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The association between motivation and physical activity among forensic and rehabilitation inpatients in Aotearoa New Zealand

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ABSTRACT

The aim of this study was to examine the association between motivation and physical activity among forensic and rehabilitation inpatients living with serious mental illness in Aotearoa New Zealand (NZ). Patients from a long-stay forensic and rehabilitation inpatient facility were recruited to participate in an interview that collected information on their personal characteristics (e.g., age, gender), motivation to be active using the Behavioural Regulation in Exercise (BREQ-3-PA), and physical activity levels using the Simple Physical Activity Questionnaire (SIMPAQ). The association between motivation and physical activity was examined using Spearman's rho and classified according to accepted thresholds for correlation coefficient effect sizes. All participants (n = 24) met global and national physical activity recommendations. All correlations between the different physical activity types and the relative autonomy index score were negligible (Spearman's rho < 0.3), as were correlations between total moderate-vigorous physical activity and each of the six motivation subscales (Spearman's rho < 0.3). Participation in exercise and sport was positively correlated with intrinsic motivation (Spearman's rho = 0.356) and identified regulation (Spearman's rho = 0.391). All other correlations between physical activity types and the motivation subscales were negligible (Spearman's rho < 0.3). In summary, there was limited evidence of an association between physical activity participation and motivation to be physically active. Results may have been affected by the effects of institutionalisation within this population, whose ability to act autonomously is severely limited. Further research is required to better understand the potential benefit of motivational interventions to encourage physical activity participation, and what form they should take.

1. Introduction

The physical health of people living with mental illnesses has been noted as a priority area for clinical practice and research internationally (Firth et al., 2019) and in New Zealand (Te Pou, 2020). A considerable mortality gap exists between those with and without severe mental illness (SMIs; e.g., schizophrenia, bipolar disorder, and major depressive disorder) (Thornicroft, 2011). This persistent inequity is largely attributable to the relatively poor physical health of individuals with SMI, among whom non-communicable diseases are responsible for more premature mortality than suicide (Correll et al., 2017; Hayes et al., 2015; Olfson et al., 2015; Swaraj et al., 2019; Vancampfort et al., 2017). Review level evidence indicates that these long-term health inequities mirror lower levels of physical activity participation by people experiencing SMI and that encouraging participation in

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physical activity can be an effective intervention for improving physical health in this population group (Bull et al., 2020; Schuch et al., 2017; Stubbs et al., 2016; Vancampfort et al., 2017). Specifically, effective promotion of physical activity can contribute to improving both the physical and mental health of people experiencing SMIs.

The socio-ecological model has been widely used to understand physical activity behaviour and develop interventions to improve participation (Bauman et al., 2012; Sallis & Saelens, 2000). Within populations under mental health services, physical activity is influenced by public policy (funding, restrictions imposed under the Mental Health Act such as e.g., leave status), community (facility policy, facility design and accessibility), interpersonal (peer networks, support from mental health professionals), and individual factors (e.g., self-efficacy, attitudes, motivation) and personal characteristics (e.g., gender, ethnicity, socio-economic status, health status, disability). While each of these factors are important antecedents of physical activity behaviour, an individual's motivation has been shown to be a significant predictor of physical activity for people living with SMI (Vancampfort et al., 2017). Among the most popular conceptualisations of human motivation – supported by a large body of evidence – is self-determination theory (SDT) (Deci & Ryan, 2000).

Broadly, SDT posits that there are two types of motivation: autonomous and controlled. Autonomous motivation comes from within an individual, and is comprised of three types. Intrinsic motivation describes undertaking an activity out of enjoyment or mastery (e.g., playing a favourite sport); identified regulation describes undertaking an activity because it is aligned with one's personal values (e.g., exercising because it improves physical health); integrated regulation describes undertaking an activity because it is linked to one's identity (e.g., being a 'runner' or a 'cyclist'). Conversely, controlled motivation is externally driven. External regulation is prototypical of this – being active on the basis of receiving a reward or avoiding a punishment. More relevant to physical activity is introjected regulation – which describes ego-based motivation such as exercising to attain a certain body ideal, often as a result of societal pressure. Individuals often experience several such types of motivation at any one time, and they can fluctuate over time (Lindwall et al., 2017). In the presence of autonomous motivation for physical activity, long-term adherence and psychological well-being are more likely if the surrounding social and physical environment are conducive to participation (Jenkins et al., 2021; Teixeira et al., 2020).

SDT also posits that key to autonomous motivation is the satisfaction of three basic psychological needs within a given behavioural context: competence, autonomy, and relatedness (Deci & Ryan, 2000). In the context of physical activity, autonomy refers to an individual feeling that they have choice in their physical activity (Ryan & Deci, 2000), competence refers to feeling able to meet specific activity-based goals (e.g., a certain amount of steps), and relatedness refers to feeling socially connected to others within the context of physical activity (e.g., peers or instructors; Edmunds et al., 2006). As a result of having these three psychological needs met within a given context, autonomous motivation is more likely. There is existing evidence regarding the importance of satisfying psychological needs in the development of motivation for physical activity (Teixeira et al., 2020).

While research into the relationship between motivational type and physical activity among individuals with SMI is limited, existing research does indicate an association between autonomous motivation for physical activity and physical activity behaviour (Sørensen, 2006; Vancampfort et al., 2015). However, despite these findings, very few studies have involved people who are institutionalised in mental health care facilities, which is a unique and important context that warrants further investigation. Our prior exploratory research in this population suggested motivation to be a key factor, with sedentary participants spontaneously raising 'low motivation' as a barrier to being physically active (Every-Palmer et al., 2018).

Therefore, the aim of this study was to assess the association between motivation and physical activity among a population of forensic and rehabilitation inpatients experiencing SMI in NZ. This will provide insight into the relative importance of motivation as a determinant of physical activity behaviour in this population group. In doing so, our objective is to understand how to improve support for sustained participation in physical activities that are beneficial to the physical and mental wellbeing of SMI inpatients at mental health care facilities.

2. Methods

2.1. Participants

Participants were recruited from long-stay forensic and rehabilitation inpatient units (Te Korowai Whariki) at Ratonga Rua o Porirua Hospital, which houses patients with various mental illnesses (psychosis, bipolar, schizoaffective disorder) and serves five district health boards across the lower North Island of Aotearoa New Zealand. Patients have different access to leave according to their legal status and the specific ward in which they reside (of which there were four), with these wards ranging from medium security (restricted access) to open access.

Inclusion criteria stated that participants must: be a current inpatient of the forensic and rehabilitation mental health services; have a diagnosis of a psychotic disorder and/or a mood disorder with psychotic features (ICD-10 or DSM-5 criteria); meet diagnostic criteria for a serious mental illness (clinician-administered); have the capacity to provide informed consent (as assessed by the treating psychiatrist); and have spent a minimum of two months in the service (such that treating teams could have adequate time to treat their mental state and to ascertain that they have capacity to give informed consent). Exclusion criteria included: a mental state considered by the treating psychiatrist as too unstable to participate in the trial; and an inability to speak English.

Patients were invited to study information sessions organised by hospital staff (i.e., not members of the research team, thus minimising coercion). Patients who indicated interest were provided with an information sheet that included research team contact details. Once contact was made and the patient agreed to participate, informed consent was obtained. Data collection took place from June 2021 to September 2021. Participants' access to physical activity opportunities varied according to the ward on which they resided, but all included a minimum of weekly access

to a personal trainer and access to cardio fitness equipment and weight areas. In addition, swimming pool access (subject to approval by an on-site occupational therapist) and a weekly sports group were available to participants. Opportunities for walking included one on-site treadmill and pathways around the facility grounds. For those with approved leave into the community, there was also the opportunity to walk to the nearest town with amenities (shops, takeaways) located approximately one kilometre away.

Ethical approval was granted by the University of Otago Ethics Committee (New Zealand). Māori consultation was undertaken with the Ngāi Tahu Māori Consultation Committee. Participants' time was acknowledged with a NZ$40 supermarket voucher.

2.2. Procedure

Physical activity and motivation data were collected at one time point for each participant, via face-to-face interviews that lasted approximately 20 – 30 minutes. Study data were collected and managed using REDCap electronic data capture tools hosted at the University of Otago. All participants identifying information (names and other identifiable information) was removed and linked by a secure keycode. Only the principal investigator and the researcher administering the data collection tools had access to the raw data.

2.3. Measures

2.3.1. Participant characteristics

Key descriptive data collected included: age, gender, ethnicity, and smoking status. One participant did not report their smoking status. Other variables recorded included: leave status (whether the participant was able to leave their unit and if so the number of hours/week approved leave); access to physical activity support; primary psychiatric diagnosis; other psychiatric diagnoses; current psychotropic medication; patient status (forensic or rehabilitation); whether the participant was under the Mental Health Act; non-psychiatric diagnoses and associated medication; and height and weight which were used to calculate body mass index (BMI). Data were retrieved from participants' patient records, with their explicit permission (requested during the informed consent process).

2.3.2. Physical activity

The Simple Physical Activity Questionnaire (SIMPAQ; Rosenbaum et al., 2020) was designed to measure self-reported physical activity, sedentary behaviour, and sleep of people living with a serious mental illness. The SIMPAQ consists of five sections, covering sleep, sedentary behaviour, walking, physical activities such as exercise and sport, and any other incidental physical activities (e.g., gardening, household chores). The SIMPAQ was conducted via face-to-face interviews. The SIMPAQ has been shown to be valid and reliable across various samples (Rosenbaum et al., 2020). For the purposes of this study, physical activity was separated into: i) walking; ii) exercise and sport; iii) other physical activity. As per the SIMPAQ analysis rules, total moderate-vigorous physical activity was also estimated by summing the walking and the exercise and sport domains (Rosenbaum et al., 2020; Simple Physical Activity Questionnaire, 2019).

2.3.3. Motivation for physical activity

The Behavioural Regulation in Exercise (BREQ-3-PA version; Markland & Tobin, 2004; Wilson et al., 2006) consists of 24 items, each answered on a five-point Likert-type scale from zero (not true for me) to four (very true for me). There are six subscales each containing four items: i) Intrinsic motivation (e.g., 'I am physically active because I enjoy it'); ii) Integrated regulation (e.g., 'I consider physical activity as part of my identity'); iii) Identified regulation (e.g., 'It's important to me to be regularly physically active'); iv) Introjected regulation (e.g., 'I am physically active because other people say I should be'); v) External regulation (e.g., 'I take part in physical activity because my friends/family/partner say I should'); and vi) Amotivation (e.g., 'I don't see the point in being physically active'). Mean scores were calculated for each subscale. These scores were also weighted and summed according to established protocols to give a composite overall score known as the Relative Autonomy Index (RAI) (Connell & Ryan, 1985; Grolnick & Ryan, 1987; Howard et al., 2020; Markland & Ingledew, 2007).

2.4. Statistical approach

All analyses were conducted using SPSS Version 26.0 (IBM, Armonk, NY). There were initially 38 participants who agreed to be part of the study and met the inclusion criteria. Three participants provided incomplete responses to SIMPAQ items and were excluded. A further 11 participants were excluded after applying the SIMPAQ cleaning rules (i.e., nine participants provided responses that accounted for less than 18 hours of their day and two participants reported walking and/or exercise values exceeding the 2.5 SD threshold) (Simple Physical Activity Questionnaire, 2019). Analyses were conducted on the remaining 24 participants. Descriptive statistics were computed to characterise the data. Spearman's rho correlation coefficients were used to examine the association between each of the motivation variables and the physical activity variables because the data was not normally distributed. We applied widely accepted effect size parameters from the field of behavioural science to define the strength of association for the calculated correlation coefficients (i.e., 0.0 – 0.3 = negligible correlation, 0.3 – 0.5 = low correlation, 0.5 – 0.7 = moderate correlation, 0.7 – 0.9 = high correlation, 0.9 – 1.0 = very high correlation) (Hinkle et al., 2003).

3. Results

3.1. Participants characteristics

Descriptive statistics for the participant characteristics are presented in Table 1. The mean age of participants was 34.3 ± 12.5 years. Most participants were men (75.0%), Māori (58.3%), had leave from their unit (75.0%), used more than 10 hours of leave/week (58.3%), did not smoke (56.5%), and were classified as having obesity (70.8%). The mean BMI was 36.3 ± 7.8 kg/m^2.

All participants were receiving compulsory treatment under mental health legislation.

Table 1: Participant characteristics.

	n	%
Gender		
Men	18	75.0
Women	6	25.0
Ethnicity		
NZ European	6	25.0
Māori	14	58.3
Pasifika	3	12.5
MELAA	1	4.2
Leave status		
Yes	18	75.0
No	6	25.0
Amount of leave used (hours)		
0 – 2	6	25.0
2 – 5	0	0.0
5 – 10	4	16.7
10 – 15	1	4.2
15 – 20	5	20.8
20+	8	33.3
Smoking status		
Smoker	10	43.5
Non-smoker	13	56.5
Weight status		
Normal weight (18.5 – 24.9 kg/m^2)	17	70.8
Overweight (25.0 – 29.9 kg/m^2)	6	25.0
Obese (≥ 30.0 kg/m^2)	1	4.2

Note: NZ = New Zealand; MELAA = Middle Eastern, Latin American, and African.

The most common primary diagnosis was schizophrenia (n = 21, 87.5%). The primary diagnosis of the other three participants was schizoaffective disorder, major depressive disorder, and bipolar affective disorder. Ten participants did not have a secondary psychiatric diagnosis (41.2%), though 12 had a substance use disorder (50%), two had post-traumatic stress disorder (8.3%), one had attention deficit hyperactivity disorder (4.2%), one had a history of depression (4.2%), and another had schizotypal personality disorder (4.2%).

With regards to antipsychotic medication, 14 (58.3%) participants were taking Clozapine, 11 (45.8%) were taking atypical medication (e.g., Olanzapine, Risperidone, Quetiapine, Paliperidone, Aripiprazole), four (16.7%) were taking mood stabilisers (Lithium, Sodium Valproate), two (8.3%) were taking antidepressants (SSRIs, Venlafaxine), two (8.3%) were taking benzodiazepines (Lorazepam, Diazepam, Clonazepam), and seven (29.2%) were taking other psychiatric medication. Six (25.0%) participants were taking multiple types of antipsychotic medications.

Nine participants had no comorbid physical health conditions (37.5%), whereas eight had metabolic risk factors (e.g., hypertension, hyperlipidemia) (33.3%), three had musculoskeletal afflictions (e.g., arthritis, chronic joint pain) (12.5%), three had breathing troubles (e.g., sleep apnea, asthma, emphysema) (12.5%), two had polycystic ovary syndrome (8.3%), two had hyperthyroidism (8.3%), two had low iron/anemia (8.3%), and three reported other conditions (12.5%).

3.2. Physical activity and motivational characteristics

Descriptive statistics for the participant physical activity duration and motivation scores are presented in Table 2. Most physical activity occurred via walking. Overall, the participants scored highest for intrinsic motivation and identified regulation, but integrated regulation was also scored highly.

All participants reported participating in at least one hour of physical activity daily and easily exceeded current global recommendations for physical activity participation (Bull et al., 2020). We note that many of our participants provided information that did not sufficiently account for 24 hours. Recall is understood to be low in this population, and for this reason the SIMPAQ includes aids to maximise recall (e.g., the interviewer totals the hours recall as the interview progresses). This is also reflected by the SIMPAQ guidelines that indicate accounting for between 18 and 30 hours is sufficient recall (Rosenbaum et al., 2020).

Table 2: Physical activity and motivation descriptive statistics.

	M	SD
Self-reported physical activity (hrs/day)		
Walking	2.2	2.3
Exercise and sport	0.5	0.4
Other	0.3	0.6
Moderate-vigorous	2.7	2.3
Motivation to be active (scale)		
Intrinsic motivation	3.1	0.7
Integrated regulation	2.7	1.1
Identified regulation	3.1	0.7
Introjected regulation	1.9	1.1
External regulation	1.5	1.2
Amotivation	0.4	0.6
Relative Autonomy Index	11.7	5.0

3.3. Association between motivation and physical activity

Results from the correlation analyses are presented in Table 3. All correlations between the different physical activity types and the RAI score were negligible (Spearman's rho < 0.3). The

correlations between total moderate-vigorous physical activity and each of the six motivation subscales were also negligible (Spearman's rho < 0.3). However, participation in exercise and sport was positively correlated with both intrinsic motivation (Spearman's rho = 0.356) and identified regulation (Spearman's rho = 0.391), albeit a weak association. All other correlations between physical activity types and the motivation subscales were negligible (Spearman's rho < 0.3).

4. Discussion

We found high levels of self-reported physical activity, primarily in the form of walking, in our sample of inpatients with SMI at a mental health care facility in New Zealand. Although there was a negligible association between total moderate-vigorous physical activity and all indicators of motivation to be physically active, volitional physical activity (i.e., exercise and sport) was weakly associated with both intrinsic motivation and identified regulation. Despite several limitations, our findings have important implications for the development and delivery of physical activity interventions for people experiencing SMIs and are admitted to mental health care facilities.

The levels of physical activity reported in our sample far exceeded that in the general population in New Zealand (Ministry of Health - Manatū Hauora, 2020; Sport New Zealand - Ihi Aotearoa, 2020). This contrasts with the existing international evidence for people experiencing SMI, who typically fall below general population norms (Schuch et al., 2017; Stubbs et al., 2016). Indeed, even compared to previous research within the same population (Huthwaite et al., 2017), physical activity levels were significantly elevated. Although this is almost certainly partly due to selection bias in our sample from voluntary recruitment, it is important to note that previous meta-analyses did not include data from New Zealand where clinical care norms are rapidly evolving to be more inclusive of physical activity 'prescription' (Schuch et al., 2017; Stubbs et al., 2016). Indeed, in the region from which our sample was taken there has been an increasing focus on embedding physical activity in the usual care provided by mental health care practitioners (Capital and Coast District Health, 2015).

Another potential reason that our results differed to previous research in this population lies in the data capture method. The SIMPAQ, being delivered via an interview and designed to provide increased hourly accountability, was more sensitive to smaller incidental physical activities as compared to the self-report measure used previously (Huthwaite et al., 2017). Further, specific changes in the context since the previous study were reported by staff working at the facilities, including new programmes facilitated by on-site cultural support groups and compulsory morning 'outside' time in some units that were not in place during the previous study.

Research assistants reported that some participants were also walking outside while using electronic cigarettes (i.e., to 'vape'), an activity that was not permitted during Huthwaite et al.'s (2017) study. Staff also anecdotally reported that participants 'pacing' inside the unit was a common form of physical activity, which might have been missed by less sensitive self-report physical activity measures. It is highly likely that our results reflect a mixture of these recent institutional and regulatory changes. Finally, we note that self-report methods for PA are subject potential reliability issues (Firth et al., 2018) regardless of the population being studied.

The high levels of physical activity participation in our sample may partially explain the limited associations we found with motivation to be active. Despite the ongoing conjecture in the international literature, most studies report a much stronger cross-sectional association between physical activity and motivation to be active when compared to our study (Owen et al., 2014; Teixeira et al., 2012). However, all prior studies comprised fewer active participants. The geographical context of the facilities – located on a large campus one kilometre distance from the nearest shops – may have resulted in patients with appropriate leave status accumulating physical activity opportunistically through walking as a means of getting somewhere rather than as a deliberate exercise strategy. It is also possible that participants in our study had a substantial volume of physical activity embedded in their daily mental health management plan, and that direct supervision of this within an inpatient setting increased their participation irrespective of their motivation. A case in point is the compulsory daily outdoors time - characteristic of controlled motivation - which existed at the time of data collection in some of the units.

Table 3: Spearman's rho correlations between physical activity and motivation to be active.

Motivation subscale (BREQ-3-PA version)	**Self-reported physical activity (hrs/day)**			
	Walking	**Exercise and sport**	**Other**	**Moderate-vigorous**
Intrinsic motivation	0.034	0.356[#]	0.179	0.079
Integrated regulation	0.257	0.194	-0.096	0.296
Identified regulation	0.171	0.391[#]	0.062	0.293
Introjected regulation	0.038	0.207	0.027	0.053
External regulation	0.001	0.129	0.077	0.019
Amotivation	-0.293	-0.031	-0.105	-0.242
Relative Autonomy Index	0.244	0.117	0.056	0.284

Note: [#]Denotes a low correlation according to established thresholds for effect size (Hinkle et al., 2003).

This may partly explain why physical activity was not strongly associated with autonomous motivation in this study. Of note, previous studies of physical activity motivation in the SMI population have not been conducted specifically within forensic inpatients with limited leave.

Thus, structured physical activity offered to our participants as part of usual care combined with more limited autonomy than the general population could have increased physical activity via mandated participation. Although this potentially has physical health benefits for individuals with SMI (Correll et al., 2017; Olfson et al., 2015; Swaraj et al., 2019; Vancampfort et al., 2017), if autonomy is compromised, it may also have a negative impact on their immediate mental health and their sustained participation in physical activity. It is now well established that positive experiences of physical activity are critical for improving mental health and facilitating ongoing participation in people experiencing SMI (Bull et al., 2020; Firth et al., 2016). An important part of this is providing participants with the opportunity to initially choose physical activity options that they find appealing (Collado-Mateo et al., 2021). Added to this, of course, is the fact that participants' recently increased use of electronic cigarettes might have contributed to increased physical activity, this balance of different health behaviours is clearly a delicate one.

Despite the evidence for the mental health benefits of walking (Kelly et al., 2018), its overwhelming contribution to total physical activity and underwhelming association with motivation in our results suggests that it may not have been the activity of choice for our sample. In contrast, it appears that the intrinsic motivation our study participants had to engage in physical activity did contribute to their participation in exercise and sport. Similarly, our results for identified regulation indicate that the participants attached personal importance to being physically active and this was also a determinant of their engagement in physical activity. These findings highlight the importance of focusing on enjoyment and personal values, particularly via environmental and/or experiential interventions, when attempting to motivate people with SMIs to be physically active (Rhodes et al., 2009). Our results also add support for the qualitative findings from previous research with regards to high levels of autonomous motivation in this population (Every-Palmer et al., 2018).

However, our results also contextualise and bring into question the relative importance of motivational approaches for effective promotion of physical activity in SMI inpatient settings. Specifically, as we have surmised above, our findings indicate that the high levels of physical activity participation in our sample were not particularly driven by individuals' motivation to be active. Furthermore, implementing an intensive strategy to improve motivation at an intrapersonal level, such as motivational interviewing, in isolation is likely to have limited scalability and cost-effectiveness in this population group (O'Halloran et al., 2014). Rather, it is more likely that concurrently addressing multiple factors across the socio-ecological model will directly improve physical activity levels and indirectly influence motivation levels (e.g., changing socio-cultural norms to enable safe access for inpatients with SMI to a broad range of community sports) (O'Halloran et al., 2014; Solar & Irwin, 2010). This does not preclude individualised approaches to address motivation, but there is a clear need for further research to understand its role in SMI inpatient settings.

Further research should include longitudinal and intervention studies to overcome the cross-sectional limitations of our study and establish the temporal relationship between motivation and physical activity participation in SMI inpatients. Based on our findings, this may be particularly pertinent when considering the transition that occurs when an inpatient with SMI is discharged into the community. Although motivation did not appear to be a critical factor for engaging in a large amount of physical activity in a highly structured inpatient setting, it may become more important as an individual moves to an environment that is likely to be inherently less supportive. For example, the social and built environment within which individuals will live is fundamentally different upon discharge, meaning many habits formed during an inpatient stay may not transfer unless individuals are appropriately prepared and supported to make this transition. Despite this, our results indicate that even people without a large amount of leave from the facility were engaged in physical activity levels well above national norms (Ministry of Health - Manatū Hauora, 2020; Sport New Zealand - Ihi Aotearoa, 2020). How well this is sustained after discharge is yet to be ascertained and warrants further investigation. Importantly, as is the case in other areas of health within Aotearoa and previous research in this population, Māori were overrepresented in our sample. As such, any interventions that are developed should at least be culturally responsive or ideally based on cultural knowledge that reflects the target population (e.g., Mātauranga Māori).

There were several other limitations to our study that should be addressed in future research. As previously mentioned, one limitation is the small sample size. Participants represented only 26% of the total number of patients in these forensic and rehabilitation services. Recruitment for such research is historically challenging within forensic and rehabilitation services, and our participation rates were similar to previous research in the same population (e.g., Huthwaite et al., 2017). Therefore, even though our participants were highly active, they were not representative of the larger population of patients within these services. It is possible that those who chose not to participate did so in part because they were not active, or participation precluded by failing to meet inclusion criteria at the time of recruitment. The small sample size prevented more nuanced and adjusted analyses.

Additionally, the small sample size is attributable to the exploratory nature of our study, the uniqueness of the target population, and challenges in obtaining complete measurement responses (e.g., due to participant recall). The use of objective measurement devices would address the widely recognised concerns about the validity of self-report physical activity measures, particularly in this population group whose recall capacity is often compromised (Sallis & Saelens, 2000). Although the SIMPAQ was specifically developed for people with SMI with these limitations in mind and has been validated internationally across multiple settings (Rosenbaum et al., 2020), our sample had particularly high attrition. Future research should ensure that measures are in place to improve data completion rates. For example, participants could be asked about a specific day (as opposed to a 'over the last seven days') or alternative measurement methods could be used (e.g., physical activity diary). Subjective reports can be triangulated with objective with objective recording through the use of activity trackers.

Furthermore, sampling from numerous inpatient facilities would help to increase sample size, as well as allow for comparisons between facilities to identify areas of apparent strength and/or weakness. Finally, assessing only motivation limited the ability to draw firm conclusions on other determinants of physical activity participation in the target population group. Assessing other psychological constructs, such as barriers/facilitators to physical activity may help identify what intrapersonal, interpersonal, and environmental factors need to be addressed.

In summary, our sample was a highly active group, but we found limited evidence of an association between physical activity participation and autonomous motivation to be physically active. However, the patient management methods in place in this context are likely to have impacted participants' autonomy, which would have influenced this association. We believe that autonomy-supportive motivational interventions based on motivational theory do have a place in forensic and rehabilitation services, but considering the restrictions in place in such settings, these are likely to look different in design as compared to those used in the general population. Regardless, any motivational work should leverage the perceived enjoyment and value of being physically active to engage people in exercise and sports of their choice. We also acknowledge that physical activity and exercise, while crucial to the improving the physical health of people living with serious mental illness, other factors also significantly contribute to health and well-being, including nutrition and smoking abstinence. As such, any efforts to improve the health of this population should consider multiple health behaviours besides physical activity. Future research involving larger samples, exploring changes over time, assessing other constructs, and/or involving comparisons between facilities or individuals in the general population is warranted.

Conflict of Interest

The authors declare no conflict of interests.

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