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Research Article

Exercise in Inpatient Addiction Treatment: A Qualitative Analysis of Adult Male Exercise Preferences during Treatment

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Abstract

Introduction: Research regarding the use of exercise in drug and alcohol treatment, despite its early promise, is underdeveloped. There have been few studies that lay the foundation for the type of exercise that may be preferred in an inpatient drug and alcohol setting. This study attempts to remedy this lack of knowledge by qualitatively assessing the exercise and physical activity preferences for males engaged in inpatient addiction treatment.

Methods: Twelve male, adult participants, engaged in treatment at a Southern facility in the United States, completed brief, semi-structured interviews *via* Zoom. Interviews included questions regarding the participants' physical activity history, use of the available exercise opportunities at the treatment center, and preferences for exercise and physical activity in the inpatient treatment setting. Participants also completed the Global Physical Activity Questionnaire (GPAQ).

Results: Qualitative analysis identified 6 primary themes:

- Current and/or Past Sport Participation,
- Current and/or Past Physical Activity Participation,
- Current and/or Past Exercise Participation,
- Exercise Improves Emotion Regulation and Enhances Perceptions toward Physical Body,
- Free Weights Provide the Option for Strength Training, and
- Treatment Centers should Prioritize Exercise and Nutrition.

Subthemes included exercise history during incarceration and a decrease in exercise during active addiction. GPAQ results revealed most participants had a history of manual labor.

Conclusion: Males who have a history of exercise prefer exercise during addiction treatment and feel that it is an important part of their recovery journey. Future research should explore exercise preferences among females in the treatment setting, as well as physical activity for those who are not already intrinsically motivated for exercise.

Keywords: Exercise; Addiction; Treatment; Physical activity; Substance use disorder

Introduction

The National Survey on Drug Use and Health estimated 21.7 million people, or 8.1% of the population, aged 12 and older needed substance use treatment and met criteria for substance use disorder in the year 2015 in the United States [1]. However, only 10.8% of the 21.7 million people who needed treatment were in receipt of treatment. In the alcohol and other drug treatment setting, the population is often transient and ever-changing, with some reports finding that about 45% of patients drop out of treatment in the first 5 weeks, 4% stay less than one day, and 40% stay less than 1 month [2]. The longer patients stay in treatment, the more likely they are to acquire the skills and tools necessary to maintain sobriety; therefore, treatment centers need to employ tactics that maintain the patients' presence.

In the increasingly necessary hunt for treatments that are reliable and effective, W.J. Lynch et al., (2013) suggest that research be devoted to determining whether exercise increases the likelihood of maintaining abstinence [3]. From a neurobiology perspective, the dopaminergic systems in the brain associated with the development of drug and alcohol addiction lie in the same pathway implicated with exercise behaviour [4,5]. Because the brain does not discriminate between different sources of dopamine triggers, it is viable that exercise can be utilized as an intentional part of substance misuse treatment programming. It has been suggested that the treatment setting include therapies that reduce the value of drug-related rewards and improve the response to natural, non-drug rewards, like exercise itself

[6]. In addition to acting on the reward pathways in the brain, regular exercise also independently reduces psychological symptoms that are often diagnosed co-morbidities in those with Substance Use Disorder (SUD), like depression and anxiety [7,8]. Especially in at-risk populations, exercise has been found to effectively reduce the symptoms associated with depression in addition to preventing depressive episode relapses [7].

Over the past decade, empirical data has mounted regarding the relationship between SUD recovery, addiction, and exercise, as evidenced by the recent review by Patterson and colleagues (2022). After reviewing 53 articles, the authors conclude that indeed, exercise in a clinical setting improves addiction outcomes. One way that exercise exerts its effect in the addiction treatment setting is by reducing cravings. In a small feasibility study, authors found that exercise performed at an intensity rated as just "somewhat hard" may help to attenuate drug cravings, at least temporarily [9]. Moderating drug cravings, even on a momentary basis, is important in the early stages of seeking sobriety. If exercise can provide patients a break from the assault of early sobriety cravings, then it may also allow patients to maintain treatment longer and gather more tools for successful recovery. Along with reducing cravings, exercise while in a treatment setting provides many physical benefits in addition to social benefits. As addiction recovery is often a community-oriented process, exercising with others while in treatment can enhance the sense of belonging among clients through being physically active [10]. Ultimately, the goal of SUD treatment is to provide patients with the tools necessary to maintain sobriety once they complete treatment. Exercise is one such behavioral tool that can be implemented for little cost to one's time and energy and resources.

Despite the many findings in support for exercise as a recovery tool, it should be noted that not all those in treatment experience exercise as a preferable activity. One published study found no difference in quality of life measures among patients enrolled in an exercise intervention as compared to controls [11]. To examine this further, client exercise preferences in treatment need to be identified. Some studies have begun to explore the exercise preferences of those engaged in various stages of treatment and suggest that patients prefer exercise that is easy to access and begins early in recovery [12-14]. In the intensive outpatient setting, Abrantes et al., (2012) found that 95% of respondents (N=97) expressed interest in engaging in exercise specifically designed for those in substance recovery and 89% wanted to initiate exercise within the first 3 months of sobriety. Further, survey results indicated that overall, participants wanted to engage in exercise that was unsupervised, self-paced, and included resistance/strength training. Similar results were replicated in the inpatient setting, with one study citing 70.6% of respondents in favour of receiving exercise counselling as part of their overall treatment [14]. Finally, in a recent meta-analysis of physical activity preferences in individuals with substance use disorders, Simonton et al., (2018) found that participants preferred exercise to be located at the facility at which they frequent and that they preferred activities like walking, strength training, and cycling.

Given the need for improvements in substance treatment and the health benefits of exercise, further research is warranted. The aim of this study was to explore the exercise and physical activity history and preferences for males engaged in inpatient drug and alcohol addiction treatment. Authors conducted interviews and qualitative data analysis to explore answers to the main research question, which centered around exploring the experience of exercise during inpatient addiction treatment. The outcomes of this study will provide data that can directly inform the development of exercise programming in addiction treatment centres.

Methods

A phenomenological qualitative approach was utilized in this study. Phenomenology "describes the common meaning for several individuals of their lived experiences of a concept or phenomenon" [15]. Phenomenology was chosen as the main inquiry was centered on understanding the experiences of participants in addiction treatment. This study utilized the COREQ qualitative checklist to ensure sound methodology [16].

Setting

Participants in this study were adult males enrolled in an inpatient drug and alcohol treatment program in the Midwest/Southern region of the United States. The treatment program is a 28-day residential substance use program that includes some regularly scheduled exercise programming. Outside instructors come to the agency several times a week to lead the clients in CrossFit and yoga classes onsite. Additionally, some outdoor leisure time is offered on a daily basis as well as the opportunity to use the onsite exercise space, which includes limited cardio equipment and resistance bands. A small internal university grant accompanied this study, providing $ 3,000 to equip the onsite exercise space. When the interviewees refer to the exercise opportunities at the agency, they are referring to both the exercise classes taught by outside instructors and the equipment provided by the grant.

The individuals who participated in the study were offered a $ 10 gift card to a local grocery store in exchange for their time. Eligibility criteria included

- age 18 years or older,
- current active enrollment in the inpatient treatment program and ability to complete Zoom interview.

Participant recruitment took place following IRB approval; convenience sampling conducted by a treatment centre staff member solicited interest by reading an author-created recruitment script. The onsite research team member created the Zoom schedule and passed out gift cards to participants upon completion of interviews. A total of 12 participants agreed to be interviewed and all 12 attended on the day of the interviews.

Interviews

Interviews with the participants were semi-structured in nature. The interview questions were developed and conducted by 2 female study authors with experience working in addiction treatment. The researchers are both licensed counsellors and university faculty. One researcher is faculty in the Kinesiology department and the other is faculty in the Counselling department.

The nature of the semi-structured interviews allowed the researchers to gather information in a non-linear format and follow the participants' leads. The interviews included the gathering of demographic information, perceptions and preferences regarding exercise history and exercise in treatment (semi-structured interview piece), and the Global Physical Activity Questionnaire (GPAQ), in that order. Because this study took place during COVID, interviews were conducted *via* Zoom; no repeat interviews were conducted, and each interview lasted between 10 minutes-15 minutes. Participants took their interviews in a private room at the treatment agency while interviewers took them in a private room at their respective residences. Both participants and interviewers were on audio and video and the meetings were recorded.

The interviews occurred over the span of 2 weekend days, with one participant entering the interview room at a time, being called from a list by the onsite research coordinator (8 interviews on day 1, and 4 interviews on day 2). Non-participants were otherwise engaged in regularly scheduled programming at the agency. The researchers commenced the interviews by introducing themselves and providing a brief overview of the project, stating that the purpose of the research was to gather information on participant exercise history and their experiences with exercise while in addiction treatment. Verbal consent was solicited by the researchers and anonymity was explained. Participants were instructed to answer the open-ended questions as honestly and with as much detail as possible.

Data collection

Demographic questions included age, gender, sexuality, days of sobriety, treatment history, and drug of choice. Semi-structured interview questions centered around gathering information regarding the participants' physical activity, sport and exercise history, current engagement in physical activity, sport, and exercise, and preferences for activity within the treatment setting (**Appendix A**).

The GPAQ is a 16-item questionnaire developed for the World Health Organization that addresses the domains of activity at work, travel to and from places, and recreational activities [17]. The GPAQ is meant to be conducted in an interview style, with the interviewee following a specific set of questions and presenting the show cards when prompted. The set of questions asks participants to report whether they participate in vigorous or moderate physical activity while at work or in recreational activities. To ensure participant understanding of the physical activity questions intensity (e.g., vigorous, moderate), show cards are utilized. Vigorous-intensity activities were described as "activities that require hard physical effort and cause large increases in breathing or heart rate" while moderate-intensity activities were described as "activities that require moderate physical effort and cause small increases in breathing or heart rate" (GPAQ Analysis Guide, p.4). The show cards are depictions of individuals doing activities that demonstrate what is meant by moderate physical activity and vigorous physical activity in each of the aforementioned domains. The scale has been found to be valid for those with experience in Moderate-to-Vigorous Physical Activity (MVPA), which aligns with the purpose of this study [18]. To assess the travel domain, participants are asked to report whether they walk or use a bicycle for at least 10 minutes continuously to get to and from places. All of these domains (work, recreation, travel) are assessed regarding their participation weekly (yes/no), the number of days of their participation weekly, and the number of minutes per day spent in that type of activity. The final question asks participants how many minutes they spend sitting (outside of sleep) per day.

Data analysis

Data analysis followed the Thematic Analysis process outlined by Nowell et al., (2017) in order to adhere to qualitative research rigor. Specifically, researchers worked in a triad to complete the following phases of analysis:

- Phase 1: Familiarizing yourself with your data
- Phase 2: Generating initial codes
- Phase 3: Searching for themes
- Phase 4: Reviewing themes
- Phase 5: Defining and naming themes
- Phase 6: Producing the report.

Throughout the phases of analysis, the research triad (which included the 2 authors who conducted the interviews and have clinical expertise in substance treatment and a 3rd author) maintained reflexive journals, kept a detailed record of the handling of the data, and met regularly to review theme development and discuss data interpretation.

After familiarizing themselves with the data by reading the transcripts that were generated, the coding process began. Coding was conducted by 2 members of the research team, one of whom was also an interviewer. The coding process occurred over the course of 3 rounds during which the researchers worked independently and systematically through the entire data set creating a hierarchical coding schematic (coding software was not utilized). After each round of coding, the research triad met *via* Zoom; the coders detailed their findings and a 3rd researcher provided objective input and expertise. Once the data was deemed to be sufficiently coded, the coding researchers began the process of searching for, and reviewing themes.

The theme development process followed that of coding: The two primary coding authors worked independently to develop themes, then met with the 3rd author to debrief and refine. Initial themes were derived from some predefined

codes (e.g., exercise history) and "miscellaneous" theme was utilized to maintain contact with codes that did not seem to fit anywhere at first. Themes were reviewed, defined, and named over the course of several meetings between the coding authors and the research triad. Direct quotes from participants were maintained in their entirety so that raw data could be embedded in the final report.

Quantitative data was calculated for demographics and the GPAQ using SPSS statistics software.

Results

Twelve participants met inclusion criteria and were interviewed for this study. The participants were between the ages of 18 years-64 years old and 100% identified as heterosexual males (Table 1). All participants had at least 22 days of consecutive sobriety at the time of the interviews and drug of choice was varied. Participants had a history of prior treatment including detox, psychiatric hospitalization, 28-day residential, intensive outpatient, and outpatient.

Table 1: Participant demographic information

Category	Participants (N=12)
Age	
18-24	3
25-34	3
35-44	3
45-54	2
55-64	1
Sexual orientation	
Heterosexual	12
Days of sobriety	
0-7	0
8-14	0
15-21	0
22-30	5
31+	7
Treatment history	
Detox	4
Psychiatric hospitalization	4
28-day residential	12
Intensive outpatient	4
Outpatient	3
Drug of choice	
Marijuana	2
Alcohol	2
Heroin	2
Other	6
Note: Participants were instructed to select all treatment history they had completed	

GPAQ results

The results of the GPAQ compiled sample data regarding physical activity levels across 3 major domains: Activity at work, travel to and from places, and recreational activities (Table 2). The majority of participants reported a history of work experience that included vigorous and moderate physical activity (n=9; n=11). Some participants reported engaging in vigorous and/or moderate physical activity up to 7 days per week (m=4, SD=2.53; m=4.25, SD=2.221) with the number of minutes engaged in vigorous and/or moderate physical activity reported being as high as 12 hours per day (m=315.83, m=314.17, SD=221.337).

Table 2: GPAQ Results (N=12)

Domains	Subdomains	Count	Range (Weekly)	Mean (Weekly)	SD
Activity at work	V Work Experience	9	-	-	-
	V Days per Week		0-7	4	2.523
	V Minutes per Week		0-600	315.83	-
	M work Experience	11	-	-	-
	M Days per Week		0-7	4.25	2.221
	M Minutes per Week		0-720	314.17	221.34
Travel to and from places	Travel>10 minutes walking and/or biking	9	-	-	-
	Travel Days per Week		0-7	4.75	3.108
	Travel Minutes per Week		0-840	222.5	284.45
Recreation	V activity	8	-	-	-
	V days per week		0-6	1.75	1.815
	V minutes per week		0-240	84.17	75.854
	M activity	9	-	-	-
	M days per week		0-7	2.88	2.337
	M minutes per week			142.5	167.34
Sitting	-	-	0-480	186.67	118.35
Note: V=Vigorous intensity physical activity; M=Moderate intensity physical activity					

The majority of participants also reported spending more than 10 minutes per day travelling to and from places (n=9). Participants were instructed to exclude the physical activities at work that were already mentioned, and instead focus on the usual way that they travel to work, shopping, market, or a place of worship. The average number of days spent traveling more than 10 minutes was 4.75 while the average number of minutes traveling per week was 222.50, with some participants reporting 7 days of traveling by foot and/or bike per week and up to 14 hours a week.

In the recreation domain, again, most participants reported spending weekly time in vigorous and/or moderate physical activity (n=8; n=9). The participants reported spending an average of 1.75 days (84.17 minutes, SD=75.854) in vigorous physical activity and 2.88 days (142.50 minutes, SD=167.339) in moderate physical activity.

Last, the participants reported spending between 0 minutes-480 minutes sitting per day (sitting or reclining at work, home, getting to/from places, with friends, at a desk, playing cards or watching television; not sleeping). The average amount of time spent sitting was reported to be 186.67 minutes (about 3 hours) daily (SD=118.347).

Themes

Participant interviews revealed 6 primary themes regarding exercise.

Current and/or past sport participation: The majority of participants in this research study reported a history of participating in organized sport. Many of the participants reported engaging in organized sport as youth, with the most cited sport involvement being football. Additionally, some participants report that they have engaged in sport as an adult, primarily as a leisure time activity.

P3: I grew up playing sports football stuff and my instructor kept me in shape... Football, baseball... About 7 years, 6 years or 7 years. Probably more than that. More than that because I started in 5th grade. So, 5th grade to graduation.

P9: I mean, I used to play basketball in high school, so it kind of brings up some old memories of what we used to do. So that's kind of where it brings up my happiness really. So I'm getting a little bit older, I'm about to be 23 and you know exercise is a big thing for me and you know to reach some of my goals that I want to get. I mean it's really, it's really I guess important to me.

Current and/or past physical activity participation: The World Health Organization defines Physical Activity as "any bodily movement produced by skeletal muscles that requires energy expenditure" (WHO Physical Activity Fact Sheet, October 2022). This may include all movement "during leisure time, for transport to get to and from places, or as part of a person's work." Specifically referred to by the WHO are activities like "walking, cycling, wheeling, sports, active recreation and play, and can be done at any level of skill and for enjoyment by everybody." The majority of participants engaged in the interviews reported a history that is consistent with the WHO definition of Physical Activity. Participants reported engaging in a range of physical activity in their adult history, including leisure time physical activity (e.g., riding bikes, playing pickup basketball games), physically active work, and walking/biking as a method of transportation. Additionally, participants reported informally engaging in sport-based activities while attending inpatient treatment, like tossing a football, playing cornhole, or throwing discs.

P2: I love to ride a bike. I have one in the house with my girl. We go down and ride bikes all the time on the river.

P12: I used to work over by across from the VA hospital. And it was a seven-story building over there. And when I get finished with my janitorial work, just for fun, I'd run the steps, you know, 7 flights.

Current and/or past exercise participation: The Centers for Disease Control (CDC) defines exercise as a "subcategory of physical activity that is planned, structured, repetitive, and purposive, in the sense that the improvement or maintenance of one or more components of physical fitness it the objective" [19]. Whereas physical activity encompasses any activity that occurs while sleeping, at work, or at leisure, exercise is considered a more intentional behavior that is completed for the purpose of improving either health-related physical fitness, or skill-related physical fitness [20,21]. In the current study, several participants reported a history of engaging in exercise as an adult and many of the participants reported current involvement in exercise during inpatient treatment. Specifically, participants reported regular engagement in the agency's CrossFit and yoga programming, regular use of the agency's dedicated indoor exercise space, as well as regular participation in independent exercise (e.g., pushups, situps, pullups, walking, etc).

P1: "It's actually been really good. I do yoga. They do yoga twice a week and then we have a CrossFit lady that comes in Monday, Wednesday, and Friday, and sometimes her partner comes in on Thursday. So we've had CrossFit since I've been here."

P2: Honestly I do push-ups every morning here and we walk a lot of laps we walk a lot. I am trying to lose this. I put on a lot of weight and I'm trying to get rid of it.

P3: After I got out of treatment here, and other treatments and jail, I went to the gym every day.

P6: I used to go to Planet Fitness.

P6: Yeah I'll always be outside. And I'll always be working out in my room. I got a pull up bar in my room so I'll be lifting and be doing pull ups and stuff.

P7: I do CrossFit three days a week and yoga twice a week.

P10: Push-ups or have a pull up bar, pull-ups, dips off of a chair, or just whatever I can use. Or more body weight than actual, you know heavy weights. I feel it tones you up more.

P10: We're limited on uh on equipment, but uh, but yeah, there's a little fitness lady that comes in and I believe it's three times a week and so whatever, whatever routine she comes in with, I'll go out there and I'll do... She brings the kettle, the kettle bells, sometimes some dumbbells. Well, workout A little bit. We'll do some sit ups, some pushups and things like that.

P11: Push-ups, dips. We do a lot of walking laps, like when you're not feeling it as much, we just walk around. I like doing pushups a lot.

Exercise improves emotion regulation and enhances perceptions toward physical body: Frequently cited among the participants were the positive mental and physical benefits of exercise. In particular, participants reported noticing a decrease in negative mental health symptoms (e.g., stress, anxiety, depression, etc) and an increase in positive emotion and cognition (e.g., focus, motivation, tension-relief, etc). Additionally, the participants regularly reported positive changes in their perceptions of their own physical bodies. These perceptions included weight changes, changes in musculature, and changes in the body's abilities. Participation in the yoga program was specifically mentioned to be associated with enhanced connection to one's physical body (e.g., loose muscles, reduced tension) and emotional regulation (e.g., breathwork, relaxation, spirituality).

P1: It is very beneficial. I mean, otherwise than staying healthy, it helps out and it clears my mind. It gives me a clear state of mind. It makes me feel good about my day. At least I can say I worked out or whatnot.

P3: Like I can have the shittiest day in the world, pardon my language, the worst day in the world, but once I work out it gives me that natural high and it puts me in such a great mood all day long. It makes the rest of my day go by better because we work out in the morning.

P4: I like how the energy is, how it relieves a lot of things spiritually off I had a lot of tension and it helps with that... I guess there's one she do with the breathing technique? I love the breathing technique. It works... How clear the Chakras you know what I'm saying?

P7: I think it's a vital ingredient. I had gotten away from it and had not realized how much of just a key component my sobriety laid in that that workout. Getting something in, even if I can't get to the gym or I can't do something working around outside and doing something strenuous because I suffer from bipolar disorder. And I can get to a dark place real quick if I don't. But just any amount of activity at all. But consistent activity it just proves that it's vital to my sobriety nonstop.

P8: Like I said before, it keeps me out of my head, keeps me going. Plus it makes me feel good when I look in the mirror and I can flex on myself.

P9: Yeah, usually when I get into the groove, you know what I mean? And I start doing these types of things. When I first come into these, you know, buildings and stuff, I'm all fogged up. You know, I'm confused, I'm lost. And, you know, once I start getting integrated with other people, with the yoga teacher or the fitness teacher and stuff like that, I mean, things start, you know, getting back together because I've had some clean time and I've had some experience with exercise and the yoga itself outside of here. And it's always just kept me smooth... Yeah. It's calm, peaceful. It kind of brings happiness to me at the same time.

P10: Oh yes, ma'am, yes, ma'am. I've already picked up body weight and getting back into it. So yes, and I'm feeling, I'm feeling pretty good.

Free weights provide the option for strength training: The participants in this study overwhelmingly reported a wish for engagement in strength training. At the time of the interviews, the dedicated exercise space in the agency did not include strength training equipment onsite; it was reported that weights were brought in by the outside exercise instructors (e.g., CrossFit). However, participants identified free weights specifically, above any other type of strength training (e.g., machines, medicine balls, kettlebells, resistance bands), as an option that they wish they had access to daily while engaged in treatment. Other types of strength training equipment that were mentioned by participants were cable machines, peg boards, and weight machines. It was clear that the participants had a history of engaging in strength training and felt that the option to participate in strength training while attending inpatient treatment would benefit their physical bodies.

P1: Some dumbbells maybe, or kettlebells. Kettlebells, well, it would be nice, but I don't know that there's enough room for them in there. But dumbbells would be something that'd be nice in there. Yeah, kettlebells, you'd need a little bit more space so nobody gets hurt or anything like that.

P3: They need more free weights here. I mean, I think it'll be a lot better if they had some kind of free weights here because it really bores me out. It's basically just cardio and I mean, it's good exercise. But like for me, I'm more like into working up from less wanting to bulk up. It's not to cut weight or trim down I'm trying to gain it not lose it.

P4: Well, since it's kind of a tight area they could probably just get more weights in there. You know the ball thing is good but we need more weights. More things to do calisthenics with.

P10: Umm. I mean, I don't know if they necessarily have the room for it, but maybe some cable weights or some pull up bars? We have to improve on doing pull-ups and usually a lot of us go into the bathroom and use the stall. So yeah.

Treatment centres should prioritize exercise and nutrition: Throughout the interviews, it was consistently reported that exercise and nutrition were of importance while attending inpatient treatment. In the traditional SUD

treatment model, the hierarchy of needs is addressed on behalf of the clients from the bottom up (need citation). Participants in this study report that it is necessary, and important, to be intentional about the ways that exercise and nutrition are incorporated into treatment programming, just as other programming needs are addressed. The areas of opportunity included exercise timing, nutrition timing, exercise availability, exercise guidance, and nutrition guidance.

P8: One thing I don't like about the whole like fitness thing. They take you to eat. And then they bring you back over to work out. So I mean, if they can work out before they take you to eat that would be perfect. Because you need to absorb all the nutrients and then you can heal. They do it ass backwards.

P11: Just the right way to. Like the right way to do it... Important when it comes to working out... And maybe like a diet. Like something you should eat. Like somebody saying this is the stuff you should eat if you're trying to do this or whatever you're going to get out of the workout. Like you're trying to slim down or if you're trying to bulk up... Yeah, so also some instruction in regards to like diet and how to eat differently for like different reasons, like not just like a standard diet, but like how can you like gain more muscle or things like that.

Discussion

This qualitative study of patients enrolled in a short-term residential substance treatment program revealed 6 primary categories regarding exercise history and preferences. Some minor themes that emerged included a pattern in which activity waxed and waned along with the participants' active addiction status and a history of being physically active while incarcerated. In addition to the themes derived from the qualitative aspect, the GPAQ results indicated that the majority of participants had a significant work history with manual labour and the majority of participants reported being engaged in travel to/from places for significant periods of time.

The participants interviewed all discussed prior engagement in sport, exercise, or leisure-time physical activity before entering the current treatment facility. The decision to separate the themes was intentionally made to capture the essence of the way that the clients described their relationship with movement. For example, "exercise" is a term that is used to describe intentional, repeated, structured movement that is done for the purpose of increasing some aspect of fitness (American College of Sports Medicine, 2018). "Physical activity" is a broader term that captures the description of movement done during leisure time or as part of a physically active lifestyle. While often used interchangeably, it is important to note that planned, purposeful activity describes engagement with exercise (e.g., P12: I used to work over by across from the VA hospital. And it was a seven-story building over there. And when I get finished with my janitorial work, just for fun, I'd run the steps, you know, 7 flights) while any bodily movement that expends energy above resting describes physical activity (e.g., P4: Before I came to [treatment] my relation with that was it was occasional, I'm active I'm athletic actually). All interviewees discussed their current engagement with exercise programming at the treatment agency. This engagement included attending facility-sponsored onsite CrossFit classes, yoga classes, spending recreation time in the onsite exercise space, being physically active during outdoors recreation time, as well as finding ways to exercise on their own (e.g., pushups in their bedrooms, pullups on the bathroom stalls, etc). The participants all discussed benefits of exercise for both their physical and mental well-being, with many of them citing exercise as an important part of their recovery journey.

A minor theme emerged among interviewees regarding their exercise participation while in active addiction versus in times of sobriety/recovery when they were in active use, they no longer were exercising or being physically active during their leisure time. Now, when no longer in active addiction, they are back to exercising. Furthermore, many indicated exercise as a vital ingredient to their recovery journey. Important to note is that whether there are formal opportunities presented to the clients or not, for those who see exercise as a part of their recovery, they will find ways to be intentionally active. According to these participants, the want is present, and many participants have formed their own community of physical wellness. They exercise together, coach each other, and have become a training group of sorts.

Traditionally, physical activity and wellness has not been a priority in SUD treatment centres beyond the basic goal of helping clients maintain sobriety. As shown in these interviews, clients indicated they spend most of their day sitting in group and individual counselling and education sessions. While group and individual counselling are a vital part of treatment, adding opportunities to engage in physical wellness practices may enhance treatment's impact during the limited inpatient timeframe. One client summed up the daily schedule by stating: "Well, this is a great place and it's 28 days and they cram a lot in and it's 28 days. I mean, you get up at 6:30 and use the, the day ends at 8 from the regular schedule. And then there's cleanup, there's the, you know, your job, you know, clean up jobs or sweeping or mopping or whatever you're doing. So, the days are long here. So, there's not a whole lot of time for recreation and things like that as a matter of fact, like I said, I'm like getting senior citizen category, so as soon as I get cut loose, I hit the sack" (P12). Rather than viewing exercise as a luxury or privilege for those who have completed treatment, exercise should be viewed as a tool for maintaining motivation and engagement during treatment while also grounding them in habits that are in line with health-promoting behaviours. Treatment centres would benefit greatly by generating more purposeful plans to incorporate physical wellness into

their curriculum and provide exercise opportunities daily. A physically active community within a treatment center would benefit greatly from the many positive direct and indirect side effects of regular exercise.

Another minor theme that emerged was related to exercise during incarceration, which was mentioned by several participants. Exercise opportunities identified in prison included playing basketball and weight training. Importantly, one participant stated that following his time exercising in prison, he carried that habit on once he was released: "Well, I did, I did some penitentiary time and so I got it into it real big when I was in the penitentiary and when I got out I was still you know, working out you know, at least four to 5 days a week but once getting back into you know, using I didn't, I didn't do it much... A lot of calisthenics, weightlifting, jogging, walking, stuff like that (P10)." This participant's experience highlights the importance of introducing positive daily habits that support the maintenance of sobriety once the inpatient treatment phase is complete, above and beyond avoiding relapse. Although he states that he did go back to using at some point following incarceration, exercise remains a grounding force in his sober life. As previously mentioned, exercise may combat cravings by acting on the dopaminergic system and activating reward pathways [6]. While it takes some time for individuals in early sobriety to get used to the smaller dopamine waves that occur as a result of non-drug-induced positive reinforcements, exercise is a very viable option in this retraining process. Lynch et al., (2013) point to the need for research that characterizes the neurobiological mechanisms by which exercise alone, or in conjunction with other treatments, exerts efficacy as a function of the stage of the addiction process. That is, whether exercise is efficacious during withdrawal, early sobriety, and later sobriety as mediated by the neurobiological processes that accompany each of these stages of addiction recovery. Developing phase-matched exercise interventions to support each stage of the recovery process is highly advantageous and would provide treatment centers with purposeful programming to support recovery through movement. Findings from the GPAQ worth noting are

- The amount of time that the participants reported spending in travel time and
- The history of manual labor.

According to the directions in the GPAQ, interviewees were instructed to answer the travel question based on whether they spend more than 10 minutes per day in travel to/from places *via* bicycle or walking (excluding work itself, this includes going to work, shopping, market, place of worship, etc). The average amount of time participants reported in this type of travel was 4.75 days with an average of 222 minutes. It is inferred that participants are referring to a time prior to this current stay in treatment, as there is no travel necessary in inpatient treatment. What is not immediately clear is whether participants were also referring to travel time spent in relation to securing substances during active addiction. Some studies have reported that heroin users walked an average of 10,000 steps per day, with some walking just shy of 5 miles per day in pursuit of money and/or the drug itself (citation). This aspect of the active addiction lifestyle needs more research, specifically in exploring the relationship between exercise during addiction and individuals' intrinsic motivation for exercise in sobriety. It is likely that some individuals may perceive exercise in sobriety as an unwelcome memory while others may perceive exercise as an opportunity for well-being [22].

Last, nearly 3 quarters of the participants reported a history of manual labour, identifying with work that was moderate or vigorous-intensity in nature. Based on this finding, there is likely a relationship between preference for manual labor and preference for exercise while in treatment. One participant commented regarding his activity history: "Basically construction work. Yeah. That's about all I've done is poor concrete. Its good exercise." (P3). It is difficult to determine the direction of the relationship between manual labor and exercise preference as oftentimes manual labor jobs are transient in nature and heavily dependent on seasonal activities. The challenging nature of the labor combined with the inconsistent paychecks make this type of work appealing for individuals who also live in a transient way (e.g., in/out of incarceration, in/out of active addiction).

Conclusion

Though the interviews conducted with the males in the current study provided insight to inform exercise programming in treatment centres, the study is not without its limitations. Notably, there were only 12 participants involved in the interviews, and among those, they were clearly interested in exercise. It is also possible that those who were interested in discussing exercise *via* Zoom interviews were intrinsically motivated by the topic itself. Because of this, the opinions of the participants, and their physically active past, cannot be generalized across all males engaged in inpatient treatment. Additionally, it is unclear whether the participant answers to the GPAQ were in reference to their recent transition to treatment (it is unknown how many consecutive days they had been in treatment), their recent transition to sobriety (they all reported at least 22 consecutive days of sobriety), or whether they were referring to their lifestyle at some point in the past. The difference between exercise habits before, during, and after active addiction is an area that may gleam more insights regarding the utility of exercise interventions in the SUD population.

While it is important to support the preferences of those who are intrinsically motivated to exercise, it is equally as important to explore the preferences for movement in those who are unmotivated for exercise. Following treatment, those who are unmotivated for exercise are more at-risk for leading a sedentary lifestyle, increasing the likelihood that they would develop chronic health issues (i.e., cardiovascular disease, diabetes, hypertension, etc). In addition to

the development of phase-specific interventions, it is necessary to investigate exercise settings (e.g., group-based vs individual) as well as explore exercise maintenance and the long-term outcomes following discharge from treatment facilities.

Last, of the 12 participants all identified as heterosexual males; therefore the generalizability of this study may be limited. In future research, investigating the unique preferences of female-identifying clients as well as those in the LGBTQ+ community could prove insightful.

Credit Authorship Contribution Statement

Jennifer Lape Kaiser: Conceptualization, Methodology, Interviews, Formal analysis, Writing-original draft, Project administration. Taylor Allesch: Formal analysis, Writing-review and editing. Dana Ripley: Conceptualization, Methodology, Interviews, Formal analysis, Writing-review and editing. Maura Bennett: Formal analysis, Writing-review and editing.

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Conflict of Interest

Authors have no conflict of interest to declare.

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