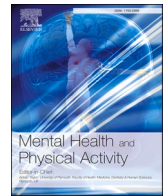


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# Mental Health and Physical Activity

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## Physical activity following discharge from inpatient adult mental health settings

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### ABSTRACT

**Background:** People with severe mental illness are considerably less physically active than the general population and experience a premature mortality of 10–20 years, often attributed to modifiable behaviours, including physical activity. Inpatient environments provide opportunities for people with SMI to become more physically active, however evidence is limited on its sustainability following discharge to community settings.

**Objective:** This review aimed to summarise the published evidence relating to physical activity interventions following discharge from inpatient adult mental health settings.

**Design:** MEDLINE, CINAHL, PsycINFO and AMED databases were searched to identify articles considering physical activity interventions taking place following discharge from an adult (>18) inpatient mental health setting, published after 2007.

**Results:** Of 3412 unique results, 5 studies were eligible for inclusion. Despite all included studies involving some transition between inpatient and community mental health settings, to-date no study has focused exclusively on physical activity interventions delivered following discharge from inpatient mental health settings.

**Conclusions:** This review has found insufficient evidence to guide the delivery of physical activity following discharge from inpatient mental health services. Future research is required to improve our knowledge of the optimal forms and delivery of physical activity interventions during this time, alongside quantifying the impact on readmission rates and clinical presentation.

### 1. Introduction

It is now widely accepted that there is a clear link between physical and psychological health, with the presence of physical health problems significantly increasing an individual's risk of developing mental health problems, and vice versa (The King's Fund, 2023). Increasing physical activity has the potential to improve the physical and mental health of the population, with methods tending to be widely accessible and generally deemed safe and cost-effective, with minimal to no side effects (Roux et al., 2008).

In the general population it has been shown that engaging in regular physical activity can help to reduce the symptoms of anxiety and depression (Singh et al., 2023), and there is growing recognition of the

wider benefits in terms of productivity (Grimani, Aboagye, & Kwak, 2019), quality of life (de Oliveira, Souza, Rodrigues, Fett, & Piva, 2019), and healthcare costs to society (Miles, 2007). Similar results are also demonstrated in populations with SMI, in which physical activity has been shown to reduce psychiatric symptoms in schizophrenia (Firth, Cotter, Elliott, French, & Yung, 2015; Keller-Varady et al., 2018), and improve cognitive functioning (Firth et al., 2017). However, despite recommendations from policy (Cooper et al., 2016) this is yet to become commonplace in routine clinical practice (Stubbs & Rosenbaum, 2018).

Mental health settings can be obesogenic due to restrictions on movement, reduced access to outdoor space, increased access to unhealthy food and less control over food choices (Faulkner, Gorczynski, & Cohn, 2009). Given the right conditions, the inpatient environment can

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provide an opportunity to support people with SMI to make positive lifestyle changes, including becoming more physically active (Hargreaves, Lucock, & Rodriguez, 2017; Rogers, Papatthomas, & Kinnafick, 2021), making dietary changes (Naslund et al., 2017), and stopping smoking (Shoemith et al., 2022). Facilitators to support engagement in physical activity within this setting include access to a qualified professional to deliver the activity, social support of peers and healthcare professionals, education, and personalised goal setting and activity plans (Kandola & Osborn, 2022).

The 2016 NICE guideline for ‘Transition between inpatient mental health settings and community or care home settings’ (NICE, 2016) recommends that individuals are encouraged to maintain community links during inpatient episodes, and to restart activities before discharge through trial periods out of hospital. Within these guidelines there is no specific reference to physical activity, and it is currently unclear how these guidelines have influenced the provision or planning of physical activity provision during the transition from inpatient to community settings within clinical practice.

Whilst opportunities may exist within inpatient settings, there is limited evidence on which physical activity interventions and delivery styles are most successful in achieving long-term behaviour change once the inpatient admission ends (Machaczek et al., 2023). Considering the potential vulnerabilities during the transition period, the use of interventions such as physical activity during this time may be efficacious across health outcomes.

This question prompted our review which was aimed at identifying previous research promoting physical activity during participant transitions between inpatient and community mental health settings. To our knowledge there have been no other reviews completed which attempted to address this topic.

## 2. Methods

### 2.1. Information sources and literature search

This scoping review adopted a mixed methods approach and therefore did not limit the results based on study type or design. We conducted the review in accordance with the JBI methodology for scoping reviews (Aromataris & Munn, 2020) and uploaded to Open Science Framework in advance of initiating the searches (DOI 10.17605/OSF.IO/PF8RX).

The search strategy is outlined in Appendix 1, with searches being conducted within MEDLINE, CINAHL, PsycINFO and AMED databases.

### 2.2. Eligibility criteria

We sought peer reviewed studies which focused on physical activity interventions in adults ( $\geq 18$  years) following discharge from any inpatient mental health service. We limited our search to those in the English Language, published after 2007. We excluded papers from eating disorder or learning disability populations.

### 2.3. Study screening and selection

Following the search, all identified citations were collated and uploaded into Rayyan (Ouzzani, Hammady, Fedorowicz, & Elmagarmid, 2016) and duplicates removed. Titles and abstracts were screened by two independent reviewers for assessment against the inclusion criteria. Potentially relevant sources were retrieved in full and assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of sources of evidence at full text that did not meet the inclusion criteria were recorded. Any disagreements between the reviewers at each stage of the process were resolved through discussion. The reference lists of all included articles, as well as that of any review articles or meta-analyses, were screened for additional relevant studies.

### 2.4. Data extraction

Data was extracted from papers included in the scoping review by two or more independent reviewers using a predefined data extraction form. The data extracted included participant information, study setting, intervention characteristics and study outcomes relevant to the review questions.

### 2.5. Analysis

A descriptive analytical approach was used to summarise the contextual, process and outcome related data from the included studies, to summarise existing knowledge, and identify gaps in the literature.

## 3. Results

### 3.1. Search results

In total, 5815 studies were identified from the searches (Fig. 1), and after removal of duplicates, and title/abstract and full-text screening, 5 studies (one including two publications by Kruisdijk) were included for data extraction (Kruisdijk, Hendriksen, Tak, Beekman, & Hopman-Rock, 2018, 2019; Acil, Dogan, & Dogan, 2008; Furzer, Wright, Edoo, & Maiorana, 2021; Gomes et al., 2014; Kang et al., 2016).

### 3.2. Study characteristics

Key study details including title, authors, year published, and are summarised in Table 1. The review identified one feasibility study (Furzer et al., 2021), two quasi-experimental studies (Acil et al., 2008; Gomes et al., 2014), and two randomised controlled trials (Kang et al., 2016; Kruisdijk, Hopman-Rock, Beekman, & Hendriksen, 2019) for inclusion. There was also one further process evaluation of the randomised trial published separately by (Kruisdijk et al., 2018). Year of publication ranged from 2008 (Acil et al., 2008) to 2021 (Furzer et al., 2021), and sample sizes from 19 (Gomes et al., 2014) to 70 (Furzer et al., 2021).

### 3.3. Outcomes assessed

The most common outcomes assessed within included studies were Quality of Life (Acil et al., 2008; Gomes et al., 2014; Kang et al., 2016; Kruisdijk et al., 2019), Cardiovascular and anthropometric measures (Gomes et al., 2014) and use of medical intervention or hospitalisation (Gomes et al., 2014; Kang et al., 2016).

## 4. Discussion

To our knowledge this is the first review to examine available literature relating to physical activity interventions following discharge from inpatient adult mental health settings which identified five eligible studies for inclusion. Despite all included studies involving some transition between inpatient and community mental health settings, no study appears to have focused exclusively on physical activity interventions delivered for the transition from inpatient mental health to community settings. Given the amount of physical activity related research that has been published, the transition between inpatient and community settings appears to have been significantly neglected. We hope that through highlighting this aspect within our review, physical activity interventions during this will be given increased focus.

### 4.1. Optimising engagement with physical activity

Furzer et al. (2021); Gomes et al. (2014); and Kruisdijk et al. (2018) all explored the link between exercise enjoyment, measured through subjective means, and its impact upon engagement with prescribed physical activity. Gomes et al. (2014) attributed their high attendance

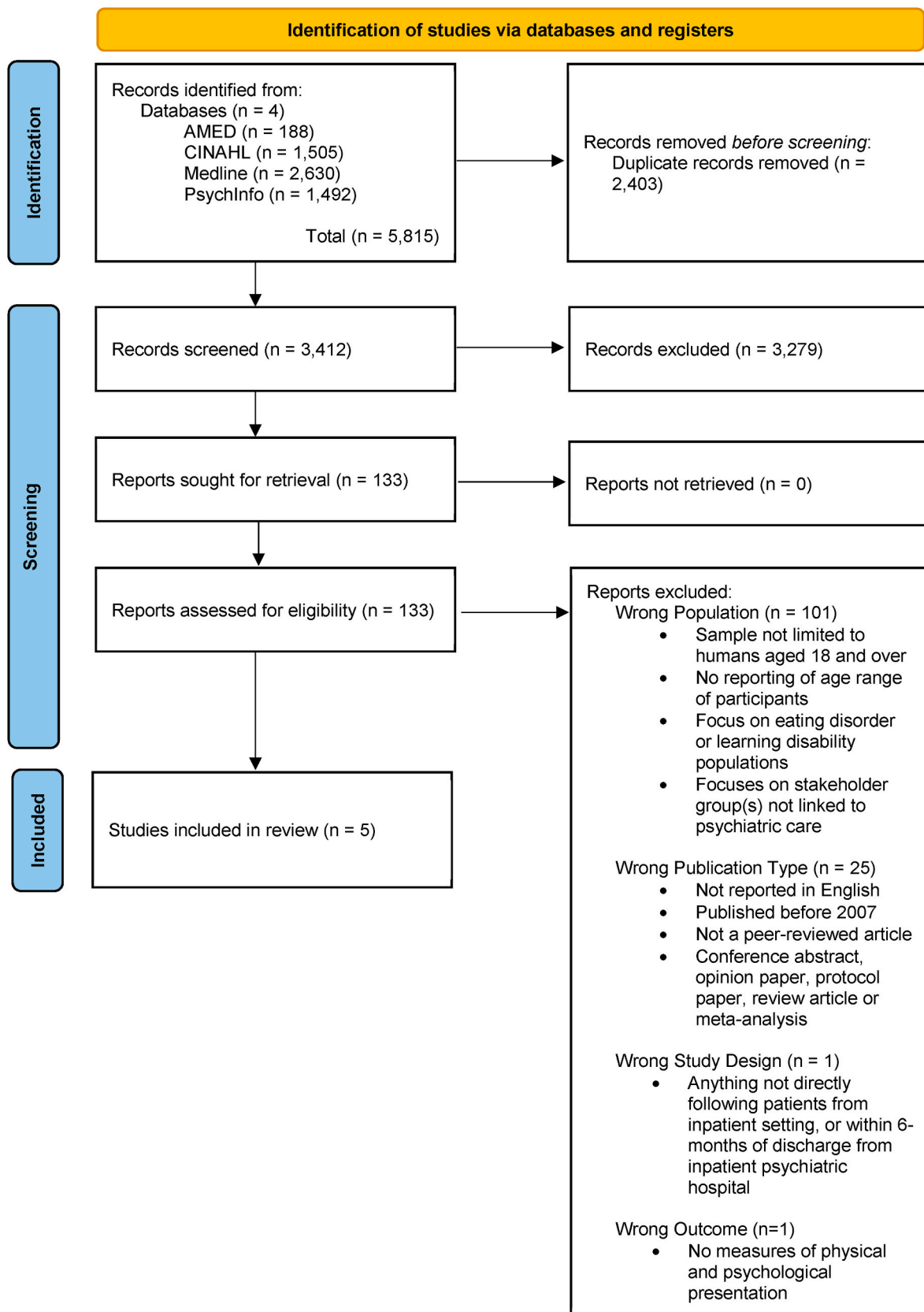


Fig. 1. PRISMA flow diagram.

**Table 1**  
Summary of study characteristics.

Article Title	Authors	Year	Country	Study Design	Participants	Participant Demographics	Physical Activity Type	Characteristics of Physical Activity Intervention	Outcome Measures
Move your mind: embedding accredited exercise physiology services within a hospital-based mental health service	Furzer, Bonnie J.; Wright, Kemi E.; Edoo, Azam; Maiorana, Andrew;	2021	Australia	Feasibility Study	70 individuals referred from both community and inpatient mental health settings	Mean age:40, 59% female, 41% male	Individual, open gym and group classes	Not specified	Service acceptability and delivery, consumer satisfaction, and engagement
EFFORT-D study process evaluation: challenges in conducting a trial into the effects of running therapy in patients with major depressive disorder	Kruisdijk, Frank; Hendriksen, Ingrid; Tak, Erwin; Beekman, Aart-Jan; Hopman-Rock, Marijke; And also Kruisdijk, Frank; Hopman-Rock, Marijke; Beekman, Aart-Jan; Hendriksen, Ingrid;	2018 and 2019	Netherlands	Observer-blinded randomised controlled parallel trial	48 inpatients, day patients or outpatients, with a Hamilton Depression Scale score >14	Mean age: 41.6, 62.5% female, 37.5% male	Running therapy or Nordic walking	Group based for 1-h sessions, two times a week for 6 months	Service providers opinions on sustainability, uptake, participation, and areas for improvement
Effects of a group physical activity program on physical fitness and quality of life in individuals with schizophrenia	Gomes, Eluana; Bastos, Tânia; Probst, Michel; Ribeiro, José Carlos; Silva, Gustavo; Corredeira, Rui;	2014	Portugal	Quasi-Experimental Study	19 outpatients with schizophrenia combined with cardiovascular risk factors	Mean age: 39.5, 84% female, 16% male	Indoor/ outdoor small group games, 2× per week	Volleyball, handball, basketball, soccer, walking/ jogging, at 75–85% of heart rate reserve	Adherence, anthropometric characteristics and body composition, exercise capacity, quality of life, medication use
Effect of Community-Based Social Skills Training and Tai-Chi Exercise on Outcomes in Patients with Chronic Schizophrenia: A Randomized, One-Year Study	Kang, Ruiying; Wu, Yeqing; Li, Zhiwu; Jiang, Jun; Gao, Qi; Yu, Yuncui; Gao, Keming; Yan, Yuxiang; He, Yan;	2016	China	Randomised Controlled Trial	244 patients with a diagnosis of schizophrenia, Aged between 18 and 60 years with illness duration of no less than 2 years	Mean age: 45.9, 52% female, 48% male	Tai Chi alongside social skill intervention	45 min of Tai chi, alongside social skills training, twice per month for 12 months	Medication dosage, psychotic symptoms (PANSS), quality of life, rehospitalisation, medication adherence, aggressive behaviour
The effects of physical exercises to mental state and quality of life in patients with schizophrenia	Acil, A. A.; Dogan, S.; Dogan, O.;	2008	Turkey	Quasi-Experimental Study	30 patients requiring hospitalisation upon schizophrenia diagnosis, followed up as outpatients between 1992 and 2005	Mean age: 32, 40% female, 60% male	Aerobic exercise	3 × 40 min sessions of aerobic exercise per week for 10 weeks	Quality of life, symptom severity, mental state

rate (79.7%) to varying forms of trust building exercises carried out by the researchers and participants which in turn had a positive effect on motivation and commitment. Physical activity interventions are more successful when participants are adequately motivated and perceive activities as enjoyable, so future research and clinical practice should take this into account when designing interventions. Where possible this should be responsive to the differing needs of individuals and offering a

personalised approach to physical activity.

#### 4.2. Impact on readmission

Whilst all studies provided insights into the characteristics of physical activity interventions within this population, only [Kruisdijk et al. \(2018\)](#) provided evidence on rates of readmission, reporting that

episodes of major depression lasted, on average, for 6 months with around 75% remission after 1 year and therefore may prolong remission, but is clearly an area that requires further, robust investigation.

#### 4.3. Use of NICE guideline for 'transition between inpatient mental health settings and community or care home settings'

None of the included papers in this review make reference to the NICE guidelines above (NICE, 2016). Beyond merely observing that the majority of included studies (3) were published post-2016, we are unable to address the extent to which the research was informed by this available guidance.

#### 4.4. Limitations/strengths

The ability to only include studies published in English is a limitation of this study which may have limited the number of studies in this review. A further limitation with the review is that the delivery and setup of services is variable which led to difficulties in comparing the identified studies, and also terminology used with regards to transition from a hospital to community setting meaning we are unable to guarantee that all relevant studies were captured as some community samples may have included participants who had transitioned from a hospital setting but weren't reported as such. This may have led to some studies being excluded, although steps were taken to be more inclusive with studies. Considering these limitations, it is important to contextualise this review as being of a broad scoping nature. Our review is the first of its kind and is designed to highlight the important clinical implications of considering physical activity interventions during the transition between inpatient and community mental health settings.

#### 4.5. Recommendations for future research and clinical practice

This review provides an overview of current research and opportunities for potential developments within clinical and research practices related to physical activity during the transition between inpatient and community mental health settings, finding significant gaps in the current knowledge base of this area. As identified above, no previous studies have focused exclusively on the implementation of physical activity interventions during the transition between inpatient and community mental health settings. As an overarching objective, any work focusing on this area would be beneficial to undertake, with the potential to utilise current services as part of any evaluation.

One such opportunity would be exploring the signposting to community services such as exercise referral schemes which generally monitor physical outcomes and engagement as part of routine practice. Any evaluation may also consider monitoring psychological symptoms during any engagement period, and outcomes such as involvement with community mental health teams or re-admissions to inpatient mental health services.

There are likely to be pockets of clinical practice where signposting to community physical activity services occurs as part of routine clinical care, and potentially cases where this occurs within community mental health teams. The issue however is that there is currently no standardised or promoted pathway by which this can be implemented more widely. Any such development should be co-produced with service users, considering their experience alongside a focus on improving clinical outcomes.

## 5. Conclusion

Despite good awareness of the potentially positive impact of physical activity on both physical and psychological health, there is currently no research investigating the impact of methods to facilitate ongoing engagement with physical activity during the transition between inpatient and community mental health settings.

Future research in any form is required to begin specifically investigating physical activity interventions that are likely to be beneficial during the transition between inpatient and community mental health settings. As a starting point in clinical practice, we recommend that clinicians prioritise referrals to local exercise referral schemes, allowing patients to continue with physical activity in a supportive environment upon discharge from inpatient services. This has the potential to improving the likelihood of achieving successful long-term behaviour changes which are likely to improve both physical and psychological health.

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## CRediT authorship contribution statement

**Philip Hodgson:** Conceptualization, Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Visualization, Project administration, Funding acquisition. **Jack Haywood:** Methodology, Validation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Visualization, Project administration. **Alex Benham:** Methodology, Validation, Formal analysis, Investigation, Resources, Writing – original draft, Writing – review & editing, Visualization, Project administration, Supervision, Funding acquisition.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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## Appendix 1. Search strategy

### Mental health terms: title and abstract

“Mental health” or “Mental well-being” or “Mental well being” or “Psychological well being” or “Psychological well-being” or “Mental disorder\*” or “Mental illness\*” or “Mental disease\*” or “Anxiety disorder\*” or “Mood disorder\*” or “Affective disorder\*” or “Depressive disorder\*” or “Neurotic disorder\*” or “Personality disorder\*” or Schizophreni\* or “Somatoform disorder\*” or “Adjustment disorder\*” or Neuros?s or Psychos?s or Delusion\* or Paranoia or Hallucination\* or Depression or “Panic disorder\*” or Phobia\* or “Health anxiet\*” or “Bipolar disorder\*” or “Obsessive compulsive disorder\*” or “Obsessive



thought\*\*” or “Intrusive thought\*\*” or “Post traumatic stress disorder\*\*” or “Post-traumatic stress disorder\*\*”

### Setting terms: title and abstract

“Post-Hospital” or “Post Hospital” or “Non-acute care” or “Secondary care” or “Tertiary care” or outpatient\* or Community or Triage or discharge, “Hospital discharge”, “Psychiatric hospital discharge”, Transfer.

### Physical activity terms: title and abstract

Exercis\* or exercise or “physical exertion” or “physical fitness” or jog\* or (physical\* adj3 (activ\* or fit\*)) or Aerobics or swim\* or gym\* or sport\* or workout or skip\* or calisthenics or e-Exercise or Bicyc\* or Cycling or Parkrun or Couch to 5k or Danc\*

### Limits

- Date: 2007 onwards
- English language only

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