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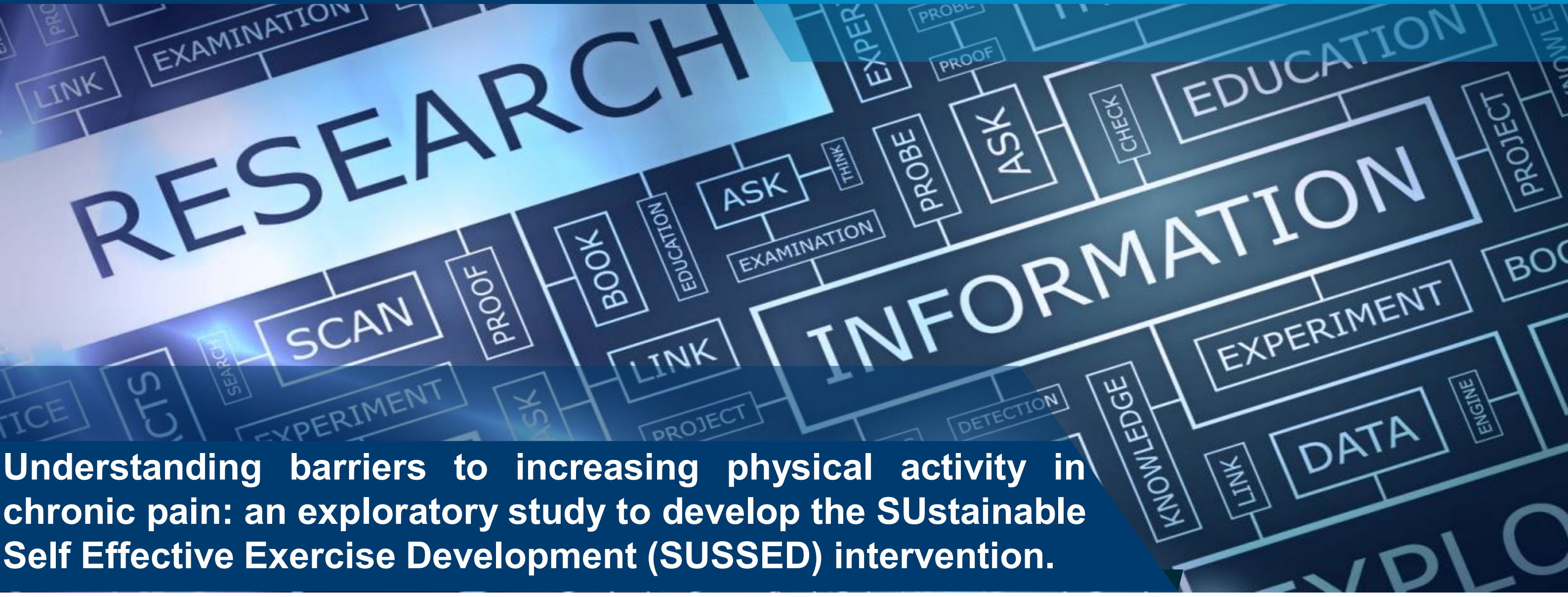
RESEARCH PROJECT BRIEFING



Understanding barriers to increasing physical activity in chronic pain: an exploratory study to develop the SUstainable Self Effective Exercise Development (SUSSED) intervention.

AIMS

1. Identify barriers and facilitators (things that make it harder or easier) to physical activity (PA) in individuals with moderate to severe chronic pain by exploring the associations between personal and clinical factors, within the theoretical framework of the Capability Opportunity Motivation-Behaviour (COM-B) model (Michie et al., 2011), a framework that helps understand behaviour change.

2. Understand what healthcare professionals and other stakeholders (e.g., leisure centres, Green Health Partnership, third sector organisations) see as barriers and facilitators to increasing PA for people with chronic pain and how addressing these can support the effective use of a new decision support tool - SUSSED.

3. Use subjective (self-reported) and objective (device-measured) methods to assess physical activity capacity (what people can do) and behaviour (what they actually do), to find the best outcome measures for future SUSSED studies.

4. Conduct Patient and Public Involvement and Engagement (PPIE) to understand patient preferences and ensure the SUSSED tool meets user needs.

5. Combine this new evidence, our previous work, and existing published research to develop the SUSSED framework for further refinement and testing.

KEY FINDINGS

1. Patient themes where barriers and facilitators to PA were identified:
    - Capability: Pain, poor mental health, understanding how PA relates to chronic pain
    - Opportunity: Support from friends, family, or pets; accessibility; environment and green spaces
    - Motivation: Experiences with healthcare providers, perception of self and health (how people view their own wellbeing and abilities)

2. Stakeholder themes on perceived barriers and facilitators that need addressed :
    - Capability: Lack of knowledge about PA benefits, self-efficacy (confidence in being active)
    - Opportunity: Accessibility, income, support, personalised programmes, time
    - Motivation: Patients' pain being believed by service providers, self-efficacy (confidence in PA)

3. Factors such as sex, age, socioeconomic status, pain intensity, and pain-related psychological issues significantly influenced PA levels. Barriers included clinical symptoms, tiredness, low motivation, and lack of time. Facilitators included effective pain management, growing confidence in PA, gradual improvements, and social support, varying by individual characteristics.

4. Based on patient experiences with two different activity monitors, the Fitbit (a wrist-worn device) was preferred. The ActivPAL (a small device worn on the thigh) was found to be more accurate.

5. PPIE emphasised the need for a user-friendly tool that considers physical, mental, and emotional barriers. Participants suggested using pre-assessment tools like brief questionnaires or easy-to-use webpages to help healthcare providers recommend personalised PA plans.

WHAT DID THE STUDY INVOLVE?

1. This mixed methods study used:
   Semi–structured interviews (guided conversations with flexibility) to understand barriers and facilitators to physical activity in people with moderate to severe chronic pain, including:

   a. People with chronic (>6 months) pain (n=42) referred to the NHS Tayside Pain Service;
   b. Key stakeholders (n=15) who prescribe or deliver physical activity programmes or support to patients with chronic pain and may benefit from the SUSSED tool

2. Whilst originally designed to take place face-to-face, these were redesigned to be conducted remotely, either via MS Teams or telephone, due to the impact of the Covid-19 pandemic. People with chronic pain also completed a range of validated patient reported outcome measures (PROMs), standard questionnaires assessing patients' symptoms and impact.

3. Subgroup analyses stratified the cohort by personal and clinical characteristics, analysing PA levels through PA monitors (devices that track movement) (i.e., Fitbit and ActivPAL) and self-reported experiences, to identify barriers and facilitators across different demographic groups..

4. PA levels were measured using PA monitors. Patients were randomised to wear either an ActivPAL monitor alone or both an ActivPAL and a Fitbit, comparing objective and subjective approaches for acceptability and feasibility, as there is no consensus on the most effective method on trackers.

5. A comprehensive systematic review was conducted to ensure that all relevant published evidence relating to barriers and facilitators of PA in people with chronic pain was identified and considered in relation to informing development of the SUSSED tool.

6. Three PPIE sessions were held to understand patients' preferences on decision support tools and guide development of the SUSSED tool's next stage.

WHAT WERE THE RESULTS AND WHAT DO THEY MEAN?

Participant characteristics and findings

The study recruited 42 people living with moderate to severe chronic pain (27 female, 64%), with a mean age of 51 (range 20–81) and mean BMI of 32 (range 22–46). Most participants (n=28, 67%) were from the most deprived areas in Scotland, as indicated by the Scottish Index of Multiple Deprivation (SIMD 1–3). The majority preferred telephone interviews (31 out of 42, 74%) over video calls.

Overall, PROMs (questionnaires assessing pain and its effects) from people with chronic pain indicated moderate to severe pain and impact (Brief Pain Inventory mean pain severity 5.0(1.1), and pain interference 6.4(2.0)). Levels of PA were generally low ((Physical Activity Stages of Change: 26/41 reporting not being currently physically active, although they intended to become more physically active over the next 6 months).

Psychological PROMs highlighted several barriers: high levels of pain-related worry and negative thinking (Pain Catastrophizing Scale (31.1(13.0)), low confidence in managing pain (Pain Self-Efficacy Score 26.6(11)), and fear of movement due to pain (Tampa Scale of Kinesiophobia average 40.5(9.3)). Thus, people with pain were physically inactive, with a number of potential barriers identified through PROMs. On a positive note, the majority wanted to become more active.

Barriers and facilitators: COM-B analysis

Interview themes were mapped onto the COM-B model to understand what influences physical activity in this population. A range of barriers and facilitators were identified by both people with pain and healthcare providers (see Table 1). These insights will guide the development of personalised strategies to support behaviour change.

Results also indicated that age, sex, socioeconomic factors, pain levels, and psychological responses like catastrophizing and kinesiophobia affect physical activity levels. This highlights the need for tailored approaches for vulnerable groups.

COM-B		Patients		Stakeholders	
		Barriers	Facilitators	Barriers	Facilitators
Capability	Physical	• Current pain levels • Unpredictability of pain • Co-morbidities	• Understanding physical activity as a solution • Reasonable adjustments/ modifications	• Patients' lack of belief in benefit of physical activity • Patients' pain experience • Patients' pain management knowledge for physical activity being low	• Patients having previous positive experience of physical activity • Availability of appropriate and enjoyable activities • Patients good at pain self-management
	Psychological	• Experiencing poor mental health • Lack of confidence	• Having confidence to manage treatment • Setting targets that are manageable • Therapeutic relationships	• Patients' poor mental health • Patients' low confidence and belief in benefit of physical activity for pain management	• Personalised techniques to increase patient motivation and responsibility • Listening to what patients say they need
Opportunity	Social	• Pressure from significant others • Lack of social and professional support • Self-isolation and stigma	• Having supportive peers • Receiving emotional and functional support	• Stigma • Chronic pain being invisible leading to lack of support	• Social accountability • Patient autonomy regarding progress
	Physical	• Inadequate local environment for engaging in physical activity • Lack of routine • Covid restrictions	• Having support through friends/ companion pets • Having access to a suitable environment for activity	• Lack of access (waiting and review times) to services • Covid interruption of services • Socioeconomic factors • Time to talk to patients	• Providing free/reduced cost services • Having access to personalised, flexible and appropriate physical activity treatments
Motivation	Reflective	• Negative beliefs about exercise • Negative perceptions of self with chronic pain • Negative experiences of health care professionals	• Having peer support from experts by experience	• Patient having past negative experiences of pain and physical activity	• Pain being believed by services
	Automatic	• Feeling helpless and fearful • Lack of belief in recovery • Fear of falling	• Trust and acceptance of doctors. • Being able to set personalised goals	• Health care professionals lack of belief in pain experience	

Table 1: Barriers and Facilitators themes from patient and stakeholder interviews within a COM-B framework

Use of PA monitors

The ActivPAL monitor, a small device worn on the thigh to measure sitting, standing, and walking, was used by 42 participants (excluding one wheelchair user, for whom the device was not suitable). Most participants (n=38) had at least five full days of usable data, demonstrating that use of the monitor was feasible in this population.

Participant experience

In the subgroup (n=20) who wore both the ActivPAL and the Fitbit, the Fitbit was more acceptable, as determined through the patient experience. The Fitbit was worn for an average of two days longer than the ActivPAL, and fewer people experienced discomfort (10% vs. 19%) or itchiness (10% vs. 24%) during wear (see figure 1). One participant experienced pain while wearing both monitors.

Objective measurement

Compared with the ActivPAL, the Fitbit over-reported both steps per day (7,769 ± 6,237 vs. 5,892 ± 5,931 steps/day; $p<0.0001$) and time spent in MVPA (36 ± 40 vs. 10 ± 14 min/day; $p=0.0159$). Correlation between monitors was strong for steps ($r=0.919$), but moderate for MVPA ($r=0.559$). If total volume of physical activity (steps/day) is the outcome of interest, then the Fitbit is recommended, especially if used in conjunction with a wear log to identify periods of non-wear. However, if time spent in MVPA is the outcome of interest, particularly if adherence to physical activity guidelines is of interest, then the ActivPAL should be considered.

Self-reported activity via the International Physical Activity Questionnaire (IPAQ) had a weak correlation with ActivPAL data ($r=0.076$), suggesting it may not be reliable for this group.

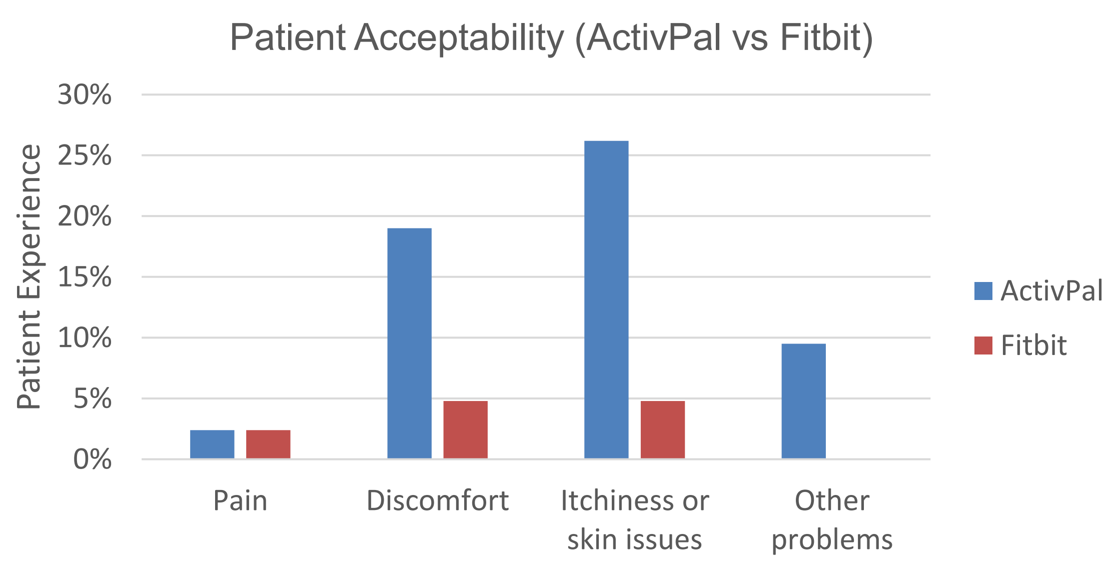


Figure 1: Patient acceptability of activity monitors of ActivPal and Fitbit users (n=42)

Systematic review

A systematic review was conducted to compare our findings with existing literature. Using a predefined strategy, databases including Embase, Medline, PsycINFO, CINAHL, and Cochrane were searched. Of 1,833 articles identified, 95 full-text studies were reviewed and 39 included.

The literature on barriers and facilitators to PA in chronic pain patients, was consistent with our findings. However, the literature mainly focused on the barriers to physical activity. The proposed SUSSED framework will focus on addressing both barriers and facilitators as identified from people living with chronic pain and key stakeholders (figure 2).

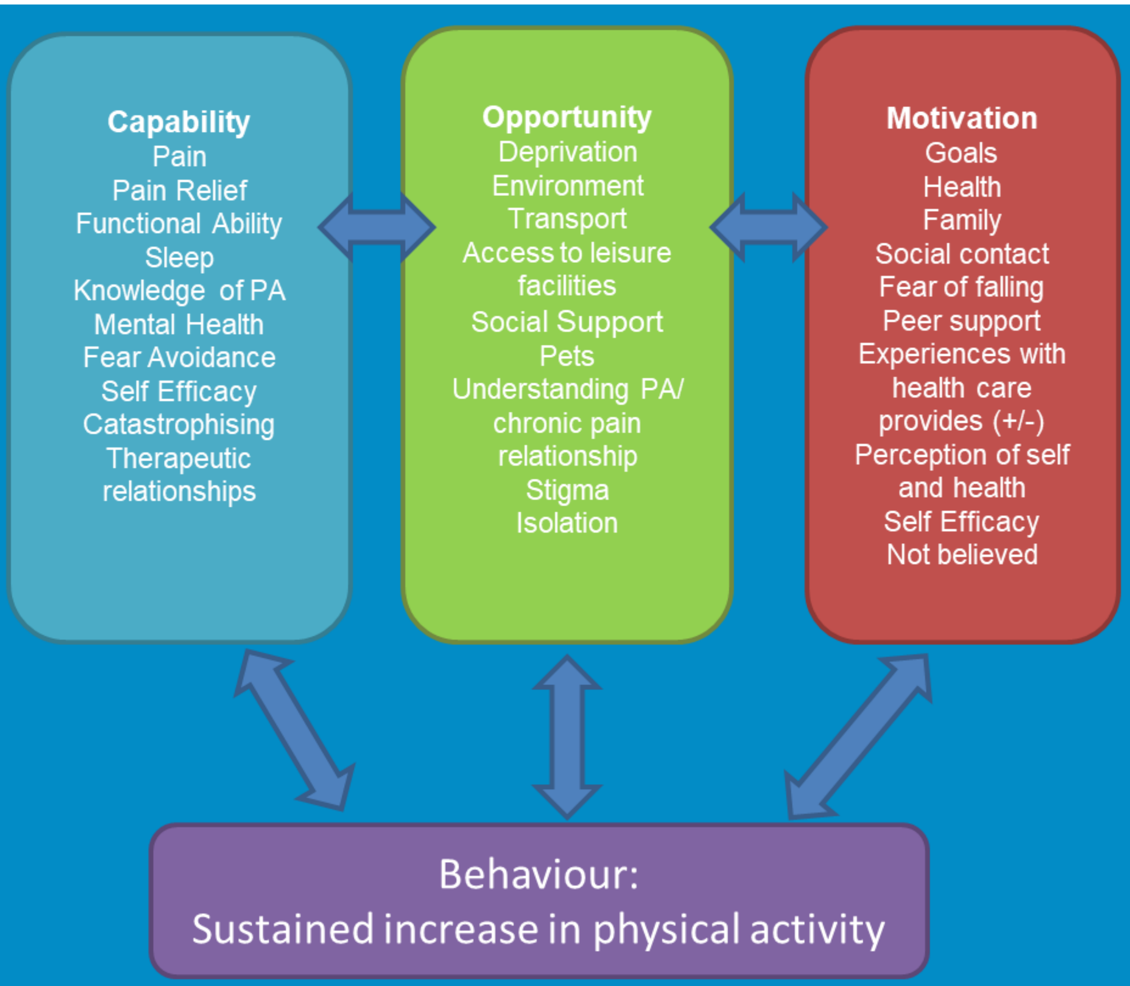


Figure 2: Proposed preliminary SUSSED framework to underpin clinical decision support tool

PPIE insights

Insights from three PPIE sessions informed the development of the SUSSED tool. Participants emphasised the need for personalised and adaptable physical activity plans, and highlighted barriers related to technology access. They recommended making the tool available in multiple formats (e.g., paper-based, online, or web-based). Participants demonstrated that it is essential to educate healthcare professionals on chronic pain management, specifically prescribing/ subsidising PA programmes to ensure the success of the intervention and improve health outcomes. Finally, participants highlighted the importance of accessible recruitment strategies, ongoing support, and clear communication to promote long-term engagement with physical activity and the SUSSED tool.

WHAT IMPACT COULD THE FINDINGS HAVE?

Chronic pain affects around 43% of people in the UK, and despite the lack of evidence for long-term effectiveness, there has been a significant increase in analgesic prescribing, including opioids, over the last two decades, leading to considerable harms. In contrast, increasing PA is a proven effective strategy for managing chronic pain, yet most individuals with chronic pain are not engaging in it. PA should be an integral part of standard care.

Our research not only enhances the understanding of factors that facilitate or hinder PA engagement but also lays the groundwork for an evidence-based, theory-driven clinical tool. The findings will inform the development of the SUSSED tool, designed to create personalised PA plans for individuals with chronic pain by systematically considering relevant personal and clinical factors.

The findings represent a key phase in the development process, with the next step being to develop, refine and test the SUSSED tool. Our current research confirms that activity monitors are acceptable and reliable measures for evaluating the effectiveness of interventions. PPIE sessions also highlighted patients' preferred tool elements and formats, as well as intervention strategies. These findings could guide us in designing personalised PA interventions by addressing disparities related to socioeconomic status, sex, age, ultimately improving access to PA resources and effective pain management.

HOW WILL THE OUTCOMES BE DISSEMINATED?

Dissemination will be supported by close collaboration with Pain Concern, Versus Arthritis, and patient partners from the NRS Pain/Scottish Pain Research Community (SPaRC). Leveraging our established networks and collaborators, we will maximise the impact of this research through traditional channels such as peer-reviewed publications and presentations at scientific conferences on local, national, and international levels. In partnership with the Green Health Partnership, we will ensure strong links with health and social care services, actively planning for future development and implementation of the findings. Accessible reports will also be created to guide healthcare providers in improving PA interventions for diverse subgroups.

CONCLUSION

Addressing chronic pain effectively requires urgent non-pharmacological solutions. Despite strong national and international guidelines advocating for increased PA to manage chronic pain, many individuals still engage in very low levels of PA. Effective pain management and social support are essential for boosting PA levels. A tailored and flexible approach to PA, considering individual barriers and facilitators, is crucial for improving PA engagement among people with chronic pain. The COM-B framework enables the development of a clinical decision support tool (i.e., the SUSSED tool) that will provide a personalised approach to enhancing PA in this population.

RESEARCH TEAM & CONTACT

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Additional Information

This project was completed on 28th February 2025 funded by the CSO.