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British Journal of Oral and Maxillofacial Surgery 55 (2017) 164–167

BRITISH Journal of Oral and Maxillofacial Surgery

www.bjoms.com

Effect of noise on tasks in operating theatres: a survey of the perceptions of healthcare staff

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Available online 31 October 2016

Abstract

Noise in the operating theatre has an adverse impact on healthcare professionals, both physically and psychologically. It can be distracting, make communication difficult, and contribute to a perceived increase in stress. Staff in theatre must deliver high quality care, and overlook noise as a potentially damaging influence. The aim of this survey was to obtain further information about the perspective of healthcare professionals on how noise can affect their practice and whether it affects their work in theatre. We distributed six closed-ended questions in the form of a Survey Monkey® questionnaire to about 50 hospitals across the UK and target groups such as medical students, the Leeds Advanced Trauma Life Support faculty group, the Court of Examiners of the Royal College of Surgeons of England, and surgical trainees sitting the Member of the Royal College of Surgeons examination.

We received 519 responses of which 415 respondents (83%) thought that noise contributed to human errors. A total of 282 participants (57%) thought that the theatre was the noisiest area within the theatre suite. Both communication among staff (n = 400, 80%) and concentration (n = 384, 77%) were thought to be adversely affected by noise. However, 385 (78%) did not feel that music adversely affected their performance. The results provide insights into the interplay of noise and its effect on people. Although the role of music remains contentious, our results suggest that it might have a calming influence.

Keywords: noise; human factors; background; healthcare; survey; safety

Introduction

In the operating theatre where electronic instruments, bleeps, intercoms, monitor alarms, and power tools are commonplace, noise is inevitable.[1] Many studies have found that noise can affect healthcare, and is consequently an environmental hazard.[2] Its adverse effects can range from impaired concentration[3] to mental and physical stress.[4] Sustained exposure can also cause permanent, noise-induced hearing loss and tinnitus in staff working in the operating theatre.[5] Anaesthesia may also blunt natural reflexes to sudden spikes in noise, and may cause acoustic trauma in patients, more so among older ones.[6]

In addition to adverse effects on health, noise can cause distractions that could lead to serious lapses in patients' safety. The ability to focus on tasks, and to concentrate, can be appreciably impaired by noise, particularly when people are exposed to sudden bursts such as loud talking or that made

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http://dx.doi.org/10.1016/j.bjoms.2016.10.011

by some surgical instruments. The role of music, on the other hand, remains contentious.

The aim of this survey was to obtain further information on the perspective of the professionals who work in theatre on how noise can affect their day-to-day practice and whether it has any impact on their work. The impact of extraneous noise is well-known to have a deleterious effect on awareness of surroundings in other high-risk industries. The key objectives of this survey were to identify which human factors, if any, were adversely affected by excessive noise, whether music was deemed to have an unfavourable effect, whether staff working in a noisy environment thought that they were more likely to make an error, and in which part of the operating theatre complex did noise have the greatest impact on patients' safety.

Methods

Design of the survey

A survey that comprised six questions was circulated among healthcare professionals who worked in operating theatres in the UK. Responses were collected on the effect of noise on human factors including performance of tasks, communication, and the ability to concentrate while working.

Closed-ended questions were designed and modified by distributing the questionnaires to a sample of staff who worked in the operating theatres at Chesterfield Royal Hospital, UK. Responses were analysed and questions redesigned based on any feedback.

Participants

The final version of the web-based (SurveyMonkey®) anonymous questionnaire was distributed as an email link to 50 NHS hospitals across the UK and target groups, which included Sheffield University medical students undertaking anaesthesia or general surgical placements, Leeds Advanced Trauma Life Support faculty group, the Court of Examiners of the Royal College of Surgeons of England (either surgeons or anaesthetists), and surgical trainees sitting the Member of the Royal College of Surgeons (MRCS) examination.

Collection and analysis of data

An opportunity for participants to give feedback about the survey and make any comments about individual questions was provided in the last section of the survey. Fifteen days after the survey had been distributed, a reminder was sent to the participants to complete it. Responses were collected in both electronic and paper format, depending on the respondent's preference and location. All data collected in paper format were entered on to the SurveyMonkey® database manually.

Table 1
Responses by grades of health professionals (n = 519).

Grade	Number (%)
Surgeon	169 (33)
Anaesthetist	142 (27)
Medical student	84 (16)
Theatre nurse	37 (7)
Operating department practitioner	20 (4)
Health care assistant	19 (4)
Recovery nurse	18 (3)
Theatre coordinator	5 (1)
Other	25 (5)

Table 2
Factors thought to be adversely affected by noise (n = 519). Participants were given an opportunity to select more than one option for this question.

Factors	Number (%)
Communications between staff	400 (80)
Concentration	384 (77)
Stress level	305 (61)
Effective team work	288 (58)
Performance in general	251 (50)
Performance of some tasks	234 (47)
None	8 (2)

Table 3
Types of music preferred by staff (n = 493).

Type of music	Number (%)
None	51 (10)
Pop or contemporary	96 (20)
Classical or calming	132 (27)
Other	214 (43)

Ethical considerations

All the respondents were told at the beginning of the survey that participation was completely voluntary and no identifiable data would be collected. Their completion of the survey was presumed to indicate consent, and research on anonymous data collected in this manner does not require ethics approval from any research ethics committee in the UK.

Results

A total of 519 responses were received, and a list of those who replied is shown in Table 1. Table 2 shows those factors that were adversely affected by noise, and Table 3 the types of music preferred by staff. Table 4 shows the parts of the theatre suite which were most thought to have been affected by noise.

Discussion

The results of this large survey have confirmed that staff working in theatre perceived noise as a barrier to communication, and a potential contributing factor to human errors.