

Factors Affecting Addiction Severity Index (ASI) among Clients Enrolled in Methadone Maintenance Treatment (MMT) Program in Myanmar

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Research

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Abstract

Background: Opioid substitution with methadone maintenance treatment (MMT) is shown to reduce illicit opioid use and renew social-functioning. Understanding factors that undermine clients' social-functioning during MMT treatment is vital for improving treatment compliance and quality of life.

Method: A total of 210 respondents who were presently enrolled in formal MMT program in Myanmar were recruited from five cities through stratified random sampling for this cross-sectional study. The Addiction Severity Index (ASI) was used to objectively assess respondents social-functioning in the last 30 days. Higher ASI scores denotes poorer social-functioning.

Result: Respondents total ASI scores in the respective domains were; employment (47.4%), alcohol (44.4%), drug use (7.2%), legal (49.2%) and social-family relationship (10.7%). Those reported to have never injected drugs in the last 30 days had lower ASI scores than those who reported injection drug use ($p=0.026$). After identifying the differences in ASI total scores, we found there are significant associations in the clients' Hepatitis C status, age category, frequency of heroin injection, quality of life score, marital status, current leisure status with family/friend, current history of injection in the last 30 days, income status, satisfaction with current marital status, as well as reported drug and alcohol use ($p<0.05$). Stepwise binary logistic regression showed alcohol and higher frequency of heroin injection is associated with higher ASI scores. Meanwhile, older age respondents, those who had leisure time with family, and satisfied with current marital status had lower ASI scores ($p<0.05$).

Conclusion: Our results indicate that those enrolled in MMT program in Myanmar faced many challenges in their daily social-functioning. Treatment providers must take heed of these apparent impediment to ensure clients chequered social-functioning do not undermine their treatment compliance.

Trial registration: NA

Background

United Nations Office on Drugs and Crime (UNODC) estimated that there are about 57.8 million opioid users globally (UNODC, World Drug Report 2020). UNODC found almost half of those who injected drugs were living with HIV and one out of every eight injectors had hepatitis C (UNODC, World Drug Report 2018). Opioid substitution therapy (OST) with methadone maintenance treatment (MMT) is the most promising harm-reduction intervention for reducing illicit opioid use (WHO, The methadone fix 2008). Though, MMT is shown to curtail HIV spread and improve health, it is also equally important to evaluate clients social-functioning in MMT program (Bart 2012).

In Myanmar, MMT programme was first introduced in 2006 primarily to curb HIV spread among injecting drug users. As of 2019, a total of 19,991 people who inject drugs (PWIDs) have enrolled in MMT program in Myanmar (Myanmar 2020). With the support of public and private sectors who work collectively to mitigate HIV spread, they were also responsible to ensure MMT programme functions effectively. The

National Strategic Plan for HIV/ AIDS (2021-2025) plans to ensure that 40% of PWIDs in 2025 are enrolled in MMT programme. Since clients in MMT program are bound to face impairments in social-functioning, thus it is vital for treatment providers to identify factors undermining clients social-functioning during MMT treatment. Given that clients in MMT program are susceptible to experience social-impairments, this study aims to generally determine MMT client social-functioning and identify factors undermining their social-functioning in MMT treatment.

Methods

Study design, respondents and location

A total of 210 clients receiving methadone treatment participated in this cross-sectional study. All the respondents for this study were recruited through stratified random sampling from five cities (Yangon, Mandalay, Lashio, Kawlin and Mohnyin) in Myanmar where MMT programme is formally implemented. The Addiction Severity Index- Lite (ASI) (McLellan, et al. 1999) was used to objectively determine respondents social-functioning.

Inclusion and exclusion criteria

Inclusion criteria for the study include; 1) must be above 18 years of age, 2) presently enrolled in MMT programme and tested positive for methadone, and 3) must have a minimum of six-months MMT history. We excluded those who hesitate to give their informed consent and those experiencing significant health and psychological problems.

Measures

All the study data was collected from May to July 2017. All the surveys were conducted through face-to-face interviews by two trained researchers. A semi-structured questionnaire was used to collect respondents' socio-demographic characteristics, quality of life information, HIV risk behaviours, previous drug use history, and history on infectious disease and methadone treatment experiences. We also used the validated Addiction Severity Index- Lite (ASI) (McGahan, et al. 1986), WHOQOL-BREF (WHO, The World Health Organization Quality of Life (WHOQOL)-BREF 2004), and Timeline Follow back (TLFB survey) (NIDA-CTN 2014) questionnaires to collect respondents drug use history.

Specifically for Addiction Severity Index (ASI) scores, 5 out of 7 composite scores were collected and analysed for employment, alcohol, drug use, legal status, family/social composite scores except medical and psychiatric composites. Each raw composite score was calculated and transformed to a 0-100 scale using the formula shown below:

$$\text{Transformed scale} = \frac{(\text{Actual raw score} - \text{lowest possible raw score})}{\text{Possible raw score range}} \times 100$$

where “Actual raw score” is the values achieved through summation of responses from each composite score, “lowest possible raw score” is the lowest possible value that could occur through summation (this value would be 4 for all facets of employment), and “Possible raw score range” is the difference between the maximum possible raw score and the lowest possible raw score.

Urinalysis

All the respondents were screened for methadone use prior to their participation in the study. Rapid-test kits were used to confirm the respondents illicit drug use status for Morphine, Cannabis, Methamphetamine, Amphetamine, and Benzodiazepine use.

Composite Score for Employment Status

ASI composite score for employment status was included questions on driver’s license and car availability for their use, paid work in the past 30 days, income from work in the past 30 days. Those responses were combined and transformed to 0-100 scale for comparison among the responses.

Composite Score for Alcohol Use

Composite score for alcohol use was derived from the responses to the questions of number of days of any alcohol use/ intoxication in the past 30 days, number of days troubled or bothered by any alcohol problems, how it was troubled in the past 30 days, how importance of treatment for alcohol problems and money spent during the past 30 days on alcohol. Alcohol related responses were combined and transformed to 0-100 scale for comparison among the responses.

Composite Score for Drug Use

Composite score for drug use was derived from the responses to the questions of number of days use of drugs (Heroin, Methadone, Other opiates/analgesics, Barbiturates, Other sedatives, Cocaine, Amphetamines, Cannabis, Hallucinogens), number of days used more than one drug, number of days experienced drug use problems in the past 30 days, how it was troubled in the past 30 days and how importance of treatment for drug problems. Drug use related responses were combined and transformed to 0-100 scale for comparison among the responses.

Composite Score for Legal Status

Composite score for legal status was derived from the responses to the questions on status of presently awaiting charges, trial, or sentencing, number of days engaged in illegal activity for profit in past 30 days and amount of money received from illegal sources in the past 30 days. Legal status related responses were combined and transformed to 0-100 scale for comparison among the responses.

Composite Score for Family/Social Status

Composite score for family/social status was derived from the responses to the questions on satisfaction with current marital situation, serious conflicts with their family in the past 30 days, family problems troubled or bothered in the past 30 days and importance of treatment or counselling for family problems. Responses were combined and transformed to 0-100 scale for comparison among the responses.

Composite Score for Medical Status and Psychiatric Status

Composite score for medical status and psychiatric status were not included as the exclusion criteria of the respondent “those who couldn’t answer the survey questions due to medical and psychiatric problem were excluded” in the client selection criteria. So, these two sessions in the ASI were omitted.

Statistical analysis

Use of Statistical tests

The study data was analysed with Stata14.0 software. The responses were summarized and analysed into respective composite scores and total scores. Chi-square test and Fisher’s exact test were used for identifying association of the ASI score differences between categorical variables. For examining the differences between mean ASI scores of the interested parameters, independent sample t-tests were used for analysis. A higher ASI score reflects the worse functioning situation and lower ASI scores reflects the better functioning of the clients. Binary logistic regression was used for identifying the predictors to the interested outcome “ASI total score”. Stepwise binary logistic regression analysis was done to recheck the significant regression output with the intended output by adjusting the confounding associated variables. All outcomes were set with statistically significance at $p < 0.05$ with two-tailed results.

Ethical consideration

Ethical approval for the study was obtained from the Human Ethics and Research Committee of Universiti Sains Malaysia (No: USM/ JEPeM/16080269) (University of Science, Malaysia) and Department of

Results

Socio-demographic characteristics

Respondents' socio-demographic characteristics are shown in Table 1. Respondents average methadone dose in this study was 83 mg/ day (with a range of between 20 mg to 300 mg/ day). Meanwhile, 132 (63.46%) received a daily methadone dose of less than and equal 80 mg, while 76 (36.54%) had more than 80 mg. The respondents mean duration of methadone treatment history in this study was 28 months (2.4 years). Eighty-three percent (173/210) had one episode of methadone treatment history, while the rest had more than one episode of treatment history.

Table 1
Demographic Characteristics of Methadone respondents

Variable	Frequency (n and %)	Mean (SD)	Range
Place of respondents	210 (100%)	42	
Kawlin (Sagaing)	42 (20%)		
Lashio (Shan)	42 (20%)		
Mandalay (Mandalay)	42 (20%)		
Mohnyin (Kachin)	42 (20%)		
Yangon (Yangon)	42 (20%)		
Age (years)	129 (61.4%)	33.35 (8.85)	20–76
less than and equal 35 years	81 (38.6%)		
more than 35 years			
Gender	207 (98.6%)		
Male	3 (1.4%)		
Female			
BMI (Body Mass Index)	206 (98%)	20.52 (3.38)	14.03– 33.39
Less than 18.5 underweight	61 (29.61%)		
Between 18.5–25 normal	123 (59.71%)		
More than 25 overweight	22 (10.68 %)		
Working as outreach or peer	29 (13.81%)		
Yes	181 (86.19%)		
No			
Education (years)	7.99	3.54	0–15
No formal education	6 (2.86%)		
Primary	42 (20%)		
Secondary (Middle + High School)	117 (55.71%)		
College- University	45 (21.43%)		

Scores on Addiction Severity Index

Variable	Frequency (n and %)	Mean (SD)	Range
Marital Status	84 (40.58%)		
Married	27 (13.04%)		
Separated/ Divorce/ Widowed	96 (46.38%)		
Single			
Recent 3 year living style	72 (34.45%)		
Nuclear family style	91 (43.54 %)		
With parents	41 (19.62%)		
Extended family	5 (2.39%)		
Alone			
Employment (usual/last)	192 (91.43%)		
Employed	18 (8.57%)		
Un-employed currently (includes disable, student)			
Scores on Addiction Severity Index			

To reflect the severity index of the clients, ASI scores were calculated as in the Table 2.

Table 2
Table showing ASI Scores (Transformed on 0-100 scale)

Variable	Frequency (n and %)	Mean (SD)	Range (on 100 scale)
ASI total score	210 (100%)	84.66 (43.30)	0-265/ 500
ASI average score	210 (100%)	23.97 (10.49)	0-66
ASI Composite Scores	207 (98.6%)	47.38 (19.15)	0-100
ASI for Employment	64 (30.5%)	44.39 (21.12)	0-100
ASI for Alcohol Use	210 (100%)	7.2 (13.39)	0-100
ASI for Drug Use	28 (13.3%)	49.21 (25.44)	0-100
ASI for Legal Status	210 (100%)	10.72 (12.70)	0-100
ASI for Family/ Social Status	-	-	-
ASI for Medical	-	-	-
ASI for Psychiatrist			

From the calculated ASI total scores derived from different domains, mean score differences with the respondents' characteristics were analysed in Table 3 (Tun, Vicknasingam and Singh 2019).

Table 3

Table showing probability on differences of ASI score with characteristics of the respondents

Differences in ASI score	ASI total (p value)	ASI for Employment (p value)	ASI for Alcohol Use (p value)	ASI for Drug Use (p value)	ASI for Legal Status (p value)	ASI for Family/Social Status (p value)
Demographic characters						
Age (less than and equal 35 years vs more than 35 years)	0.0247**	0.6651	0.1936	0.3094	0.7322	0.0324**
BMI (Body Mass Index)	0.2183	0.5501	0.6583	0.3500	0.8174	0.1341
Currently on ART	0.6534	0.0043**	0.8580	0.3583	0.9498	0.7714
Education more than and equal 5 years of school less than 5 years of school	0.9893	0.0661	0.6023	0.0800	0.2279	0.6285
No job currently	0.0000***	0.0032**	0.1291	0.0196**	0.4407	0.0024**
Current Peer/Outreach	0.0556	0.1028	0.9147	0.5493	0.8768	0.3889
Marital status (Currently married vs single/ separated)	0.0000***	0.0473**	0.0437**	0.0031**	0.0528	0.0723
Income (High vs less by mid-point)	0.0000***	0.0000***	0.1899	0.4677	0.0086**	0.6369
Current marital status satisfaction (Yes vs No)	0.0098**	0.1920	0.2646	0.8611	0.1305	0.0000***
WHO Quality of life (QOL) total score	0.0002***	0.0571	0.2826	0.0693	0.0407**	0.0007***
Physical QOL score	0.0062**	0.0649	0.2335	0.0047**	0.3404	0.0047**
Psychological QOL score	0.3739	0.7356	0.8709	0.1105	0.8980	0.0971
Social QOL score	0.0584	0.1284	0.3910	0.2688	0.5397	0.0056**

** significance < 0.05, *** significance < 0.001

Differences in ASI score	ASI total (p value)	ASI for Employment (p value)	ASI for Alcohol Use (p value)	ASI for Drug Use (p value)	ASI for Legal Status (p value)	ASI for Family/Social Status (p value)
Environmental QOL score	0.0111 **	0.0278**	0.0993	0.3737	0.9454	0.0239**
Current leisure status satisfaction	0.0032**	0.1312	0.1254	0.0026**	0.8875	0.0001***
Current leisure status with family	0.0000***	0.0725	0.0431**	0.0045**	0.0768	0.0017**
Current leisure status with friend	0.0200**	0.2842	0.0201**	0.9914	0.5825	0.8206
Current leisure status alone	0.0059**	0.3564	0.5417	0.0029**	0.0483**	0.0025**
Infection history						
HIV status (No vs Yes)	0.4194	0.0011**	0.6500	0.4106	0.8203	0.5671
Hepatitis C status	0.0162**	0.7934	0.0625	0.0047**	0.0280**	0.7754
Hepatitis B status	0.4711	0.6819	0.1659	0.5011	0.0983	0.5560
TB treatment history	0.2669	0.7647	0.6546	0.4545	0.3424	0.1745
STI history	0.7533	0.7371	0.8152	0.3931	0.2593	0.5848
Abuse encountered within 30 days	0.3155	0.9705	0.0149**	0.8687	0.3398	0.0000***
Psychological abuse	0.3703	0.5270	0.0172**	0.8228	0.3398	0.0000***
Physical abuse	.	.	.	.	.	.
Sexual abuse	.	.	.	.	.	.
Methadone services						
Methadone dose categories (more than 80 mg vs less than and equal 80 mg)	0.4118	0.0589	0.4615	0.4146	0.5453	0.8511

** significance < 0.05, *** significance < 0.001

Differences in ASI score	ASI total (p value)	ASI for Employment (p value)	ASI for Alcohol Use (p value)	ASI for Drug Use (p value)	ASI for Legal Status (p value)	ASI for Family/Social Status (p value)
Methadone duration (more than 2.4 year vs less than and equal 2.4 year)	0.8608	0.0029**	0.0214**	0.7135	0.7088	0.4136
Methadone treat freq:	0.5357	0.6881	0.9363	0.9428	0.8144	0.3509
more than 80 mg	0.5339	0.7627	0.1462	0.5504	0.6394	0.2824
less than and equal 80 mg	0.7544	0.7915	0.3286	0.8215	0.5256	0.6815
more than 2 years	0.1795	0.6651	0.7122	0.9382	0.6179	0.3986
less than and equal 2.4 years	0.7389	0.6127	0.8141	0.9353	0.7242	0.5175
** significance < 0.05, *** significance < 0.001						

From mean ASI score difference analysis, methadone clients with younger age group, unemployed, single or separated, low income, clients who were not satisfied with current marital status, who had less quality of life (Physical and environmental domains), clients not satisfied with current leisure status and clients with hepatitis C infection were highly associated with high addiction severity index total scores ($p < 0.05$). ASI score differences with the illicit drug use situation was further analysed in Table 4.

Urinalysis Finding

Results from the urine drug screen show, 117 (55.71%) tested for morphine, 54 (25.71%) (amphetamine and methamphetamine), 25 (11.90%) THC (Cannabis compound) and 72 (34.29%) benzodiazepine. More than two-thirds tested for only one type of drug, while 92 (43.81%) were identified as poly-drug users.

Table 4

Table showing probability on differences in ASI score with illicit drug use situation of respondents

Differences in ASI score	ASI total (p value)	ASI for Employment (p value)	ASI for Alcohol Use (p value)	ASI for Drug Use (p value)	ASI for Legal Status (p value)	ASI for Family/Social Status (p value)
Urine illicit drug findings (Absent vs Present)						
Urine Morphine	0.3703	0.0411**	0.3759	0.0293**	0.7341	0.2260
Urine THC	0.1104	0.2043	0.6153	0.0001***	0.3911	0.5580
Urine Methamphetamine	0.6610	0.3091	0.8607	0.7425	0.9762	0.7884
Urine Amphetamine	0.2132	0.2811	0.7069	0.2423	0.4915	0.6015
Urine Benzodiazepine	0.3846	0.3103	0.1724	0.3263	0.1646	0.0209**
Reported drug use status						
Last heroin injection within 30 days	0.0030**	0.9604	0.1464	0.0011**	0.1898	0.0542
Frequency of injection	0.0011***	0.2328	0.7005	0.0000***	0.0789	0.8703
Needle sharing within 30 days	0.0160**	0.0208**	0.5509	0.9036	0.1936	0.3324
Life time sharing of needle and syringes	0.0478**	0.0098**	0.4959	0.1341	0.3605	0.9177
Drug and alcohol (N vs Y)	0.0000***	0.9727	0.1895	0.0018***	0.4915	0.4039
Alcohol	0.0000***	0.0536	0.1272	0.8612	0.6686	0.2497
Heroin	0.0073**	0.4919	0.6977	0.0004***	0.4764	0.2126
Methadone (210)	-	-	-	-	-	-
Morphine	0.0508**	0.0493**	0.5351	0.4790	-	0.0039**
Benzodiazepine	0.0133**	0.0620	0.0131**	0.0000***	0.0820	0.0004***
Barbiturate	0.6641	0.0066**	-	0.8158	-	0.8083
Antidepressant	0.0000***	0.5726	0.0116**	0.1850	0.5822	0.0001***
** significance < 0.05, *** significance < 0.001						

Differences in ASI score	ASI total (p value)	ASI for Employment (p value)	ASI for Alcohol Use (p value)	ASI for Drug Use (p value)	ASI for Legal Status (p value)	ASI for Family/Social Status (p value)
Cocaine (210)						
Amphetamine	0.0646	0.7017	0.1001	0.0444**	0.9021	0.0203**
THC	0.0162**	0.5060	0.6153	0.0000***	0.3911	0.4161**
Ecstasy	0.3084	0.1360	-	0.5617	-	0.0015**
Inhalants	0.0391**	0.8469	0.5046	0.0050***	0.5852	0.0610
More than one drug	0.0005***	0.6107	0.1160	0.0033***	0.6847	0.9663
** significance < 0.05, *** significance < 0.001						

ASI drug use scores were significantly high among clients who injected heroin in the last 30 days and also reported higher frequency of drug injection ($p < 0.05$). Needle sharing in the last 30 days, as well as needle sharing in their life-time were seen among clients with high ASI employment score ($p < 0.05$). Those clients reported alcohol and drug use (alcohol, heroin, benzodiazepine, antidepressant, THC, Inhalants) and poly-drug use had higher ASI scores ($p < 0.05$).

After identifying the differences in ASI total scores, factors associated with high ASI scores were explored. There was significant association between ASI scores of methadone clients who had Hepatitis C, age category, category of frequency of heroin injection, quality of life score, marital status, current leisure status with family/ friend, history of injection per month currently, income status, satisfaction with current marital status, reported drug and alcohol use among variables mentioned in the tables. For drug and alcohol use; alcohol, heroin, anti-depressant, and those who use more than one drug were associated with higher ASI scores ($p < 0.05$).

Stepwise binary logistic regression analysis

After considering significant association factors in the model affecting ASI total scores, stepwise binary logistic regression was done to identify predictors that were linked with high ASI scores. Retention in logistic regression was used for predicting client characteristics had impacted on the total score of addiction severity index. When checking for the multi collinearity, mean variance inflation factor (vif) was 1.89 and none of the variable has more than 10. The regression model alpha ratio is set at 0.05.

Table 5
Table showing the result of stepwise binary logistic regression

Logistic regression		Number of obs =		125	
		LR chi2(4) =		62.30	
		Prob > chi2 =		0.0000	
Log likelihood = -55.007694		Pseudo R2 =		0.3616	
ASI total category	Adjusted Odds Ratio	[95% Conf. Interval]		z	P > z
Heroin injection frequency	4.11	1.37	12.35	2.52	0.012
Alcohol	24.47	6.14	97.51	4.53	0.000
Age	0.12	0.04	0.37	-3.70	0.000
Leisure with family	0.23	0.82	0.63	-2.84	0.005
Satisfaction with marital status	0.12	0.03	0.57	-2.67	0.008
_cons	12.2	1.11	134.31	2.04	0.041

In the analysis of adjusted model of binary logistic regression, potential confounding variables (among associated characteristics) were considered for adjustment and estimated the association of independent variables to the outcome (dependent) variable of total score of addiction severity index of the methadone clients. Alcohol alone had 24 times (aOR 24.47, 95% CI; 6.14–97.51, $p = 0.000$) while higher frequency of heroin injection had 4 times (aOR 4.11, 95% CI; 1.37–12.35, $p = 0.012$) in contributing high addiction severity score of the clients. Getting in older than 35-year age group had 8 times (aOR 0.12, 95% CI; 0.05–0.37, $p = 0.000$) and leisure with the family lessen the addiction severity by 4 times among methadone clients (aOR 0.23, 95% CI; 0.04–0.37, $p = 0.000$) and satisfaction with current marital status also lessen severity by 8 times among methadone clients (aOR 0.12, 95% CI; 0.03–0.57, $p = 0.008$).

Significant differences of ASI scores from logistic regression were seen among the client with different characteristics were mentioned in graph 1.

Discussion

To the best of our knowledge, this study is among the few available studies that aims to describe MMT clients social-functioning in Myanmar. Various studies have shown that clients who are enrolled in MMT programme have better ASI scores or social-functioning (Feelemyer, et al. 2014). We found alcohol and frequency of heroin injection significantly influenced ASI scores. Since the majority of clients were still abusing drugs, alcohol consumption also highly influenced clients social-functioning. High scores on ASI were observed among those reported drug and alcohol use and also among poly-drug users ($p < 0.05$). In another 10-year follow-up study, alcohol highly influenced to the drug use and ASI drug scores was also

significant ($p = 0.0008$) (Auriacombe, et al. 2014). Those who had drug use and alcohol had higher ASI scores in the drug use domain ($p < 0.05$). These finding was in accordance with a previous study (Robles, Huang and Simpson 2011). Consequently, increase in ASI scores for alcohol use was also a strong predictor for dropping out from MMT programme (Jiang, et al. 2014).

There were no significant differences in the ASI total scores with methadone dose and duration of treatment. In another longitudinal study, there was significant differences in ASI drug use domain ($p = 0.0002$) among clients receiving high methadone dose (more than 100 mg) and ASI family domain ($p = 0.03$) among those receiving lower doses of methadone (60–100 mg) (Fareed, et al. 2009). Longer treatment duration had significant differences in ASI employment score ($p = 0.0029$) and ASI alcohol use scores among MMT clients in this study ($p = 0.0214$). This was similar to the findings of system review results of ASI employment scores reduced at follow up from baseline with longer duration on methadone ($p = 0.074$) (Feelemyer, et al. 2014).

Opioid dependent clients identified by urine had higher ASI scores for employment and drug use ($p < 0.05$). Those who tested for opioid use were more likely to use benzodiazepine ($p = 0.000$).

Benzodiazepine use was found to be common among MMT clients (Ghitza, Epstein and Preston 2008). Use of Benzodiazepine identified by urine in this study was associated with higher ASI scores for family ($p = 0.0209$), low dose methadone clients ($p = 0.014$) and clients who had longer MMT duration ($p = 0.031$).

This study has a few limitations especially in the medical and psychological domains of ASI, because the study exclusion criteria also considered a screening tools for patients who couldn't response well with these factors in participation the survey. Questions on seriousness on the feeling of present legal problems and importance of counselling or referral need for legal problems were not included due to privacy reason.

Conclusion

Our findings proved that there were significant influential factors that affected clients social-functioning in MMT program in Myanmar. There is a need for treatment providers to give more attention to subtle factors affecting clients social-functioning. As addiction scores are higher in employment, legal and alcohol, the study highlights a critical intervention need for proper psychosocial counselling and rehabilitation programme with employment supports for methadone clients. Besides addressing pharmaceutical interventions, creating employment opportunities and enabling social factors like marital and family status satisfaction are also crucial for improving clients social-functioning. Further studies are needed to determine clients social-functioning in MMT program in Myanmar.

Declarations

Ethical Approval and Consent to participate

This research approval was granted from the Human Ethics Committee of the Universiti Sains Malaysia (No:USM/ JEPeM/16080269) (University of Science, Malaysia) and Department of Medical Research (No: Ethics/DMR/2017/057), Ministry of Health and Sports, (Research 2017).

Consent for publication

All authors read and approved final manuscript submission. All authors agree to publish this prepared manuscript and no other submission of this manuscript to other journal.

Competing Interest

All authors declare that there is no competing interest.

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Authors' Contributions

Sun Tun contributed in designing, implementation, analysis and wrote the manuscript. B. Vicknasingam and Darshan Singh contributed in designing, analysis and contributed in this manuscript.

Data Availability

The [.dta] data used to support the findings of this study are available from the corresponding author upon the approval of the Centre for Drug Research.

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Figures

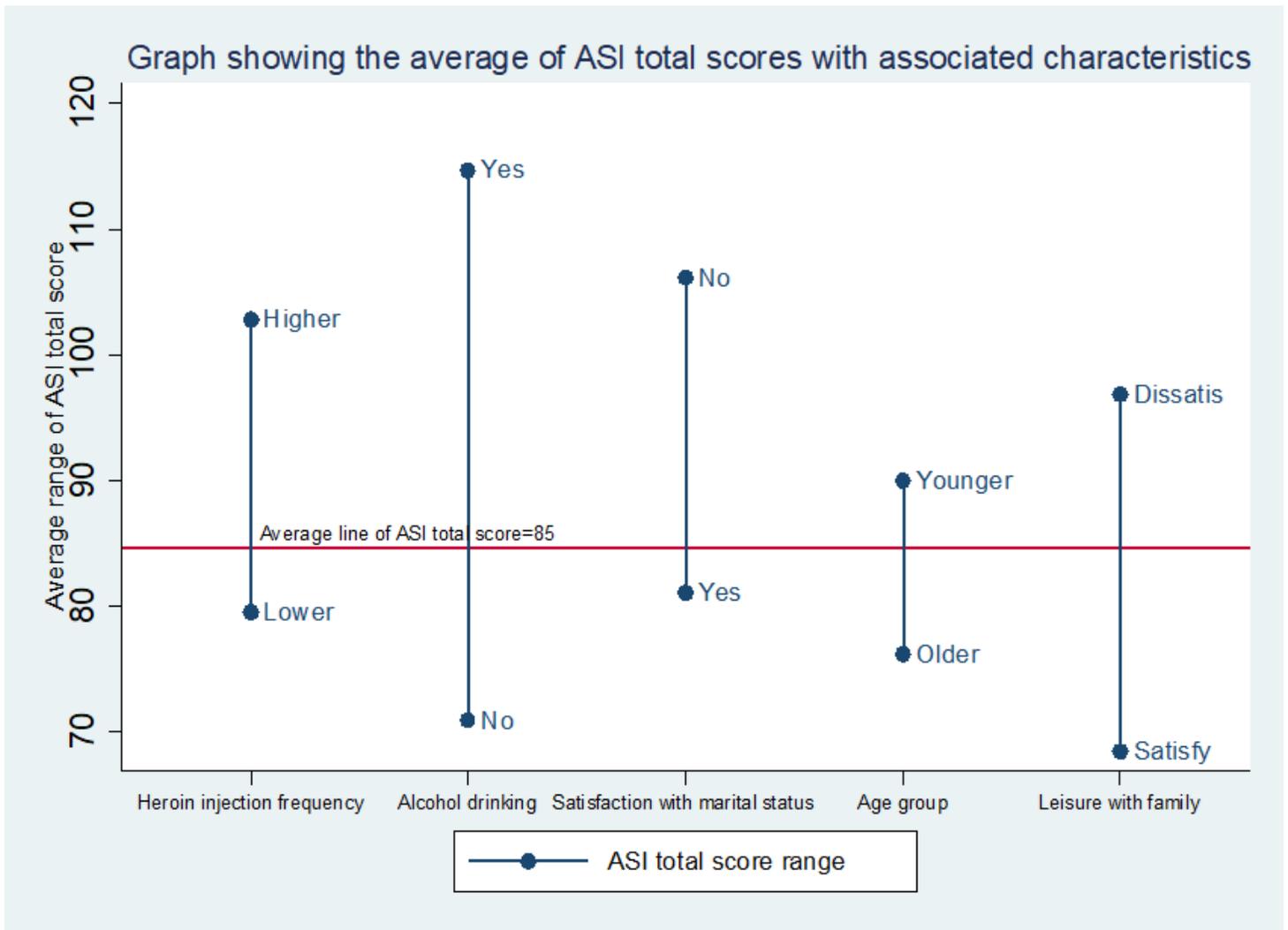


Figure 1

Graph showing the average of ASI total scores with associated characteristics

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