COgnitive Muscular therapy versus psychologically informed Physiotherapy In non- specific chronic Neck pain: a feasibility study (COMPIN)

1. Background and rationale

Chronic neck pain (CNP) is the fourth leading cause of disability with a prevalence approaching 12% in the UK [1]. Although common, CNP is under researched compared to other common conditions such as low back pain [2]. Current conservative management guidelines for CNP recommend a multimodal approach to include advice, analgesics, and physiotherapy [3]. Physiotherapy involves stretching and strengthening exercises in combination with manual therapy. Combining exercise with manual therapy improves short term outcomes [4], but does not affect long-term outcomes in CNP [5]. Critically, a recent systematic review of over 40 trials concluded that current physiotherapy management for CNP has small to moderate effect sizes of 0.3-0.7 [2, 6] with effects reducing over time. As such, there is a need for new interventions for CNP which can deliver larger treatment effects.

There is now growing support for the idea that pain signalling mechanisms are altered in people affected by CNP [7]. This central modulation of the pain experience results in generalised pain hypersensitivity and a decrease in pain thresholds to normally non-painful stimuli [8]. While prolonged nociceptive input can cause sensitisation, emotional responses to pain are thought to be responsible for the maintenance of pain [9]. Importantly, characteristics such as fear-avoidance [10] and pain catastrophising [9, 11] are related to motor control changes such as altered force and speed of movement [12]. However, while physiotherapy management of other chronic musculoskeletal conditions, such as low back pain, routinely incorporates psychosocial techniques, there has only been a small amount of research investigating psychosocial interventions for CNP [13]. Importantly, this research shows promise, supporting the need for further work in this area.

Current NICE recommended physiotherapy management, such as manual therapy and exercise, does not specifically target muscle overactivity. This may explain the modest effect sizes and lack of long-term effects with current management. Interestingly, studies have shown that electromyography (EMG) biofeedback is helpful in reducing CNP [14]. However, current biofeedback interventions do not include psychological techniques, nor do they target altered postural alignment. Moving forwards, new interventions are required that address psychological and postural mechanisms that underpin muscle overactivity in CNP.

We have created a new physiotherapist-led intervention for knee osteoarthritis which we refer to as Cognitive Muscular Therapy (CMT) [15]. CMT is an integrated behavioural intervention which combines psychologically informed practice with muscle biofeedback training. The aim of CMT is to reduce muscle overactivity, minimise mechanical loading on anatomical structures and change

beliefs related to musculoskeletal pain. We have delivered CMT to five people with CNP. Following the intervention, patients reported a mean change in the Neck Pain Disability Index (NDI) of 65%, ranging from 31%-80%. Furthermore, patients described CMT as "enlightening" because it gave them new insight into how their "pain related to their beliefs, posture and muscle patterns." This proposed study will seek to explore the viability of a large-scale RCT (Randomised Controlled Trial) comparing CMT with current best practice care for patients at high risk of long-term disabling chronic neck pain.

2. Feasibility study

This trial will deliver key parameters that are required to run a future, pragmatic, two-arm RCT designed to understand the clinical and cost-effectiveness of the CMT intervention for people who fail to benefit from current best practice care physiotherapy for CNP. For this study, we will work with local GP practices to recruit 48 patients with ongoing CNP who would be considered at high risk of a poor long-term outcome.

Once recruited, patients will be randomised 1:1 into two groups: an intervention group who receive the CMT intervention (n=24) and a control group (n=24) who receive best practice psychologically informed physiotherapy. Each group will receive 7 sessions over a 13-week period, and we will collect outcomes at baseline, 14 weeks and 26 weeks. Data will inform planning for a future trial. Full details are provided below:

2.1 Recruitment and inclusion

We will recruit 48 patients with ongoing CNP who would be considered at high risk of poor long-term outcome. Inclusion/exclusion criteria will align with previous studies in CNP.

Inclusion criteria

1. Adults with CNP pain duration >3 months and considered at high-risk of poor long-term outcome (identified with STarT MSK tool)
2. Currently scoring 4 or more on a numerical response scale for pain from 0-10 (0=no pain, 10=worst pain)
3. Ability to stand for 10 minutes (required to complete the intervention)
4. Speak and understand English sufficiently to read the information sheet and sign the consent form

Exclusion criteria

1. Diagnosis of inflammatory arthritis (e.g. rheumatoid arthritis, psoriatic arthritis)
2. Previous spinal surgery such as discectomy, anterior cervical discectomy and fusion, disc replacement, laminectomy and scoliosis fixation
3. Diagnosis of degenerative neurological disorders (e.g. Multiple Sclerosis/ Parkinsons)
4. Vulnerable patients for example those who lack mental capacity to make decisions, have dementia or are nearing the end of life
5. BMI of more than 33 (as increased subcutaneous fat prevents collection of surface EMG signals)
6. Pending litigation related to an injury for example at work or whilst driving.

7. Unable to cancel or postpone other treatment that is being received for the condition, for example physiotherapy, chiropractic or osteopathy.

Recruitment through local GP practices:

If possible, we aim to recruit all patient through local (to Salford) GP practices. At each practice, a clinical research nurse will oversee a search to identify primary care consulters with a relevant diagnostic (SNOMED CT) code who have consulted their GP for CNP within the previous three months. Eligible patients will be sent the patient information sheet (Participant information sheet- COMPIN (patient)) along with the invitation letter (Letter of invitation- COMPIN). The patient will then independently contact the research team by telephone or email if interested in the study.

Recruitment through musculoskeletal physiotherapy waiting lists:

At each site, a member of clinical or administrative staff will screen the waiting lists for patients with referrals for CNP. A clinical research nurse will then screen the referrals against the inclusion/exclusion criteria of the study. All relevant participants will be sent an invite letter and participant information sheet. Participants will contact the research team independently. Once in contact with the research team their eligibility and will complete screening.

Recruitment through pain team physiotherapy waiting lists:

At each site, a member of clinical or administrative staff will screen the waiting lists for patients with referrals for CNP. A clinical research nurse will then screen the referrals against the inclusion/exclusion criteria of the study. All relevant participants will be sent an invite letter and participant information sheet. Participants will contact the research team independently. Once in contact with the research team their eligibility and will complete screening.

Recruitment through social media

We will use social medial channels, such as Facebook, and Instagram to promote the study (see Social media advert (patient)). Individuals who are interested in participating in our research will be required to text 'NECK' to a specific number or send an email expressing their interest in the study. If interested in the study, the research team will complete an initial screening using the inclusion/exclusion criteria described above and, if eligible will be sent the patient information sheet (Participant information sheet- COMPIN (patient)) along with the invitation letter (Letter of invitation- COMPIN). The patient will then independently contact the research team if interested in the study and the research team will send out a consent form (Participant consent form- COMPIN (patient).

Recruitment of NHS Physiotherapists

We plan to employ a maximum of 4 physiotherapists at band 7 level or above from local trusts who will deliver the control intervention. We will identify physiotherapists who are happy to be seconded onto the project, work overtime or, if they work part time, to take part in this project on their day off. Specifically, we will liaise with the department lead who will ask staff members to contact us directly if they are interested in taking part. We will also post an advert on the Chartered Society of Physiotherapy (CSP) website (CSP advert- COMPIN).

If interested in the study, the physiotherapist will contact the research team to discuss the study. The research team will check eligibility (band 7 physiotherapist with >3 years' experience of managing patients with chronic pain). A competency checklist will be used to verify that the physiotherapists level of experience and knowledge is at an expected level to deliver the interventions. If competent, the physiotherapists will be provided with the treatment protocols, complete a short online refresher training course on chronic pain and attend the University of Salford for a training workshop. Further details are provided in the section below on physiotherapist training.

2.2 Consent and randomisation

Patients

Once the consent form has been received, the participants will be formally enrolled onto the study. However, they will not be randomised, into the control or intervention arm, until six weeks before the treatment is due to commence. For some participants this may involve a wait of up to two months between enrolment on the study and randomisation. However, this is necessary to coordinate delivery of the intervention.

Once enrolled, with permission from the participant, the research team will send a letter to the GP informing them of the patient's participation in the study. Baseline outcomes will then be collected (see below) to include a diversity and inclusion questionnaire. Specifically, to ensure that there is a diverse range of participants, we will explore data related to age, gender, disability, religion, ethnicity and socio-economic class in the intervention and control groups. Once the outcomes are completed, patients will be randomised into either the intervention group (CMT- treatment group 1) or control group (psychologically informed physiotherapy- treatment group 2).

Randomisation will be carried out via a web-based randomisation system (https://www.sealedenvelope.com/). The allocation sequence will be generated by the lead or co-investigator not otherwise involved in the recruitment/treatment of participants. Once group allocation has been confirmed the intervention coordinator (member of the research team) will liaise with participants over the phone to schedule the appointments.

Physiotherapist consent for interviews

The physiotherapists will be asked if they would like to be interviewed about their experiences. If interested, they will be provided with the information sheet (Participant information sheet- COMPIN interview (physiotherapist)). They will be given a minimum of 24 hours to decide if they want to take part. If they want to take part, they will sign the consent form (Participant consent form – COMPIN interview (physiotherapist) and return this to the research coordinator. If they do not consent to be interviewed they can still take part in the trial and deliver the intervention.

2.3 Interventions, timing, and setting

Treatment group 1- CMT

The CMT intervention will be delivered to treatment group 1 by lead investigator Mr Brookes or a suitably qualified physiotherapist who has been involved in previous NIHR funded studies and completed further training in CMT. Mr Brookes is an experienced band 7 NHS physiotherapist who

has developed and delivered the intervention during the NIHR funded projects. Due to NHS pressures, the sessions will take place at the University of Salford.

There are five separate intervention components which the physiotherapist works through sequentially. A summary of each intervention component is provided below:

Component 1/session 1 (Understanding neck pain): Persuasive communication and imagery (through animated videos) are used to challenge the belief that CNP is the direct consequence or result of "wear and tear" on the spine or discs and to convey the idea that increased muscle activation will increase spinal loads, potentially exacerbating pain.

Component 2/ sessions 1 and 2 (General relaxation): patients are taught to release specific patterns of muscular holding in the trunk and neck muscles. A key focus is on the use of diaphragmatic breathing to train relaxation of the abdominal muscles and the use of EMG biofeedback to raise awareness of overactivity of the sternocleidomastoid/trapezius muscles in lying and sitting.

Component 3/session 3,4 and 5 (Postural deconstruction): A set of clinical procedures are used that enable the physiotherapist to unpick (deconstruct) patterns of postural muscle activity and associated patterns of hip/trunk muscle stiffness. Working through the procedures, the patient is provided with experiential learning of how to stand with reduced postural muscle activity and more relaxed neck muscles.

Component 4/ session 6 (Contextual triggers): This component aims to raise awareness of inappropriate contraction of the neck muscles which can be triggered by pain expectations. Using biofeedback, the patient is taught to minimise anticipatory muscular contraction, which can occur before initiation of movement. Patients are also encouraged to reflect on emotional responses to anticipated pain.

Component 5/ session 7 (Functional integration): This final component builds on the principles of component 4 (Contextual triggers). The physiotherapist works through a range of functional tasks which are known to provoke CNP. Using hands-on guidance, the physiotherapist first ensures that there is no muscular bracing or disturbance in postural muscle tone (component 3) triggered immediately prior to task performance. The focus then shifts to guiding smooth performance of the task, again without muscular bracing.

The CMT intervention is delivered across seven individual clinical sessions, each lasting 45-60 minutes. Alongside the face-to-face sessions, patients are provided with access to an online learning platform which uses animated videos to convey intervention concepts and explain what should be practiced between clinical sessions.

Delivery of the intervention is supported with animated videos which explain intervention concepts, and which are watched prior to, during and following the clinical sessions. These videos are delivered through an online platform or via a tablet computer which we will provide to patients who do not have an appropriate device. EMG biofeedback is also used, in components 2-5, to visualise muscle patterns. This requires the physiotherapist to place small sensors on the skin overlying the patient's neck muscles. Muscle activation data is then visualised on a laptop computer.

Although novel, the CMT intervention integrates many standard physiotherapy techniques, such as training to encourage diaphragmatic breathing, muscle flexibility testing and postural assessment. It

also integrates psychologically informed practice, which is well-established across the profession. The key differences with conventional physiotherapy is that the CMT intervention aims to develop awareness of muscle tension, rather than use muscle strengthening. As such, there are negligible risks with this approach, and we did not observe any adverse effects in our previous studies involving CMT. More information on the CMT intervention is provided in the publication of our intervention development study [15].

Treatment group 2- psychologically informed physiotherapy

Participants in treatment group 2 will receive psychologically informed physiotherapy which is a well-established treatment for patients with long term pain. The patients will receive 5 face to face sessions of 45-60 mins delivered at the University of Salford and complete 2 pre-recorded/prepared online sessions. The sessions will include the following:

Session 1 will include a subjective and objective assessment. It will include a discussion about understanding pain, the chronic pain cycle and the benefits of exercise. The patients will be taught stretches and relaxation exercises. Goal setting will be completed at the end of the session.

Session 2 will include a review of the patients understanding of pain. Their goal and exercises will be reviewed. The session will include an introduction to unhelpful behaviours (boom/bust, avoidance, excessive persistence) and completing an activity diary. The session will end with stretches and relaxation exercises.

Session 3 (online) focuses on pacing theory and practice. It will include information on pacing such as planning/prioritising, reviewing activity diaries, and discovering/testing baselines. The session will end with setting a pacing goal.

Session 4 will include an activity diary review and goal setting related to pacing. Education will focus on pacing. The session will include a graded exercise circuit and relaxation exercises.

Session 5 will include a goal review. Education will focus on sleep hygiene and medication. The session will include a graded exercise circuit and relaxation exercises.

Session 6 will include a goal review. Education will focus on managing flare ups. The session will include a graded exercise circuit and relaxation exercises.

Session 7 (online) will include education on employment, the role of healthy lifestyles (smoking, exercise, diet) and future goals.

To assess the fidelity of the interventions we will perform an audit of the clinical notes. This will involve reviewing a random selection of 10 sets of notes per site (40 in total) at different stages of the patient journey. We will use the treatment protocols as a checklist to assess treatment consistency across sites and physiotherapists. This will be completed by collaborator Dr Antcliffe.

Undergoing other interventions

Following completion of treatment 1 or 2, participants can opt to undergo other interventions e.g., private physiotherapy, without needing to withdraw from the study. However, if this occurs prior to

the completion of the 6-month outcomes, these visits will need to be recorded in the healthcare resource questionnaire.

2.4 Clinical, QoL & health economic outcomes

As this is a feasibility trial, the primary outcomes will relate to the feasibility of conducting a future, fully powered RCT (recruitment, retention, adherence, and acceptability) and obtaining parameters required to inform its design and conduct, such as the standard deviation of outcome measures that may feed into the sample size calculation.

We will collect data using the following questionnaires which are included in this application:

1. Neck Disability Index (NDI)
2. Numerical rating scale of pain scale (0-10)
3. 13-item Tampa Scale of Kinesiophobia (TSK- 13)
4. Pain Catastrophising Scale (PCS)
5. EQ-5D-5L (EuroQol)
6. STarT MSK Screening Tool
7. Healthcare utilisation questionnaire

We will collect the following diversity and inclusion data at baseline only (included with the application):

1. Diversity and inclusion questionnaire

We will collect the following patient experience data at 14 weeks (included with the application):

1. Musculoskeletal Patient Reported Experience Measure- (MSK PREM)

2.5 Statistical analysis and sample size

We plan to recruit 48 participants to the study. Assuming a dropout of 20%, this should provide approximately 19 in each group for the final analysis. The primary objective of this study is to assess the feasibility, and inform planning, of a future large-scale clinical trial. Sample sizes of between 24 and 70 have been recommended for feasibility trials to provide a reliable estimate of parameters required to calculate the sample size for a main trial, e.g. standard deviation of continuous outcomes, recruitment, and attrition rates. Our sample of 48 is therefore in line with these recommendations.

To inform planning of a future trial, the number of participants screened, consenting, and randomised will be presented by month. Reasons for non-participation (ineligible or non-consenting) will be summarised where available. Baseline and outcome data will be summarised descriptively by randomised group and overall using mean (SD) for continuous variables and number and percentage for categorical. Trial follow-up rates and intervention session attendance will be summarised. Clinical outcome data analysis will be exploratory in nature and used to plan our future trial. We will plot line graphs to look at the trajectory of each outcome over time, looking at both individual participants and the mean values for each randomised group. However, if there is an

unexpectedly large difference (>1 SD) in clinical outcomes between the two groups, we will undertake a formal statistical analysis using independent t-tests. This will allow us to test for differences in outcomes at the 14-week follow-up.

An intention-to-treat (ITT) analysis, along with a per-protocol analysis, will be conducted after the 14 week follow up point. In the per-protocol analysis, only participants who complete more than 5 out of 7 sessions will be included. Employing this dual methodology will allow us to determine the genuine impact of the CMT and control interventions while also providing data relevant to clinical allocation. This approach will help us refine the analysis plan for a future trial.

2.6 Health economic analysis

We will not perform statistical analysis on the health economic data. Instead, these data will be used to inform planning of a future RCT. Specifically, we will explore health outcomes (i.e. the EQ-5D-5L), healthcare resource use and costs of the intervention and control groups. Cost and outcome data will be collected at baseline, 14 weeks and 26 weeks using participant self-completed questionnaires. Health-related quality of life data will be obtained via the EQ-5D-5L to enable the measurement of participants' utility. Estimates of the raw EQ-5D-5L scores will be presented, both overall and by domain, with completion rates also summarised.

An NHS costing perspective will be taken for the analysis. Healthcare utilisation data will be collected and presented for relevant resources used by CNP patients in primary care and the community (i.e. appointments with a GP, nurse, physiotherapist, occupational therapist, and other primary/community care healthcare professionals) and the hospital setting (i.e., hospital outpatient attendances, accident and emergency admissions, day case attendances and inpatient admissions). Participants will be asked to record their resource use specifically in relation to CNP. Mean resource use by item will be summarised and completion rates will be presented. Unit costs for the healthcare resources will be sourced from established costing databases, such as NHS Reference Costs [17] and Personal Social Services Research Unit Costs of Health and Social Care [18]. Indicative costs of the intervention will be estimated, incorporating the cost of delivering the sessions, and the associated materials, versus the control group.

2.7 Qualitative evaluation of the acceptability

Patient interviews: Following the intervention, we will purposively select (through pain outcomes) a subset of 10 participants from each group, who together demonstrate a range of clinical responses. We will also select two participants who have withdrawn from the study. Each participant will be interviewed by an experienced independent qualitative researcher who did not take part in the intervention delivery to explore intervention acceptability of the CMT intervention and the control intervention from the patients' perspective. Interviews will be carried out over phone or via video conference and will be guided by a topic guide (Interview topic guide- COMPIN (CMT treatment group)) and (Interview topic guide- COMPIN (control group)) and mapped to the acceptability framework developed by Sekhon *et al.* [19]. The interview will take up to 30-60 minutes and responses to the interview questions will be transcribed. Following verbatim transcription of the audio recordings, participants will be provided with an opportunity to check these for accuracy. Recordings will then be destroyed to ensure that all responses are complete anonymised.

Data will be analysed using reflective Thematic Analysis [20] to interpret the data and the resulting themes. This process will involve comparison of findings within and among transcripts, and use of

memos to record decision points. The approach to analytical interpretation of the themes identified by the researcher will be reflexive, aiming to achieve richer interpretations of meaning, rather than attempting to achieve consensus of meaning.

2.8 Stop-go criteria for the follow-on trial

To help decide whether to proceed to a full RCT we will use a stop- go criteria for each of our objectives using a traffic light signal where green indicates no issues, amber indicates changes required and red indicates issues that cannot be resolved. York Clinical Trials Unit, who would lead a follow-on trial, have advised on these criteria:

1 Recruitment: Average participants recruited per month: red: <4 per month; amber: 4-6 per month; green> 6 per month.

2: Adherence/retention: Participants attending >5 (of 7) clinical sessions: <60%; amber=60-79%; green≥80%.

3: Outcomes: Participants providing 14-week and 6 month data: red<60%; amber=60-79%; green≥80%. Appropriateness of outcomes determine via qualitative evaluation.

4 Acceptability to patients. Determined via the qualitative evaluation.

3. Project timetable

This project will be delivered over a 14-month period. Advisory and steering group meetings will take place in months 1, 6 and 14. During the first 4 months we will develop the materials for the control intervention and recruit/train the 4 NHS physiotherapists. Recruitment, consent, and randomisation for wave 1 will be completed by month 4 with wave 1 interventions delivered in months 5-8. Post intervention outcomes for wave 1 will be completed by month 9. Recruitment consent and randomisation for wave 2 will be completed by month 7 with wave 2 interventions delivered in months 8-10. Post intervention outcomes for wave 2 will be completed by month 11. Qualitative evaluation will take place in months 8-12. Data analysis, write up and evaluation will take place in months 12-14. 6-month outcomes will be completed for wave 2 by month 14 (July 2025) which will constitute the end of the study.

4. Dissemination

We will report the findings of the study through two papers, submitted to open access journals such as BMC Musculoskeletal disorders. The first paper will report descriptive statistics on the clinical outcomes and on the feasibility of conducting a large-scale RCT. The second paper will describe the qualitative exploration of participant's experiences of the CMT and control interventions. These findings will be presented at the Chartered Society of Physiotherapy (CSP) Annual Conference. We will also send each participant a written summary of the research findings on study completion and promote the findings by authoring an article in the CSP Frontline magazine.

5. Patient and public involvement in the proposed research

We will form a user advisory group which will consist of four patient representatives who will advise on research design, participant information resources and dissemination. This groups will attend PPIE meetings at the start of the study and every 4-5 months (3 over the course of the project). The

lead PPIE member will also attend the user steering group meetings. The user advisory group will be consulted on several different aspects of research design. For example, the appropriateness of the control intervention and the appropriateness of specific trigger questions used in the interviews designed to elicit user perspectives of our intervention and on trial involvement.

6. References

1. Safiri, S., et al., *Global, regional, and national burden of neck pain in the general population, 1990-2017: systematic analysis of the Global Burden of Disease Study 2017.* Bmj, 2020. **368**: p. m791.
2. Verhagen, A.P., *Physiotherapy management of neck pain.* J Physiother, 2021. **67**(1): p. 5-11.
3. *National Institute for Health and Care Excellence (2018) Neck pain - non-specific. Available at: https://cks.nice.org.uk/neck-pain-non-specific.*
4. Hidalgo, B., et al., *The efficacy of manual therapy and exercise for treating non-specific neck pain: A systematic review.* J Back Musculoskelet Rehabil, 2017. **30**(6): p. 1149-1169.
5. Miller, J., et al., *Manual therapy and exercise for neck pain: a systematic review.* Man Ther, 2010. **15**(4): p. 334-54.
6. de Zoete, R.M., et al., *Comparative effectiveness of physical exercise interventions for chronic non-specific neck pain: a systematic review with network meta-analysis of 40 randomised controlled trials.* Br J Sports Med, 2020.
7. Xie, Y., et al., *Comparing Central Pain Processing in Individuals With Non-Traumatic Neck Pain and Healthy Individuals: A Systematic Review and Meta-Analysis.* The Journal of Pain, 2020. **21**(11-12): p. 1101-1124.
8. Castaldo, M., et al., *Widespread Pressure Pain Hypersensitivity, Health History, and Trigger Points in Patients with Chronic Neck Pain: A Preliminary Study.* Pain Med, 2019. **20**(12): p. 2516-2527.
9. Mansfield, M., et al., *The association between psychosocial factors and mental health symptoms in cervical spine pain with or without radiculopathy on health outcomes: a systematic review.* BMC Musculoskeletal Disorders, 2023. **24**(1).
10. Lee, K.-C., T.T.W. Chiu, and T.-H. Lam, *The role of fear-avoidance beliefs in patients with neck pain: relationships with current and future disability and work capacity.* Clinical Rehabilitation, 2007. **21**(9): p. 812-821.
11. Hill, J.C., et al., *Predictors of poor outcome in patients with neck pain treated by physical therapy.* Clinical Journal of Pain, 2007. **23**(8): p. 683-690.
12. Karos, K., et al., *Fear of pain changes movement: Motor behaviour following the acquisition of pain-related fear.* Eur J Pain, 2017. **21**(8): p. 1432-1442.
13. Letzel, J., F. Angst, and M.B. Weigl, *Multidisciplinary biopsychosocial rehabilitation in chronic neck pain: a naturalistic prospective cohort study.* Eur J Phys Rehabil Med, 2018.
14. Campo, M., et al., *The effectiveness of biofeedback for improving pain, disability and work ability in adults with neck pain: A systematic review and meta-analysis.* Musculoskelet Sci Pract, 2021. **52**: p. 102317.
15. Preece, S.J., et al., *A new integrated behavioural intervention for knee osteoarthritis: development and pilot study.* BMC Musculoskelet Disord, 2021. **22**(1): p. 526.
16. Hill, J.C., et al., *Risk-based stratified primary care for common musculoskeletal pain presentations (STarT MSK): a cluster-randomised, controlled trial.* Lancet Rheumatol, 2022. **4**(9): p. e591-e602.
17. *Department of Health. NHS Reference Costs 2018/19:*. 2019; Available from: https://improvement.nhs.uk/resources/national-cost-collection/.
18. *Curtis L, Burns A. Unit Costs of Health and Social Care 2019. University of Kent: Personal Social Services Research Unit; 2019.*; Available from: https://www.pssru.ac.uk/project-pages/unit-costs/unit-costs-2019/.

19. Sekhon, M., M. Cartwright, and J.J. Francis, *Acceptability of healthcare interventions: an overview of reviews and development of a theoretical framework.* BMC Health Services Research, 2017. **17**(1): p. 88.
20. Braun, V. and V. Clarke, *Using thematic analysis in psychology.* Qualitative Research in Psychology, 2006. **3**(2): p. 77-101.