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The Implementation of Contingency Management Intervention in an Institutionalized Drugs Treatment Facility in Malaysia

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Abstract

Despite Contingency Management Intervention (CM) having been proven to be a highly effective intervention in the context of substance use treatment and rehabilitation worldwide, it is still rarely studied in the context of institutionalized treatment settings. The purpose of the study was to determine the effectiveness of CM intervention conducted in an institutionalized drug treatment setting in Malaysia. The study's main objective was to examine the effectiveness of CM intervention on clients' treatment engagement within a usual psychosocial (PS) program. A total of 44 clients from the Narcotic Addiction Rehabilitation Centre or PUSPEN were randomly assigned into two groups, namely the experimental group and the control group. The experimental group followed a 12-week psychosocial intervention (PS) with CM intervention (CM) (PS+CM). Meanwhile, the controlled group inclusively went through 12 weeks of the usual psychosocial intervention program (PS). CM intervention was used to reinforce clients' engagement within treatment sessions by giving tangible rewards for every treatment engagement behaviour recorded. Rewards collected have an associated monetary value which was used to redeem retail items such as food, toiletries, books and clothing items. Data collection was performed weekly for every psychosocial session conducted by the PUSPEN's treatment officers. The findings demonstrated that CM intervention effectively improves clients' treatment engagement and verified that CM interventions can also be conducted in an institutionalized drug treatment setting in Malaysia.

Keywords: Contingency Management (CM), Psychosocial, PUSPEN, Treatment Engagement, Substance Use Disorder

Introduction

Substance use disorder is a very common public health problem in Malaysia. According to the World Drugs Report (2022), it is estimated around 284 million people, or 5.6% of the global

population aged 15–64, used drugs in 2020 (UNODC, 2022). Substance use addiction threatens the home environment, disturbs family life, disorganizes relationships, and often compromises finances, as well as the mental, emotional, and physical health of an individual (Roth, 2010). In Malaysia, crimes related to drug abuse ranging from petty to serious crimes are being highlighted in the media all the time. According to the statistic, around 126,390 addicts were identified during the period of 5 years from 2016 to 2020. Relapse rates for the period of five years showed an average of 29.4% of the overall cases detected (National Anti-Drugs Agency, n.d., 2021)

In dealing with the growing problems of substance use disorders, the need for a better and more effective intervention to treat this disorder is extremely high (Ismail et al., 2022; Ting Chie et al., 2016). Many researchers in the field of behavioural change have made numerous studies to better understand and contribute to more effective interventions in the field of substance use disorders. Many evidence-based approaches and best practices have been introduced to treat substance use disorders. Interventions such as the Cognitive Behaviour Therapy (CBT), Motivational Enhancement Therapy (MET), 12-Step Approach, Narcotic Anonymous (NA), and Therapeutic Community (TC) are among the researchers' contributions. In addition, researchers in this field have also contributed to the development of CM intervention as one of the most effective interventions in the treatment of substance use disorders (DeFulio, 2022; Higgins & Silverman, 2008; Regnier et al., 2022).

CM intervention uses systematic ways to reinforce outcomes primarily by promoting and sustaining positive behavioural change. In treating substance use disorders, CM interventions often focus on increasing abstinence from drug use and improving treatment attendance, medication adherence, and other therapeutic goals (Ginley et al., 2021; Higgins & Silverman, 2008; Proctor, 2022). CM intervention has been used as an effective stand-alone treatment and with a combination of other comprehensive treatment programmes depending on the severity, types of drug dependence, and the population involved. CM intervention treatments for substance use disorder have been used for the past 50 years and within that period it has taken many forms such as 'receiving clinic privileges for every proven drug abstinence among methadone maintenance patients (Stitzer et al., 1992), 'drug-dependent individuals receiving temporary housing contingent for every proof of drug use abstinence' (Milby et al., 2008), and 'obtaining redeemable vouchers for retail items contingent with abstinence among drug users' (Lussier et al., 2006).

CM intervention studies in the field of substance use have been recorded and found to be highly effective as early as the 1970s by incorporating principles based on the Reinforcement Theory developed by Skinner. CM intervention has grown and become more prominent through the development of CM protocol in early 2000 (Petry, 2000) which includes a nationwide collaboration between scientific researchers in the addictions field and community-based treatment programmes known as MIEDAR (Motivational Incentives to Enhance Drug Abuse Recovery). This effort has led to the launch of national dissemination of CM intervention efforts throughout the U.S (Peirce et al., 2006; Petry et al., 2005) and also internationally (Chen et al., 2013; Garcia-Fernandez et al., 2011; Hser et al., 2011; Petitjean et al., 2014; Regnier et al., 2022; SecadesVilla et al., 2015).

Problem Statement

CM intervention in an institutionalized setting such as in a correctional institution or prison is rarely studied and explored by researchers (Burdon et al., 2013; Proctor, 2022). In an

institutionalized setting, the CM intervention's objective was to change an individual's behaviour through the systematic application of positive reinforcement or punishment, contingent upon the performance of a desired positive behaviour (Burdon et al., 2001). Reinforcement is delivered contingent upon the performance of specific behaviour, with the intention of increasing the frequency of wanted behaviour. Unlike in the community settings where CM intervention was used to reinforce abstinence, CM intervention in the controlled environment mostly targeted the prosocial and positive behaviour in the institution such as punctuality, participation, and completion of programme tasks to avoid misconduct in the institution (Burdon et al., 2002). In most treatment programmes such as in Malaysia, disciplinary actions against inmates or clients especially for those who violate institutional or programme rules are the main approach used. Little emphasis was given to rewarding the clients or inmates for showing positive changes or attitudes as well as performing well in certain acts or behaviour.

As is the case with substance abuse treatment in the Narcotic Addiction Rehabilitation Centre or PUSPEN, participation in institutionalized drug treatment programs often involves some level of coercion. Coercion and punishment were once the primary approaches of the institution in this country or as they were called back in the day the "tough and rugged" system (Mohamed., 2006). Similar to other coerced institutions in the world, drug treatment programs tend to enforce compliance with institutional rules and codes of behavioural conduct through the contingent delivery of punishment. As a result, clients who have low levels of motivation for treatment in an institutionalized setting remain unengaged in the treatment programs and thus suffer from recovery failure (Burdon et al., 2002).

Positive reinforcement also exists in the PUSPEN setting, however, when it does occur it usually takes the form of verbal praise from a treatment staff or a peer. From the implementation of the therapeutic community (TC) model treatment, peer group gives verbally or written praises for any positive behaviour shown by the community member through "push-ups" (De Leon, 2000). Other than praises, a more physical reinforcement can be in the form of promoting the client up in the TC hierarchy, moving the client to the next phase of the treatment programme or giving additional privileges to the client in the institution. However, these types of reinforcements are not fixed and usually happen occasionally rather than fixed. The types of reinforcement were also not specific or varied each time, it was also given at odd times which is not reflected in the positive behaviour that occurred. Reinforcements are not immediately experienced by the clients and are usually based on a subjective evaluation of a client's progress in treatment (Burdon et al., 2001). Using an informal reward system will not likely have an effect on clients' behaviour because it did not follow established procedures for positive behavioural reinforcement set according to the CM intervention system.

Implementing behavioural change strategies using CM intervention in this setting is very beneficial for the recovery of the client's substance use treatment. However, CM intervention in the institutionalized setting should be implemented in a much different manner than in the community. Previous literature on CM intervention in the institution has pointed out a few interesting facts for the intervention to be effective. Development of CM intervention in this setting must take into consideration the client's demographic, the type of reinforcer used, the magnitude of reinforcer against the magnitude of punishment and the severity of the substance uses disorders. CM intervention in the institution especially in the PUSPEN can't

directly target abstinence because the environment is in a controlled setting where any type of substance is prohibited. As stated before, institutionalized and correctional-based interventions are often characterized by low levels of engagement and motivation. Thus, this study was aim to investigate the effectiveness of CM intervention in improving clients' treatment engagement within the PUSPEN settings.

Client engagement with treatment has frequently been cited as directly associated with positive treatment outcomes in psychotherapeutic interventions, substance abuse treatment, alcohol abuse treatment and correctional treatment (Holdsworth et al., 2014) and significantly associated with positive treatment outcomes (Fiorentine et al., 1999; Simpson et al., 1995). Treatment engagement is often viewed in terms of the intensity and duration of the client's treatment and participation. Clients with high treatment engagement would mean that they participate more frequently in treatment sessions and other activities (intensity), and they complete treatment or, at least, stay in treatment for a relatively long period (duration).

In general, treatment engagement can be understood as any effort made by the clients in pursuing and maintaining themselves in treatment (Holdsworth et al., 2014). Holdsworth et al (2014) categorized treatment engagement into four operational definitions based on previous literature on treatment engagement. The four categories of definition are (1) engagement as attendance, (2) engagement as participation or involvement, (3) engagement as homework compliance or practice and (4) engagement as the therapeutic relationship. Treatment engagement in this study was defined by client achievement in three parameters namely homework completion, participation and client understanding of the session. These three parameters are also interrelated to the client's attendance and the therapeutic relationship between the client and the treatment officers.

Research Methodology

Research Design

For this study, a randomized controlled trial (RCT) design was used. RCT is a type of scientific experiment which aims to reduce bias when testing a new treatment (Sibbald & Roland, 1998). The subject participating in the trial are randomly allocated to either the group receiving the treatment or to a group receiving standard treatment as the control group (Curtis et al., 2009). For this study, the researcher randomly assigns the subjects to the treatment group of psychosocial with CM intervention (PS+CM) and compared them with the control group of psychosocial without CM intervention (PS). The PS+CM group was exposed to CM intervention for the duration of 12 weeks. The PS group received the usual psychosocial treatment without CM intervention throughout the 12 weeks of study. In this study, 44 clients were assigned randomly into two groups namely the experimental, and the controlled group, using excel random number generator. Clients who met the selection criteria were given a random code of numbers from 1 to 44, using the RAND function in the Microsoft Excel software to generate a random list of numbers. The first 22 combinations of numbers generated were grouped as the experimental group (PS+CM) and the other 22 combinations of numbers generated were grouped as the controlled group (PS). The participants in the experimental group received the psychosocial treatment programme with CM intervention (PS+CM). Meanwhile, patients in the control group only received psychosocial intervention. Randomization was intended to ensure that all potential confounding factors are divided

equally and structurally equivalent among the groups compared. Only if the groups are structurally equivalent can any differences in the results be attributed to a treatment effect rather than the influence of confounders.

Blinding

In this study, a single-blind method was performed on the treatment groups whereby both groups did not know what intervention they will follow. The purpose of blinding is to avoid the issue of bias. Due to the study location which is in a controlled environment of the PUSPEN and the nature of CM which reinforces behaviour with a tangible reward, a single-blind method on experimental subjects was used. The purpose of blinding between groups also helps to avoid the issue of rewards rivalry, compensation, and the issue of honesty in terms of their involvement in the study. Meanwhile, the clinician or treatment officers conducting the sessions were not blinded in the study because of the difficulty in blinding both the clinician and the subjects in an institution-based setting.

Intention to Treat Analysis (ITT)

Intention to treat analysis (ITT) is a method of analysis in a randomized controlled trial where all subjects who are assigned to one of the treatments were analysed together regardless of whether or not they completed or received the treatment (Homish et al., 2010; Wang, 2014). For the purpose of this study, intention to treat (ITT) analysis was used. It involved including the analysis of all subjects for whom data were available on the basis of the group they were allocated regardless of their adherence to the protocol (such as attendance). Intention to treat analysis is used in the study to avoid bias during analysis and type I error. Most scholars refer to ITT as a concept of once assigned always analysed, which means every subject who is randomized will always be analysed regardless of non-compliance, protocol deviation, withdrawal or any disruption after the randomization (Gupta, 2011; Soares & Carneiro, 2002). In this study, the issue of client attendance was faced throughout the study whereby a few of the subjects were absent during the sessions due to disciplinary action, family visits and carrying out other tasks required by the PUSPEN administration during the conducted session. There were also other disruptions that affected the motivation of the subjects during the sessions such as the interview session for acceptance into a vocational institution.

Research Location

A PUSPEN which implemented the psychosocial intervention located between the rural and urban areas was chosen as a study location. Among the 20 PUSPENs, one specific centre met the criteria, which was PUSPEN Dengkil. This PUSPEN is located in the district of Sepang in the rural area of Dengkil and situated nearby to an urban area of Putrajaya and Kuala Lumpur. The purpose of selecting a PUSPEN located between the rural and urban area was to represent a mixed population from both areas and not only from one background. Currently, the majority of clients in this centre are voluntary and are first-time cases entering the PUSPEN for treatment which was compatible with the subject selection criteria. Before the initial study was conducted, a meeting and discussion with National Anti-Drugs Agency (AADK)'s officials were made stating the intention and purpose of the study.

Population and Sampling

In making sure the subjects in each group are homogenous and the issue of research validity and bias can be minimized, the researchers have pre-determined the criteria of the subjects as follows;

a) Entering PUSPEN for the first time
b) Aged between 19 to 39 years old (youth age - the highest age group in PUSPEN)
c) Participate in psychosocial and spiritual programmes
d) Male
e) Muslims
f) Free of any psychiatric disorder or chronic disease
g) Did not participate in any drug substitution therapy
h) Agree to join the study and sign the consent form

A total of 94 PUSPEN clients were invited to join the study. From the total number of individuals screened, a total of 50 clients were excluded from the study for various reasons. 37 clients did not meet the exclusion criteria set by the researcher. The majority of the clients that were excluded are because of age differences as they are much older and with longer drug use experience. 12 clients have difficulty reading and writing which would be a disadvantage for them during the CM treatment sessions. 45 clients met with the inclusion criteria and were selected as participants in the study. However, one client refused to sign the consent form and wished to be excluded from the study leaving a total of 44 clients selected as the research subjects. To determine the appropriate sample size for groups and the number of participants involved in the experiment, the researcher used G*Power software version 3.0.10 for Windows which was a free power analysis tool to compute statistical power analysis (Faul et al., 2009). G*Power was used to compute effect sizes and determine the appropriate group of participants. For the purpose of this study, the researcher has set the values for these three factors as alpha = 0.05, power = 0.80, and effect size =0.50 which are the standard values used in social science studies (Cohen, 1977; Lipsey, 1990).

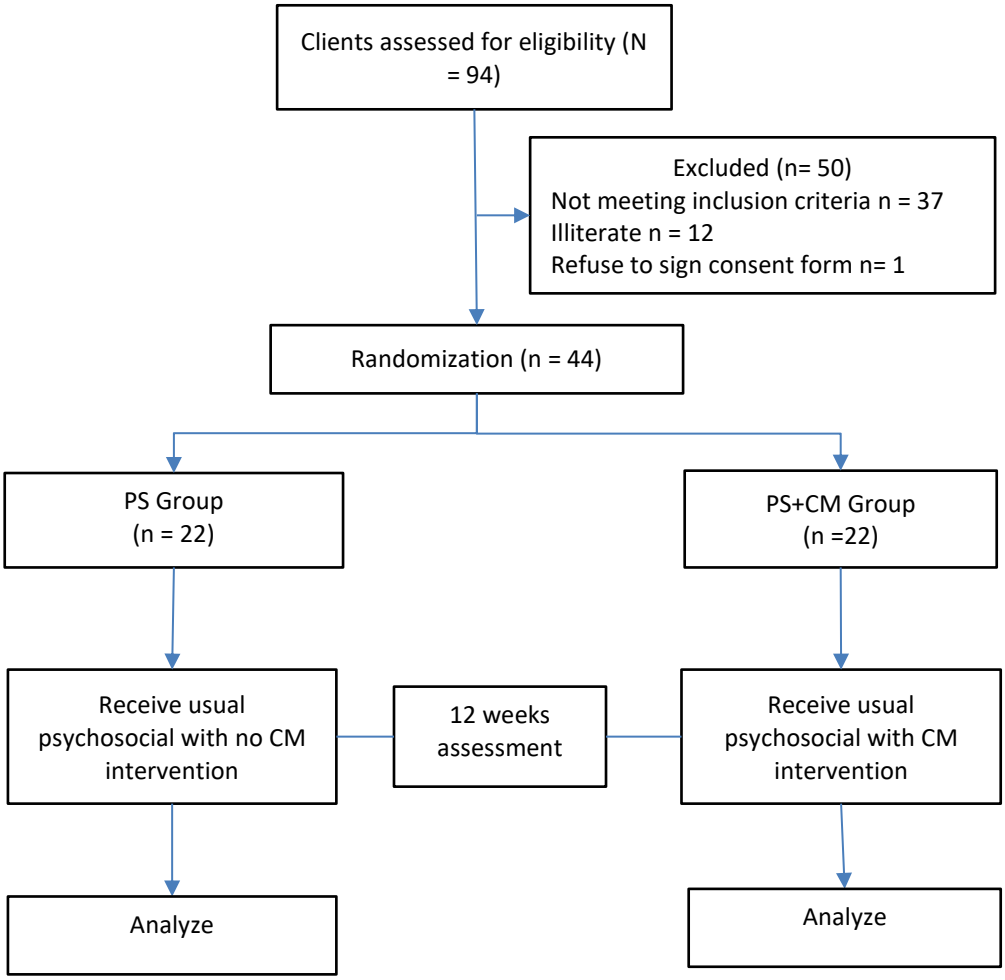

Figure 1: Participants' Flow Diagrams

CM Intervention

CM implementation in this study was developed based on the protocol established by (Petry, 2000). In designing a CM intervention, the researcher needs to identify which specific behaviour or goals that need to be changed or achieved. The behaviour was quantified objectively and must occur frequently. Treatment programmes and interventions in the PUSPEN are most effective and well developed for clients. However, the issue of getting the client to engage during a treatment session is somewhat challenging. Using CM to make the client more engaged in the programme helped to improve the outcome of the treatment programme.

The next step in developing CM programme is deciding the type of reinforcer or reward appropriate in a controlled environment such as the PUSPEN and what resources are available to reinforce the targeted behaviour. Prior to the real study, a focus group discussion (FGD) was conducted by the researcher with several clients and staff of the PUSPEN. The clients were selected among clients who are about to be released from the PUSPEN. The purpose of the FGD was to find the type of reward suitable as the CM reinforcer in the PUSPEN. From the FGD, most clients stated that early release was the most desirable reward. However, due to PUSPEN's policy, rules and regulations, this reward was not allowed. Other rewards such as cigarettes, money and any illegal product are also prohibited. Based on the FGD, several types

of rewards were suggested as a CM reinforcer for this study such as fast food, toiletries, clothing items (trousers, shoes, shirt, and towel) and stationery (pen, pencil, notebook etc.). All suggestions from the FGD were used as exchanged items based on the reward stickers collected.

Finally, monitoring and reinforcement schedules of the objective behaviours are required in a CM intervention. Once the targeted behaviour, monitoring system and reinforcement schedule are selected, a behavioural contract was drawn up. All subjects were asked to read the contract to ensure that they are not missing anything or misinterpreting the contract. Every detail was specified including exact behaviours, how they will be monitored, and how the reinforcer will be applied. Consistent application of the contract was ensured including consistent reminders of behaviours and their consequences. In other words, reminding clients of how many goals they need (to obtain a bonus, or the number of stickers available on their chart) to reinforces their attempts at behavioural change. These reminders may increase the probability that the reward system will have its desired effect of promoting long-term changes.

Scoring Methods

Three parameters were used to represent treatment engagement in this study which include, active participation in treatment sessions, completion of homework and understanding of topics. All subjects are required to attend the psychosocial session every week and participate actively in the class by asking questions and giving ideas and feedback which represent the participation parameter. Subjects also have to complete the assignment or homework provided by the rehabilitation officer and submit it during the subsequent week to represent the homework parameter. For the understanding parameter, subjects were given a simple quiz each week to test their understanding of the psychosocial topic presented in the previous week. Subjects who manage to answer at least 70% correctly from the quiz scored as achieving the understanding parameter. Every parameter achieved can earn the subject a reward sticker which they will put on their progress chart. The number of stickers collected by the subject was used as a scoring method for treatment engagement in this study. The reward sticker has a specified value that can be used to exchange certain items. This type of chart is similar to incentive charts or encouragement charts used in schools to reward good behaviours or as a parenting strategy to reinforce rules, chores, and responsibilities. The value of each sticker begins with MYR2.00 and increases every four weeks to the value of MYR5.00 per sticker as a motivation for the subjects. Each subject can get a maximum of four stickers every week and can earn a maximum value of MYR20.00 every week. The subject who collected the most stickers every four weeks gets a bonus sticker equivalent to MYR10.00 for the first month, MYR20.00 for the second month and MYR30.00 for the third and final months.

Ethical Considerations

In dealing with a sensitive group of a population such as substance users, proper ethical conduct needs to be established. All the necessary requirements regarding the ethical aspects of the study were properly planned and handled by the researcher accordingly. The researcher has sought approval from the Universiti Sains Islam Malaysia's Ethics Board committee for the purpose of this study and the board has granted approval for the

implementation of the study through its committee meeting (USIM/JKEP/2018-35). All subjects in this study were explained in detail, verbally and through writing, the description of the study, the benefits and the risks involved in the study. All information obtained during the study including personal data and research data was kept confidential. Subjects' participation in the study was strictly voluntary and there was no penalty whatsoever for any refusal or withdrawal from the study. A small amount of money was given as a token of appreciation for the subjects' time and difficulty in joining the study. Before the study was conducted, all selected subjects must agree in writing to the terms and conditions mentioned by filling in the consent form provided by the researcher.

Data Analysis

The research data were analysed using IBM Statistical Analysis Software Package (IBM-SPSS) version 22. The first section was the descriptive statistics, which were used to calculate and show the demographic background and characteristics of clients' means and standard deviation at baseline. The second section was the inferential statistical tests used to examine the hypotheses built. Group comparison for baseline characteristics was done using a *t*-test for continuous data, while, the chi-square ($\chi 2$) test was used to calculate nominal and categorical data. A Generalized Estimating Equation (GEE) analysis was performed to examine the individual treatment engagement performance.

Generalized estimating equations (GEE) introduced by (Liang & Zeger, 1986) have become very popular in the biological, epidemiological, and related disciplines, yet remain less known in the educational and social sciences (Hardin & Hilbe, 2013; Wang, 2014). GEE provide a general framework for the analyses of continuous, ordinal, polychotomous, dichotomous, and count-dependent data, and relaxes several assumptions of traditional regression models. Parameter estimates from the GEE are consistent even when the covariance structure is misspecified, under mild regularity conditions.

The focus of the GEE is on estimating the average response over the population rather than the regression parameters that would enable the prediction of the effects of changing one or more covariates on a given individual. GEE belong to a class of regression techniques that are referred to as semiparametric because they rely on the specification of only the first two moments. They are a popular alternative to the likelihood-based generalized linear mixed model which is more sensitive to variance structure specification (McCullagh & Nelder, 1989). GEE can handle a variety of outcome data types (e.g., continuous, count, binary) as well as time-varying and time-invariant predictors and GEE models are more flexible for missing data compared to other models (Diggle et al., 2002).

Finding

Demographic Characteristic

The socio-demographic characteristics of the 44 subjects were based on the inclusion criteria determined by the researcher. However, a few additional information was added such as education level, marital status, and occupational information to further explore the background of the subjects. Overall, 100% of subjects are male with an average age of 28 years old and Muslims in religion. Around 50% (CM+PS) to 65% (PS) have an education level of Sijil Pelajaran Malaysia (SPM). More than 60% of them are single, and less than 20% of them are working and have an average income of between RM1500 to RM2200 (Table 1).

Table 1
Baseline Demographic Characteristics

Variables[a]	PS Controlled Group (n=22)	PS+CM Experimental Group (n=22)
Gender (% male)	100	100
Age	28.9 (4.8)	28.7 (4.6)
Ethnicity (% Malays)	95.7	100
Religion (% Islam)	100	100
Education level (%)		
Diploma	0	9.1
SPM	65.2	50.0
PMR	21.7	27.3
Primary school	13.0	13.6
Marital status (%)		
single	60.9	68.2
married	30.4	31.8
divorced	8.7	0
Occupation status (% working)	21.0	16.0
Average income	2215.7 (2014.8)	1577.3 (946.1)

[a] Values are mean (SD), otherwise declared.

Clinical Characteristic

Clinical characteristics at baseline showed an average drug use starting age at 23 years old for the PS+CM group, and at 24 years old in the PS group, with a period of addiction between 4 to 5 years. Reasons for drug use were different for both groups; with 50% of the PS+CM group citing the cause by peer influence, and 61% from the PS group as due to curiosity to try. All subjects enter the PUSPEN for treatment for the first time and are methamphetamine users. Clinical assessment using the Severity of Dependence Scale (SDS) showed most subjects with a mean score of 1.4 which was a moderate level of severity. Subjects in the study reported a moderate level of motivation during baseline. Comparison between both groups showed that there was no significant difference between both groups which revealed that randomization has worked (Table 2).

Table 2
Baseline Clinical Characteristics

Variables[a]	PS Controlled Group (n=22)	PS+CM Experimental Group (n=22)
Drugs use starting age	24.3 (5.2)	23.4 (5.3)
Period of addiction	4.1 (2.0)	4.9 (2.7)
Reason for using (%)		
Peer influence	34.8	50.0

Wanted to try	60.9	40.9
Family problem	4.3	4.5
Others	0	4.5
First time getting treatment in PUSPEN (%)	100	100
Type of drug (% meth)	100	100
The severity of Dependence Scale (SDS)	1.3 (0.4)	1.4 (0.6)

[a] Values are mean (SD), otherwise declared.

CM Effects on Clients' Treatment Engagement

An analysis was made to explain data collected from baseline until week 12 of CM intervention implementation on the three treatment engagement parameters: namely (1) completion and submission of homework, (2) participation in the session, and (3) understanding of the session's topic. Findings revealed that there were several differences observed in all three parameters between both groups, even though only one of the parameters was found to be statistically significant. From the weekly achievements, we could see that the PS + CM group have higher scores in all three parameters. Multilevel analysis using GEE showed only the understanding parameter has a significant difference between the treatment group (Wald-$\chi2$ = 5.970; p = 0.015). Meanwhile, for the other two parameters, namely homework and participation, the analysis found no significant differences in the performance of homework completion and participation among clients between PS + CM groups and PS groups, within the 12 weeks of study.

The overall mean value for the three parameters was computed to form a new variable namely clients' treatment engagement and showed that there was a significant difference between the two treatment groups (PS + CM vs PS). The GEE analysis conducted revealed that there was a significant difference between treatment groups [Wald-$\chi2$ = 7.555; p = 0.006], thereby accepting the main hypothesis that CM does have an effect on treatment engagement during the 12 weeks of CM study. The results indicated that from the first to the twelfth week of CM intervention, there was an increase in treatment engagement for the PS+CM group as compared to the PS group. This finding lends support to the previous studies conducted in the investigations of CM effect on improving treatment engagement among substance users (Dallery et al., 2015; Fitzsimons et al., 2015; Kidorf et al., 2013; Kropp et al., 2017; Stewart et al., 2015), and adds another significant CM efficacy study, as reviewed by past researchers (Benishek et al., 2014; Davis et al., 2016; Higgins et al., 2013).

Previous studies of CM in an institution-based facility or in a mandatory setting found CM to not have a significant effect on clients (Burdon et al., 2013; Hall et al., 2016; M. L. Prendergast et al., 2008, 2015). CM interventions at these locations which are especially focusing on goal-targeted behaviours such as treatment engagement are also rarely researched (Burdon et al., 2013). Previous CM research was mostly conducted in outpatient or community-based settings and was usually targeting abstinence and adherence to treatment (Benishek et al., 2014; Davis et al., 2016; Prendergast et al., 2006). However, this study showed a contradicting result from most CM studies conducted in an institution-based setting. One major aspect that may contribute to the insignificant outcome of past research might be due to the effect of punishment or clients' negative attitude towards their entry into treatment, which contributes to a much higher impact than the value of the incentive given. According to (Gendreau et al., 2014), positive reinforcements within the criminal justice

setting must be higher than the effect of punishment by a ratio of 4:1 or higher, in order for it to be effective.

The significant results produced in this study could also be precipitated by the overall value of reward stickers provided weekly, based on the combination of the treatment engagement parameters. An individual client was able to collect a total of four stickers weekly, which were equivalent to a minimum value of MYR8.00 and to a maximum value of MYR20.00 every single week. The overall value of incentives in this study was found to be high enough for it to be effective compared to the individual value of the parameter which showed to have a much lower effect on clients. Analysis on individual treatment engagement parameters found only one parameter to have a significant effect on clients which is the 'understanding' parameter. The other two parameters were found to have an insignificant result which might be caused by the low individual value of each parameter in this study. Previous study conducted in determining the effect of reward magnitude towards CM efficacy (Kropp et al., 2017; Packer et al., 2012; Peirce et al., 2006; Petry et al., 2004, 2015; Petry & Martin, 2002; Petry & Roll, 2011; Romanowich & Lamb, 2010; Sigmon & Stitzer, 2005; Silverman et al., 1999) suggested that CM efficacy are significantly related to the magnitude of the incentive given (Petry & Roll, 2011). Some studies also suggested that the higher the magnitude, the higher the efficacy it will become (Petry et al., 2004). Due to the context and cultural differences in this study, the magnitude of the reinforcements selected were based on the CM protocols developed by (Petry, 2000) and also by a focus group discussion (FGD) with the PUSPEN's clients and staff. This process has provided insightful assumptions about the most valuable and suitable CM rewards magnitude in a controlled environment of PUSPEN. Even though the results of this study have found the reward's magnitude selected to have a significant outcome, the researcher believes that the results could have been better if a higher rewards magnitude was implemented in the study.

CM reinforcement was found to have a significant effect on the 'understanding' parameter, owing to the fact of it being a low interest task and is not often experienced by the client in the real world, compared to the other two variables. According to (Promberger & Marteau, 2013) and (Cameron et al., 2001), the use of rewards on behaviours that depend on self-control and low in interest might actually increase clients' intrinsic motivation because it enhances the feeling of competence when achieving it. Compared to the 'homework' and 'participation' parameters, the clients' sense of accomplishment was much higher when they managed to get rewards for answering questions related to their treatment sessions. Most of the clients had doubted their own ability as most of them came from a lower education background and having low self-esteem.

The escalating value of CM reinforcement in this study also plays an important role in providing a significant result (Romanowich & Lamb, 2015, 2010; Tuten et al., 2012). Romanowich & Lamb (2015), suggested that escalating reinforcement value would have a better outcome compared to a fixed reinforcement value. The increasing value of the rewards every four weeks with an additional bonus reward sticker, gave anticipation for clients to perform better every week. However, due to the limitations in funding and the overall cost of implementation of this study, the escalating value could only be performed every four weeks rather than weekly, which may have reduced the overall effectiveness of this study.

The finding of this study has proven that CM intervention has a significant effect on clients' treatment engagement similar to previous studies conducted (Brigham et al., 2010;

Kidorf et al., 2013; Montgomery et al., 2015; Petry & Carroll, 2013). Engaging substance use clients in a coerced and compulsory environment may be particularly challenging because of the perception that the institution as a form of punishment (Chie et al., 2015; Ibrahim et al., 2009; Scorzelli James, 1992; Ting Chie et al., 2016), and the beliefs that the decision for treatment was not their own (Wild et al., 2006). This study has proven otherwise, that clients from a compulsory treatment centre could also improve their engagement towards the treatment programme through the use of CM intervention. Improving clients' treatment engagement would provide more positive outcomes in the client's recovery process in the long run.

This finding also supports previous studies which discovered that CM combined with other intervention strategies, would improve the effectiveness of the existing intervention programmes (Gray et al., 2011; Winstanley et al., 2011). CM in this study was combined with the usual PUSPEN's psychosocial intervention and was found to have a significant effect in improving clients' engagement towards the programmes. Improving clients' engagement is an important aspect of any treatment programme especially in treating substance use disorders in a compulsory treatment programme. By using CM intervention, clients were reinforced to perform better in their treatment sessions, thus improving the overall treatment programme and providing better outcomes in clients' recovery in the long run, similar to Carroll et al. (2006), which found that combining CM with other interventions to reinforce attendance and drug abstinence was more effective than using the intervention alone.

Research Limitations

The current study has a few limitations that can be improved in future studies. During the study, the researcher was confronted with several challenges, one of which was financial constraints, especially in providing rewards or reinforcement for the CM intervention clients. CM is an intervention that reinforced certain desirable behaviours through the use of positive reinforcements, in this case, reward stickers with monetary value were used to provide tangible reinforcement for every targeted behaviour. This study was supported financially through a research grant with a limited budget provided by AADK. The grant helped in funding some of the research needs in particular the client reinforcements and tokens for client participation. Due to the financial limitation of this study, the researcher developed a CM intervention in the PUSPEN with a smaller rewards magnitude and on a smaller sample size to ensure it was cost-effective and complied with the budget provided.

Research limitations experienced by the researcher were also attributed to the location of the study which was within a controlled environment of the PUSPEN. One of the issues faced was in monitoring the client's behaviour between sessions. Monitoring of clients after the intervention session was assigned under the responsibility of the PUSPEN's management until the next intervention session was resumed. Anything that occurred during that period of time was beyond the researcher's control.

Another issue in conducting this study in the PUSPEN was the effect of negative reinforcements applied within the compulsory environment. The application of disciplinary action, regulation, and punishment still remain a dominant approach within the PUSPEN, which in a way affect the overall outcome of the study. Precautions were made to mitigate the impact of coercion during this study, such as by informing the subjects that they will not be punished for not complying with the observed parameters in each session. Nonetheless,

the coercion effect can still be seen with few of the findings showing no significant results between the PS+CM group and the PS group. According to Gendreau et al (2014), one of the principles in carrying out a CM approach in the institution is that positive reinforcement must dominate four times or higher than the effect of punishment, in order for it to be effective.

Another problem faced by the researcher was the issue of the client's attendance throughout the study whereby a few of the subjects were absent during some of the sessions due to disciplinary action, family visits, and performing other tasks required by the PUSPEN's administration. There was also an interview session held in the PUSPEN for the recruitment into a vocational training centre which caused a low motivation period for the clients during that week. Time constraint is also a common limitation experienced by researchers. Due to the limited study period, the researcher was unable to investigate the long-term effects of CM intervention more than the duration of time used in this study. In order to obtain a conclusive finding on the long-term effects of CM intervention, a longer period of study is required.

Suggestions for Future Research

It is hoped that this study would generate more interests for future researchers in conducting further research in CM intervention studies, especially in the local context of Malaysia. Based on the limitations experienced in this study, the researcher would put forward a few suggestions in order to improve future studies. In anticipation of the study sample size, this study can be considered as a small sample size study, even though power analysis was done. Larger sample sizes are suggested in order to get a more accurate and comprehensive result which can be used for more reliable generalization purposes.

Financial resources also need to be considered as CM implementation would require a higher cost if the sample size was increased. However, implementation of lower costs CM can be considered as demonstrated in the studies conducted by (Branson et al., 2012; Petry & Martin, 2002). In addition, the determination of a greater rewards value may need to be considered in order to see the difference in effect based on the magnitude of rewards as reviewed by Ghitza et al (2008), which highlighted that the value of a higher rewards would increase CM effectiveness.

This study proved that CM is effective for research and implementation within the institutionalized setting of the PUSPEN. However, CM interventions are ideally studied and conducted in an open setting within the community without any form of strict control. Most studies of the CM models have studied CM interventions in a more open setting but because of the limitations faced by the researcher, the study location was changed to a more controlled environment. Future studies can improve on this matter by using this study as a reference and also improve on the limitations encountered in this study to conduct a proper CM study by targeting substance user in the community.

As mentioned in the research limitations section, time constraint is one of the challenges faced by the researcher in examining the long-term CM effect on clients. A longitudinal study is suggested in order to get a more conclusive result of CM's long-term effects. CM effect could be studied within one or two years after the client is released from the PUSPEN. Another aspect that can be touched on by future researchers is studying CM's effects on the rehabilitation officers or from the treatment provider's perspective. It would be an interesting study to find out what are their views of CM intervention towards clients'

behavioural change and how CM intervention could help them in providing a better service to the client.

Conclusion

CM is an intervention approach that has the potential to be more widely studied, especially within the scope of Malaysia. In addition to the treatment and rehabilitation aspects of drug addiction, the CM intervention can also be applied in various forms of behavioural modifications such as adherence to programmes or medicines compliance for other health problems such as diabetes, hypertension, obesity and so on. The Malaysian government has spent a lot of money and energy to treat substance use disorder and these costs are rising every year. Applying more evidence-based approaches hopefully would help provide alternatives and increase the efficacy of treating drug problems in the country.

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