

Nurse-led randomised controlled trials in the perioperative setting: A scoping review

Supplement 1: Verification form

Question (Response to each question must be 'yes' for paper to be included.)	Response	
Is the paper a randomised controlled trial?	Yes ☐	No ☐
Is the paper nurse-led (is the first or last author a nurse as per listed qualifications)?	Yes ☐	No ☐
Is the article published between January 2014 and May 2019?	Yes ☐	No ☐
Is the topic of the paper related to perioperative care at one or more phases (pre-admission; pre-operatively; intra-operatively; immediately post-operatively)?	Yes ☐	No ☐
Eligible for inclusion?	Yes ☐	No ☐

Supplement 2: Data extraction form

Author/s			
Year of publication		Country of origin	
Primary aim			
Secondary aim/s			
Study population			
Sample size		Study design	
Intervention			
Comparator/s			
Timing of intervention			
Timing of comparator			
Outcome measurements			
Outcome assessor		Outcome points	
Outcome measurements methods			
Findings			
Primary outcome			
Secondary outcome/s			
Reviewer comments			
Funding source			

Supplement 3: Table of included studies

First author (year), country	Primary aim	Primary outcome	Secondary outcome/s	Participant age	Surgical population	Total sample size (n)	Timing of intervention (I) and timing of outcome (O)	Funding
Al-Azawy, (2015) Norway	To compare and evaluate the effect of premedication, standardised pre-operative information and anxiety on pain intensity, drug consumption and satisfaction.	pain intensity	pre-operative anxiety on pain intensity and drug consumption	adults >18 years	Patients undergoing ablation for AF under conscious sedation	60	I: pre-operative information, medication one hour prior to surgery O: baseline, during and after procedure	Supported by Department of Heart Disease Haukeland University Hospital, Bergen. No specific funding mentioned.
Al-Yateem (2016) UAE	To assess play distraction versus premedication.	anxiety (mYPAS)	anxiety (STAI)	children 3–8 years	ASA I–II undergoing elective day surgery under GA	168	I: one hour prior to surgery O: during anaesthesia, pre-operatively, induction, anaesthetically, upon discharge	Funded by a grant from University of Sharjah.
Ayik (2018) Turkey	To measure effects of lavender oil aromatherapy massage versus usual care.	anxiety (STAI)	sleep quality	adults >18 years	Colorectal surgery	80	I: pre-operatively – night before and morning of surgery O: pre-operatively – night before and morning of surgery (after massage / usual care)	No specific grant funding received.
Baker (clinical trial protocol) USA	To compare IV versus oral acetaminophen (paracetamol).	pain	1. opioid consumption 2. PONV 3. post-operative respiratory depression 4. administration of reversal agents 5. LOS in PACU 6. Satisfaction	adults >18 years	Multiple surgical specialities	120	I: pre-operatively O: within 24 hours (except patient satisfaction – two days post-operatively)	Not stated.
Bakhshi (2014) Iran	To assess effects of positioning and early sandbag removal.	back pain	1. foot pain 2. haematoma 3. dorsalis pedis pulse 4. bleeding	adults	post-coronary angiography patients	80	I: after catheterisation O: one, two, three and six hours post-operatively and the following morning	No statement of funding evident.
Baradaranfard (2018) Iran	To evaluate impact of warming (forced air versus warmed IV fluids versus control) on physiological indices.	core body temperature	1. blood pressure 2. heart rate 3. shivering	adults 18–65 years	laparoscopic cholecystectomy	96	I: from induction of anaesthesia until PACU discharge O: before induction of anaesthesia until discharge from PACU	Funding by Isfahan University of Medical Sciences.
Brix (2016) Denmark	To compare two anaesthetic techniques.	post-operative pain (NRS)	1. intraoperative fentanyl use 2. analgaesic and antiemetic use in PACU 3. PONV occurrence 4. time to PACU discharge 5. recalled worst pain after discharge 6. recalled PONV after discharge	adult females	ambulatory operative hysteroscopy	153	I: initial surgery O: immediately post-operatively and two weeks post-discharge	Author has received funding from Hede Nielsen Family Foundation, the Gurli and Hans Engell Friis Foundation, the Aase and Ejnar Danielsens Foundation and the Health Research Fund of Denmark.
Çakar (2017) Turkey	To assess pre-operative oral carbohydrate vs standard fasting.	pre-operative discomfort –hunger, thirst, mouth dryness, chill, headache	1. post-operative complications 2. physiological parameters 3. PONV 4. pain	adults 16–80 years	thyroidectomy	95	I: from 00.00 hours night before surgery O: 10 pm and 6 am prior to surgery, every two hours post-surgery	No statement of funding.
Carlsson (2018) Sweden	To assess the effectiveness of pre-operative visits to the operating theatre on anxiety.	anxiety (mYPAS)	parental anxiety (STAI)	children 3–12 years and their parents	ENT day surgery	57	I: prior to the day of surgery O (children): in the waiting room, after arrival to OR, at anaesthesia induction O (parents): in waiting room and once child anaesthetised	Centre of clinical research in Värmland supported the project.

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Carr (2015) USA	To compare P6 stimulation versus control on PONV	PONV (Likert nausea scale score)	Nil	adult females 18–67 years	laparoscopic cholecystectomy	56	I: intraoperatively O: on admission to PACU; at 30 and 60 mins, PACU discharge, at home up to 24 hours	No statement of funding.
Charette (2015) Canada	To assess guided imagery and relaxation combined with education versus usual care.	pain intensity	1. anxiety (STAI-Y) 2. coping strategies 3. regular activities	adolescents and young adults	spinal fusion for scoliosis	40	I: commenced pre-operatively O: day of surgery to two weeks post-discharge	Funded by the Canadian Nurses Foundation; the Quebec Inter-university Nursing Intervention Research Group (GRIISIQ); the Quebec Ministry of Education, Recreation and Sports; the Fonds de Recherche du Québec-Santé (FRQS); The Saite Justine Hospital Foundation; the Foundation of Stars and the Gustav Levinschi Foundation.
Chartrand (2017) Canada	To examine the effect of a pre-operative DVD on parental knowledge versus standard care.	parental knowledge	1. participation 2. anxiety 3. children's distress 4. analgesia 5. length of recovery	parent–child dyads (children 3–10 years)	elective ENT outpatient or dental surgery	105	I: after pre-assessment clinic appointment O: in the recovery room until discharge from day surgery.	Study funded by Children's Hospital of Eastern Ontario Research Institute Surgery Associates Research and Development Fund. First author also received scholarships.
Chen (2014) USA	To compare carbon dioxide versus room air insufflation.	discomfort	abdominal girth	adults >18 years	screening colonoscopy	98	I: during colonoscopy O: upon arrival to recovery room, at time of post-anaesthesia recovery (PAR) score of 10 or pre-procedure baseline, when eligible for discharge	No funding received.
Chen (2015) Taiwan	To assess effects of music versus no music on psychophysiological responses	Psycho-physiological parameters (HR, RR, SBP, DBP)	1. pain (VAS) 2. opioid dosage	adults	elective total knee replacement	30	I: pre-operatively; in OR and in PACU O: pre-operatively, in surgical waiting area, in PACU and in post-operative ward	No funding statement.
Chevillon (2015) USA	To evaluate impact of multifaceted pre-operative education versus standard care	post-operative delirium	1. anxiety (STAI) 2. knowledge 3. predictors of delirium 4. days of mechanical ventilation 5. ICU stay (days)	adults	pulmonary thromboendar-ectomy	129	I: one day prior to surgery O: intra-operatively (cardiopulmonary indicators), daily for up to seven days after surgery or until ICU discharge	No funding statement.
Choi (2018) South Korea	To compare durations of bed rest and immobilisation (three groups).	incidence of post-dural puncture headache (PDPH)	backache	adults >18 years	elective orthopaedic knee or hip, or bladder surgery, or haemorrhoidectomy under spinal anaesthesia	138	I: post-surgery O: immediate post-ward transfer then daily for five days	No funding statement.

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Conway (2017) Australia	To assess effectiveness of forced air warming versus usual care (passive warming) for hypothermia prevention.	post-procedure temperature	1. shivering 2. thermal comfort 3. major post-operative complications 4. cardiovascular complications, cardioversion or myocardial infarction	adults >18 years	interventional cardiovascular procedures <30 minutes duration with sedation	140	I: during procedure O: during procedure, post-operatively, at 30 days (complications)	First author awarded an NHMRC Early Career Fellowship. Study funded by St Vincent's Clinic Foundation Multidisciplinary Patient Focussed Research Grant. Equipment provided by Covidien Investigator sponsored Research Program.
Dehghan (2017) Iran	To compare dramatic puppet versus therapeutic play versus usual care.	anxiety	nil	children 6–12 years	appendectomy	75	I: pre-operatively, morning of surgery O: night before surgery, pre-operatively before anaesthesia	Supported by Mashhad University of Medical Sciences.
Deitrick (2015) USA	To compare two doses of IV promethazine (6.25mg versus 12.5mg).	PONV (verbal descriptive scale)	post-operative sedation (institution's internal sedation scale)	adults 18–75 years	ambulatory surgery	120	I: throughout Phase I and Phase II recovery O: throughout Phase I and Phase II recovery	Combined AORN/STTI International Small Grant.
Dickinson (2015) USA	To assess silver impregnated dressings versus dry sterile dressings.	wound healing	infection	Adults	cardiac surgery with sternotomy wound	315	I: incision closure O: five days post-operatively and throughout recovery	No funding statement but dressings donated by manufacturers.
Duparc-Alegria (2018) France	To assess impact of short hypnotic session versus usual care.	post-operative pain (VAS)	1. anxiety level 2. total morphine consumption	children 10–18 years	routine major orthopaedic surgery	119	I: just prior to surgery O: 24 hours post-operatively	Funded by Ministry of Health grant and sponsored by Assistance-Publique-Hôpitaux de Paris-Direction Recherche Clinique et du Développement.
Erdling (2015) Sweden	To compare oesophageal and nasopharyngeal temperature in patients receiving prewarming versus no prewarming.	difference in temperature change between devices and warming groups	effect of prewarming, age and Body Mass Index (BMI) upon measured temperatures (two devices)	adults	elective open colorectal surgery under combined anaesthesia	53	I: pre-operatively (prewarming) or intra-operatively O: before epidural, after test dose, anaesthesia start and then at 30 minute intervals	No funding statement.
Ertug (2017) Turkey	To compare nature sounds versus relaxation exercises versus no intervention.	anxiety	nil	adults >18 years	elective surgery (under GA)	159	I: day of surgery O: day of surgery, recruitment, after intervention, 30 minutes post-intervention	No funding statement.

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Fetzer (2018) USA	To assess effectiveness of pre-emptive pre-operative belladonna and opium suppository versus routine care.	post-operative bladder comfort (bladder urgency via five-point Likert scale and pain via 0–10 VAS)	1. narcotic requirements 2. LOS	adults	ureteroscopy	50	I: after anaesthesia induction and before insertion of surgical scope O: during PACU at every 15 minutes until discharge, outpatient discharge	One author funded by Vermont/New Hampshire Association of Perianaesthesia Nurses for cost of study medication.
Franzoi (2016) Brazil	To compare listening to music versus usual care (toys and television).	anxiety	1. HR 2. SBP 3. DBP 4. RR 5. oxygen saturation	children 3–12 years	elective surgery under GA	52	I: day of surgery O: 15 minutes post-intervention	No funding statement.
Fuganti (2018) Brazil	To evaluate effect of prewarming versus usual care (cotton blankets) on body temperature.	tympanic temperature	1. air temperature in OR 2. humidity OR	adults >18 years	elective gynaecological surgery	86	I: pre-operatively O: after prewarming and at 30 minute intervals until end of surgery	No funding statement.
Garcia (2018) Brazil	To compare therapeutic listening versus standard care.	anxiety	1. surgical fears 2. salivary cortisol 3. HR 4. RR 5. SBP 6. DBP	adults >18 years	surgery for colorectal cancer	50	I: day of surgery O: pre-intervention at 2.5 hours, then 1 hour post-procedure	Supported by Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq), Brazil, grant.
Gomez-Urquiza (2016) Spain	To compare projection of photos versus photos and music versus usual care	anxiety	1. HR 2. RR 3. DBP 4. SBP	adults 25–50 years	ENT surgery	180	I: day of surgery O: pre-operatively from 45 to 120 minutes prior to surgery	No funding received.
Gross (2016) USA	To assess outcomes after three different dressing practices.	air leak	1. patient comfort 2. skin integrity at incision site	adults >18 years	patients with chest drains	64	I: following insertion of chest tube in OR O: upon post-operative arrival to trauma centre and then daily up until a maximum of five days	No funding statement.
Groton (2015) USA	To evaluate effectiveness, tolerability and cost of three bowel preparations (three groups).	effectiveness of bowel preparation	1. tolerability 2. cost	adults >18 years	outpatient colonoscopy	276	I: prior to colonoscopy O: during colonoscopy, post-procedure and at follow-up clinic	No funding received.
Ham (2017) South Korea	To assess saline solution replacement versus not changing saline solution.	colony forming units (CFU)	nil	adults >18 years	colectomy for colon cancer	52	I: intra-operatively after colon removal (intervention) O: 48 hours post collection	Funded by Konkuk University GLOCAL Campus, Republic of Korea.

First author (year), country	Primary aim	Primary outcome	Secondary outcome/s	Participant age	Surgical population	Total sample size (n)	Timing of intervention (I) and timing of outcome (O)	Funding
Handan (2018) Turkey	To assess impact of music during caesarean delivery versus usual care.	Anxiety (VAS)	1. body temperature 2. oxygen saturation 3. RR 4. HR 5. SBP 6. DBP	females	caesarean delivery for multiple births	60	I: during surgery O: at the end of surgery	Supported by the Scientific Research Project Fund of Karamanoglu Mehmetbey University.
He (2015) Singapore	To assess therapeutic care versus standard care (plus information pamphlet).	anxiety	1. negative emotional manifestation 2. post-operative pain	children 6–14 years	inpatient elective surgery	95	I: three to seven days prior to surgery O: baseline, day of surgery, 24 hours post-surgery	Funded by the National Medical Research Council New Investigator Grant, Ministry of Health, Singapore.
Hoffman (2017) USA	To assess efficacy of P6 acupressure versus placebo	PONV incidence	N/A	adults	planned ambulatory surgery; high risk for PONV	110	I: pre-operatively: 30-60 minutes pre-induction O: three recovery phases – Phase 1 (PACU), Phase 2 (pre-discharge), Phase 3 (24 hours post-discharge)	No funding statement.
Kapritsou (2018) Greece	To compare fast-track conventional recovery protocols.	LOS	1. readmission rates 2. complications 3. pain (VAS)	adults 30–82 years	hepatectomy	62	I: immediately after surgery O: point of discharge	No funding received.
Karunakaran (2016) India	To assess video-assisted learning versus usual care.	knowledge	1. anxiety (STAI) 2. physiological and behavioural responses 3. relationship between knowledge, anxiety and physiological responses	adults	gastroscopy	72	I: pre-procedure O: 30 minutes prior to procedure	College of Nursing, Christian Medical College, Vellore, Tamil Nadu.
Kelly (2017) USA	To assess effectiveness of folded and rolled dry cotton blankets warmed in 130°F or 200°F cabinets.	skin temperature	1. thermal comfort 2. safety	adults >18 years	hospital volunteers or employees (healthy volunteers)	20	I: in-vitro (in perioperative setting) O: at regular intervals up to 40 minutes after blanket application	No funding statement.
Klintworth (clinical trial protocol) USA	To examine the use of 2% chlorhexidine gluconate cloths pre-operatively and daily post-operatively versus standard care.	surgical site infection	1. serious adverse events 2. mortality	adults >18 years	colorectal surgery	163	I: pre- and post-operatively up to four days O: up to 30 days post-operatively	No funding statement.
Koenen (2017) Australia	To compare reflective blankets versus cotton blankets for reduction of core-periphery heat gradient.	pre-operative change in foot temperature	1. normothermia on arrival to PACU 2. proportion of patients requesting additional warmed blankets	adults	elective surgery more than one hour duration	328	I: pre-operative holding bay O: on admission and then at regular intervals until before discharge from PACU	Supported by the NSW Health Education and Training Institute (Rural Research Capacity Building Program).

First author (year), country	Primary aim	Primary outcome	Secondary outcome/s	Participant age	Surgical population	Total sample size (n)	Timing of intervention (I) and timing of outcome (O)	Funding
Kose (2016) Turkey	To assess different hair shaving practices.	surgical site infection	body image	adults	elective cranial surgery	200	I: pre-operatively in OR O: Post-operatively – first, third, fourth, seventh and tenth days	Funded by Gulhane Military Medical Academy Scientific Research Council.
Kurtovic (2017) Croatia	To compare post-operative analgaesic efficacy of intermittent versus PCA paracetamol.	Post-operative analgaesic efficacy	nil	adults 27–80 years	elective lumbar discectomy of intervertebral disc extrusion at L4-L5	56	I: in OR on completion of surgery to 48 hours post-operatively every six hours O: In OR on completion of surgery to 48 hours post-operatively	No funding statement.
Lee (2015) Taiwan	To compare post-operative heat-preserving gown versus cotton cloths to reduce duration of hypothermia.	hypothermia duration	1. cost effectiveness 2. thermal comfort	adults	post-spinal surgery (in PACU)	100	I: PACU O: post-operatively: on admission to PACU until normothermia achieved	No funding statement.
Lee (2018) Taiwan	To assess nurse-delivered education with video versus standard care	anxiety (STAI and cortisol levels)	pain	adults ≤ 20 years	lumbar spinal surgery	86	I: day before surgery O: day before surgery; 30 minutes pre-surgery, day after surgery	No funding statement.
Li (2014) Hong Kong	To assess therapeutic play with dolls versus standard care (pre-operative preparation).	anxiety (STAIC)	1. parental anxiety 2. satisfaction (child and parental)	children 7–12 years	elective surgery	108	I: day of surgery O: before and after intervention, post procedure	Supported by the Health and Health Services Research Fund, Food and Health Bureau, Hong Kong SAR Government.
Liguori (2016) Italy	To examine Clickamico app with clown doctors versus standard care (brochure).	pre-operative anxiety (mYPAS)	nil	children 7–12 years	elective surgery	40	I: night prior to procedure O: afternoon before surgery, day of surgery (on transfer)	Funded by the Department of Health Sciences at the University of Florence, the Meyer Children's Hospital, and the Meyer Foundation.
LoRusso (2018) USA	To evaluate blood glucose levels of Type II diabetic patients with use of etomidate versus propofol for induction of anaesthesia.	perioperative blood glucose	nil	adults	patients with Type II diabetes undergoing surgery	18	I: at induction O: at induction and following emergence from anaesthesia	No funding statement.
Lynch (2015) USA	To compare room air versus carbon dioxide insufflation	pain intra-procedure and anaesthetically (non-verbal and verbal pain scale)	1. length of recovery 2. nursing tasks and time	adults	routine screening or surveillance colonoscopy under moderate sedation	191	I: during procedure O: during and post-procedure	No funding received..
Ma (2015) China	To assess three perineal disinfection solutions.	pre-operative bacterial count	nil	adults or children	urethral opening surgery		I: five times a day O: one and two days post-procedure	No funding statement.
Martin (2014) USA	To examine the impact of therapeutic suggestion under anaesthesia.	LOS	1. anxiety (VAS and CRA scale) 2. pain (FLACC and Wong–Baker FACES pain rating scale) 3. intravenous morphine dosage 4. PONV 5. emergence delirium 6. implicit memory	children 4–8 years and self-identified primary caregiver	non-coblation tonsillectomy or adenotonsillectomy	94 child–care-giver pairs	I: completion of surgery until readiness to wake up in PACU O: post-operatively (PACU)	Funded by ASPAN grant, and an XTO Energy Clinical Scholars Grant.

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McClurkin (2016) USA	To assess impact of self-selected music versus music versus no music (usual care).	anxiety (STAI)	1. patient satisfaction 2. relationship between STAI and NVAAS	adults 18–75 years	day surgery (multiple specialities)	133	I: pre-operatively O: afternoon prior to surgery, day of surgery (on transfer)	Funded by Baylor St. Luke's Nursing Research Council and the Friends of Nursing.
Mirbagher (2016) Iran	To assess effects of mentoring versus usual learning activities.	clinical perioperative competence	nil	adults	OR students	60	I: over 15 months O: before and after intervention	No funding statement.
Molloy (2016) USA	To compare preventative use of dorzolamide-timolol ophthalmic solution with balanced salt solution.	intraocular pressure	time effects	adults	patients scheduled for prolonged steep Trendelenburg procedures	90	I: following induction of anaesthesia O: baseline, then every 30 minutes during surgery	No funding statement.
Mousavi (2018) Iran	To assess supportive educational nurse-led interventions versus standard care	anxiety (STAI)	sleep (GSQS)	adults	Elective coronary artery bypass graft (CABG) surgery	160	I: one and two days prior to surgery O: day of admission, night before surgery	Funded by Tehran University of Medical Sciences.
Munday (2018) Australia	To compare pre-operative warming plus IV fluid warming versus usual care including IV fluid warming.	perioperative heat loss	1. hypothermia 2. maternal thermal comfort 3. MAP 4. shivering 5. agreement between temperature devices 6. neonatal temperature 7. Apgar score	women >18 years	women undergoing elective Caesarean delivery with intrathecal morphine	50	I: pre-operatively O: post-operatively up to discharge	Funding by Perioperative Nurses Association of Queensland (PNAQ).
Nieh (2018) Taiwan	To assess efficacy of forced air warming versus passive insulation on rewarming.	rewarming	thermal comfort	adults >20 years	laparoscopic thoracic or abdominal surgery over one hour anaesthesia	127	I: during anaesthesia until PACU discharge O: every 30 minutes intra-operatively and in PACU until normothermia achieved	Taichung Veterans General Hospital, Republic of China.
Nilsson (2014) Sweden	To assess effectiveness of P6 acupressure (with Sea-Band) versus placebo on post-operative nausea.	post-operative nausea	frequency of vomiting	adults >18 years	elective infratentorial or supratentorial craniotomy	120	I: applied at the end of surgery O: on arrival to PACU; then at specified intervals until 48 hours post-operatively	Devices partly provided by SeaBand Ltd, remainder provided by Department of Neurosurgery of Umeå University Hospital. Study supported by hospital's research foundation.
Notte (2016) USA	To measure effect of Reiki versus usual care on perceived pain.	perceived pain	1. post-operative analgesic consumption 2. satisfaction with Reiki 3. satisfaction with hospital experience	adults 18–30 years	total knee arthroplasty (TKA)	43	I: after admission, after admission to PACU, daily for three post-operative days O: before and after each treatment or at each participant–nurse encounter	Funded by Sharpe/Strumia Research Foundation of Bryn Mawr Hospital.
Oh (2017) Korea	To compare effects of transcutaneous electrical nerve stimulation relief band with wrist band with acupressure on Nei-Guan acupuncture point.	PONV (Rhodes Index of Nausea, Vomiting and Retching)	frequency of patient-requested anti-emetics	adult females 16–65 years	gynaecology surgery under general anaesthesia with PCA	54	I: prior to anaesthesia O: at 0–24 hours after PACU discharge	No funding received.
Oliveira (2016) Brazil	To assess pre-operative orientation video versus usual care.	patient knowledge	nil	adults >18 years	cardiac surgery	90	I: approximately 72 hours prior to surgery O: Post-intervention	Funded by Fundo de Apio à Pesquisa do Instituto de Cardiologia (FAPIC).
Ozlu (2018) Turkey	To assess the effect of cold application versus no cold application on pain and bleeding	pain	bleeding	adults >18 years	septoplasty to correct deviated septum	60	I: in ENT clinic for 15 minutes prior to surgery O: post-operatively at regular intervals up to 24 hours	No funding received.
Palese (2015) Italy	To assess post-operative shampooing versus no shampooing.	comfort	1. surgical site contamination (CFU) 2. surgical site infection	adults >18 years	elective craniotomy	53	I: post-procedure O: 30 days post-surgery	No funding statement.

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Paris (2014) USA	To examine effect of various warming methods on maternal body temperature during Caesarean delivery.	maternal core body temperature	1. maternal hypothermia 2. estimated blood loss 3. post-operative pain 4. rescue blanket use 5. maternal shivering 6. maternal–newborn bonding 7. first axillary newborn temperature 8. cord pH 9. Apgar scores (one and five minutes)	women	elective, singleton Caesarean delivery	226	I: pre-operatively until two hours post-delivery O: pre-operatively through to fourth postpartum hour.	Medline Industries donated the warming pad and temperature sensing Foley catheters.
Piredda (2016) Italy	To evaluate effectiveness of information booklet alone or with clarification questions versus standard care (three groups).	short- and long-term knowledge regarding totally implantable access ports (TIAPs)	physiological indicators of anxiety	adults >18 years	patients diagnosed with cancer, admitted to day surgery for insertion of TIAP	105	I: In day surgery waiting room O: before TIAP implantation, in waiting room, at three months	Funded by Center of Excellence of Nursing Research and Culture, Nursing Professional Board of Rome.
Pool (2015) USA	To assess raising head of bed to 15 degrees versus keeping flat.	patient comfort: pain (VAS)	nil	adults	cardiac angiography	71	I: post-procedure O: before procedure, every 15 minutes post-procedure	No funding statement.
Pu (2014) China	To assess feasibility and efficacy of intra-operative underbody warming vs passive warming.	intra-operative hypothermia	1. temperature decline (via nasopharyngeal temperature) 2. prothrombin time 3. activated partial thromboplastin time 4. thrombin time 5. complications: in OR and post-operatively 6. shivering 7. pain (VAS)	adults >18 years	open and laparoscopic surgery for gastrointestinal tumours	110	I: intra-operatively O (primary): from anaesthesia induction, every 20 minutes until end of procedure O (secondary): in OR, end of anaesthesia, post-operative day 1	Funded by the Science and Technology Commission of Shanghai Jiao Tong University.
Qvarfordh (2014) Denmark	To assess mobilisation shortly after lumbar disc surgery versus wheeling from PACU to ward.	feasibility	1. safety 2. wellbeing (Bournemouth questionnaire)	adults >18 years	elective lumbar discectomy	22	I: one hour post-operatively O: one hour post-operatively	Funded by Glostrup Hospital, the Capital Region of Denmark.
Reynolds (2015) Australia	To assess BPU, SSD and TA versus usual care.	feasibility	1. peripheral arterial catheter failure 2. dislodgement 3. occlusion 4. phlebitis 5. infection: local or CRBSI	adults >18 years	surgical patients booked for post-operative ICU	123	I: operating theatre O: on insertion of arterial catheter in OR, daily in ICU, on ICU discharge	Funding provided for products by the Alliance for Vascular Access Teaching and Research Group (AVATAR) at Griffith University.
Razera (2016) Brazil	To assess use of educational video versus usual care.	knowledge of informal caregivers	nil	Unclear: caregivers of children	informal caregivers of children undergoing primary cheiloplasty and/or palatoplasty	80	I: post-operatively, on day of discharge (24 hours post-surgery) O: peri- and post-operatively on discharge	PhD scholarship funding by Fundação de Amparo à Pesquisa do Estado de São Paulo (FAPESP).
Rhodes (2015) USA	To assess effect of pre-operative education and orientation versus no education and orientation.	anxiety	1. caregiver anxiety 2. LOS 3. morphine equivalent use 4. patient/caregiver satisfaction	children 11–21 years	posterior spinal fusion (PSF) surgery	65	I: pre-operative O: two weeks pre-operatively, immediately prior to surgery, during surgery, post-operative day 2, on discharge	No funding statement.
Sáenz-Jalón (2017) Spain	To assess the limb occlusion pressure technique versus standard pneumatic ischemia technique.	arterial blood pressure	1. ischemia time 2. anaesthetic incidents: pain, administration of opiates 3. surgical incidents: interruptions to procedure, bleeding 4. LOS	adults	upper limb surgery requiring surgical ischemia and locoregional anaesthesia	160	I: intra-operative O: intra-operatively and post-operatively (LOS)	Funded by Premio Nacional de Investigación de Enfermería Valdecill a del año 2012.

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Sahin (2018) Turkey	To evaluate acupressure versus placebo application on P6 acupoint.	PONV	1. post-operative pain severity 2. analgesic drug requirement 3. anxiety 4. patient feedback	adults (females)	laparoscopic cholecystectomy		I: one hour prior to surgery O: At two, six and 24 hours post-operatively	No funding received.
Salomon (2018) USA	To assess pre-operative telephone communication by nurse anaesthetist versus standard care (face-to-face on morning of surgery).	anxiety (APAIS, STAI Y-1)	nil	adults	office-based anaesthesia for urological procedures	41	I: pre-operative – night before surgery (intervention), day of surgery (control) O: pre- and post-operatively	No funding statement.
Simeone (2017) Italy	To evaluate the efficacy of a nursing educational intervention.	parental anxiety (STAI)	nil	adults	parents of children undergoing cardiac surgery for interventricular defect for the first time	96	I: pre-operatively O: unclear (stated pre- and post-operatively)	No funding statement.
Sites (2014) USA	To evaluate controlled breathing with peppermint aromatherapy versus controlled breathing alone for PONV relief.	PONV	administration of post-operative anti-emetics	adults >18 years	elective laparoscopic, ENT, orthopaedic or urological day surgery under GA with intubation	330	I: upon initial report of PONV in PACU or day surgery O: post-operatively in PACU or day surgery	No funding statement.
Stallings-Welden (2018) USA	To examine effectiveness of aromatherapy with standard care for PONV.	PONV	1. post discharge nausea and vomiting (PDNV) 2. risk factors for PONV	adults >18 years	ambulatory surgical patients	221	I: post-operatively and through discharge O: post-operatively and after discharge	No funding statement.
Stewart (2018) USA	To compare tablet-based interactive distraction with oral midazolam.	pre-operative anxiety (m YPAS-SF)	1. emergence delirium 2. PACU LOS 3. caregiver anxiety (seven-point Likert) 4. caregiver satisfaction (seven-point Likert)	children 4–12 years and caregivers	outpatient surgery	102 patients (and 102 care-givers)	I: pre-induction O: on admission, parental separation, mask induction and then on emergence	Funded by West Coast University.
Su (2018) Taiwan	To assess efficacy of forced air warming versus passive insulation.	perioperative hypothermia	1. shivering 2. pain 3. blood loss 4. adverse cardiac events	adults >20 years	laparoscopic thoracic or abdominal surgery	124	I: during anaesthesia, intra-operatively until end of PACU O: every 30 minutes intra-operatively and in PACU until normothermia achieved	Taichung Veterans General Hospital, Republic of China.
Tsai (2017) Taiwan	To assess effectiveness of three antiseptic handwashing methods amongst surgical staff.	CFU counts	time for hand cleansing	adults	practicing surgeons and scrub nurses with experience of conventional surgical and waterless hand rub OR protocols		I: immediately pre-operatively O: before and after surgical hand disinfection, immediately after operation	Funded by Taipei Medical University, Shuang Ho Hospital.
Ugras (2018) Turkey	To assess different types of music versus no music (three groups).	pre-operative anxiety (STAI)	1. SBP 2. DBP 3. HR 4. cortisol levels	adults	surgical otorhinolaryngology patients	180	I: music for 30 minutes pre-procedure O: at completion of intervention	No funding received.
Ullan (2014) Spain	To assess effect of play versus usual care	post-surgical pain (FLACC)	nil	children 1–7 years	elective surgery	95	I: during hospital stay O: each hour post-operatively, commencing when consciousness regained	Funded by The Council of Education of the Junta of Castilla and Leon Spain, and the Spanish Ministry of Education.
Unulu (2018) Turkey	To assess effectiveness of P6 acupuncture.	nausea intensity	1. patient information 2. anxiety 3. perianesthesia comfort 4. general comfort	adults	gynaecologic (not obstetric) surgery		I: within 12 hours after procedure O: post-operatively (0–2, 2–6, 6–12, 12–24 and 24–48 hours)	No funding statement.

First author (year), country	Primary aim	Primary outcome	Secondary outcome/s	Participant age	Surgical population	Total sample size (n)	Timing of intervention (I) and timing of outcome (O)	Funding
Webster (2014) Australia	To assess consumption of carbohydrate fluids versus usual care	Time to readiness to discharge	1. time to first flatus 2. time to first bowel movement 3. mortality (from any cause during trial) 4. adverse outcomes	adults >18 years	elective bowel surgery	46	I: from 19.00 the night prior to surgery O: post-operatively	No funding statement.
Wilson (2016) Canada	To assess individualised education prevention.	nausea	1. pain 2. analgesic and anti-emetic administration	adults	total knee replacement surgery		I: pre-operatively O: post-operatively day 3	Partially funded by the Kingston General Hospital Women's Auxiliary Millennium Fund.
Wistrand (2016) Sweden	To compare preheated and room temperature skin disinfectant solution.	skin temperature	patients' experience	adults >18 years	patients undergoing pacemaker, implantable cardioverter-defibrillator or cardiac resynchronisation therapy under local anaesthesia	220	I: OR (immediately prior to procedure) O: Before and after skin disinfection (in OR)	Funded by research council of Örebro County Council.
Wu (2019) China	To assess safety and feasibility of early oral hydration in the PACU.	PONV	1. thirst 2. incidence of oropharyngeal discomfort 3. patient satisfaction	adults	elective laparoscopic cholecystectomy	1735	I: post-operatively (PACU) O: post-operatively up to day 1	Funded by the Sichuan Provincial Health Department.
Zaman (2018) Iran	To assess effect of warm versus room temperature IV fluids.	shivering	1. core temperature 2. oxygen saturation 3. vital signs	adults	elective abdominal surgery	70	I: intra-operatively O: post-operatively – on admission to PACU and at 30 minutes in PACU	No funding statement.

Abbreviations: AF = atrial fibrillation; APAIS = Amsterdam Preoperative Anxiety and Information Scale; AORN = Association of periOperative Registered Nurses; ASA I–II = American Society of Anesthesiologists classification normal healthy patients to patients with mild systemic disease; ASPAN = American Society of PeriAnesthesia Nurses; BPU = Bordered Polyurethane; CFU = colony forming unit; CRA scale = Child Rating of Anxiety scale; CRBSI = Catheter-related bloodstream infection; DBP = diastolic blood pressure; ENT = ear, nose and throat; FLACC = Faces, Legs, Activity, Cry, Consolability scale; GA = general anaesthetic; GSQS = Groningen's Sleep Quality Scale; HR = heart rate; ICU = intensive care unit; IV = intravenous; LOS = length of stay; MAP = mean arterial pressure; mYPAS = modified Yale Preoperative Anxiety Scale; mYPAS-SF = modified Yale Preoperative Anxiety Scale Short Form; NHMRC = National Health and Medical Research Council; NRS = numeric rating scale; NVAAS = Numerical Visual Analog Anxiety Scale; OR = operating room; P6 = pericardium acupuncture point; PACU = Post Anaesthesia Care Unit; PCA = patient-controlled analgesia; PONV = post-operative nausea and vomiting; RR = respiratory rate; SBP = systolic blood pressure; SSD = sutureless securement device; STAI = State-Trait Anxiety Inventory; STAIC = State-Trait Anxiety Inventory for Children; STAI-Y = State-Trait Anxiety Inventory (Form Y); STTI = Sigma Theta Tau International; TA = tissue adhesive; UAE = United Arab Emirates; USA = United States of America; VAS = Visual Analog Scale