Impact of using personal mobile phones in the operating theatre: A scoping review

Supplement 1: Characteristics of included studies

Author (year) Country of origin	Title	Objective/s	Research method / level of evidence	Population	Results
Avidan et al. (2019)[1] Israel	Cell phone calls in the operating theater and staff distractions: An observational study	To evaluate the number of phone calls that take place in the operating theatre, during elective surgery. To assess whether the phone calls lead to staff distractions.	Observational mixed study 4.c	Surgical staff, observed during 52 elective surgeries	Negative impact: risk of distraction. In 29 of the received phone calls, 30 staff distractions were reported (80% were from surgeons using their personal mobile phones).
Çelikoyar et al. (2019)[2] Turkey	Mobile technology for recording surgical procedures	To evaluate the possibility of using smartphones to record surgical procedures.	Observational study without a control group 3.e	Five recorded neck surgeries	Positive impact: improvement of professional skills, usefulness for care provision. It is possible to use a mobile phone as a recorder, in open surgical procedures.
Chang et al. (2017)[3] Taiwan	Nasal colonisation and bacterial contamination of mobile phones carried by medical staff in the operating room	To assess the incidence of bacterial contamination on the mobile phones carried by the medical staff in the operating theatre. To determine the relationship between the aforesaid incidence and the medical staff's nasal contamination.	Observational quantitative cohort study 3.c.	216 swab samples (collected from the mobile phones, nostrils, and dominant hand, of 72 medical staff members) were analysed	Negative impact: risk of infection due to bacterial contamination. A nasal colonisation rate of 98% was reported, with 27.3% potentially pathogenic bacteria. In 94.3% of the medical staff, the same bacteria were found, simultaneously, on their mobile phones, on their hands and inside their nostrils.
Cohen et al. (2018)[4] USA	Distracted doctoring: The role of personal electronic devices in the operating room	To identify the use of electronic devices, namely mobile phones, by the staff of cardiac surgery operating theatres, during procedures with extracorporeal circulation (ECC).	Observational quantitative study 4.c	Staff of cardiac surgery operating theatres	Negative impact: risk of distraction. Staff members spent about 1.5 minutes focusing on their mobile phones, regardless of the surgical stage.
Cumino et al. (2017)[5] Brazil	Smartphone-based behavioural intervention alleviates children's anxiety during anaesthesia induction: A randomised controlled trial	To verify the effectiveness of non-pharmacological strategies in preventing child anxiety during anaesthetic induction. The addressed strategies included: distracting the child using mobile applications, previously provided to the child and his/her parents; offering written information (pamphlet).	Randomised clinical trial 1.c	84 children, divided into four test groups	Positive impact: usefulness for distracting children during anaesthetic induction. The children's anxiety decreased when mobile phone–based distraction was provided in combination with an informative pamphlet.
Dowden et al. (2020)[6] Canada	Recommended cleaning practices for cell phones in the operating room: A modified scoping review	To analyse mobile phones as a source of contamination in operating theatres. To identify current mobile phone cleaning practices. To explore mobile phone disinfection protocols.	Scoping review 4.b	Studies reporting the practice of cleaning mobile phones in an operating theatre setting	Negative impact: risk of infection due to bacterial contamination. All the included studies showed the existence of contamination on the participants' mobile phones. In some cases, pathogenic bacteria were detected.
Jeske et al. (2007)[7] Austria	Bacterial contamination of anaesthetists' hands by personal mobile phone and fixed phone use in the operating theatre	To evaluate the role of mobile phones in transmitting bacteria to the anaesthetist's hands, in the operating theatre. To compare the aforesaid role with the contribution of fixed telephones located in the operating theatre's antechamber.	Observational quantitative study 4.c	40 anaesthetists	Negative impact: risk of infection due to bacterial contamination. Following mobile phone use, the contamination of the participants' hands increased in 38 cases. After fixed telephone use, the contamination of the participants' hands increased in 33 cases. In both situations, microorganisms were detected, namely pathogenic bacteria.

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Lee et al. (2014)[8] South Korea	Effect of behavioral intervention using smartphone application for pre-operative anxiety in pediatric patients	To assess the benefits of a behavioural intervention programme involving the use of a mobile application to reduce child anxiety during anaesthetic induction.	Randomised controlled trial 1.c	120 children, scheduled for elective surgery under general anaesthesia	Positive impact: usefulness for distracting children during anaesthetic induction. Among the applied strategies, mobile phone use produced the most significant decrease in child anxiety.
Murgier et al. (2016)[9] France	Microbial flora on cell-phones in an orthopedic surgery room before and after decontamination	To evaluate the bacterial contamination of mobile phones used by the orthopaedic surgery staff in the operating theatre. To compare the mobile phones' bacterial flora, before and after decontamination, and to determine the hygiene habits related to such devices.	Observational quantitative cohort study 3.c.	52 participants (surgeons, nurses, anaesthetists, radiology technicians and pharmaceutical representatives)	Negative impact: risk of infection due to bacterial contamination. The mobile phones presented a contamination rate of 94%. The devices' decontamination significantly reduced this parameter (it decreased to 75%).
Park et al. (2019)[10] South Korea	International Nursing: Use of a commercially available smartphone application to solve information needs of orthopedic scrub nurses	To describe the usefulness of a mobile application designed to organise information, from the point of view of scrub nurses who work in orthopaedic surgery settings.	Qualitative study: focus group interviews 5.c	Four orthopaedic surgery scrub nurses	Positive impact: improvement of professional skills. From the scrub nurses' perspective, the application allowed an efficient organisation of the surgical information.
Pinar et al. (2016)[11] Turkey	Smartphone use habits of anesthesia providers during anesthetised patient care: A survey from Turkey	To describe current habits and opinions, regarding smartphone use by Turkish anaesthesia staff.	Exploratory quantitative study 4.c	955 participants (nurses and anaesthetists)	Negative impact: risk of distraction. Mobile phones were used in the operating theatre for non-professional purposes, having the potential to distract the staff.
Porter et al. (2022)[12] Iran	Development, validation and results of a survey of personal electronic device use, among 299 anesthesia providers from a single institution	To develop, validate and apply a questionnaire that allows determining usage patterns and eventual risks, with respect to the use of personal electronic devices (smartphones) by anaesthesia providers, in perioperative settings.	Retrospective quantitative study 4.c	299 anaesthesia providers (nurses and others)	Negative impact: risk of distraction. The vast majority of the participants (80%) viewed mobile phone use as a potential distraction, capable of jeopardising patient safety.
Qureshi et al. (2020)[13] Pakistan	Mobile phones in the orthopedic operating room: Microbial colonisation and antimicrobial resistance	To investigate the microbial colonisation of mobile phones used by orthopaedic operating theatre staff.	Exploratory quantitative study 4.c	Anaesthetists, surgeons, nurses and other technicians	Negative impact: risk of infection due to bacterial contamination. A total of 100 mobile phones were analysed, with bacterial contamination being detected on 93 devices.
Shakir et al. (2015)[14] USA	Investigation of cell phones as a potential source of bacterial contamination in the operating room	To document the presence of bacterial contamination on the orthopaedic surgeons' mobile phones, in the operating theatre. To determine whether a standard mobile phone disinfection protocol reduces the existing contamination rate.	Exploratory quantitative study 4.c	53 orthopaedic surgeons	Negative impact: risk of infection due to bacterial contamination. The orthopaedic surgeons' mobile phones exhibited high levels of bacterial contamination, which decreased with disinfection practices. However, after one week, recontamination occurred.
Smith et al. (2011)[15] USA	Survey on cell phone use while performing cardiopulmonary bypass	To determine the frequency of mobile phone use among perfusionists. To identify the perfusionists' concerns and opinions, regarding the use of mobile phones during extracorporeal circulation (ECC) procedures.	Observational quantitative study 4.c	439 perfusionists	Negative impact: risk of distraction. While performing ECC in cardiac surgeries, perfusionists accessed their mobile phones for non-professional purposes, which may have led to distractions.

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