Physical activity services for inpatients in secure mental health settings: what works, for whom, under what circumstances and why? A realist synthesis.

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Abstract

Background: Physical activity (PA) has multiple benefits for people with severe mental illness (SMI). However, more research is needed to determine optimal delivery methods in secure inpatient settings. Realist synthesis, a theory-driven evidence review, has key methodological advantages for evaluating complex interventions and is well-suited to address the research-practice gap concerning the delivery of PA inpatient programmes. This realist synthesis explored 'what works, for whom, under what circumstances, and why' in enhancing PA engagement among inpatients with SMI in secure psychiatric settings.

Methods: We conducted a two-phase realist synthesis. We searched seven bibliographic databases and supplemented this with hand searches to identify grey and additional literature sources. No restrictions were applied to the types of articles included. A total of 65 sources of evidence contributed to the synthesis. The evidence was extracted, assessed and synthesised. Two programme theories, underpinned by six context-mechanism-outcome configurations, were developed.

Results: Programme theory one emphasises the crucial role of PA providers in implementing PA programmes. Deliverers must display relational and delivery competencies to earn the trust and confidence of service users (SUs). Building and nurturing these relationships is especially important for SUs who have had previous coercive experiences with mental health services. Programme theory two underscores the importance of providing deliberate (e.g. gym sessions) and incidental PA opportunities (e.g. fun and engaging ward activities) to ensure that all SUs can access daily activities, even if they do not wish to be formally active. Engagement in these opportunities should be voluntary, not mandatory. For SUs with negative past PA experiences, activities should be perceived as enjoyable, meaningful, and achievable to encourage their future participation.

Conclusion and Clinical Implications This synthesis produced evidence-informed programme theories and underlying context-mechanism-outcome configurations that can inform the design, development, and delivery of PA programmes in inpatient healthcare settings.

Key words: severe mental illness, physical activity, secure inpatient settings, realist synthesis

Introduction

Severe mental illness (SMI) is a subset of mental illness (1). It is broadly defined as "a group of conditions that are often chronic and so debilitating that people's ability to engage in functional and occupational activities is severely impaired" (2). Example of SMI include schizophrenia, bipolar disorder, psychosis or schizoaffective disorder. Those experiencing acute symptoms of SMI can be treated within secure inpatient psychiatric services (3). These services aim to assess, treat, and rehabilitate individuals in safe residential environments (4,5).

Physical activity (PA) offers multiple benefits for the psychological and physiological health of people who live with SMI (6). For many individuals with SMI, PA can play a significant role in recovery (7). Even modest increases in moderate-to-vigorous PA are beneficial (8).

In mental healthcare, the physical health of individuals with SMI is a significant concern (9,10). Patients' already poor physical health is often exacerbated in secure settings (11,12), partly due to inactivity and other health risk behaviours, such as smoking and unhealthy diets. Contributing factors include obesogenic ward cultures, psychotropic medication (13), acute mental illnesses (7) limited opportunities for movement, and low staffing levels. These barriers can lead to increased sedentary time and lower levels of PA among inpatients (14).

At the same time, inpatient services provide key opportunities to engage individuals with SMI in PA (15–17) These opportunities include access to PA facilities, well-trained staff, and supportive communities for PA. Encouraging individuals who live with SMI to participate in inpatient PA programmes is a complex social intervention that requires multiple strategies, a multidisciplinary approach, and adaptation to various contexts (18).

In recent years, a growing body of evidence has supported PA and exercise interventions in secure mental health settings, with various systematic reviews and meta-analyses being published (7,19,20). Despite the benefits of PA for individuals in clinical care, physical inactivity, high levels of sedentary behaviour, and the poor physical health of patients in secure inpatient psychiatric settings remains a major concern (10). More knowledge is therefore needed regarding the numerous

individual, interpersonal, environmental and organisational factors affecting the initiation and maintenance of PA in clinical practice (20). Understanding these multi-level factors is needed to establish pragmatic and scalable methods for programme delivery and optimisation (20) to integrate PA into routine clinical practice (7).

Research designs frequently used to evaluate the effectiveness of PA interventions in secure inpatient settings, such as randomised controlled trials, meta-analyses, and systematic reviews, primarily focus on whether programmes 'work' or 'what works on average' (21). These approaches often overlook social architectural and contextual differences that explain why and how these programmes work or not (21,22), for whom, and under what circumstances. This oversight can hinder their application for policy development, implementation, and integration into everyday healthcare practice (23).

PA provision in secure inpatient settings is a complex intervention nested within a complex system, with mechanisms that bring about changes depending on context. The primary goal of this realist synthesis was to identify and analyse the current research evidence, alongside stakeholder input, to discern 'what works, for whom, under what circumstances and why' to increase engagement in PA among inpatients in secure psychiatric settings. We aimed to develop programme theories and underlying context-mechanism-outcome configurations to inform the design, development, and delivery of PA programmes in secure inpatient settings.

Research question: How, why, for whom, and under what circumstances do programmes in secure inpatient settings increase PA engagement among people who live with SMI?

Method

Realist Synthesis

Realist synthesis is a theory-driven and iterative method for synthesising evidence. It investigates the mechanisms within interventions and identifies caveats and conditions under which they operate to achieve desired outcomes (24). The context-mechanism-outcome configuration (CMOC) serves as the analytical unit, providing a framework for identifying causal relationships to explain 'how, why, for whom, and under what conditions a programme works' (25). CMOCs were used to build and construct programme theories.

This realist synthesis was conducted in accordance with The Realist and Meta-narrative Evidence Syntheses: Publication Standards: realist synthesis (26). A protocol was prepared and published in the BMJ (27). Summary statements from the study protocol will be given. Key realist terms and definitions can be found in Table 1.

Changes in the Review Process

Two changes were made to the protocol:

1. SCOPUS and MEDLINE databases were added to the search for empirical evidence to broaden the scope of the searches.
2. More detailed and revised measures for richness and relevance were introduced.

Overview of the phases taken to complete the synthesis.

The study design followed the five steps of realist synthesis, which were split into two phases. Phase one involved determining the scope of the synthesis and identifying and developing candidate programme theories for testing. Phase two involved the iterative testing, development, and refinement of the CMOCs and programme theories.

Table 1

Key Terms and definitions

Key Term	Definition
Abductive Logic	Abductive logic represents the point in the scientific method where novelty and innovation are introduced. Inventive and creative thinking play a pivotal role in the process of abduction.
Context	Contexts are the psychological, organisational, technical, economic and relational forces and aspects of settings that interact and influence each other. These dynamic features shape the mechanisms through which the programme works (28)
Mechanism	Mechanisms are recognised as causal entities responsible for generating or initiating observable events (29)
Candidate Programme Theories (cPTs)	A set of initial hypotheses, typically presented as context-mechanism-outcome configurations or causal statements, explains how and why interventions produce outcomes. cPTs are refined throughout the iterative realist process.
Retroductive theorising	Retroductive theorising involves inferring what is happening at deeper levels of reality. This approach employs abductive reasoning to formulate and theorise program theories, allowing researchers to delve into the underlying aspects of a programme. Retroductive theorising promotes ontological depth by embracing abductive thinking, encouraging a deeper understanding of the fundamental aspects and mechanisms driving the observed phenomena.
Substantive Theories	Established theories in a particular field (30)

Phase and Step 1: Determining the Scope of the Study, and Identifying Candidate Programme Theories

In the initial phase of the study, we conducted an informal literature search to 'get a feel' and to determine the focus of our synthesis (31), p. 154) (please see protocol for details). This search was supplemented by additional sources, including grey literature, books, social media, and informal discussions with patients and practitioners during visits to secure inpatient settings.

Stakeholder Consultations

The quality standards for realist syntheses emphasise the importance of stakeholder involvement from the outset to enhance its relevance for the end user (32,33). Nine expert stakeholders were recruited through the contacts of the research team: two physiotherapists, two sport and exercise therapists, one psychiatrist, one expert by experience, one mental health nurse, one activity co-ordinator and one academic. During phase 1, stakeholders shared their experiences and perceptions regarding what they thought 'works' (or not), 'why' and 'how' for PA engagement in secure settings. They also signposted the research team to relevant grey literature.

Using Substantive Theories for Theory Development

We utilised substantive (i.e. formal) theories to guide the theory building process. Effective public health initiatives have been developed based on an understanding of health behaviours and the contexts in which they occur (34). Therefore, we decided to adopt a socio-ecological approach, which is a framework for understanding how individuals' behaviours are affected by various levels of their environment, as it would help us to explore the complexity of PA engagement (41).

Development of Candidate Programme Theories

After familiarising ourselves with the literature and consulting stakeholders, we developed candidate programme theories (cPTs) that were overarching ideas about how and why PA programmes were believed to work. These cPTs were represented as CMOs and recorded in an excel spreadsheet. Each time a new theory was adapted, a new tab was created to document the revisions.

Phase 2. Testing of the cPTs

Phase 2 formed the iterative search phases (see Figure 1). This involved three stages of iteration, conducted between February 2022 and April 2024. The goal of phase two was to test and refine the cPTs iteratively, utilising empirical sources.

Figure 1.

An Overview of phase 2: testing and refining the candidate programme theories

[INSERT FIGURE 1]

Step 2. Search for Empirical Evidence

Search strategies were developed, adapted, and refined, with the help of an experienced information scientist (NR) (see supplementary material A1 for search strategies). These searches aimed to find data to test the cPTs and search strategies were revised iteratively as new data became available. The first search explored five databases: Web of Science, PubMed, PsychInfo, PsychArticles, EMBASE. For subsequent searches, the research team added SCOPUS and MEDLINE. References were imported into into Covidence systematic review software, Melbourne, Australia. Alongside database searches, additional search techniques such as hand searches, searches in google scholar, 'cluster searching', and forward and backwards citation tracking, were utilised.

Step 3. Screening and appraisal of documents

The purposeful selection and appraisal of documents are imperative for developing and refining of the cPT's (35). We utilised The Context and Implementation of Complex Intervention's framework (36) to formulate the inclusion/exclusion criteria (as detailed in the supplementary material, Table A2). This framework was chosen because it closely aligns with the questions and terminology used in our synthesis (37,38). The primary researcher (TK) screened the title and abstracts to assess their potential relevance (table 2.) to the developing cPTs. TK initially completed the full-text screening, while a co-author (FK) screened 10% of the included evidence for both relevance and rigour, with no discrepancies found.

Relevance

Relevance determines that the piece of evidence can contribute to theory building and / or testing (32). The relevance of the included evidence was evaluated in three ways: 1) whether the article pertains to SMI and PA; 2) if it was conducted within secure inpatient mental health settings; 3) whether it provided evidence that developed, refuted, refined, or endorsed the cPT. Based on Morton et al.'s (39) traffic light assessment system (table 2), a scoring tool was used to ensure the inclusion of highly relevant studies. However, if a study presented medium relevance (i.e. was

conducted within an outpatient settings) but was potentially conceptually rich, it was included for data extraction.

Table 2

Relevance description criteria

Ranking	Relevance Description
1 - Low	Refer to one: SMI, secure settings or Physical Activity / Exercise; AND they potentially developed, refuted, refined, or endorsed the cPTs
2 - Medium	Refer to two: SMI, secure settings or Physical Activity / Exercise; AND they potentially developed, refuted, refined, or endorsed the cPTs
3 -High	Refer to all three: SMI, secure settings or Physical Activity / Exercise; AND if they potentially developed, refuted, refined, or endorsed the cPTs;

Note *SMI – Severe Mental Illness; cPTs – candidate Programme Theories

Rigour

Rigour was determined through consideration of whether the 'piece of literature is good enough to be included? And if the methods used to generate the data are credible, plausible and trustworthy?' (40). All included citations and grey literature were screened for rigour. Since realist guidelines do not endorse using a formal rigour checklist (41), it is possible to include evidence deemed low in rigour if it is relevant to cPTs (42). Each study was assigned a low, medium, or high rigour score based on its research claims, sample size, data collection techniques, and analysis methods (43).

Step 4. Data extraction and organising data

Data extraction and organisation from the included articles was completed by the primary researcher. An extraction template was created for the included studies, in an Excel spreadsheet, and was organised into three sections:

1. Descriptive characteristics: participants, settings, aims, designs, methods, and results.
2. Richness, relevance, and rigour.
3. Extracted data relating to the cPTs.

Sections of relevant text relating to the cPTs was extracted and organised under their concepts. Extracts of data were then hand-coded and synthesised into CMOCs in step 5.

Step 5. Synthesis of the Data

The primary author led the analysis process with support from discussions with the research team. The synthesising process was guided by retroductive theorising whereby a combination of abductive, inductive, and deductive thinking was utilised to elucidate patterns of generative causation. In addition, to find causal patterns across the dataset, five techniques-juxtaposition, reconciliation, adjudication, consolidation, and situating - were used (for more detail, see protocol (10)). Ongoing discussions were had between TK, FK, and KM where the CMOC's were developed and refined. Each CMOC was then individually reviewed, refined, and verified against the extracted evidence with JH (see supplementary material A3). Approximately 30 hours of collaborative discussion took place.

Richness

The richness scoring assessment utilised tools from previous realist synthesis (39,44) (see table 3), ensuring evidence provided depth and contribution to the cPTs (41). The lead author classified the articles as either conceptually rich, thick or thin based on their contribution to PT development. Evidence was given a place-holder richness score. Once the PTs and CMOs were consolidated, a finalised richness score was given.

Table 3

Richness Assessment Scoring System

Score	Richness Description
0	Conceptually thin: Little contribution to programme theory or causal insight
1	Conceptually thick: provides causal insight into programme theories
2	Conceptually rich: gives highly valuable contribution / causal insight into the CMOCs

**Note – Context-Mechanism-Outcome-Configurations*

Stakeholder Consultations

After each iterative development of the CMOs, they were presented and taught to the nine stakeholder experts, for the respondents to comment on with a view to confirm, deny or refine. This is called the teacher-learner technique (45). Furthermore, when there were gaps in the research evidence,

stakeholders were consulted to provide further nuance and guidance. Stakeholders were consulted via online and face-to-face meetings, focus-group discussions, and emails. Approximately 23 hours of discussion was had. Detailed annotations were made on the candidate CMOs.

Programme Theory Consolidation

In line with other realist research, continuous iterative searching, screening, data synthesis, stakeholder consultations, and adaptions of the CMOCs continued until 'theorical saturation' was reached (46). The CMOCs were synthesised into two programme theory (PT) statements that specifically outlined 'what works', 'for whom', 'why', and 'under what circumstances' in enhancing engagement among people who live with SMI in PA programmes delivered in secure inpatient settings.

Results

Document Characteristics

Over the database search phases, 5561 sources of evidence were identified. Following title and abstract screening, 169 papers were included in the full text review. Following full text review, 42 pieces of evidence were included. An additional 23 sources of evidence were identified through additional search techniques bringing the total to 65 sources to be included in the synthesis (see table A4 in supplementary material for study characteristics). Our searching process is summarised in figure 2.

Among these studies, 35 were conducted in inpatient healthcare settings, seven in inpatient and outpatient settings, and three in outpatient settings. Six articles described studies conducted in across multiple mental healthcare settings including residential, community and inpatient services. Additionally, four papers were community-based PA interventions. Three studies were conducted in primary care facilities, two in psychiatric clinics, and one included participants from the general population. Three documents did not specify the setting. We also included four pieces of grey literature (such toolkits and guidance from NHS England and Public Health England).

The study designs varied: 21 were qualitative studies, 10 used mixed methods, and 11 used cross-sectional designs. Additionally, there was one service evaluation, two process evaluations, and a randomised controlled trial. We also included 15 evidence syntheses comprising six systematic reviews and meta-analyses, five feature articles, a scoping review, a meta-ethnography review, a perspective piece, and an implementation paper. For transparency, all synthesised sources of evidence are listed (see Table A4). Of the 65 pieces of evidence, nine were deemed conceptually rich while 38 studies were deemed conceptually thick, providing sufficient insights into CMOC and PT development.

Figure 2.

PRISMA 2020 flow diagram for new systematic reviews which included searches of databases, registers, and other sources.

[INSERT FIGURE 2]

Main Findings

Our analysis and stakeholder input, present six evidence-informed CMOCs organised under two PTs: 1) The Importance of Providers for Physical Activity Implementation and 2) Taking a Multi-Component Approach to Physical Activity Implementation. Summary statements will be given for each PT and CMOC. Individuals with SMI will be referred to as service users (SU).

Programme Theory One: The Importance of Providers for PA Implementation

Tables 4 and 5 present our refined PT and two underpinning CMOCs, emphasising the importance of the PA providers' qualities for effective implementation.

PT1 synthesises CMOC1 and 2, highlighting that SU PA engagement largely depends on the qualities of the individuals delivering the PA. PA providers must exhibit relational and delivery competencies to earn the trust and confidence of SUs. Building these relationships is particularly important for individuals who have encountered previous coercive experiences with mental health services.

CMOC1 (the therapeutic alliance) highlights the importance establishing a therapeutic alliance when delivering PA to SUs. Because SUs commonly experience coercive or negative interactions with mental health services, prioritising time to build rapport and trust is important for PA engagement. Over time, this approach helps SUs feel equal to, trust, and respect the provider, leading to a sense of relational security. This sense of security is more likely to develop if providers consistently demonstrate warmth, compassion, optimism, and emotional support to SUs.

CMOC2 (provider competencies) underscores the necessity for competent practitioners with high PA knowledge and confidence levels. Practitioners need the requisite PA competencies and the time and capacity to adapt to the immediate needs and dynamic contexts experienced by SUs, including psychopathological symptoms (e.g. apathy, mania), challenges of inpatient settings (e.g.

ward disruption, sleep disturbance), and considerations related to other treatments (e.g. medication side effects) and therapies (e.g. cognitive behaviour therapy). For SUs, this approach enhances the likelihood of feeling supported, understood, and valued while also feeling confident in the advice provided by a trusted source.

Table 4.

The Importance of Providers for Physical Activity Implementation Programme Theory

What Works	For Whom	Why	Under What Circumstances
Creating the relational and social conditions for PA to thrive is integral. Providers must take the time to build and develop positive relationships with SUs and have the competence, confidence, and knowledge to deliver quality PA sessions.	Building and prioritising relationship-building is particularly important for SUs who have had negative and coercive experiences with mental health services.	A positive relationship and therapeutic alliance with the provider foster trust, respect, and a sense of relational security. When the provider displays competence when delivering PA, SUs are more likely to feel confident in their advice.	• These outcomes are more likely when providers display consistency, warmth, compassion, optimism, and emotionally support SUs. • They are also more likely when providers have the competences, time, and capacity to adapt their PA delivery to the dynamic contexts and immediate needs of SUs, ensuring that SUs feel supported, valued, and understood in these interactions.

Table 5.

The Importance of Providers for Physical Activity Implementation Context-Mechanism-Outcome Configurations

Context-Mechanism-Outcome Configuration	Evidence Sources
CMOC1. The Therapeutic Alliance. When a SU has experienced negative and coercive interactions with mental health services, such as neglect or mistreatment (C), they are likely to view the clinical team and hospital as being 'against them' (C). When practitioners actively prioritise and take the time to build and maintain rapport (sometimes before PA) through consistency, warmth, compassion, optimism and emotional support (C), then SUs are more likely to develop a positive relationship and form a therapeutic alliance with the PA provider (O). Over time, this approach helps SUs feel equal to, trust, and respect the provider, leading to a sense of relational security (M).	(17,47–59)
CMOC2. Provider Competencies When SUs experience complex and dynamic SMI symptoms, receive multiple treatments, and face the unpredictable nature of the ward context alongside the side effects of medication, their preferences and motivation for PA can change throughout the day (C). When inpatient settings have PA providers with the time, capacity, confidence, competence, and knowledge to tailor their approach to these dynamic contexts and immediate needs (C), then SUs are more likely to be receptive to future engagement in PA (O). This is because SUs are more likely to feel supported, understood, valued, and confident in the advice from a trusted source (M).	(6,49,50,53,55,59–67)

Note. C=Context; M= Mechanism; O=Outcome; SU=Service User; PA=Physical Activity

Programme Theory Two: Taking a Multi-Component Approach to PA Implementation

Tables 6 and 7 present our second refined programme theory and four underpinning CMOCs, emphasising the multi-component approach needed for PA delivery in secure inpatient settings.

PT2 highlights the importance of offering deliberate (e.g. gym sessions) and incidental PA opportunities (e.g. fun and inclusive ward activities) to SUs. These approaches ensure that all SUs can access daily movement opportunities, even if they do not wish to be formally active. The PT emphasises that engagement in PA should be autonomous and not enforced or compulsory and activities should be perceived as enjoyable, meaningful, and achievable to encourage engagement, especially if SUs have had negative PA experiences. To make these programmes engaging, ward staff and practitioners should be enthusiastic, motivating, provide positive encouragement and reassurance to ease SUs' anxieties around PA. Creating a harmonious environment is crucial, as it helps to promote harmony, collaboration, and social connection on the ward. Over time, this fosters positive, memorable PA experiences that encourage future participation.

CMOC3 (enthusiastic environments) depicts the importance of creating a daily ward culture that encourages participation in fun and engaging on-ward activities. These environments are particularly important for SUs who lack the motivation or interest to engage in traditional formal exercise.

CMOC4 (decision-making) encompasses a positive and negative CMOC regarding SU's PA decision-making. Promoting SU ownership over their PA choices is important, as the secure inpatient environment frequently imposes control. Providers must promote SU autonomy and ensure that PA is not compulsory or forced.

CMO5 (positive and pleasurable PA experiences) emphasises the importance of PA experiences being positive and pleasurable. Providers should therefore ensure that SUs engage in meaningful activities at intensities that are comfortable for them. This approach makes these experiences enjoyable, rewarding, and chosen by the SUs. Promoting pleasurable experiences is

347 especially vital for SUs who lack the confidence in their ability to participate, fear failure, and have
348 had previous negative experiences with PA.

349 CMO6 (PA language) explains the importance of the sensitivity around the language used
350 when encouraging SUs to engage in PA. Reassuring and supportive language is especially important
351 for those lacking the confidence to engage in PA.

352

Table 6

Taking a Multi-Component Approach to PA Implementation Programme Theory

What Works	For Whom	Why	Under What Circumstances
When delivering PA to SUs, it is important to create a supportive environment that offers deliberate (e.g. gym sessions) and incidental PA opportunities (e.g. fun and inclusive ward activities). Facilitating small, achievable, and manageable PA changes while supporting SUs in choosing activities that align with their interests and comfort levels, helps to promote positive, memorable experiences that encourage future participation.	These approaches are important for SUs who have low confidence in their ability to participate in PA or who may not wish to participate in formal PA.	Ensuring that activities are at an intensity SUs are comfortable with makes PA experiences enjoyable, positive, rewarding, and memorable. Involving SUs in decision-making, in an environment where control is frequently imposed, fosters a sense of autonomy, empowerment, and ownership, making engagement in activities more meaningful. Being part of an enthusiastic and engaging ward environment also promotes a sense of connection, harmony and collaboration with SUs and staff.	Positive outcomes are more likely when ward staff are motivating, inclusive, and welcoming. Additionally, these outcomes are more likely when providers encourage participation without making PA compulsory or enforced, provide reassuring and supportive language that helps to ease SU insecurities around PA, and ensure PA is manageable and achievable.

362 **Table 7.**

363 *Taking a Multi-Component Approach to PA Implementation Context-Mechanism-Outcome Configurations*

364

Context-Mechanism-Outcome Configuration	Evidence Sources
CMOC3. Enthusiastic Environments When SUs lack the motivation or interest to engage in traditional formal exercise, but the culture of the ward is one where staff are enthusiastic, inclusive, motivating, committed, and facilitate a welcoming community that encourages participation in fun and engaging daily on-ward activities (e.g. bowling, dance, or tag) (C), then SUs are more likely to engage ward activities that increase their daily PA engagement (O). This is because SU's will be more likely to perceive these activities as enjoyable and experience a sense of connection, harmony, and collaboration with both SUs and staff (M).	(6,19,50,51,53,55,59,65,68–78)
CMOC4. Decision-Making: ***Positive:*** When residing in mental health units where restrictive practices are commonly employed and control is frequently imposed (C), SUs are more likely to take ownership of their health and engage in PA (O) if providers encourage them to participate in the decisions about their PA involvement (C). This is because when SUs can make decisions regarding their participation, they feel a greater sense of personal autonomy and empowerment in managing their own needs (M). ***Negative:*** When residing in mental health units where restrictive practices are often used, and control is frequently exerted (C), if SUs are excluded from decision-making about their participation in physical activities and when physical activity is made compulsory or enforced (C), then SUs may be less receptive to engage in and maintain PA (O). This is because of the SU's feelings of powerlessness and a lack of control over the activities they participate in (M).	(6,55,56,58,59,61,63,69,71,73,76,79–83)
CMOC5. Pleasurable PA Experiences When a SU has had negative experiences with physical activity, lacks confidence in their ability to participate, and fears failing at these activities (C), practitioners help by facilitating small, achievable, and manageable PA changes for the SU (C). By supporting SUs in choosing	(6,53,55,58,63,67,69,76,84–90)

activities that align with their interests, that is, activities that are meaningful to them and at an intensity they are comfortable with (C), SUs are more likely to engage and enjoy positive, memorable PA experiences (O). These positive experiences are crucial for encouraging future participation (O) because they make activities more enjoyable, rewarding, meaningful, and facilitate feelings of autonomy (M).	(53,55,58,67)
CMOC6. Physical Activity Language When a SU has had negative experiences with PA and lacks confidence in their ability to participate, a provider who creates a safe and supportive environment and uses positive reassuring PA language (C), increases the likelihood of the SU engaging in PA with them (O). This is because the SU is likely to feel more secure and experience less anxiety about participating in PA (M).	

Note. C=Context; M= Mechanism; O=Outcome; SU=Service User; PA=Physical Activity

Discussion

Summary of Findings

This synthesis has provided a new perspective of the research concern PA provision in secure in inpatient settings. By adopting a realist approach and synthesising insights from 65 sources of evidence and expert stakeholders, we have developed two programme theories and six detailed CMOCs. These theories go beyond conventional evaluation of "what works on average". They offer causal explanations and nuanced insights into "what works, for whom, why and under what circumstances". The findings reaffirm that implementing PA programmes in secure inpatient mental health settings represents a complex social intervention that requires multiple strategies and a multidisciplinary approach (18).

Comparisons to Theory and Existing Literature

An important aspect of realist synthesis is the utilisation of substantive theory to help explain inferences regarding drivers for individuals' actions (91,92). The theories below have implications to the PTs and CMOCs.

Taking a Socio-Ecological Approach

The socio-ecological model (93), also known as the ecological systems theory, helps explain how sociological influences within the inpatient secure setting affect PA behaviours. This framework views individuals as embedded within social systems that interact to produce health outcomes (94). The model identifies five interacting levels of influence on health behaviours: intrapersonal factors, interpersonal (relational) factors, institutional factors (including social and organisational environments), community, and public policy. McLeroy et al (93) posited that intervention strategies should target all these levels to be effective.

Our findings suggest that implementing multiple environmental changes across different levels of the socio-ecological model influences SU PA behaviours. Programme and intervention strategies should emphasise changes in three keys areas: the environmental (e.g. promoting enthusiastic cultures), the intrapersonal context (e.g. strengthening relationships and enhancing

provider delivery), and the institutional contexts (e.g. ensuring adequate staffing for PA delivery and providing access and funding for equipment). It is essential to address all of these areas while tailoring interventions to the individual needs of each inpatient.

Our findings therefore offer an alternative approach to popular delivery methods by moving beyond placing the SU at the centre of PA behaviours. Previous research has highlighted the importance of creating more effective and motivating inpatient environments that do not solely rely on an SMI individual's motivation (19). Those with SMI often struggle with self-management due to various factors including high doses of medication, illness symptoms, and systemic challenges (95). Motivational interviewing and goal setting are the most frequently employed intervention approaches in PA interventions for individuals with SMI (96). These approaches rely on individuals' self-regulatory abilities. Such reliance can lead to unrealistic expectations regarding an individual's motivation to make rational decisions to pursue PA goals (97). Consequently, relying solely on SUs to self-manage and cognitively plan to achieve their goals will likely to be ineffective for individuals with SMI in inpatient psychiatric settings. This highlights that individual-level approaches alone might not be the best interventions for inpatients with SMI on secure wards (19). Alternative approaches need to be considered. For example, our findings emphasise the importance of how PA is delivered. Specifically, through fostering motivational and supportive social environments for SUs.

Basic Psychological Needs

To create more motivational environments, this synthesis found that PA programmes should promote three basic psychological needs (BPN): autonomy, competence, and relatedness (98). The BPN theory emphasises creating social environments directly affecting these three innate and essential needs (99). When all three needs are satisfied, individuals experience greater intrinsic motivation, which is one of the strongest predictors of exercise adherence in the general population (100). The BPNs have also been shown to play an important role in the engagement of people with SMI in PA (60,76).

418 The BPN theory aids in understanding PT2 and its CMOCs. Autonomy refers to the
419 experience of willingness and volition (101). Promoting SU's agency and autonomy is important
420 because the relationship between autonomy and psychiatric disorders is complex, with autonomy
421 often being undermined (79). For example, in CMOC4, involving and supporting SUs in PA decision-
422 making relating to PA is essential for fostering the feelings of autonomy. Conversely, if SUs are
423 excluded from decisions or participation in PA feels compulsory or pressured, their receptivity to
424 engaging in PA is likely low (77,81).

425 Relatedness refers to the experience of feeling connected and significant to others through
426 warmth, care, and bonding (101). Social connection is an important mechanism for engaging in PA
427 (CMOC1, 3) and is crucial for building a therapeutic alliance with providers. Being part of an
428 environment that fosters meaningful social connection offers numerous social benefits (6,77),
429 including promoting a sense of community (6) and feelings of being cared for and accepted (50,69).

430 Competence refers to the experience of mastery and effectiveness (101). In PT2, ensuring that
431 changes are small, achievable, and rewarding helps foster feelings of competence among SUs, which
432 is an essential motivator for engaging in PA (6,60,67). Experiences of competence are particularly
433 important for SUs who have had negative experiences with PA, lack the confidence in their ability to
434 engage in activities, and fear failure. If a SU struggles to complete the PA programme and experiences
435 feelings of failure, this thwarts their competence, further exacerbating feelings of insecurity and self-
436 doubt towards PA. Together, the findings of this synthesis highlight that creating social environments
437 around SUs that aim satisfy the BPNs can be effective for PA engagement.

438 ***Relational and Technical Trust***

439 Another important finding is the substantial role that PA practitioners play in engaging SUs in
440 PA programmes. The development of trust emerged as a crucial mechanism in the relational context
441 surrounding these programmes, influencing the initiation and maintenance of engagement. In mental
442 health care, trust is conceptualised as "the belief that service providers will care for them properly

443 and, more specifically, that providers will be competent and honest, pursue the interests of service
444 users, and protect private information" (102).

445 Trust is complex, dynamic, multifactorial, and influenced by various factors, such as past
446 experiences, perceived power imbalances, culture, diagnosis, and knowledge of services (103). The
447 quality of interaction and trust between the provider and patient is fundamental to patient satisfaction
448 and service engagement (103). In the clinical environment, trusting therapeutic relationships are
449 essential for PA engagement (6). Although the importance of trust in mental health settings has been
450 articulated for engagement in other areas, for example medication optimisation (92), it has yet to be
451 addressed within recent reviews of the research area. This is therefore another unique finding of the
452 synthesis.

453 A theoretical framework proposed by Metz et al. (104) for building trusting relationships to
454 support implementation helps to explain our findings from PT1. Traditionally, trust has been
455 conceptualised as a rational process driven by self-interest, overlooking the nuanced roles of
456 perceptions, attributions, and affective processes involved in building relational trust (104). This bi-
457 dimensional model conceptualises trust through two core mechanisms: relational and technical, as
458 found in PT1.

459 Relational trust is facilitated through authenticity, empathy, consistency, and emotional
460 support, all predicted by the strength and quality of interactions between providers and participants.
461 These approaches elicit positive affective responses and foster relational security, therefore fostering
462 trusting relationships and engagement with service providers. Conversely, technical trust is a
463 cognitive approach focusing on PA provider's demonstration of competence, expertise, and
464 knowledge in delivering PA. Metz's dual-process approach provides a new perspective on how trust
465 operates within SMI PA engagement.

466 Prioritising relational and technical trust is key to fostering high-quality relationships, which
467 is essential for achieving successful implementation outcomes (104). However, the time required to
468 foster high-quality relationships may encounter practical challenges for providers, due to time

469 constraints and workload. Therefore, future research is needed to explore the feasibility of this PT in
470 real-world settings.

471 ***Affective-Reflective Approaches***

472 The affective-reflective theory (ART) of inactivity (97) helps to explain PT2. The dual-
473 process model focuses on the "type 1" (affect-centric, pleasure-orientated, automatic) and "type 2"
474 (reflective, rational, self-determined) processes involved in inactivity and exercise behaviours. The
475 theory posits that we have initial instinctive and automatic associations to exercise drawn from past
476 exercise experiences and the need to self-preserve. These automatic responses are consciously
477 reflected upon when PA is offered. If the SU consciously chooses to initiate PA, following the exercise
478 behaviour, cognitive and affective encoding will give feedback to the automatic associations. Thus, if
479 PA exercise is too strenuous, unpleasant, unenjoyable, or causes discomfort, this negative affective
480 feedback becomes encoded into the individual's automatic associations. The next time they are
481 approached to engage in PA, negative automatic associations and affective valuation will occur, and
482 they will be unlikely to initiate PA behaviours. Whereas if PA experiences are positive, the next time
483 SUs are approached to be active, these automatic positive feelings will be reflected upon, increasing
484 the chances of future PA initiation. To sustain continued participation, affective experiences are key to
485 adherence (105,106).

486 Our findings from both PTs fit into the ART. For many, PA brings back negative past
487 experiences and emotions, which can make those who struggle with it fear failure and lack the
488 confidence to be active. Practitioners who lead PA sessions should keep activities small, achievable,
489 manageable, and at comfortable intensities for SUs. As a result, SUs will have enjoyable, rewarding,
490 autonomous PA experiences, which are cognitively and affectively encoded. The next time they are
491 approached to be active, these automatic positive feelings will be reflected upon. Therefore, positive
492 and pleasurable PA experiences were key to future PA initiation. The ART, therefore, highlights the
493 importance of automatic positioning and affective associations promoting sustained engagement in
494 PA.

To advance the research area, future SMI research should explore hedonic motivational approaches that offer new, broader perspectives. This new perspective should consider theories that address both automatic and conscious processes for engaging in PA. Furthermore, little is known about the predictive role of the mechanisms of enjoyment and affect in long term PA engagement within psychiatric populations (107). The findings of this synthesis therefore give a unique contribution to the research area by shedding new light on the importance of promoting approaches to PA that promote positive affective experiences for PA engagement.

Future Directions, Strengths and Limitations

To advance the development, refinement, and exploration of SMI PA programmes, the feasibility and proposed effectiveness of the PTs could be further explored by evaluating their application in real world settings. This could be achieved through qualitative exploration or a consensus style method of the proposed functionality of the PTs and CMOCs with more stakeholders. Furthermore, realist researchers have also introduced additional research questions, such as 'what cost', that explore theory cost-effectiveness (108). Specifically, exploring how some resources offered require economic or monetary investment, and do others not. Therefore, considerations of these PTs real-world application and cost-effectiveness require evaluation.

This synthesis also focused on SMI SUs as "actors". Given its socio-ecological nature, emphasis has been placed on creating a thriving social environment and PA delivery. Future realist research would therefore benefit from exploring staff members as actors; for instance, investigating the leadership and political contexts and resources that facilitate staff competence and confidence to deliver PA.

A strength of this synthesis is extensive stakeholder consultations to iteratively develop and refine cPTs. Engaging stakeholders throughout the process ensured our findings reflected real-word experiences and helped to gain a more comprehensive picture of and helped to shape the programme theories. However, our expert group consisted mostly of staff members with only one expert by

experience included. The included studies also reflected the lack of SU data, mainly focusing on the staff perspective. The lack of SU voice is likely due to informed consent and ethical barriers.

Conclusion

This synthesis provides a novel perspective on understanding PA engagement among SMI inpatients. PA programmes should adopt a multi-level and multidisciplinary approach to ensure they are engaging for all SUs. The findings emphasise the quality of the relationships between SUs and providers, the environment created on the wards, and promoting and facilitating positive PA experiences, as fundamental to optimising PA engagement. The findings offer practical recommendations for improving PA services and contribute to the field, informing future research and practice.

Declarations

Ethical Approval and Consent for Publication

The study was granted ethical approval from Loughborough University's research ethics committee (2021-6220-5431). To ensure confidentiality, stakeholders' identities were anonymised, and collected data securely stored on a Microsoft One Drive server. Stakeholder consent was obtained for the inclusion of direct quotes.

Availability of data and material

The analysed data set is available from the corresponding author on reasonable request.

Consent for Publication

Not applicable

Competing Interests

The authors declare that they have no competing interests.

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Authors Contributions

TK was the primary author of the manuscript and conducted all stages of the synthesis. FK, JH and KM made significant contributions to the methodology, results, development and refinement of the PTs, and multiple manuscript drafts. All authors contributed to the final manuscript (TK, KM, JH, JAK, KB and FK).

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Abbreviations

cPT – Candidate Programme Theory

CMOC – Context-Mechanism-Outcome-Configuration

PA – Physical Activity

PT – Programme Theory

SMI – Severe Mental Illness

SU – Service User

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