

# Biopsychological Prediction Models of Pain Management Programme (PMP) Outcomes for Chronic Pain

## PhD studentship award report

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### **Overall project summary**

This PhD project aims to identify the factors that enable some chronic pain patients in the UK to benefit from pain management programmes (PMPs), which are the preferred intervention for patients suffering from moderate to severely disabling chronic pain. Despite their effectiveness, PMPs are expensive and resource-intensive, and show variable outcomes across patients, with some showing improvement, no change, or even deterioration. This project will focus on identifying "enabling factors" associated with positive PMP outcomes, and will conduct three studies: a systematic review and meta-analysis to assess predictors of PMP outcomes, the development of a clinical prediction model of PMP outcomes using patient data from a local NHS pain management centre, and the use of Q-methodology to identify new "enabling factors" associated with positive PMP outcomes. The project will focus on emotional functioning outcomes for the systematic review and meta-analysis, while study 2 will use existing patient-reported and physician-reported data as predictors to develop the clinical prediction model. Study 3 will use Q-methodology to identify predictors of positive PMP outcomes that may be missed in the quantitative literature, allowing for nuanced, subjective perspectives from those involved in PMPs (including patients and practitioners). Ultimately, the project aims to identify which patients are most likely to benefit from PMPs and to focus interventions on those patients or better tailor PMPs to patient needs.

### **Study 1: Systematic review and meta-analysis of pain management programme (PMP) outcomes for chronic pain**

**Summary:** This is a study on identifying biological, psychological, and social factors that can predict pain management program (PMP) outcomes for emotional functioning in chronic pain patients from existing literature. The study involves a systematic review and possibly a meta-analysis of individual studies that have identified prognostic factors for PMP outcomes. The research focuses on emotional functioning, which has not been adequately reviewed despite its importance as an outcome domain for chronic pain clinical trials.

**Progress:** The first phase of the study (completed) involved building a search and scanning titles and abstracts of 2,989 articles for eligibility. The next phase is data extraction and risk of bias assessment (commenced), followed by assessing potential publication bias. We plan to complete the data extraction by July 2023 and then proceed with the synthesis/analysis section of the review by the end of October 2023.

### **Study 2: Predicting pain management programme (PMP) outcomes for chronic pain: development and validation of multivariable prediction models**

**Summary:** This study focuses on developing statistical models to understand how patient-reported outcomes can be predicted after participation in a Pain Management Programme (PMP). The study aims to use an existing clinical database, the Walton Centre NHS Foundation Trust's 'Pain Management Registry', to develop the model, assess its overall accuracy and assess the relative contribution of specific prognostic factors. The developed prediction model could potentially help to prospectively identify patients who would benefit from PMPs or to identify where PMPs might not be meeting the needs of certain patients. The study will use regression-based analyses to model associations between pre-programme patient characteristics and patient-reported effects of the PMP as measured at post-programme follow-up. The planned statistical analysis involves mixed effects logistic regression and linear mixed effects models.

**Progress:** The timeline for the study involves completing a university ethics application and information sharing agreement by the end of June 2023, with data cleaning/processing completed before the end of 2023 and interpreting the data by February 2024. The study is expected to be written-up by around the start of summer 2024.

### **Study 3: Identify new 'enabling factors' that promote PMP engagement and long-term benefits: A Q-method investigation**

**Summary:** Study 3 will use Q-methodology to better understand why some people benefit from pain management programmes. The goal of this study is to find out what factors contribute to successful outcomes in pain management programmes, beyond what previous research has shown. These new factors would be called "enabling factors". The study will involve talking to patients, caregivers, GPs, and other staff to get their personal experiences and opinions. By doing this, we hope to capture all the important information about pain management programmes. After the interviews are finished, the researchers will use the information they gathered to create a set of statements called a "Q-set". These statements will be grouped by theme and will come from the interviews and previous research on the topic. Each statement will describe a patient characteristic that could be considered an "enabling factor". Then, another group of patients and staff will be asked to rank the statements within each Q-set according to how much they agree with them. This process is called a "Q-sort". The researchers will analyse the results of the Q-sort to find any similarities between the participants' rankings and to identify any possible consensus on the topic.

**Progress:** This study is in the planning stages. We plan to submit an NHS ethics application by the end of October 2023. Recruitment for the qualitative interviews should begin in March 2024, but it will depend on how long it takes for the application to be approved. The Q-sort stage will happen later, around August 2024, after the Q-set has been created. We plan to finish the study by the summer of 2025.

**Gantt chart indicating study plans and progress**

