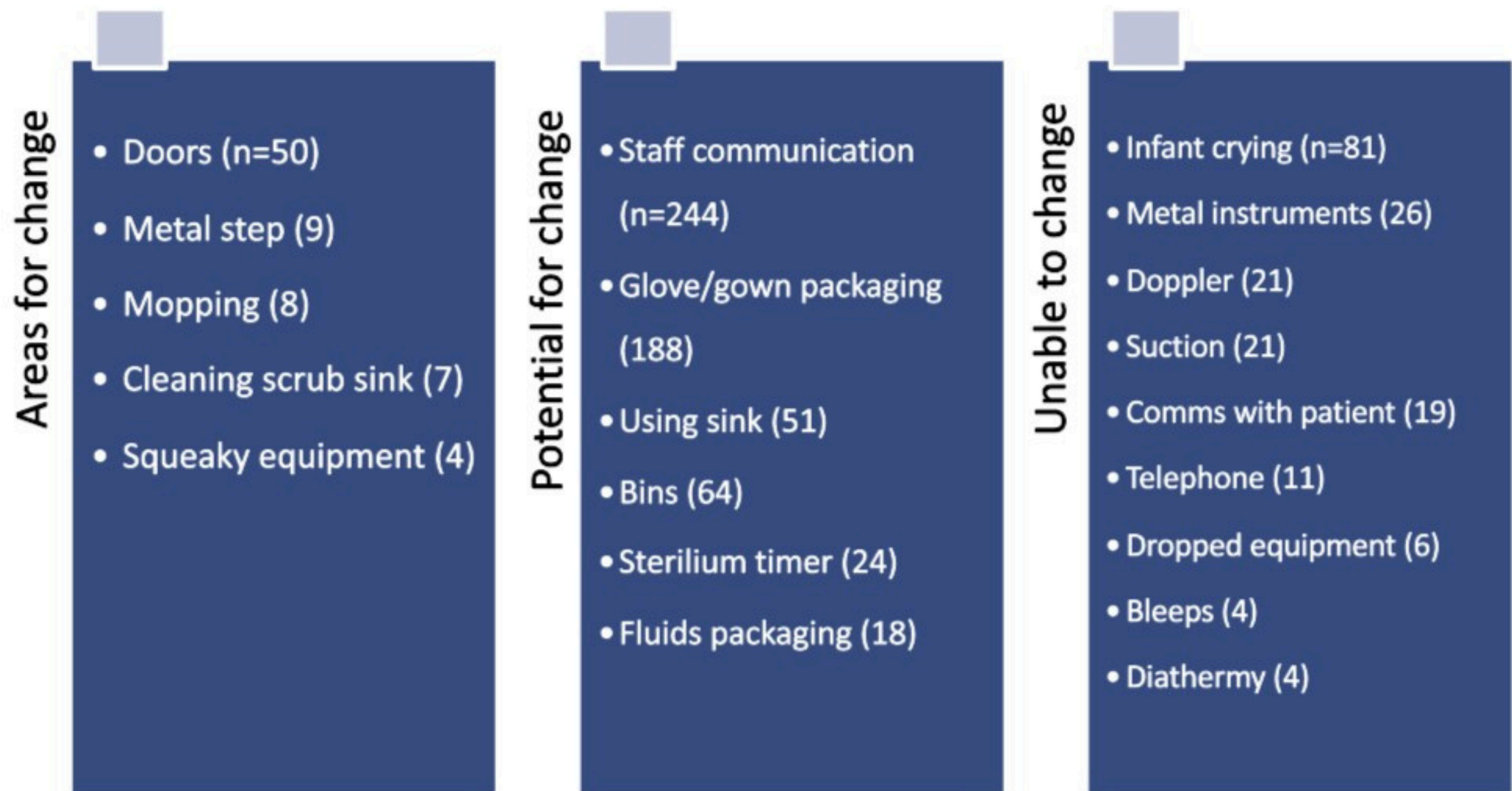


Figure 4: Classification of cause of noise greater than startle response threshold

## CONCLUSION

Sound levels within obstetric theatres do not meet the recommended limits set by the WHO, potentially impacting patient care and safe communication. The primary cause of raised noise levels was surgical equipment, followed by communication.

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