People Who Use Drugs in Rehabilitation, from Chaos to Discipline: Advantages and Pitfalls

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Abstract

Evidence -based models emphasizing on lifestyle bahaviors for the treatment of drug use is still in its infancy .The development of multifactorial effective drug use intervention programs as part of health promotion is crucial to decrease risk of relapse. This study aims at exploring the lifestyle practices including dietary intake, physical activity and sleep of people who use drugs undergoing residential rehabilitation treatment in Lebanon with its perceived benefits and pitfalls. A purposive sample of 18 males and 9 females at different stages of recovery from drug use in rehabilitation centers participated in the qualitative discussions. The six phases thematic analysis revealed four themes: chaotic lifestyle, disciplined lifestyle, benefits and pitfalls of disciplined lifestyle, and suggestions for making rehabilitation a better experience. Participants discussed their chaotic lifestyle during addiction with poor food intake, disrupted sleep and low physical activity moving to a more disciplined routine enforcing normality in lifestyle practices with social and professional support .The early phases of treatment were marked with increased food intake and weight gain perceived as a health indicator and the sole divergent from drugs ,moving towards more structured meals and efforts to lose weight in later stages. Lack of variety of Physical activity programs taking into consideration the motivational differences among the participants was also highlighted. Measures for improving rehabilitation services in terms of promoting healthy eating habits and environmental control were thoroughly addressed.

These findings shed the light on the challenges faced in maintaining a healthy lifestyle in rehabilitation centers and the necessities of addressing them to improve the overall rehabilitation experience , prevent relapse and inform the development of future targeted intervention programs tackling all aspects of behavioral changes .

Introduction

Illicit drug use among young people is epidemic and remains a significant public health concern. It is associated with unhealthy lifestyle practices including poor dietary habits, changes in physical activity and sleep problems leading to substantial health problems and poor quality of life.

Drug use greatly affects individuals'dietary habits, and compromises their nutritional status [1].Most users have a low nutrient-dense food intake with sweet cravings [2-4]and decreased body mass index (BMI)[5-8] putting them in a mild to moderate malnutrition status[9] .

Physical activity is another lifestyle practice affected by drug use. The scarce evidence on People Who Use Drugs (PWUD)'s involvement in physical activity is controversial. Some suggest low participation in structured sports [10,11], while others show active participation in an attempt to stay healthy and divert from the use of drugs as a self-care strategy[12-14].

Sleep is negatively affected by drug use[15 16-18]. An estimated 10-15% of people with chronic sleep disturbance have underlying substance abuse problems, and this is affected by the type of drug used[19 18,20].

Once referred to inpatient rehabilitation services, i.e. detoxification followed by psychotherapy and behavioral modification therapies [21],addressing lifestyle practices and improving the quality of life of PWUD are crucial to decrease the risk of relapse[22].

During rehabilitation, dietary habits and nutritional status fluctuate depending on the stage of recovery[23]. In the early stages, binge eating is observed due to replacing drugs with food as compared to more structured eating habits later[24-26].

Physical activity is another potential non-pharmacological treatment for addiction[27]. It was shown to reduce sufferings from withdrawals, anxiety, and depression, in addition to improving self-confidence with a sense of the new quality of life[22,28,29].Nevertheles, the controversy around benefits of physical activity during rehabilitation remains in light of the scarcity of studies exploring this issue.

The sleep of drug users undergoing treatment, especially in rehabilitation services, has also received little attention. The dearth of studies are conducted on opiate addicts receiving methadone treatment, showing inadequate sleep quality and quantity which could arise from a

mix of contributory causes like psychopathological problems, nicotine use, duration of opiate use, in addition to methadone itself that produces sleep abnormalities[19,30 31].

Research on best practices for disseminating evidence-based substance abuse treatments into practice is still in its infancy[32]. Models used for recovery from addiction mainly emphasized on basic pharmaco and psycho-social elements like understanding and accepting self, family and peer support and community envolvment[33,34] ,with little emphasis on lifestyle behaviors tailored to meet the individuals needs and preferences. The need for the development of multifactorial effective drug use intervention programs as part of health promotion is crucial to decrease risk of relapse[33].

The present study was conducted in Lebanon, a small high-middle income country in the Eastern Mediterranean region. Despite the various predisposing factors for drug use including internal and regional armed conflicts for over three decades, studies on drug use patterns in Lebanon are scarce[35-37]. To our knowledge, no previous studies were conducted on the in-patient rehabilitation services offered in the country.

This study aims at exploring the lifestyle practices including dietary intake, physical activity and sleep of PWUD undergoing treatment (detoxification followed by in-patient rehabilitation) in Lebanon and perceived benefits and pitfalls. Ultimately, the findings will inform the development of future targeted intervention programs.

Method

Design and approach

This is a descriptive qualitative study based on focus group discussions (FGDs) with a sample of PWUD undergoing treatment in rehabilitation centers in Lebanon. Ethical approval was obtained from the American University of Beirut (SBS-2018-0424) and the Lebanese International University (LIUIRB-180122-NB1) Institutional Review Boards.

Sample

A purposive sampling approach was used to recruit participants from drug rehabilitation centers. The criteria of selection were adult (above 18 years of age), Lebanese and active drug users seeking treatment from both genders. We excluded non-Lebanese and participants below the

age of 18. Seven FGDs were conducted on participants in rehabilitation centers as they were acquainted with each other and shared a similar experience and setting.

Recruitment and data collection

We approached the seven operating rehabilitation centers in Lebanon. Three out of seven only granted us approval to collect data from their patients. From each center, eligible participants who consented to participate in the discussions were approached and informed about the objectives and the methods of the study in-addition to their right to withdraw at any time. Two groups of participants were chosen: those who have been in rehabilitation for less than six months (early recovery) and those who completed more than six months (late recovery). The early recovery groups ranged from four to five participants, while the late recovery ranged from three to six participants .Two of the centers provide services for males solely and one for females. The two researchers NM and GHA introduced themselves to the participants and handed them a written consent form explaining the purpose of the study, the process of data collection, and that they can withdraw from the study at any time. Also, their consent for audio-recording the sessions and quoting them in the final manuscript was sought. A semi-structured discussion guide containing open questions was used; however, probing questions arose to delve into important points raised by the participants (Appendix 1). All discussions were conducted in Arabic and in a private room in the center. One researcher was taking notes and the other moderating. The discussion was started by asking each participant to introduce him/herself and since participants were acquainted with each other they discussed freely their life during addiction and factors leading them to seek treatment. Followed by this, the moderator guided the discussion toward the daily routines in the center including assigned chores, their food intake and choices, factors affecting their intake ,weight change experiences, sleep and physical activiy. Finally the need for nutrition education in the center and the best way to deliver it was also addressed. All FGDs were conducted before the analysis.Following each FGD, NM and GHA had a debriefing session to discuss the yield. Saturation was reached after seven FGD.

Data analysis

All FGDs were transcribed by NM and EM. We used the six phases thematic analysis approach recommended by Braun et al[38](Appendix 2). Themes and sub-themes were identified, and corresponding quotes were translated and saved in a data repository. Representative quotes were cited in the manuscript. This study followed the consolidated criteria for reporting qualitative studies (COREQ) (Appendix 3).

Findings

Sociodemographic characteristics of study participants

Eighteen males and nine females in recovery from drug use from three different rehabilitation centers in Lebanon participated in this study. Their sociodemographic characteristics are detailed in Table 1. 52% of the participants fell in the early recovery stage (less than six months) and 48% in the late recovery stage (6-12 months).

Table 1: *Demographic Information of Participants of the Focus Group Discussions (FGD) .*

		Center 1 (n=9)	**Center 2 (n=8)**	**Center 3 (n= 10)**	**Total (n=27)**
Age (mean±SD)		29.2±6.1	28.6±5.4	32.1±7.7	30.1±6.5
Gender (%)	Male	0 (0)	8 (100)	10 (100)	18 (66.7)
	Female	9 (100)	0 (0)	0 (0)	9 (33.3)
Duration of the treatment (%)	Early Recovery (< 6 months)	5 (55.6)	5 (62.5)	4 (40)	14 (51.9)
	Late Recovery (> 6 months)	4 (44.4)	3 (37.5)	6 (60)	13 (48.1)

Emerging themes

The yield of the discussions can be summarized into the following four themes: chaotic lifestyle, disciplined lifestyle, benefits and pitfalls of disciplined lifestyle, and suggestions for making rehabilitation a better experience. Within each theme, we identified several sub-themes and we noted when they differed by gender and recovery stage.

Chaotic lifestyle

Sub-themes

1- "We're not used to tackling life without drugs."

Drugs were the way out from low self-esteem, depression and stressful experiences in life, such as family conflicts. *"My addiction started because of my parent's problems and divorce." (0406)*

Addiction was the gateway for fitting in with friends and family members.

"I started my drug use in my teenage, I wanted to keep pace with our generation, and that's how it went." (0410)

"I wanted to have friends older than me and got used to drugs." (0306)

"Everyday depression." (0201)

"My siblings do drugs too." (0407)

Interestingly, two female participants indicated that weight gain was the trigger for drug use, while two others started as a result of chronic pain and usage of pain killers.

"At first, I had gallbladder disease and because of medications I started drugs." (0407)

"After I got out of here, I relapsed again because of my weight gain." (0407)

2- Chaotic lifestyle "No discipline, no discipline, no time, nothing, nothing."

Eating habits were messed up. Most indicated rarely eating. *"Drugs suppress[ed] appetite" (0308)*, and they were craving mainly for carbohydrates *"Mostly, its sugar, bonbons and juices" (0410).* All preferred to spend the money on drugs rather than food. Sleeping patterns were also chaotic. Drugs have deleterious consequences leading to disrupted sleep. Consequently, many had major health complications *"I became anorexic, I now weigh 37 kg and I have no power left in me." (0410).*

Only two participants addressed physical activity during their addiction period. One male had a passion and interest for competitive sports but despite this, participation levels tended to cutail dramatically once heavy drug consumption set in. "*I took a personal trainer and nutrition course before I started my addiction. I used to go to competitions in sports. When I started drugs my weight changed from 88 to 55Kg. I was depressed , stayed at home all times and stopped going to the gym."(0207)*

On the other hand one female reported that she had routinely participated in physical activity despite her addiction, which in turn played a role in preventing extreme weight loss as a result

of the drugs. *"I used to go to a dietitian before and during my addiction. I kept doing sports during my addiction that is why my weight did not change."*(0405)

3- Coerced "Got sick of the life with drugs."

Most participants had a tipping point leading to rehabilitation, for some extrinsic, for others intrinsic factors. Three participants stated being coerced by legal authorities to seek treatment and fear of imprisonment led them to rehabilitation. Five others indicated that family and peers motivated them to seek treatment.

"At first, I had to be admitted to a rehab because of the drug court." (0409)

"Got out of prison, stayed home then back to prison again." (0307)

"I travelled to Africa and ran out of drugs, so I went back to Lebanon and I was advised by my uncle to go to a rehab center so I can get my life together." (0406)

Fear was the internal driver to seek treatment for three participants, mainly fear of losing a job or losing a life due to overdose. Many indicated being fed-up with the chaotic lifestyle that led them to rehabilitation.

"We got sick of the life with drugs, it was painful, and we went through a lot, we have tried many ways to overcome drug addiction and there was no other solution. Most of us here are well educated and well aware that addiction is a disease of no cure but rehab." (0203)

"I got fed up and tired of the life of drugs, I want to save myself." (0302)

For others, remorse after relying on violence or theft to acquire the drug triggered this desire to seek help for drug cessation.

"I don't steal, how did I do that to my parents? What affected me most is the way I talked with my father, I snapped and told him: I will break the fridge and the TV, just give me the money." (0306)

Five participants indicated that because they had a relapse from previous rehabilitation experience, they were challenged to pursue further treatment. *"Many times, I have packed my bag to be admitted to a rehab and then leave and go back home, I've let my parents down a lot." (0307)*

Females specifically noted that treatment was the only way for not losing the custody of a child. Three of the participants were mothers; two already lost the custody of a child because of drug

addiction, and the other was pregnant during addiction and both wanting to maintain their role as mothers after treatment.

Disciplined lifestyle, benefits and pitfalls

The shift from chaotic to disciplined lifestyle was the hallmark for this period.

In rehabilitation, participants became more connected to daily life routines, had more social and professional support. This period was characterized as mostly very welcomed albeit its pitfalls.

Sub-themes

1- Eat, sleep and exercise."Our daily routine."

All participants reported living a more disciplined lifestyle. The mornings start by waking up early and meeting for breakfast followed by completing their assigned chores like cleaning, cooking, or gardening. After lunch, they do recreational tasks like arts especially for females, psychotherapy meetings, followed by dinner and early sleep.

"We wake up in the morning, pray, have breakfast, do errands assigned to us, attend a meeting, take a break, sometimes there will be no meetings to be held, this basically depends on the program, if so then we run more errands assigned to each. At noon, we go out to evangelize and have lunch afterwards. We then drink our coffee and we exercise. We take a break, have a bath, then we either have dinner or hold a meeting right before dinner. We sometimes get our own free time after dinner and this depends on the schedule. We then say our prayers and go straight to bed. That's our daily routine." (0304)

During the early stages of recovery (1-6 months), the disciplined lifestyle helped them gain weight. This was perceived as an indicator of health replacing what they lost during addiction; and this in turn increased their self-confidence and self-image

"I gained 16 Kg in two months, huge number." (0410)

"I'm actually satisfied that I'm putting on some weight." (0304)

Eat

Meals were part of the disciplined lifestyle as participants described having three communal meals at a fixed time. Most participants in the early stages of rehabilitation (1-6 months)

expressed that they ate large amounts of food during meals and craved for sweet and junk foods that were used as a replacement for drugs. "*Outside rehab I used to eat a sandwich here I have my full breakfast. At lunch, instead of eating a plate I eat two or three. Some people around here binge eat as a way to overcome the stress and need for drugs." (0401)*

Some blamed their binging on food on their frustration from the strict environment in the rehabilitation centers, they ate out of boredom. Eating became the only source of diversion from drugs. *"Coming from a free world where you have access to coffee, soft drinks wherever you are and then all of a sudden you have a structured life, this is frustrating." (0403)*

Four participants stated that the menu offered in the center was healthy and constituted of vegetables, grains and some proteins when available. Three others perceived the high amount of carbohydrates given and little protein with no limited portions as unhealthy.

"The food here is way better than food outside, it's healthier." (0209)

"*Foods available are not much healthy foods." (0405)*

Females showed frustration regarding the weight gain, and to some this was a reason for relapse.

"I was never satisfied with my weight gain, I cry night and day." (0405)

In the late recovery stage (6-12 months), meal structuring becomes a part of their daily routine and food is no more seen as a substitute for drugs where most participants reported some struggle in terms of food intake control. Consciousness of the weight gain and desire to lose the extra weight was frequently expressed in this stage of the treatment. Weight gain and increased food intake is no more seen as a health indicator, rather a cause in some for drug relapse leading to frustration and self-hatred. *"I see people suffering from their extra weight, If I ever put that weight on, I would do drugs for a month to lose that extra weight and then I'll quit." (0212)*

Exercise

Physical activity is a mandatory daily or weekly routine in all centers. Participants had a positive attitude towards physical activity and indicated marked physical, psychological and craving benefits from it. *"Yes, a bit of weights, a bit of stretching, a bit of cardio. In summer it is very nice*

we play basketball, volleyball, football. Stuff like that, and we also go for other activities in summer , so we enjoy the weekend." (0401)

On the other hand, some reported that it is a daily routine that is not enjoyed and boring. *"It is a repetition, every week it is the same, it is a routine: running, stretching." (0407)*

Sleep

Upon admission, all participants suffered from poor sleep. In the rehabilitation, their sleeping patterns were more disciplined in terms of timing and duration. Excessive sleeping hours especially during the day was reported to the caregivers as it was perceived as a sign of improper coping and possible relapse to drugs. Some females expressed the need for more sleeping hours. *"Whoever sleeps a lot during the day is noticed by the management. To them, this person is facing issues in the treatment, so they speak to him privately to determine his weakness and work on it."(0208)*

"I need someone to wake me up like four times in the morning." (0401)

"Do you need more sleep?" (Facilitator) "Yes." (0401 & 0403)

2-Therapy

In terms of therapy, in the religious centers, prayers (Christo-therapy) played a major part of the treatment. Psychotherapy is also included in the daily routine, where weak points of the participants leading to relapse are identified and worked upon. *"When I arrived here, I was in a very bad shape, I had no communication with others, and I was introverted. Yet, as soon as you arrive, they start working on your weaknesses and boost your self-confidence. They also set goals for whoever is afraid of confrontation to overcome such fear." (0209)*

3-Support system

Most participants pointed to three types of support: environmental, professional and peer. This support was very important in helping participants hold back their cravings for food and drugs.

The presence of this supportive environment embeds security and safety within participants for sustainability and drug relapse prevention through excluding any association that could lead to substance abuse again. Most of the participants expressed their gratitude to the excessive support and care offered by the care providers. They listened to their problems and were not judgmental or hostile.

Peer support was also cited as a positive supporting system to cope with mainly craving. The pre-set knowledge of the obstacles that will be faced in the different stages of the treatment insured better coping within the participants in addition to them supporting other peers in their first experience. This applies largely to the increased food intake, sweet cravings and weight increase that is faced in the early stages of the treatment, in addition to drug craving.

Suggestions for making rehabilitation a better experience

Whilst residential rehabilitation treatment centers provide a stable environment to target multiple health risk behaviors, these services tend to focus mainly on the drug and alcohol abuse problems of the individuals. Other factors like smoking, healthy eating and exercise should be addressed and tackled as part of the daily routine. The participants expressed the need to tailor a program addressing three needs:

1-Nutrition

Two types of suggestions emerged. One in relation to environmental control and the second is promoting healthy eating habits. Participants expressed the need to have "*healthy snacks"* available at all times as a means to decrease the sweet cravings and limit the food intake to healthy choices. Others expressed that the rehabilitation centers should have "*dietitians setting healthy daily menus with emphasis on portion control"* as a means to control the weight gain experienced.

"I feel what is wrong in this center is that instead of giving sweets as a snack to the person who is hungry or ask him to wait till the time of the next meal, I can give him an apple or a banana so to stop the feeling of hunger and stop him from the continuous thinking of food." (0401)

However, strict discipline was not recommended in the first stages as *"we have rules and we do not want more to be added" (0403),* which may offset individuals.

"A nutrition intervention program" in treatment centers that provides general nutrition education to all participants in the early stages of the treatment (0-6 months) is desired. An important aspect of this program is to raise awareness about the increase in food intake and weight that the participants might face during the treatment.

In later stages (6-12 months), having an "*individualized consultation"* to members in need of weight monitoring or loss was expressed. *"Start with general information about nutrition and then it becomes individualized." (0303)*

2- *Physical Activity*

Participants expressed the need for more varied physical activity programs to be administered in the afternoons rather than mornings because this when craving for drugs are intensified *"Would you prefer to have physical activity first thing in the morning, or it does not matter?" (facilitator)*

"In the afternoon. During sports it's the only time I do not have drug cravings" (0403)

"In the morning you wake up calm but in afternoon you have cravings so sports are very important."(0401)

3-Transitional programs post-rehabilitation

Some participants emphasized on the need to have transitional programs post-rehabilitation where coaching sessions are delivered to prevent relapse and reuse of drugs. *"Every drug user needs follow up. Every person who leaves the center today will relapse if not now after a year maybe. We need to stay protected. The one who wants to stop drug abuse has to stay protected all his life. He needs follow up all his life. "(0207)*

Table 2: *Lifestyle description and suggestions during rehabilitation**.***

	Description	***Benefits***	***Pitfalls***	***Suggestions***
Nutrition	-Fixed mealtimes with free portion size	-Desciplined eating habits -Healthy menus	-Increased sweet cravings -Large meals consumed -Unhealthy menus (to some)	-Healthy snacks available at all times -Healthy menus set by a nutritionist -Nutrition awareness programs at early stages of treatment -Individualized nutrition consultation at later stages of treatment when needed

Physical Activity	-Daily or weekly mandatory routine	-Marked physical and psychological benefits	-Boring routine with little variety	-Varied physical activity programs in afternoons
Sleep	-Disciplined time and sleep duration	-Healthy sleeping patterns	-Need for longer sleeping hours -Excessive daily sleeping is a sign of improper coping with the treatment	-Transitional post-rehabilitation sessions to prevent relapse

Discussion

This study is among the first to briefly shed the light on the lifestyle of PUWD including eating, sleep and exercise habits during addiction with more emphasis on the early and late stages of rehabilitation. Participants described their disciplined lifestyle in rehabilitation centers, which were overall well-received. But, they identified pitfalls which,if not properly addressed, may lead some to relapse. They suggested measures for improving rehabilitation services.

Our participants discussed factors leading to addiction and rehabilitation that are echoed in the literature[39-42]. Further, lifestyle practices during addiction including low food and poor nutrient intakes[1,24,43],lack of engagement in physical activity,as well as disrupted sleep due to the pronounced effect of drugs on wakefulness are also reported globally[17,18,20] .

We found that residential rehabilitation centers provide a stable environment to prevent relapse. The focus is mainly on pharmacotherapy and psychotherapy as means for preventing relapse; and secondly on enforcing a disciplined routine to regain normality in lifestyle practices. While the former seem to be overall well-received, the latter was a blanket approach, not addressing individuals' preferences, thus suboptimal and in need of being redressed. Empowering individuals to gain a healthy lifestyle practices during rehabilitation is important to prevent relapse as our participants indicated. In fact, binge eating and weight gain were associated with relapse, especially among females[44 45]; and lack of sleep may be bidirectional: drug use causes sleep disturbances and difficulty sleeping causes relapse[46]. Thus, providing person-centered

interventions including personal coaching in rehabilitation centers by way of preventing relapse are suggested as essential components in treatment facilities[47,48].

In terms of eating practices, in the early stage of rehabilitation, binge eating is sometimes the sole divergent from drugs[44,49,50]. Effective measures for controlling food intake may include pairing nutritional programs with leisure/vocational activities, to establish healthy food habits while simultaneously increasing self-worth through actively working with individuals and identifying skills and vocations effaced during addiction. Further, establishing nutrition educational programs with emphasis on increasing knowledge, and changing attitudes and practices to promote positive nutrition behavior[24,47] could help preventing relapse[51] .

Physical activity is another lifestyle habit poorly addressed in rehabilitation centers in Lebanon. Our participants almost marginalized the role of physical activity by labeling it as 'boring'. It is an essential element as it reduces relapse and withdrawal sufferings while improving sleep[19,28,52].It also has a positive effect on the psycho-social wellbeing of individuals [22,53] .Interventions to incent individuals to participate in physical activities, while improving the quality and variety of programs are highly recommended. Fun Sports that encourage team work and communication tend to have an appeal for some participants and serve as a forum for the practice of social skills and the development of friendships with other recovering individuals.Understanding motivational differences among participants is a key determinant of engagement and adherence[11,27,54]. Thus, when identifying the type and level of physical activity, it is important to have them person-centered, i.e. taking into consideration individuals' self-efficacy, readiness, preference of the type of activity offered, in addition to the tolerance rate.

Follow-up treatment in the community beyond the rehabilitation center is crucial to decrease the risk of relapse among users, and was expressed as a need among most of our participants. There is accumulating evidence suggesting the association between the length of the treatment modality and drug use relapse. The longer the treatment (6-12 months), the less the relapse [55].The research indicates the need to investigate further the factors that contribute to sustaining a decrease in drug use and negative behaviors post-treatment.

Study strengths and limitations

This study pioneered in tackling the lifestyle practices of PWUD undergoing treatment in rehabilitation centers in Lebanon through qualitative research in the absence of any quantitative data . There are several strengths and limitations that are worth noting. This study fills a gap in the international literature on the lifestyle pf PWUD undergoing residential rehabilitation.The research team was composed of two members: NM and GHA who are located in Lebanon. GHA, the qualitative methodologist, worked with NM on developing the predetermined open-ended questions to guide the discussion and conducted interviews. Our evaluation employed several techniques to ensure reflexivity and to increase the credibility of the study: securing a high proportion of potentially eligible individuals to participate; using transcribed audio-recorded interviews; and using participants' quotes to support our findings. Both researchers have no prior rapport with the participants or the rehabilitation centers.

As for the limitations, female participants were less represented compared to the males and this goes back to the limited number of rehabilitation centers in Lebanon that accommodate females. Factors associated with poor lifestyle habits including psychotropic medications and cigarette smoking were not adequately addressed.

Implications for future research

Residential treatment centers are controlled environments with potential for offering and implementing healthy lifestyle intervention programs to its residents. Policies for better treatment to drug users talking all aspects of behavioral changes can be developed from extensive research in this population group. Further research in assessing the nutritional status and healthy behaviors of drug users in rehabilitation centers are required for the development and implementation of a multidisplinary intervention program in the promotion of good health among this population group. Also it is important to test the evidence generated by this qualitative research through quantitatve ones, ultimately to come out with an evidence based multifaceted intervention.

Conclusion

PWUD undergoing treatment in rehabilitation centers are a vulnerable population with many challenges. Treatment services mainly concentrate on the medical management of withdrawal and its complications with little emphasis on other treatment modalities. In this study, we shed the light on some of the challenges PWUD face in maintaining a healthy lifestyle in rehabilitation centers and the necessities of addressing those challenges in order to improve the overall rehabilitation experience and prevent relapse.

Appendix 1: Study guide

Gender:

Age:

Marital Status:

<u>Focus group Guide Questions</u>

1- Tell me a little about yourself and why you are here
2- Let us talk about your daily routine
3- What do you usually eat?
4- Who selects the food?
5- Who cooks the food?
6- Let us talk about the effect of the drug/treatment on the food intake and food choices
7- Let us talk about other factors that you feel affects your food intake
8- What do you think about your individual and group eating habits?
9- Let us talk about your experiences with weight change
10- How do you feel about your weight ?
11- What in your opinion causes the weight loss/ gain ?
12- What do you think about having information on healthy eating ?
13- What are you interested in knowing about food and nutrition?
14- What do you think is the best way to gain such information?
15- Let us talk about exercise
16- What type of exercise do you do ?
17- Would you like to do more exercise as part of the program?
18- What ideas do you have to increase exercise ?

Appendix 2: Thematic inductive analytical approach

Adopted from: Braun V, Clarke V. Using Thematic Analysis in Psychology.Qualitative Research in Psychology.2006:77-101

Data was thematically analyzed along six phases.

Phase 1: The interviewers and coder read and re-read each transcript to get acquainted with the information.

Phase 2: An initial list of codes was generated.

Phase 3: The search for themes started. The interviewer and coder discussed the relationships between codes. A log of potential themes and sub-themes was developed, including a list of definitions and quotes to illustrate each theme and sub-theme.

Phase 4: The list of themes was further refined based on consensus reached among all research team members to define themes and sub-themes and highlight the existing relationships between these themes.

Phase 5: Defining and refining the themes was done, that is we identified the story behind each theme and the relationship between themes.

Phase 6: The findings were presented in a narrative form, and a synthesis of the results was included. These findings were supported with quotes from interviewees and beneficiaries relating to identified themes and sub-themes. In this stage, every effort was made to provide a concise, coherent, logical, non-repetitive, and interesting account of the story the data tell – within and across themes.

Appendix 3: Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist

Developed from: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*. 2007. Volume 19, Number 6: pp. 349 – 357.

No. Item	Guide questions/description	Reported on Page #
Domain 1: Research team and reflexivity		
Personal Characteristics		
1.Interviewer/facilitator	Which author/s conducted the interview or focus group?	Page 4
2. Credentials	What were the researcher's credentials? e.g. PhD, MD	Page 15
3. Occupation	What was their occupation at the time of the study?	N/A
4. Gender	Was the researcher male or female?	N/A
5. Experience and training	What experience or training did the researcher have?	Page 15
Relationship with participants		
6.Relationship established	Was a relationship established prior to study commencement?	N/A
7. Participant knowledge of the interviewer	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	N/A
8. Interviewer characteristics	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	N/A
Domain 2: Study design		
Theoretical framework		
9. Methodological orientation and Theory	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	Page 5
Participant selection		
10. Sampling	How were participants selected? e.g. purposive, convenience, consecutive, snowball	Page 4
11. Method of approach	How were participants approached? e.g. face-to-face, telephone, mail, email	Page 5
12. Sample size	How many participants were in the study?	Pages 4,5
13. Non-participation	How many people refused to participate or dropped out? Reasons?	N/A

Setting		
14. Setting of data collection	Where was the data collected? e.g. home, clinic, workplace	Page 4
15. Presence of non-participants	Was anyone else present besides the participants and researchers?	N/A
16. Description of sample	What are the important characteristics of the sample? e.g. demographic data, date	Page 5
Data collection		
17. Interview guide	Were questions, prompts, guides provided by the authors? Was it pilot tested?	Page 4 and Appendix 1
18. Repeat interviews	Were repeat interviews carried out? If yes, how many?	N/A
19. Audio/visual recording	Did the research use audio or visual recording to collect the data?	Page 4
20. Field notes	Were field notes made during and/or after the interview or focus group?	Page 4
21. Duration	What was the duration of the inter views or focus group?	N/A
22. Data saturation	Was data saturation discussed?	Page 4
23. Transcripts returned	Were transcripts returned to participants for comment and/or correction?	N/A
Domain 3: Analysis and findings		
Data analysis		
24. Number of data coders	How many data coders coded the data?	N/A
25. Description of the coding tree	Did authors provide a description of the coding tree?	N/A
26. Derivation of themes	Were themes identified in advance or derived from the data?	Page 5
27. Software	What software, if applicable, was used to manage the data?	N/A
28. Participant checking	Did participants provide feedback on the findings?	N/A
Reporting		
29. Quotations presented	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	Pages 6-12
30. Data and findings consistent	Was there consistency between the data presented and the findings?	Pages 13-15
31. Clarity of major themes	Were major themes clearly presented in the findings?	Pages 6-12
32. Clarity of minor themes	Is there a description of diverse cases or discussion of minor themes?	Pages 13-15

References

1. Nabipour S, Ayu Said M, Hussain Habil M. Burden and nutritional deficiencies in opiate addiction- systematic review article. *Iranian journal of public health.* 2014;43(8):1022-1032.
2. Stickel A, Rohdemann M, Landes T, et al. Changes in Nutrition-Related Behaviors in Alcohol-Dependent Patients After Outpatient Detoxification: The Role of Chocolate. *Substance Use & Misuse.* 2016;51(5):545-552.
3. Jeynes KD, Gibson EL. The importance of nutrition in aiding recovery from substance use disorders: A review. *Drug and alcohol dependence.* 2017;179:229-239.
4. Sæland M, Haugen M, Eriksen FL, et al. High sugar consumption and poor nutrient intake among drug addicts in Oslo, Norway. *British Journal of Nutrition.* 2010;105(4):618-624.
5. Santolaria-Fernandez FJ, Gomez-Sirvent JL, Gonzalez-Reimers CE, et al. Nutritional assessment of drug addicts. *Drug and alcohol dependence.* 1995;38(1):11-18.
6. Lv D, Zhang M, Jin X, et al. The Body Mass Index, Blood Pressure, and Fasting Blood Glucose in Patients With Methamphetamine Dependence. *Medicine.* 2016;95(12):e3152-e3152.
7. Lin SH, Yang YK, Lee SY, et al. Association between cholesterol plasma levels and craving among heroin users. *Journal of addiction medicine.* 2012;6(4):287-291.
8. Tang AM, Bhatnagar T, Ramachandran R, et al. Malnutrition in a population of HIV-positive and HIV-negative drug users living in Chennai, South India. *Drug and alcohol dependence.* 2011;118(1):73-77.
9. Ross LJ, Wilson M, Banks M, Rezannah F, Daglish M. Prevalence of malnutrition and nutritional risk factors in patients undergoing alcohol and drug treatment. *Nutrition.* 2012;28(7):738-743.
10. Neale J, Nettleton S, Pickering L, Fischer J. Eating patterns among heroin users: a qualitative study with implications for nutritional interventions. *Addiction (Abingdon, England).* 2012;107(3):635-641.
11. Abrantes AM, Battle CL, Strong DR, et al. EXERCISE PREFERENCES OF PATIENTS IN SUBSTANCE ABUSE TREATMENT. *Mental health and physical activity.* 2011;4(2):79-87.
12. Rene D. Drumm DM, Lisa Metsch,Melodie Neufeld, Alex Sawatsky. "I'm A Health Nut!" Street Drug Users' Accounts Of Self-Care Strategies. *The Journal of Dug Issue.* 2005;35(3):607-630.
13. Powers JM, Woody GE, Sachs ML. Perceived Effects of Exercise and Sport in a Population Defined by Their Injection Drug Use. *The American Journal on Addictions.* 1999;8(1):72-76.
14. Fischer J, Butt C, Dawes H, et al. Fitness levels and physical activity among class A drug users entering prison. *British journal of sports medicine.* 2012;46(16):1142-1144.
15. Duterte M, O'Neil S, McKearin G, Sales P, Murphy T, Murphy S. Walking the tightrope: balancing health and drug use. *Journal of psychoactive drugs.* 2001;33(2):173-183.
16. Gossop MR, Bradley BP, Brewis RK. Amphetamine withdrawal and sleep disturbance. *Drug and alcohol dependence.* 1982;10(2-3):177-183.

17. Mahfoud Y, Talih F, Streem D, Budur K. Sleep disorders in substance abusers: how common are they? *Psychiatry (Edgmont).* 2009;6(9):38-42.
18. Schierenbeck T, Riemann D, Berger M, Hornyak M. Effect of illicit recreational drugs upon sleep: cocaine, ecstasy and marijuana. *Sleep medicine reviews.* 2008;12(5):381-389.
19. Stein MD, Herman DS, Bishop S, et al. Sleep disturbances among methadone maintained patients. *Journal of substance abuse treatment.* 2004;26(3):175-180.
20. Conroy DA, Arnedt JT. Sleep and substance use disorders: an update. *Current psychiatry reports.* 2014;16(10):487.
21. Gerstein DR, Lewin LS. Treating Drug Problems. *New England Journal of Medicine.* 1990;323(12):844-848.
22. Gimenez-Meseguer J, Tortosa-Martinez J, de los Remedios Fernandez-Valenciano M. Benefits of Exercise for the Quality of Life of Drug-Dependent Patients. *Journal of psychoactive drugs.* 2015;47(5):409-416.
23. Forrester JE, Tucker KL, Gorbach SL. The effect of drug abuse on body mass index in Hispanics with and without HIV infection. *Public Health Nutrition.* 2007;8(1):61-68.
24. Cowan J, Devine C. Food, eating, and weight concerns of men in recovery from substance addiction. *Appetite.* 2008;50(1):33-42.
25. Varela P, Marcos A, Ripoll S, Santacruz I, Requejo AM. Effects of human immunodeficiency virus infection and detoxification time on anthropometric measurements and dietary intake of male drug addicts. *The American Journal of Clinical Nutrition.* 1997;66(2):509S-514S.
26. Kolarzyk E, Chrostek Maj J, Pach D, Janik A, Kwiatkowski J, Szurkowska M. Assessment of daily nutrition ratios of opiate-dependent persons before and after 4 years of methadone maintenance treatment. *Przeglad lekarski.* 2005;62(6):368-372.
27. Abrantes A, Blevins C. Exercise in the Context of Substance Use Treatment: Key Issues and Future Directions. *Current Opinion in Psychology.* 2019;30.
28. Roessler KK. Exercise treatment for drug abuse--a Danish pilot study. *Scandinavian journal of public health.* 2010;38(6):664-669.
29. Bardo MT, Compton WM. Does physical activity protect against drug abuse vulnerability? *Drug and alcohol dependence.* 2015;153:3-13.
30. Peles E, Schreiber S, Adelson M. Documented poor sleep among methadone-maintained patients is associated with chronic pain and benzodiazepine abuse, but not with methadone dose. *European neuropsychopharmacology : the journal of the European College of Neuropsychopharmacology.* 2009;19(8):581-588.
31. Beswick T, Best D, Rees S, Bearn J, Gossop M, Strang J. Major disruptions of sleep during treatment of the opiate withdrawal syndrome: differences between methadone and lofexidine detoxification treatments. *Addict Biol.* 2003;8(1):49-57.
32. Miller WR, Sorensen JL, Selzer JA, Brigham GS. Disseminating evidence-based practices in substance abuse treatment: a review with suggestions. *Journal of substance abuse treatment.* 2006;31(1):25-39.
33. Davidson L, Andres-Hyman R, Bedregal L, Tondora J, Frey J, Kirk TA. From “Double Trouble” to “Dual Recovery”: Integrating Models of Recovery in Addiction and Mental Health. *Journal of Dual Diagnosis.* 2008;4(3):273-290.

34. Shannon CS, Bourque D. Overlooked and underutilized: the critical role of leisure interventions in facilitating social support throughout breast cancer treatment and recovery. *Social work in health care.* 2005;42(1):73-92.
35. Ghandour LA, El Sayed DS, Martins SS. Prevalence and patterns of commonly abused psychoactive prescription drugs in a sample of university students from Lebanon: an opportunity for cross-cultural comparisons. *Drug and alcohol dependence.* 2012;121(1-2):110-117.
36. Karam EG, Ghandour LA, Maalouf WE, Yamout K, Salamoun MM. A rapid situation assessment (RSA) study of alcohol and drug use in Lebanon. *Le Journal medical libanais The Lebanese medical journal.* 2010;58(2):76-85.
37. Karam EG, Maalouf WE, Ghandour LA. Alcohol use among university students in Lebanon: prevalence, trends and covariates. The IDRAC University Substance Use Monitoring Study (1991 and 1999). *Drug and alcohol dependence.* 2004;76(3):273-286.
38. Braun V, Clarke V. Using thematic analysis in psychology. *Qualitative Research in Psychology.* 2006;3(2):77-101.
39. Wood AP, Dawe S, Gullo MJ. The role of personality, family influences, and prosocial risk-taking behavior on substance use in early adolescence. *Journal of adolescence.* 2013;36(5):871-881.
40. Lo CC, Stephens RC. Arrestees' perceived needs for substance-specific treatment: exploring urban-rural differences. *The American journal of drug and alcohol abuse.* 2002;28(4):623-642.
41. Warner BD, Leukefeld CG. Rural-urban differences in substance use and treatment utilization among prisoners. *The American journal of drug and alcohol abuse.* 2001;27(2):265-280.
42. Lindberg MA, Zeid D. Interactive pathways to substance abuse. *Addict Behav.* 2017;66:76-82.
43. Emerson MH, Glovsky E, Amaro H, Nieves R. Unhealthy weight gain during treatment for alcohol and drug use in four residential programs for Latina and African American women. *Subst Use Misuse.* 2009;44(11):1553-1565.
44. Warren CS, Lindsay AR, White EK, Claudat K, Velasquez SC. Weight-related concerns related to drug use for women in substance abuse treatment: prevalence and relationships with eating pathology. *Journal of substance abuse treatment.* 2013;44(5):494-501.
45. university ncoaasaCac. *Food for thought:substance abuse and eating disorders.* colombia university;2003.
46. Hsu WY, Chiu NY, Liu JT, et al. Sleep quality in heroin addicts under methadone maintenance treatment. *Acta neuropsychiatrica.* 2012;24(6):356-360.
47. Karajibani M, Montazerifar F, Dashipour A, Lashkaripour K, Abery M, Salari S. Effectiveness of Educational Programs on Nutritional Behavior in Addicts Referring to Baharan Hospital, Zahedan (Eastern of IR Iran). *International journal of high risk behaviors & addiction.* 2014;3(2):e18932-e18932.
48. Copeland J, Martin G. Web-based interventions for substance use disorders: a qualitative review. *Journal of substance abuse treatment.* 2004;26(2):109-116.

49. Orsini CA, Ginton G, Shimp KG, Avena NM, Gold MS, Setlow B. Food consumption and weight gain after cessation of chronic amphetamine administration. *Appetite.* 2014;78:76-80.
50. Hodgkins CC, Cahill KS, Seraphine AE, Frostpineda K, Gold MS. Adolescent Drug Addiction Treatment and Weight Gain. *Journal of Addictive Diseases.* 2004;23(3):55-65.
51. Grant BF, Stinson FS, Dawson DA, et al. Prevalence and co-occurrence of substance use disorders and independent mood and anxiety disorders: results from the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of general psychiatry.* 2004;61(8):807-816.
52. Zschucke E, Heinz A, Strohle A. Exercise and physical activity in the therapy of substance use disorders. *TheScientificWorldJournal.* 2012;2012:901741.
53. Kessler RC, Crum RM, Warner LA, Nelson CB, Schulenberg J, Anthony JC. Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Archives of general psychiatry.* 1997;54(4):313-321.
54. Williams D, Strean W. Physical Activity as a Helpful Adjunct to Substance Abuse Treatment. *Journal of Social Work Practice in The Addictions.* 2004;4:83-100.
55. Hubbard RL, Craddock SG, Anderson J. Overview of 5-year followup outcomes in the drug abuse treatment outcome studies (DATOS). *Journal of substance abuse treatment.* 2003;25(3):125-134.