**PROTOCOL TITLE**

The MOVEMENT study: iMproving quality Of life in people with seVEre MENTal illness

SHORT TITLE

The MOVEMENT study

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**STUDY SITES**

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**ABBREVIATIONS AND DEFINITIONS OF TERMS**

AEP – Accredited Exercise Physiologist

CRF – Case report form

HHS – Hospital and Health Service

NGO – non-government organisation

PA – Physical activity

PHN – Primary Health Network

PI – Principal Investigator

QoL – Quality of life

SMI – Severe Mental Illness

# INTRODUCTION

## Background

Severe mental illnesses (SMIs), such as major depression, bipolar disorder, and psychotic disorders, are associated with long-term disadvantage and psychosocial disability. Symptoms including hallucinations and avolition in psychotic disorders, and depression and mania in affective disorders, can fluctuate in severity. People with SMI utilise health services and often require support from carers across a range of settings such as acute inpatient, intensive rehabilitation, and community support, dependent upon phase of illness and level of cognitive and functional disability[1](#_ENREF_1). Preventable cardiometabolic conditions such as diabetes have a high prevalence in people with SMI[2](#_ENREF_2), and combined with other psychosocial difficulties such as social isolation, further contribute to heightened psychological distress and lower quality of life (QoL) of this group[3](#_ENREF_3).

Physical activity and exercise is associated with higher QoL in the general population, and exercise interventions can improve QoL in people with mental illnesses[4-6](#_ENREF_4). People with SMI have low levels of PA[7](#_ENREF_7) which contribute to poor health outcomes, but if supported appropriately, adherence to exercise interventions for this group is comparable with the general population (~70% completion rates)[8](#_ENREF_8). Meta-analyses indicate that exercise interventions can also reduce the positive and negative symptoms of psychosis and improve functioning and metabolic health in people with SMI[4](#_ENREF_4),[9](#_ENREF_9),[10](#_ENREF_10). Exercise is an evidence-based therapy for improving health outcomes in people with a range of mental illnesses, and internationally adopted best-practice guidelines such as the *Early intervention framework for patients on psychotropic medication* recommend lifestyle support for people with metabolic risks including low physical activity[11](#_ENREF_11).

Accredited Exercise Physiologists (AEPs) specialise in rehabilitative exercise therapy and professional consensus statements advocate for their role in mental health services[12-14](#_ENREF_12). Pioneering examples of service models incorporating AEPs within mental healthcare currently exist within Australia. The Keeping the Body in Mind program has operated since 2016 and evidenced improved health outcomes for young people and adults with psychotic disorders[10](#_ENREF_10),[15](#_ENREF_15). Studies have demonstrated feasibility of exercise physiology services and promising outcomes for people with SMI[16-21](#_ENREF_16); however, evidence on the effectiveness and cost-effectiveness of exercise services integrated into routine mental healthcare is limited.

Recommendations from the recent *Queensland Parliamentary Inquiry into Mental Health* include embedding AEPs into the mental health workforce (recommendation 51)[22](#_ENREF_22); however, without evidence on implementation effectiveness, there is a risk that these recommendations will not be adopted by services. Recently, a state-wide consultation conducted by the Queensland Department of Health *Improving the physical health and wellbeing of consumers of mental health and alcohol and other drug services* (2021)[23](#_ENREF_23) recommended intersectoral partnership approaches (e.g. with Primary Health Networks and non-government organisations) to improve continuity for addressing lifestyle factors in people with SMI. Further, the national *Being Equally Well* Roadmap (2021) advocates for implementation effectiveness evidence in physical activity interventions for people with SMI as a priority area for research (element 7)[24](#_ENREF_24). This study, therefore, addresses an important research evidence gap for informing policy and practice.

## Methodology

A quasi-experimental design will be used for this project. Similar to randomised controlled trials, quasi-experimental designs may include control and intervention groups, with the key difference being the non-random allocation of participants into treatment groups[25](#_ENREF_25). While randomised designs provide methodological benefits for by reducing the potential for bias, quasi-experimental designs are useful for conducting implementation studies, particularly when the random allocation to treatment conditions may be unethical [26](#_ENREF_26), as is the case in the current study. By allowing participants to choose their involvement in the intervention, the external validity of the design is improved because the process more closely parallels routine care where patients are provided information about the risks and benefits of a particular intervention, and asked if they would like to be involved[27](#_ENREF_27). In addition, a unique opportunity from with quasi-experimental designs, is that between-groups data can be used to characterise participants who decline the intervention, which is critical for identifying whether an intervention is perceived as acceptable by sub-groups within the population group of interest (in this study, adults with a diagnosed SMI)[28](#_ENREF_28).

# DESIGN

This is a quasi-experimental effectiveness trial of implementing an AEP service within mental healthcare across public mental health services and non-government organisations.

Participants will be recruited into a 6-month cohort study (Part 1), within which they will be offered involvement in the AEP service (Part 2). Participants will be informed about the AEP service option at the time of recruitment, and that participation in Part 1 does not require participation in Part 2. All participants will be asked to complete the same research assessment schedule regardless of their decision to participate in the exercise intervention. Data from participants who consent to the AEP service will be compared with those who decline.

# AIMS

The ***primary aim*** of this study is to evaluate the effectiveness of the AEP service for improving QoL in people with SMI. To do so, we will compare outcomes between participants who consent to the AEP service with those who decline. The ***secondary aim*** is to assess the cost-effectiveness of the AEP service. ***Tertiary aims*** are to evaluate the implementation process and experiences of participants who consent to the AEP service.

# METHOD

This is a 4-year study funded by a Medical Research Futures Fund (MRFF) grant ($590,000), and the Brisbane North Primary Health Network (BNPHN: $160,000).

This project was developed with the support and input of a broad collaboration of service providers and mental health sector leaders. Partner organisations include NGOs: Communify Queensland, Stride, Neami National, Richmond Fellowship Queensland; public hospital and health services (HHSs): Metro South Addictions and Mental Health Service, Metro North Mental Health Service; Primary Health Networks (PHNs): Brisbane North and Brisbane South; and Psychosis Australia, a national advocacy body in the mental health and research sector. These organisations provided letters of support for the MRFF grant application, are named on the multi-institutional agreement, and will support recruitment and contribute to the study’s Steering Committee.

The study will be conducted over four years, with recruitment, intervention delivery and data collection occurring over two years from January 2025 to December 2026 across sites within both Metro North and Metro South catchment regions.

## Recruitment

***Eligibility criteria***

Individuals will be eligible if they are: (i) a current consumer of mental health services for people with SMI (i.e., International Classification of Diseases (ICD)-10 diagnoses, which may include: F20: Schizophrenia, F21: Schizotypal disorder, F22: Delusional disorders, F23: Brief psychotic disorder, F24: Shared psychotic disorder, F25: Schizoaffective disorders, F28: Other psychotic disorder not due to a substance or known physiological condition, F29: Unspecified psychosis not due to a substance or known physiological condition, F30: Manic episode, F31: Bipolar disorder, F32: Depressive episode, F33: Major depressive disorder, recurrent, F60: Specific personality disorders, F61: Mixed and other personality disorders) provided by partnering organisations, (ii) aged 18-65 years, (iii) sufficiently fluent in English to complete consent and study procedures, and (iv) willing to provide consent to study participation. Note: eligibility criterion (i) is related to the service type to improve generalisability of the findings to services; diagnostic criteria will not be used to assess eligibility of individuals. Individuals identified as having compromised capacity to consent as determined by treating clinicians will be excluded from study invitation.

Eligibility criteria are kept broad to improve representativeness of participants. Participants who agree to be involved with the AEP service will undergo medical screening, and clearance from a general practitioner may be required if risk factors are identified. If contraindications are identified according to the American College of Sports Medicine absolute contraindications to exercise (9th edition, page 53), they will be unable to participate in the exercise program for safety reasons.

***Promotion***

The study will be promoted across team meetings using a study flyer (Attachment). Staff will be asked to facilitate a meeting between potentially eligible consumers and the researchers for study invitation, or to refer potentially interested individuals using an online form (hosted by Qualtrics managed by Griffith University: Attachment), including name, contact details, diagnosis and any additional information relevant for the researchers (e.g. risks). Qualtrics software, as managed by Griffith, is run using password protected individual accounts, with two-factor authentication for access. Data collection will occur using REDCap software, enabling separate storage of referral information from the experimental trial data.

***Recruitment and Consent***

Potentially eligible individuals will be given a full explanation in lay terms, with a friend or family member present if desired, of the study aims, the discomfort, risks and benefits in taking part and a copy of the Participant Information Sheet Consent Form to review (Attachment).

Participants will be invited to a study about the influences on recovery and quality of life. The researchers will explain that the aim of the study is to evaluate which psychosocial and lifestyle influences may improve recovery and quality of life, and whether participation in exercise can improve these outcomes.

They will be informed that study participation requires them to complete assessments at three timepoints, each three-months apart, and they will be offered a $50 gift card to recompense their involvement at the completion of each assessmentsession. This is a single study design, where all participants will complete each assessment session. Participants will then be informed that they can access an optional exercise program as part of their involvement in the study, and data collected as part of the exercise program will be used in analyses. Involvement in the exercise program does not alter the assessment schedule. It will be explained to participants that they can withdraw from the study at any time without prejudice and will not affect their current care. The participant will have the opportunity to ask questions. A telephone number will be provided so that participant can call a research representative who will be able to respond to any questions they may have. Participants who agree may elect to complete the consent and baseline assessment after their usual care meeting at the organisation or service. Alternatively, their contact information will be recorded for follow-up at a later date.

***Participant flow***

After completing the baseline assessments, participants will be asked if they would like to participate in the AEP service. If they agree, the researcher will arrange a time for them to meet the AEP at the exercise venue for a medical screening questionnaire and induction to the facility. The anticipated flow of participant recruitment is shown below.

Not consented

(n=20)

Assessed for eligibility (n=250)

Consented to AEP Intervention

(n=100)

Declined AEP Intervention

(n=100)

T2 (n=75)

Consent to Participate (n=200)

T1: Baseline measures (n=200)

T3 (n=57)

Analysed

(n=75)

T2 (n=75)

T3 (n=57)

Analysed

(n=75)

**Figure 1:** Participant flow diagram

Anticipated recruitment for a sample size of n=75 in each condition. Assumptions: ~75% of people invited will consent; 50% of sample will consent to the exercise program; 25% dropout at each assessment point)

Ineligible

(n=30)

## AEP service structure

The exercise service will involve an AEP working with participants according to their scope of practice[29](#_ENREF_29). After initial screening and assessment, participants will be offered up to four individual sessions at the gym to improve their confidence and familiarity with the facility. Participants will then be asked to complete at least one 60-minute group-based exercise session/week. Group sessions will be conducted at a publicly accessible community gym in groups of up to 10 participants. Group sessions will be closed to research participants only, and the AEP will engage participants in individual goal setting about completing exercise outside supervised sessions. Individual goal setting and exercise prescriptions will be tailored to individual preferences and abilities, and include a variety of aerobic and resistance exercises, and physically active recreation (e.g., sports, active groups). The program will be delivered in 8-week blocks separated by interim assessments; participants will be offered involvement in the service for two program blocks (total 6 months). Participants will be sent weekly text message reminders about the group session times, with phone follow-up if sessions are missed without notification. There will be no restrictions on participating in other therapies or programs outside the intervention. Participants will have access to the service for up to six months, corresponding with the assessment schedule.

## Assessment procedure

### All participants

The outcome measures for all participants will include self-report questionnaires and physical measures (anthropometric: e.g., height, weight, waist circumference; physiological: blood pressure, and finger-prick blood tests to assess fasting LDL and HDL cholesterol, triglyceride, and glucose).

The questionnaires can be completed online in the participant’s own time – if they agree to this, the participant will be emailed and text-messaged a link to the questionnaires. If the participant would like support to complete the questionnaires, the researcher will arrange a time to complete the questionnaires and physical measures with the participant in person. If the participant wants to complete the assessments in person, the researchers will arrange to meet participants at a venue convenient for them, which will be either the mental health service or organisation where they usually receive their care, or the participants residence. Standard procedures will be followed to ensure researcher safety for in-person assessments, including logging the venue that they will be visiting, and liaising with clinicians involved with their care to ascertain any risks. Information about the assessments is provided in Table 1 below, and the questionnaires are provided in Attachment.

***Table 1: Questionnaire assessments***

|  |  |
| --- | --- |
| *Health and demographic information* | |
| Quality of life (ReQoL) | The ReQol consists of 10 items about mental health and recovery concepts related to quality of life, and one additional item about physical health[30](#_ENREF_30). A utility index can be calculated from seven items covering recovery themes of autonomy, wellbeing, hope, activity, belonging and relationships, self-perception, and physical health, with scores ranging from −0.195 to 1[31](#_ENREF_31). | |
| Quality of life (EQ-5D-5L) | The EQ-5D-5L has a strong focus on physical components of quality of life and will be used to supplement the ReQoL. Five items corresponding with dimensions of mobility, self-care, usual activities, pain/discomfort, and anxiety/depression; participants respond by selecting on of five levels in each dimension. This instrument has been validated in diverse population groups, has strong correlations with measures of physical functioning and pain or discomfort, and has been shown to be moderately responsive to improvements in health[32](#_ENREF_32). | |
| Resource use | Health professional visits, diagnostic tests, medications, hospitalisations, social service supports (including NDIS), and broader engagement in community recreation groups. |
| Metabolic health | Metabolic risks (waist circumference, triglycerides, high-density lipoprotein (HDL) cholesterol, systolic blood pressure, fasting glucose) will be measured, and metabolic syndrome severity Z-score (MetS-Z) calculated[33](#_ENREF_33). A point-of-care Cholestech LDX will be used to measure fasting blood indicators using a finger-prick blood test. |
| Demographic information | Age, sex, gender, education, living situation, income, employment status, co-occurring health conditions and medications will be assessed using questions informed by the Survey of High Impact Psychosis study[34](#_ENREF_34). |
| *Other psychosocial factors* | |
| Kessler-6 scale of psychological distress (K6) | The K6 consists of six items to assess general psychological distress experienced in the past month using a 5-point scale; the K6 has high internal consistency and reliability (Cronbach’s α=0.89)[35](#_ENREF_35). |
| General self-efficacy (GSE-6) | The GSE-6 assesses generalised self-efficacy using six items rated on a 4-point scale from ‘not at all true’ to ‘exactly true’ [36](#_ENREF_36). |
| Health literacy (HL-EUQ-6) |  |
| Sense of belonging instrument – psychological (SOBI-P) | The SOBI-P consists of eight items that correspond with the fitting-in and self-awareness subscales (FIS and SAS respectively) of the psychological sense of belonging[37](#_ENREF_37); scoring is on a 4-point scale[38](#_ENREF_38). |
| Social connection | Social support from (i) family members (ii) friends and (iii) support workers will be assessed using questions from a previous questionnaire[39](#_ENREF_39). The questionnaire asks about the number of connections and frequency of contact to estimate social network, and how many family members and friends they could ‘rely on if you need help’ and ‘confide in if something is troubling you’, corresponding with instrumental social support and emotional social support. |
| Alcohol intake (AUDIT-C) | The AUDIT-C consists of three items to assess frequency and volume of alcohol consumption, and frequency of high alcohol consumption. The hazardous drinking threshold has a sensitivity of 0.81 and specificity of 0.76 for a sample of people with mood disorder[42](#_ENREF_42). |
| Nutritional intake ( | Nutritional intake will be assessed using the Rapid |
| The International Physical Activity Questionnaire (IPAQ-SF) | The IPAQ-SF consists of seven items to assess weekly frequency and average daily duration of activity and sedentary behaviour in the previous seven days[46](#_ENREF_46). The IPAQ has a test-retest reliability of 0.68 and validity coefficient of 0.37 when compared with accelerometer-derived estimates of MVPA for people with schizophrenia[47](#_ENREF_47). |
| Mini-Sleep Questionnaire (MSQ) | The MSQ consists of 10 items to assess sleep quality and daytime sleepiness. Responses are on a frequency scale of 1–7; the total sum score estimates sleep–wake quality, with scores over 30 representing severe sleep-wake difficulties[48](#_ENREF_48). |

*Physical assessments*

*Anthropometric*: Weight will be measured to the nearest 0.01 kg using electronic scales (M301 digital physician scales), height will be measured to the nearest 0.1 cm using a stadiometer, and waist was measured to the nearest 0.1 cm using a circumference measuring tape that applies a constant tension (Seca 201).

*Physiological*: Blood pressure will be measured using an automatic sphygmomanometer (Omron HEM7322). Blood indicators will be measured after an 8-hr fast using a portable Cholestech LDX, which measures glucose, LDL and HDL cholesterol, triglyceride concentrations from a finger-prick sample.

*Qualitative*

Participants will be invited to qualitative interviews and focus groups to evaluate their experiences of the program. To ensure that a range of views are represented, participants from three different experience groups will be invited to interviews; those who: (1) declined the exercise service; (2) accepted but did not continue; and (3) had high attendance to the sessions. Group 1 will explore what participants perceive as being important for their mental health and recovery, and reasons for declining the exercise program. Group 2 will explore reasons for discontinuation, and how barriers could be addressed or how the program could be adapted to be more acceptable. Group 3 will explore enablers to attendance, and the perceived benefits of participation. The Behaviour Change Wheel and COM-B framework will inform evaluation of participant experiences[49](#_ENREF_49). A framework approach will be employed for qualitative analysis which provides a structure for coding and categorising data.[50](#_ENREF_50) Both deductive and inductive logic will be used to reduce and synthesise data and develop responses to questions regarding acceptability, experience and mechanisms of action.

### Participants who consent to the AEP service

Participants who consent to the AEP service will complete a medical screening questionnaire with the AEP (Attachment), on commencement of the study only. They will also be asked to complete the 30-s sit-to-stand test at each assessment point for a submaximal measure of physical functioning. Participant ‘exposure’ to the intervention will be assessed by recording attendance to each exercise session, as well as the rate of perceived exertion (RPE), any adverse events at *each session*, and exercises completed.

# DATA MANAGEMENT AND ANALYSES

All consent processes and research data will be collected using REDCap managed by Griffith University. Upon conclusion of data collection processes, Dr Justin Chapman and Dr Meg Doohan will de-identify the data, and only deidentified electronic datasheets (e.g. SPSS database file) will be made available to investigators for analysis. Upon conclusion of the study, electronic data will be deidentified by allocating a unique code in sequential order and kept for 15 years.

The consent form in the PICF asks participants to identify whether they wish to be contacted for involvement in future ethically approved studies. Participants who select this option will have identifying information stored in a folder separate from the data collection materials in REDCap, accessible only to Drs Justin Chapman and Meg Doohan.

A de-identified copy of the data may be published in an open access repository. This allows other researchers to access and use the data to advance understanding in this field. All data will be anonymized or de-identified before being published. This means that all potentially identifying information will be removed so it will not be possible to identify who provided the data.

## Analyses

*Primary aim*

To address the primary aim, linear mixed-effects models for repeated measures (measurements nested within individuals) to compare outcomes between participants who access the exercise service with those who decline. The first-order autoregressive covariance structure will be used to account for the decreasing correlation of measurements over time. We will adjust for potential confounders, such as changes to medications, other treatments (e.g., Allied Health), psychosocial factors, and self-reported lifestyle behaviours, as well as for baseline health status. The five sites will be included as dummy variables and fitted as fixed effects. Analysis will be conducted on the intention-to-treat basis (ITT); missing data will be handled using multiple imputation. Potential recruitment bias will be assessed by comparing participant characteristics with a random sample of de-identified routine care data from the whole service cohort.

*Secondary aim*

All relevant costs and patient health outcomes will be compared in a comprehensive cost-effectiveness analysis using both health sector and partial societal perspectives. Resource use data will inform the analysis of incremental costs between intervention and comparison groups. Incremental health utility scores between groups will be analysed using linear mixed models. Quality-adjusted life years (QALYs) will, in turn, be estimated using area-under-the-curve methods. The ‘incremental cost per QALY gain’ ratio will be estimated by dividing the difference in mean costs between participants who accept the exercise service vs those who decline against the corresponding difference in mean outcomes. Uncertainty and sensitivity analyses will be conducted to evaluate the impact of parameter uncertainty around the cost-effectiveness findings.

*Tertiary aims*

Recruitment and participation rates and the resourcing required to conduct the study will be examined. The Consolidated Framework for Implementation Research will inform evaluation of the implementation process[51](#_ENREF_51), and the Behaviour Change Wheel and COM-B framework will inform the evaluation of the implementation and participant experiences[49](#_ENREF_49). To ensure that a range of views are represented, participants from three different experience groups (those who: (i) declined the exercise service; (ii) accepted but did not continue; and (iii) had high attendance to the sessions) will be invited to interviews. A framework approach will be employed for qualitative analysis which provides a structure for coding and categorising data.[50](#_ENREF_50) Both deductive and inductive logic will be used to reduce and synthesise data and develop responses to questions regarding acceptability, experience, and mechanisms of action.

## Sample size

Previous research has estimated mean baseline ReQoL scores of 21.99 (SD=10.26) for a sample of people with mental health difficulties, and that a change of five points or more on the ReQoL is reliable for detecting clinical changes[29](#_ENREF_29). Using Power Analysis and Sample Size software (PASS) 2020 for a repeated measures design with a first-order autoregressive covariance structure, we estimate that 75 participants would be required in each condition to provide at least 90% power to detect a clinically significant increase of five points on the ReQoL questionnaire, assuming a correlation between three time points of 0.6 and a statistical significance level set at 5%. Acounting for dropout, we will aim to recruit a total of 200 participants over two-years.

# ADVERSE EVENT MONITORING

## Definition of an Adverse Event (AE)

An AE can be any unfavourable and unintended sign (including an abnormal laboratory finding), symptom, or disease (new or exacerbated) temporally associated with the use of a medicinal product, whether or not considered related to the medicinal product. For marketed medicinal products, this also includes failure to produce benefits (i.e. lack of efficacy), abuse or misuse.

In this study, AEs may include pre- or post-intervention events that occur as a result of protocol-mandated procedures (i.e. invasive procedures, exercise induced injury or complaint).

## Definition of a Serious Adverse Event (SAE)

A serious adverse event is any untoward medical occurrence that, at any dose:

a) results in death

b) is life threatening

c) requires hospitalisation or prolongation of an existing hospitalisation.

d) results in disability/incapacity, or

f) Any event deemed by the investigator as being a significant medical event.

## Monitoring and reporting

Data on adverse events will be recorded and reported, including any new injuries, exacerbations of pre-existing conditions, participant withdrawal and reasons and adverse events judged to be as a direct result of the intervention will be specifically recorded in the case report form. We will examine adverse events at each exercise session and each assessment point. All adverse events reported between consent and final visit will be recorded in the Adverse Event Log (Attachment) and stored in the participant’s case report form (CRF). The investigator or AEP will ask the participant non-leading questions in an effort to detect adverse events e.g. “How have you been over since the last session”. The AEP will be provided mental health first aid training prior to any data collection, as well as being provided mentorship from the broader research team who have expertise in mental health. The PI will be notified immediately if there are any adverse events, and the research team will notify the HREC immediately.

The investigator is responsible for the detection and documentation of events meeting the criteria and definition of an adverse event (AE) or a serious adverse event (SAE) as provided in this protocol. All adverse events will be recorded between the time of consent and the follow-up visits. Each Participant will be monitored regularly by the investigator and study personnel for adverse events occurring throughout the study. The research team will enquire about AEs by asking the following non-leading questions:

At the beginning and post intervention participants will be asked:

*“How are you feeling?” Does your current intervention cause you regular side effects? Do you have any general health conditions that cause you problems on a regular basis (e.g. that we might expect to occur over the duration of this study?"*

At subsequent scheduled visits, participants will be asked:

*“Since your last visit, have you had any health problems?”*

The investigator or site staff will be responsible for detecting AEs and SAEs, as detailed in this section of the protocol.

### Assessment of Intensity

The investigator will make an assessment of intensity for each AE and SAE reported during the study. The assessment will be based on the investigator’s clinical judgement. The intensity of each AE and SAE recorded in the CRF should be assigned to one of the following categories:

*Mild*: An event that is easily tolerated by the Participant, causing minimal discomfort and not interfering with everyday activities.

*Moderate*: An event that is sufficiently discomforting to interfere with normal everyday activities.

*Severe*: An event which is incapacitating and prevents normal everyday activities.

An AE that is assessed as severe should not be confused with an SAE. Severity is a category utilised for rating the intensity of an event; and both AEs and SAEs can be assessed as severe.

### Assessment of Causality

The investigator is obligated to assess the relationship between the intervention and the occurrence of each AE/SAE. Alternative causes, such as natural history of the underlying diseases, concomitant therapy, other risk factors, and the temporal relationship of the event to the intervention will be considered and investigated. The following classifications will be used:

*Not Related* In the Investigator’s opinion, there is not a causal relationship between the study intervention and the adverse event.

*Unlikely* The temporal association between the adverse event and study intervention is such that the study intervention is not likely to have any reasonable association with the adverse event.

*Possible* The adverse event could have been caused by the study Participant’s clinical state or the study intervention.

*Probable* The adverse event follows a reasonable temporal sequence from the time of study intervention, abates upon discontinuation of the study intervention and cannot be reasonably explained by the known characteristics of the study Participant’s clinical state.

*Definitely* The adverse event follows a reasonable temporal sequence from the time of study intervention or reappears when study intervention is reintroduced.

## Follow-up of AEs and SAEs

All AEs and SAEs documented at a previous visit/contact and are designated as ongoing, will be reviewed at subsequent visits/contacts.

All AEs and SAEs will be followed until resolution, until the condition stabilises, until the event is otherwise explained, or until the Participant is lost to follow-up. Once resolved, the appropriate AE/SAE CRF page(s) will be updated.

## Participant Withdrawal by the Investigator

Worsening of mental state such that the patient is admitted to hospital or their ability to provide ongoing informed consent is compromised or physical injury preventing the participant from continuing in the clinical trial.

## Risk Management Process

The Risk Identification, Evaluation and Management plan for this study is presented in the MSH Risk Management Template (Attachment). It will ensure that risk and uncertainty are appropriately managed for the duration of the study. The risk management process is in accordance with the NHMRC National Statement on Ethical Conduct in Research Involving Humans (2023).

# CASE REPORT FORM

# A Case Report Form (CRF) will be completed for each study participant summarising all clinical screening and study data that will be used by the research team for analysis. The completed CRF’s will be retained by the Investigators for a period of at least 15 years or the maximum time frame as determined by local regulations, whichever is the longest.

# ETHICAL CONSIDERATIONS

## Research merit and integrity

**Capacity to consent**: Participants will be community-dwelling adult non-acute outpatient clients of partnering mental health services and organisations. Although some participants may be under community treatment orders, these are not inpatients, and their mental illnesses are being managed sufficiently to be living independently in the community. The researchers will assess ability to understand the study requirements by asking the potential participants to explain the purpose and process of the study in their own words, and what they are being asked to do before being formally invited to participate and signing a written informed consent form. The researchers have experience working with this patient group in community and research settings. Mental health clinicians not involved with the study will make first contact with clients about the study. Clinicians will only refer clients who express interest in participating after they have had due time to consider participation. Participants can withdraw at any time without consequence.

**Minimising discomfort/distress**: The questionnaire assessments are expected to take 60 minutes to complete. The questionnaires ask about generalised QoL, psychological distress, loneliness, and other psychosocial and lifestyle factors; however, they are not diagnostic tools or designed to assess clinical symptoms. If participants experience discomfort while completing the questionnaires, they can take a break from the assessments. If they experience distress (e.g. when answering questions about depression), the researcher will offer to speak with a staff member about providing additional debriefing and support about the experience.

People who are not accustomed to exercise may perceive greater exertion during moderate exercise and be more at risk of injury. To mitigate this, we have incorporated a medical screening process prior to participation, and the AEP will be accredited with Exercise and Sports Science Australia, which allows them to individually prescribe exercises for people with complex conditions. The exercise sessions will be individualised for safety. Participants will be informed to begin exercise slowly to allow time for the body to condition.

People with mental illnesses can have sensitivities, such as anxiety about participating in groups, catching public transport, attending new venues etc. The AEP will complete mental health awareness training before beginning the study, and the researchers have extensive experience working with this patient group in research and community settings. Researchers cannot provide transport; however, they will assist participants by meeting them at a convenient location for assessment sessions (e.g. their residence, or a neutral location such as library or café) and helping them plan their transport route to the venue.

**Research quality/integrity**: Participants can elect to participate in the AEP service in this quasi-experimental design. This process may allow a more representative sample to be recruited because study participation is not contingent on participating in the AEP service (which may introduce recruitment bias). This may also improve external validity, because giving participants the choice to be involved with an exercise program is more reflective of clinical practice than random allocation. However, the two sub-groups identified within the participant sample (i.e. those who agree or decline to participate in the AEP service) may differ on important characteristics which introduce bias. The lack of random allocation reduces the internal integrity of the design. The control group may therefore be different from the intervention group on important factors, such as cognitive or physical functioning, or motivation for exercise. We will consider this in the results and interpretation by acknowledging the limitations of this design and conducting explorative analyses with different segments of the intervention group, e.g., estimating the cost that would be justified to invest into helping participants who discontinued the intervention to remain involved.

## Justice

**Entitlement to participate in research**: Recruitment methods for this study have been included in respect of patient autonomy. Participants will be community-dwelling adults who are clients of non-acute mental health services. Participants may have a combination of depression, anxiety, stress related disorders, bipolar disorder, schizophrenia, psychosis or drug or alcohol dependencies. Participants will be independently living members of the community whose illnesses are not likely to affect their capacity to provide informed consent. However, a staff member involved with the care of consumers will decide whether to ask the consumer for their assent for the researcher to discuss the study with them based on their clinical opinion of capacity to consent.

## Beneficence

**Risks and benefits**: Adults with SMI have low levels of physical activity which contributes to poor health outcomes. They may also face many barriers to becoming physically active, such as low motivation, low physical conditioning, and illness symptoms. This highlights the importance of this trial, which aims to determine the effectiveness of an exercise service for this group. From our previous experience, adults with mental illness value the opportunity to engage in physical activity research; participation in the study is voluntary and participants can withdraw anytime without consequence. Risk of injury will be managed by a medical screen, individualising exercises, and adequate supervision by a tertiary qualified exercise professional. Risk of adverse mental health event (e.g. panic attack) will be managed by appropriate discussion about sensitivities prior to beginning the group program.

Participants will be asked to complete physiological measures, including blood pressure and a finger-prick blood test that can be conducted with portable equipment. This is similar to a blood glucose test that people with diabetes may self-administer using over-the-counter equipment purchased from the chemist. The researchers will be trained in appropriate and safe use of the equipment and will have Hepatitis C vaccination which is a requirement for working conducting tests, and participants will be asked to do the finger-prick themselves. The blood test will need to be fasted, so the test will be arranged for early in the morning and at a venue comfortable for the participant such as their residence or the mental health organisation.

Participants receive $50 gift card compensation for completing the research measures. This amount is not considered large enough to influence participation. This amount is also consistent with consumer remuneration in co-design or contribution to committees as endorsed by the Queensland Mental Health Commission and other government departments.

## Respect

**Respect of participant autonomy**: Written informed consent will be sought directly from participants. Researchers will explain the study, ask participants to repeat the requirements, and answer any questions they may have. Clinical staff will not refer clients who are experiencing acute episodic symptoms such that their capacity to consent is compromised. The researchers will informally assess ability to consent by asking participants to repeat the study requirement to confirm understanding. Participants can decline or withdraw at any time without consequence.

# References

1. Morgan V, McGrath J, Jablensky A, et al. Psychosis prevalence and physical, metabolic and cognitive co-morbidity: data from the second Australian national survey of psychosis. *Psychol Med.* 2014;44(10):2163-2176.

2. Firth J, Siddiqi N, Koyanagi A, et al. The Lancet Psychiatry Commission: a blueprint for protecting physical health in people with mental illness. *Lancet Psychiatry.* 2019;6(8):675-712.

3. Barnes AL, Murphy ME, Fowler CA, Rempfer MV. Health-related quality of life and overall life satisfaction in people with serious mental illness. *Schizophrenia research and treatment.* 2012;2012.

4. Firth J, Stubbs B, Rosenbaum S, et al. Aerobic exercise improves cognitive functioning in people with schizophrenia: a systematic review and meta-analysis. *Schizophr Bull.* 2017;43(3):546-556.

5. Rosenbaum S, Tiedemann A, Sherrington C, Curtis J, Ward PB. Physical activity interventions for people with mental illness: a systematic review and meta-analysis. *J Clin Psychiatr.* 2014;75.

6. Firth J, Solmi M, Wootton RE, et al. A meta‐review of “lifestyle psychiatry”: the role of exercise, smoking, diet and sleep in the prevention and treatment of mental disorders. *World Psychiatry.* 2020;19(3):360-380.

7. Stubbs B, Firth J, Berry A, et al. How much physical activity do people with schizophrenia engage in? A systematic review, comparative meta-analysis and meta-regression. *Schizophr Res.* 2016;176(2-3):431-440.

8. Vancampfort D, Rosenbaum S, Schuch FB, Ward PB, Probst M, Stubbs B. Prevalence and predictors of treatment dropout from physical activity interventions in schizophrenia: a meta-analysis. *Gen Hosp Psychiatry.* 2016;39:15-23.

9. Korman N, Stanton R, Vecchio A, et al. The effect of exercise on global, social, daily living and occupational functioning in people living with schizophrenia: A systematic review and meta-analysis. *Schizophr Res.* 2023;256:98-111.

10. Samaras K, Shiers D, Chen R, Holt RI, Curtis J. Keeping the Body in Mind: Scientific Effort in Advocating the Best Outcomes for People Living With Severe Mental Illness. *Front Endocrinol.* 2021;12:831933.

11. Curtis J, Newall HD, Samaras K. The heart of the matter: cardiometabolic care in youth with psychosis. *Early Interv Psychiatry.* 2012;6(3):347-353.

12. Fibbins H, Lederman O, Morell R, Furzer B, Wright K, Stanton R. Incorporating exercise professionals in mental health settings: An Australian perspective. *Journal of Clinical Exercise Physiology.* 2019;8(1):21-25.

13. Lederman O, Grainger K, Stanton R, et al. Consensus statement on the role of Accredited Exercise Physiologists within the treatment of mental disorders: a guide for mental health professionals. *Australas Psychiatry.* 2016;24(4):347-351.

14. Morgan AJ, Parker AG, Alvarez-Jimenez M, Jorm AF. Exercise and mental health: an exercise and sports science Australia commissioned review. *Journal of Exercise Physiology Online.* 2013;16(4).

15. Curtis J, Watkins A, Teasdale S, et al. 2-year follow-up: Still keeping the body in mind. *Aust N Z J Psychiatry.* 2018;52(6):602-603.

16. Seymour J, Pratt G, Patterson S, et al. Changes in self-determined motivation for exercise in people with mental illness participating in a community-based exercise service in Australia. *Health Soc Care Community.* 2021.

17. Korman N, Fox H, Skinner T, et al. Feasibility and Acceptability of a Student-Led Lifestyle (Diet and Exercise) Intervention Within a Residential Rehabilitation Setting for People With Severe Mental Illness, GO HEART (Group Occupation, Health, Exercise And Rehabilitation Treatment). *Front Psychiatry.* 2020;11:319.

18. Furzer BJ, Wright KE, Edoo A, Maiorana A. Move your mind: embedding accredited exercise physiology services within a hospital-based mental health service. *Australas Psychiatry.* 2021;29(1):52-56.

19. Fibbins H, Edwards L, Morell R, Lederman O, Ward P, Curtis J. Implementing an exercise physiology clinic for consumers within a community mental health service: a real-world evaluation. *Front Psychiatry.* 2021;12:791125.

20. Pearce M, Foote L, Brown E, O’donoghue B. Evaluation of an exercise physiology service in a youth mental health service. *Ir J Psychol Med.* 2021;38(1):56-61.

21. Chapman J, Kugelman, J., Pratt, G., Tillston, S. *Healthy Lifestyles Program Report.* QIMR Berghofer Medical Research Institute;2022.

22. Inquiry into the opportunities to improve mental health outcomes for Queenslanders, Report No. 1, 57th Parliament Mental Health Select Committee June 2022. In:2022:156.

23. Improving the physical health and wellbeing of consumers of mental health and alcohol and other drug services. In: Mental Health Alcohol and Other Drugs Branch, ed. Brisbane: Department of Health; 2021.

24. Morgan M, Peters D, Hopwood M, et al. Being Equally Well: Better physical health care and longer lives for people living with serious mental illness. In: Mitchell Institute, ed. Melbourne, Victoria University2021.

25. Rockers PC, Røttingen J-A, Shemilt I, Tugwell P, Bärnighausen T. Inclusion of quasi-experimental studies in systematic reviews of health systems research. *Health Policy.* 2015;119(4):511-521.

26. Maciejewski ML. Quasi-experimental design. *Biostatistics & Epidemiology.* 2020;4(1):38-47.

27. Miller CJ, Smith SN, Pugatch M. Experimental and quasi-experimental designs in implementation research. *Psychiatry Res.* 2020;283:112452.

28. Estrada S, Arancibia M, Stojanova J, Papuzinski C. General concepts in biostatistics and clinical epidemiology: Experimental studies with randomized clinical trial design. *Medwave.* 2020;20(04).

29. ESSA. Scopes of Practice. Exercise and Sports Science Australia. <https://www.essa.org.au/Public/Public/Professional_Standards/ESSA_Scope_of_Practice_documents.aspx>. Published 2022. Accessed 8th February 2024.

30. Keetharuth AD, Brazier J, Connell J, et al. Recovering Quality of Life (ReQoL): a new generic self-reported outcome measure for use with people experiencing mental health difficulties. *Br J Psychiatry.* 2018;212(1):42-49.

31. Keetharuth AD, Rowen D, Bjorner JB, Brazier J. Estimating a preference-based index for mental health from the recovering quality of life measure: valuation of recovering quality of life utility index. *Value in Health.* 2021;24(2):281-290.

32. Feng Y-S, Kohlmann T, Janssen MF, Buchholz I. Psychometric properties of the EQ-5D-5L: a systematic review of the literature. *Qual Life Res.* 2021;30:647-673.

33. DeBoer MD, Dong L, Gurka MJ. Racial/ethnic and sex differences in the ability of metabolic syndrome criteria to predict elevations in fasting insulin levels in adolescents. *J Pediatr.* 2011;159(6):975-981. e973.

34. Morgan VA, Waterreus A, Jablensky A, et al. People living with psychotic illness 2010. Report on the second Australian national survey. In: Department of Health and Ageing, ed. Canberra, ACT2011.

35. Kessler RC, Barker PR, Colpe LJ, et al. Screening for serious mental illness in the general population. *Arch Gen Psychiatry.* 2003;60(2):184.

36. Romppel M, Herrmann-Lingen C, Wachter R, et al. A short form of the General Self-Efficacy Scale (GSE-6): Development, psychometric properties and validity in an intercultural non-clinical sample and a sample of patients at risk for heart failure. *GMS Psycho-Social-Medicine.* 2013;10.

37. Allen K-A, Arslan G, Craig H, Arefi S, Yaghoobzadeh A, Sharif Nia H. The psychometric evaluation of the sense of belonging instrument (SOBI) with Iranian older adults. *BMC geriatrics.* 2021;21:1-8.

38. Hagerty BM, Patusky K. Developing a measure of sense of belonging. *Nurs Res.* 1995.

39. Saha S, Scott J, Varghese D, McGrath J. Social support and delusional-like experiences: a nationwide population-based study. *Epidemiology and psychiatric sciences.* 2012;21(2):203-212.

40. Migliorini C, Fossey E, Harvey C. Self-reported needs of people living with psychotic disorders: Results from the Australian national psychosis survey. *Front Psychiatry.* 2022;13:1013919.

41. Meadows G, Harvey C, Fossey E, Burgess P. Assessing perceived need for mental health care in a community survey: development of the Perceived Need for Care Questionnaire (PNCQ). *Soc Psychiatry Psychiatr Epidemiol.* 2000;35:427-435.

42. Reinert DF, Allen JP. The alcohol use disorders identification test: an update of research findings. *Alcoholism: Clinical and Experimental Research.* 2007;31(2):185-199.

43. Swan G. Findings from the latest national diet and nutrition survey. *Proc Nutr Soc.* 2004;63(4):505-512.

44. Coyne T, Ibiebele TI, McNaughton S, et al. Evaluation of brief dietary questions to estimate vegetable and fruit consumption–using serum carotenoids and red-cell folate. *Public health nutrition.* 2005;8(3):298-308.

45. Smith KJ, McNaughton SA, Gall SL, Blizzard L, Dwyer T, Venn AJ. Takeaway food consumption and its associations with diet quality and abdominal obesity: a cross-sectional study of young adults. *International Journal of Behavioral Nutrition and Physical Activity.* 2009;6:1-13.

46. Craig CL, Marshall AL, Sjöström M, et al. International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc.* 2003;35(8):1381-1395.

47. Faulkner G, Cohn T, Remington G. Validation of a physical activity assessment tool for individuals with schizophrenia. *Schizophr Res.* 2006;82(2–3):225-231.

48. Natale V, Fabbri M, Tonetti L, Martoni M. Psychometric goodness of the mini sleep questionnaire. *Psychiatry Clin Neurosci.* 2014;68(7):568-573.

49. Michie S, Van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. *Implement Sci.* 2011;6:1-12.

50. Ritchie J, Spencer L. Qualitative data analysis for applied policy research. In: Bryman A, Burgess R, eds. *The qualitative researcher’s companion.* Vol 573. London: Routledge; 2002:305-329.

51. Damschroder LJ, Reardon CM, Widerquist MAO, Lowery J. The updated Consolidated Framework for Implementation Research based on user feedback. *Implement Sci.* 2022;17(1):1-16.