MASTER OF SCIENCE BY RESEARCH

Preoperative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk
a systematic review

Badger, Claire Louise

Award date:
2018

Awarding institution:
Coventry University

Preoperative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review

By

Claire Badger

MScR

May 2018

Preoperative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review

By

Claire Badger

May 2018

A thesis submitted in partial fulfilment of the University's requirements for the Master of Research

Certificate of Ethical Approval

Applicant:

Claire Badger

Project Title:

Pre-Operative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review protocol

This is to certify that the above named applicant has completed the Coventry University Ethical Approval process and their project has been confirmed and approved as Low Risk

Date of approval:

15 February 2017

Project Reference Number:

P48546

Table of Contents

Acknowledgements 7

Glossary 8

Abbreviations 12

Abstract 14

Background 14

Aims: 14

Methods: 14

Results: 14

Conclusion: 15

Chapter 1-Introduction 16

1.1 Background 16

1.2 Description of the high-risk population 17

1.3 Preoperative Assessment Service Context 19

1.4 Justification 20

1.5 Types of psychological interventions 21

1.6 Description of the outcomes 26

1.7 Existing knowledge and gaps 27

1.8 Review title 27

1.9 Research objectives 27

1.10 Chapter summary 28

Chapter 2 - Methodology 29

2.1 Research philosophy 29

2.2 Protocol and registration 30

2.3 Ethics and governance 30

2.4 Search strategy 30

2.4.1 Eligibility criteria 30

2.4.2 Information sources 33

2.4.3 Search terms 34

2.5 Data management 35

2.6 Selection process 35

2.7 Data extraction 36

2.7.1 Data items 37

2.7.2 Dealing with missing data 38

2.8 Assessment of Risk of Bias (ROB) in included studies 39
2.9 Data Synthesis 40
2.10 Quality Assessment 40
2.11 Chapter summary 41
Chapter 3-Results 42
3.1 Results of the search 42
3.2 Included studies 46
3.3 Risk of bias in included studies 48
3.3.1 Random sequence generation 48
3.3.2 Allocation 48
3.3.3 Blinding 49
3.3.4 Incomplete data outcome 49
3.3.5 Selective reporting 49
3.3.6 Other potential forms of bias 52
3.4 Findings by outcome 52
3.4.1 Primary outcome-behavioural recovery 53
3.4.1.1 Studies included in meta-analysis 53
3.4.1.2 Studies not included in meta-analysis 54
3.4.2 Secondary outcome -QOL 55
3.4.2.1 Studies included in meta-analysis 55
3.4.2.2 Studies not included in meta-analysis 55
3.5 Chapter summary 58
Chapter 4 -Discussion 60
4.1 Summary by outcome 60
4.1.1 Behavioural recovery 60
4.1.2 QOL 60
4.2 Findings in relation to other studies and reviews 61
4.3 Study strengths and limitations 64
4.4 Quality of the evidence 66
4.5 Implications for practice and research 67
4.6 Further research 69
4.7 Conclusions 69

Sources of support……70

References……71

List of figures

Fig.1. Study flow diagram……45

Fig. 2. Risk of bias' graph: review authors' judgements about each ROB item presented as percentages across all included studies……51

Fig.3. Analysis 1 behavioural recovery (any psychological intervention versus control)……53

Fig.4. Analysis 2 QOL (any psychological intervention versus control)……55

List of tables

Table.1. Search Terms……34

Table.2. Inclusion and Exclusion criteria……36

Table.3. Data Items……37

Table 4. Risk of bias' summary: review authors' judgements about each ROB item for each included study……50

Acknowledgements

The completion of this study was made possible by a Health Education England/National Institute for Health Research (HEE/NIHR) award. The views expressed are those of the author.

To my supervisory team, Professor Katherine Brown (Director of Studies) and Dr Alison Day for your immense support, encouragement and knowledge.

To my Mum, the main inspiration for my interest in this research topic and because you were ‘unable’ to make my first Master’s graduation ceremony.

To my Dad, Bestie and other wonderful friends for always believing I could achieve this goal even when I had doubts.

Glossary

Active hepatitis – inflammation of the liver caused by viruses, toxic substances, autoimmune disease, metabolic disease or the excess deposition of fat

Acute Coronary Syndromes – a combination of angina (unstable or stable), NSTEMI (non-ST elevation myocardial infarction or heart attack and STEMI (ST elevation myocardial infarction or heart attack). The ST segment is the portion of the electrocardiograph from the end of the S wave (downward deflection representing depolarisation of the purkinje fibres) to the beginning of the T wave (representing recovery of the ventricles) in a normal heart rhythm. In a STEMI, treatments attempt to restore blood flow to the heart and include an intervention in which the arteries are pushed open and may be stented or where the blockage is removed using medications. People who have a NSTEMI are often managed with the blood thinner, with the additional use of an intervention in those at high risk.

Acute Renal Failure – the sudden loss of the kidneys filtering ability causing accumulation of electrolytes and waste in the body

Alcohol dependence or abuse – a strong, often uncontrollable desire to drink alcohol or a pattern of drinking excessive alcohol too often such that sudden deprivation may cause withdrawal symptoms

ASA classification – a physical status classification system for assessing the fitness of patients and anaesthetic risk before surgery

Blood Pressure – the pressure of circulating blood on the walls of the main arteries. Normal range is more than 90/60mmHg and less than 120/80mmHg

Cardiac Output – the amount of blood pumped out of the heart per minute

Cardio-Pulmonary Exercise Testing – a form of exercise testing on a fixed exercise bicycle to assess functional exercise capacity

Cardiovascular disease – conditions that affects the heart or narrow or block its blood vessels

Cerebrovascular Accident – medical term for a stroke; blood flow to part of the brain is stopped by a blockage or a burst blood vessel

Chronic Obstructive Pulmonary Disease – a disease of adults especially those over 45 years characterised by damage to the lung and poor air flow

Coagulability – capability of being coagulated or clotted

Cognitive decline – reduction of cognitive abilities including memory and thinking skills

Coronary Artery/Heart Disease – build-up of a waxy plaque inside the arteries which supply blood to the heart

Coronary artery stents -a tube shaped device placed in the hearts arteries to keep them open and the blood flow patent through them

Diabetes Mellitus – a disorder of carbohydrate metabolism leading to an abnormally high blood sugar level

Dialysis – the process of removing excess waste and water from the blood when a person's kidneys have lost the ability to do this

Elective surgery – a procedure scheduled in advance because it does not involve a medical emergency

Electrocardiogram – tracing of the electrical activity of the heart; heart rhythm

End Stage Renal Dysfunction – the final stage of long term kidney disease

Frailty – a state related to the ageing process in which several issues or problems across body systems have an impact on health, confidence and well-being

Gastrointestinal – relating to the stomach and the intestines

General Anaesthetic – drug(s) that can bring about a reversible, controlled state of loss of consciousness

Gynaecological – relating to the branch of physiology and medicine which deals with the functions and diseases of women and girls, particularly those affecting the female reproductive system

Health Related Quality of Life – a concept that includes domains related to physical, mental, emotional and social functioning and the impact they have on quality of life

Heart murmur – an extra or unusual sound heard when listening to the heart with a stethoscope caused by turbulent blood flow within the heart or blood vessels due to damaged valves, narrowed arteries or abnormal heart structure

Hypertension – high blood pressure

Hypovolaemia – a decrease in the volume of circulating blood

Implanted pacemaker – a small electrical device placed in the chest which sends electrical impulses to stimulate the heart muscle

Intraoperative – denoting the period during surgery

Ischaemia – inadequate blood flow to a part of the body caused by constriction or blockage of the blood vessels supplying it

Left Ventricle – the left lower chamber of the heart with a thick muscular wall which pumps blood out of the heart

Left Ventricular Ejection Fraction – the amount of blood pumped out of the heart with each heartbeat

Local Anaesthetic – drug that causes a reversible absence of pain sensation in a small area of the body

Lumbar – relating to the lower part of the back

Morbid obesity – a serious health condition where an individual has a Body Mass Index > 40 and experiences obesity related health conditions

Morbidity – the state of being ill or of having disease

Mortality - death

Myocardial Infarction – heart attack; the death of a segment of heart muscle which follows interruption of its blood supply

Obstructive Sleep Apnoea – a serious condition in which airflow from the nose and mouth to the lungs is restricted during sleep on more than 5 occasions during one hour of sleep

Oxygen debt - a temporary oxygen shortage in the body tissues

Paediatric – the general medicine of childhood

Percutaneous Coronary Angiography – a procedure in which a catheter tube and contrast dye is inserted into the coronary arteries to look for narrowing or blockages

Perioperative – denoting the period that extends from the day before to the first few days after surgery

Physiological – the normal function of a living being

Pneumonia – inflammation of the lung caused by bacteria, in which the air sacs become filled with inflammatory cells and the lung becomes solid

Postoperative – following surgery; referring to the condition of a patient or the treatment at this time

Preoperative – before operation; referring to the condition of a patient or to treatment given at this time

Regional Anaesthetic – use of local anaesthetics to block sensations of pain in a large area of the body, such as an arm, leg or the abdomen e.g. epidural, spinal, peripheral nerve block

Respiratory disease – conditions of the airways and/or lungs that affect breathing

Respiratory failure – inadequate exchange of gases by the respiratory system, meaning that oxygen, carbon dioxide or both cannot be kept at normal levels in the blood

Respiratory Function Test – a test which measures how well a person is able to breathe and how well their lungs work

The Physiology and Operative Severity Score for Enumeration of Mortality and Morbidity– a severity scoring tool which provides prediction of general surgical patients' risk of morbidity and mortality

The Portsmouth Physiology and Operative Severity Score for Enumeration of Mortality – a modified version of POSSUM

Trans-Ischaemic Attack – the result of temporary disruption of the circulation to part of the brain due to a clot, blockage of the brains arteries with a particle or particles or spasm of the vessel walls

Vasoconstriction – decrease in the diameter of blood vessels, especially arteries

Source of all glossary terms: Martin (2015)

Abbreviations

AAGBI - The Association of Anaesthetists of Great Britain and Ireland

ASA – American Society of Anestheologists

BMI – Body Mass Index

BP- Blood Pressure

CABG – Coronary Artery Bypass Grafts

CB – Claire Badger

CBT - Cognitive Behavioural Therapy

CD - Compact Disc

CPEX – Cardio-pulmonary Exercise Testing

DM – Diabetes Mellitus

ECG – Electrocardiogram

EPOC - Effective Practice and Organisation of Care Review Group

GA – General Anaesthetic

GP- General Practitioner

h/o – History of

HNC- Head and neck cancer

HRQoL – Health Related Quality of Life

Kg - Kilogram

LA – Local Anaesthetic

LOS – Length Of Stay

m2 – Square Meter

NHS – National Health Service

NICE – National Institute Clinical Excellence

PICO – Patient Population or Problem, Intervention, Comparison, Control or Comparator, Outcome

POA – Preoperative Assessment

POSSUM - The Physiology and Operative Severity Score for Enumeration of Mortality and Morbidity

PPI – Patient Public Involvement

P-POSSUM - Portsmouth POSSUM

PRISMA – Preferred Reporting Items for Systematic Reviews and Meta-Analyses

PROSPERO - International Prospective Register of Systematic Reviews

RB – Ruth Benson

RCOA - Royal College of Anaesthetists

RCT - Randomised Controlled Trial

RFT – Respiratory Function Test

ROB – Risk Of Bias

QoL – Quality of Life

TKR – Total Knee Replacement

UHCW – University Hospitals of Coventry and Warwickshire NHS Trust

UK – United Kingdom

WHO – World Health Organisation

Abstract

Background**:** In the United Kingdom high anaesthetic risk surgical patients (those pre-disposed to complications because of for example, pre-existing conditions), have increased chance of irreversible disability or death; accounting for 80% of perioperative mortality (Pearse, Holt and Grocott 2011). Psychological preparation for surgery under General Anaesthetic (GA) can improve postoperative outcomes in a general population (Johnston and Vogele 1993; Powell, Scott, Manyande et al. 2016). Powell, Scott, Manyande et al. (2016) suggested benefit on postoperative pain, negative affect, length of stay (LOS) and behavioural recovery. However, psychological optimisation by Preoperative Assessment Services remains outside usual care and to date no systematic review has been undertaken relating to high-risk GA patients. Arguably, the best indicators of postoperative recovery for this high-risk group are behavioural recovery and quality of life (QoL).

Aims:

1. To assess whether preoperative psychological interventions are effective for improving behavioural recovery outcomes for high-risk anaesthetic patients, compared to standard care alone?

2. To assess whether preoperative psychological interventions, are effective at maintaining or improving QoL at one-month or more post-surgery compared to standard care alone?

Methods: Twelve databases were searched up to November 2017. Published Randomized Controlled Trials of adults undergoing elective surgery were included if outcomes were examined one-month to one-year postoperatively. Reference lists and forward citation searching followed. No language or date restrictions were imposed. Findings were pooled using continuous: d (hedges g) outcome type, and narrative synthesis was undertaken where meta-analysis was unsuitable. Eppi-reviewer4 software was used to manage the review (EPPI-Centre 2017).

Results: Eleven papers (n=1272) met eligibility criteria. Five were appropriate for meta-analysis; the remainder were narratively reviewed. Findings demonstrated no effect on behavioural recovery from any psychological intervention (SMD- 0.11, 95% confidence interval (CI) -0.61-0.40). QoL was not improved by psychological interventions either (SMD-0.50, 95% CI -1.69-0.69 for total QoL and SMD -1.35, 95% CI -2.95-0.25. Narrative synthesis demonstrated psychological interventions did positively influence behavioural

recovery and improved mental and physical QoL was demonstrated to be statistically significant in the intervention group of two papers reviewed narritively. However, one paper concluded that the intervention favoured the control group and therefore it is harmful. Results should be treated cautiously as there were high levels of heterogeneity for the outcome behavioural recovery. There were insufficient studies to determine the most effective intervention type.

Conclusion: Evidence suggested no improvement in behavioural recovery or QOL of high-risk anaesthetic patients when psychological interventions were delivered preoperatively. The quality of evidence was low, and no practice recommendations can be made. There is a need for further high-quality research examining larger samples of this patient population.

Chapter 1-Introduction

This review of preoperative delivery of psychological interventions to high-risk anaesthetic patients will provide the first evidence synthesis regarding the effect of this preparation on behavioural recovery and quality of life (QoL), to support development of best practice in this area. The conclusions may clarify which psychological interventions are most effective and will therefore assist with the development of suitable, safe, high quality preoperative psychological support mechanisms.

This chapter provides background and context in relation to surgery, psychological needs of preoperative patients (particularly those with a high anaesthetic risk) and the role and aims of Preoperative Assessment (POA) services. Additionally, it provides the rationale for this review based on current knowledge and knowledge gaps in this area. Next, a description of the interventions typically applied in the context, population and outcomes further justify the inclusion criteria, and lastly this chapter presents the research objectives.

The second chapter describes the methodological approach used to conduct this systematic review and the philosophical underpinnings of the research. The details of how relevant papers were identified, assessed, analysed, appraised and summarised are provided to answer the research questions along with reasons and justification for choice of methods employed.

Chapter 3 presents the main findings of this review. This includes the process of how the data were handled, the range and characteristics of studies, study quality and assessment of risk of bias of included studies.

The final chapter summarises and integrates the main findings. These are examined in the context of previous research and potential explanations for the findings are drawn out. The reliability of the results is examined along with the strengths and weaknesses of the review. Conclusions are made, and consideration is given to how this review has developed understanding of the topic area and contributed to knowledge. Implications for research and practice are reported and suggestions made for future research.

1.1 Background

In 2013, it was calculated that every year 234 million people worldwide have surgery requiring an inpatient stay. Surgery accounts for a significant proportion of National Health Service (NHS) activity. It has the purpose of diagnosis or treatment of a range of medical

conditions. Between 2003/4 and 2013/4 there was a 27% increase in the number of admissions for surgical procedures in the United Kingdom (UK). Surgical admissions reached 4.7 million in England in 2013/14 (Royal College of Surgeons 2017).

Surgery aims to improve an individual's health and is undertaken when the benefits of the operation outweigh the risks (Minto and Biccard 2014:12). Any patient undergoing surgery is exposed to a small risk of complications occurring, but these are usually unpredictable. These risks are related to surgery in general, and specific risks which certain surgeries present, for example heart rhythm problems during or after cardiac surgery, which occur in about three in ten people (Society for Cardiothoracic Surgery in Great Britain and Ireland 2018).

Surgery can also have a negative effect. In developed countries the permanent rate of disability or death after surgery is just 0.4% and 0.8% (Pearse, Holt and Grocott 2011:734). Negative effects are predominately due to the body's inability to manage the physiological stress response; characterised by increased oxygen consumption, metabolic changes, greater coagulability and shifting of fluid between body compartments. A failure of the body's compensatory mechanisms can occur when there is underlying disease and co-morbidities, or because of decreased functional capacity due to old age.

1.2 Description of the high-risk population

Despite advancements in surgical and anaesthetic management, a significant proportion of surgical patients continue to have poor outcomes. In the UK the permanent rate of disability or death following surgery, for patients with a high anaesthetic risk is 12.5% (Levett, Edwards and Grocott 2016:145). High-risk patients account for 80% of perioperative deaths (Pearse, Holt and Grocott 2011:734) and increasing numbers mean further investigation is warranted (Pearse, Holt and Grocott 2011:734).

High anaesthetic risk patients are elective surgical patients who due to existing co-morbidities are pre-disposed to specific complications such as postoperative respiratory failure, acute renal failure, and cognitive decline and therefore undergoing an anaesthetic can be more hazardous. Other known factors which heighten risk are old age (commonly defined as >65 years in developed countries) and frailty. The UK has an ageing population (Government Office for Science 2013) and as life expectancy continues to rise and medical technologies progress, an increasing number of surgical patients are elderly. These individuals have a higher risk of an adverse outcome from surgery, due to decreased functional capacity. Functional capacity is the ability to sustain oxygen delivery and use, to and by the body's tissues. This is dependent upon cardiac output and arterial oxygen

concentration (Minto and Biccard 2014:12). The American Society of Anestheologists (ASA) classification is a widely used grading system of preoperative health and is considered an important tool in predicting surgical outcome and planning perioperative care (**Appendix A)**. Patients assessed as Class III or IV are defined as respectively someone with severe systematic disease, or severe systematic disease that is a constant threat to life. Severe systematic disease includes, but is not restricted to, poorly controlled hypertension, Diabetes Mellitus, Chronic Obstructive Pulmonary Disease, morbid obesity, active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of left ventricular ejection fraction, End Stage Renal Dysfunction undergoing regularly scheduled dialysis, percutaneous coronary angiography (< 60 weeks), history of (h/o) Myocardial Infarction (MI), Cerebrovascular Accident, Trans-Ischaemic Attack or Coronary Artery Disease (CAD)/coronary artery stents (ASA 2014).

These patients are predicted to have a prolonged recovery and increased risk of morbidity and/or mortality. Their risk of undergoing a General Anaesthetic (GA) is higher than for the general population due to their preoperative state of health. They have a reduced ability to sustain oxygen delivery at the required level during the perioperative phase putting them at risk of oxygen debt. Oxygen delivery is dependent upon cardiac output and arterial oxygen content. Hypovolaemia can result from fluid shifts and fluid and blood loss during surgery impairing systemic oxygen delivery. Vasoconstriction in the spleen occurs diverting essential blood flow to the vital organs, but the side effect of this is that ischaemia to the gastrointestinal tract can occur. Patients with pre-existing cardiovascular impairment are at additional risk of myocardial ischaemia or infarction if the physiological stress of surgery is great enough. Similarly, there is the risk of stroke with underlying cerebrovascular disease (Minto and Biccard 2014: 13).

ASA score is not used in isolation by anaesthetists trying to predict how a person will tolerate a GA. A patient's risk of morbidity and/or mortality is often predicted by assessing physiological and operative factors combined, for example the Physiology and Operative Severity Score for Enumeration of Mortality and Morbidity (POSSUM) and Portsmouth POSSUM (P-POSSUM) (Prytherch, Whiteley, Higgins et al. 1998:1217). ASA is the best-known scoring system, but it doesn't calculate a value of individual patient risk or account for surgical procedure, preoperative optimisation or individual differences in postoperative care setting. POSSUM was developed to provide both retrospective and prospective analysis of the risk of postoperative mortality and morbidity and with its modification P-POSSUM is now the most commonly validated predictive scoring systems used in perioperative care. POSSUM is said to better predict mortality (Scott, Lund & Gold 2014). Both POSSUM and P-POSSUM scores describe physiological and surgical factors; each one scored

exponentially increasing from 1 to 8 (1, 2, 4, 8) subject to grading. A formula is then calculated in both scores, but this differs between POSSUM and P-POSSUM.

1.3 Preoperative Assessment Service Context

The researcher is a Consultant Nurse Lead in a Preoperative Assessment (POA) Service and is a council member of The Preoperative Association, the organization for health professionals working in the preoperative field (The Preoperative Association 2018). The researcher's interest in this area has come from both previous experiences working with high-risk patients in Cardiothoracic Surgery and past personal experience of a close relative with a high anaesthetic risk, and their recovery from multi-system failure following surgery.

POA is an integral part of the elective surgical process in the UK NHS. POA staff evaluate the health status of patients who are to be admitted for elective surgery. Assessment which is undertaken by a nurse and/or anaesthetist involves asking patients detailed questions about their health. Additionally, blood pressure (BP), pulse, height and weight are recorded, and body mass index calculated. It can also involve staff undertaking a clinical physical examination and investigations, according to National Institute Clinical Excellence (NICE) Guidance (NG45 Routine preoperative tests for elective surgery) (NICE 2016) and local Trust protocols. Examples include blood tests, Electrocardiogram, Respiratory Function Test, Echocardiogram and/or Cardio-pulmonary Exercise Testing. Additionally, the Royal College of Anaesthetists and the Association of Anaesthetists of Great Britain and Ireland (AAGBI) provide guidance to help ensure safe and effective POA.

POA services aim to optimise patients' health where necessary, so that they are prepared, and as fit as possible to undergo the anaesthetic required for surgery. Optimisation of patients' health helps to prevent or minimise postoperative complications by modifying risk factors; ensuring the best possible surgical outcome (AAGBI 2010:8). It can often require liaison with General Practitioners, surgical specialties and other members of the multi-disciplinary team. Examples of health optimisation before elective surgery include asking people with a Body Mass Index greater than 35kg/m2 to lose weight or a smoker to quit.

POA should aim to modify all risks for all patients (AAGBI 2010:3), but psychological preparation and optimisation does not form part of current NHS standard medical care (SMC). Psychological preparation is particularly important in the case of high-risk patients, for whom work up for surgery can take many weeks, and who face an operation knowing they have a greater chance than the general population of morbidity and mortality (Pearse, Holt and Grocott 2011; Minto and Biccard 2014; Royal College of Surgeons of England, 2011; Barberan-Garcia, Ubre, Roca et al. 2018).

1.4 Justification

Surgery has been identified as psychologically threatening (Johnston, Rice, Fuller et al 1978:4). Preoperative patients will often have apprehension, concerns and fears surrounding surgery (Lindsay, Smith, Hanlon et al. 2000:1412; Bradley-Palmer, Lane, Mayo et al. 2015:3162) and this can be for a number of underlying reasons including separation from family, concern about who will care for loved ones whilst they are hospitalised or increased dependency on them, risk of death or morbidity, alteration of body image, disruption to social life, loss of employment and anticipation of painful procedures (Heilmann, Stotz, Burbaum et al. 2015:352; Burton, Parker, Farrell et al. 1995:2).

It has long been known that patients having surgery experience anxiety and uncertainty (Wilson-Barnett 1979; Johnston 1980) and it is widely accepted that more distress or anxiety before surgery is linked to a longer postoperative recovery with more complications (Janice 1958; Ridgeway and Mathews 1982; Kiecolt-Glaser, Page, Marucha et al. 1998:1209; Rosenberger, Jokl and Ickovics 2006:397). Anxiety can affect patients' respiration, BP and pulse during the perioperative period and this can have a negative impact on recovery (Forward, Grueter and Crisall 2015). Anxiety and little social support have been identified as the cause of adverse psychological and functional effects during the operative waiting period and as predictors of poor physical recovery from heart surgery (Jenkins, Stanton, Savageau et al. 1994; Heilmann, Stotz, Burbaum et al. 2016).

Additionally, a positive correlation between preoperative anxiety and postoperative pain has been demonstrated in numerous studies (Ip, Abrishami, Peng et al. 2009; Munafo and Stevenson 2001; Vaughn, Wichowski, Bosworth, 2007). Despite surgical advances a significant proportion of patients report continuing pain, functional limitations, and dissatisfaction up to two years after surgery (Wylde, Dieppe, Hewlett et al. 2007:422). Valenzuela-Millán, Barrera-Serrano and Ornelas-Aguirre (2010) found high levels of preoperative anxiety in a group of patients undergoing elective surgery and concluded that the source of the anxiety appeared to be multi-factorial with evaluation of these reasons able to take place in the POA consultation.

Preoperative emotional distress can cause significant suffering for surgical patients and has been associated with impaired recovery (Mavros, Athanasiou, Gkegkes et al. 2011:5). Furthermore, it is also associated with excessive analgesic intake, higher rates of hospital readmission, and long-term mortality (Ghoneim and O'Hara 2016:1). Psychoneuroimmunological reviews have shown that psychological stress leads to clinically relevant delays in wound healing; a fundamental surgical outcome (Maple, Chilcot, Lee et al.

2015:24; Marucha, Kiecolt-Glaser and Favegehi 1998:364; Walburn, Vedhara, Hankins et al. 2009:1).

The link between depression and post-surgical outcome was also examined; particularly amongst cardiac surgical patients. Kimball in Moos (1977:114) found mortality was highest amongst those identified as depressed prior to surgery, and low morale was strongly correlated to death in research by Garrity and Klein (1975). MI patients who subsequently died had significantly higher depression scores when compared to survivors (Garrity and Klein, 1975). Depression occurs in 18-60% of patients with heart disease and this has been found to predict postoperative complications (Borowicz, Royall, Grega et al. 2002:469; Burg, Benedetto, Rosenberg et al. 2003:116), longer physical and emotional recovery (Oxlad, Stubberfield, Stuklis et al. 2006:779), poorer QoL (Tully, Baker and Knight, 2008:289) and increased rates of cardiac events along with mortality (Blumethal, Newman, Babyak et al. 2003:607).

Psychological interventions that reduce anxiety, stress and worry about surgery and recovery, prepare the patient for what to expect, or alter patients' behaviour concerning recovery, are thought to improve postoperative outcomes (Johnston and Vogele 1993:246; Devine and Cook 1986:99; Mumford, Schlesinger and Glass 1982:141; Mavros, Athanasiou, Gkegkes et al. 2011:5). Impacting postoperative outcome through psychological intervention and reducing population-level morbidity and mortality has a benefit for the individual as well as for the healthcare service (Fink, Diener, Bruckner et al. 2013:1). Individuals experience of their hospital admission can be improved by reducing stress and anxiety, reducing postoperative pain and a quicker return to their usual everyday activities (Johnston and Vogele 1993:246; Kiecolt-Glaser, Page, Marucha 1989:1214; Devine and Cook 1986:89; Rehse and Pukrop 2003;179). Economic benefits include shorter hospital LOS, reduced complication rates and mortality (AAGBI 2010:6); increasingly important targets for healthcare systems with growing pressure on resources. The NHS must work differently to improve performance and productivity but keep the patient first and foremost in a quality service (NHS Improvement 2016).

1.5 Types of psychological interventions

Psychological interventions are a range of strategies underpinned by psychological theory which aim to influence how a person thinks, feels or behaves (Shehmar and Guptan 2010:56). Within the literature regarding pre-operative high-risk anaesthetic patients these have been categorised as procedural information, behavioural instruction,

psychoeducational interventions, stress management training, prehabilitation, cognitive behavioural interventions, self-regulation interventions and expectation optimisation.

The provision of *preoperative information* regarding the procedure, anaesthetic, the perioperative period and recovery can reduce stress, anxiety and worries as patients have a better idea of what to expect and therefore feel more prepared for their surgery. *Procedural information* describes the process the patient will go through; what, when and how it will happen (Powell, Scott, Manyande et al. 2016:7). This is thought to reduce anxiety and worry by removing uncertainty for patients (Ridgeway 1982:278).

In 2005, Pager conducted a Randomised Controlled Trial (RCT) to investigate the effects of an informational video showing patients what to expect from cataract surgery. A simple, inexpensive video was demonstrated to result in a significant increase in patient understanding of and satisfaction with their surgery, as well as a decrease in anxiety. These effects were independent of patients' expected outcomes or previous experience with cataract surgery when compared to a video about the anatomy of a cataract. Moulton, Evans, Starks et al. (2015) also found positive effects of this intervention type. Their study examined preoperative education prior to hip arthroplasty and concluded that the intervention produced a significantly reduced LOS when compared with no educational intervention. The attributed cost savings more than £10,000 per year is a finding of particular interest for NHS organisations working to improve their financial position.

Behavioural instruction concerns informing patients of how they can best participate in their care during the perioperative period and recovery (Mathews and Ridgeway 1984 cited in Steptoe and Mathews 1984:240). An example is teaching deep breathing exercises after surgery to help clear the lungs and lower the risk of pneumonia. An RCT found that the intervention group who received a tailored treatment plan pre-rectal cancer surgery had a statistically significant lower anxiety score (O'Connor, Cotes and O'Neill 2014). However, with a small sample size of just 67 participants, caution must be applied as the results might not be transferrable to the high-risk population.

Psychoeducational interventions aim to modify or improve psychosocial functioning, reduce distress, and improve coping with disease. Coping skills are envisaged to be important for the high-risk group who need to deal with the predicted higher complication risk. They often combine education, for example concerning presentation of illness and its treatment with specific cognitive and behavioural strategies, accompanied by social support (Devins and Binik 1996 cited in Zeidner and Ender 1996:661). This is thought to be particularly useful in patients who need to receive a lot of information between diagnosis and surgery (Katz 2004:643). Delivery can be on an individual or group basis by any qualified health educator

as well as health professionals such as nurses, social workers, occupational therapists, psychologists or physicians. It may include the use of booklets, video or compact disc (Chan 2005:105). In 2016, Chow, Chan, Choi et al. reviewed best available evidence of the effects of psychoeducational interventions on sexual functioning, QoL, and psychological outcomes in gynaecological cancer patients for whom surgery was the first line treatment. Findings confirmed a positive effect on depression and mental QoL after meta-analysis was performed on four of the included 11 studies.

Stress management training is an education intervention which aims to reduce and manage the effects of stress and distress. It typically consists of deep breathing techniques, meditation, guided imagery techniques and counselling to promote active coping, relaxation; bringing about a positive attitude to change. Participants are taught to recognise stressful situations and identify practical ways to accept or avoid these (Rosenfeldt, Braun, Spitzer et al. 2011:2).

Patients who received stress management interventions prior to cancer surgery, described pain and distress as reduced and QoL improved, analgesic use and systolic BP were lower (Manyande, Chayen, Priyakumar et al. 1992:284; Manyande, Berg, Gettins et al. 1995:180; Kshettry, Carole, Henly et al. 2006:204). Furthermore, Parker, Pettaway, Babaian et al.'s (2009) findings demonstrated the efficacy of a brief pre-surgical stress management intervention in improving mood and some aspects of QoL, in the short and long-term, in men undergoing a radical prostatectomy for cancer. It is encouraging that this intervention has already been demonstrated to be positive in several studies involving high-risk patients.

Prehabilitation programmes set out to optimise functional capacity preoperatively. Recently, such programmes include psychological components to assist with compliance to the process (Li, Carli, Lee et al. 2013:1073). A narrative review of the literature on surgical prehabilitation was undertaken by Carli, Gillis and Scheede-Bergdahl in 2014; evidence concerned preoperative interventions for cancer patients to increase physiological reserve and accelerate recovery. Findings indicated that a group of interventions such as exercise, nutrition and anxiety reduction before surgery can complement the standard enhanced recovery program; facilitating the patients return to baseline activities of daily living. In 2015, Tsimopoulou, Pasquali, Howard et al. conducted a systematic review examining the effect of prehabilitation on the postoperative outcomes of cancer surgical patients. There was a wide range of preoperative psychological interventions investigated and they appeared to affect postoperative immunologic function and certain patient-reported outcomes. Given the quantity of emerging evidence on prehabilitation suggesting its effectiveness, a literature

synthesis is required to indicate if this intervention type would be suitable for holistically optimising the high-risk patient.

Cognitive behavioural interventions focus on the formulation of personal coping methods to solve ongoing problems and alter unhelpful patterns in thoughts, actions, and emotions (Williams and Chellingsworth 2010:2). Cognitive Behavioural Therapy (CBT) has been demonstrated to positively influence QOL. Lewin, Coulton, Frizelle et al. (2009) conducted a prospective multicentred, intention-to-treat, cluster-RCT. They investigated the clinical and cost-effectiveness of a short home-based cognitive behavioural rehabilitation programme for patients undergoing cardiac defibrillator implantation. Health-related quality of life (HRQoL) was improved with the intervention, and clinically significant psychological distress was lessened along with a significant reduction in unplanned readmissions. Additional conclusions were that the intervention was cost-effective and easily implemented. In 2016, Rolving, Sogaard, Nielsen et al. undertook cost-effectiveness analysis performed alongside a RCT of a preoperative CBT intervention, compared to SMC for patients undergoing lumbar spinal fusion surgery. At one year postoperatively the estimated Quality Adjusted Life Years was significantly better for the CBT group and significantly larger pain related disability reductions at three and six months were reported. However, no overall cost differences were found between the CBT and control group.

Similarly, *self-regulatory interventions* focus on the process of altering illness perceptions and improve coping strategies through the provision of individualised information and coping techniques (Richardson, Tennant, Morton et al. 2017:630). They have been proven effective at improving a broad range of outcomes in high-risk patient populations including MI patients and their spouses, those with CAD, acute coronary syndromes, renal disease and diabetes (Petrie, Cameron, Ellis et al. 2002; Broadbent, Ellis, Thomas et al. 2009; Cossette, Frasure-Smith, Dupuis et al. 2012; Keogh, Smith, White et al. 2011).

Expectation optimisation focuses on development of realistic expectations about the benefits of surgery and the recovery process. Patients are encouraged to develop personal ideas about their future post-surgery and how they will enjoy this (Rief, Shedden-Mora, Laferton et al. 2017: 4). In 2010 Juergens, Seekatz, Moosdorf et al. examined if illness beliefs before cardiac surgery predict disability, QoL, and depression three months afterwards. The results of this prospective study indicated that patients could benefit from expectation optimisation aimed at improving postoperative disability and physical functioning. Additionally, the implication of expectations in cardiac surgical patients was examined in 1999 in a prospective cohort study by Scheier, Matthews, Owens et al. Optimism predicted a lower rate of rehospitalization after Coronary Artery Bypass Grafts (CABG). Similarly Ronaldson,

Poole, Kidd et al. found positive expectations may improve recovery; this time in terms of pain intensity and physical symptoms. In 2016, Auer, Glombiewski, Doering et al. performed meta-analysis of 21 prospective studies and confirmed the importance of patients' expectations in the prediction of postoperative outcome; highlighting the necessity to optimise these expectations to improve QoL. Patients' beliefs about their illness before cardiac surgery strongly influenced their recovery. It appears that these findings are relevant and could be extrapolated to the high-risk population.

Psychological preparation is a broad term covering many different types of strategies. Interventions can vary widely in the range and type of techniques employed, even when targeting the same effect on similar participants. In this field of literature historically, there have often only been brief descriptions of interventions or sometimes just a label for the intervention provided by the authors (Johnston and Vogele 1993). Where there is a lack of standardisation of intervention content (Powell, Scott, Manyande et al. 2016) or where little information is available regarding it, it is difficult to make comparisons and draw conclusions on the effectiveness of the intervention (Hodges, Walker, Kleiboer, Ramirez, Richardson, Velikera & Sharpe, 2011). Furthermore, there has been inconsistency with labelling (Abraham and Michie, 2008). One remedy to these issues is for researchers to produce manuals to describe the interventions, so that if the intervention is being delivered by different individuals it is consistently provided and can be reliably replicated (Horner, Rew and Torres, 2006). In 2013, Mitchie, Richardson and Johnston et al. undertook a study which resulted in a taxonomy of 93 consensually agreed, clearly defined Behaviour Change Techniques, as a method for specifying interventions. There has not been a taxonomy produced to date in the psychological preparation literature to allow consistent identification, coding and reporting of intervention components. Arguably, until such developments, systematic review of effectiveness will remain limited.

In their reviews, Johnston and Vogele (1993) and Powell, Scott, Manyande et al. (2016) used the same seven categories of interventions (procedural information, sensory information, behavioural instruction, cognitive intervention, relaxation techniques, hypnosis and emotion focused interventions) and tightly defined the intervention types which they claim resulted in a stronger review. Powell, Scott, Manyande et al. (2016) however acknowledged that their decision to restrict inclusion criteria to these categories may have meant some studies were overlooked, therefore missing valuable information on the effectiveness of other psychological intervention types. Consequently, the current review did not limit interventions but included any preoperative psychological intervention.

1.6 Description of the outcomes

Surgical outcomes and factors which affect these have been of interest and under scrutiny for the past 20 years or so (Holt, Poloniecki and Thompson, 2008; Grocott, 2009; Levett, Edwards and Grocott et al., 2016). Numerous short and long-term outcomes including infection and complication rates, hospital LOS and 30-day mortality have been examined by hospital and individual surgeon in most surgical specialties (Marx 2017). Although other postoperative outcomes are important, behavioural recovery and QoL are arguably the best measures of recovery post-surgery for patients with a high anaesthetic risk. Even in high-risk individuals, surgery is carried out with the aim of improving that individual's health, and when the benefits outweigh the risks. Both outcomes consider recovery from the patients' perspective. In the present review outcomes were restricted to two to minimise the difficulty with heterogeneity of different outcome measures and for the practical reasons of research personnel constraints, as well as the short timescale for completion.

Behavioural recovery can be defined as the resumption of performance of tasks and activities (Powell, Scott, Manyande 2016: 8). Behavioural recovery was chosen as the primary outcome; postoperative recovery objectives are for patients' to be restored to the level of performance or an improved level, to that which they held preoperatively, or to a level the patient deems acceptable. Measuring behavioural recovery is a good, broad, medium-term determinant of intervention effect in this high-risk group. Assessment of the process of recovery; improving health and well-being over time provides clinically relevant, meaningful information on the success of treatment (Johnston and Vogele 1993), particularly when recovery for these patients can be slow and complicated with higher chances of morbidity and mortality. Johnston and Vogele (1993) and Powell, Scott, Maynade et al. (2016) also included behavioural recovery as one of their outcomes.

QOL has been defined by the World Health Organisation (WHO) (WHO 1997) as a person's perception of their position in life considering the culture and value structure and viewing this in relation to their standards, concerns expectations and goals. It is a wide-ranging notion which can be influenced by their physical health, psychological well-being, independence, personal views, social interactions and relationship to the environment. QoL was chosen because it encompasses many dimensions and so gives a holistic picture of the effectiveness of the interventions while demonstrating the true impact on the individual. It can easily be adversely affected in this patient group. Additionally, QoL is sensitive to psychological interventions (Rehse and Pukrop 2003:179).

1.7 Existing knowledge and gaps

Psychological preparation for surgery has received considerable attention and has been shown to improve patient outcomes in studies spanning many decades. Johnston and Vogele (1993) demonstrated in a review and meta-analysis of 35 studies that one or more of the interventions; cognitive intervention, emotion focused intervention, relaxation techniques, hypnosis, sensory information, procedural information and behavioural instruction improved at least one of the outcomes of postoperative pain, pain medication, LOS, clinical recovery, behavioural recovery, negative affect, psychological indices and satisfaction.

In 2016, Powell, Scott, Manyande et al. conducted a Cochrane review which built on the work of Johnston and Vogele but included studies published since 1993, a larger research base and the use of contemporary techniques such as review software. This subsequent synthesis examined whether cognitive intervention, relaxation, hypnosis, procedural information, sensory information, or emotion-focused intervention impacted on the outcomes of postoperative pain, LOS, negative affect and behavioural recovery (Powell, Scott, Manyande et al. 2016). Their conclusion was that psychological preparation may benefit the outcomes of postoperative pain, negative affect, LOS and behavioural recovery and is unlikely to be harmful. However, the quality of evidence was low or very low and therefore recommendations for practice could not be made. Additionally, they were unable to ascertain which types of intervention were most effective for improving each specific outcome.

Together these reviews provide valuable knowledge however, to date there has been no review of this evidence in relation to patients with a high anaesthetic risk, although they account for a significant proportion of negative surgical outcomes. The current synthesis therefore aims to provide new information about this important population.

1.8 Review title

Preoperative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review

1.9 Research objectives

This systematic review will answer the following research questions:

1. Are preoperative psychological interventions effective for improving behavioural recovery outcomes for high-risk anaesthetic patients, compared to standard care alone?

2. Are preoperative psychological interventions, effective at maintaining or improving quality of life (QoL) at one month or more post-surgery compared to standard care alone?

1.10 Chapter summary

This chapter detailed the review topic; providing background, context and explanation of current knowledge of the research problem and justification for choosing to examine it. This chapter concluded with the two objectives of the review. Chapter 2 will examine and justify the methodology of this review.

Chapter 2 - Methodology

2.1 Research philosophy

Systematic reviews are essential forms of research which summarise and synthesise available evidence on a subject to answer a research question or fill a knowledge gap, accurately and reliably. There is no existing review examining whether psychological interventions delivered preoperatively to patients with a high anaesthetic risk can improve outcomes, and so the current review was undertaken to address this evidence gap. To determine and understand this research question and to test the relationship between psychological interventions and the outcomes of behavioural recovery and QoL, a quantitative systematic review of RCTs has been undertaken. In the hierarchy of evidence, systematic reviews of RCTs offer the highest level of evidence (Guyatt, Rennie and Meade 2008:11). They are the gold standard for assessing the effectiveness of interventions, because carried out correctly they are rigorous and minimise bias. Systematic reviews of RCTs are used as the basis for evidence-based medicine and in the development of clinical guidelines and policy. They inform clinical decision-making and intervention reviews assist with assessing risk and benefits of health care (University of York Centre for Reviews and Dissemination 2017: v).

The current review and meta-analysis has a philosophical underpinning of 'positivism'. Positivism was first described by Auguste Comte between 1830 and 1842 (Martineau 2018) and views that only factual, observable and measurable knowledge is trustworthy when the researcher is objective and where a controlled and structured approach is taken (Collins, 2010:38). Meta-analysis is a systematic, statistical and analytical operation where a body of separate but similar quantitative research knowledge and findings are assessed and integrated with the aim of producing more precise and robust conclusions (i.e. to test the combined data for statistical significance). It is often but not always a component of a systematic review (University of York Centre for Reviews and Dissemination 2017). This paradigm has an ontological assumption that there is one reality to exist, which is observable and measurable, and an epistemological assumption that factual knowledge is quantifiable and gained through a rational, objective, predicted and controlled approach (Little 2013).

2.2 Protocol and registration

The protocol for this systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO), on 24th May 2017 and was last updated on 11th February 2018 (registration number CRD42017051925) (University of York Centre for Reviews and Dissemination 2017). It can be accessed at https://www.crd.york.ac.uk/PROSPERO/ and a copy is available in **Appendix B.** Differences between the review and the protocol are documented and justified in **Appendix C.** These were required once a clearer understanding of the review question had been gained.

Writing a protocol in advance is a way of trying to limit bias. It helps to ensure that the way articles are reviewed is not altered once the results of the identified studies are seen. Additionally, this protocol should allow replication of this review by another researcher (Gough, Oliver and Thomas 2012: 68).

2.3 Ethics and governance

Systematic reviews do not require ethical approval, however in fulfilment of Coventry University requirements it was necessary to complete the Coventry University Ethical Approval Process. This project (project ref P48546) was confirmed and approved as low risk on 15th February 2017 **(Appendix D)**.

2.4 Search strategy

A scoping search was performed to gain an overview of the range and depth of literature that existed for this research topic. It was performed once the research question had been decided, to check its validity and feasibility. Scoping helped to shape the research question by identifying that it had not already been or was being addressed, demonstrated gaps in knowledge and if there was a need to make the question more or less specific (NIHR, 2018).

2.4.1 Eligibility criteria

Studies were selected according to the criteria outlined below:

Study design – RCTs only were included following the method of Johnston and Vogele (1993) and Powell, Scott, Manyande et al. (2016) reviews. This design is the most rigorous for

determining a cause-effect relation between a treatment and outcome. Any other relevant papers found of different design were saved for future research.

Population – Studies with adult (16+ years) preoperative participants, with a high anaesthetic risk undergoing elective surgery under GA were included. Studies' addressing maternity patients, trauma patients, paediatrics and non-elective patients were excluded, along with any targeting animals. Due to the very limited timescale and lifesaving nature, preoperative preparation for emergency surgery cannot be compared with that for elective surgery. Additionally, emergency surgery carries a higher risk than planned surgery. Thus, and as per the Powell, Scott, Manyande et al. (2016) review only studies including participants undergoing elective surgery were included in this review.

Following the Johnston and Vogele (1993) and Powell, Scott, Manyande et al. (2016) reviews, the focus for this study was only surgical procedures which involve a GA. Procedures that are performed under GA independently carry a higher risk as compared to Local Anaesthetic (LA) and so it is not appropriate to include both in the same review. Clinical knowledge was used to assess whether the type of surgery would typically be performed under GA, and studies were included or excluded on this basis. In the case of surgical procedures which can be carried out under either GA or regional anaesthesia; for example, joint replacement surgery, the author was contacted to clarify. If there was no reply, further contact was made three weeks later. If no response was received following the second contact, the paper was excluded.

Intervention and comparator – Studies where any psychological intervention was delivered preoperatively were included in this review, and there was no restriction on the mode of delivery as interventions that were delivered face to face, via telephone or online; on an individual or group basis were included. Psychological interventions are defined as a range of strategies underpinned by psychological theory which aim to influence how a person thinks, feels or behaves (Shehmar and Guptan 2010:56). Scoping predicted likely types of psychological interventions which would be used in included papers, but no priority was given to any type.

The intervention for the control groups in the included studies was required to be SMC, that is preparation and interventions focused on optimising physical health alone such as the control of BP and/or Diabetes Mellitus (DM) or investigation and treatment of previously undiagnosed medical conditions such as Obstructive Sleep Apnoea, heart murmurs or respiratory disease. This is important because this represents the current provision of POA services. Papers comparing one or more interventions against each other alone were excluded from this review.

Outcome – The primary outcome of interest was behavioural recovery, with a secondary outcome of QoL. Scoping searches helped with the decision of which outcome was the most important to consider. Any studies that had one or both outcomes, as any of their outcomes were included. Studies with other outcomes in addition to behavioural recovery and QoL were not excluded at selection. Outcome measurement tools used in eligible papers were also predicted from scoping, but there was not an exclusive list. Where there were studies with multiple measures for the same outcome, the outcome measures were examined to determine which measure was the closest to the study's definition of the outcome. If there were two or more measures that mapped closely to the definition, then priority was given to the measure most commonly reported in other studies or those with the strongest psychometric properties

Timing – There was no date restriction imposed on the search as no existing literature reviews have focused on this sub-population previously.

The timescale of outcome assessment was recorded, with a minimum time point of one-month and the maximum time point of one-year as prior to this is was deemed too close to the surgery, and further than one-year post op was deemed that there could be too many other influencing factors (University of York Centre for Reviews and Dissemination 2017). Papers outside of this date range were excluded. Powell, Scott, Manyande et al. (2016) acknowledged that their inclusion of studies with timescales within as little as 48 hours of surgery may not give a true reflection of the effect of the psychological intervention as patients would be under the influence of the anaesthetic still and possible postoperative euphoria, opiate analgesia etc.

Setting – Only studies which were conducted in Europe, Australia, New Zealand, America and Canada were included in this review. All other geographical locations were excluded due to envisaged cultural differences around psychological interventions, and healthcare systems far removed from the UK NHS. This is with the aim of findings being transferrable to the UK healthcare system.

Language – All languages were included, but where studies were in languages other than English, Google Translate was utilised. This was except for papers identified through forward citation searching when each paper might identify up to 25 non-English other papers. These were excluded without any translation due to limited resources. Applying any language restrictions to searches is not recommended; but, it is acknowledged to often be unavoidable due to constraints such as a lack of access to and funding for translation services. (Smith, Devane, Begley et al. 2011:3).

Publication status – Studies were restricted to published papers only including dissertations but abstracts and conference proceedings, commentaries, letters, editorials and expert opinion were excluded. This decision was made due to the difficulty in locating unpublished studies and the limitations of time and resource however, it must be acknowledged that therefore publication bias could have been introduced. This is because negative findings can be published less frequently as authors omit writing them up and do not submit them to journals. This is due to such studies being peer reviewed less favourably, or because editors avoid publishing negative results (University of York Centre for Reviews and Dissemination 2017:16).

2.4.2 Information sources

PROSPERO (University of York Centre for Reviews and Dissemination 2017) was searched to identify any similar ongoing or completed systematic reviews.

The following electronic databases were searched: MEDLINE (EBSCOhost), CINAHL (EBSCOhost), Allied and complementary medicine databases (AHMED) (EBSCOhost), The Cochrane Library, Health and Medical collection (ProQuest), ProQuest Nursing & Allied Health Source, (ProQuest), PsycINFO (EBSCOhost), PsycArticles (EBSCOhost), Psychology Database (ProQuest), PubMed (Medline), Scopus, Turning Research Into Practice (TRIP). It was originally intended to also search Applied social sciences index and abstracts (ASSIA) database, however following advice from a systematic review librarian at UHCW, the decision was made not to carry this out as it was felt that in their experience no other new papers would be yielded.

The searches were carried out by the author (CB) on 17th May 2017 and re-run on 2nd November 2017. Alerts were set up on 17th May for all databases which highlighted any new papers, prior to re-running the searches immediately before starting writing up. No new papers were yielded from alerts or from re-running the searches.

To ensure literature saturation, the reference and citation lists of included studies identified through searching were hand searched. The reference lists of reviews (Johnston and Vogele 1993; Powell, Scott, Manyande et al. 2016) which did meet the inclusion criteria (other than being a review) were also searched to identify possibly eligible papers. Google Scholar was used to Forward Citation Search included papers to identify any other papers which met the inclusion criteria. Finally, a bibliography of the included articles was circulated to the review supervisory team.

2.4.3 Search terms

The following medical subject headings subject headings (MeSH) and key words were used for literature search strategies of the twelve electronic databases **(Table. 1).**

Table.1 Search terms

PICO	MeSH and key words
Population	"surgical procedures, operative", surg*, operat*, "general surgery", gynecology, neurosurgery, opthalmology, "orthognathic surgery", orthopaedics, otolaryngology, urology, "arthroplasty, replacement, hip", "arthroplasty, replacement, knee", "arthroplasty, replacement, shoulder", "arthroplasty, replacement, elbow", "arthroplasty, replacement, ankle", cholecystectomy, hysterectomy, "coronary artery bypass", transplants, herniorrhaphy, mastectomy, "joint replacement", "hernia repair", "bariatrc surg*", "weight loss surg*", "gastric bypass", "general an#esthe*", anesthetics, anesthesia
Intervention	pre-op* or preop*, pre-surg* or pre surg, "preoperative care", "pre-assesment", "pre-an#esthe*", psychological techniques", psychotherapy, imagery, behavio#r*, psycholog*, "cognitive therapy", CBT, "hope therapy", relaxation, "procedural knowledge", psychoeducation, hypno*, "patient education", "patient information", "patient teaching", mindfulness, "mind-body therapies", counsel#ing, coping
Comparator	"standard care", "physical intervention"
Outcome	"treatment outcome", "behavio#ral recover*"," recovery of function", rehabilitation, "activities of daily living", "quality of life", QoL, "health related quality of life", HRQOL

The PICO search terms were combined following the Cochrane highly sensitive search strategy for identifying RCTs, as suggested in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins and Green 2011) and following advice of two systematic review librarians at UHCW. The MEDLINE search strategy was developed with input from the supervisory team, then peer reviewed by a second reviewer not otherwise linked to the project. Once the MEDLINE search strategy was finalized, it was adapted to search the other databases. The search terms were adjusted as necessary according to which

database was being used. Developing a systematic search strategy, before commencing literature searches, is paramount to relevant and effective information retrieval (Smith, Devane, Begley et al. 2011:2)

The full search strategies are provided in the Appendices **(Appendix E MEDLINE via EBSCOhost; Appendix F CINAHL via EBSCOhost; Appendix G AMED via EBSCOhost; Appendix H ProQuest Psychology; Appendix I ProQuest Nursing and Allied Health; Appendix J ProQuest Health and Medical Collection; Appendix K PubMed; Appendix L Scopus; Appendix M The Cochrane Library; Appendix N PsycINFO; Appendix O PsycArticles and Appendix P TRIP PRO)**.

2.5 Data management

EPPI-Reviewer4 (Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) 2017) web-based software was used to manage the review from screening and analysis through to synthesis. Its use was agreeable amongst the supervisory team and this tool is now recommended by Cochrane (The Cochrane Collaboration 2018). CB met with Dr. Gemma Pearce, a Researcher in the Centre for Advances in Behavioural Science, Coventry University to check data extraction codes had been utilised correctly. Dr. Pearce is a trained EPPI-Reviewer. Training videos on EPPI-Reviewer (EPPI-Centre 2017) YouTube channel were also viewed along with the user manual (version 4.7.0.0) via the EPPI-Reviewer gateway. The EPPI-Reviewer (EPPI-Centre 2017) support centre were contacted by email with various queries regarding software functionality. References were organised and stored in RefWorks (ProQuest 2017).

2.6 Selection process

The screening process was carried out against the following inclusion and exclusion criteria **(Table.2):**

Duplicates were removed using the 'manage duplicates' facility of EPPI-Reviewer4 (EPPI-Centre 2017) followed by hand checking. The title and abstract of retrieved studies were reviewed by CB to exclude obviously irrelevant papers. Where the title and abstract were deemed to meet the inclusion criteria or where eligibility was unclear full text articles were obtained. These were reviewed by CB. Contact was made with the trials contact author where further information was required to assess eligibility e.g. if type of anaesthesia was not clear. The screening of a random selection of five papers was checked by RB (Dao, Youssef and Armsworth 2011; D'Lima, Colwell, Morris et al. 1996; Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Katz, Irish and Devins 2004 and Rosenfeldt, Braun, Spitzer

et al. 2011). It was not necessary to bring in a third reviewer as the two screening disagreements were resolved between CB and RB. All screening decisions were clearly recorded using EPPI-Reviewer4 (EPPI-Centre 2017). This can be seen presented using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA-P) flowchart (Shamseer, Moher and Clarke 2015) formulated by the software (Fig. 1 pg 45).

Table.2. Inclusion and Exclusion criteria

	Inclusion	**Exclusion**
Population	▪ Adult (16+ years) preoperative patients ▪ Elective surgery ▪ Men and women ▪ Any ethnic origin ▪ High-risk patients undergoing GA ▪ Patients' with psychiatric conditions or symptoms which are well controlled	▪ Paediatrics (<16 years) ▪ Animals ▪ Maternity patients ▪ Emergency or trauma patients ▪ Studies focusing on LA or regional anaesthetic only or patients with no anaesthesia (with or without sedation) ▪ Patients with psychiatric morbidity
Intervention	▪ Any psychological intervention ▪ Face to face, via telephone or online ▪Group or individual	▪ Interventions focusing only on physical health
Comparator	▪ SMC i.e. Interventions focusing only on physical health	▪ Interventions other than SMC
Outcome	▪ Primary: behavioural recovery ▪ Secondary: Health related QoL	▪ Absence of any outcomes
Setting	▪ Europe, Australia, New Zealand, America and Canada ▪ Outpatient setting	▪ Inpatients
Design	▪ RCTs	▪ Non RCTs
Literature	▪ No date restriction ▪ Published and dissertations	▪ Grey literature ▪ Expert opinion
Language	▪ Any, if interpretation can be achieved by Google Translate and can be checked by a health professional whose first language is that of the paper	▪ Studies where language interpretation cannot be undertaken by Google Translate and/or checked by a health professional whose first language is that of the paper, or is very time consuming
Follow Up	▪ Any with a minimum time point of one-month post-op and a maximum time point of one-year	▪ Follow up before one-month post-op or longer than one-year post- op

2.7 Data extraction

CB carried out data extraction and quality assessment independently, and then a random sample of three papers were checked by RB (Arthur, Daniels, McKelvie et al. 2000; Richardson, Tennant, Morton et al. 2017 and D'Lima, Colwell, Morris et al. 1996). RB agreed with data extraction and so it was not necessary to bring in a third independent reviewer. A

data collection form was devised based on the Effective Practice and Organisation of Care Review Group (EPOC) (EPOC 2013) template as suggested by the Cochrane Collaboration (Higgins and Green 2011). CB piloted the form to ensure it was effective for this review. The paper format is shown in **Appendix Q.** These headings and subheadings were used to create data extraction codes in EPPI-Reviewer4 (EPPI-Centre 2017).

2.7.1 Data items

The following data were extracted **(Table. 3.)**

Table. 3 Data Items

Data Item	Data Collected
Characteristics of included studies	Search strategy the paper was obtained from Year of the study Support for the study Ethical approval Keywords
Participants	Location of the study Setting of the study Method of recruitment of participants Informed consent Total number of participants randomised Mean age Sex Ethnicity Other sociodemographic's (if stated) Reason study sample are high-risk Type of surgery
Description of the intervention	Number randomised to treatment arm Number randomised to control arm Blinding Psychological theory underpinning intervention (as stated by author) Description of intervention in the paper Duration of the treatment period Timing of the intervention Modes(s) of delivery Person delivering the intervention Specialist training given to person delivering the intervention Costs involved in delivering the intervention Co-interventions
Quality of the outcome evaluation	Outcome name Outcome definition (as stated by author) Time points measured Do time points reported match those measured? Blinding Was Intention To Treat analysis used? Conflicts of interest Other outcomes measured that did not meet inclusion criteria? Statistical methods used in outcome analysis Were all participants who entered into the study were properly

	accounted for at the end? Were any participants moved from another group?
Outcome/effectiveness data	Intervention Outcome Outcome tool(s) Outcome tool of most interest Comparison
Other information	PPI Key conclusions of the study's authors Did the study fulfilled its aims?

2.7.2 Dealing with missing data

Data in primary studies is not always presented in a user-friendly way for those undertaking a systematic review (Smith, Devane, Begley et al. 2011:3). Due to missing data and data not being presented in an appropriate form, five out of 11 contact authors had to be approached for the papers included on full text (Garrsen, Boomsma, de Jager Meezenbroek et al. (2013); Arthur, Daniels, McKelvie et al. (2000); Shuldman, Fleming, and Goodman (2002); D'Lima, Colwell, Morris et al. (1996) and McGregor, Rylands, Owen et al. (2004). The same procedure was followed in doing this, as at the selection stage. If no reply was received following the second contact 'not clear' or 'not stated' codes were used on EPPI-Reviewer4 (EPPI-Centre 2017).

Of the five authors contacted Arthur, Daniels, McKelvie et al. (2000); D'Lima, Colwell, Morris et al. (1996) and McGregor, Rylands, Owen et al. (2004) displayed some of their results in graphical format not allowing accurate numerical values to be obtained and additionally data were missing. Missing data could not be obtained from Arthur, Daniels, McKelvie et al. (2000) as the corresponding author Arthur was deceased. D'Lima, Colwell, Morris et al. (1996) reported no standard deviation (SD) or p-value. Mean values were sent after contact, but there was still inadequate data to permit statistical calculations to be undertaken. McGregor Rylands, Owen et al. (2004) replied to the request and forwarded the data.

Assistance was sought from Sigma (mathematics and statistics support at Coventry University) to calculate total QoL scores where data was displayed as one physical QoL score and one mental QoL score, and where data for physical and mental QoL was displayed as several component parts of each of these. These were acceptable pooling calculations as most of the papers measuring QoL using the 36 item Short Form Survey (SF-36) tool presented the data as one overall QoL score which encompassed physical and mental QoL (Ware, Koskinski and Dewey 2000). No follow up data were presented for QoL in the Shuldman, Fleming, and Goodman (2002) paper and so this was requested. A response and data were received but the values were expressed as median change and

range, and these were still not acceptable forms to input into EPPI-Reviewer4 (EPPI-Centre 2017).

Garssen, Boomsma, de Jager Meezenbroek et al. (2013) were contacted because data were displayed in this study as a standard estimate of the mean. Sigma were approached for advice on whether calculations could be performed to convert this value to SD or standard error of the mean. The author was also contacted for detail of this value as is not a known statistical value. There was no reply from the author and Sigma felt that this was possibly the case of a 'typo' and that the author meant standard error of the mean.

2.8 Assessment of Risk of Bias (ROB) in included studies

Risk of bias (ROB) was assessed for all of the included studies. This is important because weakness in the design, conduct, analysis, and reporting of RCTs can mean the effect of a treatment is under or overestimated (Higgins, Altman, Gøtzsche et al. 2011:1). The assessment was carried out by CB independently and a random sample of three papers checked by RB (Arthur Daniels, McKelvie et al. 2000; Richardson, Tennant, Morton et al. 2017 and D'Lima, Colwell, Morris et al. 1996). CB has no previous experience of assessing ROB. There were no disagreements between the author and second reviewer in the assessment of ROB.

The Cochrane Handbook (Higgins and Green 2011) provides guidance on the process and the Cochrane Collaboration's recommended tool was used (Higgins, Altman, Gøtzsche et al. 2011:8). This is included in **Appendix R.** It is a domain-based evaluation developed between 2005 and 2007, in which criteria are provided to allow assessments to be made for six types of bias: selection bias, performance bias, detection bias, attrition bias, reporting bias, and any other bias. Each paper is judged by the review author as having a 'Low risk' of bias, 'High-risk' of bias or 'Unclear risk' of bias. This tool was developed to provide a more comprehensive method of assessing bias. An author detailing study conduct, on which ROB assessments are based, gives more transparency permitting reviewers to decide whether they agree with or dispute the assessments made. The latest evaluation of the tool was carried out by Savovic, Weeks, Sterne et al. (2014). There was recognition of the wide acceptance of its need and the improvements in the latest version. However, there were cautions to be note; the survey had a low response rate. Additionally, improved training and more guidance materials such as algorithms were suggested.

2.9 Data Synthesis

At the protocol stage it was envisaged it may not be appropriate for a meta-analysis to be performed, as scoping identified a range of different behavioural recovery outcome measures. However, once the eleven full text papers were identified, it became apparent that meta-analysis would be possible. EPPI-Reviewer4 (EPPI-Centre 2017) software was used selecting a random effects model, due to the heterogeneity of interventions and following advice from the research team.

Where it was not appropriate to undertake meta-analysis, interrogation of codes and detail was performed using the 'report' function of EPPI-Reviewer4 (EPPI-Centre 2017). Results were presented in tabular form (Summary of key findings **Appendix S**) and a narrative 'empirical' synthesis performed. There were several different reasons why it was not appropriate to pool some of the data using meta-analysis; where data were missing, because of heterogeneity, in the case where the summary measure was median and range, and where a study had two intervention arms. Pooling was considered to create one larger intervention group from the two intervention arms, however pooling of the data to ensure no participant was double counted would have required that the physical and mental QoL scores were pooled as well as the intervention arms. Additionally, data was in the form of n, mean and CI. Using a pooling formula to pool data in this form is much more complex than when it is displayed as mean and SD. CB has limited statistical knowledge, and despite seeking assistance again from Sigma, following discussion with the research team and Dr. Richard Cooke (a meta-analysis expert at Liverpool University) the decision was made to synthesise this study narratively.

2.10 Quality Assessment

The quality of the evidence for the primary and secondary outcome was assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group methodology (Guyatt, Oxman, Ekl et al. 2011, Guyatt, Oxman, Sultan et al. 2013). This tool was chosen because it was adopted by the Cochrane Collaboration for use with systematic reviews. The quality of a body of evidence is categorised according to the level of confidence in the treatment effect. The author has no previous experience in the use of GRADE but has used other research quality assessment tools such as Critical Appraisal Skills Programme checklist (CASP 2014).

The evidence in this review was considered in terms of the tool's five comprising factors: limitations in the design and implementation of available studies suggesting high possibility of bias, indirectness of evidence (indirect population, intervention, control, outcomes), unexplained heterogeneity or inconsistency of results (including problems with subgroup analyses), imprecision of results (wide CIs) and high probability of publication bias (Higgins and Green 2011).

RCTs qualify for the high-quality evidence rating (further research is very unlikely to change the confidence in the estimate of effect). In the present review, evidence was downgraded to moderate, low, or very low-quality evidence, according to the presence of the five factors above. Downgrading took place by one level for serious factors and two levels for very serious factors.

Ordinarily, the quality judgement would drop by one rating for each criterion, up to a maximum of three levels for all factors. If very severe issues are present for any one criterion (e.g. in assessment of limitations in design and implementation, all studies were unconcealed, not blinded, and over 50% of their patients were lost to review), RCT quality may drop by two levels solely due to that factor.

2.11 Chapter summary

This chapter has described and justified the methods employed to conduct this systematic review including searching, selection, data extraction, quality assessment and data synthesis.

Chapter 3 will detail the findings of this review.

Chapter 3 – Results

3.1 Results of search

Electronic searches identified 4235 papers (**Fig.1 Study flow diagram pg 45**); 667 from MEDLINE via EBSCOhost; 148 from CINAHL via EBSCOhost; nine from AMED via EBSCOhost; 111 from ProQuest Psychology; 282 from ProQuest Nursing and Allied Health; 459 from ProQuest Health and Medical Collection; 1207 from PubMed; 812 from Scopus; seventy-one from The Cochrane Library; twenty-four from PsycINFO; thirteen from PsycArticles and 432 from TRIP PRO.

Duplicates were removed (n=1240); leaving 2995 remaining papers. These were screened on title and abstract by CB. A total of 2952 were excluded; 2646 as they did not meet inclusion criteria on PICO, 296 on study design and ten on geographical location. Due to the nature of the interventions and the timing of them, studies tended to focus either on adults or children only. There were no studies found that addressed exclusion, as well as inclusion criteria, such as adults and maternity patients.

The lead author had to be contacted in the case of 22 papers after reading full texts (Gandler, Simmance and Keenan 2016; Dowsey, Castle, Knowles et al. 2014; Berge, Dolin, CdeC Williams et al. 2009; Birch, Stilling, Mechlenburg et al. 2017; Burgio, Goode, Urban et al. 2006; Crotty Prendergast, Battersby et al. 2009; Biau, Porcher, Roren et al. 2015; McGregor, Rylands, Owen et al. 2004; das Nair, Anderson, Clarke et al. 2016; Fink, Diener, Bruckner et al. 2013; Hussain, Brindal, van Kasteren et al. 2017; Ickmans, Moens, Putman et al. 2016; Rolving, Sogaard, Neilsen et al. 2016; Beaupre, Lier, Davies et al. 2004; Chambers, Schove, Halford et al. 2008a; Paul, van Rongen, van Hoeken et al. 2015; Schmidt, Eckard, Scholz et al. 2015; Siggeirsdottir, Olafsson, Jonsson et al. 2005; McDonald, Page, Beringer et al. 2014; Rosal, Ayers, Li et al. 2011; Jacobson, Umberger, Palmieri et al. 2016 and Laferton, Sheddon-Mora, Auer et al. 2013).

The primary reason was to confirm if the patients received GA or epidural anaesthesia; nine papers (Gandler, Simmance and Keenan 2016; Berge, Dolin, CdeC Williams et al. 2009; Burgio, Goode, Urban et al. 2006; Biau, Porcher, Roren et al. 2015; McGregor, Rylands, Owen et al. 2004; Beaupre, Lier, Davies et al. 2004; Siggeirsdottir, Olafsson, Jonsson et al. 2005; Chambers, Schove, Halford et al. 2008a; and Schmidt, Eckard, Scholz et al. 2015). Biau Porcher, Roren et al. (2015) and McGregor, Rylands, Owen et al. (2004) were able to confirm the patients in their study received GA for the surgical procedure. There was no

reply received from Gandler, Simmance and Keenan (2016); Berge, Dolin, CdeC Williams et al. 2009; Burgio, Goode, Urban et al. 2006; Siggeirsdottir Olafsson, Jonsson et al. 2005; Chambers, Schove, Halford et al. 2008a. Beaupre Lier, Davies et al. (2004) replied but were unable to confirm type of anaesthetic as these data were not collected.

In the case of four of the 22 it was necessary to confirm whether the patients received GA or epidural, and if the authors were able to identify high-risk patients separately (Dowsey Castle, Knowles et al. 2014; Rosal, Ayers, Li et al. 2011; Jacobson, Umberger, Palmieri et al. 2016; McDonald, Page, Beringer et al. 2015). The McDonald, Page, Beringer et al. (2015) paper is a review and so the contact author was emailed to ascertain if any of the individual papers would be relevant. They were unable to confirm this as this data had not been collected. Rosal, Ayers, Li et al. (2011) and Jacobson, Umberger, Palmieri et al. (2016) responded to say that they would be unable to confirm that from the data they extracted. There was no reply received from Dowsey, Castle, Knowles et al. (2014). Most results did not state anaesthetic type i.e. GA, regional anaesthetic or LA. Whether individuals received pre-medicative sedation prior to GA was not discussed either.

It was necessary to contact Rolving, Sogaard, Neilsen et al. (2016) to check if there was any separate reporting of high-risk patients amongst her participants. The response stated none of her patients were high-risk (all patients under the age of sixty-five years, BMI 25-27kg/m2, although ASA grade was not collected).

Seven authors were contacted to check if their research had been completed. Birch Stilling, Mechlenburg et al. (2017); das Nair, Anderson, Clarke et al. (2016); Fink, Diener, Bruckner et al. (2013); Hussain, Li, Brindal et al. (2017); Ickmans, Moens, Putman et al. (2016); Paul, van Rongen, van Hoeken et al. (2015) and Laferton, Sheddon-Mora, Auer et al. (2013). These authors either had not published the full study or did not respond.

Finally, Crotty, Prendergast, Battersby et al. (2009) was contacted to confirm whether there was separate reporting of outcomes for the participants that underwent surgical and non-surgical procedures, and if the outcome for pre- and postoperative interventions were reported separately. No response was received.

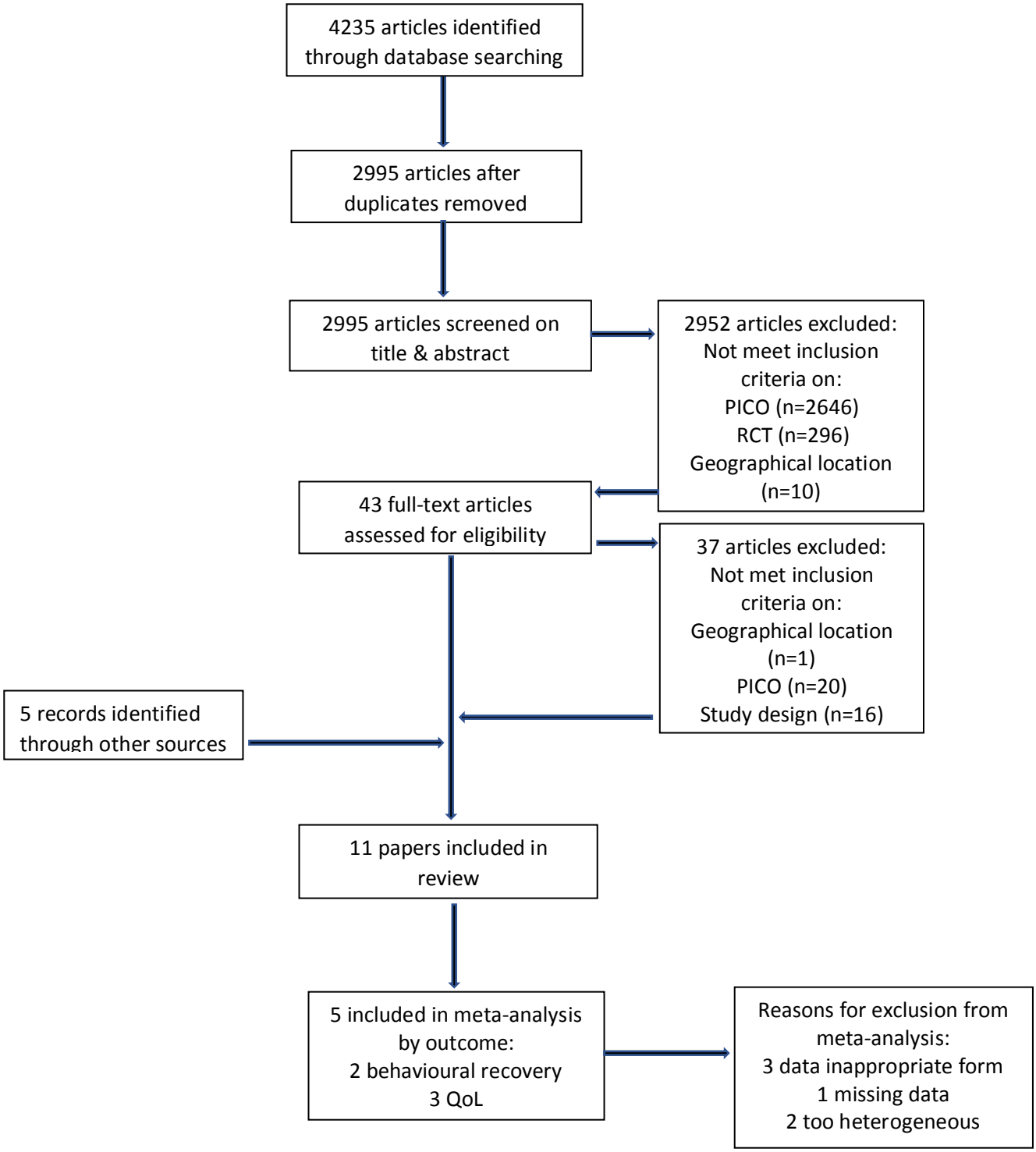
Of the 22 papers, eight (36.4%) had to be excluded as no reply was received to either of the two emails (Gandler, Simmance and Keenan 2016; Berge, Dolin CdeC Williams 2004; Burgio, Goode, Urban et al. 2006; Siggeirsdottir, Olafsson, Jonsson et al. 2005; Chambers, Schove, Halford et al. 2008a; Dowsey, Castle, Knowles et al. 2014; Crotty, Prendergast, Battersby 2009 and Fink, Diener, Bruckner et al. 2013). One (McGregor, Rylands Owen et al. 2004) paper was included after a reply from the corresponding author confirmed that the

papers met the inclusion criteria for this review. The remainder were excluded after replies confirmed that the studies did not meet the inclusion criteria.

Forty-three papers were included for full text screening. At this stage 37 were excluded (one on geographical location, 20 on PICO and 16 on study design). This left six papers included from database searching (Katz, Irish and Devins 2004; Dao, Youssef and Armsworth 2011; Rief, Sheddon-Mora, Laferton et al. 2017; Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Arthur, Daniels, McKelvie et al. 2000, Shuldman, Fleming, and Goodman 2002).

No further papers were identified from searching the reference lists of the included papers however, a further three were then identified from forward citation searching (FCS) of the seven relevant papers (from database searching) (Richardson, Tennant, Morton et al. 2017; Rosenfeldt, Braun, Spitzer et al. 2011 and Gillis, Li, Lee et al 2014) and two were included after being identified from systematic reviews which were identified in database searching (D'Lima, Colwell, Morris et al. 1996 and McGregor, Rylands, Owen et al. 2004). No further papers were identified by FCS or from reference lists of the papers included from the first round of hand searching. UHCW library were able to supply all requests. No eligible papers were included from alerts.

Fig. 1. Study Flow Diagram



3.2 Included studies

The table of characteristics of included studies is shown in **Appendix T.** Eleven studies were included in full text screening, in which 1272 participants were randomised. There were considerably more male than female participants in the included studies; 891 male and 248 female. This information was not given by Garssen, Boomsma, de Jager Meezenbroek et al. (2013).

The dates of publication of the included studies ranged from 1996 to 2017 and the studies were conducted in several countries (two US, three Canada, one Germany, one Australia, one New Zealand, one The Netherlands and two UK). There was an urban setting for the study in ten of the papers, however this information was not stated by D'Lima, Colwell, Morris et al. (1996). Ethnicity of participants was declared in just three of the papers; Richardson, Tennant, Morton et al. 2017; Shuldman, Fleming, and Goodman 2002 and Dao, Youssef and Armsworth 2011. Most of these subjects were white. When interpreting results, it is important to consider that ethnic diversity can have a bearing on uptake and effect of psychological interventions and that ethnic minorities can be under-represented in this type of research (Isaacs, Hunt and Ward et al. 2016). It has been suggested that psychological interventions should be tailored to ethnic groups (American Psychological Association, 1990).

The study participants underwent a variety of surgical procedures; one study investigated participants undergoing colorectal resection for cancer, four Cardiac surgery (one CABG and/or valve surgery, three CABG alone), two orthopaedic surgery (one total knee replacement (TKR), one total hip replacement (THR)), one breast cancer surgery, one head and neck cancer (HNC) surgery, and one oral cancer surgery. The reason(s) that the patients were high-risk included being elderly (two; D'Lima, Colwell, Morris et al. 1996 and McGregor, Rylands, Owen et al. 2004); ASA grade (three; Katz, Irish and Devins 2004; Richardson, Tennant, Morton et al. 2017 and Garssen, Boomsma, de Jager Meezenbroek et al. 2013); h/o CAD or MI (four; Dao, Youssef and Armsworth 2011; Rief, Sheddon-Mora, Laferton et al. 2017; Arthur, Daniels, McKelvie et al. 2000 and Shuldman, Fleming, and Goodman 2002). Rosenfeldt, Braun, Spitzer et al.'s (2011) patients were high-risk because of both ASA grade and h/o CAD or MI and Gillis, Li, Lee et al.'s (2014) patients were high-risk because they comprised elderly and those with an ASA grade of III or IV.

Funding came from various sources. Public funding was received by two authors (Shuldman, Fleming, and Goodman 2002 and McGregor, Rylands, Owen et al. 2004) whereas it was private funding in the case of five authors (Dao, Youssef and Armsworth 2011; Rief,

Sheddon-Mora, Laferton et al. 2017; Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Richardson, Tennant, Morton et al. 2017 and Rosenfeldt, Braun, Spitzer et al 2011). There were three papers where source of funding was not stated (Katz, Irish and Devins 2004; Gillis, Li, Lee et al 2014 and D'Lima, Colwell, Morris et al. 1996). Ethical approval was obtained and detailed in all papers apart from Katz, Irish and Devins 2004. All 11 papers stated that informed consent was taken from the participants. The method of recruitment varied in the papers; clinic (three; Richardson, Tennant, Morton et al. 2017; Gillis, Li, Lee et al 2014 and McGregor, Rylands, Owen et al. 2004); waiting list (five; Rosenfeldt, Braun, Spitzer et al 2011; Shuldman, Fleming, and Goodman 2002; Arthur, Daniels, McKelvie et al. 2000; Rief, Sheddon-Mora, Laferton et al. 2017; Dao, Youssef and Armsworth 2011) and this was unclear in three; D'Lima, Colwell, Morris et al. (1996); Garssen, Boomsma, de Jager Meezenbroek et al. (2013) and Katz, Irish and Devins (2004).

The interventions included procedural information (four; McGregor, Rylands, Owen et al. 2004; Arthur, Daniels, McKelvie et al. 2000; Gillis,Li, Lee et al 2014 and Shuldman, Fleming, and Goodman 2002); behavioural instruction (five: McGregor, Rylands, Owen et al. 2004; D'Lima, Colwell, Morris et al. 1996; Gillis, Li, Lee et al 2014; Rosenfeldt, Braun, Spitzer et al 2011 and Arthur, Daniels, McKelvie et al. 2000); coping strategies (one; Gillis, Li, Lee et al 2014); stress management (two; Rosenfeldt, Braun, Spitzer et al 2011 and Garssen, Boomsma, de Jager Meezenbroek et al. 2013); self-regulation (one: Richardson, Tennant, Morton et al. 2017); expectation optimisation (one; Rief, Sheddon-Mora, Laferton et al. 2017); CBT (one; Dao, Youssef and Armsworth 2011) and psychoeducation (one: Katz, Irish and Devins 2004). Some papers used more than one intervention. Of the 11 papers, seven contained an educational intervention. The psychological theory to underpin the intervention was outcome expectation (Rief, Sheddon-Mora, Laferton et al. 2017); self-regulation (Richardson, Tennant, Morton et al. 2017) and multiple theories (cognitive behavioural) in the case of Dao, Youssef and Armsworth (2011). Eight papers did not detail underpinning psychological theory (Katz, Irish and Devins 2004; Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Shuldman, Fleming, and Goodman 2002; Rosenfeldt, Braun, Spitzer et al 2011; Gillis, Li, Lee et al 2014; D'Lima, Colwell, Morris et al. 1996; McGregor, Rylands, Owen et al. 2004). It must be noted that six papers included an additional postoperative intervention (Katz, Irish and Devins 2004; Dao, Youssef and Armsworth 2011; Gillis, Li, Lee et al 2014; Rief, Sheddon-Mora, Laferton et al. 2017; Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Arthur, Daniels, McKelvie et al. 2000) and so it cannot be discounted that part of any effect was due all or partly to the postoperative intervention.

Five papers were included in meta-analysis (Katz, Irish and Devins 2004; D'Lima, Colwell, Morris et al. 1996; Gillis Li, Lee et al. 2014; Richardson, Tennant, Morton et al. 2017 and

McGregor, Rylands, Owen et al. 2004). There were six papers which could not be included, and a narrative review was undertaken on these. The reasons for this were that data were not expressed in an appropriate form (Arthur, Daniels, McKelvie et al. 2000; Rosenfeldt, Braun, Spitzer et al. 2011 and Shuldman, Fleming, and Goodman 2002); missing data (Garssen, Boomsma, de Jager Meezenbroek et al. 2013) and too heterogenous (Dao, Youssef and Armsworth 2011 and Rief, Sheddon-Mora, Laferton et al. 2017).

3.3 Risk of bias in included studies

Summaries across studies are presented in **Table. 4. and Fig. 2.** It was not anticipated that many of the included studies would be assessed as 'low risk' for performance bias as it is difficult to blind participants in such studies. However, no single paper scored 'low-risk' for all six types of bias. No papers were excluded due to being poor quality 'high-risk' studies.

3.3.1 Random sequence generation

Only one study was rated as 'high-risk' for random sequence generation and one as 'unclear risk' largely because only RCT designs are included. The process used to produce the allocation sequence was described in enough detail to permit a judgement of whether it should generate comparable groups in nine out of the eleven papers.

3.3.2 Allocation

Clear description of allocation concealment was provided in less than half of the papers; only five out of 11 being assessed as 'low ROB' (Arthur, Daniels, McKelvie et al. 2000; Dao, Youssef and Armsworth 2011; Rief, Sheddon-Mora, Laferton et al. 2017, Gillis, Li, Lee et al. 2014; Shuldman, Fleming, and Goodman 2002). This aspect was unclear in five papers (D'Lima, Colwell, Morris et al. 1996; Katz, Irish and Devins 2004; McGregor, Rylands, Owen et al. 2004; Richardson, Tennant, Morton et al. 2017 and Rosenfeldt, Braun, Spitzer et al. 2011).

Only four papers were rated as 'low-risk' in relation to allocation concealment (Arthur, Daniels, McKelvie et al. 2000; Rief, Sheddon-Mora, Laferton et al. 2017; Rosenfeldt, Braun, Spitzer et al. 2011 and Shuldman, Fleming, and Goodman 2002). This is because of the nature of the interventions: psychological preparation delivered in the studies involved interaction between the practitioner and the participant making blinding difficult in the case of both parties.

3.3.3 Blinding

Blinding of outcome assessment to avoid detection bias was achievable in the studies included in this review, by ensuring outcome assessors were blind to the intervention a participant received. However, this information was not detailed in six of the papers and therefore only Arthur, Daniels, McKelvie et al. 2000; Richardson, Tennant, Morton et al. 2017; Rief, Sheddon-Mora, Laferton et al. 2017; Gillis, Li, Lee et al. 2014 and Shuldman, Fleming, and Goodman 2002 could be rated as 'low ROB'.

3.3.4 Incomplete data outcome

It was possible to assess for attrition bias in all studies. Exclusions and attrition were detailed by the study authors, along with reasons, and any re-inclusions in analyses; and participant numbers in each treatment group (compared with total randomized participants) were reported by eight authors (Dao, Youssef and Armsworth 2011; D'Lima, Colwell, Morris et al. 1996; Katz, Irish and Devins 2004; McGregor, Rylands, Owen et al. 2004; Richardson, Tennant, Morton et al. 2017; Rief, Sheddon-Mora, Laferton et al. 2017; Rosenfeldt, Braun, Spitzer et al. 2011; Gillis, Li, Lee et al. 2014) and hence could be assessed as 'low ROB'.

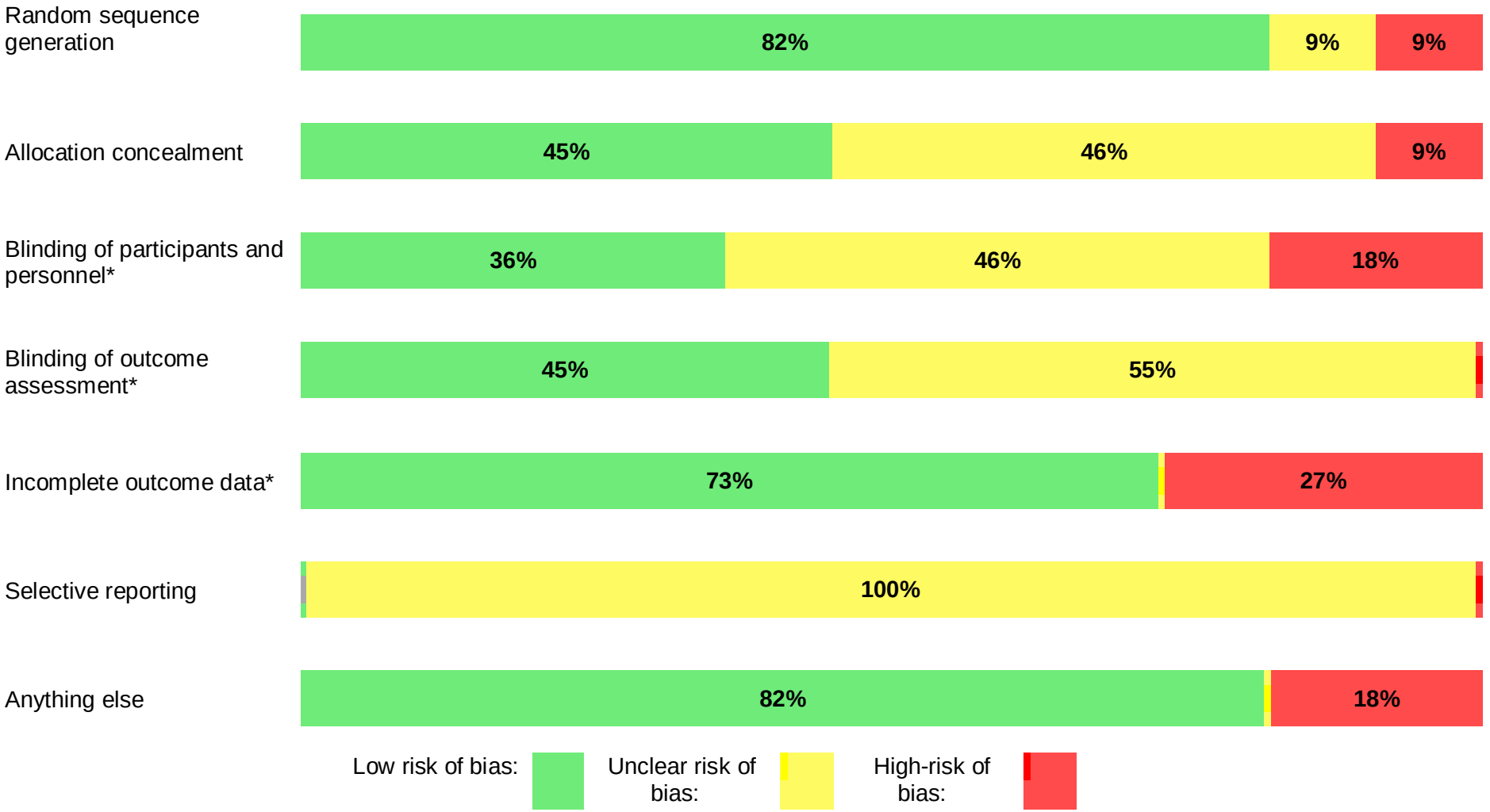
3.3.5 Selective reporting

All 11 papers were rated as 'unclear ROB'. This is because protocols for 10 of the papers were not found after searching PubMed and EBSCOhost databases and the internet; as suggested by the Cochrane Handbook (Higgins and Green 2011) and contacting the authors. Insufficient information was therefore available to allow a judgement of 'low-risk' or 'high-risk'. The protocol for the Rief, Sheddon-Mora, Laferton et al. 2017 paper was located however, the two secondary outcomes which were identified in the protocol were not reported (cost effectiveness analysis and a videotape asking participants to describe their QoL at follow up).

Table. 4. Risk of bias summary: review authors' judgements about each ROB item for each included study.

Item ID	Short Title	Random sequence generation	Allocation concealment	Blinding of participants and personnel*	Blinding of outcome assessment*	Incomplete outcome data*	Selective reporting	Anything else, ideally prespecified
32641525	Arthur (2000)	+	+	+	+	-	?	+
32639281	Dao (2011)	+	+	-	?	+	?	+
33116445	D'Lima (1996)	+	?	?	?	+	?	+
32641057	Garssen (2013)	?	-	?	?	-	?	+
32638963	Katz (2004)	+	?	?	?	+	?	-
33116446	McGregor (2004)	-	?	?	?	+	?	+
33116401	Richardson (2017)	+	?	-	+	+	?	+
32640330	Rief (2017)	+	+	+	+	+	?	+
33116402	Rosenfeldt (2011)	+	?	?	?	+	?	+
33116405	Gillis (2014)	+	+	+	+	+	?	+
32642675	Shuldham (2002)	+	+	+	+	-	?	-

Fig. 2. Risk of bias graph: review authors' judgements about each ROB item presented as percentages across all included studies.



3.3.6 Other potential forms of bias

Most studies were found not to have any additional sources of bias. Two studies were rated as 'high-risk'; Katz, Irish and Devins (2004) because of baseline differences between intervention and outcome group which could have could have contributed to differences in outcome, and Shuldman, Fleming, and Goodman (2002) because most participants were white, male and from the third (manual) occupational group upwards.

3.4 Findings by outcome

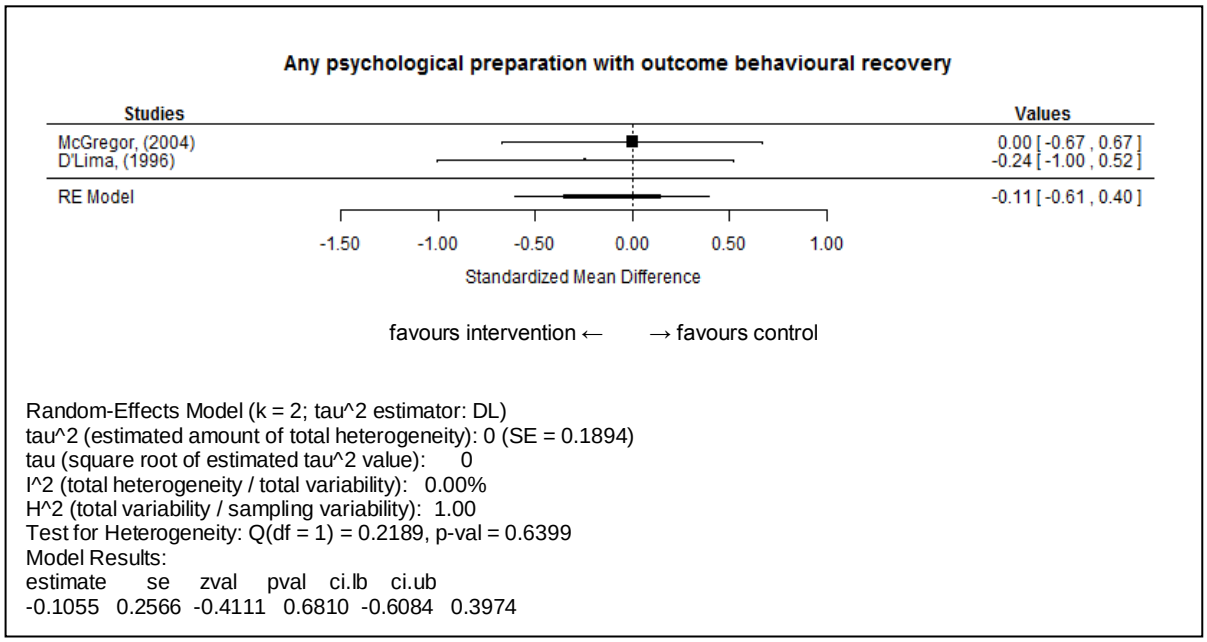
A summary of key findings is provided in **Appendix S.** One paper measured the outcome of postoperative behavioural recovery alone (D'Lima, Colwell, Morris et al. 1996) and eight papers measured QoL alone (Katz, Irish and Devins 2004; Dao, Youssef and Armsworth 2011; Garrsen, Boomsma, de Jager Meezenbroek et al. 2013; Arthur, Daniels, McKelvie et al. 2000; Shuldman, Fleming, and Goodman 2002; Richardson, Tennant, Morton et al. 2017; Rosenfeldt, Braun, Spitzer et al 2011 and Gillis, Li, Lee et al 2014). Two papers measured both behavioural recovery and QoL (Rief, Sheddon-Mora, Laferton et al. 2017 and McGregor, Rylands, Owen et al. 2004). The outcome measurement tools that the papers used were: SF-36 (Ware, Koskinski and Dewey 2000) (four; Arthur, Daniels, McKelvie et al. 2000; Shuldman, Fleming, and Goodman 2002; Gillis, Li, Lee et al 2014 and Rosenfeldt, Braun, Spitzer et al 2011); SF-12 which is adapted from SF-36 (Ware, Koskinski and Dewey 2000) (two; Dao, Youssef and Armsworth 2011 and Rief, Sheddon-Mora, Laferton et al. 2017); European Organisation for Research and Treatment of Cancer Core QoL Questionnaire (EORTC) (Aaronson, Cull, Kaasa et al. 1994) (two; Katz, Irish and Devins 2004 and Garssen, Boomsma, de Jager Meezenbroek et al. 2013); Barthel's Activities of Daily Living Index (Mahoney and Barthel 1965) (one; McGregor, Rylands, Owen et al. 2004); Functional Assessment of Cancer Therapy – Head and Neck Questionnaire (FACT-H&N) (Cella, Tulksy, Gray et al. 1993) (one; Richardson, Tennant, Morton et al. 2017); International Physical Activity Questionnaire (IPAQ) (Craig, Marshall, Sjostrom et al. 2003) (one; Rief, Sheddon-Mora, Laferton et al. 2017); EuroQoL EQ-5D (Brooks 1996 and van Agt, Essink-Bot, Krabbe et al 1994) (one; McGregor, Rylands, Owen et al. 2004) and Hospital for Special Surgery Knee Rating (Insall, Dorr, Scott et al. 1989) (one; D'Lima, Colwell, Morris et al. 1996).

3.4.1. Primary outcome - *Behavioural Recovery*

3.4.1.1 Studies included in the meta-analysis

It was possible to include two studies with the primary outcome in the meta-analysis (18% of studies) (D'Lima, Colwell, Morris et al. 1996 and McGregor, Rylands, Owen et al. 2004), with analysis of 69 participants data (5% of 1272 participants randomised in the 11 papers included on full text screening) **(Fig. 3. Analysis 1).**

Fig. 3. Analysis 1 behavioural recovery (any psychological intervention versus control)



SMD is the term that will be used in this review, rather than effect size as it is often referred to in the social sciences (Higgins and Green 2011). Overall SMD was -0.11 (95% CI) -0.61-0.40); the flattened diamond crosses the line of null effect and so the meta-analysed result cannot be said to differ from no effect at the given level of confidence. The p-value was 0.68 and so this is not a statistically significant result. There is however no statistical heterogeneity between studies (I-squared =0.00%).

The papers both measured the outcome at three months postoperatively and used the same psychological intervention of behavioural instruction, however McGregor, Rylands, Owen et al. (2004) used a combination of behavioural instruction and procedural information. The participants in both papers underwent Orthopaedic Surgery, however in the case of McGregor, Rylands, Owen et al. (2004) it was THR and in the case of D'Lima, Colwell,

Morris et al. (1996) it was TKR. Additionally, the reason the patients were high anaesthetic risk were also the same and this was being elderly.

As D'Lima, Colwell, Morris et al. (1996) and McGregor, Rylands, Owen et al. (2004) used two different tools to measure behavioural recovery a Standardised Mean Difference (SMD) or continuous: d (hedges g) outcome type was used to pool the data. However, in the case of both tools; Barthel's Index (Mahoney and Barthel 1965) and Hospital for Special Surgery Knee Rating (Insall, Dorr, Scott et al. 1989) a high score indicates independence.

Interpretation of the funnel plot was not undertaken to assess any publication bias in this or any of the subsequent analyses as it has been suggested that visual representation is inaccurate in the cases of a small number of studies (Sedgewick and Marston 2015). Additionally, it has been argued by some authors that information gained from visual inspection of funnel plots is too subjective. Terrin, Schmid and Lau (2005) found that the ability of researchers to correctly read funnel plots generated in meta-analyses conditional to publication bias, was limited.

3.4.1.2 Studies not included in meta-analysis

Two papers addressing the outcome behavioural recovery were not appropriate to include in meta-analysis (Rief, Sheddon-Mora, Laferton et al. 2017 and Gillis, Li, Lee et al. 2014) as there was no consistency in terms of type of surgery, outcome measure, outcome timepoint, reason participants were high risk or type of psychological intervention. Rief, Sheddon-Mora, Laferton et al. 2017 reported a significantly different effect in both intervention groups when compared to control, at six months postoperatively in patients who had undergone CABG surgery; EXPECT: $p < 0.001$, SUPPORT: $p < 0.001$, SMC: $p = 0.673$. Therefore, it seems that optimising patients' expectations preoperatively helped to improve physical activity six months postoperatively. This study had the third largest sample size with 124 participants randomised but it was acknowledged by the authors that replication in larger, multi-centre trials is necessary. Gillis, Li, Lee et al. 2014 also found a positive effect on physical activity. In their case behavioural instruction, procedural information and coping strategies were delivered to participants undergoing colorectal surgery. Participants self-reported physical activity at eight weeks post-surgery; estimating total hours spent per week performing 41 listed activities of various intensities. Results suggested a significant difference between groups in favour of treatment.

In summary, the evidence from the meta-analysis suggests that psychological preparation has no effect on behavioural recovery. However, the narratively synthesis demonstrated significant benefit on behavioural recovery.

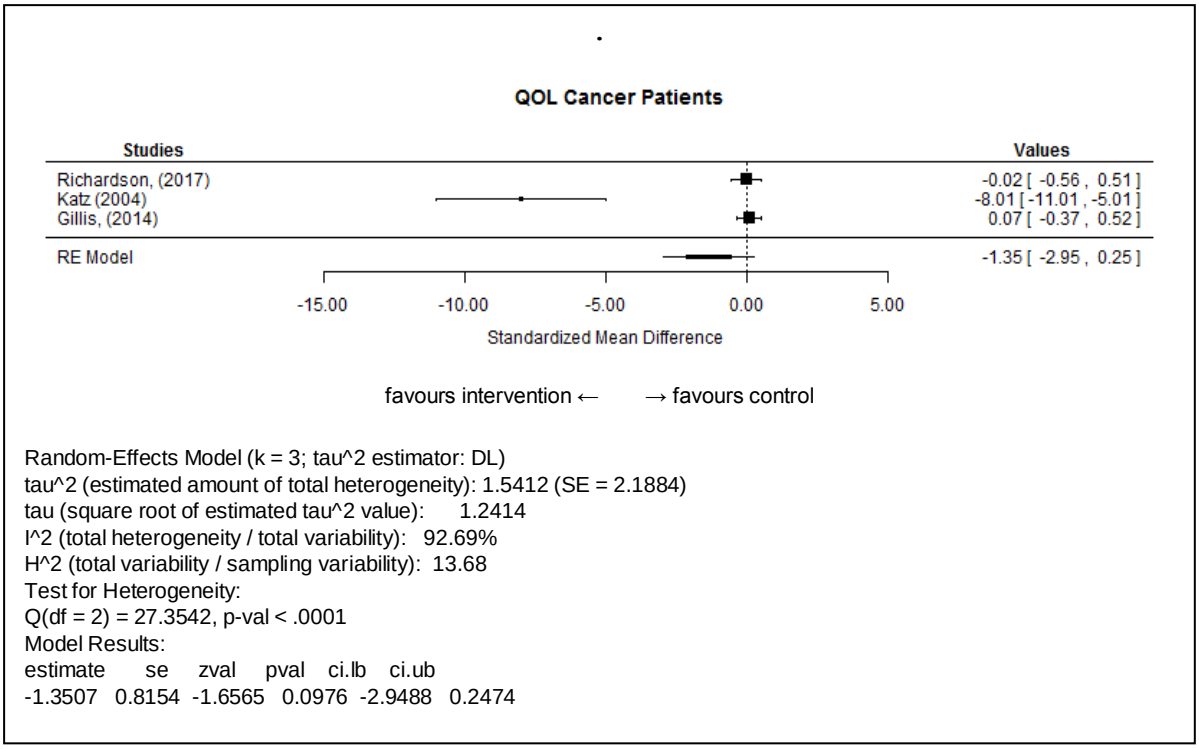
The overall quality of evidence was rated as low after downgrading two levels (**Appendix U**). The downgrade factors of ROB, inconsistency, indirectness, imprecision and publication bias were all classed as serious. Therewere no upgrade factors.

3.4.2 Secondary outcome – *QoL*

3.4.2.1 Studies included in the meta-analysis

It was possible to include three studies in meta-analysis (27% of 11 studies) which measured a QoL outcome (Gillis, Li, Lee et al 2014; Richardson, Tennant, Morton et al. 2017 and Katz, Irish and Devins 2004), and where 172 participants were randomised (14% of 1272 participants randomised) **Fig. 4. Analysis 2.** A high score represented high QoL in all three measurement tools.

Fig. 4. Analysis 2 QOL (any psychological intervention versus control)



There were two null studies with narrow CIs suggesting confidence in this result, and one very large effect, but a small sample size (Katz, Irish and Devins 2004) and hence a huge CI indicating less certain conclusions. Overall SMD was -1.35 and (95% CI -2.95-0.25 and the p-value was 0.09. This is not a statistically significant result.

There was high statistical heterogeneity between studies (I-squared =92.69%). Although all three studies had participants with cancer; the locations of the cancer varied. These were oral (Katz, Irish and Devins 2004), colorectal (Gillis, Li, Lee et al 2014) and head and neck (Richardson, Tennant, Morton et al. 2017). Additionally, outcome measurement tools varied; SF-36 (Ware, Koskinski and Dewey 2000) was utilised by Gillis, Li, Lee et al (2014), EORTC (Aaronson, Cull, Kaasa et al. 1994) in the Katz, Irish and Devins (2004) paper and FACT-H&N (Cella, Tulksy, Gray et al. 1993) in the study by Richardson, Tennant, Morton et al. (2017). Furthermore, there was variation in the timepoint that the outcome was measured; this was 12 weeks postoperatively in both the Katz, Irish and Devins (2004) and Richardson, Tennant, Morton et al. (2017), but earlier at eight weeks postoperatively in the study conducted by Gillis, Li, Lee et al (2014). Finally, there was inconsistency between the psychological interventions delivered, with three different types delivered across the three different papers; self-regulation was the intervention tested by Richardson, Tennant, Morton et al. (2017), psychoeducational intervention by Katz, Irish and Devins (2004) and in the study carried out by Gillis, Li, Lee et al (2014) an intervention involving behavioural instruction, procedural information and coping strategies was delivered.

3.4.2.2 Studies not included in meta-analysis

Six papers addressing the outcome QoL were not suitable to include in the meta-analysis (Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Shuldman, Fleming, and Goodman 2002; Arthur, Daniels, McKelvie et al. 2000; Dao, Youssef and Armsworth 2011; Rosenfeldt, Braun, Spitzer et al. 2011 and Rief, Sheddon-Mora, Laferton et al. 2017).

The psychological interventions that appeared in these papers were stress management (Garssen, Boomsma, de Jager Meezenbroek et al. 2013 and Rosenfeldt, Braun, Spitzer et al. 2011); procedural information (Shuldman, Fleming, and Goodman 2002); procedural information and behavioural instruction (Arthur, Daniels, McKelvie et al. 2000); cognitive behavioural therapy (Dao, Youssef and Armsworth 2011) and expectation optimisation (Rief, Sheddon-Mora, Laferton et al. 2017). Participants in the studies by Shuldman, Fleming, and Goodman 2002; Dao, Youssef and Armsworth 2011; Rief, Sheddon-Mora, Laferton et al. 2017 and Arthur, Daniels, McKelvie et al. 2000 all underwent CABG and were high-risk

because of h/o CAD. In the Rosenfeldt, Braun, Spitzer et al. 2011 paper participants underwent either CABG or heart valve surgery and were high-risk because of h/o CAD and/or ASA grade. In the Garssen, Boomsma, de Jager Meezenbroek et al. (2013) paper they underwent breast cancer surgery and the reason they were high-risk was ASA grade.

Garssen, Boomsma, de Jager Meezenbroek et al. (2013) reported that QoL increased at day 30 postoperatively, whereas there was no postoperative improvement seen in the control group. However, the difference between groups was not statistically significant. The sample size was small, however Garssen, Boomsma, de Jager Meezenbroek et al. (2013) stated that the power calculation indicated the sample was large enough to detect at least modest effects. Dao, Youssef and Armsworth (2011) described similar findings but this time with their brief intervention of CBT. It was found to have a low dropout rate and lack adverse effects and concluded to be an acceptable and feasible intervention for patients scheduled for CABG.

At six months postoperatively Shuldman, Fleming, and Goodman 2002 found general improvements on all outcomes compared to baseline, but where one group had improved more, the changes always favoured the control. During the study a larger percentage of the control patients were 'fast-tracked'. Additionally, of the small number of patients who returned to the intensive care unit due to deterioration, most were from the intervention group. It is suggested by the authors that these two factors may explain the poorer scores given by the intervention group. That said, the findings of this study indicate that the intervention is harmful. This is not clearly described by the authors.

In the study by Arthur, Daniels, McKelvie et al. (2000) findings suggested that patients who received procedural information and behavioural instruction reported higher physical and mental QoL scores at six to eight weeks and six months postoperatively as compared to baseline and that the difference was statistically significant compared to control. A positive effect on mental QoL was noted by Rief, Sheddon-Mora, Laferton et al. (2017) for the EXPECT intervention group; QoL was significantly improved ($p < 0.001$) in this treatment arm. However, there was no significant improvement seen for the other intervention group (SUPPORT) when compared to SMC. For physical QoL, significant improvement was seen in both treatment arms compared to control. These papers used the measurement tool SF36 and its adapted version SF12 to determine the effect of the psychological intervention on QoL in patients undergoing CABG surgery. Therefore, participants in both studies were high-risk because of CAD. These papers were unable to be included in meta-analysis. Arthur, Daniels, McKelvie et al. (2000) displayed data in graphical form, and so accurate values could not be extracted. Contact was attempted with Arthur who was the corresponding

author however, she was deceased. In the case of Rief, Sheddon-Mora, Laferton et al. (2017) data was not displayed in an appropriate form to input into EPPI-Reviewer4 (EPPI-Centre 2017), but as mean and range of observed means.

Physical QoL was significantly improved six weeks post-surgery compared to baseline ($p < 0.001$) in treatment and control groups in a study conducted by Rosenfeldt, Braun, Spitzer et al. (2011). However, there was no significant difference between the groups overall ($p = 0.35$). A mental stress reduction intervention was delivered preoperatively in this study to participants undergoing cardiac surgery. Mental QoL at six weeks postoperatively, compared to baseline was significantly improved in the intervention group ($p= 0.03$) but was unchanged in the control ($p= 0.84$).

In summary, meta-analyses suggested that psychological interventions had no effect on QoL in preoperative patients with a high anaesthetic risk. High levels of statistical heterogeneity make it difficult to accept with confidence the results suggested. Improved physical and mental QoL was demonstrated to be statistically significant in the intervention group, of two papers reviewed narratively. However, one paper concluded that the intervention favoured the control group and therefore the intervention is harmful. This is a very important finding.

Overall the 11 papers had small sample sizes, with Shuldman, Fleming, and Goodman (2002) having the largest number of participants randomised; just 356. Control group content was often poorly reported with little more or no other detail that 'treatment as usual' or 'SMC' in seven out of the 11 included papers.

The overall quality of evidence was rated as low **(Appendix U);** downgraded by three levels (due to all downgrade factors being assessed as serious apart from inconsistency which was assessed as very serious) but upgrading by one (very large magnitude of effect).

3.5 Chapter summary

This chapter has presented the findings of this review including the search results, the study range and characteristics, study quality and ROB reports, and included analysis of the effect of the interventions on the two outcomes. Synthesis of the results has been reported by outcome for those studies included in a meta-analysis and those pooled by narrative synthesis. Tables and figures were used to assist with the presentation of included studies and their findings. Forest plots visually illustrated results of meta-analyses. Although funnel plots were produced by EPPI-Reviewer4 (EPPI-Centre 2017) software these were not interpreted. A 'summary of findings' table provided main data regarding the quality of evidence, the size of effect of the interventions by outcome, and the conclusion of findings

synthesised narratively. The evidence from the meta-analysis suggests that psychological preparation has no effect on behavioural recovery or QoL. In the narratively synthesised studies significant benefit on behavioural recovery was seen. Two papers reviewed narratively suggested QoL was improved and this improvement was statistically significant. However, one paper concluded that the intervention group faired worse than the control; that is harm was caused and this is a very important finding.

Chapter 4 will describe and interpret the review findings.

Chapter 4 - Discussion

4.1 Summary by outcome

4.1.1 *Behavioural recovery*

The meta-analysis suggested that preoperative psychological interventions had no effect (SMD -0.11; 95% CI -0.61-0.40) on behavioural recovery for high risk patients. CI's were large as sample sizes were small. There was a common intervention type amongst the pooled data; behavioural instruction. McGregor, Rylands, Owen et al. (2004) however used a combination of behavioural instruction and procedural information. The participants all underwent Orthopaedic Surgery and the outcome was measured at the same timepoint. Therefore, there was no statistical heterogeneity between studies. However, the two studies included in the narrative synthesis both reported contrasting findings to those of the meta-analysis. Both studies (Rief, Sheddon-Mora, Laferton et al. 2017 and Gillis, Li, Lee et al. 2014) found a significant difference between groups in favour of the intervention group. It is interesting that a positive effect was demonstrated by Gillis, Li, Lee et al. (2014) even though the time between diagnosis and surgery was just three to four weeks.

4.1.2 *QoL*

Findings of the meta-analyses were that psychological preparation had no effect on overall QoL (SMD -1.35; 95% CI -2.95-0.25). There were two null studies with small CIs and one very large effect with very wide CIs. It is debatable whether these results demonstrate anything that would not have been better considered in a narrative synthesis. Additionally, statistical heterogeneity was high in this analysis as there was limited consistency in the measures used. Of the studies not included in meta-analysis, mixed results were found. Two studies demonstrated a positive effect; Rief, Sheddon-Mora, Laferton et al. (2017) and Arthur, Daniels, McKelvie et al. (2000). Rief, Sheddon-Mora, Laferton et al. (2017) concluded that optimising patients' expectations pre-surgery helps to improve outcome six months after treatment. One caution to note is that the same trainers were used for both treatment arms. Whilst this reduces error variance due to therapist differences there is a risk of contamination effects, although treatment fidelity checks indicated satisfactory adherence. The latter paper suggested that patients who received procedural information and behavioural instruction reported higher physical and mental QoL scores at six to eight weeks and six months

postoperatively compared to baseline. However, the sample size was small, and the intervention was delivered throughout the whole waiting period; the same findings may not be achieved where there are short waits. It should be acknowledged that the intervention had a physical as well as psychological component (Arthur, Daniels, McKelvie et al. 2000:258), and so improved QoL is not solely attributable to psychological preparation. Shuldman, Fleming, and Goodman (2002) saw general improvements from baseline on all parts, but where one group had improved more, the changes always favoured SMC, therefore the intervention may cause harm. This is the only study that demonstrated potential harm. The intervention was procedural information and has not been identified as harmful in other studies, in fact Arthur, Daniels, McKelvie et al. (2000) delivered the same intervention to cardiac patients and a positive effect was seen. It has the largest sample size of all the papers reviewed but that seems the only thing particular about this studies context. Of the remainder Rosenfeldt, Braun, Spitzer et al. (2011) demonstrated an effect on mental QoL only and the Garrsen, Boomsma, de Jager Meezenbroek et al. (2013) and Dao, Youssef and Armsworth (2011) studies concluded no significant effect for the intervention group.

Rief, Sheddon-Mora, Laferton et al. (2017) demonstrated a positive effect on both behavioural recovery and QoL when they delivered their intervention to optimise expectations of Pre-Operative cardiac surgical patients.

4.2 Findings in relation to other studies and reviews

The current review builds on work by Powell, Scott Manyande et al. (2016), with a focus on patients with a high anaesthetic risk, those who underwent any surgery type and any psychological intervention. As per the 2016 review, findings cannot be generalised to emergency procedures or children. Current outcomes were restricted to behavioural recovery and QoL. Powell, Scott, Manyande et al. (2016) included behavioural recovery as a result but were unable to perform a meta-analysis for this due to the heterogeneity in behavioural recovery measures. Powell, Scott, Manyande et al. (2016:32) concluded that psychological preparation could benefit behavioural recovery in a general population of surgical patients, however this current study was unable to demonstrate this for high-risk patients. One possible explanation for this could be that there were three and a half times more male participants than females in studies included in the current review, and there is evidence that females are more receptive to psychological treatment (Johnston and Vogele 1993; 16).

More than half of the papers included psychological interventions that had an educational basis to some degree. When planning the current review, it was not envisaged that educational therapies such as procedural information and behavioral instruction would be classed as psychological interventions. However, they change expectations about what we think or do and therefore should be (Suls and Wan, 1989; Johnston and Vogele, 1993; Kiecolt-Glaser and Favegehi 1998; Newell, Sanson-Fisher and Savolainen, 2002; Shehmar and Gupta, 2010; Powell, Scottand Maynade et al. 2016). Importantly however, preoperative assessment SMC has educational features, without a formal label of psychological preparation. Procedural information and behavioural instruction were the two most common interventions amongst papers included in the Powell, Scott and Maynade et al. (2016) review.

Mcdonald, Page, Beringer et al. (2014) suggested that preparation with an educational basis might require individual tailoring as patients' needs vary. For example, some patients do not want to know every detail of what to expect during hospitalisation as this may cause them greater anxiety. This could provide an explanation for the lack of effect in the high-risk group, despite best evidence in the general population demonstrating effectiveness. Perhaps the interventions make patients focus more on their risk of morbidity and mortality; and recovery and QoL is adversely affected. Averill and Thompson supported this notion as far back as 1973 and 1981, in reviews proposing information may not always be useful to patients. Langer, Janis and Wolfer (1975) suggested that preoperative information might tune some individuals into pain and discomfort, creating more problems.

Some of the educational interventions in this current review contained general advice only which could explain their ineffectiveness. It appeared that only Arthur, Daniels, McKelvie et al. 2000; Shuldman, Fleming, and Goodman (2002) and D'Lima, Colwell, Morris et al. 1996 made efforts to individualise their interventions. Veronovici, Lasiuk, Rempel et al. (2014) examined QoL in high-risk patients and agreed; standardised educational tools are appropriate but only effective if used in combination with individualised interventions. Additionally, Hathaway's (1986) review found a preoperative instruction programme had greater effect on postoperative outcomes when addressing specific needs of the individual.

Many interventions featuring in this review improve recovery by lessening or managing stress, anxiety and worry about surgery or by managing expectations perioperatively. However, variability of content was common within intervention type, and detail was reported to variable degrees. The underlying mechanisms by which the interventions might affect the outcomes was poorly discussed in the papers; eight out 11 papers made no reference to underpinning psychological theory. These findings are consistent with those reported by

Tsimopoulou, Pasquali Howard et al. (2015). As has been proposed and widely accepted within the behaviour change literature, without standardised definitions of strategies or techniques contained within intervention, there are challenges identifying elements contributing to effectiveness, as well as issues of replicability (Abraham and Michie 2008: 379). Future research in this field needs to consider development of hierarchical taxonomies of intervention techniques, like the type produced by Michie et al (2013) and clearer descriptions of intervention content to enable more robust examination of what works to improve outcomes after surgery.

In this review, and that of Powell, Scott and Maynade et al. (2016) fidelity was not examined; that is whether interventions were delivered in accordance with the study protocol. This is crucial where complex psychological interventions are delivered by a person rather than in a standard format such as a DVD or leaflet. Whoever is delivering the intervention needs full training in the content and delivery, and that this standard is evaluated to ensure consistency of adherence. If a fidelity check is not conducted, then it is possible that important elements are missed or added. It would have been challenging to assess fidelity in this review because ROB assessment revealed that ten of the 11 protocols could not be located.

Some of the aspects of preparation covered in this review were also examined by Tsimopolou, Pasquali, Howard (2015:4117). They demonstrated that QoL indicators were positively influenced in high-risk cancer surgical patients meaning their findings differ from these. One possible explanation is that psychological interventions led to fewer surgical site infections; improving QoL and recovery. This theory was not proposed in any studies included in this review, however there have been several others who discuss the link between psychological stress and clinically relevant delays in wound healing (Maple, Chilcot, Lee et al. 2015:24; Marucha, Kiecolt-Glaser and Favegehi 1998:364; Walburn, Vedhara, Hankins et al. 2009:1).

None of the papers included in the current review featured hypnosis as an intervention, despite hypnosis being the focus of a synthesis by Tefikow, Barth, Maichrowitz et al. in 2013. There were differences between their review and the current one; surgical recovery was an outcome, but QoL was not measured and not all patients were high-risk. Additionally, some interventions were delivered postoperatively. Hypnosis was demonstrated to have small to medium effects and these findings did reflect those of a few earlier reviews (Flammer and Bongartz 2003; Montgomery, David, Winkel et al. 2002 and Schnur, Bovbjerg, David 2008). Flammer and Bongartz (2003) demonstrated a medium effect of hypnosis when integrating data from 57 studies into a meta-analysis. In an RCT, Schnur, Bovbjerg, David (2008) found

hypnosis superior to control reducing sedation and LA use; pain, nausea, fatigue, discomfort, and emotional upset at discharge. Additionally, hypnosis was cost-effective. Tefikow, Barth, Maichrowitz et al. (2013) reviewed a study of self-hypnosis in GA high-risk patients on their preoperative night, and reported positive findings for depression, fatigue, anger and reduced tension (Ashton, Whitworth, Seldomridge et al. 1995).

Several studies contained multi-faceted interventions. Arthur, Daniels, McKelvie et al. 2000; Gillis, Li, Lee et al 2014 and McGregor, Rylands, Owen et al. (2004) all contained procedural information in combination with behavioural instruction. Rosenfeldt, Braun, Spitzer et al's 2011 study used an intervention comprising stress management and behavioural instruction. When this method is employed it is difficult to be clear which of the components were effective or not; would one of the components have been effective if used alone i.e. were they ineffective due to their joint effect. However, prehabilitation is a contemporary multimodal holistic approach to pre-operative preparation and Tsimopolou, Pasquali, and Howard's (2015) review concluded that there were demonstrable gains to be seen with prehabilitation programmes following colorectal cancer resection. Additionally, Barberan-Garcia, Ubre, Roca et al. (2018) assessed personalised prehabilitation in an RCT including 125 high-risk patients. Postoperative complications were seen in 51% fewer patients providing encouraging results and warranting further consideration of prehabilitation as a core element of preoperative care.

Placebo research has found that expectations play a role in placebo response (Schedlowski, Enck, Rief et al. 2015:725; Colloca, Jonas, Killen et al. 2014:126; Kaptchuk, Kelley, Conboy et al. 2014:1002) and so this could account for non-significant intervention effects. Only four papers were rated as 'low-risk' for ROB in relation to blinding of participants (Arthur, Daniels, McKelvie et al. 2000; Rief, Sheddon-Mora, Laferton et al. 2017; Rosenfeldt, Braun, Spitzer et al.2011 and Shuldman, Fleming, and Goodman 2002) due to the nature of the interventions. Delivery of psychological preparation involved interaction between the person providing the intervention and the participant making blinding difficult in the case of both parties.

4.3 Study strengths and limitations

Strengths of this research are firstly, the inclusion of an RCT only design which permitted reliable comparisons with SMC. Well conducted RCTs are the gold standard study method for evaluating efficacy of interventions (Spieth, Kubasch, Penzlin et al. 2016:1341). Secondly, a comprehensive search strategy was employed with 12 databases searched; including those good for reviews of health care interventions, those appropriate to the review topic with a narrower psychology focus, and general nursing and medical databases to

ensure no available evidence was missed. Thirdly, the outcome assessment tools used by all 11 papers were validated, thereby having been proven to measure what they claim to measure in the specific population. And lastly it was possible to include five out of 11 (45%) papers in meta-analyses.

The review is subject to some limitations. No date restriction was imposed on the search to try to ensure completeness, however this possibly compounded some of the problems with heterogeneity as the earliest included paper dated from 1996, and psychological techniques and clinical/managerial practice have changed since then. Future work may involve use of date ranges in secondary analyses.

The outcomes were restricted to behavioural recovery and QoL and in doing so other important outcomes may have been missed. (see section 1.6). Other outcomes measured in eligible studies in addition to the outcome of interest could have provided useful data regarding the high-risk group. These were cost-analysis (McGregor, Rylands, Owen et al. 2004) and utilisation of healthcare services which was an outcome Arthur, Daniels, McKelvie et al. (2000) used. These would have been a good measure of economic effect of the interventions. Negative affect was measured in some excluded papers which could have provided valuable knowledge in high-risk patients; surgery in this group is more likely to cause adverse outcomes and it would have been useful to try to establish if psychological interventions could reduce this. The timeframe chosen to examine the outcomes was one month to one year postoperatively. However, there is a view that four weeks might be too early to assess these outcomes in this high-risk group. Patients who have had surgery are still suffering pain and sleep disturbance, have a healing wound and may still need assistance with daily activities and so hence behavioural recovery and QoL scores could reflect this (Ince, Kirat, Geisler et al. 2011). Powell, Scott, Manyande (2016) suggested their focus on the earliest outcomes could have resulted in an under-estimation of the impact of psychological preparation.

Information was extracted regarding the delivery mode, timing and duration of the intervention, but it was not possible to perform secondary analyses and draw conclusions concerning their importance in the success of the intervention. This is due to the small number of papers eligible for inclusion in the review. Timing of the delivery of the intervention is an important factor as there needs to be long enough timescale prior to surgery to ensure influence, but not so long that the participants might lose interest or become disengaged. A protocol was published by Nicholson Lewis, Lee et al. in 2013 on the Cochrane Database of systematic reviews detailing the intentions to establish the evidence around the timing of

educational interventions for surgical patients, but unfortunately the review did not proceed to publication.

The problems experienced with data formats which limited the number of papers included in meta-analysis were not anticipated. These were graphical presentation, inappropriate numeric values such as medians and missing data. This process could have been detailed in the protocol, however there was uncertainty at the protocol stage that meta-analysis would be possible at all.

Due to the challenge of obtaining unpublished papers only published papers were reviewed. This can lead to selective publication of results and there is suggestion that negative or non-significant findings regarding the efficacy of interventions are less likely to be reported than positive ones (Higgins and Green 2011). Several papers included in this review reported negative or non-significant results but the caution regarding selective reporting is advised in the Cochrane Handbook and so needs to be given due consideration in ROB assessment.

4.4 Quality of the evidence

Every effort was made to plan and conduct this review carefully, systematically and transparently to minimise bias in the process. The protocol was prepared using P-PRISMA checklist and registered with PROSPERO prior to starting the review, to set a clear direction for the research and to prevent choices being made because of prior knowledge of the research subject. Sources of bias were reduced by limiting to RCTs. Guidance regarding search strategies was sought from systematic review librarians however this stage was more complex and time consuming than had been anticipated. This was because the review question contained several strands, and numerous terms could be spelt in different ways.

The overall quality of the evidence was rated as low according to the GRADE approach. This is such that more research is very likely to have important impact on confidence in the estimate of effect and is likely to change the estimate. All 11 papers had features of bias. Heterogeneity was found just with the outcome QoL. In QoL over half of the studies used SF-36 or SF-12 as the outcome measure but heterogeneity remained high. This was due to differences in type of surgery, reason participants were high-risk, type of intervention, mode, timing and duration of delivery and outcome timepoint measured.

High levels of heterogeneity were reported by several other authors who reviewed the effects of psychological interventions (Mavros, Athanasiou, Gkegkes et al. 2011; Johnston and Vogele 1993; and Tsimopoulou, Pasquali, and Howard et al. 2015). They reported their findings despite the levels of heterogeneity, but this can affect the confidence people have in

these results. Reporting findings despite the high i-square value can drive improvements in future research (Higgins and Green 2011).

Seven out of the 11 papers received at least one 'high-risk' of bias rating and every paper received at least one 'unclear risk' of bias rating with Garssen, Boomsma, de Jager Meezenbroek et al. (2013) and Shuldman, Fleming, and Goodman (2002) having the most 'high-risk' ratings (two each). Five papers all had the highest numbers of 'unclear' risks; D'Lima, Colwell, Morris et al. 1996; Garssen, Boomsma, de Jager Meezenbroek et al. 2013; Katz, Irish and Devins 2004; McGregor, Rylands, Owen et al. (2004) and Rosenfeldt, Braun, Spitzer et al. (2011). Powell, Scott, Manyande (2016) rated many studies as 'unclear' for reporting bias. In this current review all 11 papers were graded as such. It is pertinent to raise the same challenge as Powell, Scott, Manyande (2016); it is not clear if these studies were all poorly conducted (which would carry a 'high-risk' of bias) or if they were methodologically sound but reported badly.

The eligible papers featured small scale studies with statistically non-significant results but pooling them in the way they were in this review helps to build a picture of the potential of the intervention. This practice is carried out in other Cochrane reviews for example Gurusamy (2014). In small samples it is less likely for rarely occurring, but important outcomes to be detected as they would in larger populations (Kaplan, Bush and Berry 1978; Higgins and Green 2011). Small sample size is a common finding across other reviews, as is poor quality (McDonald 2014; Newell, Sanson-Fisher and Savolainen 2002). There is a demand for more high-quality studies examining larger samples of this patient population. High quality research studies should justify a clear purpose for investigating a well formulated problem. The study should be well designed and demonstrate findings which advance knowledge in relation to related studies (RAND Corporation 2018). An example of a methodological issue which if addressed should achieve a higher level of evidence is publishing of a protocol to assess risk of reporting bias and improve reproducibility (Higgins and Green, 2011).

4.5 Implications for practice and research

This review was the first to focus on adult patients with a high anaesthetic risk. It examined this group undergoing elective surgery with GA, and so the findings are not generalisable to children, patients undergoing emergency surgery, or patients receiving other types of anaesthetics. The type of surgical procedure was not restricted and there was a reasonable spread of six different types of surgical procedures amongst the 11 papers. Therefore, it is felt that these conclusions can possibly be applied across other surgical specialties. It is

interesting however, that other reviews focused on a specific type of surgery. McDonald, Page, Beringer et al. (2014) and Louw, Diener, Butler et al. (2013) both investigated educational preparation (including behavioural instruction and procedural information) for patients undergoing hip or knee arthroplasty. They looked at how this preparation might affect pain, anxiety, function and LOS. McDonald, Page, Beringer et al. (2014) concluded that there may be no benefit whilst Louw, Diener, Butler et al. (2013) found the benefit to pain to be limited but no meta-analysis was undertaken. Rolving, Sogaard, Neilsen et al. (2016) examined lumbar spine fusion patients. These patients were not high-risk but did undergo a GA. Preoperative CBT was delivered and Quality Adjusted Life Years (Wittrup-Jensen, Lauridsen and Gudex 2009) assessed alongside an economic evaluation using EuroQol (Brooks 1996). CBT was found to be effective and was recommended to be integrated into preoperative rehabilitation programmes.

Only a small number of papers were eligible for inclusion. However, this is an important finding, as it clearly demonstrates the limited knowledge regarding how these patients should be supported holistically before surgery, to improve their outcomes. In a future review when more data is available and if heterogeneity allowed, it would be useful to undertake secondary analyses to examine by intervention type. Powell, Scott Manyande et al. (2016) planned further work in terms of secondary analyses by surgery type, however given that many elements of patient preparation are common despite type of surgery, this is felt to be a less important focus.

In the UK NHS patients currently experience lengthy waits for surgery. This time on the waiting list could be put to good use but recommendations for change of practice cannot be made based on the results of this review. Further research to gain a clear understanding of how the preoperative period can be used effectively, efficiently and safely to optimise postoperative recovery is required. The safety of any intervention is of paramount importance but just three papers in this review stated that their intervention (Arthur, Daniels, McKelvie et al. 2000; Dao, Youssef and Armsworth 2011 and Rosenfeldt, Braun, Spitzer et al. 2011) was safe. Rosenfeldt, Braun, Spitzer et al. (2011) was the only one of these to explain why. He detailed presence of a physician at first exercise session utilising ECG and heart rate monitoring. He concluded that mental stress reduction was safe even for those with advanced cardiac disease and so this is an important consideration for further research in the high-risk group.

4.6 Further research

There is a growing body of literature examining this subject but more high-quality research in this area is required. There is an impetus for further research as outcomes are highly relevant for patients' well-being and the economic position of NHS organisations. There were several protocols found through database searching and so it will be interesting to check if the full trials have now been published to add more information to this debate. There are few well designed and conducted studies with clear reporting and a low ROB. PRISMA-P checklist (Shamseer, Moher and Clark 2015) should be adhered to by researchers designing and reporting RCTs.

There is a clear need for future research to focus on the standardise the definitions and content of interventions. Producing a taxonomy in this field would mean consistently identifiable and reportable intervention components and would allow the reader to know what an intervention actually comprises.

A small number of the papers included in this review asked patients if they were satisfied with the interventions they received, however no papers stated that patients were involved in the study design. Patient Public Involvement (PPI) is of paramount importance in modern day research. It is vital that patients' views are considered regarding psychological support and how this might look for them. This will allow depth of knowledge and understanding to be gained and will assist with planning further research. INVOLVE; a national advisory group combine expertise, insight and experience in the field of PPI aiming to integrate this at all stages and in all types of research (INVOLVE 2018).

4.7 Conclusions

The evidence suggested that psychological interventions delivered preoperatively to patients with a high anaesthetic risk do not improve behavioural recovery or QoL. The quality of evidence was low, and no practice recommendations can be made.

Sources of support

The National Institute for Health Research (NIHR) has funded the Master of Science by Research in Clinical Practice undertaken by CB, of which this systematic review forms a component. Additionally, the NIHR have funded backfill costs of CB's NHS post, on a 50% part-time basis. Coventry University have provided the Post Graduate Researcher fund, and in the first year of this study the Global Leaders Programme monies. EPPI-Reviewer software costs and travel costs for attending conferences were claimed from these funds by CB.

Non-financial support for the review has additionally been received from CB's line manager allowing 50% release from Trust job plan and therefore supporting the opportunity to conduct this review

The author has no conflict of interests to declare.

Appendices

Appendix A. ASA Classification System

ASA PS Classification	Definition	Examples, including, but not limited to:
ASA I	A normal healthy patient	Healthy, non-smoking, no or minimal alcohol use
ASA II	A patient with mild systemic disease	Mild diseases only without substantive functional limitations. Examples include (but not limited to): current smoker, social alcohol drinker, pregnancy, obesity (30 < BMI < 40), well-controlled DM/HTN, mild lung disease
ASA III	A patient with severe systemic disease	Substantive functional limitations; One or more moderate to severe diseases. Examples include (but not limited to): poorly controlled DM or HTN, COPD, morbid obesity (BMI ≥40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of ejection fraction, ESRD undergoing regularly scheduled dialysis, premature infant PCA < 60 weeks, history (>3-months) of MI, CVA, TIA, or CAD/stents.
ASA IV	A patient with severe systemic disease that is a constant threat to life	Examples include (but not limited to): recent (< 3-months) MI, CVA, TIA, or CAD/stents, ongoing cardiac ischemia or severe valve dysfunction, severe reduction of ejection fraction, sepsis, DIC, ARD or ESRD not undergoing regularly scheduled dialysis
ASA V	A moribund patient who is not expected to survive without the operation	Examples include (but not limited to): ruptured abdominal/thoracic aneurysm, massive trauma, intracranial bleed with mass effect, ischemic bowel in the face of significant cardiac pathology or multiple organ/system dysfunction
ASA VI	A declared brain-dead patient whose organs are being removed for donor purposes	

(American Association of Anaestheologist)

Appendix B. Review protocol

Protocol using PRISMA-P (Preferred Reporting Items for Systematic review and Meta-Analysis Protocols) Checklist 2015

ADMINISTRATIVE INFORMATION

Title: Preoperative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review protocol

---

Registration: In accordance with the guidelines, this systematic review protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO) on 24th May 2017 and was last updated on 20th May 2017 (registration number CRD42017051925)**.**

Authors:

Contact: Corresponding author: Claire Badger, 3 Leys Road Hillmorton Rugby Warwickshire CV21 4DR Badgerc3@uni.coventry.ac.uk

Author affiliations:

1 Faculty of Health and Life Sciences, Coventry University, Priory Street, Coventry, CV1 5FB

2 Preoperative Assessment Service, Clinic 6 Outpatients Department, University Hospital, University Hospitals Coventry and Warwickshire (UHCW), Clifford Bridge Road, Coventry, CV2 2DX

3 Preoperative Assessment Service, Outpatients Department, Hospital of St Cross, Barby Road, Rugby, Warwickshire, CV22 5PX

4 The Preoperative Association, 21 Portland Place, London, W1B 1PY

5 Professor Katherine Brown k.brown@coventry.ac.uk; Dr Alison Day hsx482@coventry.ac.uk;

Contributions: CB is the guarantor. BG is Director of Studies for CB and AD is secondary supervisor for CB. CB wrote up the protocol. Dr Anne Scase (Consultant Anaesthetist, Clinical Director Theatres and Anaesthetics, Pre-Op Assessment Anaesthetic Lead, Coventry) provided expertise for high anaesthetic risk definition. Miss Ruth Benson (Vascular Specialist Registrar UHCW) is second reviewer. Chris Bark (Academic Liaison Librarian Nursing, Midwifery and Health Coventry University), Petra Meeson (Knowledge Skills Librarian, UHCW), Anna Brown and Amber Dunlop (Systematic Review Specialist Librarian, Clinical Evidence Based Information Service CEBIS UHCW) contributed to the draft of the search strategy. All authors assisted with finalising the selection criteria and had input into the risk of bias assessment strategy and data extraction criteria. All authors read, provided feedback and approved the final protocol.

Amendments: In the event of protocol amendments, this section will document the date of each change and a description of the amendment will be included, along with the rationale for this. Amendments will not be amalgamated into the protocol or review.

Support:

Sources: National Institute for Health Research (NIHR). Non-Financial support for the review has additionally been received from CB's line manager allowing release from Trust job plan on a 50% basis and therefore supporting the opportunity to conduct this review. Financial support from Coventry University is in terms of the Post Graduate Researcher fund, and the Global Leaders Programme monies, which for this year alone has been sanctioned for use in attending conferences and workshops.

Sponsor: UHCW are the sponsor of the systematic review.

Role of sponsor or funder: The NIHR has funded the Master of Science by Research in Clinical Practice undertaken by CB, of which this systematic review forms the thesis component. Additionally, the NIHR have funded backfill costs of CB's NHS post, on a 50% part-time basis. The NIHR is not involved in any other part of the review, such as developing the protocol, data collection or analyses. The funder will have no input into the evaluation or write up of the study results.

INTRODUCTION

Rationale: In 2013 it was calculated that every year 234 million people have surgery requiring an inpatient stay. Surgery is undertaken for a variety of health conditions for the purposes of diagnosis or treatment. Hopefully surgery will lead to improvement in an individual's health, it can also have a negative impact. In developed countries the permanent rate of disability or death after such procedures is 0.4% and 0.8%. However, in the subgroup of high-risk patients, in the UK, this figure is 12.5%. This cohort of patients account for 80% of perioperative deaths (Pearse, Holt and Grocott 2011); and the short term post-op mortality of these patients undergoing elective surgery is 6% (Minto and Biccard 2014).

Preoperative patients will often have concerns and fears surrounding surgery and this can be for a number of underlying reasons; who will care for their partner and/or dependents whilst they are hospitalised, risk of death or morbidity, alteration of body image, increased dependency on loved ones, disruption to social life, loss of employment, separation from family and anticipation of painful procedures; to name just a few. There is evidence to suggest that more distress or anxiety prior to surgery is linked with a slower postoperative recovery with more complications (Kiecolt-Glaser, Page, Marucha et al. 1998; Rosenberger, Jokl and Ickovics 2006).

There is evidence that psychological preparation for surgery improves surgical outcomes (Johnston 1993). A Cochrane systematic review (Powell, Scott, Manyande et al. 2016) examined several postoperative outcomes; postoperative pain and behavioural recovery as primary outcomes and negative effect, resource use, length of hospital stays, postsurgical analgesia use, physiological recovery and patient satisfaction with treatment as secondary outcomes. It concluded that psychological preparation may be beneficial for the outcomes of postoperative pain, negative affect, length of stay and behavioural recovery, and is unlikely to be harmful. However, the quality of evidence was low or very low and therefore recommendations for practice could not be made. Additionally, the 2016 review was unable to ascertain which specific type of

intervention could be utilised to improve which specific post-op outcome. Additionally, with a specific focus on patients with a high anaesthetic risk, this review will provide new information, as this population has not previously been examined. New findings will also be in the form of any papers published since the 2016 review. Further investigation is warranted by the increasing numbers of patients with a high anaesthetic risk; along with the UK's aging population (Government Office for Science 2013; Pearse, Holt and Grocott 2011). Although the outcomes of the 2016 review are important post-surgery, the ultimate goal of surgical treatment is for the patient to restored to the level of function, in all aspects of life that they held preoperatively, or for this to be improved: hence the focus for this review.

This systematic review is important as impacting postoperative outcome has a benefit for the individual as well as for the healthcare service. Currently the preparation and optimisation of elective surgical patients' health has a definite focus on physical well-being. This review will provide health professionals working in Preoperative Assessment as well as the wider field of surgery, with valuable information as to whether there is evidence of a beneficial (or otherwise) influence on surgical outcome when psychological interventions are delivered preoperatively to elective patients undergoing a high-risk general anaesthetic (GA). Furthermore, which psychological interventions provide influence will be identified. Gaining this understanding is fundamental to ensure delivery of the highest quality, safe care in a local Preoperative Assessment Service. It will inform future research to address the preoperative psychological preparation needs of high anaesthetic risk patients.

Definition of the population- Surgical patients who are pre-disposed to specific complications such as postoperative respiratory failure, acute renal failure, and cognitive decline. The American Society of Anaestheologists (ASA) classification is a widely used grading system of preoperative health and is considered an important tool in predicting surgical outcome and planning perioperative care. Patients assessed as class 3 or 4 are defined as someone with severe systematic disease and severe systematic disease that is a constant threat to life respectively. Severe systematic disease includes but is not restricted to poorly controlled hypertension, DM, Chronic Obstructive Pulmonary Disease (COPD), morbid obesity (BMI > 40), active hepatitis, alcohol dependence or abuse, implanted pacemaker, moderate reduction of left ventricular ejection fraction, End Stage Renal Dysfunction (ESRD) undergoing regularly scheduled dialysis, percutaneous coronary angiography (PCA) < 60 weeks, history (> 3-month) of Myocardial Infarction (MI), Cerebrovascular Accident (CVA), Trans-Ischaemic Attack (TIA) or Coronary Artery

Disease (CAD)/coronary artery stents (ASA, 2014). These patients might be expected to have a prolonged recovery, increased morbidity and/or mortality. The risk to this group of patients of undergoing a GA is higher than for a general population due to their preoperative state of health. It is cardiovascular disease that is the leading cause of perioperative death in surgical patients (Mercantini, Di Somma, Magrini et al. 2012).

ASA score is not used in isolation by anaesthetists trying to predict how a person will tolerate a GA. Other influencing factors are old age (commonly defined as >65 years in developed countries), frailty and smoking history. A patient's risk of morbidity and/or mortality is often predicted by assessing physiological and operative factors combined, for example The Physiology and Operative Severity Score for Enumeration of Mortality and Morbidity (POSSUM) and Portsmouth POSSUM (P-POSSUM) (Prytherch, Whiteley, Higgins et al. 1998).

Definition of the intervention – Psychological interventions are a range of strategies underpinned by psychological theory which plan to influence how a person thinks, feels or behaves. Scoping has suggested the types of physiological interventions which may be identified are Cognitive Behavioural Therapy,
coping strategies, problem solving therapy, hope therapy, psychoeducation, relaxation, procedural information, preoperative information, hypnosis, and guided imagery. Other interventions may be identified during the course of conduction the review.

Description of the outcome – Behavioural recovery can be defined as the resumption of performance of tasks and activities of everyday living; that is physical function, recreational activities and employment along with social and psychological function.

Objectives: The proposed systematic review will answer the following research questions:

1. Are preoperative psychological interventions effective for improving behavioural recovery outcomes for high-risk anaesthetic patients, compared to standard care alone?

2. Are preoperative psychological interventions, effective at maintaining or improving QOL at one-month or more post-surgery compared to standard care alone

---

METHODS

Eligibility criteria: Studies will be selected according to the criteria outlined below:

Study design – Randomized control trials (RCTs) only will be included as this design is feasible for the interventions and outcomes of interest. Any other relevant papers will be saved for future research.

Population – Adult (16+ years) preoperative patients, with a high anaesthetic risk undergoing elective surgery under GA will be included. Studies addressing animals, maternity patients, trauma patients, paediatrics and non-elective patients will be excluded. Studies that address both the exclusion criteria as well as the inclusion, will be eligible provided data is reported separately i.e. adults and children, adults and maternity patients, elective and emergency patients etc. Additionally, if there is separate reporting, studies including a mixture of patients receiving GA and regional anaesthetic and Local Anaesthetic (LA), and emergency and elective surgery will be included. Studies where all patients have undergone LA or no anaesthesia (with or without sedation) will be excluded. Studies where individuals have received pre-medicative sedation prior to GA will be included. Studies involving patients with pre-existing, diagnosed psychological morbidity will be excluded. However, there will not be exclusion of studies with participants who have psychiatric conditions or symptoms which are well controlled and co-exist with the condition for which surgery is required.

Intervention – Of interest are psychological interventions however studies involving other interventions will be included, if there is a psychological component and they are reported separately.

Comparator – The comparator is standard medical care (SMC) alone. Any papers which examine SMC and psychological interventions will be included if there is separate reporting.

Outcome – The primary outcome is behavioural recovery. The secondary outcome is health related QoL. Outcome measures of behavioural recovery are predicted to, but will not exclusively include: SF-36 physical function (Ware 2000), Nottingham Health Profile (NHF): physical mobility (Hunt 1983) , Barthel Index (Mahoney 1965), and Western Ontario and McMaster Osteoarthritis Index (WOMAC) functional status (Bellamy 1988). For health related QoL it is predicted that the instrument may be SF-36 (Ware 2000).

Timing – There will be no date restriction. The time point of outcome assessment will be noted, with a minimum time point of one-month and the maximum time point of one year as prior to this is deemed too close to the surgery, and further than one-year post op it is deemed that there could be too many other influencing factors.

Setting – Studies which were conducted in Europe, Australia, New Zealand, America and Canada only will be included. All other settings will be excluded due to differences in healthcare systems from that of the UK and/or cultural differences in outlook on surgery.

Language –All languages will be included, but where studies are in languages other than English, they will only be included when translation can take place by reasonable efforts, due to resource limits. Reasonable efforts are cases where Google Translate can be utilised and when resources are then available for the translation to be checked by a healthcare professional whose first language is that of the paper.

Publication status – Published papers will be selected including dissertations but abstracts and conference proceedings, commentaries, letters, editorals and expert opinion will be excluded.

Information sources: PROSPERO (University of York Centre for Reviews and Dissemination 2017) will be searched for ongoing or recently completed systematic reviews.

Literature search strategies will be developed using medical subject headings (MeSH), CINAHL headings and key words related to psychological interventions, high-risk anaesthetic patients and behavioural recovery. The following databases will be searched: Medline

(EBSCOhost), CINAHL (EBSCOhost), Allied and complementary medicine databases (AHMED) (EBSCOhost), Applied social sciences index and abstracts (ASSIA) (ProQuest), The Cochrane Library, Health and Medical collection (ProQuest), Proquest Nursing & Allied Health Source, Psychinfo (EBSCOhost), Psycharticles (EBSCOhost), Psychology Database (ProQuest), PubMed (Medline), Scopus, Turning Research Into Practice (TRIP). No date restrictions will be imposed upon the search

To ensure literature saturation, the reference and citation lists of included studies or relevant reviews identified through the search will be hand searched. Google Scholar will be searched for RCTs and dissertations and finally, a list of the included articles will be provided to the review team.

The searches will be carried out by CB.

Search strategy: The study design is restricted to RCTs, however the search will not be restricted by language or limited by date. Only studies in languages other than English that can be translated using Google Translate and checked by a health professional with a first language of that of the paper, will be included. This is because of resource limits. Search strategies will be created by CB with input from a subject Librarian with expertise in systematic review searching. The MEDLINE strategy will be developed with input from the team and a subject librarian, then peer reviewed by a second reviewer not otherwise associated with the project. A draft MEDLINE search strategy is included in ***Appendix B***. After the MEDLINE strategy is finalized, it will be adopted in order to search the other databases. The search terms will be adjusted if it is found to be necessary to do so.

The following subject search terms and key words will be used for database searching:

P – “surgical procedures, operative”, surg*, operat*, “general surgery”, gynecology, neurosurgery, opthalmology, “orthognathic surgery”, orthopaedics, otolaryngology, urology, “arthroplasty, replacement, hip”, “arthroplasty, replacement, knee”, “arthroplasty, replacement, shoulder”,

“arthroplasty, replacement, elbow”, “arthroplasty, replacement, ankle”, cholecystectomy, hysterectomy, “coronary artery bypass”, transplants, herniorrhaphy, mastectomy, “joint replacement”, “hernia repair”, “bariatrc surg*”, “weight loss surg*”, “gastric bypass”, “general an#esthe*”, anesthetics, anesthesia

I – pre-op* or preop*, pre-surg* or pre surg, “preoperative care”, “pre-assesment”, “pre-an#esthe*”, psychological techniques”, psychotherapy, imagery, behavio#r*, psycholog*, “cognitive therapy”, CBT, “hope therapy”, relaxation, “procedural knowledge”, psychoeducation, hypno*, “patient education”, “patient information”, “patient teaching”, mindfulness, “mind-body therapies”, counsel#ing, coping

C – “standard care”, “physical intervention”

O – “treatment outcome”, “behavio#ral recover*”,” recovery of function”, rehabilitation, “activities of daily living”, “quality of life”, QOL, “health related quality of life”, HRQOL

The above terms will be combined with the Cochrane highly sensitive search strategy for identifying RCTs as suggested in the Cochrane Handbook for Systematic Reviews of Interventions (Higgins and Green, 2011).

Study records:

Data management: EPPI-Reviewer4 (Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) (EPPI-Centre 2017) web-based software will be used to manage this systematic review through all stages of the process from screening, analysis, all the way through to synthesis. Its use is agreeable amongst the research team as its ability for multiple concurrent users will enable members of the research team to be located in different geographical locations, and it allows easily export of research data to other software. CB will undertake training on EPPI-Reviewer4 (EPPI-Centre 2017). References will be organised and stored in RefWorks (ProQuest 2017)

Selection process:

	Inclusion	Exclusion
Population	▪ Adult (16+ years) preoperative patients ▪ Elective surgery ▪ Men and women ▪ Any ethnic origin ▪ High-risk patients undergoing GA ▪ Patient's with psychiatric conditions or symptoms which are well controlled	▪ Paediatrics (<16 years) ▪ Animals ▪ Maternity patients ▪ Emergency or trauma patients ▪ Studies focusing on LA or regional anaesthetic only or patients with no anaesthesia (with or without sedation) ▪ Patients with psychiatric morbidity
Intervention	▪ Any psychological intervention ▪ Face to face, via telephone or online ▪ Group or individual	▪ Interventions focusing only on physical health
Comparator	▪ SMC i.e. Interventions focusing only on physical health	▪ Interventions other than SMC
Outcome	▪ Primary: behavioural recovery ▪ Secondary: Health related QoL	▪ Absence of any outcomes
Setting	▪ Europe, Australia, New Zealand, America and Canada ▪ Outpatient setting	▪ Inpatients
Design	▪ RCTs	▪ Non RCTs
Literature	▪ No date restriction ▪ Published and dissertations	▪ Grey literature ▪ Expert opinion
Language	▪ Any, if interpretation can be achieved by Google Translate and can be checked by a health professional whose first language is that of the paper	▪ Studies where language interpretation cannot be undertaken by Google Translate and/or checked by a health professional whose first language is that of the paper, or is very time consuming
Follow Up	▪ Any with a minimum time point of 1-month post op and a maximum time point of one year	▪ Follow up before 1-month post op or longer than one-year post op

The screening process will be carried out as below against the above inclusion and exclusion criteria:

1) Title and abstract of retrieved studies reviewed to exclude obviously irrelevant papers. A small random sample will be double-checked by a second member of the review team Contact will be made with the lead author where more information is required to determine eligibility e.g. if type of anaesthesia is not clear. If the authors do not respond within three weeks, then the study will be excluded.
2) Where the title and abstract are deemed to meet the inclusion criteria or where eligibility is unclear full text articles will be obtained. These will be reviewed by CB and verified by another member of the review team.

A third member of the review team will be requested to review in the cases of any screening disputes. All screening decisions will be clearly recorded using EPPI-Reviewer4 (EPPI-Centre 2017) and presented using a PRISMA flowchart formulated by the software and a table of 'characteristics of excluded studies'.

Data collection process: The data extraction form is based on the Effective Practice and Organisation of Care Review Group (EPOC) (EPOC 2013) template as suggested by the Cochrane Collaboration. The paper format is shown in **Appendix N** for clarity, but for this review the electronic version will be uploaded onto EPPI-Reviewer4 (EPPI-Centre 2017). The data extraction form has been piloted to ensure that all reviewers retrieve comparable results.
All selected full text articles will be reviewed by CB and independently verified by a second member of the review team. In cases of any disagreements a third independent researcher or third member of the review team will be bought in and will have the final decision. Data in primary studies is not always presented in a user-friendly way for those undertaking a systematic review therefore, authors will be contacted for missing information. Multiple reports of a single study will be excluded as otherwise this would introduce bias. There will be clear documentation of any such exclusions.

Data items: The following data will be extracted using the chosen data extraction form:

Study participants – total number participants and number randomised, age, gender, race/ethnicity, geographical location, setting, surgery type, co-morbidities making the patient high-risk and/or ASA grade, number patients who underwent GA and number undergoing other type anaesthetic, method of recruitment

Study methods – aim, duration

Interventions – nature of intervention, psychological theory underpinning intervention, number of intervention groups, number randomised to each group, control groups, timing and duration of intervention, mode of delivery, provider, economic variables and resource requirements, adherence to intervention and control, attrition rate, loss to follow up rate

Outcome – outcome name (behavioural recovery and/or health related QoL), authors definition of outcome, time point measured and reported and person doing so, measurement tool details (e.g. upper and lower limits and if high or low score is favourable) and if the tool is validated

Results –number of papers, total number participants randomised, number participants randomised to each intervention, number of missing participants, number of participants (if any) moved from another group and reasons, type of surgical procedures, type of anaesthetic, means, standard deviations, proportions, estimate of effect with confidence interval, p-value, any other results reported

Applicability – have any important populations been excluded from the study, does the study address the review question?

Other information – key conclusions of study authors, references of other relevant studies, lead author correspondence details for further information requested, indication of response from author

---

Outcomes and prioritisation: The primary outcome will be the number of participants in whom better behavioural recovery was measured using SF-36 physical function (Ware 2000), Nottingham Health Profile (NHF): physical mobility (Hunt 1983) , Barthel Index (Mahoney 1965), or Western Ontario and McMaster Osteoarthritis Index (WOMAC) functional status (Bellamy 1988), (i.e. a higher score) following a preoperative psychological intervention. This outcome is of the most interest.

The secondary outcome will be the number of participants in whom health related QoL measured by SF-36 was maintained or improved (i.e. an equal or higher score) by the same psychological interventions.

Where studies report various time points these will be grouped as follows:

Short term postoperatively (post operation) – one to four months

Medium term postoperatively – > four months to eight months

Long term postoperatively - > eight months to one year

Risk of bias in individual studies: As RCTs only will be included, the Cochrane Collaboration's Risk of Bias (RoB) tool will be utilised electronically to assess the possible risk of bias for each study. (Higgins and Green 2011). This includes selection bias, performance bias, attrition bias, detection bias and reporting bias by examining sequence generation, allocation concealment, blinding, incomplete outcome data (e.g. dropouts and withdrawals) and selective outcome reporting. An assessment of risk of bias on each of the six domains will be made on each paper and rated as 'high-risk' or 'low risk'. Blinding of participants or professionals delivering or facilitating the interventions is not expected due to the interactive nature, but this will be noted in any studies where this has been attempted. If the study is poorly reported the risk of bias will be judged as 'unclear' and the corresponding author for the study will be contacted for more information. Assessment will be undertaken independently by two review authors. Any disagreements will be resolved firstly by discussion and then a third author will be consulted for arbitration. Risk of bias within and across studies will be produced and presented in tabular form using EPPI-Reviewer4 (EPPI-Centre 2017). CB does not have previous experience of assessing bias.

Data synthesis: EPPI-Reviewer4 (EPPI-Centre 2017 (software will be used to support data synthesis**.** It will calculate common measures of effect (odds ratios, risk ratios, risk differences, standardized mean differences, mean differences) from a variety of statistics (2 x 2 tables,

means, standard deviations, confidence intervals, p, t and r values). However, it is predicted that it may not be appropriate for a meta-analysis to be performed for this review as there appears to be a range of different behavioural recovery outcome measures. It is likely that a narrative synthesis will be more appropriate, and information will be presented in text and tables. There will be a systematic and comprehensive approach to this and it is possible that EPPI-Reviewer4 (EPPI-Centre 2017) will be utilised however guidelines produced by Popay, Roberts, Sowden et al. (2006) will be acknowledged. These are suggested by the Centre for reviews and dissemination and information also by the Cochrane Collaboration.

Meta bias (es): Selective Outcome reporting bias – if a study protocol is available the outcomes reported in this can be compared to the published article. If no protocol is available, then the outcomes reported in the methods and results section should be compared.
Publication or dissemination bias – this review will not contain unpublished studies, but CB is aware unpublished papers are more likely to contain non-significant or negative results and when these are not included exaggerated results may be produced.

Confidence in cumulative evidence: The quality of evidence for primary and secondary outcomes will be assessed using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) working group methodology (Guyatt, Oxman, Ekl et al. 2011; Guyatt, Oxman, Sultan et al. 2013). The Cochrane Collaboration approved the standards of the GRADE system for use with systematic reviews to categorise the quality of a body of evidence, as to the level of confidence that an estimate of effect or association is close to the quantity of specific interest. The evidence in this review will be considered in terms of risk of bias within studies (methodological quality), directness of evidence, heterogeneity, precision of effect estimates and risk of publication bias (Higgins and Green 2011). Each outcome will be judged as high (further research is very unlikely to change our confidence in the estimate of effect), moderate (further research is likely to have an

important impact on our confidence in the estimate of effect and may change the estimate), low (research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate), or very low (very uncertain about the estimate of effect).

(Shamseer, Moher, Clarke et al. 2015)

Appendix C. Differences between protocol and review

It was not envisaged that there would be so many studies where the intervention was delivered to participants both preoperatively and postoperatively, and decisions regarding eligibility of these studies was therefore not addressed in the protocol.

Additionally, it was not expected that the intervention would have a physical and psychological component or that some studies may have an intervention and one or more co-interventions without separate reporting. Following discussion with the supervisory team these papers were included and this issue was dealt with at data synthesis.

Where there are multiple measures for the same outcome for Quality of Life analyses, the outcome measures themselves were examined and which measure was closest to the study's definition of the outcome was determined.

Advise regarding meta-analysis was sought from Dr Stephen Cooke Dr Richard Cook at Liverpool University. At the protocol stage it was envisaged it may not be appropriate for a meta-analysis to be performed for this review, as there appeared to be a range of different behavioural recovery outcome measures. However, once the 11 full text papers were identified, it became apparent that meta-analysis would be possible.

Appendix. D. Coventry University Ethics Application

P48546

Coventry University ETHICS

Low Risk Research Ethics Approval

Project Title

Pre-Operative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review protocol

Record of Approval

Principal Investigator

I request an ethics peer review and confirm that I have answered all relevant questions in this checklist honestly.	X
I confirm that I will carry out the project in the ways described in this checklist. I will immediately suspend research and request new ethical approval if the project subsequently changes the information I have given in this checklist.	X
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the Code of Research Ethics issued by the relevant national learned society.	X
I confirm that I, and all members of my research team (if any), have read and agreed to abide by the University's Research Ethics, Governance and Integrity Framework.	X

Name: Claire Badger

Date: 23/11/2016

Student's Supervisor (if applicable)

I have read this checklist and confirm that it covers all the ethical issues raised by this project fully and frankly. I also confirm that these issues have been discussed with the student and will continue to be reviewed in the course of supervision.

Name: Beth Grunfeld

Date: 15/02/2017

Reviewer (if applicable)

Date of approval by anonymous reviewer: 15/02/2017

P48546

Low Risk Research Ethics Approval Checklist

Project Information

Project Ref	P48546
Full name	Claire Badger
Faculty	Faculty of Health and Life Sciences
Department	FRC Technology Enabled Health Research (CTEHR)
Supervisor	Beth Grunfeld
Module Code	N/A
EFAAF Number	
Project title	Pre-Operative psychological interventions to promote behavioural recovery in patients with a high anaesthetic risk: a systematic review protocol
Date(s)	19/09/2016 - 16/05/2018
Created	23/11/2016 09:45

Project Summary

This review will ascertain whether there is evidence of a beneficial (or otherwise) influence on behavioural recovery when psychological interventions are delivered pre-operatively to elective patients undergoing a high risk general anaesthetic. The review team will identify, assess, analyse, synthesise and summarise the findings of all relevant existing individual studies in this topic area and methods to ensure rigor and minimise bias will be employed, so that the conclusions are valid and reliable.

PROSPERO has already identified that this review has not been previously carried out, or is ongoing. The search strategies will be created using medical subject headings, Cinahl headings and text words related to psychological interventions, high risk anaesthetic patients, quality of life(QOL)and behavioural recovery. A MEDLINE strategy will be developed and once finalized it will be adapted in order to search other health databases. Papers included will be restricted to Randomised Controlled Trial's (RCT's).

To ensure literature saturation, there will be hand searching of reference and citation lists of included studies and searching via Google Scholar for RCT's and dissertations.

Names of Co-Investigators and their organisational affiliation (place of study/employer)	
Is the project self-funded?	YES
Who is funding the project?	NIHR, Post Graduate Researcher fund, and the Global Leaders Programme monies.

Has the funding been confirmed?	YES
Are you required to use a Professional Code of Ethical Practice appropriate to your discipline?	YES
Have you read the Code?	YES

Project Details

What is the purpose of the project?	The proposed systematic review will answer the following research questions: 1. Are pre-operative psychological interventions more effective in achieving better behavioural recovery outcomes for high risk anaesthetic patients, when compared to standard care alone? 2. Within these pre-operative psychological interventions is there evidence that QOLis maintained or improved at two months or more post surgery?
What are the planned or desired outcomes?	The primary outcome will be the number of participants in whom better behavioural recovery was measured using existing validated tools e.g. SF36 physical function (Ware, 2000) , Nottingham Health Profile: physical ability (Hunt, 1983) , Barthel Index (Mahoney, 1965), or Western Ontario and McMaster Osteoarthritis Index functional status (Bellamy, 1988), (i.e. a higher score) following a pre-operative psychological intervention. The secondary outcome will be the number of participants in whom health related QOL measured by SF-36 was maintained or improved (i.e. an equal or higher score) by the same psychological interventions. This review will provide health professionals working in Pre-Operative Assessment as well as the wider field of surgery, with valuable new information as currently the preparation and optimisation of elective surgical patients' health has a definite focus on physical well-being. Gaining this understanding is fundamental to ensure delivery of the highest quality care in a local Pre-Operative Assessment Service. It will inform future research to address the pre-operative psychological preparation needs of high anaesthetic risk patients.
Explain your research design	A research protocol has been written using the validated PRISMA-P (Preferred Reporting Items for Systematic review and

	Meta-Analysis Protocols) Checklist (Shamseer, Moher and Clarke et al, 2015) This ensures that the plan for this review is explicitly specified prior to starting. It helps ensure consistent conduct of the review,and transparency for the reader by stating the methods in advance; therefore reducing the risk of bias. Any modifications required will be clearly documented and justified. The design is a systematic review of published RCT's and dissertations. There will be no date or language limits imposed on the search. However, only non-English studies that can be translated using Google Translate and checked by a health professional with a first language of that of the paper, will be included due to resource limits. EPPI-Reviewer 4 software will be used to manage this review through all stages from screening to synthesis. Additionally narrative synthesis guidelines produced by Popay, Roberts and Sowden et al (2006) and suggested by the Centre for reviews and dissemination and Cochrane Collaboration will be acknowledged. Reference management will be via Refworks.
Outline the principal methods you will use	Twelve databases will be searched including Medline, Cinahl and Cochrane Library. Participants of included studies will be adult (17+ yrs) elective pre-operative patients, with a high anaesthetic risk and receiving general anaesthetic. The screening process will be carried out against clear inclusion and exclusion criteria in two stages; title and abstract (small random sample double checked by second reviewer) and where articles are deemed to meet the inclusion criteria or where eligibility is unclear full text articles will be reviewed by lead author and second reviewer. A third reviewer will be requested in the case of any screening disputes. Screening decisions will be recorded using EPPI-Reviewer 4 and presented using a PRISMA flowchart formulated by the software and a table of

	'characteristics of excluded studies'. An electronic data extraction form based on the Effective Practice and Organisation of Care Review Group (EPOC) (EPOC, 2013) template and suggested by the Cochrane Collaboration will be used and uploaded onto EPPI-Reviewer 4. Authors will be contacted for missing information. Multiple reports of a single study will be excluded with clear documentation of this.
Are you proposing to use an external research instrument, validated scale or follow a published research method?	YES
If yes, please give details of what you are using	Systematic review based on PRISMA-P protocol and using Cochrane Collaboration guidelines.
Will your research involve consulting individuals who support, or literature, websites or similar material which advocates, any of the following: terrorism, armed struggles, or political, religious or other forms of activism considered illegal under UK law?	NO
Are you dealing with Secondary Data? (e.g. sourcing info from websites, historical documents)	YES
Are you dealing with Primary Data involving people? (e.g. interviews, questionnaires, observations)	NO
Are you dealing with personal or sensitive data?	NO
Is the project solely desk based? (e.g. involving no laboratory, workshop or off-campus work or other activities which pose significant risks to researchers or participants)	YES
Are there any other ethical issues or risks of harm raised by the study that have not been covered by previous questions?	NO
If yes, please give further details	

External Ethical Review

Question		Yes	No
1	Will this study be submitted for ethical review to an external organisation? (e.g. Another University, Social Care, National Health Service, Ministry of Defence, Police Service and Probation Office)		X
	If YES, name of external organisation		
2	Will this study be reviewed using the IRAS system?		X
3	Has this study previously been reviewed by an external organisation?		X

Risk of harm, potential harm and disclosure of harm

Question		Yes	No
1	Is there any significant risk that the study may lead to physical harm to participants or researchers?		X
	If YES, please explain how you will take steps to reduce or address those risks		
2	Is there any significant risk that the study may lead to psychological or emotional distress to participants?		X
	If YES, please explain how you will take steps to reduce or address those risks		
3	Is there any risk that the study may lead to psychological or emotional distress to researchers?		X
	If YES, please explain how you will take steps to reduce or address those risks		
4	Is there any risk that your study may lead or result in harm to the reputation of participants, researchers, or their employees, or any associated persons or organisations?		X
	If YES, please explain how you will take steps to reduce or address those risks		
5	Is there a risk that the study will lead to participants to disclose evidence of previous criminal offences, or their intention to commit criminal offences?		X
	If YES, please explain how you will take steps to reduce or address those risks		
6	Is there a risk that the study will lead participants to disclose evidence that children or vulnerable adults are being harmed, or at risk or harm?		X
	If YES, please explain how you will take steps to reduce or address those risks		
7	Is there a risk that the study will lead participants to disclose evidence of serious risk of other types of harm?		X
	If YES, please explain how you will take steps to reduce or address those risks		
8	Are you aware of the CU Disclosure protocol?	X	

Appendix E. MEDLINE Search Strategy (Search 1)

#	Query	Limiters/Expanders	Last Run Via	Results
S1	((MH "Preoperative Care") OR TI preop* OR AB preop* OR TI "pre-op*" OR AB "pre-op*" OR TI "pre-surg*" OR AB "pre-surg*") OR (TI "pre-assessment" OR AB "pre-assessment" OR TI "pre-an#esthe*" OR AB "pre-an#esthe*")	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	303,706
S2	(MH "Surgical Procedures, Operative+") OR (TI surg* OR AB surg* OR TI operat* OR AB operat*	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	3,968,081
S3	((MH "General Surgery") OR (MH "Gynecology") OR (MH "Neurosurgery") OR (MH "Ophthalmology") OR (MH "Orthognathic Surgery") OR (MH "Orthopedics") OR (MH "Otolaryngology+") OR (MH "Surgery, Plastic") OR (MH "Surgical Oncology") OR (MH "Thoracic Surgery") OR (MH "Urology")) OR ((MH "Colorectal Surgery") OR (MH "Surgery, Oral") OR (MH "Surgery, Computer-Assisted"))	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	184,462
S4	(MH "Arthroplasty, Replacement, Hip") OR (MH "Arthroplasty, Replacement+") OR (MH "Arthroplasty, Replacement, Knee") OR (MH "Arthroplasty, Replacement, Shoulder") OR (MH "Arthroplasty, Replacement, Elbow") OR (MH "Arthroplasty, Replacement, Ankle")) OR (MH "Cholecystectomy+") OR (MH "Hysterectomy+") OR (MH "Coronary Artery Bypass+") OR (MH "Transplants+") OR (MH "Herniorrhaphy")	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	161,905
S5	TI surg* OR AB surg* OR TI ("coronary artery bypass graft*" or CABG) OR AB ("coronary artery bypass graft*" or CABG) OR TI mastectomy OR AB mastectomy OR TX ("joint replacement" or arthroplasty) OR AB ("joint replacement" or arthroplasty) OR TI ("hip replacement" or "knee replacement") OR AB ("hip replacement" or "knee replacement") OR TI ("shoulder replacement" or "shoulder arthroplasty") OR AB ("shoulder replacement" or "shoulder arthroplasty")	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	1,661,832
S6	TI "ankle replacement" OR AB "ankle replacement" OR TI cholecystectomy OR TI cholecystectomy OR TI hysterectomy OR AB hysterectomy OR TI transplant* n surg* OR AB transplant* n surg* OR TI "hernia repair" OR AB "hernia repair" OR TI herniorrhaphy OR AB herniorrhaphy OR TI "bariatric surg*" OR AB bariatic surg* OR TI "weight loss surg*" OR AB "weight loss surg*" OR TI "gastric bypass" OR TI "gastric	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE	62,359

	bypass"		Complete	
S7	TI "general an#esthe*" OR AB "general an#esthe*" OR (MH "Anesthetics+") OR (MH "Anesthesia+")	Search modes – MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	244,670
S8	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	4,174,294
S9	(MH "Psychological Techniques+") OR (MH "Psychotherapy+") OR (MH "Cognitive Therapy+") OR (MH "Mindfulness") OR (MH "Mind-Body Therapies+")	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	317,896
S10	TI psycholog* OR AB psycholog* OR TI behavio#r* OR AB behavio#r* OR TI mindfulness OR AB mindfulness OR TI CBT OR AB CBT OR TI psychoeducation OR AB psychoeducation OR TI psychotherapy OR AB psychotherapy	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	1,163,154
S11	TI "cognitive therapy" OR AB "cognitive therapy" OR TI "mind-body" OR AB "mind-body" OR TI imagery OR AB imagery OR TI "hope therapy" OR AB "hope therapy" OR TI relaxation OR AB relaxation OR TI hypno* OR AB hypno*	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	136,355
S12	TI "patient information" OR AB "patient information" OR TI "patient education" OR AB "patient education" OR TI counsel#ing OR AB counsel#ing OR TI "procedural knowledge" OR AB "procedural knowledge" OR TI "patient teaching" OR AB "patient teaching" OR TI coping OR AB coping	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	133,265

S13	S9 OR S10 OR S11 OR S12	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	1,589,136
S14	S8 AND S13	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	146,569
S15	TI "behavio#ral recovery" OR AB "behavio#ral recovery" OR (MH "Rehabilitation") OR (MH "Activities of Daily Living") OR (MH "Recovery of Function") OR TI "recovery of function" OR AB "recovery of function" OR (MH "Treatment Outcome") OR TI "treatment outcome" OR AB "treatment outcome" OR (MH "Quality of Life") OR TI "health related quality of life" OR AB "health related quality of life" OR TI HRQOL OR AB HRQOL OR TI QOL OR AB QOL OR TI "quality of life" OR AB "quality of life"	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	1,076,809
S16	(MH "Randomized Controlled Trial+") OR TI "randomised controlled trial" OR AB "randomised controlled trial" OR TI RCT OR AB RCT OR TI "randomized controlled trial" OR TI "randomized controlled trial" OR AB placebo	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	226,330
S17	S14 AND S15	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	17,934
S18	S16 AND S17	Search modes - MeSH & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - MEDLINE Complete	667

Appendix F. CINAHL Search Strategy (Search 2)

#	Query	Limiters/Expanders	Last Run Via	Results
S1	(MH "Preoperative Care+") OR TI preop* OR AB preop* OR TI "pre-op*" OR AB "pre-op*" OR TI "pre-surg*" OR AB "pre-surg*" OR TI "pre-assessment" OR AB "pre-assessment" OR TI "pre-an#esthe*" OR AB "pre-an#esthe*"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	46,248
S2	(MH "Surgery, Operative+") OR TI surg* OR AB surg* OR TI operat* OR AB operat*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	325,262
S3	((MH "General Surgery") OR (MH "Gynecology") OR (MH "Neurosurgery") OR (MH "Ophthalmology") OR (MH "Orthognathic Surgery") OR (MH "Orthopedics") OR (MH "Otolaryngology+") OR (MH "Surgery, Plastic") OR (MH "Surgical Oncology") OR (MH "Thoracic Surgery") OR (MH "Urology")) OR ((MH "Colorectal Surgery") OR (MH "Surgery, Oral") OR (MH "Surgery, Computer-Assisted"))	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	33,779
S4	(MH "Arthroplasty, Replacement, Hip") OR (MH "Arthroplasty, Replacement+") OR (MH "Arthroplasty, Replacement, Knee") OR (MH "Arthroplasty, Replacement, Shoulder") OR (MH "Arthroplasty, Replacement, Elbow") OR (MH "Arthroplasty, Replacement, Ankle")) OR (MH "Cholecystectomy+") OR (MH "Hysterectomy+") OR (MH "Coronary Artery Bypass+") OR (MH "Transplants+") OR (MH "Herniorrhaphy")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	43,989
S5	TI surg* OR AB surg* OR TI ("coronary artery bypass graft*" or CABG) OR AB ("coronary artery bypass graft*" or CABG) OR TI mastectomy OR AB mastectomy OR TX ("joint replacement" or arthroplasty) OR AB ("joint replacement" or arthroplasty) OR TI ("hip replacement" or "knee replacement") OR AB ("hip replacement" or "knee replacement") OR TI ("shoulder replacement" or "shoulder arthroplasty") OR AB ("shoulder replacement" or "shoulder arthroplasty")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	284,828
S6	TI "ankle replacement" OR AB "ankle replacement" OR TI cholecystectomy OR TI cholecystectomy OR TI hysterectomy OR AB hysterectomy OR TI transplant* n surg* OR AB transplant* n surg* OR TI "hernia repair" OR AB "hernia repair" OR TI	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen -	13,712

	herniorrhaphy OR AB herniorrhaphy OR TI "bariatric surg*" OR AB bariatic surg* OR TI "weight loss surg*" OR AB "weight loss surg*" OR TI "gastric bypass" OR TI "gastric bypass"		Advanced Search Database - CINAHL Complete	
S7	TI "general an#esthe*" OR AB "general an#esthe*" OR (MH "Anesthetics+") OR(MH "Anesthesia+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	63,158
S8	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	447,863
S9	(MH "Psychological Techniques+") OR (MH "Psychotherapy+") OR (MH "Cognitive Therapy+") OR (MH "Mindfulness") OR (MH "Mind-Body Therapies+")	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	170,897
S10	TI psycholog* OR AB psycholog* OR TI behavio#r* OR AB behavio#r* OR TI mindfulness OR AB mindfulness OR TI CBT OR AB CBT OR TI psychoeducation OR AB psychoeducation OR TI psychotherapy OR AB psychotherapy	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	261,511
S11	TI "cognitive therapy" OR AB "cognitive therapy" OR TI "mind-body" OR AB "mind-body" OR TI imagery OR AB imagery OR TI "hope therapy" OR AB "hope therapy" OR TI relaxation OR AB relaxation OR TI hypno* OR AB hypno*	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	16,222
S12	TI "patient information" OR AB "patient information" OR TI "patient education" OR AB "patient education" OR TI counsel#ing OR AB counsel#ing OR TI "procedural knowledge" OR AB "procedural knowledge" OR TI "patient teaching" OR AB "patient teaching" OR TI coping OR AB coping	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	67,270

			Database - CINAHL Complete	
S13	S9 OR S10 OR S11 OR S12	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	446,020
S14	S8 AND S13	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	24, 640
S15	TI "behavio#ral recovery" OR AB "behavio#ral recovery" OR (MH "Rehabilitation") OR (MH "Activities of Daily Living") OR (MH "Recovery of Function") OR TI "recovery of function" OR AB "recovery of function" OR (MH "Treatment Outcome") OR TI "treatment outcome" OR AB "treatment outcome" OR (MH "Quality of Life") OR TI "health related quality of life" OR AB "health related quality of life" OR TI HRQOL OR AB HRQOL OR TI QOL OR AB QOL OR TI "quality of life" OR AB "quality of life"	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	148,744
S16	(MH "Randomized Controlled Trial+") OR TI "randomised controlled trial" OR AB "randomised controlled trial" OR TI RCT OR AB RCT OR TI "randomized controlled trial" OR TI "randomized controlled trial" OR AB placebo	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	69,525
S17	S14 AND S15	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Complete	2, 257
S18	S16 AND S17	Search modes - Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL	148

			Complete	

Appendix G. AMED - The Allied and Complementary Medicine Database Search Strategy (Search 3)

#	Query	Limiters/Expanders	Last Run Via	Results
S1	(DE "PREOPERATIVE CARE") OR TI preop* OR AB preop* OR TI pre-op* OR AB pre-op* OR TI pre-surg* OR AB pre-surg* OR TI pre-assessment OR AB pre-assessment OR TI pre-an#esthe* OR AB pre-an#esthe*	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	1,883
S2	(DE "SURGERY") OR (DE "SURGERY OPERATIVE") OR (DE "SURGERY PLASTIC") OR (DE "ARTHROPLASTY") OR (DE "MASTECTOMY")	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	1,982
S3	TI surg* OR AB surg* OR TI operat* OR AB operat* OR TI "coronary artery bypass graft" OR AB "coronary artery bypass graft" OR TI mastectomy OR AB mastectomy OR TI arthroplasty OR AB arthroplasty OR TI "hip replacement" OR AB "hip replacement" OR TI "knee replacement" OR AB "knee replacement" OR TI "organ transplant" OR AB "organ transplant"	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	14,560
S4	TI cholecystectomy OR AB cholecystectomy OR TI hysterectomy OR AB hysterectomy OR TI herniorrhaphy OR AB herniorrhaphy OR TI "bariatric surg*" OR AB "bariatric surg*" OR TI "weight loss surg*" OR AB "weight loss surg*" OR TI "gastric bypass" OR AB "gastric bypass"	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	91
S5	(DE "ANESTHETICS") OR (DE "ANESTHESIA") OR TI "general an#esthe*" OR AB "general an#esthe*"	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	504
S6	S1 OR S2 OR S3 OR S4 OR S5	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	15,774

S7	(DE "PSYCHOLOGICAL METHODS") OR (DE "PSYCHOTHERAPY") OR (DE "COGNITIVE THERAPY") OR (DE "PSYCHOEDUCATION") OR (DE "RELAXATION") OR (DE "HYPNOSIS") OR (DE "PATIENT EDUCATION") OR (DE "COUNSELING")	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	8,816
S8	TI psycholog* OR AB psycholog* OR TI behavio#r* OR AB behavio#r* OR TI mindfulness OR AB mindfulness OR TI CBT OR AB CBT OR TI psychoeducation OR AB psychoeducation OR TI psychotherapy OR AB psychotherapy	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	17,581
S9	TI "cognitive therapy" OR AB "cognitive therapy" OR TI "mind-body" OR TI "mind-body" OR TI imagery OR AB imagery OR TI "hope therapy" OR AB "hope therapy" OR TI relaxation OR AB relaxation OR TI hypno* OR AB hypno*	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	5,309
S10	TI "patient information" OR AB "patient information" OR TI "patient education" OR AB "patient education" OR TI counsel#ing OR AB counsel#ing OR TI "procedural knowledge" OR AB "procedural knowledge" OR TI "patient teaching" OR AB "patient teaching" OR TI coping OR AB coping	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	4,345
S11	S7 OR S8 OR S9 OR S10	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	28,183
S12	S6 AND S11	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	1,230
S13	(DE "RECOVERY OF FUNCTION") OR (DE "ACTIVITIES OF DAILY LIVING") OR (DE "REHABILITATION") OR (DE "QUALITY OF LIFE")	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	12,899
S14	TI "treatment outcomes" OR AB "treatment outcomes" OR TI "recovery of function" OR AB "recovery of function" OR TI "activities of daily living" OR AB "activities of daily	Search modes – Find all my search terms &	Interface - EBSCOhost Research Databases	25,975

	living" OR TI rehabilitation OR AB rehabilitation OR TI "behavio#ral recovery" OR AB "behavio#ral recovery" OR TI "health related quality of life" OR AB "health related quality of life"	key word & Boolean/Phrase	Search Screen – Advanced Search Database - AMED	
S15	TI HRQOL OR AB HRQOL OR TI QOL OR AB QOL	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen – Advanced Search Database - AMED	1,827
S16	S13 OR S14 OR S15	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	33,882
S17	S12 AND S16	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	314
S18	(DE "RANDOMIZED CONTROLLED TRIALS") OR TI "randomised controlled trial" OR AB "randomised controlled trial" OR TI RCT OR AB RCT OR AB placebo	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	3,447
S19	S17 AND S18	Search modes – Find all my search terms & key word & Boolean/Phrase	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - AMED	9

Appendix H. Proquest Psychology Database Search Strategy (Search 4)

#	Query	Limiters/Expanders	Last Run Via	Results
S24	ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment") OR ti("pre-anaesthe*") OR ab("pre-anaesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	687

S25	ti("pre-anesthe*") OR ab("pre-anesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	5
S26	SU.EXACT("Surgery") OR ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	62666
S27	SU.EXACT("Anesthesia") OR ti("general anaesthe*") OR ab("general anaesthe*") OR ti("general anesthe*") OR ab("general anesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	1555
S28	(ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment") OR ti("pre-anaesthe*") OR ab("pre-anaesthe*")) OR (ti("pre-anesthe*") OR ab("pre-anesthe*")) OR (SU.EXACT("Surgery") OR ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)) OR (SU.EXACT("Anesthesia") OR ti("general anaesthe*") OR ab("general anaesthe*") OR ti("general anesthe*") OR ab("general anesthe*"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	64134
S29	SU.EXACT("Psychotherapy") OR SU.EXACT("Cognitive therapy") OR SU.EXACT("Patient education")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	20966
S30	SU.EXACT("Counseling")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	9474
S31	ti(psycholog*) OR ab(psycholog*) OR ti(psychother*) OR ab(psychother*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("mind-body") OR ab("mind-body")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	170255
S32	ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR	Search modes –	Interface - Proquest	17260

	ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap*") OR ab("hope therap*")	thesaurus & Boolean/Phrase	Search Screen - Advanced Search Database – Psychology Database	
S33	ti(relaxation) OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(coping) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) AND ab(coping)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	31460
S34	ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach") OR ab("patient teach") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	1245
S35	(SU.EXACT("Psychotherapy") OR SU.EXACT("Cognitive therapy") OR SU.EXACT("Patient education")) OR SU.EXACT("Counseling") OR (ti(psycholog*) OR ab(psycholog*) OR ti(psychother*) OR ab(psychother*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("mind-body") OR ab("mind-body")) OR (ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap*") OR ab("hope therap*")) OR (ti(relaxation) OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(coping) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) AND ab(coping)) OR (ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach") OR ab("patient teach") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	217496
S36	SU.EXACT("Activities of daily living") OR SU.EXACT("Rehabilitation") OR SU.EXACT("Quality of life")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	32987
S37	ti(behavio*) OR ab(behavio*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living") OR ti(rehabilitat*) OR ab(rehabilitat*) OR ti("quality of life") OR ab("quality of life")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	265586

S38	ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	5410
S39	SU.EXACT("Clinical outcomes") OR ti(outcome*) OR ab(outcome*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	131613
S40	(SU.EXACT("Activities of daily living") OR SU.EXACT("Rehabilitation") OR SU.EXACT("Quality of life")) OR (ti(behavio*) OR ab(behavio*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living") OR ti(rehabilitat*) OR ab(rehabilitat*) OR ti("quality of life") OR ab("quality of life")) OR (ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)) OR (SU.EXACT("Clinical outcomes") OR ti(outcome*) OR ab(outcome*))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	371525
S41	SU.EXACT("Clinical trials") OR ti("randomised controlled trial") OR ab("randomised controlled trial") OR ti("randomized controlled trial") OR ab("randomized controlled trial") OR ti(placebo) OR ab(placebo)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	36535
S42	((ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment") OR ti("pre-anaesthe*") OR ab("pre-anaesthe*")) OR (ti("pre-anesthe*") OR ab("pre-anesthe*")) OR (SU.EXACT("Surgery") OR ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)) OR (SU.EXACT("Anesthesia") OR ti("general anaesthe*") OR ab("general anaesthe*") OR ti("general anesthe*") OR ab("general anesthe*"))) AND ((SU.EXACT("Psychotherapy") OR SU.EXACT("Cognitive therapy") OR SU.EXACT("Patient education")) OR SU.EXACT("Counseling") OR (ti(psycholog*) OR ab(psycholog*) OR ti(psychother*) OR ab(psychother*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("mind-body") OR ab("mind-body")) OR (ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap*") OR ab("hope therap*")) OR (ti(relaxation) OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(coping) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) AND ab(coping)) OR (ti("patient knowledge") OR ab("patient knowledge") OR ti("patient	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Psychology Database	111

	educati*") OR ab("patient educati*") OR ti("patient teach") OR ab("patient teach") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information"))) AND ((SU.EXACT("Activities of daily living") OR SU.EXACT("Rehabilitation") OR SU.EXACT("Quality of life")) OR (ti(behavio*) OR ab(behavio*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living") OR ti(rehabilitat*) OR ab(rehabilitat*) OR ti("quality of life") OR ab("quality of life")) OR (ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)) OR (SU.EXACT("Clinical outcomes") OR ti(outcome*) OR ab(outcome*))) AND (SU.EXACT("Clinical trials") OR ti("randomised controlled trial") OR ab("randomised controlled trial") OR ti("randomized controlled trial") OR ab("randomized controlled trial") OR ti(placebo) OR ab(placebo))			

Appendix I. Nursing and Allied Health Database Search Strategy (Search 5)

#	Query	Limiters/Expanders	Last Run Via	Results
S2	(MESH.EXACT.EXPLODE("Preoperative Care:E.02.760.795") OR MESH.EXACT.EXPLODE("Preoperative Care:N.02.421.585.795") OR MESH.EXACT.EXPLODE("Preoperative Care:E.04.604.750")) OR (MESH.EXACT.EXPLODE("Preoperative Period:N.02.421.585.753.937") OR MESH.EXACT.EXPLODE("Preoperative Period:E.04.614.937")) OR ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	4569
S5	ti("pre-anaesthe*") OR ti("pre-anesthe*") OR ab("pre-anaesthe*") OR ab("pre-anesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	72
S6	MESH.EXACT("Surgical Procedures, Operative") OR MESH.EXACT.EXPLODE("Specialties, Surgical")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	6216
S7	ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing &	539607

			Allied Health Database	
S8	(MESH.EXACT("Anesthetics") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.696.277.100.035") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.954.427.210.100.035")) OR MESH.EXACT.EXPLODE("Anesthesia, General") OR ti("general anesthe*") OR ab("general anesthe*") OR ti("general anaesthe*") OR ab("general anaesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	9973
S9	((MESH.EXACT.EXPLODE("Preoperative Care:E.02.760.795") OR MESH.EXACT.EXPLODE("Preoperative Care:N.02.421.585.795") OR MESH.EXACT.EXPLODE("Preoperative Care:E.04.604.750")) OR (MESH.EXACT.EXPLODE("Preoperative Period:N.02.421.585.753.937") OR MESH.EXACT.EXPLODE("Preoperative Period:E.04.614.937")) OR ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment")) OR (ti("pre-anaesthe*") OR ti("pre-anesthe*") OR ab("pre-anaesthe*") OR ab("pre-anesthe*")) OR (MESH.EXACT("Surgical Procedures, Operative") OR MESH.EXACT.EXPLODE("Specialties, Surgical")) OR (ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)) OR ((MESH.EXACT("Anesthetics") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.696.277.100.035") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.954.427.210.100.035")) OR MESH.EXACT.EXPLODE("Anesthesia, General") OR ti("general anesthe*") OR ab("general anesthe*") OR ti("general anaesthe*") OR ab("general anaesthe*"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	548993
S10	(MESH.EXACT.EXPLODE("Psychological Techniques:F.04.669") OR MESH.EXACT.EXPLODE("Psychological Techniques:E.05.796")) OR MESH.EXACT.EXPLODE("Psychotherapy") OR MESH.EXACT.EXPLODE("Psychology") OR MESH.EXACT.EXPLODE("Cognitive Therapy") OR (MESH.EXACT.EXPLODE("Mind-Body Therapies") OR MESH.EXACT.EXPLODE("Mindfulness:F.02.463.551") OR MESH.EXACT.EXPLODE("Mindfulness:F.04.754.137.428.500")) OR (MESH.EXACT.EXPLODE("Patient Education as Topic:I.02.233.332.500") OR MESH.EXACT.EXPLODE("Patient Education as Topic:N.02.421.726.407.680")) OR (MESH.EXACT.EXPLODE("Counseling:F.02.784.176") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.461.363") OR MESH.EXACT.EXPLODE("Counseling:F.04.408.413") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.143.303"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	138896
S11	ti(psycholog*) OR ab(psycholog*) OR ti(psychother*) OR ab(psychother*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("Mind-body") OR ab("Mind-body")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search	55448

			Database - Nursing & Allied Health Database	
S12	ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap*") OR ab("hope therap*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	8793
S13	relaxation OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) OR ti(coping) OR ab(coping)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	104970
S14	ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach*") OR ab("patient teach*") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	7481
S15	((MESH.EXACT.EXPLODE("Psychological Techniques:F.04.669") OR MESH.EXACT.EXPLODE("Psychological Techniques:E.05.796")) OR MESH.EXACT.EXPLODE("Psychotherapy") OR MESH.EXACT.EXPLODE("Psychology") OR MESH.EXACT.EXPLODE("Cognitive Therapy") OR (MESH.EXACT.EXPLODE("Mind-Body Therapies") OR MESH.EXACT.EXPLODE("Mindfulness:F.02.463.551") OR MESH.EXACT.EXPLODE("Mindfulness:F.04.754.137.428.500")) OR (MESH.EXACT.EXPLODE("Patient Education as Topic:I.02.233.332.500") OR MESH.EXACT.EXPLODE("Patient Education as Topic:N.02.421.726.407.680")) OR (MESH.EXACT.EXPLODE("Counseling:F.02.784.176") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.461.363") OR MESH.EXACT.EXPLODE("Counseling:F.04.408.413") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.143.303"))) OR (ti(psycholog*) OR ab(psycholog*) OR ti(psychother*) OR ab(psychother*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("Mind-body") OR ab("Mind-body")) OR (ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap*") OR ab("hope therap*")) OR (relaxation OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) OR ti(coping) OR ab(coping))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	287171

	OR (ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach*") OR ab("patient teach*") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information"))			
S16	(MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.760.169.063.500.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.831.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:N.02.421.784.110") OR MESH.EXACT.EXPLODE("Activities of Daily Living:I.03.050")) OR (MESH.EXACT.EXPLODE("Rehabilitation:N.02.421.784") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.831") OR MESH.EXACT.EXPLODE("Rehabilitation:H.02.403.680.600") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.760.169.063.500")) OR (MESH.EXACT.EXPLODE("Quality of Life:K.01.752.400.750") OR MESH.EXACT.EXPLODE("Quality of Life:N.06.850.505.400.425.837") OR MESH.EXACT.EXPLODE("Quality of Life:I.01.800")) OR MESH.EXACT.EXPLODE("Recovery of Function")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	32982
S17	ti(behaviour*) OR ab(behaviour*) OR ti(behavior*) OR ab(behavior*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living") OR ti(rehabilitat*) OR ab(rehabilitat*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	202941
S18	ti("quality of life") OR ab("quality of life") OR ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	55915
S19	(MESH.EXACT.EXPLODE("Treatment Outcome:N.05.715.360.575.575.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:N.04.761.559.590.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:E.01.789.800")) OR ti(outcome*) OR ab(outcome*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	363646
S20	((MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.760.169.063.500.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.831.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:N.02.421.784.110") OR MESH.EXACT.EXPLODE("Activities of Daily Living:I.03.050")) OR (MESH.EXACT.EXPLODE("Rehabilitation:N.02.421.784") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.831") OR	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	586605

	MESH.EXACT.EXPLODE("Rehabilitation:H.02.403.680.600") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.760.169.063.500")) OR (MESH.EXACT.EXPLODE("Quality of Life:K.01.752.400.750") OR MESH.EXACT.EXPLODE("Quality of Life:N.06.850.505.400.425.837") OR MESH.EXACT.EXPLODE("Quality of Life:I.01.800")) OR MESH.EXACT.EXPLODE("Recovery of Function")) OR (ti(behaviour*) OR ab(behaviour*) OR ti(behavior*) OR ab(behavior*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living") OR ti(rehabilitat*) OR ab(rehabilitat*)) OR (ti("quality of life") OR ab("quality of life") OR ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)) OR ((MESH.EXACT.EXPLODE("Treatment Outcome:N.05.715.360.575.575.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:N.04.761.559.590.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:E.01.789.800")) OR ti(outcome*) OR ab(outcome*))			
S21	MESH.EXACT.EXPLODE("Randomized Controlled Trial") OR ti("randomised controlled trial") OR ab("randomised controlled trial") OR ti("randomized controlled trial") OR ab("randomized controlled trial") OR ti(placebo) OR ab(placebo)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	69746
S22	(((MESH.EXACT.EXPLODE("Preoperative Care:E.02.760.795") OR MESH.EXACT.EXPLODE("Preoperative Care:N.02.421.585.795") OR MESH.EXACT.EXPLODE("Preoperative Care:E.04.604.750")) OR (MESH.EXACT.EXPLODE("Preoperative Period:N.02.421.585.753.937") OR MESH.EXACT.EXPLODE("Preoperative Period:E.04.614.937")) OR ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment")) OR (ti("pre-anaesthe*") OR ti("pre-anesthe*") OR ab("pre-anaesthe*") OR ab("pre-anesthe*")) OR (MESH.EXACT("Surgical Procedures, Operative") OR MESH.EXACT.EXPLODE("Specialties, Surgical")) OR (ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)) OR ((MESH.EXACT("Anesthetics") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.696.277.100.035") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.954.427.210.100.035")) OR MESH.EXACT.EXPLODE("Anesthesia, General") OR ti("general anesthe*") OR ab("general anesthe*") OR ti("general anaesthe*") OR ab("general anaesthe*"))) AND (((MESH.EXACT.EXPLODE("Psychological Techniques:F.04.669") OR MESH.EXACT.EXPLODE("Psychological Techniques:E.05.796")) OR MESH.EXACT.EXPLODE("Psychotherapy") OR	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database - Nursing & Allied Health Database	282

	MESH.EXACT.EXPLODE("Psychology") OR MESH.EXACT.EXPLODE("Cognitive Therapy") OR (MESH.EXACT.EXPLODE("Mind-Body Therapies") OR MESH.EXACT.EXPLODE("Mindfulness:F.02.463.551") OR MESH.EXACT.EXPLODE("Mindfulness:F.04.754.137.428.500")) OR (MESH.EXACT.EXPLODE("Patient Education as Topic:I.02.233.332.500") OR MESH.EXACT.EXPLODE("Patient Education as Topic:N.02.421.726.407.680")) OR (MESH.EXACT.EXPLODE("Counseling:F.02.784.176") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.461.363") OR MESH.EXACT.EXPLODE("Counseling:F.04.408.413") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.143.303"))) OR (ti(psycholog*) OR ab(psycholog*) OR ti(psychother*) OR ab(psychother*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("Mind-body") OR ab("Mind-body")) OR (ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap*") OR ab("hope therap*")) OR (relaxation OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) OR ti(coping) OR ab(coping)) OR (ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach*") OR ab("patient teach*") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information"))) AND (((MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.760.169.063.500.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.831.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:N.02.421.784.110") OR MESH.EXACT.EXPLODE("Activities of Daily Living:I.03.050")) OR (MESH.EXACT.EXPLODE("Rehabilitation:N.02.421.784") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.831") OR MESH.EXACT.EXPLODE("Rehabilitation:H.02.403.680.600") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.760.169.063.500")) OR (MESH.EXACT.EXPLODE("Quality of Life:K.01.752.400.750") OR MESH.EXACT.EXPLODE("Quality of Life:N.06.850.505.400.425.837") OR MESH.EXACT.EXPLODE("Quality of Life:I.01.800")) OR MESH.EXACT.EXPLODE("Recovery of Function")) OR (ti(behaviour*) OR ab(behaviour*) OR ti(behavior*) OR ab(behavior*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living") OR ti(rehabilitat*) OR ab(rehabilitat*)) OR (ti("quality of life") OR ab("quality of life") OR ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)) OR ((MESH.EXACT.EXPLODE("Treatment Outcome:N.05.715.360.575.575.800") OR			

	MESH.EXACT.EXPLODE("Treatment Outcome:N.04.761.559.590.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:E.01.789.800")) OR ti(outcome*) OR ab(outcome*))) AND (MESH.EXACT.EXPLODE("Randomized Controlled Trial") OR ti("randomised controlled trial") OR ab("randomised controlled trial") OR ti("randomized controlled trial") OR ab("randomized controlled trial") OR ti(placebo) OR ab(placebo))			

Appendix J. Proquest Health and Medical Collection Search Strategy (Search 6)

#	Query	Limiters/Expanders	Last Run Via	Results
S43	(MESH.EXACT.EXPLODE("Preoperative Care:E.02.760.795") OR MESH.EXACT.EXPLODE("Preoperative Care:N.02.421.585.795") OR MESH.EXACT.EXPLODE("Preoperative Care:E.04.604.750")) OR (MESH.EXACT.EXPLODE("Preoperative Period:N.02.421.585.753.937") OR MESH.EXACT.EXPLODE("Preoperative Period:E.04.614.937")) OR ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	10384
S44	ti("pre-anaesthe*") OR ab("pre-anaesthe*") OR ti("pre-anesthe*") OR ab("pre-anesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	184
S45	MESH.EXACT("Surgical Procedures, Operative") OR MESH.EXACT.EXPLODE("Specialties, Surgical") OR ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	1164536
S46	(MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.696.277.100.035") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.954.427.210.100.035")) OR MESH.EXACT.EXPLODE("Anesthesia, General") OR ti("general anaesthe*") OR ab("general anaesthe*") OR ti("general anesthe*") OR ab("general anesthe*")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	22619

S47	((MESH.EXACT.EXPLODE("Preoperative Care:E.02.760.795") OR MESH.EXACT.EXPLODE("Preoperative Care:N.02.421.585.795") OR MESH.EXACT.EXPLODE("Preoperative Care:E.04.604.750")) OR (MESH.EXACT.EXPLODE("Preoperative Period:N.02.421.585.753.937") OR MESH.EXACT.EXPLODE("Preoperative Period:E.04.614.937")) OR ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment")) OR (ti("pre-anaesthe*") OR ab("pre-anaesthe*") OR ti("pre-anesthe*") OR ab("pre-anesthe*")) OR (MESH.EXACT("Surgical Procedures, Operative") OR MESH.EXACT.EXPLODE("Specialties, Surgical") OR ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)) OR ((MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.696.277.100.035") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.954.427.210.100.035")) OR MESH.EXACT.EXPLODE("Anesthesia, General") OR ti("general anaesthe*") OR ab("general anaesthe*") OR ti("general anesthe*") OR ab("general anesthe*"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	1181201
S48	(MESH.EXACT.EXPLODE("Psychological Techniques:F.04.669") OR MESH.EXACT.EXPLODE("Psychological Techniques:E.05.796")) OR MESH.EXACT.EXPLODE("Psychology") OR MESH.EXACT.EXPLODE("Psychotherapy") OR MESH.EXACT.EXPLODE("Cognitive Therapy") OR MESH.EXACT.EXPLODE("Mind-Body Therapies") OR (MESH.EXACT.EXPLODE("Mindfulness:F.02.463.551") OR MESH.EXACT.EXPLODE("Mindfulness:F.04.754.137.428.500")) OR (MESH.EXACT.EXPLODE("Patient Education as Topic:I.02.233.332.500") OR MESH.EXACT.EXPLODE("Patient Education as Topic:N.02.421.726.407.680")) OR (MESH.EXACT.EXPLODE("Counseling:F.02.784.176") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.461.363") OR MESH.EXACT.EXPLODE("Counseling:F.04.408.413") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.143.303"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	223433
S49	ti(psycholog*) OR ab(psycholog*) OR ti(psychotherap*) OR ab(psychotherap*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("mind-body") OR ab("mind-body")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	202736
S50	ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap") OR ab("hope therap")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search	25523

			Database – Health and Medicine Database	
S51	ti(relaxation) OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) OR ti(coping) OR ab(coping)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	108470
S52	ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach*") OR ab("patient teach*") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	14157
S53	((MESH.EXACT.EXPLODE("Psychological Techniques:F.04.669") OR MESH.EXACT.EXPLODE("Psychological Techniques:E.05.796")) OR MESH.EXACT.EXPLODE("Psychology") OR MESH.EXACT.EXPLODE("Psychotherapy") OR MESH.EXACT.EXPLODE("Cognitive Therapy") OR MESH.EXACT.EXPLODE("Mind-Body Therapies") OR (MESH.EXACT.EXPLODE("Mindfulness:F.02.463.551") OR MESH.EXACT.EXPLODE("Mindfulness:F.04.754.137.428.500")) OR (MESH.EXACT.EXPLODE("Patient Education as Topic:I.02.233.332.500") OR MESH.EXACT.EXPLODE("Patient Education as Topic:N.02.421.726.407.680")) OR (MESH.EXACT.EXPLODE("Counseling:F.02.784.176") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.461.363") OR MESH.EXACT.EXPLODE("Counseling:F.04.408.413") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.143.303"))) OR (ti(psycholog*) OR ab(psycholog*) OR ti(psychotherap*) OR ab(psychotherap*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("mind-body") OR ab("mind-body")) OR (ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap") OR ab("hope therap")) OR (ti(relaxation) OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) OR ti(coping) OR ab(coping)) OR (ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach*") OR ab("patient teach*") OR	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	531824

	ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information"))			
S54	(MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.760.169.063.500.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.831.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:N.02.421.784.110") OR MESH.EXACT.EXPLODE("Activities of Daily Living:I.03.050")) OR (MESH.EXACT.EXPLODE("Quality of Life:K.01.752.400.750") OR MESH.EXACT.EXPLODE("Quality of Life:N.06.850.505.400.425.837") OR MESH.EXACT.EXPLODE("Quality of Life:I.01.800")) OR MESH.EXACT.EXPLODE("Recovery of Function") OR (MESH.EXACT.EXPLODE("Rehabilitation:N.02.421.784") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.831") OR MESH.EXACT.EXPLODE("Rehabilitation:H.02.403.680.600") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.760.169.063.500"))	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	48918
S55	ti(rehabilitat*) OR ab(rehabilitat*) OR ti(behavio*) OR ab(behavio*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living")	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	580233
S56	ti("quality of life") OR ab("quality of life") OR ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	130330
S57	(MESH.EXACT.EXPLODE("Treatment Outcome:N.05.715.360.575.575.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:N.04.761.559.590.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:E.01.789.800")) OR ti(outcome*) OR ab(outcome*)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	805356
S58	((MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.760.169.063.500.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.831.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:N.02.421.784.110") OR MESH.EXACT.EXPLODE("Activities of Daily Living:I.03.050")) OR (MESH.EXACT.EXPLODE("Quality of Life:K.01.752.400.750") OR	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine	1428730

	MESH.EXACT.EXPLODE("Quality of Life:N.06.850.505.400.425.837") OR MESH.EXACT.EXPLODE("Quality of Life:I.01.800")) OR MESH.EXACT.EXPLODE("Recovery of Function") OR (MESH.EXACT.EXPLODE("Rehabilitation:N.02.421.784") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.831") OR MESH.EXACT.EXPLODE("Rehabilitation:H.02.403.680.600") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.760.169.063.500"))) OR (ti(rehabilitat*) OR ab(rehabilitat*) OR ti(behavio*) OR ab(behavio*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living")) OR (ti("quality of life") OR ab("quality of life") OR ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)) OR ((MESH.EXACT.EXPLODE("Treatment Outcome:N.05.715.360.575.575.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:N.04.761.559.590.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:E.01.789.800")) OR ti(outcome*) OR ab(outcome*))		Database	
S59	MESH.EXACT.EXPLODE("Randomized Controlled Trial") OR ti("randomized controlled trial") OR ab("randomized controlled trial") OR ti("randomised controlled trial") OR ab("randomised controlled trial") OR ti(placebo) OR ab(placebo)	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	175026
S60	(((MESH.EXACT.EXPLODE("Preoperative Care:E.02.760.795") OR MESH.EXACT.EXPLODE("Preoperative Care:N.02.421.585.795") OR MESH.EXACT.EXPLODE("Preoperative Care:E.04.604.750")) OR (MESH.EXACT.EXPLODE("Preoperative Period:N.02.421.585.753.937") OR MESH.EXACT.EXPLODE("Preoperative Period:E.04.614.937")) OR ti(preop*) OR ab(preop*) OR ti("pre-op*") OR ab("pre-op*") OR ti("pre-surg*") OR ab("pre-surg*") OR ti("pre-assessment") OR ab("pre-assessment")) OR (ti("pre-anaesthe*") OR ab("pre-anaesthe*") OR ti("pre-anesthe*") OR ab("pre-anesthe*")) OR (MESH.EXACT("Surgical Procedures, Operative") OR MESH.EXACT.EXPLODE("Specialties, Surgical") OR ti(surg*) OR ab(surg*) OR ti(operat*) OR ab(operat*)) OR ((MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.696.277.100.035") OR MESH.EXACT.EXPLODE("Anesthetics, General:D.27.505.954.427.210.100.035")) OR MESH.EXACT.EXPLODE("Anesthesia, General") OR ti("general anaesthe*") OR ab("general anaesthe*") OR ti("general anesthe*") OR ab("general anesthe*"))) AND (((MESH.EXACT.EXPLODE("Psychological Techniques:F.04.669") OR	Search modes – thesaurus & Boolean/Phrase	Interface - Proquest Search Screen - Advanced Search Database – Health and Medicine Database	459

	MESH.EXACT.EXPLODE("Psychological Techniques:E.05.796")) OR MESH.EXACT.EXPLODE("Psychology") OR MESH.EXACT.EXPLODE("Psychotherapy") OR MESH.EXACT.EXPLODE("Cognitive Therapy") OR MESH.EXACT.EXPLODE("Mind-Body Therapies") OR (MESH.EXACT.EXPLODE("Mindfulness:F.02.463.551") OR MESH.EXACT.EXPLODE("Mindfulness:F.04.754.137.428.500")) OR (MESH.EXACT.EXPLODE("Patient Education as Topic:I.02.233.332.500") OR MESH.EXACT.EXPLODE("Patient Education as Topic:N.02.421.726.407.680")) OR (MESH.EXACT.EXPLODE("Counseling:F.02.784.176") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.461.363") OR MESH.EXACT.EXPLODE("Counseling:F.04.408.413") OR MESH.EXACT.EXPLODE("Counseling:N.02.421.143.303"))) OR (ti(psycholog*) OR ab(psycholog*) OR ti(psychotherap*) OR ab(psychotherap*) OR ti(psychoeducation*) OR ab(psychoeducation*) OR ti(mindful*) OR ab(mindful*) OR ti("mind-body") OR ab("mind-body")) OR (ti(CBT) OR ab(CBT) OR ti("cognitive behavio*") OR ab("cognitive behavio*") OR ti("cognitive therap*") OR ab("cognitive therap*") OR ti(imagery) OR ab(imagery) OR ti("hope therap") OR ab("hope therap")) OR (ti(relaxation) OR ab(relaxation) OR ti(hypno*) OR ab(hypno*) OR ti(counselling) OR ab(counselling) OR ti(counseling) OR ab(counseling) OR ti(coping) OR ab(coping)) OR (ti("patient knowledge") OR ab("patient knowledge") OR ti("patient educati*") OR ab("patient educati*") OR ti("patient teach*") OR ab("patient teach*") OR ti("procedural knowledge") OR ab("procedural knowledge") OR ti("patient information") OR ab("patient information"))) AND (((MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.760.169.063.500.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:E.02.831.067") OR MESH.EXACT.EXPLODE("Activities of Daily Living:N.02.421.784.110") OR MESH.EXACT.EXPLODE("Activities of Daily Living:I.03.050")) OR (MESH.EXACT.EXPLODE("Quality of Life:K.01.752.400.750") OR MESH.EXACT.EXPLODE("Quality of Life:N.06.850.505.400.425.837") OR MESH.EXACT.EXPLODE("Quality of Life:I.01.800")) OR MESH.EXACT.EXPLODE("Recovery of Function") OR (MESH.EXACT.EXPLODE("Rehabilitation:N.02.421.784") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.831") OR MESH.EXACT.EXPLODE("Rehabilitation:H.02.403.680.600") OR MESH.EXACT.EXPLODE("Rehabilitation:E.02.760.169.063.500"))) OR (ti(rehabilitat*) OR ab(rehabilitat*) OR ti(behavio*) OR ab(behavio*) OR ti("recovery of function") OR ab("recovery of function") OR ti("activities of daily living") OR ab("activities of daily living")) OR (ti("quality of life") OR ab("quality of life") OR			

	ti(QOL) OR ab(QOL) OR ti(HRQOL) OR ab(HRQOL)) OR ((MESH.EXACT.EXPLODE("Treatment Outcome:N.05.715.360.575.575.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:N.04.761.559.590.800") OR MESH.EXACT.EXPLODE("Treatment Outcome:E.01.789.800")) OR ti(outcome*) OR ab(outcome*))) AND (MESH.EXACT.EXPLODE("Randomized Controlled Trial") OR ti("randomized controlled trial") OR ab("randomized controlled trial") OR ti("randomised controlled trial") OR ab("randomised controlled trial") OR ti(placebo) OR ab(placebo))			

Appendix K. PubMed Search Strategy (Search 7)

#	Query	Limiters/Expanders	Last Run Via	Results
#1	Search ((((((preoperative care[MeSH Terms]) OR preop*[Title/Abstract]) OR "pre-op*"[Title/Abstract]) OR "pre-surg*"[Title/Abstract]) OR "pre-assessment"[Title/Abstract]) OR "pre-anesthetic"[Title/Abstract]) OR "pre-anaesthetic"[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	286843
#2	Search ("Surgical Procedures, Operative"[Mesh]) OR "Specialties, Surgical"[Mesh]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	2876948
#3	Search (surg*[Title/Abstract]) OR operat*[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	2251286
#4	Search ("Anesthesia"[Mesh]) OR "Anesthetics"[Mesh]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	218283
#6	Search (anaesthe*[Title/Abstract]) OR anesthe*[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	345417
#7	Search #1 OR #2 OR #3 OR #4 OR #6	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	430576
#8	Search (("Psychological Techniques"[Mesh]) OR "Psychotherapy"[Mesh])	Search modes –	Interface - PubMed	305462

		MeSh, Keyword & Boolean Operator	Search Screen – Advanced search Database - PubMed	
#9	Search "Mind-Body Therapies"[Mesh]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	45457
#10	Search ((((((((((psycholog*[Title/Abstract]) OR behaviour*[Title/Abstract]) OR behavior*[Title/Abstract]) OR mindfulness[Title/Abstract]) OR CBT[Title/Abstract]) OR psychoeducation[Title/Abstract]) OR psychotherapy[Title/Abstract]) OR "cognitive therapy"[Title/Abstract]) OR "mind-body"[Title/Abstract]) OR imagery[Title/Abstract]) OR "hope therapy"[Title/Abstract]) OR relaxation[Title/Abstract]) OR hypno*[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	1356390
#11	Search "Patient Education as Topic"[Mesh]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	77058
#12	Search ((((((("patient information"[Title/Abstract]) OR "patient education"[Title/Abstract]) OR counselling[Title/Abstract]) OR counseling[Title/Abstract]) OR "procedural knowledge"[Title/Abstract]) OR "patient teaching"[Title/Abstract]) OR coping[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	138685
#13	Search #8 OR #9 OR #10 OR #11 OR #12	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	1718155
#14	Search ((("Recovery of Function"[Mesh]) OR "Rehabilitation"[Mesh]) OR "Treatment Outcome"[Mesh]) OR "Quality of Life"[Mesh]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	1158425
#15	Search (((((((("behavioural recovery"[Title/Abstract]) OR "behavioral recovery"[Title/Abstract]) OR rehabilitation[Title/Abstract]) OR "activities of daily living"[Title/Abstract]) OR "recovery of function"[Title/Abstract]) OR "treatment outcome"[Title/Abstract]) OR "health related quality of life"[Title/Abstract]) OR HRQOL[Title/Abstract]) OR QOL[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	226888
#16	Search #14 OR #15	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search	1274103

			Database - PubMed	
#17	Search ((((randomized controlled trial[MeSH Terms]) OR "randomised controlled trial"[Title/Abstract]) OR "randomized controlled trial"[Title/Abstract]) OR RCT[Title/Abstract]) OR placebo[Title/Abstract]	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	336944
#18	Search #7 AND #13 AND #16 AND #17	Search modes – MeSh, Keyword & Boolean Operator	Interface - PubMed Search Screen – Advanced search Database - PubMed	1207

Appendix L. Scopus Search Strategy (Search 8)

#	Query	Limiters/Expanders	Last Run Via	Results
1	(((TITLE-ABS-KEY ((preop! OR "pre-op!" OR "pre-surg!" OR "pre-assessment" OR "pre-anaesthe!" OR "pre-anesthe!")) OR TITLE-ABS-KEY ((surg! OR operat! OR "coronary artery bypass graft" OR cabg OR mastectomy OR "joint replacement" OR arthroplasty OR "hip replacement" OR "knee replacement")) OR TITLE-ABS-KEY (cholecystectomy OR hysterectomy OR transplant OR "hernia repair" OR herniorrhaphy) OR TITLE-ABS-KEY ("bariatric surg!" OR "weight loss surg!" OR "gastric bypass"))) OR (TITLE-ABS-KEY ("general anaesthe!" OR "general anesthe!"))) AND ((TITLE-ABS-KEY (psycholog! OR behaviour! OR behavior! OR mindfulness OR cbt OR psychoeducation OR psychotherapy) OR TITLE-ABS-KEY ("cognitive therapy" OR "mind-body" OR imagery OR "hope therapy" OR relaxation OR hypno! OR coping) OR TITLE-ABS-KEY ("patient information" OR "patient education" OR counseling OR counselling OR "procedural knowledge" OR "patient teaching")))	Search modes – Document search Boolean/Key Word or Phrase	Interface – Scopus Research Databases Search Screen - Advanced Search Database - Scopus	20, 486
2	(TITLE-ABS-KEY (recovery OR "activities of daily living" OR rehabilitation OR "behavioural recovery" OR "behavioral recovery") OR TITLE-ABS-KEY ("recovery of function" OR "treatment outcome" OR "quality of life" OR "health related quality of life" OR qol OR hrqol))	Search modes – Document search Boolean/Key Word or Phrase	Interface – Scopus Research Databases Search Screen - Advanced Search Database - Scopus	2, 586, 638
3	((((TITLE-ABS-KEY ((preop! OR "pre-op!" OR "pre-surg!" OR "pre-assessment" OR "pre-anaesthe!" OR "pre-anesthe!")) OR TITLE-ABS-	Search modes – Document search	Interface - Scopus Research Databases	6, 359

	KEY ((surg! OR operat! OR "coronary artery bypass graft" OR cabg OR mastectomy OR "joint replacement" OR arthroplasty OR "hip replacement" OR "knee replacement")) OR TITLE-ABS-KEY (cholecystectomy OR hysterectomy OR transplant OR "hernia repair" OR herniorrhaphy) OR TITLE-ABS-KEY ("bariatric surg!" OR "weight loss surg!" OR "gastric bypass"))) OR (TITLE-ABS-KEY ("general anaesthe!" OR "general anesthe!"))) AND ((TITLE-ABS-KEY (psycholog! OR behaviour! OR behavior! OR mindfulness OR cbt OR psy choeducation OR psychotherapy) OR TITLE-ABS-KEY ("cognitive therapy" OR "mind-body" OR imagery OR "hope therapy" OR relaxation OR hypno! OR coping) OR TITLE-ABS-KEY ("patient information" OR "patient education" OR counseling OR counselling OR "procedural knowledge" OR "patient teaching")))) AND ((TITLE-ABS-KEY (recovery OR "activities of daily living" OR rehabilitation OR "behavioural recovery" OR "behavioral recovery") OR TITLE-ABS-KEY ("recovery of function" OR "treatment outcome" OR "quality of life" OR "health related quality of life" OR qol OR hrqol)))	Boolean/Key Word or Phrase	Search Screen - Advanced Search Database - Scopus	
4	TITLE-ABS-KEY ("randomised controlled trial" OR rct OR placebo)	Search modes – Document search Boolean/Key Word or Phrase	Interface – Scopus Research Databases Search Screen - Advanced Search Database - Scopus	810, 843
5	(((((TITLE-ABS-KEY ((preop! OR "pre-op!" OR "pre-surg!" OR "pre-assessment" OR "pre-anaesthe!" OR "pre-anesthe!")) OR TITLE-ABS-KEY ((surg! OR operat! OR "coronary artery bypass graft" OR cabg OR mastectomy OR "joint replacement" OR arthroplasty OR "hip replacement" OR "knee replacement")) OR TITLE-ABS-KEY (cholecystectomy OR hysterectomy OR transplant OR "hernia repair" OR herniorrhaphy) OR TITLE-ABS-KEY ("bariatric surg!" OR "weight loss surg!" OR "gastric bypass"))) OR (TITLE-ABS-KEY ("general anaesthe!" OR "general anesthe!"))) AND ((TITLE-ABS-KEY (psycholog! OR behaviour! OR behavior! OR mindfulness OR cbt OR psy choeducation OR psychotherapy) OR TITLE-ABS-KEY ("cognitive therapy" OR "mind-body" OR imagery OR "hope	Search modes – Document search Boolean/Key Word or Phrase	Interface – Scopus Research Databases Search Screen - Advanced Search Database - Scopus	812

	therapy" OR relaxation OR hypno! OR coping) OR TITLE-ABS-KEY ("patient information" OR "patient education" OR counseling OR counselling OR "procedural knowledge" OR "patient teaching")))) AND ((TITLE-ABS-KEY (recovery OR "activities of daily living" OR rehabilitation OR "behavioural recovery" OR "behavioral recovery") OR TITLE-ABS-KEY ("recovery of function" OR "treatment outcome" OR "quality of life" OR "health related quality of life" OR qol OR hrqol)))) AND (TITLE-ABS-KEY ("randomised controlled trial" OR rct OR placebo))			

Appendix M. The Cochrane Library Search Strategy (Search 9)

#	Query	Limiters/Expanders	Run Via	Results
#1	MeSH descriptor: [Preoperative Care] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	5709
#2	MeSH descriptor: [Preoperative Period] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	213
#3	preop*:ti,ab,kw or "pre-op*":ti,ab,kw or "pre-surg*":ti,ab,kw or presurg*:ti,ab,kw or preassess*:ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	27921
#4	"pre-assess*":ti,ab,kw or preanaesthe*:ti,ab,kw or preanesthe*:ti,ab,kw or "pre-anaesthe*":ti,ab,kw or "pre-anesthe*":ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	2256
#5	#1 or #2 or #3 or #4	Search Manager	Cochrane Library Wiley Online Library	29718
#6	MeSH descriptor: [Specialties, Surgical] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	1953
#7	MeSH descriptor: [Surgical Procedures, Operative] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	117320
#8	surg*:ti,ab,kw or operat*:ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	157551
#9	#6 or #7 or #8	Search Manager	Cochrane Library Wiley Online Library	213092
#10	MeSH descriptor: [Anesthetics, General] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	4936
#11	MeSH descriptor: [Anesthesia, General] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	6159
#12	"general anaesthe*":ti,ab,kw or "general anesthe*":ti,ab,kw (Word variations have	Search	Cochrane Library	10624

	been searched)		Wiley Online Library	
#13	#10 or #11 or #12	Search Manager	Cochrane Library Wiley Online Library	16854
#14	MeSH descriptor: [Psychological Techniques] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	7212
#15	MeSH descriptor: [Psychotherapy] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	20473
#16	MeSH descriptor: [Psychology] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	994
#17	MeSH descriptor: [Cognitive Therapy] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	7230
#18	MeSH descriptor: [Mindfulness] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	353
#19	MeSH descriptor: [Mind-Body Therapies] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	5526
#20	MeSH descriptor: [Counseling] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	4530
#21	MeSH descriptor: [Patient Education as Topic] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	8058
#22	psycholog*:ti,ab,kw or psychother*:ti,ab,kw or psychoeducation*:ti,ab,kw or mindful*:ti,ab,kw or "mind-body":ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	49344
#23	CBT:ti,ab,kw or "cognitive behavio*":ti,ab,kw or "cognitive therap*":ti,ab,kw or "imagery":ti,ab,kw or "hope therap*":ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	14519
#24	"relaxation":ti,ab,kw or hypno*:ti,ab,kw or "counselling":ti,ab,kw or "counseling":ti,ab,kw or "coping":ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	25917
#25	"patient knowledge":ti,ab,kw or "patient educati*":ti,ab,kw or "patient teach*":ti,ab,kw or "procedural knowledge":ti,ab,kw or "patient information":ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	11427
#26	#14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25	Search Manager	Cochrane Library Wiley Online Library	94973
#27	MeSH descriptor: [Recovery of Function] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	4334
#28	MeSH descriptor: [Activities of Daily Living] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	4745
#29	MeSH descriptor: [Rehabilitation] explode all trees	Medical Terms (MeSH)	Cochrane Library	28308

			Wiley Online Library	
#30	MeSH descriptor: [Quality of Life] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	19823
#31	"behaviour* recovery":ti,ab,kw or "behavior* recovery":ti,ab,kw or "recovery of function":ti,ab,kw or "activities of daily living":ti,ab,kw or rehabilitat*:ti,ab,kw (Word variations have been searched	Search	Cochrane Library Wiley Online Library	25956
#32	"quality of life":ti,ab,kw or "QOL":ti,ab,kw or HRQOL:ti,ab,kw (Word variations have been searched)	Search	Cochrane Library Wiley Online Library	51774
#33	MeSH descriptor: [Treatment Outcome] explode all trees	Medical Terms (MeSH)	Cochrane Library Wiley Online Library	121188
#34	outcome*:ti,ab,kw (Word variations have been searched)	Search		289023
#35	#27 or #28 or #29 or #30 or #31 or #32 or #33 or #34	Search Manager	Cochrane Library Wiley Online Library	332197
#36	#5 and #9 and #13 and #26 and #35	Search Manager	Cochrane Library Wiley Online Library	71

Appendix N. PsycINFO Search Strategy (Search 10)

#	Query	Limiters/Expanders	Last Run Via	Results
S1	TI preop* OR AB preop* OR TI "pre-surg*" OR AB "pre-surg*" OR TI pre-op* OR AB pre-op* OR TI "pre-assessment" OR AB "pre-assessment" OR TI "pre-an#esthe*" OR AB "pre-an#esthe*"	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	8,555
S2	TI surg* OR AB surg* OR TI operat* OR AB operat* OR TI mastectomy OR AB mastectomy OR TI "coronary artery bypass" OR AB "coronary artery bypass" OR TI arthroplasty OR AB arthroplasty OR TI "Joint replacement" OR AB "Joint replacement"	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	165,507
S3	TI "hip replacement" OR AB "hip replacement" OR TI "knee replacement" OR AB "knee replacement" OR TI cholecystectomy OR AB cholecystectomy OR TI hysterectomy OR AB hysterectomy OR TI "transplant* n1 surg*" OR AB "transplant*	Search modes – Find all my search terms & thesaurus	Interface - EBSCO Search Screen - Advanced Search	1,188

	n1 surg*" OR TI "hernia repair" OR AB "hernia repair"	Boolean/Phrase	Database - PsycINFO	
S4	TI herniorrhaphy OR AB herniorrhaphy OR TI "bariatric surg*" OR AB "bariatric surg*" OR TI "weight loss surg*" OR AB "weight loss surg*" OR TI "gastric bypass" OR AB "gastric bypass"	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	1,162
S5	TI "general an#esthe*" OR AB "general an#esthe*"	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	3,213
S6	S1 OR S2 OR S3 OR S4 OR S5	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	172,752
S7	TI psycholog* OR AB psycholog* OR TI psychotherapy OR AB psychotherapy OR TI behavio#r* OR AB behavio#r* OR TI mindfulness OR AB mindfulness OR TI CBT OR AB CBT OR TI psychoeducation OR AB psychoeducation	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	1,252,620
S8	TI "cognitive therapy" OR AB "cognitive therapy" OR TI "mind-body" OR AB "mind-body" OR TI imagery OR AB imagery OR TI "hope therapy" OR AB "hope therapy" OR TI relaxation OR AB relaxation OR TI hypno* OR AB hypno*	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	140,049
S9	TI "patient information" OR AB "patient information" OR TI "patient education" OR AB "patient education" OR TI counsel#ing OR AB counsel#ing OR TI "procedural knowledge" OR AB "procedural knowledge" OR TI "patient teaching" OR AB "patient teaching" OR TI coping OR AB coping	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	140,049
S10	S7 OR S8 OR S9	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	1,364,996

S11	S6 AND S10	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	53,673
S12	TI "behavio#ral recovery" OR AB "behavio#ral recovery" OR TI rehabilitation OR AB rehabilitation OR TI "activities of daily living" OR AB "activities of daily living" OR TI "recovery of function" OR AB "recovery of function" OR TI "treatment outcome*" OR AB "treatment outcome*" OR TI "quality of life" OR AB "quality of life"	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	117,315
S13	TI "health related quality of life" OR AB "health related quality of life" OR TI HRQOL OR AB HRQOL OR TI QOL OR AB QOL	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	15,614
S14	S12 OR S13	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	117,535
S15	TI "randomised controlled trial" OR AB "randomised controlled trial" OR TI "randomized controlled trial" OR AB "randomized controlled trial" OR TI RCT OR AB RCT OR AB placebo	Search modes – Find all my search terms & thesaurus Boolean/Phrase	Interface - EBSCO Search Screen - Advanced Search Database - PsycINFO	52,967
S16	S11 AND S14 AND S15	Search modes – Find all my search terms & thesaurus Boolean/Phrase		24

Appendix O. PsycArticles via Proquest Search Strategy (Search 11)

#		Limiters/Expanders	Last Run Via	Results
S1	ti(preop* OR "pre-op*" OR "pre-surg*" OR "pre-assessment" OR "pre-anaesthe*" OR "pre-anesthe*") OR ab(preop* OR "pre-op*" OR "pre-surg*" OR "pre-assessment" OR "pre-anaesthe*" OR "pre-anesthe*")	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	159
S2	MJMAINSUBJECT.EXACT.EXPLODE("Surgery") OR ti(surg* OR operat*) OR ab(surg* OR operat*)	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	7,775
S3	MAINSUBJECT.EXACT.EXPLODE("Anesthesia (Feeling)") OR ti("general anaesthe*" OR "general anesthe*") OR ab("general anaesthe*" OR "general anesthe*")	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	37
S4	(ti(preop* OR "pre-op*" OR "pre-surg*" OR "pre-assessment" OR "pre-anaesthe*" OR "pre-anesthe*") OR ab(preop* OR "pre-op*" OR "pre-surg*" OR "pre-assessment" OR "pre-anaesthe*" OR "pre-anesthe*")) OR (MJMAINSUBJECT.EXACT.EXPLODE("Surgery") OR ti(surg* OR operat*) OR ab(surg* OR operat*)) OR (MAINSUBJECT.EXACT.EXPLODE("Anesthesia (Feeling)") OR ti("general anaesthe*" OR "general anesthe*") OR ab("general anaesthe*" OR "general anesthe*"))	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	7,923
S5	MAINSUBJECT.EXACT.EXPLODE("Psychotherapy") OR MAINSUBJECT.EXACT.EXPLODE("Client Education") OR MAINSUBJECT.EXACT.EXPLODE("Counseling")	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus	15,356

			Database - PsycArticles	
S6	ti(psycholog* OR psychother* OR psychoeducation* OR mindful* OR "mind-body" OR CBT OR "cognitive behavio*" OR "cognitive therap*" OR imagery Or "hope therap*") OR ab(psycholog* OR psychother* OR psychoeducation* OR mindful* OR "mind-body" OR CBT OR "cognitive behavio*" OR "cognitive therap*" OR imagery OR "hope therap*")	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	55,124
S7	ti(relaxation OR hypno* OR coping OR counselling OR counseling OR "patient knowledge" OR "patient educati*" OR "patient teach*" OR "procedural knowledge" OR "patient information") OR ab(relaxation OR hypno* OR coping OR OR counselling OR counseling OR "patient knowledge" OR "patient educati*" OR "patient teach*" OR "procedural knowledge" OR "patient information")	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	9,420
S8	(MAINSUBJECT.EXACT.EXPLODE("Psychotherapy") OR MAINSUBJECT.EXACT.EXPLODE("Client Education") OR MAINSUBJECT.EXACT.EXPLODE("Counseling")) OR (ti(psycholog* OR psychother* OR psychoeducation* OR mindful* OR "mind-body" OR CBT OR "cognitive behavio*" OR "cognitive therap*" OR imagery OR "hope therap*") OR ab(psycholog* OR psychother* OR psychoeducation* OR mindful* OR "mind-body" OR CBT OR "cognitive behavio*" OR "cognitive therap*" OR imagery OR "hope therap*")) OR (ti(relaxation OR hypno* OR coping OR counselling OR counseling OR "patient knowledge" OR "patient educati*" OR "patient teach*" OR "procedural knowledge" OR "patient information") OR ab(relaxation OR hypno* OR coping OR counselling OR counseling OR "patient knowledge" OR "patient educati*" OR "patient teach*" OR "procedural knowledge" OR "patient information"))	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	65,854
S9	MAINSUBJECT.EXACT.EXPLODE("Activities of Daily Living") OR MAINSUBJECT.EXACT.EXPLODE("Rehabilitation") OR MJMAINSUBJECT.EXACT.EXPLODE("Quality of Life") OR MAINSUBJECT.EXACT.EXPLODE("Recovery (Disorders)")	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	4,116
S10	ti(behavio* OR "recovery of function" OR "activities of daily living" OR rehabilitat* OR "quality of life" OR QOL OR HRQOL) OR ab(behavio* OR "recovery of function" OR	Search modes – Find all my search terms	Interface – Proquest Database	44,762

	"activities of daily living" OR rehabilitat* OR "quality of life" OR QOL OR HRQOL)	Boolean/Phrase	Search Screen - Advanced Search & Thesaurus Database - PsycArticles	
S11	MAINSUBJECT.EXACT.EXPLODE("Treatment Outcomes") OR ti(outcome*) AND ab(outcome*)	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	3,776
S12	(MAINSUBJECT.EXACT.EXPLODE("Activities of Daily Living") OR MAINSUBJECT.EXACT.EXPLODE("Rehabilitation") OR MJMAINSUBJECT.EXACT.EXPLODE("Quality of Life") OR MAINSUBJECT.EXACT.EXPLODE("Recovery (Disorders)")) OR (ti(behavio* OR "recovery of function" OR "activities of daily living" OR rehabilitat* OR "quality of life" OR QOL OR HRQOL) OR ab(behavio* OR "recovery of function" OR "activities of daily living" OR rehabilitat* OR "quality of life" OR QOL OR HRQOL)) OR (MAINSUBJECT.EXACT.EXPLODE("Treatment Outcomes") OR ti(outcome*) AND ab(outcome*))	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	48,594
S13	MAINSUBJECT.EXACT.EXPLODE("Clinical Trials") OR ti("randomised controlled trial" OR "randomized controlled trial" OR placebo) OR ab("randomised controlled trial" OR "randomized controlled trial" OR placebo)	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	1,717
S14	((ti(preop* OR "pre-op*" OR "pre-surg*" OR "pre-assessment" OR "pre-anaesthe*" OR "pre-anesthe*") OR ab(preop* OR "pre-op*" OR "pre-surg*" OR "pre-assessment" OR "pre-anaesthe*" OR "pre-anesthe*")) OR (MJMAINSUBJECT.EXACT.EXPLODE("Surgery") OR ti(surg* OR operat*) OR ab(surg* OR operat*)) OR (MAINSUBJECT.EXACT.EXPLODE("Anesthesia (Feeling)") OR ti("general anaesthe*" OR "general anesthe*") OR ab("general anaesthe*" OR "general anesthe*"))) AND ((MAINSUBJECT.EXACT.EXPLODE("Psychotherapy") OR MAINSUBJECT.EXACT.EXPLODE("Client Education") OR	Search modes – Find all my search terms Boolean/Phrase	Interface – Proquest Database Search Screen - Advanced Search & Thesaurus Database - PsycArticles	13

	MAINSUBJECT.EXACT.EXPLODE("Counseling")) OR (ti(psycholog* OR psychother* OR psychoeducation* OR mindful* OR "mind-body" OR CBT OR "cognitive behavio*" OR "cognitive therap*" OR imagery OR "hope therap*") OR ab(psycholog* OR psychother* OR psychoeducation* OR mindful* OR "mind-body" OR CBT OR "cognitive behavio*" OR "cognitive therap*" OR imagery OR "hope therap*")) OR (ti(relaxation OR hypno* OR coping OR counselling OR counseling OR "patient knowledge" OR "patient educati*" OR "patient teach*" OR "procedural knowledge" OR "patient information") OR ab(relaxation OR hypno* OR coping OR counselling OR counseling OR "patient knowledge" OR "patient educati*" OR "patient teach*" OR "procedural knowledge" OR "patient information"))) AND ((MAINSUBJECT.EXACT.EXPLODE("Activities of Daily Living") OR MAINSUBJECT.EXACT.EXPLODE("Rehabilitation") OR MJMAINSUBJECT.EXACT.EXPLODE("Quality of Life") OR MAINSUBJECT.EXACT.EXPLODE("Recovery (Disorders)")) OR (ti(behavio* OR "recovery of function" OR "activities of daily living" OR rehabilitat* OR "quality of life" OR QOL OR HRQOL) OR ab(behavio* OR "recovery of function" OR "activities of daily living" OR rehabilitat* OR "quality of life" OR QOL OR HRQOL)) OR (MAINSUBJECT.EXACT.EXPLODE("Treatment Outcomes") OR ti(outcome*) AND ab(outcome*))) AND (MAINSUBJECT.EXACT.EXPLODE("Clinical Trials") OR ti("randomised controlled trial" OR "randomized controlled trial" OR placebo) OR ab("randomised controlled trial" OR "randomized controlled trial" OR placebo))			

Appendix P. TRIP PRO Search Strategy (Search 12)

Query	Limiters/Expanders	Last Run Via	Results
(pre-operative)(psychological intervention)(behavioural recovery)	Search modes - PICO	Interface – TRIP PRO Search Screen - PICO Database – TRIP PRO	432

Appendix Q. Data Collection Form

Data collection form

Review title or ID

Study ID *(surname of first author and year first full report of study was published*

Report IDs of other reports of this study

Notes:

General Information

Date form completed *(dd/mm/yyyy)*	
Name/ID of person extracting data	
Title *(title of paper/ abstract/ report that data are extracted from)*	
Reference details	
Report author contact details	
Study funding source *(including role of funders)*	
9. Possible conflicts of interest *(for study authors)*	
10. **Notes:**	

Eligibility

Study Characteristics	**Review Inclusion Criteria** *(Insert inclusion criteria for each characteristic as defined in the Protocol)*	**Yes/ No / Unclear**	**Location in text** *(pg & ¶/fig/table)*
11. Type of study	Randomised trial	…	
12. Participants		…	
13. Types of intervention		…	
14. Types of outcome measures		…	
15. Decision: …			
16. Reason for exclusion			
17. Notes:			

DO NOT PROCEED IF STUDY EXCLUDED FROM REVIEW

Population and setting

	Description *Include comparative information for each group (i.e. intervention and controls) if available*	**Location in text** *(pg & ¶/fig/table)*
18. Population description *(from which study participants are drawn)*		
19. Setting *(including location and social context)*		

	Description *Include comparative information for each group (i.e. intervention and controls) if available*	**Location in text** *(pg & ¶/fig/table)*
20. Inclusion criteria		
21. Exclusion criteria		
22. Method/s of recruitment of participants		
23. Informed consent obtained	**Yes/No/Unclear**	
24. Notes:		

Methods

	Descriptions as stated in report/paper	**Location in text** *(pg & ¶/fig/table)*
25. Aim of study		
26. Start date		
27. End date		
28. Duration of participation *(from recruitment to last follow-up)*		
29. Ethical approval necessary and sought?	**Yes/No/Unclear**	
30. Notes:		

Risk of bias assessment

Domain	**Risk of bias** *Low/ High/Unclear*	**Support for judgement**	**Location in text** *(pg & ¶/fig/table)*
31. Random sequence generation *(selection bias)*	**…**		
32. Allocation concealment *(selection bias)*	**…**		
33. Blinding of participants and personnel *(performance bias)*	**…**	**Outcome group: All/**	
34. Blinding of outcome assessment *(detection bias)*	**…**	**Outcome group: All/**	
35. Incomplete outcome data *(attrition bias)*	**…**		
36. Selective outcome reporting? *(reporting bias)*	**…**		
37. Other bias	**…**		
38. Notes:			

Participants

	Description as stated in report/paper	**Location in text** (pg & ¶/fig/table)

	Description as stated in report/paper	Location in text (pg & ¶/fig/table)
39. Total no. randomised & % *(or total pop. at start of study for NRCTs)*		
40. Withdrawals and exclusions: no. & % *(if not provided below by outcome)*		
41. Age (mean, median, range etc.)		
42. Gender: no. & %		
43. Race/Ethnicity		
44. Type of surgery		
45. Elements making patients high- risk and/or ASA grade		
46. Does study address (and report separately) exclusion as well as inclusion criteria?	**Yes/No/Unclear** **Which elements?**	
47. Notes:		

Intervention groups

Copy and paste table for each intervention and comparison group

	Description as stated in report/paper	Location in text *(pg & ¶/fig/table)*

	Description as stated in report/paper	Location in text *(pg & ¶/fig/table)*
48. Group name		
49. Psychological theory underpinning intervention		
50. No. randomised to group *(specify whether no. people or clusters)*		
51. Description *(include sufficient detail for replication, e.g. content, dose, components; if it is a natural experiment, describe the pre-intervention)*		
52. Duration of treatment period		
53. Timing *(e.g. frequency, duration of each episode)*		
56. Control group details		
57. Resource requirements to replicate intervention *(e.g. staff numbers, cold chain, equipment)*		

	Description as stated in report/paper	Location in text *(pg & ¶/fig/table)*
58. Adherence to intervention and control		
59. Attrition rate		
60. Loss to follow up rate		
61. Note s:		

Outcomes

Copy and paste for each outcome

Outcome 1

	Description as stated in report/paper	Location in text *(pg & ¶/fig/table)*
62. Outcome name		
63. Time points measured including baseline *(specify whether from start or end of intervention)*		
64. Time points reported		
65. Authors definition *(with diagnostic criteria if relevant and note whether the outcome is desirable or undesirable if this is not obvious)*		
66. Person measuring/ reporting		
67. Measurement tool		

	Description as stated in report/paper		Location in text *(pg & ¶/fig/table)*
68. Scales: upper and lower limits *(indicate whether high or low score is good)*			
69. Is outcome/tool validated?	... *Yes/No/ Unclear*		
70. Any outcomes measured but not reported	*Yes/No/ Unclear*		
71. Notes:			

Results

Copy and paste the appropriate table for each outcome, including additional tables for each time point and subgroup as required

	Description as stated in report/paper				Location in text *(pg & ¶/fig/table)*
72. Comparison					
73. Outcome					
74. Subgroup					
75. Time point(s) *(specify from start or end of intervention)*					
76. Results	**Intervention**		**Comparison**		
	No. with intervention	Total in group	No. with intervention	Total in group	

	Description as stated in report/paper		Location in text *(pg & ¶/fig/table)*
72. Comparison			
73. Outcome			
74. Subgroup			
75. Time point(s) *(specify from start or end of intervention)*			
77. Post-intervention or change from baseline?			
78. Any other results reported *(e.g. odds ratio, risk difference, CI or p-value)*			
79. No. missing participants and reasons			
80. No. participants moved from other group and reasons			
81. Any other results reported			
82. Notes:			

83. Notes:

Applicability

84. Have important populations been	…	

excluded from the study? *(consider disadvantaged populations, and possible differences in the intervention effect)*	*Yes/No/Unclear*	
85. Does the study directly address the review question? *(any issues of partial or indirect applicability)*	... *Yes/No/Unclear*	
86. **Notes:**		

Other information

	Description as stated in report/paper	**Location in text** *(pg & ¶/fig/table)*
87. Key conclusions of study authors		
88. References to other relevant studies		
89. Correspondence required for further study information *(what and from whom)*		
90. Further study information requested *(from whom, what and when)*		
91. Correspondence received		

(from whom, what and when)	
92. **Note:**	

(EPOC, 2013)

Appendix. R. Cochrane ROB tool

Domain	Support for judgement	Review authors' judgement	Criteria for judgement
Selection bias.			
Random sequence generation.	Describe the method used to generate the allocation sequence in sufficient detail to allow an assessment of whether it should produce comparable groups.	Selection bias (biased allocation to interventions) due to inadequate generation of a randomised sequence.	Low Risk- The investigators describe a random component in the sequence generation process such as: • Referring to a random number table; • Using a computer random number generator; • Coin tossing; • Shuffling cards or envelopes; • Throwing dice; • Drawing of lots; • Minimization*. *Minimization may be implemented without a random element, and this is considered to be equivalent to being random. High-risk – The investigators describe a non-random component in the sequence generation process. Usually, the description would involve some systematic, non-random approach, for example: • Sequence generated by odd or even date of birth; • Sequence generated by some rule based on date (or day) of admission; • Sequence generated by some rule based on hospital or clinic record number Other non-random approaches happen much less frequently than the systematic approaches mentioned above and tend to be obvious. They usually involve judgement or some method of non-random categorization of participants, for example: • Allocation by judgement of the clinician; • Allocation by preference of the participant; • Allocation based on the results of a laboratory test or a series of tests; Allocation by availability of the intervention. Unclear Risk- Insufficient information about the sequence generation process to

			permit judgement of 'Low risk' or 'High-risk'.
Allocation concealment	Describe the method used to conceal the allocation sequence in sufficient detail to determine whether intervention allocations could have been foreseen in advance of, or during, enrolment.	Selection bias (biased allocation to interventions) due to inadequate concealment of allocations prior to assignment	Low Risk- Participants and investigators enrolling participants could not foresee assignment because one of the following, or an equivalent method, was used to conceal allocation: • Central allocation (including telephone, web-based and pharmacy-controlled randomization); • Sequentially numbered drug containers of identical appearance; Sequentially numbered, opaque, sealed envelopes. High-risk – Participants or investigators enrolling participants could possibly foresee assignments and thus introduce selection bias, such as allocation based on: • Using an open random allocation schedule (e.g. a list of random numbers); • Assignment envelopes were used without appropriate safeguards (e.g. if envelopes were unsealed or nonopaque or not sequentially numbered); • Alternation or rotation; • Date of birth; • Case record number; Any other explicitly unconcealed procedure. Unclear Risk – Insufficient information to permit judgement of 'Low risk' or 'High-risk'. This is usually the case if the method of concealment is not described in sufficient detail to allow a definite judgement – for example if the use of assignment envelopes were sequentially numbered, opaque and sealed.
Performance bias.			
Blinding of participants and personnel Assessments should be made for each main outcome (or class of outcomes).	Describe all measures used, if any, to blind study participants and personnel from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding	Performance bias due to knowledge of the allocated interventions by participants and personnel during the study.	Low Risk – Any one of the following: • No blinding or incomplete blinding, but the review authors judge that the outcome is not likely to be influenced by lack of blinding; Blinding of participants and key study personnel ensured, and unlikely that the blinding could have been broken. High-risk –

	was effective.		Any one of the following: • No blinding or incomplete blinding, and the outcome is likely to be influenced by lack of blinding; Blinding of key study participants and personnel attempted, but likely that the blinding could have been broken, and the outcome is likely to be influenced by lack of blinding. Unclear Risk – Any one of the following: • Insufficient information to permit judgement of 'Low risk' or 'High-risk'; The study did not address this outcome.
Detection bias.			
Blinding of outcome assessment Assessments should be made for each main outcome (or class of outcomes).	Describe all measures used, if any, to blind outcome assessors from knowledge of which intervention a participant received. Provide any information relating to whether the intended blinding was effective	Detection bias due to knowledge of the allocated interventions by outcome assessors.	Low Risk – Any one of the following: • No blinding of outcome assessment, but the review authors judge that the outcome measurement is not likely to be influenced by lack of blinding; Blinding of outcome assessment ensured, and unlikely that the blinding could have been broken. High-risk – Any one of the following: • No blinding of outcome assessment, and the outcome measurement is likely to be influenced by lack of blinding; Blinding of outcome assessment, but likely that the blinding could have been broken, and the outcome measurement is likely to be influenced by lack of blinding. Unclear Risk – Any one of the following: • Insufficient information to permit judgement of 'Low risk' or 'High risk'; The study did not address this outcome.
Attrition bias.			
Incomplete outcome data Assessments should be made for each main outcome (or class	Describe the completeness of outcome data for each main outcome, including attrition and exclusions from the analysis. State whether attrition and exclusions were	Attrition bias due to amount, nature or handling of incomplete outcome data.	Low risk- Any one of the following: • No missing outcome data; • Reasons for missing outcome data unlikely to be related to true outcome (for survival data, censoring unlikely to be introducing bias);

of outcomes).	reported, the numbers in each intervention group (compared with total randomized participants), reasons for attrition/exclusions where reported, and any re-inclusions in analyses performed by the review authors.		• Missing outcome data balanced in numbers across intervention groups, with similar reasons for missing data across groups; • For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk not enough to have a clinically relevant impact on the intervention effect estimate; • For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes not enough to have a clinically relevant impact on observed effect size; Missing data have been imputed using appropriate methods High-risk – Any one of the following: • Reason for missing outcome data likely to be related to true outcome, with either imbalance in numbers or reasons for missing data across intervention groups; • For dichotomous outcome data, the proportion of missing outcomes compared with observed event risk enough to induce clinically relevant bias in intervention effect estimate; • For continuous outcome data, plausible effect size (difference in means or standardized difference in means) among missing outcomes enough to induce clinically relevant bias in observed effect size; • 'As-treated' analysis done with substantial departure of the intervention received from that assigned at randomization; Potentially inappropriate application of simple imputation. Unclear Risk – Any one of the following: • Insufficient reporting of attrition/exclusions to permit judgement of 'Low risk' or 'High-risk' (e.g. number randomized not stated, no reasons for missing data provided); The study did not address this outcome.
Reporting bias.			
Selective reporting.	State how the possibility of selective outcome reporting was examined by the review authors, and what was found.	Reporting bias due to selective outcome reporting.	Low Risk – Any of the following: • The study protocol is available and all of the study's pre-specified (primary and secondary) outcomes that are of

			interest in the review have been reported in the pre-specified way; The study protocol is not available but it is clear that the published reports include all expected outcomes, including those that were pre-specified (convincing text of this nature may be uncommon). High-risk – Any one of the following: • Not all of the study's pre-specified primary outcomes have been reported; • One or more primary outcomes is reported using measurements, analysis methods or subsets of the data (e.g. subscales) that were not pre-specified; • One or more reported primary outcomes were not pre-specified (unless clear justification for their reporting is provided, such as an unexpected adverse effect); • One or more outcomes of interest in the review are reported incompletely so that they cannot be entered in a meta-analysis; The study report fails to include results for a key outcome that would be expected to have been reported for such a study. Unclear Risk – Insufficient information to permit judgement of 'Low risk' or 'High-risk'. It is likely that the majority of studies will fall into this category.
Other bias.			
Other sources of bias.	State any important concerns about bias not addressed in the other domains in the tool. If particular questions/entries were pre-specified in the review's protocol, responses should be provided for each question/entry.	Bias due to problems not covered elsewhere in the table.	Low Risk – The study appears to be free of other sources of bias. High-risk- There is at least one important risk of bias. For example, the study: • Had a potential source of bias related to the specific study design used; or • Has been claimed to have been fraudulent; or Had some other problem. Unclear Risk- There may be a risk of bias, but there is either: • Insufficient information to assess whether an important risk of bias exists; or Insufficient rationale or evidence that an identified problem will introduce bias.

(Higgins and Green 2011)

Appendix S. Summary of findings

<table>
<tr><th>Outcomes</th><th>Data Pooled</th><th colspan="2">Results SMD (95% CI), p-value i-squared (%), result favours</th><th>Number of participants (studies)</th><th colspan="2">Quality of the evidence (GRADE)
High quality – further research unlikely to change confidence in estimate of effect
Moderate quality – further research likely to have important impact on confidence in the estimate of effect and may change the estimate
Low quality – further research very likely to have important impact on confidence in the estimate of effect and is likely to change the estimate
Very low quality – very uncertain about the estimate</th></tr>
<tr><td></td><td></td><td>Meta-analysis</td><td>Narrative synthesis</td><td></td><td colspan="2"></td></tr>
<tr><td rowspan="2">Behavioural recovery</td><td rowspan="2">Any psychological intervention versus control</td><td rowspan="2">SMD:- 0.11(-0.61-0.40)
p-value: 0.68
i-squared:0.00%
Result favours: crosses line of null effect</td><td rowspan="2">Significant benefit on behavioural recovery</td><td rowspan="2">282
(4)</td><td colspan="2">LOW</td></tr>
<tr><td>DOWNGRADING FACTORS
RISK OF BIAS: Serious
INCONSISTENCY: Serious
INDIRECTNESS: Serious
IMPRECISION: Serious
PUBLICATION BIAS: Serious</td><td>UPGRADING FACTORS</td></tr>
<tr><td rowspan="2">QoL</td><td rowspan="2">Any psychological intervention versus control</td><td rowspan="2">SMD: -1.35 (-2.95-0.25)
p-value: 0.09
i-squared: 92.69%</td><td rowspan="2">Improved physical and mental QoL was demonstrated to be statistically significant in the intervention group, of two papers. Two papers reported benefit on QoL, but the effect was not significant. One paper demonstrated mental QoL was significantly improved in the intervention group but for physical QoL there</td><td rowspan="2">1203
(9)</td><td colspan="2">LOW</td></tr>
<tr><td>DOWNGRADING FACTORS
RISK OF BIAS: Serious
INCONSISTENCY: Very serious
INDIRECTNESS: Serious
IMPRECISION: Serious
PUBLICATION BIAS: Serious</td><td>UPGRADING FACTORS
Very large magnitude of effect</td></tr>
</table>

			was no significant difference in improvement between the groups. One paper concluded that the intervention favoured the control group and therefore the intervention is harmful.			

Appendix. T Characteristics of included studies

First author, publication year	Participants (Country, reason high-risk, type of surgery, method of recruitment, mean age (years)	Intervention (type, description, mode of delivery, timing, person delivering, duration of treatment (mins)	Control (type, description, mode of delivery, timing person delivering, duration (mins)	n total n intervention n control	Outcome measured	Outcome tools used to measure
Katz, 2004	**Country** - Canada **Reason high-risk** - ASA grade **Type of surgery** - oral cancer surgery **Method of recruitment** – unclear **Mean age**-53.4 (intervention arm) 60 (control arm)	**Type** -Psychoeducation **Description**-95 page booklet about oral cancer, treatment & coping strategies **Mode of delivery-** face to face 1:1, printed material, telephone **Timing -**Preop to discuss booklet, day of surgery & 3 additional post op interventions (day 2 or 3, day 7 or 8 & pre-discharge **Person delivering-**research nurse **Duration of treatment-** each intervention 60-90	**Type**-Standard level of care **Description-**brief description of pertinent information about illness and treatment, orientation to ward, history take & physical examination **Mode of delivery**- face to face **Timing**-same time as surgical consent, on admission or preadmit **Person delivering-**surgeon, nurse, ENT housestaff, other members of the head & neck team as required **Duration** – not stated	19 10 9	QoL	EORTC (Global QoL)
Dao, 2011	**Country** - United States (US) **Reason high-risk** - <	**Type** -CBT **Description-**brief; called 'Managing Anxiety and	**Type** -Treatment as usual **Description-** not stated **Mode of delivery-** not stated	100 50 50	QoL	SF-12

	or > 3-month **Type of surgery** - h/o CAD Cardiac surgery – CABG **Method of recruitment** – waiting list **Mean age**- 52.8 (intervention arm) 64.2(control arm)	Depression using Education and Skills (MADES) **Mode of delivery-**unclear **Timing-**preop 4-10 days & post op day 3 & day 5 **Person delivering-**clinical psychologist **Duration of treatment-** four x 60	**Timing-** not stated **Person delivering-** not stated **Duration-** not stated			
Rief, 2017	**Country** -Europe **Reason high-risk** - < or > 3-month h/o CAD **Type of surgery** - cardiac surgery – CABG **Method of recruitment** -waiting list **Mean age**- not stated only median age (intervention or control arm)	**Type** - Expectation Optimisation **Description-**brief; to optimise expectations (EXPECT**);** focus on emotional support and general advice but not on expectations (SUPPORT) **Mode of delivery-**face to face 1:1, printed material. Co-mode- telephone & audio CD **Timing-**preop & post op but not clear **Person delivering-**clinical psychologist **Duration of treatment-**two x 50; two x 20 & booster 20	**Type** -SMC **Description-** standardised informed consent & general medical care, assessments identical to intervention groups **Mode of delivery-**not stated **Timing-**not stated **Person delivering-**not stated **Duration-**not stated	124 80 (41 SUPPORT intervention; 39 EXPECT intervention) 44	Behavioural recovery & QoL	**Behavioural recovery** - International Physical Activity Questionnaire (IPAQ) **QoL** -SF-12
Garssen, 2013	**Country** -Europe **Reason high-risk** - ASA grade **Type of surgery** - breast cancer surgery **Method of recruitment** -unclear **Mean age**-52 (intervention arm) 54 (control arm)	**Type** - Stress Management **Description-**counselling, relaxation & guided imagery to promote coping, relaxation & +ve attitude to change (preop); strengthen effect focus, alleviate distress & strengthen feeling of control (postoperatively) **Mode of delivery-**face to face 1:1**.** Co-mode audio CD **Timing-**one session day 5 &	**Type** -Regular care condition **Description-**care as usual without any contact with the psychologist **Mode of delivery-**not stated **Timing-**not stated **Person delivering-**not stated **Duration-**not stated	85 42 43	QoL	**QoL** -EORTC

		day 1 pre-surgery & postoperative day 2 & 30 **Person delivering-**clinical psychologist **Duration of treatment-**four x 45-60 two preop & two post-surgery				
Arthur, 2000	**Country** -Canada **Reason high-risk** - < or > 3-month h/o CAD **Type of surgery** - cardiac surgery – CABG **Method of recruitment** -waiting list **Mean age**-61.8 (intervention arm) 63.8 (control arm)	**Type** - Procedural Information, Behavioural Instruction **Description**-. Multidimensional:1) exercise training 2) education & reinforcement of exercise by detailed teaching with broad content, & discussion of psychological issues 3) telephone calls to reassure & answer questions. Referral to psychologist if necessary. Co-intervention-information regarding surgery, hospitalisation & recovery & health professional roles. Videotape for pts & families of previous pts experiences **Mode of delivery**-face to face1:1, printed material. Co-mode – videotapes (preop), monthly telephone calls (continued post-op) **Timing-** 8 wk programme; education at study entry & 1 wk before surgery **Person delivering-**nurse, clinical psychologist, exercise specialist, kinesiologist **Duration of treatment-**1440 (90 twice weekly x eight	**Type** -Usual care **Description-**not stated **Mode of delivery-**not stated **Timing-**preop **Person delivering-**primary care physicians, cardiologists or surgeons **Duration-** not stated	249 (3 withdrew after randomisation) 123 123	QoL	SF-36

		weeks)				
Shuldman, 2002	**Country** -Europe **Reason high-risk** - < or > 3-month h/o CAD **Type of surgery** - cardiac surgery – CABG **Method of recruitment** -waiting list **Mean age**-not stated (intervention arm or control)	**Type** - Procedural Information **Description-**information on preop events & likely progress; factors person to the pt concerning recovery & hospital stay; & usual care **Mode of delivery-**face to face group, printed material. Co-mode - videos **Timing-** early in the waiting period **Person delivering-**nurse, physiotherapist, medic **Duration of treatment-**240	**Type** -usual care **Description-** education **Mode of delivery-**face to face 1:1, regular series of sessions on the wards to which pts were invited **Timing-** between a few days before admission up until the day before admission & throughout hospital stay **Person delivering-**nurse, doctor, physiotherapist, occupational therapist, pharmacist & dietician **Duration-** not stated	356 188 168	QoL	**QoL** -SF-36
Richardson, 2017	**Country** -Australasia **Reason high-risk** - ASA grade **Type of surgery** - HNC Surgery **Method of recruitment** -Clinic **Mean age**-not stated (intervention arm or control arm)	**Type** - Self Regulation **Description-** **Mode of delivery-**face to face 1:1, printed material. Co-mode-telephone. **Description-**tailored information about HNC based on brief assessment, specifically perceptions of consequence, timeline, personal control, treatment control, illness & coherence & casual perceptions **Timing-**not clear; flexible & organised around pt appointments, 1st session prior to treatment commencing, 2nd session beginning of treatment 3rd session towards end treatment **Person delivering-**health psychologist **Duration of treatment-**210	**Type** - SMC **Description-** **Mode of delivery**-face to face 1:1; information sheets about treatment, hospital length of stay & if a tracheostomy is required; clinic letter **Description**-multi-disciplinary meeting to identify treatment plan; discussion of diagnosis & treatment; anaesthetic review; welcome meeting at the dept; referral to Cancer Society; contact details HNC specialist nurse **Timing-**not stated **Person delivering-** multidisciplinary team, consultants, nurse, HNC specialist nurse **Duration-** not stated	64 (2 withdrawn after randomisation as there was no malignancy) 31 31	QoL	FACT-H&N

Rosenfeldt, 2011	**Country** -Australasia **Reason high-risk** - ASA grade & 3-month h/o **Type of surgery** - cardiac surgery (CABG and/or valve surgery) **Method of recruitment** -waiting list **Mean age**-62.5 (intervention arm) 68(control arm)	**Type** - Stress Management, behavioural instruction **Description-**light physical exercise; education about the effects of stress & relaxation techniques & CD of relaxing music **Mode of delivery-**unclear. Stress management – session pt & family encouraged to attend; exercise seems face to face but unclear if 1:1 or group **Timing-**during first 2 weeks on waiting list **Person delivering-** physiotherapist, occupational therapist **Duration of treatment-** exercise 240; stress management 240	**Type** -Usual care **Description-**Waited at home without receiving additional therapy **Mode of delivery-**not stated **Timing-** not stated **Person delivering-**not stated **Duration**- not stated	117 60 67	QoL	SF-36
Gillis, 2014	**Country** -Canada **Reason high-risk** - Elderly & ASA grade **Type of surgery** - colorectal cancer resection **Method of recruitment** -clinic **Mean age**-65.7 (intervention arm) 66 (control arm)	**Type** - Procedural Information, Behavioural Instruction, Coping Strategies **Description-**prehabilitation – home based including moderate exercise, nutritional counselling & relaxation exercises **Mode of delivery**- Face to face 1:1; printed material. Co-mode-food diary, CD **Timing**-4 weeks preop & for 8 weeks post op **Person delivering-** psychologist, kinesiologist, dietician **Duration of treatment-total unclear; exercise 1200, coping strategies up to 60**	**Type** -SMC **Description-**rehabilitation, enhanced recovery programme **Mode of delivery-**unclear **Timing-**immediately after surgery **Person delivering-** psychologist, kinesiologist, dietician **Duration-**unclear	89 (12 excluded because: did not undergo resection, underwent emergency surgery, were operated on at different hospital, withdrew consent or were lost to follow up) 38 39	QoL	SF-36

D'Lima, 1996	**Country** -US **Reason high-risk** - elderly **Type of surgery** - orthopaedic surgery - TKR **Method of recruitment** -unclear **Mean age**- 68.5 group 2 physical therapy; 71.6 group 3 cardiovascular condition (intervention arms) 69.5 (control arm)	**Type** - Behavioural Instruction **Description-**Group 2 taught to use graphed exercise to meet goal set by pt & therapist with a review at each visit; group 3 an individually designed cardiovascular conditioning programme to improve fitness within physical limitations **Mode of delivery-**Group 2 face to face 1:1, group 3 unclear if face to face 1:1 or group **Timing-**unclear but possibly started 6 wks prior to surgery **Person delivering-** physiotherapist, exercise physiologist **Duration of treatment-**Group 2 & 3 810 each	**Type-** not stated **Description**-existing routine postoperative exercise protocol for TKR & routine precautions **Mode of delivery-** face to face but unclear if 1:1 or group; printed material showing postoperative exercise regimen **Timing-**preop **Person delivering-**physical therapist **Duration-** 45	30 20 (10 group 2 physical therapy & 10 group 3 cardiovascular conditioning) 10	Behavioural recovery	**Behavioral recovery-** hospital for special surgery knee rating
McGregor, 2004	**Country** -Europe **Reason high-risk** - elderly **Type of surgery** - orthopaedic surgery - THR **Method of recruitment** -clinic **Mean age**-70.8 (intervention arm) 72.8 (control arm)	**Type** - Procedural Information, Behavioural Instruction **Description**-class reinforced booklet & checked pts able to do exercises & demonstrate use walking aids postoperatively, discussion regarding provision of home aids. Booklet described surgery, periop stages & provided answers to commonly asked questions **Mode of delivery**-face to face but unclear if hip class is 1:1 or group; printed material **Timing-**2-4 weeks preop **Person delivering-**not clear **Duration of treatment-**not clear	**Type** -Standard pathway of care **Description-**no information booklet & did not attend class, severity of disease process not assessed **Mode of delivery**-not stated **Timing**-not stated **Person delivering-**not stated **Duration**- not stated	39 19 20	Behavioural recovery & QoL	**Behavioural recovery** - Barthel's Activities of Daily Living **QoL** -EuroQol

Appendix U. GRADE report behavioural recovery evidence

1. Are the studies you took results from randomised?

STUDY TYPE	**Randomised controlled**

2. Downgrade factors

FACTORS	PROBLEM AREAS	COMMENT
RISK OF BIAS: Serious	• Sequence generation • Concealment • Blinding participants / personnel • Blinding assessors • Incomplete data • Selective outcome reporting Intention-to-treat	High-risk - allocation concealment and incomplete data (Garssen); imcomplete data and anything else (Shuldman); random sequence generation (McGregor) Unclear risk - randomn sequence generation, blinding participants, blinding assessors, selective reporting (Garssen); selective reporting (Shuldman); allocation concealment, blinding participants, blinding assessors, selective reporting (D'Lima); selective reporting (Rief) and allocation concealment, bliniding participants, blinding assessors, selective reporting (McGregor)
INCONSISTENCY: No Serious		
INDIRECTNESS: Serious	• Intervention / comparator dissimilarity • Wide confidence intervals	

	Few patients	
IMPRECISION: Serious		
PUBLICATION BIAS: Serious		No assessment of funnel plot symmetry due to small number studies and other limitations. Only published studies included in inclusion criteria.

3. Upgrade factors (if relevant)

	UPGRADE AREAS	COMMENT
		None

4. Certainty level

CERTAINTY LEVEL	COMMENT
LOw	Behavioural recovery (Garssen, Shuldman, D'Lima, Rief, McGregor)

Appendix V. GRADE report QoL evidence

1. Are the studies you took results from randomised?

STUDY TYPE	Randomised controlled

2. Downgrade factors

FACTORS	PROBLEM AREAS	COMMENT
RISK OF BIAS: Serious	• Sequence generation • Concealment • Blinding participants / personnel • Blinding assessors • Incomplete data • Selective outcome reporting Intention-to-treat	High-risk - random sequence generation (McGregor); Blinding participants (Richardson); other (Katz); blinding participants (Dao); incomplete data and other (Shuldman); incomplete data (Arthur) Unclear risk - selective reporting, allocation concealment, blinding participants, blinding assessors McGregor); selective reporting (Gillis); Blinding participants, bliding assessors, allocation concealment, selective reporting (Rosenfeldt); Selective reporting (Richardson); selective reporting (Rief); Blinding assessors, selective reporting (Dao); allocation concealment, blinding participants, blinding assessors, selective reporting (Katz); random sequence generation, blinding participants, blinding assessors, selective reporting (Garssen); selective reporting (Shuldman); Selective reporting (Arthur)
INCONSISTENCY: Very serious	• CIs not overlapping Statistical heterogeneity	
INDIRECTNESS: Serious	Intervention / comparator dissimilarity	
IMPRECISION: Serious	• Wide confidence intervals Few patients	
PUBLICATION BIAS: Serious		No assessment of funnel plot symmetry due to small number studies and other limitations. Only published studies included in inclusion criteria.

3. Upgrade factors (if relevant)

	UPGRADE AREAS	COMMENT
	Very large magnitude of effect	SMD 1.60 QoL two scores using SF-36/SF-12

4. Certainty level

CERTAINTY LEVEL	COMMENT
Low	QoL (McGregor, Gllis, Rosenfeldt, Richardson, Rief, Dao, Katz, Garssen,Shuldman, Arthur)

References

Aaronson, NK.; Cull, A.; Kaasa, S. and Sprangers, MAG. (1994) 'The EORTC modular approach to quality of life assessment in oncology' *International Journal of Mental Health* 23: 75-96

Abraham, C. and Michie, S. (2008) 'A taxonomy of behaviour change interventions used in techniques' *Health Psychology* 27(3): 379-87

American Association of Anaestheologists (ASA) (2014) *ASA Physical Status Classification System* [online] Available from: https://www.asahq.org/For-Members/Clinical-Status-Classification-System.aspx [8 April 16]

American Psychological Association (1990) *Guidelines for Providers of Psychological Services to Ethnic, Linguistic and Culturally Diverse Populations* [online] Available from: https://www.apa.org/pi/oema/resources/policy/providor-guidelines.aspx [28 Oct 18]

Arthur, H.; Daniels, C.; McKelvie, R.; Hirsh, J. and Rush, B. (2000) 'Effect of a preoperative intervention on preoperative and postoperative outcomes in low-risk patients awaiting elective coronary artery bypass surgery – a randomised controlled trial' *Annals of Internal Medicine* 133(4):253-262

Ashton, RC.; Whitworth, GC.; Seldomridge, JA.; Shapiro, PA.; Michler, RE.; Smith, CR.; Rose, EA.; Fisher, S. and Meiimet, C. (1995) 'The Effects of Self-Hypnosis on Quality of Life Following Coronary Artery Bypass Surgery: Preliminary Results of a Prospective, Randomized Trial' *The Journal of Alternative and Complementary*

Medicine 1(3): 285- 290

Association Anaesthetists Great Britain and Ireland (AAGBI) (2010) Pre-Operative Assessment and Patient Preparation: The Role of the Anaesthetist [online] Available from: https://www.aagbi.org/sites/default/files/preop2010.pdf [01 Feb 18]

Auer, CJ.; Glombiewski, JA.; Doering, BK.; Winkler, A.; Laferton, JA.; Broadbent, E. and Rief, W. (2016) 'Patients' Expectations Predict Surgery Outcomes: A Meta-Analysis' *International Journal Behavioural Medicine* 23(1): 49-62

Barberan-Garcia, A.; Ubre, M.; Roca, J.; Lacy, AM.; Burgos, F.; Risco, R.; Momblan, D.; Balust, J.; Blanco, I. amd Martinez-Palli, G. (2018) 'Personalised Prehabilitation in High-risk Patients Undergoing Elective Major Abdominal Surgery' *Annals Surgery* 267(1): 50-56

Beaupre, LA.; Lier, D.; Davies, DM. and Johnston, DBC. (2004) 'The effect of a preoperative exercise and education program on functional recovery, health related quality of life, and health service utilization following primary total knee arthroplasty *The Journal of Rheumatology* 31(6): 1166-1173

Bellamy, N.; Buchanan, WW.; Goldsmith, CH.; Campbell, J. and Stitt, LW. (1988) Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. *Journal of Rheumatology* 15*:* 1833–40

Berge, DJ.; Dolin, SJ.; CdeC Williams, A. and Harman, R. (2004) 'Pre-operative and

post-operative effect of a pain management programme prior to total hip replacement: a randomized controlled trial' *Pain* 110:33-39

Biau, DJ.; Porcher, R; Roren, A.; Babinet.; Rosencher, N.; Chevret, S.; Poiraudeau, S and Anract, P. (2015) 'Neither pre-operative education or a minimally invasive procedure have any influence on the recovery time after total hip replacement' *International Orthopaedics* 39: 1475-1481

Birch, S.; Stilling, M.; Mechlenburg, I. and Hansen, TB (2017) 'Effectiveness of a physiotherapist delivered cognitive-behavioural patient education for patients who undergoes operation for total knee arthroplasty: a study protocol of a RCT' *BMC Musculoskeletal Disorders* 18(116): 1-9

Blumenthal, JA.; Newman, M.; Babyak,MA.; Lett, HS. And Mark, D. (2003) 'Depression as a risk factor for mortality after coronary artery bypass surgery' *Lancet* 362:604-9

Borowicz, L.; Royall, R.; Grega, M.; Selnes, O.; Lyketsos, C. and McKhann, G. (2002) 'Depression and cardiac morbidity 5 years after coronary artery bypass surgery' *Psychosomatic Medicine* 43:464-71

Bradley-Palmer, J.; Lane, D.; Mayo, D.; Schluchter, M. and Leeming R. (2015) 'Effects of Music Therapy on Anesthesia Requirements and Anxiety in Women Undergoing Ambulatory Breast Surgery for Cancer Diagnosis and Treatment: A RCT' *Journal of Clinical Oncology* 23(28): 3162-3170

Broadbent, E.; Ellis, CJ.; Thomas, J.; Gamble, G. and Petrie, KJ. (2009) ' Further

development of an illness perception intervention for myocardial infarction patients: A randomized controlled trial' *Journal Psychosomatic Research* 67:17–23

Brooks, R. (1996) 'EuroQol: the current state of play' *Health Policy* 37: 53

Burg, MM.; Benedetto, C.; Rosenberg, R. and Soufer, R. (2003) 'Presurgical depression predicts medical morbidity 6 months after coronary artery bypass graft surgery' *Psychosomatic Medicine* 65:111-8

Burgio, KL.; Goode, PS.; Urban, DA.; Umlauf, MG.; Locher, JL.; Bueschen, A. and Redden, DT. (2006) 'Preoperative Biofeedback Assisted Behavioural Training to Decrease Post-Prostatectomy Incontinence: A RCT' *The Journal of Urology* 175:196-201

Burton, M., Parker, R., Farrell, A., Bailey, D., Conneely, J., Boot, S. and Elcombea, S. (1995) 'Randomised Controlled Trial Of Preoperative Psychological Preparation For Mastectomy' *Psycho-oncology* 4 : 1-19

Carli, F.; Gillis, C. and Scheede-Bergdahl, C. (2017) 'Promoting a culture of prehabilitation for the surgical cancer patient' *Acta Oncologica* 56:2 128–133

Cassin, SE.; Sockalingam, S.; Du, C.; Wnuk, S.; Hawa, R. and Parikh, SV. (2016) 'A pilot randomized controlled trial of telephone-based cognitive behavioural therapy for preoperative bariatric surgery patients' *Behaviour Research and Therapy* 80: 17-22

Cella, DF.; Tulsky, DS.; Gray, G.; Sarafian, B.; Linn, E.; Bonomi, A.; Silberman, M.;

Yellen, SB.; Winicour, P. and Brannon, J. (1993) 'The Functional Assessment of Cancer Therapy Scale: Development and Validation of the General Measure' *Journal of Clinical Oncology* 11: 570- 579

Chambers, SK.; Schove, L.; Halford, K.; Clutton, S.; Ferguson, M.; Gordon, L.; Gardiner, RA.; Occhipinti, S. and Dunn, J. (2008a) 'ProsCan for Couples: RCT of a couples-based sexuality intervention for men with localised prostate cancer who receive radical prostatectomy' *BMC Cancer* 8(226): 1-8

Chambers, SK.; Ferguson, M.; Gardiner, RA.; Nicol, D.; Gordon, L.; Occhipinti, S. and Aitken, J. (2008b) 'ProsCan for men; RCT of a decision support intervention for men with localised prostate cancer' *BMC Cancer* 8: 207

Chan, C. (2005) 'Psychoeducational intervention: A critical review of systematic analyses' *Clinical Effectiveness in Nursing* 9(3–4): 101-111

Chow, KM.; Chan, CWH.; Choi, KKC and Chan, JCJ. (2014) 'A Review of Psychoeducational Interventions to Improve Sexual Functioning, Quality of Life, and Psychological Outcomes in Gynecological Cancer Patients' Cancer *Nursing* 39(1): 20-31

Clode-Baker, E.; Draper, E.; Raymond, N.; Haslam, C. and Gregg, P. (1997) 'Preparing patients for total hip replacement: a randomized controlled trial of a preoperative educational intervention' *Journal Health Psychology* 2(1):107-14

Cohen, J. (1988) *Statistical Power Analysis for the Behavioural Sciences* Second

Edition US: Lawrence Erlbaum Associates

Collins, H. (2010) *Creative Research: TheTheory and Practice of Research for the Creative Industries* Worthing: AVA Publications

Colloca, L.; Jonas, WB.; Killen, J.; Miller, FG.; Shurtleff, D. (2014) 'Reevaluating the placebo effect in medical practice' *Zeitschrift Fur Psychologie* 222: 124-127

Cooil, J. and Bithell, C. (1997) 'Pre-operative education for patients undergoing total hip replacement: A comparison of two methods' *Physiotherapy Theory and Practice* 13(2):163-73

Cossette, S.; Frasure-Smith, N.; Dupuis, J.; Juneau, M. and Guertin, M. (2012 'Randomized controlled trial of tailored nursing interventions to improve cardiac rehabilitation enrolment' *Nursing Research* 61: 111–120

Craig, CL.; Marshall, AL.; Sjostrum, M.; Bauman, AE.; Booth, ML.; Ainsworth, BE.; Pratt, M.; Ekelund, ULF.; Yngve, A.; Sallis, JF.; Oja, P. (2003) 'International Physical Activity Questionnaire: 12 Country Reliability and Validity' *Medical Science Sports Exercise* 35(8): 1381-95

Critical Appraisal Skills Programme (CASP) (2014) *CASP Checklists* [online] Available from: http://www.casp-uk.net/ [1st April 2016]

Crotty, M.; Prendergast, J.; Battersby, MW.; Rowett, D.; Graves, SE.; Leach, G. and Giles, LC. (2009) 'Self-management and peer support among people with arthritis

on a hospital joint replacement waiting list a RCT' *Osteoarthritis and Cartilage* 17: 1428-1433

Dao, TK.; Youssef, NA.; Armsworth, M.; Wear, E.; Papathopoulos, KN. And Gopaldas, R. (2011) 'Randomized controlled trial of brief cognitive behavioural intervention for depression and anxiety symptoms preoperatively in patients undergoing coronary artery bypass graft surgery' *The Journal of Thoracic and Cardiovascular Surgery* 142(3):e109-e115

das Nair, R.; Anderson, P.; Clarke, S.; Leighton, P.; Lincoln, NB.; Mhizha-Murira, JR.; Scammell, BE. and Walsh, DA. (2016) 'Home-administered pre-surgical psychological intervention for knee osteoarthritis (HAPPiKNEES): study protocol for a randomised controlled trial' *Trials* 17(54): 1-11

das Nair, R.; Mhizha-Murira, JR.; Anderson, P.; Carpenter, H.; Clarke, S.; Groves, S.; Leighton, P.; Scammell, BE., Topcu, G.; Walsh, DA.and Lincoln, NB. (2018) 'Home-based pre-surgical psychological intervention for knee osteoarthritis (HAPPiKNEES): a feasibility RCT' *Clinical Rehabilitation* 1-13

Department of Health (2008) *High Quality Care for All: NHS Next Stage Review. [online]* Available from: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/ Publications AndGuidance/DH_091443 [31 Mar 18]

Department of Health (2016) *Operational productivity and performance in English NHS acute hospitals: Unwarranted variations. An independent report for the Department of Health by Lord Carter of Coles* [online] Available from:

https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_da ta/file/499229/Operational_productivity_A.pdf [31 Mar 18]

Devine, EC. and Cook, TD. (1986) 'Clinical and Cost-Saving Effects of Psychoeducational Interventions with Surgical Patients: A Meta-Analysis' *Research in Nursing and Health* 9:89-105

D'Lima, DD.; Colwell, CW.; Morris, BA.; Hardwick, ME. And Kozin, F. (1996) 'The Effect of Preoperative Exercise on Total Knee Replacement Outcomes' *Clinical Orthopaedics and Related Research* 326: 174-182

Doering, S.; Behensky, H.; Rumpolg, G.; Schatz, DS.; Rossler, S.; Hofstotter, B.; Krismer, M.; Schlusser, G.; (2001) Videotape preparation of patients before hip replacement surgery improves mobility after three months' *Zeitschrift fur Psychhosomoaticische Medizin und Psychotherapie* 47(2): 140-152

Dowsey, MM.; Castle, DJ.; Knowles, SR.; Monshat, K.; Salzberg, MR. amd Choong, PFM. (2014) 'The effect of mindfulness training prior to total joint arthroplasty on post-operative pain and physical function: study protocol of a randomised controlled trial *Trials* 15(208):1-8

Effective Practice and Organisation of Care (EPOC) (2013) *Data collection form. EPOC Resources for review authors* [online] Oslo: Norwegian Knowledge Centre for the Health Services Available from: http://epoc.cochrane.org/epoc-specific-resources-review-authors [24 Jan 17]

Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) (2017) *EPPI-Reviewer 4* [online] Available from: https://eppi.ioe.ac.uk/ [05 Sep 17]

Ferrara, PE.; Rabini, A.; Maggi, L.; Piazzini, DB.; Logroscino, G.; Magliocchetti, G.; Amabile, E.; Tancredi, G.; Aulisa, AG.; Padua, L. and Don Carlo Gnocchi (2008) 'Effect of pre-operative physiotherapy in patients with end-stage osteoarthritis undergoing hip athroplasty' *Cardiac Rehabilitation* 22: 10-11

Fink, C.; Diener, MK.; Bruckner, T.; Müller, G.; Paulsen, L,; Keller, M,; Büchler, MW. and Knebel, P (2013) 'Impact of preoperative patient education on prevention of postoperative complications after major visceral surgery: study protocol for a randomized controlled trial' (PEDUCAT trial) *Trials* 2013, 14:271

Flammer, E. and Bongartz, W. (2003) 'On the efficacy of hypnosis: A meta-analytic study' *Contemporary Hypnosis* 179-197

Fortin, F.; and Kirouac, S. (1976) 'A randoimized controlled trial of preoperative patient education' *International Journal of Nursing Studies* 13(1): 11-24

Forward, JB.; Grueter, NE.; Crisall, SJ. And Lester, HF. (2015) 'Effect of Sructured Touch and Guided Imagery for Pain and Anxiety in Elective Joint Replacement Patients – A RCT: M-TIJP' *The Permanente Journal Fall'* 19(4): 18-28

Furze, G.; Dumville, J.; Miles, J.; Irvine, K.; Thompson, DR. and Lewin, B. (2008) 'Prehabilitation" prior to CABG surgery improves physical functioning and depression' *International journal of cardiology* 132(1): 51-8

Gade, (2015) 'The Impact of a Preoperative Cognitive Behavioural Therapy (CBT) on Dysfunctional Eating Behaviours, Affective Symptoms and Body Weight 1 Year after Bariatric Surgery: A Randomised Controlled Trial' *Obesity Surgery* 25(11): 2112-211

Gandler, N.; Simmance, N. and Keenan, J (2016) 'A pilot study investigating dietetic weight loss interventions and 12 month functional outcomes of patients undergoing total joint replacement' *Obesity Research and Clinical Practice* 10: 220-223

Garrity, TF. and Klein, RF. (1975) 'Emotional response and clincal severity as early determinants of six month mortality after MI' *Heart Lung* 4:730-737

Garssen, B.; Boomsma, MF.; de Jager Meezenbroek, E.; Porsild, T.; Berkhof, J; Berbee, M.; Visser, A.; Meijer, S. and Beelen, RHJ. (2013) 'Stress management training for breast cancer surgery patients' *Psycho-Oncology* 22: 572-580

Ghoneim, MM. and O'Hara, MW. (2016) 'Depression and postoperative complications: an overview' *Biomedcentral Surgery* 16(5):1-10

Gilbey, HJ.; Ackland, TR.; Wang, AW.; Morton, AR.; Trouchet, T. and Tapper, J. (2003) 'Exercise Improves Early Functional Recovery After Total Hip Arthroplasty' *Clinical Orthopaedics and Related Research* 408: 193-200

Gillis, C.; Li, C.; Lee, L.; Awasthi, R.; Augustin, B.; Gamsa, A.; Sender Liberman, A.; Stein, B.; Charlebois, P.; Feldman, LS. And Carli, F. (2014) 'Prehabilitation versus Rehabilitation' *Anesthesiology* 121(5): 937-947

Gocen, Z.; Zen, A.; Unver, B.; Karatosun, V. and Gunal, I. (2004) 'The effect of preoperative physiotherapy and education on the outcome of total hip replacement: a prospective randomised controlled trial' *Clinical Rehabilitation* 18: 353-8

Goodman, H.; Parsons, A.; Davidson, J.; Preedy, M.; Peters, E.; Shuldham, C.; Pepper, J. and Cowie, MR. (2007) 'A randomised controlled trial to evaluate a nurse-led programme of support and lifestyle management for patients awaiting cardiac surgery: 'Fit for surgery: Fit for life' study' *European Journal of Cardiovascular Nursing* 189-195

Gough, D.,Oliver, S. and Thomas, J. eds. (2012*)* *An Introduction to Systematic Reviews* Thousand Oaks CA: Sage Publications

Government Office for Science (2013) Future of Ageing [online] Available from: http://www.gov.uk/government/collections/future-of-ageing [28 Mar 17]

Grocott, M. (2009) 'Improving Outcomes After Surgery' [online] Available from: https://doi.org/10.1136/bmj.b5173 [23 Oct 18]

Gurusamy, KS.; Vaughan, J. and Davidson, BR. (2014) 'Formal education of patients about to undergo laparoscopic cholecystectomy [online] *Cochrane Database of Systematic Reviews* Available from: http://cochranelibrary-wiley.com [14 Apr 18]

Guyatt, G.; Rennie, D.; Meade, MO. and Cook, DJ. eds. (2008) *Users' guides to medical literature* 2nd edition New York: McGraw Hill Medical

Guyatt, G.; Oxman, AD.; Akl, EA.; Kunz, R.; Vist, G.; Brozek, J.; Norris, S.; Falck-Ytter, Y.; Glasziou, P.; DeBeer, H.; Jaeschke, R.; Rind, D.; Meerpohl, J.; Dahm, P. and Schünemann, HJ. (2011) 'GRADE guidelines: 1. Introduction-GRADE evidence profiles and summary of findings tables' *Journal Clinical Epidemiology* 64: 383-94

Guyatt, G,; Oxman, AD.; Sultan, S,; Brozek, J.; Glasziou, P,; Alonso-Coello, P.; Atkins, D.; Kunz, R.; Montori, V.; Jaeschke, R.; Rind, D.; Dahm, P.; Akl, EA.;Meerpohl, J.; Vist, G.; Berliner, E.; Norris, S.; Falck-Ytter, Y. and Schünemann, HJ. (2013) 'GRADE guidelines 11: Making an overall rating of confidence in effect estimates for a single outcome and for all outcomes' *Journal Clinical Epidemiology* 66: 151-7

Hathaway, D. (1985) 'Effect of Preoperative Instruction on Postoperative Outcomes: A Meta-Analysis' *Nursing Research* 35(5): 269-275

Heilmann, C.; Stotz, U.; Burbaum, C.; Feuchtinger, J.; Leonhart, R; Siepe, M.; Beyersdorf, F. and Fritzsche, K. (2015) 'Short-term intervention to reduce anxiety before coaronary artery bypass surgery – a RCT' *Journal of Clinical Nursing* 25: 351-361

Higgins, JPT.; Altman, DG.; Gøtzsche, PC.; Jüni, P.; Moher, D.; Oxman, AD.; Savović, J.; Schulz, KF.; Weeks, L.; Sterne, JAL.; Cochrane Bias Methods Group and Cochrane Statistical Methods Group (2011) 'The Cochrane Collaboration's tool for assessing risk of bias in randomised trials' *British Medical Journal* 343:1-9

Higgins, J. and Green, S. (2011) *Cochrane Handbook for Systematic Reviews of Interventions* The Cochrane Collaboration [online] Available from: http://handbook.cochrane.org/ [8 Jan 17]

Hodges, LJ.; Walker, J.; Kleiboer, AM.; Ramirez, AJ.; Richardson, A.; Velikova, G. and Sharpe, M. (2011) 'What is a psychological intervention? A metareview and practical proposal' *Psychooncology* Vol. 20 p470-478

Holt, PJE.; Poloniecki, JD. And Thompson, MM. (2008) 'How to improve surgical outcomes' [online] Available from: https://doi.org/10.1136/bmj.39545.504792.80

Hoogeboom, TJ.; Dronkers, J.; van den Ende, C.; Oostling, E. and van Meeteren, N. (2010) 'Preoperative therapeutic exercise in frail elderly scheduled for total hip replacement: A randomized pilot trial' *Clinical Rehabilitation* 24(10): 901-10

Horner, S; Rew, L. and Torres, R. (2006) 'Enhancing intervention fidelity: a means of strengthening study impact' *Journal Specialists Pediatric Nursing* 11(2):80-9

Hunt, SM, and McEwen J. (1983) The development of a subjective health indicator *Sociology of Health and Illness* 2: 231–45

Hussain, MS.; Li, J.; Brindal, E.; van Kasteren, Y.; Varnfield, M.; Reeson, A.; Berkovsky, S.; Freyne, J. (2017) 'Supporting the Delivery of Total Knee Replacements Care for Both Patients and Their Clinicians With a Mobile App and Web-Based Tool: Randomized Controlled Trial Protocol' *JMIR Research Protocols* 6(3): e32

Ickmans, K.; Moens, M.; Putman, K.; Buyl, R.; Goudman, L.; Huysmans, E.; Diener, I.; Logghe, T.; Louw, A. and Nijs, J (2016) 'Back school or brain scholl for patients undergoing surgery for lumbar radiculopathy? *Journal of Physiotherapy* 62:165

Insall, JN.; Dorr, LD.; Scott, RD. and Scott, WN. (1989) 'Rationale of the Knee Society Clinical Rating System' *Clinical Orthopaedics* 248: 13-14

Ip, HY.; Abrishami, A.; Peng, PW.; Wong, J. and Chung, F. (2009) 'Predictors of postoperative pain and analgesic consumption: A qualitative systematic review' *Anesthesiology*, 111: 657–677

Isaacs, T.; Hunt, D; Ward, D.; Rooshenas, L. and Edwards, L. (2016) 'The Inclusion of Ethnic Minority Patients and the Role of Language in Telehealth Trials for Type 2 Diabetes: A Systematic Review' *The Journal of Medical Internet Research* 18(9): e256

Jacobson, AF.; Umberger, WA.; Palmieri, PA.; Alexander, TS.; Myerscough, RP.; Draucker, CB.; Steudte-Schmiedgen, S. and Kirschbaum, C. (2016) 'Guided Imagery for Total Knee Replacement: A Randomized, Placebo-Controlled Pilot Study' *The Journal of Alternative and Complementary Medici*ne 22(7): 563-575

Janis, IL. (1958) *Psychological Stress: Psychoanalytic and Behavioural Studies of Surgical Patients* New York: Wiley

Jenkins, CD.; Stanton, BA.; Savageau, JA.; Ockene, IS.; Denlinger, P. and Klein, MD. (1994) 'Physical, psychologic, social, and economic outcomes after cardiac valve surgery' *Achieves Internal Medicine* 143: 2107-l3

Johnston, JE. (1980) 'Anxiety in surgical patients' *Psychological Medicine* 10: 145-152

Johnston, JE.; Rice, VH.; Fuller, SS. And Endress, P. (1987) 'Sensory Information, Instruction in a Coping Strategy and Recovery from Surgery' *Research in Nursing and Health* 1(1): 4-17

Johnston, M. and Vogele, C. (1993) 'Benefits of psychological preparation for surgery: A meta-analysis' *Annals of Behavioral Medicine* 15 (4): 245-56

Juergens, MC.; Seekatz, B.; Moosdorf, RG.; Petrie, KJ. and Rief, W. (2010) 'Illness Beliefs before cardiac surgery predict disability, quality of life, and depression 3 months later' *Journal of Psychomatic Research* 68:6 553–560

Kaptchuk, TJ.; Kelley, JM.; Conboy, LA.; Davis, RB.; Kerr, CE.; Jacobson, EE.; Kirsch, I.; Schyner, RN.; Nam, BH.; Nguyen, LT,; Park, M.; Rivers, AL.; McManus, C.; Kokkotou, E.; Drossman, DA.; Goldman, P. and Lembo, AI. (2008) 'Components of placebo effect: randomised controlled trial in patients with irritable bowel syndrome' *BMJ* 336: 999-1003

Katz, M., Irish, J. and Devins, G. (2004) 'Development And Pilot Testing Of a Psychoeducational Intervention For Oral Cancer Patients' *Psycho-Oncology* 13: 642–653

Keogh, KM.; Smith, SM.; White, P.; McGilloway, s.; Kelly, A.; Gibney, J. and O'Dowd, T. (2011) 'Psychological family intervention for poorly controlled type 2 diabetes' *The*

American Journal of Managed Care 17:105–113

Kiecolt-Glaser, JK., Page, GG., Marucha, PT., MacCallum, RC. and Glaser, R. (1998) 'Psychological influences on surgical recovery. Perspectives from psychoneuroimmunology' *The American Psychologist* 53(11): 1209-18

Kimball, CP. (1977) *'Psychological responses to the experience of open heart surgery'* in '*Coping With Physical Illness'*. ed. by Moos, RH New York: Plenum 113-133

Korpela, P., (1999) 'Courses on adjustment education and rehabilitation by groups of diagnoses' in Effects of an intervention on health behaviors of older coronary artery bypass (CAB) patients by Kummel, M., Vahlberg, T., Ojanlatva, A., Ka¨rki, R., Mattila, T. and Kivela, SL. *Archives of Gerontology and Geriatrics* 46: 227–244

Kshettry, VR.; Carole, LF.; Henly, SJ.; Sendelbach, S. and Kummer, B. (2006) 'Complementary alternative medical therapies for heart surgery patients: Feasibility, safety, and impact' *Annals Thoracic Surgery* 81: 201-205

Kummell, M.; Vahlberg, T; Ojanlatva, A.; Karki, R.; Mattila, T.; Kivela, S-L. (2008) 'Effects of an intervention on health behaviours of older coronary artery bypass (CAB) patients' *Archieves of Gerontology and Geriatrics* 46: 227-244

Laferton, JAC.; Sheddon Mora, M.; Auer, CJ. Moosdorf, R. and Rief, W. (2013) 'Enhancing the efficacy of heart surgery by optimizing patients' preoperative expectations: Study protocol of a RCT' *American Heart Journal* 165: 1-7

Leigh, S. and Flatt, S. (2015) 'App-based psychological interventions: friend or foe?' *Evidence Based Mental Health* 18(4): 97-99

Levett, Dr. DZH.; Edwards, Dr. M.; Grocott, Prof. M. and Mythen, Prof. M. (2016) 'Preparting the patient for surgery to improve outcomes' *Best Practice and Research Clinical Anaesthesiology* 30:145-157

Lewin, RJ.; Coulton,S.; Frizelle, DJ.; Kaye, G. and Cox, H. (2009) 'A brief cognitive behavioural preimplantation and rehabilitation programme for patients receiving an implantable cardioverter-defibrillator improves physical health and reduces psychological morbidity and unplanned readmissions' *Heart* 95: 63–69

Li, C.; Carli, F.; Lee, L.; Charlebois, P.; Stein, B.; Liberman, AS.; Kaneva, P.; Augustin, B.; Wongyingsinn, M.; Gamsa, A.; Kim DJ.; Vassiliou, MC. And Feldman, LS. (2013) 'Impact of a trimodal prehabilitation program on functional recovery after colorectal cancer surgery: a pilot study' *Surgical Endoscopy* 27: 1072-1082

Lin, C-Y.; Yaseri, M.; Pakpour, AH.; Malm, D.; Brostrom, A.; Fridlund, B.; Burri, A. and Webb, TL. (2016) 'Can a Multifaceted Intervention Including Motivational Interviewing Improve Medication Adherence, Quality of Life and Mortality Rates in Older Patients Undergoing Coronary Artery Bypass Surgery? A multicentre, Randomized Controlled Trial with 18-Month Follow- Up *Drugs Aging* 34:143-156

Lindsay, GM.; Smith, LN.; Hanlon, P. and Wheatlet, DJ. (2000) Coronary artery disease Patients' perceptions of their health and expectations of benefit following coronary artety bypass grafting *Journal of Advanced Nursing* 32: 1412-1421

Little, TD. (ed.) (2013) *The Oxford Handbook of Quantitative Methods in Psychology* Oxford: Oxford University Press

Louw, A.; Diener, I.; Butler, DS. and Puentedura, EJ. (2013) 'Preoperative education addressing postoperative pain in total joint arthroplasty: review of content and educational delivery methods' *Physiotherapy Theory and Practice* 29(3): 175-94

Mahoney, FI and Barthel, DW. (1965) Functional evaluation: The Barthel Index *Maryland State Medical Journal* 14: 61–5

Manyande, A.; Chayen, S.; Priyakumar, P; Smith, CT.; Hayes, M.; Higgins, D.; Kee, S.; Phillips, S. and Salmon, P. (1992) 'Anxiety and endocrine responses to surgery: Paradoxical effects of preoperative relaxation training' *Psychosomatic Medicine* 54: 275-287

Manyande, A.; Berg, S.; Gettins, D.; Stanford, SC.; Mazhero, S.; Marks, DF. and Salmon, P. (1995) 'Preoperative rehearsal of active coping imagery influences subjective and hormonal responses to abdominal surgery' P*sychosomatic Medicine* 57: 177-182

Maple, H.; Chilcot, J.; Lee, V.; Simmonds, S.; Weinman, J. and Mamode, N. (2015) 'Stress predicts the trajectory of wound healing in living kidney donors as measured by high-resolution ultrasound' *Brain, Behavior and Immunity* 43:19–26

Marucha, PT.; Kiecolt-Glaser, JK. and Favegehi, M. (1998) Mucosal wound healing is impaired by examination stress. *Psychosomatic Medicine* 60:362–5

Martin, E. (ed.) (2015) *Oxford Concise Medical Dictionary* Oxford: Oxford University Press

Martineau, H. (ed.) (2018) *Social Physics: From the Positive Philosophy of Auguste Comte (1856)* France: Relnk Books

Marx, C. (2017) Improving patient outcomes after surgery [online] Available from: http://www.bmj.com/content/359/bmj.j4580 [19 Mar 18]

Mathews, A., Ridgeway, V. (1984) 'Psychological preparation for surgery'. in *Health*

Care and Human Behaviour by Steptoe, A. and Mathews, A, (eds.) (1884) London: Academic Press: 231– 59

Mavros, MN.; Athanasiou, S.; Gkegkes, LD.; Polyzos, KA.; Peppas, G. and Falagas, ME. (2011) 'Do Psychological Variables Affect Early Surgical Recovery?' *PLOS one* 6(5): 1-6

Maybin, J. and Thorlby, R. (2008) *High Quality Care For All: The Kings Fund briefing on NHS Next Stage Review final report.* [online] Available from: http://www.kingsfund.org.uk/publications/brief [31 Mar 18]

McDonald, S.; Page, MJ.; Beringer, K.; Wasiak, J. and Sprowson, A. (2014) 'Preoperative education for hip or knee replacement (review)' *The Cochrane Library* 5:1-84

McGregor, AH.; Rylands, H.; Owen, A.; Dore, CJ. And Hughes, SPF. (2004) 'Does Preoperative Hip Rehabilitation Advice Improve Recovery and Patient Satisfaction? *The Journal of Arthroplasty* 19(4): 464-468

Mercantini, P., Di Somma, S.; Magrini, L., Kazemi Nava, A., Scarinci, A., La Torre, M., Ferri, M., Ferri, E., Petrucciani, N. and Ziparo, V. (2012) 'Preoperative brain natriuretic peptide (BNP) is a better predictor of adverse cardiac events compared to preoperative scoring system in patients who underwent abdominal surgery' World Journal of Surgery 36(1): 24-30

Michie, S.; Richardson, M.; Johnston, M.; Abraham, C.; Francis, J.; Hardeman, W.; Eccles,

MP.; Cane, J. and Wood, CE. (2013) 'The behaviour change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behaviour change interventions' *Annals Behavioural Medicine* 46(1): 81-95

Minto, G. and Biccard, B. (2014) 'Assessment of the high-risk perioperative patient' *Continuing Education in Anaesthesia, Critical Care & Pain* 14 (1): 12-17

Montgomery, GH.; David, D.; Winkel, G.; and Silverstein, JH. and Bovbjerg, DH. (2002) 'The effectiveness of adjunctive hypnosis with surgical patienyts: A meta-analysis' *Anesthesia and Analgesia* 94(6): 1639-1645

Moulton, LS.; Evans, PA.; Starks, I. and Smith, T. (2015) 'Pre-operative education prior to elective hip arthroplasty surgery improves postoperative outcome' *International Orthopaedics* 39: 8 1483–1486

Munafo, MR. and Stevenson, J. (2001) 'Anxiety and surgical recovery: Reinterpreting The Literature' *Journal of Psychosomatic Research* 51(4): 589–596

Mumford, E.; Schlesinger, HJ. and Glass, GV. 1982) 'The Effects of Psychological Intervention on Recovery From Surgery and Heart Attacks: An Analysis of the Literature' *American Journal of Public Health* 72(2) :141-151

Naidu, S. and Gopalan, PD. (2016) 'The informed consent process for anaesthesia: perspectives of elective surgical patients at Inkosi Albert Central Hospital, Durban, South Africa' *South African Journal of Anaesthesia and Analgesia* 22(2): 60-64

Newell, SA.; Sanson-Fisher, RW. And Savolainen, NJ. (2002) 'Systematic Review of Psychological Therapies for Cancer Patients: Overview and Recommendations for Future Research' *Journal of the National Cancer Institute* 94(8):558-584

NHS England (2017) *Next steps on the NHS Five Year Forward View* [online] Available from:https://www.england.nhs.uk/publication/next-steps-on-the-nhs-five-year-forward-view/ [31 Mar 18]

NHS Improvement (2016) *Implementing the Forward View: Supporting providers to Deliver* Version 1 [online] Available from: https://improvement.nhs.uk/uploads/documents/Provider_roadmap_20160211.pdf [25 Feb 18]

NHS Improvement (2018) *Better healthcare, transformed care delivery and sustainable finances* [online] Available from: https://improvement.nhs.uk/ [31 Mar 18]

NICE (2016*) NG45 Routine preoperative tests for elective surgery* [online] Available from: https:// www.nice.org.uk/guidance/ng45 [15 Jan 18]

Nicholson, A.; Lewis, SR.; Lee, A.; Smith, AF. And Coldwell, CH. (2013) 'Different Formats and timing of educational interventions for surgical patients' *Cochrane Database of Systematic Reviews* 12: 1-11

NIHR (2018) *Research Design Service* [online] Available from: https://www.nihr.ac.uk/.../research/research-design-service [27 Sep 18]

O'Connor, G., Coates, V. and O'Neill,S. (2014) Randomised controlled trial of a tailored information pack for patients undergoing surgery and treatment for rectal cancer European Journal Oncology Nursing 18(2):183-91

Oxlad, M.; Stubberfield, J.; Stuklis, R.; Edwards, J. and Wade, TD. (2006) Psychological Risk factors for cardiac-related hospital readmission within 6 months of coronary artery bypass graft surgery *Journal Psychosomatic Research* 61:775-81

Pager, CK. (2005) **'**Randomised controlled trial of preoperative information to improve satisfaction with cataract surgery' *British Journal Ophthalmology* 89:10–13

Parker, PA.; Pettaway, CA.; Babaian, RJ.; Pisters, LL.; Miles, B. Fortier, A.; Wei, Q.; Carr,DD. and Cohen, L. (2009) 'The Effects of a Presurgical Stress Management Intervention for Men With Prostate Cancer Undergoing Radical Prostatectomy' *Journal of Clinical Oncology* 27(19):3169-3176

Paul, L.; van Rongen, S.; van Hoeken, D.; Deen, M.; Klaassen, R.; Ulas Biter, L.; Hoek, HW. and van der Heiden, C. (2015) 'Does cognitive behavioural therapy strengthen the effect of bariatric surgery for obesity? Design and methods of a randomized and controlled study' *Contemporary Clinical Trial* 42: 252-256

Pearse, R., Holt P. and Grocott, M. (2011) 'Managing perioperative risk in patients undergoing elective non-cardiac surgery' *British Medical Journal* 343: 734-9

Petrie, KJ.; Cameron, LD.; Ellis, CJ.; Buick, D. and Weinman, J. (2002) 'Changing illness perceptions after myocardial infarction: An early intervention randomized controlled

trial' *Psychosomatic Medicine* 64: 580–586

Powell R.; Scott N.; Manyande A.; Bruce J.; Vögele C.; Byrne-Davis LMT.; Unsworth M.; Osmer C. and Johnston M. (2016) 'Psychological preparation and postoperative outcomes for adults undergoing surgery under general anaesthesia' (review) *Cochrane Database of Systematic Reviews 5*: 1-282

ProQuest (2017) *RefWorks* [online] Available from: https://www.refworks.com/refworks2/ [31 Oct 17]

Prytherch, Dr D,, Whiteley, M., Higgins, B.; Weaver, P., Prout, W. and Powell, S. (1988) 'POSSUM and Portsmouth POSSUM for predicting mortality' *British Journal of Surgery* 85(9): 1217-1220

Rehse, B. and Pukrop, R. (2003) Effects of psychosocial interventions on quality of life in adult cancer patients: Meta analysis of 37 published controlled outcome studies *Patient Education and Counseling* 50:179-186

Richardson, AE.; Tennant, G.; Morton, RP. And Broadbent, E. (2017) 'A Self-Regulatory Intervention for Patients with Head and Neck Cancer: Pilot Randomized Trial ' *Annals of Behavioural Medicine* 51:629-641

Ridgeway, V. and Mathews, A. (1982) 'Psychological preparation for surgery: a comparison of methods' *British Journal of Clinical Psychology* 21:271–80

Rief, W.; Sheddon-Mora, MC.; Laferton, JAC.; Auer, C.; Petrie, KJ.; Salzmann, S.;

Schedlowski, M. and Moosdorf, R. (2017) 'Preoperative optimization of patient expectations improves long-term outcome in heart surgery patients: results of the randomized controlled PSY-HEART trial' *BMC Medicine* 15(4): 1-13

Suls, J.and Wan, CK. (1989) 'Effects of sensory and procedural information on coping and stressful medical procedures and pain: A meta-analysis' *Journal of Consulting and Clinical Psychology* 57(3): 372-379

Rolving, N.; Sogaard, R.; Neilsen, CV.; Christensen, FB. Bunger, C. and Oestergaard, LG. (2016) 'Preoperative Cognitive-Behavioural Patient Education Versus Standard Care for Lumbar Spine Fusion Patients: Economic Evaluation Alongside a RCT' *Spine* 41(1): 18-25

Ronaldson, A.; Poole, L.; Kidd, T.; Leigh, E.; Jahangiri, M, and Steptoe A. (2014) 'Optimism measured pre-operatively is associated with reduced pain intensity and physical symptom reporting after coronary artery bypass graft surgery' *Journal Psychometric Research* 77(4): 278-82

Rosal, MC.; Ayers, D.; Li, W.; Oatis, C.; Borg, A.; Zheng, H. and Franklin, P. (2011) 'RCT of a peri-operative behavioural intervention to improve physical adherence and Functional outcomes following total knee replacement' *BMC Musculoskeletal Disorders* 12(226): 1-7

Rosenberger, PH.; Jokl, P. and Ickovics, J (2006) Psychosocial Factors and Surgical Outcomes: An Evidence-Based Literature Review *Journal of the American Academy of Orthopaedic Surgeons* 14(7): 397-405

Rosenfeldt, F.; Braun, L.; Spitzer, O.; Bradley, S.; Shepherd, J.; Bailey, M.; van der Merwe, J.; Leong, J-Y. and Esmore, D. (2011) 'Physical conditioning and mental stress reduction – a randomised trial in patients undergoing cardiac surgery *BMC Complementary and Alternative Medicine* 11(20): 1-7

Royal College of Surgeons of England (2011) 'The Higher Risk General Surgical Patient: Towards Improved Care for a Forgotten Group: Report of the Royal College of Surgeons of England/Department of Health Working Group on Perioperative Care of the Higher-Risk General Surgical Patient' 1-36

Royal College of Surgeons (2017) Advancing Surgical Care [online] Available from: https://rcseng.ac.uk [20 Feb 18]

Santa Mina, D.; Matthew, AG.; Hilton, WJ.; Au, D.; Awasthi, R.; Alibhai, SMH.; Clarke, H.; Ritvo, P.; Trachtenberg, J.; Fleshner, NE.; Finelli, NE. and Wijeysundera, D. (2014) 'Prehabilitation for men undergoing radical prostatectomy: a multi-centre, pilot RCT' *BMC Surgery* 14(89): 1-17

Savović, J.; Weeks, L.; Sterne, JAC.; Turner, l.; Altman, DG.; Moher, and Higgins, JPT (2014) 'Evaluation of the Cochrane Collaboration's tool for assessing the risk of bias in randomized trials: focus groups, online survey, proposed recommendations and their implementation' *Systematic Reviews* 3(37): 2-12

Schedlowski, M.; Enck, P.; Rief, W. and Bingel, U. (2015) 'Neuro-bio-behavioral mechanisms of placebo and nocebo responses: implications for clinical trials and

clinical practice' *Pharmacology Review* 1328: 697-730

Scheier, MF.; Matthews, KA.; Owens, JF.; Schulz, R.; Bridges, MW.; Magovern, GJ. and Carver CS. (1999) 'Optimism and rehospitalization after coronary artery bypass graft surgery' *Archieves Internal Medicine* 159(8): 829-35

Schmidt, M.; Eckardt, R.; Scholtz, K.; Neuner, B.; von Dossow-Hanfstingl, V.; Sehouli, J.; Stief, CG.; Wernecke, K-D. and Spies, CD. (2015) 'Patient Empowerment Improved Perioperative Quality of Care in Cancer Patients Aged >/= 65 Years - A Randomized Controlled Trial' *PLOS ONE* 10(9): e0137824

Schneiderman, N., Antoni M., Saab P. and Ironson, G. (2001) *'Health psychology: Psychosocial and biobehavioral aspects of chronic disease management'* Annual Review Psychology 62: 555–580

Schnur, JB.; Bovbjerg, DH.; David, D.; Tatrow, K.; Goldfarb, AB.; Silverstein, JH.; weltz, CR. and Montgomery, GH. (2008) 'Hypnosis decreases presurgical distress in excisional breast biopsy patients' *Anesthesia and Analgesia* 106(2): 440-444

Scott, S.; Lund, NJ.; Gold, S.; Elliott, R.; Vater, M.; Chakrabarty, MP.; Heinink, TP. And Williams, TP. (2014) 'An evaluation of POSSUM and P_POSSUM scoring in predicting post-operative mortality in a level 1 critical care setting; *BMC Anesthesiology* 14: 104 (online) Available from: https://bmcanesthesiol.biomedcentral.com/articles/10.1186/1471-2253-14-104 [11 May 18]

Sedgwick, P. and Marston, L. (2015) How to read a funnel plot in a meta-analysis [online] Available from: https://doi.org/10.1136/bmj.h4718 [10 Apr 18]

Shamseer, L.; Moher D.; Clarke M.; Ghersi, D.; Liberati. D.(deceased); Petticrew, M.; Shekelle, M.; Stewart, LA. And the PRISMA-P Group (2015) Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015: elaboration and explanation *B*ritish *Medical Journal* [online] Available from: http://www.bmj.com/content/349/bmj.g7647 [9 Jan 17]

Shehmar, M. and Gupta, J. (2010) 'The influence of psychological factors on recovery from Hysterectomy' *Journal of the Royal Society for Medicine* 103(2): 56–59

Shuldman, CM.; Fleming, S. and Goodman, H. (2002) 'The impact of pre-operative Education on recovery following coronary artery bypass surgery' *European Heart Journal* 23: 666-74

Siggeirsdottir, K.; Olafsson, O,; Jonsson, H.; Iwarsson, S.; Gudnason, V. and Jonsson, B. (2005) 'Short hospital stay augmented with education and home-based Rehabilitation improves function and quality of life after hip replacement' *Acta Orthopaedica* 76(4): 555-562

Smith, V., Devane, D., Begley, C., and Clarke, M. (2011) 'Methodology in conducting a systematic review of systematic reviews of healthcare interventions' *BioMed Central Medical Research Methodology* 11:15 [online] Available from: https://doi.org/10.1186/1471-2288-11-15 [12 Jan 18]

Society for Cardiothoracic Surgery in Great Britain and Ireland (2018) Blue Book Online [online] Available from: https://scts.org/ [23 Apr 18]

Spieth, PM.; Kubasch, AS.; Penzlin, AI.; Illigens, BM-W.; Barlinn, K. and Siepmann, T. (2016) 'Randomized controlled trials – a matter of design' *Neuropsychiatry Disease and Treatment* 12: 1341–1349

Tefikow, S.; Barth, J.; Maichrowitz, S.; Beelmann, A.; Strauss, B. and Rosendahl, J. (2013) 'Efficacy of hypnosis in adults undergoing surgery or medical procedures: A meta-analysis of RCTs' *Clinical Psychology Review* 33: 623-636

Terrin, N.; Schmid, CH. and Lau, J. (2005) 'In an empirical evaluation of the funnel plot, researchers could not visually identify publication bias' *Journal of Clinical Epidemiology* 58: 894-901

The Association of Anaesthetists of Great Britain and Ireland (2010) *AAGBI Safety Guideline Pre-operative Assessment and Patient Preparation: The Role of the Anaesthetist* [online] Available from: https://www.aagbi.org/sites/default/files/preop2010.pdf [2 Apr 18]

The Kings Fund (2018) *Ideas that change health care: Shaping policy and practice* [online] Available from: https://www.kingsfund.org.uk/ [31 Mar 18]

Tsimopoulou, I.; Pasquali, S.; Howard, R.; Desai, A.; Gourevitch, D.; Tolosa, I. and Vohra, R. (2015) 'Psychological Prehabilitation Before Cancer Surgery: A

Systematic Review' *Annals Surgical Oncology*

Tully, PJ.; Baker, RA. and Knight, JL. (2008) Anxiety and depression as risk factors for mortality after coronary artery bypass surgery Journal Psychosomatic Research 64: 285-90

University of York Centre for Reviews and Dissemination (2017) *PROSPERO* International prospective register of systematic reviews [online] Available from: https://www.crd.york.ac.uk/PROSPERO/#index.php [26 Sep 16]

Valenzuela-Millán, J.; René-Barrera, J. and Ornelas-Aguirre, SJM. (2010) 'Preoperative anxiety in anesthetic procedures' Cirugia y Cirujanos 78(2): 147-51

Vaughn, F.; Wichowski, H. and Bosworth, G. (2007) 'Does preoperative anxiety level predict postoperative pain?' *AORN Journal* 85(3): 589–604

Veronovici, NR.; Lasiuk, GC. Rempel, GR. And Norris, CM. (2014) 'Discharge education to promote self-management following cardiovascular surgery: An integrative review' *European Journal of Cardiovascular Nursing* 13(1): 22-31

Walburn, J.; Vedhara, K.; Hankins, M.; Rixon, L. and Weinman, J. (2009) 'Psychological stress and wound healing in humans: a systematic review and meta-analysis' *Journal of Psychosomatic Research* 67:253–41

Ware, JE.: Koskinski, M. and Dewey JE. (2000) *How to Score Version 2 of the SF-36 (R) Health Survey* Lincoln RI: Quality Metric Incorporated

WHO (1997) *WHOQOL Measuring Quality Of Life* [online] Available from: https:// www.who.int/mental_health/media/68.pdf [15 Jan 18]

Williams, PD.; Valderrama, DM.; Gloria, MD.; Pascoguin, LG.; Saavedra, LD.; De La Rama, DT.; Ferry, TC.; Abaguin, CM. and Zaldivar, SB. (1988) 'Effects of preparation for mastectomy/hysterectomy on women's post-operative self-care behaviors' *Journal of International Nursing Studies* 25(3):191–206

Williams, C. and Chellingsworth, M. (2010) *CBT: A Clinician's Guide to Using the Five Areas Approach* Fort Lauderdale: CRC Press

Wilson-Barnett, J. (1979) Stress in Hospital: *Patient Psychological Reactions to Illness and Health* Edinburgh: Churchill Livingstone

Wittrup-Jensen, KU.; Lauridsen, J.; Gudex, C. and Pedersen, KM. (2009) 'Generation of a Danish TTO value set for EQ-5D health states' *Scandinavian Journal of Public Health* 37(4): 459-66

Wylde, V.; Dieppe, P.; Hewlett, S. and Learmonth, ID. (2007) 'Total knee replacement: Is it really an effective procedure for all?' *The Knee* 14(6): 417-423

Young, R.; De Guzman, CP.; Matis, MS. And McClure, K. (1994) 'Effect of Preadmission Brochures on Surgical Patients' Behavioral Outcomes' *AORN* 60(2): 232-236