ISRCTN14233189 https://doi.org/10.1186/ISRCTN14233189

The REST feasibility trial: sleep and pain in patients undergoing total knee replacement

Submission date
24/03/2021

Recruitment status
No longer recruiting

Registration date
25/03/2021

Overall study status
Completed

Last Edited
30/06/2025

Condition category
Surgery

[X] Prospectively registered
[_] Protocol
[_] Statistical analysis plan
[X] Results
[_] Individual participant data

Plain English summary of protocol

Background and study aims
Knee replacement is the second most common operation in the UK with over 100,000 performed yearly. Around 20% of patients experience long-term pain after surgery causing problems with knee function, decreased activity, and a negative impact on wellbeing. Additional treatments and appointments needed to address long-term pain come at increased cost to the NHS. People with higher levels of pain before their operation are more likely to have long-term pain afterwards. Sleep has a two-way relationship with pain. Reduced sleep causes increased pain and improvement of sleep has been shown to reduce both immediate and long-term pain in people with joint problems. Our aim is to find out how best to design a larger study to test a pre-operative sleep intervention for improving long-term pain.

Who can participate?
Patients on the surgical waiting list for total knee replacement due to osteoarthritis.

What does the study involve?
Participants will be randomised to receive either standard care or the sleep intervention. Patients taking part in the intervention will attend a one-to-one appointment with a healthcare practitioner to assess their sleep issues and needs. They will then be given tailored sleep advice and will be assigned to one of 3 existing sleep interventions:
• Cognitive-behavioural therapy for insomnia
• Relaxation
• Mindfulness

An interview study with practitioners and patients will explore acceptability of delivering the intervention and the feasibility of a full trial.

Patient-reported data will be collected on:
• Joint pain
• Neuropathic pain
• Sleep quality
• Mood and well-being

We will also collect data on:
• Recruitment rate
• Adherence and engagement with the intervention
• Health economics

What are the possible benefits and risks of participating?
If you are offered the REST treatment you will be invited to attend a one hour appointment either at the hospital or using a video call. This will take up your time and we do not know if this extra appointment will be helpful to you.
If you are chosen for either the REST treatment or usual NHS care, a possible disadvantage is the time it takes you to complete the questionnaires. This may be up to 30 minutes for each questionnaire booklet.
If you attend the REST appointment a healthcare professional will assess your sleep needs and any problems you are having, and recommend a sleep treatment. These sleep treatments all have evidence to show they can help improve sleep. We do not know if they will help with your recovery and pain.

Where is the study run from?
North Bristol NHS Trust (UK)

When is the study starting and how long is it expected to run for?
November 2020 to August 2022

Who is funding the study?
National Institute for Health Research (NIHR) (UK)

Who is the main contact?
Wendy Bertram, Wendy.Bertram@nbt.nhs.uk
Dr Katie Whale, Katie.Whale@bristol.ac.uk

Contact information

Type(s)
Scientific

Contact name
Ms Wendy Bertram

Contact details
Musculoskeletal Research Unit
Translational Health Sciences
Bristol Medical School
University of Bristol
Level 1, Learning & Research Building
Southmead Hospital
Bristol
United Kingdom
BS10 5NB
+44 (0)117 414 7856
wendy.bertram@nbt.nhs.uk

Type(s)
Scientific

Contact name
Dr Katie Whale

Contact details
Musculoskeletal Research Unit
Translational Health Sciences
Bristol Medical School
University of Bristol
Level 1, Learning & Research Building
Southmead Hospital
Bristol
United Kingdom
BS10 5NB
+44 (0)117 414 7847
Katie.Whale@bristol.ac.uk

Additional identifiers

Integrated Research Application System (IRAS)
289761

Central Portfolio Management System (CPMS)
47883

Study information

Scientific Title
REST: A prospective randomised feasibility study assessing the impact of a tailored sleep intervention in patients undergoing total knee replacement (TKR)

Acronym
REST

Study objectives
The aim of this research is to find out how best to design a randomised trial to test if we can improve sleep before knee replacement surgery and reduce long-term pain.

Knee replacement is the second most common operation in the UK with over 100,000 performed yearly. Around 20% of patients experience long-term pain after surgery causing problems with knee function, decreased activity, and a negative impact on wellbeing. Additional treatments and appointments needed to address long-term pain come at increased cost to the NHS. People with higher levels of pain before their operation are more likely to have long-term pain afterwards. Sleep has a two-way relationship with pain. Reduced sleep causes increased pain and improvement of sleep has been shown to reduce both immediate and long-term pain in people with joint problems. Our aim is to find out how best to design a larger study to test a pre-operative sleep intervention for improving long-term pain.

The key questions this study will address are:
1. Are patients willing to take part in the study?
2. Will patients attend the clinic appointment?
3. Will patients engage in the sleep intervention and adhere to the agreed plan?
4. Do practitioners deliver the intervention as intended?

Ethics approval required
Old ethics approval format

Ethics approval(s)
Approved 27/12/2020, South West Cornwall & Plymouth Research Ethics Committee (Level 3, Block B, Whitefriars, Lewins Mead, Bristol, BS1 2NT, UK; +44 (0)207 104 8033; cornwallandplymouth.rec@hra.nhs.uk), ref: 20/SW/0189

Primary study design
Interventional

Study design
Interventional randomized controlled trial

Study type(s)
Prevention

Health condition(s) or problem(s) studied
Sleep quality in patients scheduled to undergo total knee replacement surgery

Interventions
REST is a two-centre feasibility RCT with embedded health economics and qualitative work.

Patients on the waiting list for a total knee replacement at North Bristol NHS Trust (Bristol) or Cardiff and Vale University Health Board (Cardiff), and who are experiencing disturbed sleep will be invited to take part in the study through the following process:
1. Patient identified from pre-surgical waiting list by NHS staff
2. Patient is sent a pre-notification card
3. Patient is sent a screening information pack containing an invitation letter, screening study patient information booklet, screening study consent form, screening questionnaire, reply slip, and pre-paid return envelope. They are asked to complete the documents and return to the study team if interested in the study.
4. All returned packs are scored for eligibility. Eligible patients are sent a letter inviting them to the main study with a trial information leaflet, and will then be contacted by the research team. The research team will answer any questions they may have and book a consent visit and recruit them into the trial. Ineligible patients will receive a letter thanking them for their interest.

Trial sample size
The sample size is set at 80 participants (40/arm). This is sufficient to estimate 75% randomisation rate (RCT progression criteria) with 95% confidence internval from 65% to 85%, and to estimate 75% intervention uptake with 95% confidence interval from 60% to 90%.

Consent and study enrolment
Eligible patients will be contacted by telephone to arrange a recruitment consultation. A research nurse will visit the patient at their home to gain informed written consent. If a home

visit is not possible then a remote consultation will be carried out using 'Attend Anywhere'. During the consent visit, participants will be informed of what taking part will involve, including the likely dates and times of appointments to ensure they will be able attend prior to completing consent procedures. After written informed consent has been given, the researcher will ask patients to complete a baseline questionnaire. The baseline questionnaire will include questions on joint pain, neuropathic pain, sleep, and general health and wellbeing.

Randomisation
After completion of the baseline questionnaire participants will be randomised by a delegated member of the study team using computer generated randomisation. Participants will be randomised to the intervention are or usual care.
Participants will then be sent a letter explaining their allocation and the next steps.

Usual care
All participants will receive usual care. Participants assigned to the usual care only arm wil continue with the care in addition to completing the study outcome measures.

Intervention
Participants in the intervention arm will receive the study intervention in addition to their usual care.
Patients will attend a single one to one appointment with an extended scope practitioner (ESP) at the hospital or remotely using a secure video platform. As assessment will be carried out to assess their individual sleep issues and needs. The assessment will include a screening questionnaire for sleep apnoea and restless legs. Participants who score high on the screening questionnaire for these conditions will be referred to their GP in addition to taking part in the intervention.
Patients will be provided with tailored sleep education and sleep hygiene advice including a booklet to take home. They will then be assigned to one of three sleep interventions based on their assessment and a share decision.
• Cognitive behaviour therapy for insomnia, delivered through Sleep Station.
• Relaxation, delivered through guided audio, workbook, and/or free Calm app sessions.
• Mindfulness meditation, delivered through guided audio and/or free Calm and Headspace app sessions.

Following the assessment the ESP will identify the key issues that need to be addressed and discuss these with the participant, provide them with a summary of each sleep intervention, and highlight which would be most appropriate. Intervention delivery and choice of sleep intervention will be guided by an intervention delivery handbook.
Participants will receive a telephone call from the ESP four weeks post-appointment. This will cover the participant's progress and engagement with their sleep hygiene plan and their chosen sleep intervention.

Data collection
Patient reported outcomes
Outcomes will be measures at three timepoints: timepoint 1 - baseline (pre-randomisation), timepoint 2 - one-week
pre-surgery, and timepoint 3 - 3-months post-surgery. The questionnaire booklet includes:
• Joint pain – Oxford Knee Score
• Neuropathic pain – PainDETECT
• Sleep quality and beliefs about sleep – Sleep Condition Indicator, Pittsburgh Sleep Quality Index

• Psychological wellbeing – Hospital Anxiety and Depression Scale
• General health and wellbeing - EQ-5D-5L, ICECAP-A
• Bespoke resource use questionnaire

The baseline questionnaire will be completed during the consent appointment. All participants will receive a prenotification card one week prior to the Timepoints 2 and 3 questionnaires to thank them for taking part in the study, remind them a study questionnaire is on its way and when it should be completed. Questionnaires will be posted to participants four days prior to the timepoint with a pre-paid return envelope .
Participants who have not returned the timepoint 2 (one week pre-surgery) questionnaire by four days prior to surgery will be telephoned and offered the option of completing the questions over the phone. Participants who cannot be reached prior to surgery will be offered the option of completing the questions upon admission to hospital prior to surgery.
Participants who have not returned the timepoint 3 (three months post-surgery) questionnaire will be telephoned one week after the timepoint. Those who cannot be reached by telephone will be sent a reminder pack in the post.

Feasibility outcomes
Data will be collected on the following recruitment outcomes:
• Number of patients invited to study
• Number of patients returning screening questionnaire
• Number of patients meeting eligibility criteria
• Number of patients recruited
• Follow-up and dropout rates
Reasons for declining will be explored in the qualitative study.

Uptake and adherence
Intervention uptake is defined at attendance at the clinic appointment. Adherence is assessed at the 4-week follow-up call. Participants who attended a clinic appointment will receive a telephone call at 4-weeks to get feedback on the following questions:
• Changes made as a result of sleep hygiene and education advice
• Engagement in the assigned sleep intervention
• Any additional changes made to sleep or sleep routine

Health economics
Health economics data will be collected using the EQ-5D-5L and ICECAP-A questionnaires at timepoints 1, 2, and 3. A bespoke resource questionnaire will used at timepoints 2 and 3 only and will capture the following:
• healthcare interactions in the community, primary, and secondary care,
• medication use associated with chronic pain
• resources associated with the sleep intervention, e.g. tailored assessment, resources associated, and subsequent treatment

Qualitative study
This will explore the acceptability of delivering the sleep intervention and the feasibility of conducting an RCT. The study will comprise qualitative interviews with participants in both arms and ESPs delivering the intervention, and nonparticipatory observation to assess fidelity.
The aims of the qualitative study are:
• Assess fidelity of intervention delivery and ESP delivery experiences
• Assess training needs of ESPs and optimise the training package
• Assess patient acceptability of participating in the study
• Explore patients' views of the intervention

Qualitative sample sizes were guided by information power. Interviews will be conducted with 4 ESPs at two time points, after training completion and after delivering the interventions. Interview will be conducted pre-surgery with 20 participants in the intervention group (10/site), and 5 in the control group. All participants who decline participation in the study or withdraw will be invited to take part in a short telephone intervention about their reasons. In order to gain a wide range of participant views, maximum variation sampling will be used. Sampling criteria will be gender, age, and trial arm allocation.

Observations of ESP training
Non-participatory observations of the ESP training will be conducted to optimist the intervention delivery training package. Observations will assess engagement with training, suitability of training package, and identify any refinements needed to training package and intervention manual.
Two of the study team will conduct observations of all training. Observation notes will be recorded on a pro-forma. Observations notes will be compared and discussed between the two team members and any refinements will be identified.

Extended scope practitioner interviews
Semi-structured interviews will be conducted with all four ESPs at two time points, after completion of training and after delivering the intervention. Interviews will be guided by a pre-prepared topic guide and will focus on experiences of intervention training and delivery. Interviews will be conducted at the hospital or by telephone/Skype, depending on availability

Participant interviews
Interviews will explore participants' views on the trial, including willingness to be randomised and experiences of completing outcome data. Intervention group interviews will include experiences and acceptability of the intervention including the assessment and tailored sleep advice, experiences of engaging in the chosen ESI, and views on the impact of the intervention on sleep and pain.

Data analysis
Quantitative analysis
The baseline characteristics of each group will be tabulated using means and standard deviations for normally distributed data, medians and interquartile ranges for non-normally distributed data, and percentages and counts for categorical data. Recruitment rate (Objective 1), randomisation rate, withdrawal rate, intervention uptake (Objective 2), and proportion of questionnaires completed will be reported as percentages.
We will describe the proportion of people with on-going pain in each trial arm at 3-months post-operatively (defined as OKS <14). These proportions will be used to inform the sample size calculation for a full trial92 (Objective 9). As this is a complex tailored intervention the intervention arm is considered to be all patients who took part in the sleep intervention. At full trial stage we plan to conduct sub-group analyses to explore if there are any differences in effectiveness between the chosen ESIs.

Qualitative analysis
Data collection and analysis will be conducted in parallel after the first three interviews. This allows for refinement of the topic guide and further exploration of areas of interest or relevance to the intervention.
Non-participatory observations will include thorough note taking. These will be written up electronically and imported into NVivo.
Audio files will be transcribed verbatim, anonymised, and imported into NVivo. Patient and ESP

interviews will be analysed separately. Transcripts and observation notes will be analysed using framework analysis. Data will be organised using the topic guide as a starting framework, which will be refined as analysis progresses.
Five transcripts will be independently double coded. Coding will be compared and contrasted and discussed between the two researchers in order to refine the coding list.

Intervention Type
Behavioural

Primary outcome(s)
Collected by patient completed questionnaires at baseline, one week prior to surgery and three months after surgery:
1. Knee pain and function measured using the Oxford Knee Score
2. Neuropathic components in pain measured using PainDETECT
3. Sleep quality measured using the Sleep Condition Indicator
4. Sleep quality measured using the Pittsburgh Sleep Quality Index
5. Anxiety and depression measured using the Hospital Anxiety and Depression Scale
6. Quality of life measured using the EQ-5D-5L
7. Capability measured using ICECAP-A

Key secondary outcome(s)
Additional resource use data will be collected in the pre and post-op questionnaires only, which includes primary and secondary health care interactions, medication use and patient out of pocket expenditure and productivity

Completion date
31/08/2022

Eligibility

Key inclusion criteria
1. On the waiting list for a primary TKR due to osteoarthritis
2. Aged 18 years and over
3. Experiencing disturbed sleep, defined as a score of 0-28 on the Sleep conditions indicator

Participant type(s)
Patient

Healthy volunteers allowed
No

Age group
Adult

Lower age limit
18 Years

Sex
All

Total final enrolment
57

Key exclusion criteria
Current exclusion criteria as of 01/12/2023:

1. Diagnoses with a clinical sleep disorder, assessed via screening questionnaire (e.g. clinical insomnia)
2. Currently receiving treatment for a clinical sleep disorder, assessed via screening questionnaire
3. Taking prescription medication to help with sleep
4. Unable or unwilling to attend intervention appointment
5. Unable or unwilling to provide informed consent
6. Unable to complete study questionnaires in English

_____

Previous exclusion criteria:

1. Diagnoses with a clinical sleep disorder, assessed via screening questionnaire (e.g. clinical insomnia)
2. Currently receiving treatment for a clinical sleep disorder, assessed via screening questionnaire
3. Unable or unwilling to attend intervention appointment
4. Unable or unwilling to provide informed consent
5. Unable to complete study questionnaires in English

Date of first enrolment
25/03/2021

Date of final enrolment
31/12/2021

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
Southmead Hospital
North Bristol NHS Trust
Southmead Road
Westbury-On-Trym
Bristol
United Kingdom
BS10 5NB

Sponsor information

Organisation
North Bristol NHS Trust

ROR
https://ror.org/036x6gt55

Funder(s)

Funder type
Government

Funder Name
NIHR Central Commissioning Facility (CCF); Grant Codes: NIHR201036

Funder Name
National Institute for Health Research (NIHR) (UK)

Alternative Name(s)
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

Funding Body Type
Government organisation

Funding Body Subtype
National government

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan
Current IPD sharing statement as of 24/08/2022:
Participants were asked on the consent form if they were willing for their information to be shared anonymously with other researchers to support other research in the future. The anonymised trial data will be stored on the University of Bristol Research Data Storage Facility and will be shared via the University of Bristol Research Data Repository (https://data.bris.ac.uk

/data/). Access to the data will be restricted to ensure that data is only made available to bona fide researchers after a Data Access Agreement has been signed by an institutional signatory.

Previous IPD sharing statement:
The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request

IPD sharing plan summary

Stored in non-publicly available repository

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		20/03/2024	30/06/2025	Yes	No
HRA research summary			28/06/2023	No	No