Funded by:	Arthritis WA and Arthritis Australia
Recipient:	Dr Belinda Lawford
Intended Department	University of Melbourne Centre for Health, Exercise and Sports Medicine, Department of Physiotherapy
Project:	Co-designing a physical activity mobile app for lower limb osteoarthritis: JointMotion

Scientific summary:

What were the main scientific objectives of the grant?

The initial objective of this project was to co-design a physical activity mobile app for people with lower limb osteoarthritis. However, as we engaged with people with osteoarthritis and other stakeholders, it became clear that users preferred a comprehensive program that integrated both exercise and weight loss rather than separate interventions. As a result, our objective evolved to develop an integrated self-management program combining exercise and weight loss. While the long-term vision remains the development of a mobile app, we began by creating a website prototype as an initial step. Additionally, we rebranded the program from 'JointMotion' to 'KneeCare' to better reflect its expanded scope.

To achieve our objectives, the project was structured into three key phases:

1) **Consumer Survey** – Assessing the feasibility and acceptability of an online exercise and weight loss program among individuals with osteoarthritis.
2) **Qualitative Interviews** – Gathering insights from individuals who had recently completed a clinician-led exercise and weight loss program to explore the feasibility of a self-directed digital version.
3) **Co-Design Workshops** – Collaborating with people with osteoarthritis, healthcare professionals, researchers, and software developers to create the KneeCare website prototype.

What were the main scientific achievements of the grant?

Part 1 – Consumer survey

We surveyed 537 people with osteoarthritis across Australia in early 2024 to evaluate interest in a digital exercise and weight loss program. We also sought to evaluate what components and features we should consider including in such a program. Key findings include:

- 98% of respondents deemed the development of an online, free self-management program incorporating both exercise and weight loss as 'important' or 'very important.'
- 93% indicated they would use such a program if available.
- Participants suggested various features, including a chatbot, automatic reminders, and personalized content tailored to individual needs.

Part 2 – Qualitative interviews

Following the survey, we conducted interviews with 20 individuals who had completed a physiotherapist-led exercise program combined with a dietitian-led weight loss program. Findings revealed:

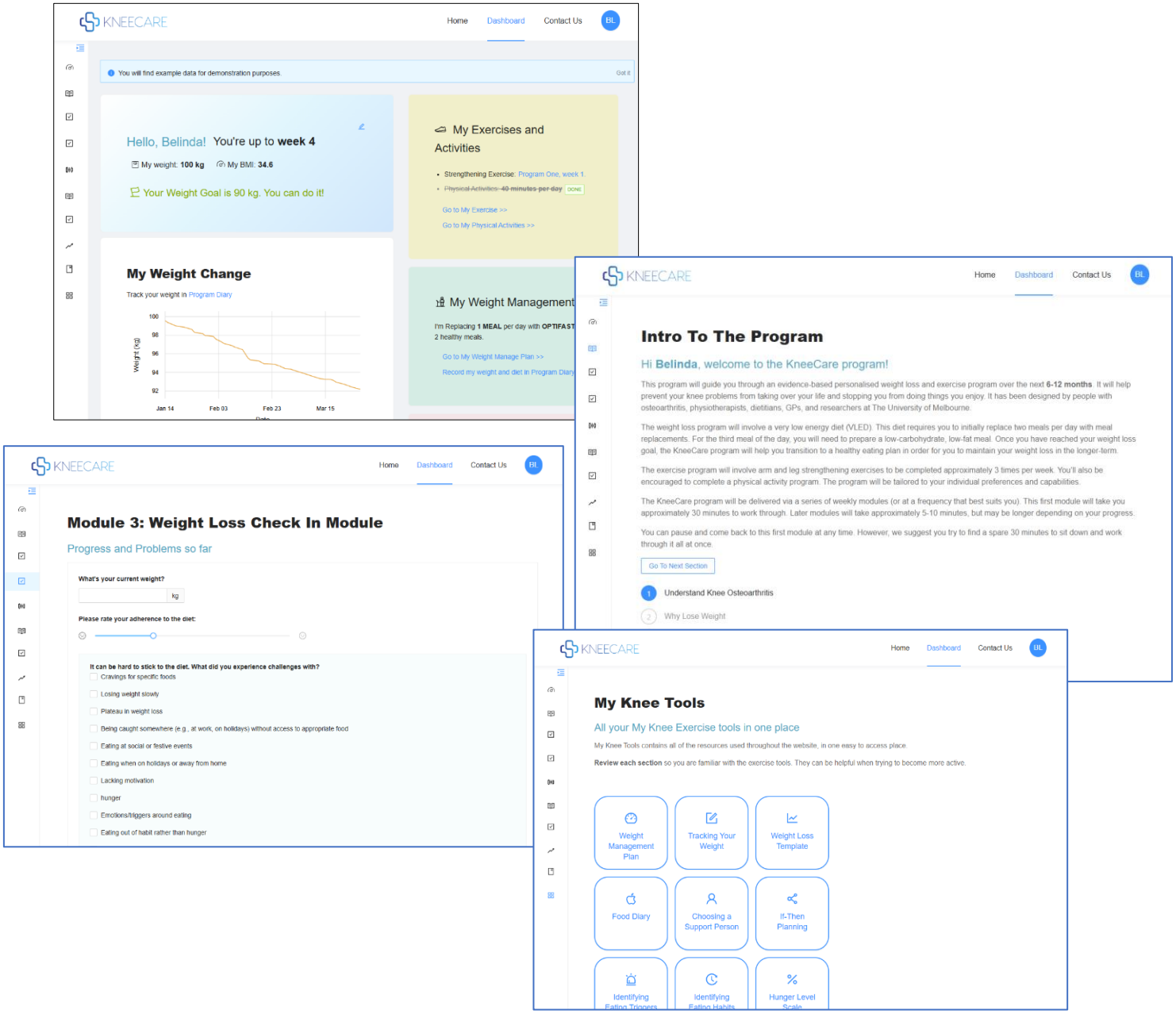
- Strong support for adapting the program into a self-directed digital format to enhance accessibility, particularly for individuals unable to afford or access healthcare professionals.
- Recognition that a self-directed program may not suit everyone, especially those who benefit from professional accountability.
- Recommendations for supportive features such as SMS/email reminders and chatbot-based guidance.

Part 3 – Co-design workshops

A multidisciplinary co-design team was assembled, including three consumers with osteoarthritis, a dietitian, a general practitioner, an endocrinologist, software engineers, researchers, and stakeholder representatives. The team engaged in three group workshops and five one-on-one interviews to guide the design and content development of the KneeCare website prototype.

The prototype is based on an effective clinician-delivered weight loss and exercise program and is structured as a series of weekly and biweekly modules. These modules provide education, personalized guidance (tailored to user-specific factors such as baseline weight, weight loss progress, functional capacity, and exercise history), and interactive features to enhance engagement. While the prototype has been developed, additional refinements are needed to enhance functionality and user experience. Applications for further funding have been submitted to support these refinements.

Screenshots of the KneeCare website prototype:



What problems, if any, did you encounter in achieving the project's objectives, and how did you address them?

Two main challenges were encountered:

- *Resource Constraints* – While a prototype has been developed, additional funding is required to complete the website's functionality and also to transition it into a mobile app. To address this, we have submitted two Medical Research Future Fund (MRFF) grant applications (with Arthritis Australia as a partner), with funding decisions expected in February 2025.
- *Balancing Innovation with Feasibility* – Some co-design suggestions required substantial resources beyond our current funding. To manage this, we implemented a 'parking lot' system, documenting ambitious ideas for future consideration should additional funding become available.

What is the plan for dissemination of findings?

We plan to publish a journal article detailing the co-design process and findings, pending the outcome of our MRFF grant applications. If funded, further development, consumer testing, and refinement will be conducted before then evaluating the effectiveness of the program in a clinical trial with nested qualitative and cost-effectiveness evaluations. The final KneeCare program will be disseminated to consumers once fully tested and validated.

Lay summary:

Overview:

This research aimed to develop an online, self-directed exercise and weight loss program called 'KneeCare' for individuals with osteoarthritis. To achieve this, we first surveyed and interviewed people across Australia to assess their interest in such a program and gather insights on how it should be structured. We then collaborated with individuals with osteoarthritis, clinicians, researchers, and other stakeholders in a series of co-design workshops to develop the KneeCare website prototype.

What problems did you try to solve, or gaps in knowledge did you try to fill?

Osteoarthritis affects one in five Australians aged 45 and over, with two-thirds also experiencing overweight or obesity. While weight loss and exercise are key treatments for osteoarthritis, access is often limited by high costs and a lack of appropriately qualified clinicians, such as dietitians and physiotherapists. To address this gap, we co-designed KneeCare - a free, online, self-directed exercise and weight loss program tailored for individuals with knee osteoarthritis and overweight/obesity. The program is based on our team's clinician-delivered intervention, which has proven effective for people with knee osteoarthritis. KneeCare has the potential to provide millions of Australians—and individuals worldwide—with free, accessible, and evidence-based treatment. Given that 86% of Australians have home internet access, this program could significantly improve accessibility and reduce healthcare costs.

What did you discover during the course of the grant?

People with osteoarthritis are highly receptive to an online self-directed exercise and weight loss program. Through consumer, clinician, and stakeholder engagement, we identified key features and preferences for KneeCare. Using this feedback, we developed the first prototype of the KneeCare website.

Have the findings of the research already benefited people with musculoskeletal disease?

Throughout the project, we actively collaborated with individuals living with osteoarthritis to ensure KneeCare aligns with their needs and preferences. Three consumers with knee osteoarthritis participated in multiple co-design workshops, directly influencing the

development of the program. Once further refined and tested, KneeCare will be made freely available for global use.

How might the findings inform further research to help sufferers in the future?

Our findings provide valuable information about the preferences and perceptions people with osteoarthritis and clinicians have about a self-directed exercise and weight loss intervention. The insights gained from this project provide valuable guidance for developing other digital interventions for arthritis and musculoskeletal conditions.

Are you planning to continue the research?

Yes. We have applied for additional funding to further refine the KneeCare program and test its effectiveness in a randomised controlled trial. If successful, we also plan to conduct cost-effectiveness and acceptability studies to optimize the program before its widespread release to individuals with osteoarthritis worldwide.