

A mixed methods study exploring how physical activity may be incorporated into a cessation intervention to best support youth experiencing homelessness in the quit process.

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Abstract

Introduction/Significance: Seventy percent of youth and young adults experiencing homelessness (YYEH), aged 14-24 years old, smoke combusted commercial tobacco—a smoking prevalence 2.5 times higher than their housed peers. The purpose of this study is to consider how physical activity may be incorporated into a cessation intervention to meet the needs of YYEH.

Methods: This study is a secondary data analysis which used a mixed methods design using data collected at a drop-in center for YYEH in a midwestern city. For the quantitative data, the aim of the univariable analysis was to understand if there were differences in tobacco use and psychosocial factors between YYEH who used the gym at the drop-in center and those who did not. Through focus groups, qualitative data was collected to understand thoughts about implementation of cessation interventions. The aim of the qualitative analysis was to understand how youth were mentioning sports and physical activity so it could be incorporated into a cessation intervention design.

Results: Samples for this study included YYEH using combusted tobacco products in the past week (Quantitative: N=96, Qualitative: N=45). Quantitative results indicated individuals that used electronic vaping products used the gym less frequently ($p=0.04$). Older individuals ($p=0.04$), those identifying as straight ($p=0.02$), and as male ($p<0.01$) used the gym more frequently. No significant differences were found in the distribution of psychosocial factors by participants' use of the gym. In the qualitative analysis, YYEH mentioned smoking at drop-in

shelters due to lack of activities and using smoking as a de-stressor. YVEH suggested having an individual like a personal trainer, to help guide exercise and the quit process, would be helpful.

Conclusion: Qualitative findings revealed YVEH asked for organized sports to socialize in a sober, reduced stress environment and to develop a relationship with “a wellness coach” who could act as a personal trainer in the gym and aid their cessation journey. We concluded that no significant differences in psychosocial factors and use of gym may be because youth were asked about their individual use of the gym at the drop-in center. Just having a gym available is not enough to benefit all youth, it is necessary to focus social engagement through physical activity to aid the cessation process.

Key Words: Mixed Methods, Smoking Cessation, Sports, Physical Activity, Psychosocial Factors, Substance Use, Youth, Young Adults, Homelessness

Introduction

Among the youth and young adults experiencing homelessness (YYEH) population, aged 14 to 24 years old, the engagement in commercial combusted tobacco use is a high-risk behavior. The smoking rates of YYEH are approximately 2 to 3 times more in comparison to the national average (Escobedo et al., 1993). YYEH can be more susceptible to contracting health adversities and complications due to the lack of resources and proper health care. The engagement in tobacco use makes this population of YYEH using combusted tobacco more vulnerable to intensified health effects from these conditions. This underserved population, often overlooked and underrepresented, especially in discussions surrounding substance abuse interventions, deserves to be recognized when considering intervention development.

Physical activity represents a prevalent and constructive practice for maintaining overall physical health and well-being. It serves not only as a means of fostering healthy lifestyles but also as an effective intervention to cultivate other beneficial habits. Physical activity has positive effects on crime prevention in populations that may be more vulnerable to falling into the cracks of the criminal justice system by creating a routine, positive social surroundings, and developing values (Cameron & MacDougall, 2000). The review conducted by Cameron & MacDougall focuses on evaluating multiple crime prevention programs that have been put in place including physical activity and whether these are viable options. One of the many programs they evaluate is a program that is an “Adelaide-based service” that utilizes sports and physical activity to create a sense of community and belonging for youth experiencing homelessness. This program has proven valuable for youth who previously lacked consistent support systems and were exposed to high-risk situations involving crime, drugs, and other challenges. It provides them with a stable

and supportive community, offering a space away from the negative influences they may have previously encountered.

Considering high rates of tobacco and substance abuse among both youth and adults, integrating physical activity interventions into support programs proves to be a viable strategy for transforming unhealthy behaviors. In adult substance use programs, utilizing physical activity programs as an intervention has shown positive effects for a multitude of reasons, allowing for improvements in overall health and helping in sobriety-based recovery as well (Kremer et al., 1995). In this study, 50 therapeutic recreation specialists or activity therapists specializing in recreation therapy for substance abuse treatment completed mixed-methods surveys to gain more information on types of physical programs offered at these facilities. Close-ended questions inquired about job roles, skills and knowledge, type of physical activity program, etc. Open-ended questions were used to better understand the physical activity programs and the trends of what type were most popular. Study findings indicated physical activity was a component of treatment at many facilities. Most successful incorporation of physical activity into treatment was when participants focused on the type of physical activity they preferred, which could be something as small as daily walking.

Implementing physical activity and exercise interventions can be beneficial at various stages of an individual's cessation journey. Exercise training is extremely useful in reducing drug use and can be helpful during the withdrawal period by relieving mental and cognitive symptoms that may occur (Zhang & Yuan, 2019). Zhang and Yuan reviewed neurobiological studies focused on the use of physical activity as an intervention for drug addictions in humans and animals. Taking a closer look into their evaluation for humans, this study highlights the benefits of exercise in reducing intense withdrawal effects and discusses how the mesolimbic

dopaminergic reward system is conditioned by physical activity and exercise which can then reduce addiction behaviors. As discussed in this qualitative review, there are common themes of exercise and physical activity reducing levels of substance use and even benefiting individuals at a neurobiological level.

The connection between physical activity and reduced substance abuse is especially pronounced among adolescents, where engagement in regular physical activity serves as a protective factor against drug use. Numerous studies have discussed the inverse relationship between physical activity and drug use, emphasizing the positive impact of an active lifestyle (Lynch et al., 2013). For adolescents with personal experiences of substance abuse, akin to tobacco-using youth and young adults experiencing homelessness, incorporating physical activity and exercise programs into substance abuse interventions can yield commendable success rates in reducing substance use. As this evidence suggests, these initiatives can significantly contribute to crime prevention, substance abuse recovery, and overall well-being. This emphasizes the importance of further exploration of physical activity interventions in diverse settings and possibly implementing these interventions as well.

In smoking cessation research studies, the incorporation of physical activity has exhibited a noteworthy impact on increased cessation rates compared to those programs lacking such a component. Particularly in the general youth population and among boys, physical activity has increased favorable outcomes for smoking cessation (Horn et al., 2011). In this study by Horn, the sample population was youth attending high school ages 14-19, who had smoked more than one cigarette in the past 30 days. The youth were offered a physical activity module to help aid them in their journey to quit smoking. Among the male youth population in this study, 24% of the youth in the cessation intervention with a physical activity module reported 7-day point

prevalence cessation, compared to 8% of the male youth reporting 7-day point prevalence in the intervention with no physical activity module included (Horn et al., 2011). The results of this study displayed an increase in quit rates, but with primarily positive outcomes for male participants.

Engaging in moderate-intensity physical activities during quit attempts has been identified as beneficial for tobacco using youth and young adults, significantly reducing the risk of withdrawal symptoms while promoting a positive mental state (Frith & Loprinzi, 2018). Frith and Loprinzi assessed a total of 1175 young adult smokers over a 2-year period to evaluate the association between smoking cessation and exercise/physical activity using survey measures. The results of this study show a positive association between the intent to quit smoking and participation in exercise.

The influence of physical activity on an individual's well-being extends to both physical and mental aspects, making it a potential facilitator for successful quit attempts. Even if an indirect relationship exists between smoking cessation and physical activity, the numerous benefits associated with the latter cannot be overlooked. In the long term, sustained physical activity contributes to reduced relapse rates, as individuals experience an increase in physical activity levels and diminished desire to smoke over time (Loprinzi & Walker, 2016). Given the evidence, it is worth considering how physical activity may be a beneficial component to augment current cessation programs, especially when trying to target cessation to vulnerable youth and young adult populations.

In a series of studies aimed to optimize smoking cessation intervention for YVEH, the purpose of this study was to consider how physical activity may be incorporated into a cessation intervention to meet the needs of YVEH. We first used results from a survey with YVEH to

explore the quantitative research question: Are there differences in psychosocial and tobacco specific factors by combusted tobacco users' unstructured use of a gym at a drop-in center for YVEH? We then analyzed focus group data to explore the qualitative research question: How are sports discussed in relation to smoking cessation interventions among youth and young adults experiencing homelessness? This study will provide insights into whether physical activity can be a valuable component of cessation intervention for this population.

Materials and Methods

This study was conducted using an explanatory sequential mixed methods design, using qualitative data analysis to better understand the quantitative results. This approach enabled us to establish a foundational understanding of youth's unstructured use of the gym at the drop-in center through quantitative analysis—not as part of a cessation program. Then we were able to discover how YVEH envisioned physical activity could be incorporated into cessation as they spontaneously brought up sports and physical activity in focus groups pertaining to the acceptability of proposed components of targeted cessation interventions for the population. While the quantitative analysis helped us comprehend the factors motivating youth to utilize the open gym at the drop-in shelter, the qualitative data enabled us to identify themes explaining how youth advocated for physical activity in a cessation intervention moving forward. All procedures were approved by a university institutional review board.

Phase I: Interview administered surveys.

Participants-

The sample for the interviews comprised youths and young adults experiencing homelessness, aged 14-24, who had smoked combusted commercial tobacco at least some days in the past week. This data was collected from participants at a drop-in center for YVEH in a Midwestern city. The drop-in center offers YVEH open access to the gym as well as access to a patio located on the shelter's property where guests can smoke. Consent was obtained for YVEH aged 18 and older and youth aged 14-17 signed a waiver of assent. A waiver of parental consent was obtained for all YVEH under 18 years of age. All participants received a \$25 gift card for their participation in the data collection process.

Instrumentation-

With assent and consent collected, the youth became eligible to participate in the interview, which took place in-person at the drop-in shelter. After gathering demographic information, the interview initially addressed various components aimed at understanding the motivations or triggers for smoking among youths. Tobacco and marijuana use, psychosocial factors, and cessation specific factors were also collected including: stress (perceived stress scale), nicotine dependence (hooked on nicotine checklist), cessation interest, confidence in quitting, and confidence in remaining smoke free (DiFranza et al., 2002; Cohen et al., 1983). Responses were gathered using Qualtrics by the interviewer or, for survey items requiring added privacy, through audio-CASI (computer-assisted self-interviewing), allowing youth to respond confidentially.

Analysis-

A secondary analysis was conducted using data collected from an interview-administered survey in 2018. The analyses were performed using R software (version 2023.03.0+386), with p-

values < 0.05 considered significant. To comprehend categorical variables, frequencies and percentages were obtained both in the overall sample as well as stratified by use of the gym. Associations among categorical variables and gym use were examined using chi-square tests or Fisher exact tests, in the case of small expected cell sizes. For continuous variables, means and standard deviations (SD) or medians and interquartile ranges (IQR) were calculated. Further investigation into the associations between continuous variables and use of the gym was conducted using t-tests or Wilcoxon rank-sum tests when the assumption of normality was violated.

Phase II: Focus Groups.

Participants -

Similar to Phase I, participants were required to meet the same eligibility criteria to participate in the focus groups at the drop-in shelter. The assent and consent process was also assessed in a manner consistent with that of Phase I.

Instrumentation -

The qualitative data was collected through approximately 90-minute focus groups, each comprising 3-6 participants. Each focus group was facilitated by one trained facilitator and accompanied by a note-taker from the research staff. A guide was provided to the facilitator and note-taker, containing questions divided into various sections aimed at eliciting feedback on the acceptability and thoughts regarding the implementation feasibility of planned components of the cessation intervention. These components included evidence-based approaches (e.g., counseling and nicotine replacement therapy) as well as targeted strategies to motivate YVEH to attempt quitting (e.g., support from a community health worker addressing social determinants of health,

planned social activities, addressing violence, and accommodating its impact). Focus group data were recorded using voice recorders and note-taking guides, both promptly uploaded into files. The voice recordings were then professionally transcribed, and the transcripts were uploaded to Atlas.ti for deductive coding.

Analysis –

Physical activity was spontaneously discussed throughout the focus group interviews across various sections pertaining to the acceptability of various cessation components. Consequently, a secondary data analysis was performed on the focus group data for this study. Data were first deductively coded for all references to physical activity, sports, or sports training. Subsequently, the coded text was analyzed for emergent themes regarding the potential of physical activity as a cessation tool and motivation to encourage quit attempts among YYEH.

Results

Phase I: Interviewer-Administered Surveys

Sample characteristics.

In Phase I of our study, the sample included 96 YYEH participating in interviewer-administered surveys, with 55 participants reporting ever use of the gym and 41 participants never using the gym. A slightly larger proportion of individuals identified as male (54%), and 5% of the sample identified as transgender or non-binary. Additionally, 53% of the sample was Black, 16% were White, and 8% of the sample population identified as Hispanic.

Demographics and Gym Use

The demographic characteristics collected facilitated the identification of individuals who may be more or less likely to use the open gym at the drop-in shelter during non-structured times (Table A). Older individuals were more likely to participate in the unprompted use of the gym ($p=0.046$). Additionally, those identifying as male were more likely to utilize the open gym compared to those identifying as female, transgender, or non-binary ($p<0.0001$). Individuals identifying as heterosexual/straight also had a greater likelihood of using the open gym ($p=0.028$).

Table A: Demographic characteristics of participants in the Phase I interviewer administered surveys and their association with unprompted use of open gym at a drop-in shelter.

	Full Population		Uses the GYM		Does Not Use the GYM		<i>p-value</i>
	(n=96)		(n=55)		(n=41)		
Age (<i>average, SD</i>)	21.82	2.00	22.17	0.013	21.35	1.62	0.0464 ^c
Sex Assigned at Birth (<i>n, %</i>)							
Male	54	56%	43	78%	11	27%	<0.0001 ^a
Female	42	44%	12	22%	30	73%	
Gender (<i>n, %</i>)							
Male	52	54%	42	76%	10	24%	<0.0001 ^a
Female	39	41%	10	18%	29	71%	
Other	5	5%	3	5%	2	5%	
Sexual Orientation (<i>n, %</i>)							
Heterosexual/Straight	71	74%	46	84%	25	61%	0.0282 ^d
Other	25	26%	9	16%	16	39%	
Race (<i>n, %</i>)							
White	15	16%	9	16%	6	15%	0.5414 ^d
Black	51	53%	29	53%	22	54%	
Other	30	31%	17	31%	13	32%	
Ethnicity (<i>n, %</i>)							
Non-Hispanic	88	92%	51	93%	37	90%	0.7203 ^d
Hispanic	8	8%	4	7%	4	10%	

^c p-value from t-test

^a p-value from Chi-square test

^d p-value from Fisher exact test

Tobacco Use and Gym Use

Tobacco use among participants was recorded, and the association between the use of various tobacco products and unprompted use of the gym was examined (Table B). Individuals who used electronic vaping products were less likely to use the gym than individuals who had never vaped (p=0.042).

Table B: Tobacco and marijuana use and associations with unprompted open-gym use at a drop-in shelter, among Phase I interviewer-administered survey participants.

	Full Population		Uses the GYM		Does Not Use the GYM		<i>p-value</i>
	(n=96)		(n=55)		(n=41)		
Tobacco Use							
Tobacco Use in Past 30 days (<i>n, %</i>)							
1-9 days	25	26%	15	27%	10	24%	0.3944 ^d
10-29 days	30	31%	14	25%	16	39%	
All 30 days	41	43%	26	47%	15	37%	
Cigar Use (<i>n, %</i>)							
Never	2	2%	1	2%	1	2%	1.0000 ^d
Ever	94	98%	54	98%	40	98%	
Cigarette Use (<i>n, %</i>)							
Never	5	5%	2	4%	3	7%	0.6480 ^d
Ever	91	95%	53	96%	38	93%	
Hookah Use (<i>n, %</i>)							
Never	41	43%	21	38%	20	49%	0.4043 ^d
Ever	55	57%	34	62%	21	51%	
E-cigarette Use (<i>n, %</i>)							
Never	27	28%	20	36%	7	17%	0.0421 ^d
Ever	69	72%	35	64%	34	83%	
ST Use (<i>n, %</i>)							
Never	68	71%	36	65%	32	78%	0.2564 ^d
Ever	28	29%	19	35%	9	22%	
Marijuana Use							

Marijuana Use in Past 30 Days (<i>n, %</i>)							
0 Days	11	11%	5	1%	6	15%	0.9656 ^d
1-9 Days	27	28%	15	27%	12	29%	
10-29 Days	29	30%	18	33%	11	27%	
All 30 Days	26	27%	16	29%	10	24%	
Hooked on Nicotine Checklist							
HONC (<i>median, IQR</i>)	6	3.75-8.0	6	3.0-8.5	6	5-8.0	0.6204 ^b
^d p-value from Fisher exact test							
^b p-value from Wilcoxon rank-sum test							

Psychosocial Factors/Cessation Interest and Gym Use

Associations between perceived stress and gym use were also assessed (Table C). While various stressors were discussed, no significant association between these stressors and the use of the open gym during non-structured times was identified. Additionally, cessation interest was evaluated among YVEH, and its association with the use of the open gym was examined, yet no significant association was found (Table D).

Table C: Association between perceived stress scale and unprompted open-gym use at drop-in shelter, among Phase I interviewer-administered survey.

	Full Population (n=96)		Uses the GYM (n=55)		Does Not Use the GYM (n=41)		<i>p-value</i>
Perceived Stress Score (<i>median, IQR</i>)	22	19.0-25.0	22	19.0-25.0	21	19.0-26.0	0.8921 ^b
Perceived Stress Grouping (<i>n, %</i>)							
Low / Moderate	75	78%	43	82%	32	78%	0.6283 ^d
High	18	19%	9	18%	9	22%	
Upset (<i>n, %</i>)							
Never/Almost Never	15	16%	9	16%	6	15%	0.7591 ^d
Sometimes	37	38%	18	33%	19	46%	
Fairly Often/Very Often	44	46%	28	51%	16	39%	
Nervous/stressed (<i>n, %</i>)							
Never/Almost Never	13	14%	5	9%	8	20%	0.3038 ^d
Sometimes	26	27%	17	31%	9	22%	
Fairly Often/Very Often	56	58%	32	58%	24	59%	

Couldn't Cope (<i>n, %</i>)							
Never/Almost Never	32	33%	17	31%	15	37%	0.9981 ^d
Sometimes	44	46%	26	47%	18	44%	
Fairly Often/Very Often	19	20%	11	20%	8	20%	
Anger (<i>n, %</i>)							
Never/Almost Never	17	18%	11	20%	6	15%	0.8122 ^d
Sometimes	25	26%	14	25%	11	27%	
Fairly Often/Very Often	54	56%	30	55%	24	59%	
Difficulties Pile Up (<i>n, %</i>)							
Never/Almost Never	36	38%	23	42%	13	32%	0.5043 ^d
Sometimes	30	31%	13	24%	17	41%	
Fairly Often/Very Often	30	31%	19	35%	11	27%	
Control (<i>n, %</i>)							
Never/Almost Never	28	29%	16	29%	12	29%	0.4652 ^d
Sometimes	29	30%	14	25%	15	37%	
Fairly Often/ Very Often	39	41%	25	45%	14	34%	
Confident (<i>n, %</i>)							
Never/Almost Never	18	19%	10	18%	8	20%	0.5165 ^d
Sometimes	26	27%	16	29%	10	24%	
Fairly Often/Very Often	52	54%	29	53%	23	56%	
Your Way (<i>n, %</i>)							
Never/Almost Never	39	41%	24	44%	15	37%	0.2208 ^d
Sometimes	35	36%	19	35%	16	39%	
Fairly Often/Very Often	21	22%	11	20%	10	24%	
Irritations (<i>n, %</i>)							
Never/Almost Never	27	28%	13	24%	14	34%	0.6913 ^d
Sometimes	39	41%	24	44%	15	37%	
Fairly Often/Very Often	30	31%	18	33%	12	29%	
On top of things (<i>n, %</i>)							
Never/Almost Never	22	23%	14	25%	8	20%	0.8360 ^d
Sometimes	47	49%	26	47%	21	52%	
Fairly Often/Very Often	27	28%	15	27%	12	29%	

^d p-value from Fisher exact test

^b p-value from Wilcoxon rank-sum test

Table D: Cessation interest/self-efficacy and association with unprompted open-gym use at a drop-in shelter, among Phase I interviewer-administered survey participants.

	Full Population		Uses the GYM		Does Not Use the GYM		<i>p-value</i>
	(n=96)		(n=55)		(n=41)		
Quit Interest (<i>median, IQR</i>)	7.5	5.0-10.0	8	5.0-10.0	7	5.0-10.0	0.8578 ^b
Confidence in Quitting (<i>median, IQR</i>)	6	4.0-10.0	6	4.0-10.0	7	5.0-8.0	0.5616 ^b

Confidence in 6 month Success (<i>n</i> , %)							
Not at All Likely / A Little Likely	22	23%	12	22%	10	24%	0.2827 ^d
Somewhat Likely	45	47%	24	44%	21	51%	
Very Likely	29	30%	19	35%	10	24%	
Confidence in Remaining Smoke Free (<i>median</i> , <i>IQR</i>)	7	5.0-10.0	7	5.5-10.0	7	5.0-10.0	0.8578 ^b

^d p-value from Fisher exact test

^b p-value from Wilcoxon rank-sum test

Phase II: Focus Groups

Focus Group sample characteristics.

In phase II of our study 45 (demographics available on n=40) participants were recruited for focus groups; all participants were YVEH who used combustible tobacco products in the past week. Among the focus group sample, 57% of the participants identified as male and 2.5% as transgender or non-binary. Additionally, 53% were Black/African American, 30% were White, and 10% of the sampled population was Hispanic (Table E).

Table E: Phase II Focus Group, sample characteristics.

	Full Sample	
	(n=40)	
	<i>n</i>	<i>%</i>
Sex assigned at birth		
Female	16	40%
Male	24	60%
Gender		
Female	16	40%
Male	23	57%
Transgender	1	3%
Pregnancy		
No	13	81%
Yes	1	6%
Don't Know	2	13%
Sexual orientation		
Heterosexual or straight	33	83%

Bisexual	5	13%
Gay or lesbian	1	3%
Pansexual	1	3%
Race		
White	12	30%
Black or African American	21	53%
Native Hawaiian or Other Pacific Islander	1	3%
Bi- or multi-racial	3	8%
Unknown	3	8%
Hispanic		
No	36	90%
Yes	4	10%

Social Physical Activity

During focus groups, youth were asked a variety of open-ended questions to better understand which activities would best support them in making a quit attempt. Regarding group activities in a sober setting, YYEH mentioned sports and physical activity as activities that would still motivate them to come to the drop-in shelter, even if it were smoking and tobacco-free.

Social Physical Activity 1: YYEH were asked what would still motivate them to utilize the drop-in shelter and its resources if it were to be smoke and tobacco-free. It was observed that sports and activities would still motivate youth to engage in the drop-in shelter.

Facilitator: What kind of activities—so, you said it would be boring to come here if you couldn't smoke, right?

Participant 1: Yeah.

Facilitator: What kind of things would not be so boring? Are there things that we could do here that would—

Participant: Activities.

Facilitator: That's okay. <Name>, what kinda activities do you like to do?

Participant: I like football, basketball. I used to play soccer when I was younger.

Facilitator: You'd wanna play sports.

Participant 2: Baseball. Yeah, and I make music.

Social Physical Activity 2: The facilitator guided the youth in discussing activities they would be interested in engaging in if it were strictly smoke and tobacco-free. This dedicated time would be organized to involve youth in activities at the drop-in shelter that would discourage the use of any tobacco products, assuring it was smoke-free.

Facilitator: Say we could do safe activities, guaranteed that they'd be safe group activities in this. Non-smoking, tobacco free. What type of activities might you want to see?

Participant 1: Hopscotch.

Participant 2: Something that's gonna keep my body moving 'cause I ain't sitting down

Facilitator: Okay. Physical activities. Maybe games that are physical. I've heard people say group trips to the zoo.

Participant: I ain't going to nobody's zoo. I might go to Zoombezi Bay, but I ain't going to nobody's zoo.

Facilitator: So, no group trips, but maybe some physical activities.

Wellness Coach/Personal Trainer

Each focus group began with a discussion on how a community health worker could support YVEH. YVEH were asked to describe the traits or experiences they would like to see in a potential community health worker who could support them in their quit attempt. During this conversation, YVEH described the traits of a personal trainer or wellness coach.

Wellness Coach/Personal Trainer #1: YVEH discussed having a support system that includes an individual who has previously attempted to quit and is capable of guiding them with exercise and making healthy choices.

Facilitator: Similar experiences with having smoked and tried to smoke. Are there any other kind of experiences that would be important for a person who is coming here to work with you around health issues?

Participant 1: You mean like a trainer, a personal trainer, right?

Participant 1: They need somebody to do somethin' like that, don't you?

Participant 1: Somebody who can have you quit smokin', a personal trainer.

Facilitator: Okay. Do they have to help you exercise too?

Participant 1: Yeah.

Participant 2: A personal trainer that really quitted smoking. Yeah, I see that.

Participant 2: That's gonna get people out and about too.

Wellness Coach/Personal Trainer #2: YVEH described a staff member at the drop-in shelter when asked about the traits they would like to see in a community health worker. One of the

supportive traits mentioned was the support they offer and their motivation to encourage healthy choices, such as going to the gym instead of engaging in harmful behavior.

Facilitator: This community health worker can also connect you with smoking cessation resources, if you are interested. This will be a little different than the services the <Name> currently offers. A community health worker is usually someone from the community they serve, or at least share some of the similar experiences with the people they serve. What kind of traits would you want in a community health worker? What kind of—who would you find reliable, trustworthy, approachable? What kind of a person would you want to—

Participant: <Name>.

Facilitator: What about <Name>?

Participant: He's good. He helps me.

Facilitator: Okay. What about <Name> is very helpful? What does he do that helps you?

Participant: Keep me outta trouble

Facilitator: Okay, and how does he keep you outta trouble?

Participant: He knows when I'm about to go off, so he'll be telling me to go outside, or just go in the gym and lay down.

Coping Mechanism

YYEH often face many stressors on a regular basis, including food security, housing stability, sufficient transportation, and taking care of family members, among others. Often, when individuals experience various stressors or frustrations, this can lead to making unhealthy

choices for temporary relief, such as smoking. YYEH were asked about these various stressors they may deal with and how they might cope with them in a healthier way.

Coping Mechanism #1: YYEH were asked what they are currently doing to stay healthy and deal with stressors and what has proven to be beneficial for their physical and mental health.

Facilitator: In this be well plan, you have, what are you currently doing to stay well? Are you taking a walk? Are you getting plenty of rest?

Participant 1: I do walk a lot.

Participant 1: Walking is part of my coping that I do in my therapy to clear my mind and relieve stress.

Additionally, YYEH discussed multiple resources (guided workbooks, planners, etc.) presented by the facilitator to support them with making any quit attempts and guide them in their cessation journey. When discussing these resources and the coping mechanisms listed in them, youth were asked what support systems they may have or would like to create.

Facilitator: Yeah. There's a list of different coping skills that you can use like taking a walk, leaving a bad situation, listening to my needs, identifying triggering events for you like loud noises, crying, closed doors. What else is in here? A little self-care summary with your strengths, red flags, wellness goals, who...or what are your supports. Then there's some information about feeling safe, what do you do in a crisis, what to expect if you go to a shelter.

Participant: Once I get myself okay and I'm stable enough, I want to start going to the gym, working on 'cause exercise, it takes my mind off a lot, so I want to start doing stuff like that and even healthier.

Coping Mechanism #2: YYEH discussed potential smoke-free activities they may be interested in and additionally mentioned how these activities can help individuals relieve stress/frustrations.

Facilitator: Okay. I'm gonna keep it really open ended here. What kind of group activities would you want to do with other people in this non-tobacco environment?

Participant 1: Board games, movie night. I love both of those. Sports?

Participant 2: Oh, yeah, playing anything.

Participant 3: Play dodgeball, or something.

Facilitator: Dodgeball? That would be fun.

Participant 2: That would because I would play that.

Participant 2: Get out your frustration.

Participant 3: Right? Everybody's mad.

Participant 2: We're not smoking, too.

Motivation to Quit

A helpful component of making quit attempts or engaging in cessation often involves motivation and incentives to quit. When asked about non-monetary activities or incentives that would serve as motivational factors for quitting and making quit attempts, YYEH mentioned physical activities, sports games, or items to play sports with.

Facilitator: [Laughter] What types of incentives might motivate you to quit smoking that are not money?

Participant 1: If you're into a sport, playing basketball or something.

Participant 2: Yeah, sports. Like tickets to sports, or things to play the sports?

Participant 1: Things to play the sports. For real.

Discussion

In our study, we documented that YYEH with certain characteristics were more likely to engage in the unprompted use of the gym compared to others. Those who were more likely to utilize the open gym at the drop-in shelter were older, identified as male and heterosexual. This may be the result of possible stigmas and different levels of comfort in gym use among youth. While our quantitative analysis showed that those who do not identify as heterosexual are less likely to use the gym, studies show that youth and young adults in the LGBTQ+ community would like to be a part of groups focused on making healthy choices, such as going to the gym, as part of their cessation journey (Backerville et al., 2018). Thus, it is important that organized sports and structured physical activities are available for individuals who may feel less comfortable utilizing the open gym. Having structured physical activities with support from peers and guidance from facilitators allows for greater inclusivity and greater access to potential cessation interventions among YYEH.

Our study took a deeper look at specific tobacco products and the unprompted use of the gym. Among all tobacco products, we found that those who used electronic vaping products were significantly less likely to use the open gym compared to those who did not vape. Studies

have shown that among male youth specifically, those who were more physically active, used the gym, and/or participated in sports were less likely to engage in unhealthy vaping behaviors (Struik et al., 2023). Additionally, when examining the perceived stress scale and the use of the gym, we did not observe any significant associations. This contradicts a study comprised of young adults and older adults participating in a smoking cessation exercise regime, in which there was significant improvement in various stress factors among the participants (Ussher et al., 2023). While our findings may not directly correlate the unprompted use of the gym and the perceived stress scale, it is important to recognize that a structured regime and organized physical activity can be helpful for YVEH in navigating physical activity as a potential smoking cessation intervention.

Our qualitative findings demonstrate that YVEH consider physical activity to be a motivational factor in making quit attempts and the format in which the physical activity is presented is a strong component in understanding YVEH's engagement in the activity. Physical activity in a social setting, presented in an organized manner, whether it be sports or any other physical activity, may be helpful for YVEH. Among adolescents, literature has established lower smoking rates among those who engage in team structured sports (Escobedo et al., 1993). Among vulnerable populations, it is important to recognize the barriers that individuals may face daily preventing them from making successful quit attempts and engaging in certain physical activities. In these cases, having a support system like a wellness coach or personal trainer allows individuals to have someone who can motivate them to make healthy choices. YVEH describe their desire to have an individual, specifically one who has made a successful quit attempt, to guide them in the gym and support them with making healthy choices as a needed resource. Findings in other literature are comparable, among individuals making quit attempts, having a

wellness/health coach reduced levels of smoking at greater rates compared to those who didn't have the support of a wellness coach (Huang et al., 2023). YVEH receiving personalized support in engaging in physical activity would aid in their cessation journey. It is also possible that personalized support could foster inclusivity by engaging YVEH that is less likely to engage in unstructured physical activity and may be less familiar with a range of physical activities

The use of the gym as an alternative coping mechanism to replace the behavior of vaping has been identified as being helpful when making a quit attempt among youth, as it can serve as a distraction (Al-Hamdani et al., 2023). This is consistent with the themes we identified of "coping mechanism", as YVEH mentioned how exercising, walking, going to the gym, etc., are all helpful ways that they can keep their minds distracted. With their minds occupied by any form of physical activity that best fits them, YVEH are less likely to engage in unhealthy behaviors like smoking. Additionally, for long-term feasibility, moderate-intensity exercise aids in reducing tobacco withdrawal symptoms and inclinations to smoke (Ussher et al., 2001). Thus, creating healthier coping mechanisms for stressful situations that can mimic the relief that smoking provides would aid individuals in making successful quit attempts. Our findings identify physical activity as a potential incentive for YVEH to make a quit attempt. Our study is consistent with findings in the literature that discuss how team sports involvement and athleticism provide an alternative reward to using tobacco products and smoking (Audrain-McGovern et al., 2003). YVEH having items to play sports with and being able to engage in sports competitions in a smoke-free environment could incentivize YVEH to make quit attempts.

Strengths and Limitations

Our study provides insight on the potential for organized physical activity and sports to be incorporated into a cessation intervention for YVEH. As both the qualitative and quantitative phases were not specifically focused on exploring physical activity as a component of cessation, the inclusion of more targeted questions could have helped us explore this issue more extensively. A more targeted approach in future studies would allow us to gather more specific insights surrounding potential physical activity interventions catering to the needs of YVEH. Additionally, due to COVID-19 delaying research at the drop-in center for 2 years, the quantitative study was closed early, limiting sample size. Finally, this is a secondary data analysis and was thus not powered for the research questions presented here.

While it's important to recognize the constraints of our research, it's equally essential to highlight its strengths, enhancing the overall credibility of our findings. Our explanatory sequential mixed methods study approach allowed us to better explain quantitative findings through the additional analysis of qualitative data. This study design was beneficial in understanding the specific needs of YVEH when discussing the implementation of physical activity as a cessation intervention.

Conclusion

There were no significant differences in nicotine dependence, quit interest or perceived stress by YVEH's use of the gym during non-structured times at the drop-in center. Yet qualitative findings revealed YVEH were asking for organized sports to socialize in a sober setting, to reduce stress, and to develop a relationship with "a wellness coach" who could not only act as a personal trainer in the gym but also aid their cessation journey. Our findings

showcase that, rather than just an open gym being accessible at drop-in shelters, YYEH desired organized physical activities and personal training to motivate engagement in tobacco cessation. These motivational components for physical activity are necessary in preparing beneficial and supportive cessation interventions for YYEH.

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