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Difference of Anxiety Subscale and Depression Score in Methamphetamine Abuse Prior and after Abstinence Over the Course of Three Weeks in Rehabilitation Center of Medan Plus

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Abstract

BACKGROUND: Clinical effect of amphetamine is related to the release of central monoamine in such a long period of time which leads to enhanced stimulation of sympathetic nervous system. Abstinence is defined as a period of restraint in which no substance is used. Anxiety and depression are most common psychiatry problem related to methamphetamine usage that has to be addressed in rehabilitation effort of methamphetamine abuse.

AIM: This study is to investigate the difference of anxiety subscale and depression (hospital anxiety and depression scale [HADS]) in methamphetamine abuse prior and after abstinence over the course of 3 weeks in rehabilitation center of Medan Plus.

METHODS: This quasi-experimental study was conducted with pre- and post-test design. Sample used in this research was generated through consecutive sampling, part of non-probability sampling, in which 30 subjects that are individuals with methamphetamine abuse were recruited in Rehabilitation Centre of Medan Plus, North Sumatera. Measurement was conducted to assist the effect of 3 weeks abstinence on HADS core. In the other hand, assessment smoking and substance involvement screening test was also used to investigate the length of substance usage.

RESULTS: Our study found a significant difference between anxiety and depression symptoms score prior and after 3 weeks abstinence in methamphetamine user ($p < 0.001$).

CONCLUSION: Following abstinence, several clinical symptoms were seen to be resolved or decreased within the first couple of weeks, including symptoms of anxiety and depression.

Introduction

Substance abuse is known as major health problem, particularly in individuals at 12–65 years old. The previous study by Jose *et al*. in 2010 reported that seven out of ten individuals in Lima, Peru that are 12–65 years old have had taken drugs. They also noted that in 2010, 4.8% of population in Lima have had taken drugs and the exact number of drug abuser reached 180,700 individuals (58,556 people took cannabis, 23,852 people took cocaine, and 33,280 took cocaine paste or commonly known as *paco*). These individuals have been diagnosed with substance abuse in accordance with ICD-10 classification [1].

Diagnostic And Statistical Manual of Mental Disorders – 5 (DSM-5) stated that substance use disorder is marked by significant impairment of psychical, psychological, and emotional function. It has been linked to other psychiatric disorders, such as depression and anxiety [2].

Amphetamine is stimulant substance, synthetically derived from amine that exhibits powerful effect on central nervous system. Methamphetamine is known to cause dependency and its abuse has been significantly increasing lately. It is approximated that 0.3–1.3% of worldwide population are methamphetamine abuser, with slightly higher prevalence in the Middle East. Substance abuse may not be the leading cause of death, yet it is linked to increased global health burden [3].

Amphetamine use has been linked to toxicity (overdose, substance induced psychotic disorder, and myocardial infarct). Its chronic use is related to the development of psychotic disorder and any other morbidities, including cardiovascular disease [3].

Methamphetamine, also known as *shisheh* in Iran, has been one of the most commonly used substances for decades. Approximately, 52 million individuals worldwide, 15–64 years of age use amphetamine for non-medical purpose at least once a year. Cocaine, amphetamine, methamphetamine, and 3,4-methylenedioxymethamphetamine have been known to be the top selling substances in Europe, but recent data showed that methamphetamine sales were even higher in this past 1 year following the sales of cannabis. Methamphetamine use is even more prevalent than the use of heroin and cocaine altogether.

Around two third of amphetamine users are in the east and south east Asia, and another one fifth is located in America, particularly Northern Mexico [4], [5], [6].

Chemical structure, particularly three-dimensional structure (3D) of amphetamine contributes to pharmacological effect, including therapeutic effect which is potentially related to the development of recreational abuse behavior. Amphetamine is part of ß-phenylethylamines. It had undergone multiple synthesis processes, even way earlier than the invention of monoamines, such as noradrenaline (norepinephrine), dopamine, and 5-hydroxy-criptamine (5-HT serotonin) which are known as main neurotransmitter in the central and peripheral nervous system. Furthermore, amphetamine's chemical structure is similar with ephedrine's [7].

Substance use disorder is serious health problem, leading to significant life burden not only to the persons, but also to their family. Loss of productivity which often leads to criminal attempts, along with expensive cost for health care impact negatively on social scheme [8].

Dopaminergic neurons on ventral-tegmental area are responsible for the projection of stimulus to reach the limbic and cortical system in the brain, particularly through nucleus accumbent. This pathway is linked to the development of reward sensation. Reward sensation is known to contribute to addiction behavior, including for amphetamine. In the other hand, locus coeruleus has been linked to modulate addiction behavior for opioids. These pathways are collectively referred to "brain-reward circuitry" [9].

Indonesian's Health Ministry has reported that the prevalence of substance abuse always increases through the years. National Narcotics Bureau along with Indonesian University found that prevalence of substance abuse has increased from 1.9% in 2008 to 2.2% (±4 million people of 10–60 years of age). United Nation Office on Drugs and Crime (UNODC) also reported that approximately 167 million to 315 million (3.6–6.9%) global citizens of 15–64 years of age have been on drugs at least once in a year [10].

Therefore, it becomes our interest to investigate differences in HADS prior and after 3 week abstinence among methamphetamine abusers at Medan Plus Rehabilitation Center.

Methods

This study is a pre-post quasi-experimental study investigating differences in HADS prior and after 3 week abstinence among methamphetamine abusers at Medan Plus Rehabilitation Center. Sample was gathered consecutively through December 2019 to January 2020 in accordance with our inclusion criteria, as in the following; 1) diagnosed with substance use disorder, 2) age of 15 – 45 years old, 3) currently in ongoing abstinence program, 4) used only methamphetamine more than a year, 5) assessment smoking and substance involvement screening test (ASSIST) score of at least 27, and 6) are willing to participate in the study. Individuals with any coexisting or any history of psychiatry morbidities are excluded from the study. Therefore, 30 subjects were gathered to attend the study.

Initially, urine sample was collected from all subjects using eligible rapid urine test, only those with positive result on methamphetamine panel that will further attend this study. Subjects were then screened using ASSIST for their addiction severity and using HADS for their anxiety and depression symptoms. Subjects will then have to complete a 3 week abstinence program. After completing the abstinence program, urine sample and screening using HADS will be conducted.

Results

Table 1 showed samples demographical characteristics. Majority of our subjects are male (n = 23, 76.7%) and average age is 33.47 ± 6.981 years of age. More than half are already married (n = 19, 63.3%) and employed (n = 16, 53.3%). We also found that our subjects were mostly graduated from senior high school (n = -2, 66.7%). Most of the subjects have already used methamphetamine for around 3 years or more (3.23 ± 1.697) with average ASSIST score of 34.07 ± 4.456.

Table 1: Samples demographical characteristics

Variable	n = 30	%
Age (mean ± SD)	33.47 ± 6.981	
Gender		
Male	23	76.7
Female	7	23.3
Marital Status		
Married	19	63.3
Not Married	11	36.7
Employment		
Employed	14	46.7
Unemployed	16	53.3
Education		
Junior High School	6	20
Senior High School	20	66.7
Diploma/Bachelor	4	13.3
Duration of usage (mean ± SD)	3.23 ± 1.697	
ASSIST score (mean ± SD)	34.07 ± 4.456	
HADS-A score before abstinence (mean ± SD)	14.97 ± 3.846	
HADS-D score before abstinence (mean ± SD)	11.27 ± 3.203	

We found that data are not normally distributed ($p < 0.05$); therefore, we performed data transformation. Yet we still found that the data are not normally distributed, ($p > 0.028$), thus we decided to use Wilcoxon test for further data analysis (Table 2).

Table 2: Shapiro–Wilk test of HADS-A

Skor HADS-A	n	Shapiro-Wilk p
HADS-A score difference	30	0.008

Shapiro–Wilk p > 0.05.

Table 3 showed that there is significant difference in HADS-A score prior and after the 3 weeks abstinence program (p < 0.001).

Table 3: Differences in hospital anxiety and depression scale anxiety subscale prior and after a 3 week abstinence

HADS-A Score	n	Median (min-max)	p value
HADS-A before abstinence	30	15.00 (6–20)	<0.001
HADS-A after abstinence	30	12.00 (4–16)	

As for HADS-D score difference, we also found that data is not normally distributed (p < 0.05); therefore, we performed data transformation. Yet we still found that the data are not normally distributed, (p < 0.001), thus we decided to use Wilcoxon test for further data analysis on HADS-D score difference.

Table 4 showed that there is significant difference in HADS-D score prior and after the 3 weeks abstinence program (p < 0.001).

Table 4: Differences in hospital anxiety and depression scale depression subscale prior and after a 3 week abstinence

HADS-A Score	n	Median (Minimum-Maksimum)	Nilai p
HADS-A before abstinence	30	12.50 (6–18)	<0.001
HADS-A after abstinence	30	9.50 (4–15)	

Discussion

Our study found that average age of our subject is 33.47 ±6.981 years old which is in line with earlier study by Gyawali *et al*. in Nepal involving 180 patients with methamphetamine abuse that also found that average as is 29.08 ± 9.98 years old [2]. We found that majority of our subjects are male which is also shown in study by Bagheri in Iran that found more patients at Therapeutic Community in Iran are male (83.9%) [3]. As for employment, our study result is also in line with earlier study by Gyawali, showing that more than half subjects are employees (52.8%) [2]. In line with a study from Diaz *et al*. in 2016 in Brazil, most participants were high school graduates (66.7%) [1].

Our result in HADS-A score difference is in contrary to previous study by Bagheri *et al*. from Iran which found that HADS-A score is not significantly different prior and after abstinence. This is probably due to different anxiety score instrument that is used in their research. In their study instead of using HADS-A, they used cattle anxiety inventory [3]. As for depression score, our result is also different from Beghari's study which is also due to instrument difference in which they used Beck Depression Scale [3].

In our study, we found that both anxiety and depression symptoms relieved after a week of post-abstinence. Our study is able to show that abstinence is related to severity of anxiety and depression symptoms among methamphetamine abusers. Yet we are aware, that this study is limited as it was only conducted at single center and only assessed singe substance abuse.

Conclusion

Our study found a marked difference between subscale anxiety and depression HADS score prior to and after 3 weeks abstinence in methamphetamine abuser. Therefore, early screening is important so that preventive strategies can be given earlier.

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