EARLY INTERVENTION IN THE REAL WORLD

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Implementation of physical activity interventions in a community-based youth mental healthcare service: A case study of context, strategies, and outcomes

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Abstract

Aims: Physical activity interventions are recommended for community-based youth mental health services to prevent physical health disparities. Implementation is challenging, and studies focusing on the methods to achieve change are needed. This study aims to identify the context, implementation strategies, and implementation outcomes that illustrate how physical activity interventions were implemented within an early intervention service in Australia.

Methods: A theoretically informed case study was undertaken. Data from a community-based youth mental health service that delivers an early psychosis programme were collected between July and November 2020. Three data sources were accessed (1) interviews with service managers, mental health clinicians and exercise physiologists; (2) document review of organizational policies and procedures; and (3) survey using the Program Sustainability Assessment Tool. The implementation outcomes investigated were acceptability, fidelity, penetration, and sustainability. Framework analysis was used, and a logic model developed guided by an established template, to interpret findings.

Results: Forty-three contextual factors and 43 implementation strategies were identified. The data suggests that creating a new clinical team and auditing and feedback

are critical for implementation. High levels of acceptability and sustainability were described, while fidelity of implementation was difficult to establish, and penetration was low.

Conclusions: The relationship between constructs suggests several mechanisms underpinned implementation. These include changing professional beliefs, establishing new organizational norms, augmenting existing work processes, and aligning physical activity with priorities of the mental healthcare system and existing work tasks. This case study provides direction for future health service planning of physical activity interventions in community-based youth mental health service.

KEYWORDS
evaluation, implementation outcome, implementation strategy, physical activity, youth mental health

1 | INTRODUCTION

Physical activity (PA) is beneficial for youth experiencing first episode psychosis (Firth et al., 2016; Firth et al., 2018; Parker et al., 2021). Physical activity, as a component of screening and lifestyle interventions, can help address the aetiology of poor physical health that is often detected early in the course of mental ill health (Carney et al., 2016; Correll et al., 2017). Poor physical health, including overweight and obesity, hypertension, insulin resistance and metabolic syndrome, contribute to higher rates of non-communicable disease and reduced life expectancy in people with serious mental illness (Firth et al., 2019). As such, preventative actions including screening and lifestyle interventions, are recommended through early intervention services (Shiers & Curtis, 2014).

Despite evidence suggesting these interventions are acceptable (Firth et al., 2016), feasible (Firth et al., 2018) and implementable in real-world settings (Smith et al., 2020a), an implementation gap exists. Wide-spread uptake and support for service users to engage with physical activity, is low. The implementation gap, that is 'interventions are not implemented with sufficient fidelity and consistency to produce optimal benefits' (Brownson et al., 2017) is a recognized problem in healthcare. Implementation research is a potential response to reduce or close this gap (Czosnek et al., 2020).

Implementation research investigates the methods needed to accelerate the uptake and use of evidence-based interventions (EBIs; such as PA) in routine healthcare practice (Bauer & Kirchner, 2019; Eccles & Mittman, 2006). Critical to implementation research is (1) the clinical or public health problem and the determinants that inhibit or enable implementation of EBIs; (2) identifying implementation strategies to help uptake (e.g., training, reminding clinicians) (Kirchner et al., 2020); (3) measuring implementation outcomes that result from the process of implementation (e.g., fidelity of implementation) (Proctor et al., 2011); and (4) the context surrounding this relationship (Damschroder, 2020). Context typically captures the unique circumstances that influence implementation efforts at a given site (Damschroder et al., 2009;

Nilsen & Bernhardsson, 2019). Establishing the relationship between context, strategies and outcomes is important because when this relationship is successful, implementation of EBIs is optimized and people receive best practice care (Proctor et al., 2011). A set of definitions of implementation research terms is provided in Supplementary file 1.

Previous research illuminates the contextual factors influencing implementation of lifestyle interventions (e.g., time, location, transportation, and attitudes of staff; Deenik et al., 2019; Mucheru et al., 2020). However few studies investigate what implementation strategies are used and the outcomes of these efforts (e.g., does training stakeholders improve acceptability of PA interventions? Deenik et al., 2020). Modelling and simulating desirable behaviours is an implementation strategy previously adopted in a community-based youth mental health service (e.g., engaging staff in physical healthcare; Rosenbaum et al., 2020). Whilst other strategies are generally suggested, they have not been identified through empirical studies (e.g., creating academic partnerships, identifying and preparing champions, and involving patients, consumers and family members; Lederman et al., 2017). Separately, outcomes of EBIs have been evaluated, but the same has not occurred for outcomes of implementation (Lederman et al., 2020). To the best of our knowledge, studies have not drawn together the context, strategies, and implementation outcomes to offer a comprehensive and transparent account of the change process involved in implementing PA interventions. This includes detailing the mechanisms that describe how the implementation strategy supported behaviour changes and contributed to successful implementation.

This study aims to address these gaps and answer the following research questions:

1. What context, strategies and outcomes contribute to the implementation of PA interventions within an early psychosis programme (EPP) in a community-based youth mental health service?
2. How can the learnings from a case study help to define what is implementation success?

2 | METHOD

2.1 | Study design

A case study approach was used to gain an in-depth understanding of the implementation process (Yin, 2018). Data from the following sources were collected in parallel: (1) Qualitative semi-structured interviews (with organizational executives, service managers, social workers, psychologists, nurses, accredited exercise physiologists [AEPs]); (2) Document review of organizational policies and procedures; (3) Quantitative survey using the Program Sustainability Assessment Tool (PSAT; Luke et al., 2014).

Three frameworks guided data collection and analysis. The Consolidated Framework for Implementation Research (CFIR; Damschroder et al., 2009) is a determinant framework that consists of 39 constructs organized into five domains that illustrate and prioritize contextual factors. The Expert Recommendations for Implementation Change (ERIC; Powell et al., 2015) is a taxonomy of 73 implementation strategies grouped within nine categories. The Implementation Outcomes Framework (Proctor et al., 2011) is an evaluation framework (Nilsen, 2015) used to measure eight implementation outcomes, four of which are used in this study (acceptability, fidelity, penetration, and sustainability). These four implementation outcomes were selected for measurement in this study as we sought to understand the later stages of implementation (via measurement of acceptability, penetration, and sustainability). Fidelity of implementation was included because of its implicit importance in verifying whether PA was implemented as intended to elicit the anticipated clinical outcomes (Proctor et al., 2011).

An interview guide was developed, informed by the CFIR interview tool, to guide semi-structured interviews (CFIR, 2018). A checklist from case study literature detailed the typical documents that the research team were seeking to collect from the site (Yin, 2018). Finally, the PSAT was selected because it is one of few validated sustainability measurement tools (Luke et al., 2014). It measures an interventions capacity for sustainability across eight domains (environmental support, funding stability, partnerships, programme adaption, communications, organizational capacity, strategic planning, programme evaluation). A case study database was created by the authorship team to maintain and organize the data collection.

Ethical approval for the study was granted by Sydney Local Health District (Concord Hospital) 2019/ETH 11806 and Alfred Health (516/19).

2.2 | Case description

The community-based youth mental health service is in Victoria, Australia. The service delivers an EPP at four different locations, of which the PA interventions are part of that service and the focus of this study. Young people are eligible for EPP if they are aged between 12 and 25 years, have experienced functional decline over the preceding 3 months (e.g., school absence) and are experiencing psychotic symptoms or are at high-risk of symptoms. The EPP provides services to approximately 550 young people at any one time and provides many supports including: reengagement in study and/or employment, relationship support, access to education courses, participation in creative and social activities and facilitating contact with a general practitioner.

2.3 | Data collection

Data collection occurred between July and November 2020. Clinical and administrative personnel from the case site helped locate relevant organizational documents. We interviewed staff who had some knowledge of the PA services delivered within the organization. We purposely selected staff with different job roles to obtain a rounded, organizational perspective of implementation (Greenhalgh et al., 2012). A subset of staff ($n = 3$) completed the 40-item PSAT survey, which is consistent with previous studies using this tool (Kelly et al., 2013; Stoll et al., 2015). The PSAT results are pooled across the three staff to provide an organizational view of programme sustainability that highlights areas of programme strength and weakness (Calhoun et al., 2014; Washington University, 2018).

2.4 | Data analysis

Descriptive statistics were calculated for the PSAT. Qualitative data was uploaded into NVivo 12 (QSR International, 2018) and analysed using framework analysis (Gale et al., 2013). To index and code the data, a coding frame was established a priori that aligned with the frameworks guiding this study. That is, we applied the determinants listed in the CFIR, the implementations strategies listed in ERIC and the four implementation outcomes examined in this study from Proctor's Implementation Outcomes, as codes in NVivo 12. Data were then mapped to the corresponding code and a framework matrix developed. This informed the content of the logic model, guided by an established template, (Smith et al., 2020b) to interpret the findings (Moore et al., 2015; Smith et al., 2020b). The data analysis was led by the first author (LC). An iterative process of review and cross-checking occurred with members of the research team (S.R., N.R., E.Z., J.R.), at scheduled monthly meetings, to produce the final logic model.

Supplementary file 2 provides a summary of the constructs, measures, and corresponding data sources for this study.

3 | RESULTS

3.1 | Description of study participants and data sources

We identified 37 data sources. We completed 10 semi-structured interviews (female $n = 8$, 80%; male $n = 2$, 20%) with staff. Most staff had between 6 and 10 years of experience ($n = 4$, 40%), or greater

than 10 years of experience ($n = 4$, 40%). Staff represented diverse roles including: (1) AEP ($n = 2$, 20%); (2) key referral source ($n = 2$, 20%); (3) other health professionals ($n = 4$, 40%); (4) executive ($n = 1$, 10%); and (5) programme manager ($n = 1$, 10%). Three PSATs were competed, and 24 documents were reviewed. Documents included: (1) evaluations ($n = 8$, 33%); public-facing documents (e.g., website; $n = 8$, 33%); (2) administrative resources (e.g., positions descriptions, staff manuals; $n = 6$, 25%); and (4) programme-specific protocols ($n = 2$, 8%).

3.2 | Description of the physical activity intervention

The PA interventions were administered by two AEPs, who service the four locations. On entry to EPP, young people work with a case manager to develop a care and recovery plan. Within this, completing a physical health screen is recommended by 6 weeks of initial service contact. The physical health screen prompts referral to PA services. Young people who are taking psychotropic medications or indicate concern/interest in their weight, sleep or level of activity are offered access to the AEP. Young people can also self-refer to PA service. The AEP conducts an initial assessment with the young person and establishes an individualized PA intervention. This may include a home programme, attendance at a local gym, or participation in walking groups or specialist programmes (e.g., tennis, football, bushwalking). Family members and friends can join the PA services for social support.

3.3 | Context and implementation strategies

Table 1 summarizes the contextual factors and implementation strategies identified with reference to the thematic frameworks (CFIR and ERIC).

3.3.1 | Contextual factors (CFIR)

Forty-three contextual factors were identified, of which 21 were prioritized as highly influential to the implementation process (Table 1). Table 2 provides a description of these 21 factors, of which seven were barriers and 14 were facilitators of the implementation process.

3.3.2 | Implementation strategies (ERIC)

Forty-three implementation strategies were identified across eight (of the possible nine) ERIC categories (Table 1). Table 3 provides a summary of the implementation strategies that are proposed to align with the prioritized determinants.

Supplementary file 3a and 3b provide an expanded explanation supported by relevant data sources for the 43 contextual factors, and a description of the 43 implementation strategies.

TABLE 1 Contextual factors and implementation strategies categorized to thematic frame

Consolidated framework for implementation research (CFIR) (5 domains)	Total number of determinants identified through study	Prioritized determinants[b]
Intervention-level factors (e.g., physical activity)	6	3
Outer-setting level factors (e.g., environment)	4	3
Inner-setting factors (e.g., organization)	19	8
Individual-level factors (e.g., healthcare clinician)	7	3
Process-level factors (e.g., implementation steps)	7	4
Total	43	21

Expert Recommendations for Implementing Change (ERIC) (9 Categories)	Number of implementation strategies identified within each category N (%)[a]
Adapt and tailor to context	5 (75.0)
Change infrastructure	3 (42.8)
Develop stakeholder interrelations	6 (37.3)
Engage consumers	6 (100.0)
Provide interactive assistance	0 (0.0)
Support clinicians	4 (80.0)
Train and educate stakeholders	10 (72.7)
Use evaluative and iterative strategies	8 (60.0)
Use financial strategies	1 (11.1)
Total	43

[a]Within category frequencies are reported for each discrete implementation strategy category.
[b]A list of prioritized determinants can be found in Table 2.

3.4 | Implementation outcomes (implementation outcomes framework)

3.4.1 | Acceptability

Physical activity is acceptable and viewed as a valuable addition to the service. Staff framed their perception in the context of the AEP's delivering the service and its importance for youth – 'Look, I just think...the people who are working within exercise physiology are fantastic workers...' (Interview 05).

Albeit acceptability had been encouraged over time—'But I guess from feedback that I've heard and observation, it's often something

TABLE 2 Description of prioritized contextual factors that influenced implementation

Barriers		
CFIR Domain	CFIR construct	Description within this study
Intervention	complexity	screening for physical health and referral to PA create more work for clinicians
Inner setting	*relative priority*	*physical health slips in the context of dealing with more immediate issues (e.g., homelessness)*
	implementation climate	*between team differences exist, which impact physical health screening rates and referral to PA*
	available resources	*there is a view that the AEP role is spread thin due to the number of staff versus the number of sites they service*
Individual	knowledge & beliefs about the innovation	clinicians lack exposure to PA in their working career, and therefore have a low affinity with PA
	self-efficacy	some clinicians view screening for physical health and referral to PA as outside their professional scope of practice, as such they lack confidence with the process
	stage of change	the degree to which PA is integrated within normal team operations
Enablers		
	CFIR construct	Description
Intervention	relative advantage	PA provides the solution to actioning the outcomes of physical health screens
	adaptability	PA is tailored to meet young people's needs
Outer setting	patient needs & resources	young people's voices are integrated across the organization (e.g., in individual treatment, service delivery and governance)
	cosmopolitanism	capacity for PA services is built through partnerships with external organizations
	external policy & incentives	a collaborative governance model enables evidence-informed practice, funding, and accountability
Inner setting	networks & communications	a flat hierarchy exists that encourages easy communication amongst staff and leaders
	culture	leaders recognize their responsibility to create a supportive working environment
	tension for change	*tolerance for accepting poor physical health has become untenable and drives change*
	learning climate	*staff are supported to participate in ongoing professional learning opportunities and a safe learning environment has been created*
	leadership engagement	*leaders drive change and value PA*
Process	engaging	case manager and mangers are viewed as the main stakeholders to engage for programme success
	formally appointed internal implementation leaders	*a dedicated role was created with responsibility for physical health*
	external change agents	*high profile individuals and organizations support implementation*
	reflecting & evaluating	*systems and processes exist to support ongoing service monitoring*

Note: Italics = Indicates construct is a sibling within CFIR framework.
Abbreviations: AEP, accredited exercise physiologist; CFIR, consolidated framework for implementation research; PA, physical activity.

that's forgotten about. And exercise physiologists have to push a fair bit…' (Interview 10).

3.4.2 | Fidelity

Quality of programme delivery
The EPP has a service model that includes 16 core components, of which two align with PA (medical interventions and group programmes). Independent fidelity checks were completed against each of the 16 core components, wherein most recently the service achieved superior results, indicating high fidelity to the core components.

Dose/amount of programme
Figures from the 2019/2020 financial year indicate the average number of AEP sessions per person is 38, which includes all attempts to

contact. Direct service provision is estimated at between one and 12 sessions. Attendance rates were not routinely captured; however, a snapshot indicates they varied from 45% (January 2020) to 77% (February 2020). The lack of specificity about the activities delivered within the PA interventions means fidelity of implementation could not be confidently determined.

3.4.3 | Penetration

Service system
The level of service integration (2019/2020 financial year) suggests approximately 18% ($n = 253$) of young people accessing the EPP service have sessions with the AEP. Typically, young people who access the AEP have approximately 20% longer duration of contact with the service than the organization average.

TABLE 3 Implementation strategies aligned to prioritized determinants

Category	ERIC strategy	Short description of strategy
Adapt and tailor to context	Promote adaptability	Different types of PA are developed and delivered to young people by trained staff (e.g., AEP)
	Use data experts	A dedicated research position supports clinical staff to conduct ongoing evaluations of services
Change infrastructure	Change record system	PA services are included within electronic medical records and the physical health screening form prompts referral to PA
	Mandate change	Leaders outlined expectation for physical health care
Develop stakeholder interrelations	Develop academic partnership	A formal partnership exists with a local university that supports governance, service quality and can advocate for the service
	Involve executive boards	Regular reporting through governing organizations is established. Reports aggregate information collected through 'quality monitoring tools/system'
	Use advisory board and workgroups	A youth advisory group is established at all sites
	Visiting other sites	Leaders were exposed to PA programmes operating in other jurisdictions during the pre-implementation phase
Engage consumers	Involve patients' consumers and family members	Young people's voices are included in individual treatment, service delivery and strategic planning
Support clinicians	Create new clinical team	A dedicated role exists that is responsible for physical health
	Resource sharing agreement	Partnerships have been established with external PA providers and discount membership fees negotiated with local gyms
	Facilitate relay of clinical data	The AEP attends multi-disciplinary team meetings to discuss young people's care and progress
	Remind clinician	'Educational materials' are used to prompt for physical health screening and referral to PA
Train and educate stakeholders	Conduct educational meetings	Presentations about PA are delivered through whole-of-staff meetings. Staff can engage in one:one learning sessions with the AEP
	Create a learning collaborative	A physical health special interest group has been established that has representation from most teams and workshops implementation issues
	Develop educational materials	The AEP role and functions are detailed within an organizational manual and a flow chart documents the process for physical health screening and referral to PA
	Shadow other experts	During the early implementation phase, staff paired-up to conduct physical health screening
Use evaluative and iterative strategies	Audit and feedback	A system exists to track completion of physical health screens as per procedures, with the results relayed to staff
	Develop and implement tools for quality monitoring	Templates exist that collect clinical and non-clinical data. This information guides individual care and can be aggregated within organizational reports (see involve executive boards)
	Develop and organize a quality monitoring system	A system exists to tracks which case managers are referring to PA (and those that are not)
	Obtain and use patient, consumer and family feedback	Surveys are developed to capture young people's views, and this is fed through to the executive
Use financial strategies	Other payment scheme	The service operates through a commissioning model

Abbreviations: AEP, accredited exercise physiologist; ERIC, expert recommendations for implementing change; PA, physical activity.

Sub-system

Penetration within the sub-system appears high. A staff manual exists that documents the PA services and instructions on how to refer. The PA services are included within the organizations reporting requirements (number of young people seen, type of PA services, workforce issues, and professional development completed) and the organizational budget includes a staffing allocation for PA interventions.

3.4.4 | Sustainability

Table 4 summarizes the PSAT results.

Evolution over time

The domains of *environment support* (5.7 ± 0.8) and *program adaption* (5.5 ± 0.7) achieved the highest scores from the PSAT assessment,

TABLE 4 Results of the Programme Sustainability Assessment Tool (PSAT)

Domain	Definition[a]	Mean[b] (SD)
Environmental support	Having a supportive internal and external climate for your programme	5.7 (0.8)
Funding stability	Establishing a consistent financial base for your programme	4.0 (0.9)
Partnerships	Cultivating connections between your programme and its stakeholders	3.8 (1.2)
Organizational capacity	Having the internal support and resources needed to effectively manage your programme and its activities	4.5 (1.1)
Program evaluation	Assessing your programme to inform planning and document results	4.2 (1.5)
Program adaptation	Taking actions that adapt your programme to ensure its ongoing effectiveness	5.5 (0.7)
Communications	Strategic communication with stakeholders and the public about your programme	4.9 (0.9)
Strategic planning	Using processes that guide your programme's direction, goals, and strategies	4.9 (0.9)

[a]Definitions as supplied.
[b]Possible range; 1–7, with higher scores indicating areas of greater programme strength.

indicating areas of programme strength. A key adaption made to the programme that supported implementation sustainability included providing different PA interventions (e.g., developing group and online classes). *Environmental support* including bi-partisan political support and champion roles, which were evident at the site, also supported sustainability—'But there are champions of it and that is the (A)EPs, the practice nurse and (the) physical health portfolio group'. (Interview 02)

Programme components

Partnerships (3.8 ± 1.2) and *funding stability* (4.0 ± 0.9) achieved the lowest scores on the PSAT. This suggests areas for improvement and are directly relevant to the programme components (e.g., maintaining a qualified workforce to deliver the programme and provision of multiple PA opportunities). The service is funded through a commissioning model, which results in some staff turnover due to an inability to provide ongoing employment contracts. Despite this, the organization is viewed as well-resourced.

While PSAT results suggest *partnerships* are an area for improvement, data from other sources does not corroborate this. The document review identified 23 organizations as formal partners of the service.

Health outcomes

No mechanism exists to monitor health benefits of the PA interventions over time which is a recognized service gap—'But the problem is

often we don't always know when the end is and so people will get discharged (without assessment by AEP)… and that's something we're trying to fix'. (Interview 02)

Relationship between context, implementation strategies and implementation outcomes

Supplementary file 4 maps the relationship between the context, strategies and outcomes and offers the mechanism for how implementation strategies exert their effect. The mechanisms suggested to underpin change include: (1) optimizing or enhancing existing workflows; (2) building clinicians' knowledge and skills; (3) influencing the social environment within the organization; (4) motivating clinicians to act in a certain way by establishing expected outcomes; (5) establishing processes that align PA with existing organizational workflows and (6) positioning PA as a value-adding solution to broader priorities of the mental healthcare system. A logic model that depicts the process of implementation is provided in Figure 1.

4 | DISCUSSION

This study applies implementation research to understand the integration of PA interventions in a community-based youth mental healthcare service delivering an EPP. Forty-three contextual factors influenced implementation, with a similar number of implementation strategies used to address these determinants. We posit that these actions contributed to various implementation outcomes (acceptability, fidelity, penetration, and sustainability). By combining these concepts, we provide a logic model that illuminates how implementation occurred.

4.1 | Contextual factors

Consistent with previous literature (de Jonge et al., 2020; Denieffe et al., 2021; Happell et al., 2012; McCurdy et al., 2020), healthcare providers lack of exposure to, knowledge about, and skills in discussing PA impacted their intention to act (e.g., screen and make referrals to PA). This was compounded by perceptions that screening and referral processes were complex, added more work and a lower priority than other issues (e.g., homelessness, unemployment). The practical implications of these findings are that implementation strategies that improve clinicians' knowledge and skills alone (e.g., education/training), are unlikely to address the challenges of workload and perceived complexity. Strategies are also required that prioritize physical health (e.g., audit and feedback) amongst other important issues and change social norms (e.g., leaders mandating change).

Organizational leaders played a critical role in prioritizing PA. Leaders allocated resources, prioritized a positive organizational culture and provided protected learning time. The extant literature identifies culture change as important for PA implementation (Rosenbaum et al., 2018). However, to the best of our knowledge only one other study has explored the role of leaders (Cabassa et al., 2020). This is despite their recognized role in influencing implementation success (Albers
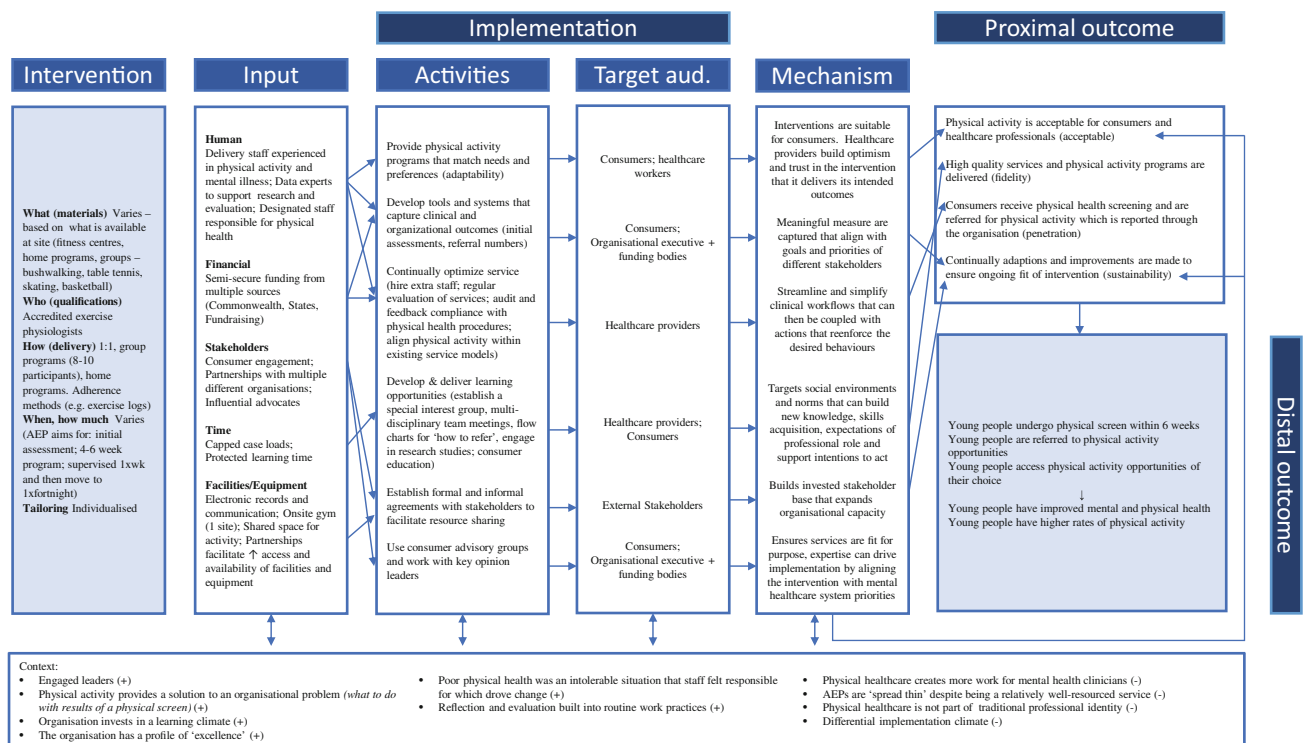
FIGURE 1 Logic model depicting the implementation process for physical activity interventions

et al., 2020; Brownson et al., 2017; Williams et al., 2020). Cabassa and colleagues posit key leadership actions were: (1) securing funding; (2) building organizational capacity; and (3) ensuring lifestyle interventions fit with existing organizational structures (Cabassa et al., 2020). Our study concurs with these findings and extends the knowledge base in PA by showing how the leaders' role can amplify evidence-based practices. This included: (1) embedding monitoring and evaluation in routine work practices; (2) integrating partnerships and workforce development opportunities within organizational reporting; and (3) enabling protected learning time (e.g., physical health special interest group).

4.2 | Implementation strategies

The study site used many implementation strategies, of which *creating a new clinical team* (e.g., adding a new nurse coordinator role) and *audit and feedback* appear critical. These strategies appear critical because they created additional, dedicated resource to coordinate the organizations approach to physical healthcare. This increased support for staff, some of whom, expressed having low exposure to physical healthcare and PA in their working history. Auditing practices, accompanied by strategies that educated and supported clinicians, reinforced the desired behaviour. A recent study that rated the importance of different strategies in relation to metabolic screening in veterans with mental illness, identified 35 strategies as 'absolutely essential' for implementation (Waltz et al., 2021). Many strategies identified by Waltz and colleagues were consistent with our study including: audit and feedback, developing and implementing tools for quality monitoring, identify and prepare champions and mandating

change (e.g., leaders with sufficient seniority to enforce change). Further, our study found limited use of financial strategies, which is also consistent with Waltz and colleagues' findings. Taken together, our findings offer insights into strategies that may be appropriate in similar mental healthcare settings. Future studies can build on this work by testing the effectiveness of these strategies, or combinations of strategies, to sustain PA interventions (Powell et al., 2019). For example, by comparing implementation success between services that use a nurse consultant and audit and feedback systems, versus those that do not. This should help identify the dedicated implementation supports required to deliver PA interventions.

4.3 | Implementation outcomes

The evaluation of fidelity evidenced a high-quality service, yet fidelity of programme dose/amount (that is needed to produce clinical outcomes) is unknown. This makes it challenging to determine fidelity of implementation. To resolve this, the record-keeping system could be updated to monitor if the intervention was delivered as planned or adaptations were needed. Second, the service-level penetration (or reach) was relatively low (18%), with people who see the AEP typically having a longer duration of contact with the service. This suggests a potential referral bias exists whereby only those with the most acute needs are being referred to the AEP. Low penetration is potentially being compounded by the individualized delivery model and level of resourcing allocated to the PA services. Combined, these findings suggest a need to explore other delivery models, such as increasing group-based services. The social support that comes from groups

(Shannon et al., 2020; Watkins et al., 2020), may be particularly appealing to youth. Group programming could also improve alignment with recommendations to better protect the good physical health of people who are at-risk, in addition to improving the physical health of people with mental illness (Firth et al., 2019).

4.4 | Relationship between context, implementation strategies and implementation outcomes

Applying case study methodology, we developed an implementation logic model to explain the implementation process. This included detailing the mechanisms that are theorized to bring about change. Identifying mechanisms is an under-studied area of implementation research (Lewis et al., 2020). A recent systematic review identified three previous studies employing case studies methods that identified mechanisms of change (Lewis et al., 2020) Consistent with our findings managerial feedback that *motivated* staff (Frykman et al., 2014), delegating *tasks responsibility* to a particular staff member, ensuring team members understood their colleagues work roles to build *trust* (Wiener-Ogilvie et al., 2008) and augmenting clinical *norms* were identified mechanisms (Bardosh et al., 2017). It is promising that across these case studies consistency in mechanisms is identified. This suggests some confidence can be taken from the learnings of our case study. However, given the limited research in this area replicating our findings is needed, prior to widespread application. Replicability should help future sites develop appropriate implementation strategies (ideally guided by ERIC or similar taxonomy) that identify and include the critical elements of change.

4.5 | Limitations

This study focused on organizational-level implementation and examined service providers perspectives of implementation of their service. We did not engage consumers or families, meaning that the findings need to be verified with service-users prior to application at other sites. The PSAT provides a cross-sectional view of sustainability but does not provide a definitive cut-off point at which sustainability is assumed. Further, the measures identified to evaluate the implementation outcomes were reliant on availability of data at the site. In some instances, this data was inaccessible, or incomplete. For example, results for service level penetration were calculated based on data supplied by the organization, however this data was not routinely collected and analysed by the service. Finally, due to COVID-19 we were unable to undertake onsite observations as initially intended.

5 | CONCLUSION

Few studies identify context, implementation strategies, implementation outcomes and relationship between these factors to articulate how implementation occurs. We found many factors appear inter-related and

multiple strategies were in-use to support effective delivery of PA. We suggest strategies that allocate direct responsibility for physical healthcare to a specific person or team is essential for effective implementation (e.g., nurse coordinator role). This is separate to hiring staff that have the required skills to deliver PA (e.g., AEP). To achieve this, leaders have a critical role in realigning or creating resources. To build on our work, future studies could: (1) test the effectiveness and cost of the implementation strategies identified (Powell et al., 2019); (2) routinely evaluate implementation outcomes within pragmatic trials to measure implementation success (Shepherd et al., 2019); and (3) build change processes that allow empirical testing of implementation components to identify the most effective bundles that lead to successful implementation (Lewis et al., 2018). Building on our work will contribute to more efficient, targeted implementation planning that can help introduce PA in youth mental health services and ultimately improve care.

DATA AVAILABILITY STATEMENT

The data that supports the findings of this study are available in the supplementary material of this article.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Czosnek, L., Rosenbaum, S., Rankin, N. M., Zopf, E. M., Cormie, P., Herbert, B., & Richards, J. (2023). Implementation of physical activity interventions in a community-based youth mental healthcare service: A case study of context, strategies, and outcomes. *Early Intervention in Psychiatry*, *17*(2), 212–222. https://doi.org/10.1111/eip.13324