POSITIVE EMOTIONS AND QUALITY OF LIFE AMONG METHADONE MAINTENANCE THERAPY PATIENTS AND THEIR PSYCHOSOCIAL CORRELATES

DR N. SANKARI GANESH

DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE DEGREE OF MASTER OF PSYCHOLOGICAL MEDICINE

FACULTY OF MEDICINE

UNIVERSITY MALAYA

KUALA LUMPUR

2017

University of Malaya

UNIVERSITI MALAYA

ORIGINAL LITERARY WORK DECLARATION

Name of Candidate: **SANKARI GANESH NARAYANASAMY**

Matric No: **MGC130001**

Name of Degree: **MASTER OF PSYCHOLOGICAL MEDICINE**

Title of Project Paper/Research Report/Dissertation/Thesis ("this Work"):

POSITIVE EMOTIONS AND QUALITY OF LIFE AMONG METHADONE MAINTENANCE THERAPY PATIENTS AND THEIR PSYCHOSOCIAL CORRELATES

Field of Study: **PSYCHIATRY**

I do solemnly and sincerely declare that:

(1) I am the sole author/writer of this Work;
(2) This Work is original;
(3) Any use of any work in which copyright exists was done by way of fair dealing and for permitted purposes and any excerpt or extract from, or reference to or reproduction of any copyright work has been disclosed expressly and sufficiently and the title of the Work and its authorship have been acknowledged in this Work;
(4) I do not have any actual knowledge nor do I ought reasonably to know that the making of this work constitutes an infringement of any copyright work;
(5) I hereby assign all and every rights in the copyright to this Work to the University of Malaya ("UM"), who henceforth shall be owner of the copyright in this Work and that any reproduction or use in any form or by any means whatsoever is prohibited without the written consent of UM having been first had and obtained;
(6) I am fully aware that if in the course of making this Work I have infringed any copyright whether intentionally or otherwise, I may be subject to legal action or any other action as may be determined by UM.

Candidate's Signature Date:

Subscribed and solemnly declared before,

Witness's Signature Date:

Name:

Designation:

University of Malaya

CERTIFICATION

This is to certify that the candidate Dr. N. Sankari Ganesh, had carried out this research project and to the best of my knowledge, this dissertation is entirely her work.

University of Malaya

Dr Manveen Kaur Harbajan Singh,
Clinical Psychiatrist,
Department of Psychological Medicine,
University Malaya.

CERTIFICATION

This is to certify that the candidate Dr. N. Sankari Ganesh, had carried out this research project and to the best of my knowledge, this dissertation is entirely her work.

University of Malaya

Dr Rusdi Bin Abd Rashid,
Senior Lecturer,
Department of Psychological Medicine,
University Malaya.

CERTIFICATION

This is to certify that the candidate Dr. N. Sankari Ganesh, had carried out this research project and to the best of my knowledge, this dissertation is entirely her work.

University of Malaya

Associate Professor Dr Ng Chong Guan,
Consultant Psychiatrist,
Department of Psychological Medicine,
University Malaya.

CERTIFICATION

This is to certify that the candidate Dr. N. Sankari Ganesh, had carried out this research project and to the best of my knowledge, this dissertation is entirely her work.

University of Malaya

Dr. R. Parameswaran,
MBBS (RAN U), MPM (UM),
F. Addiction Medicine (Sydney), Psychiatrist and Addiction Specialist. Hospital Tuanku Ja'afar, Seremban.

ABSTRACT

Positive emotions and Quality of Life among Methadone Maintenance Therapy patients and their psychosocial correlates

Objective: The main objective of this study is to assess the positive emotions and the quality of life among patients on methadone maintenance therapy in Hospital Tuanku Jaa'far, Seremban and University Malaya Medical Centre as well as their associated factors such as their psychosocial correlates.

Methodology: This is a cross sectional study, involving 154 patients, which was conducted from March 2017 until May 2017. All patients receiving MMT from both University Malaya Medical Centre and Hospital Tuanku Jaa'far were invited to participate. The sociodemographic and clinical data were obtained from those patients who consented to the study. The Positive Emotion Rating Scale (PERS) and World Health Organization Quality of Life (WHOQOL) BREF were used as instruments.

Results: The mean age was 43.8 ±9 years with the most number of the patients being male (97.4%) and Malays (75.3%). Slightly more than half (50.6%) scored above 30 in their Positive Emotion Rating Scale. There was a significant association between the Malay (p=0.042) and, Chinese (p=0.004) ethnic groups with the positive emotions. Marital status (p=0.010) and employment (p=0.008) were also significantly associated with the positive emotions, with being married and employed having higher mean scores. After controlling for potential confounding factors, having positive emotions predicted a better quality of life in all the domains of quality of life. Non diabetic patients also significantly predicted a better quality of life in the overall general health domain where- else being non married and patients without family history of mental illness significantly predicted a lower quality of life in psychological domain and overall quality of life respectively.

University of Malaya

Conclusion: The presence of positive emotions significantly improves the quality of life among patients on MMT program. Other significant contributing factors to the quality of life of these group of patients are being non diabetic, married and not having a positive family history of mental illness. Therefore, attention for including evaluation and teaching of positive emotions during the MMT program should be incorporated for a more holistic treatment approach which extends beyond maintaining abstinence of drug use.

University of Malaya

ABSTRAK

Emosi positif dan Status Kualiti Kesihatan di kalangan pesakit yang menjalani Rawatan Terapi Gantian Methadone dan hubungan psikososial mereka.

Objektif: Objektif utama untuk kajian ini ialah untuk menilai emosi positif dan status kualiti kehidupan di kalangan pesakit yang mendapat rawatan terapi gantian Methadon di Hospital Tuanku Jaa'far dan University Malaya Medical Centre, serta faktor-faktor yang berkaitan seperti hubungan psikososial mereka.

Kaedah: Ini ialah satu kajian keratan rentas yang melibatkan 154 orang pesakit dari bulan Mac 2017 sehingga Mei 2017. Semua pesakit yang menerima rawatan terapi gantian Methadone dari kedua- dua hospital, UniversityMalaya Medical Centre dan Hospital Tuanku Jaa'far telah dijemput untuk mengambil bahagian. Data sociodemografi dan klinikal telah diperolehi daripada mereka yang bersetuju untuk mengambil bahagian dalam kajian tersebut. Skala 'The Positive Emotion Rating Scale (PERS)' dan 'World Health Organization Quality of Life (WHOQOL)- BREF' telah digunakan sebagai kaedah kajian.

Keputusan: Purata umur ialah 43.8 ± 9 tahun dengan kebanyakkan pesakitnya adalah lelaki (97.4%) dan berkaum Melayu (75.3%). Lebih daripada separuh daripada pesakit mendapat skor melebihi 30 bagi skala 'Positive Emotion Rating Scale'. Terdapat hubungan yang ketara di antara kaum Melayu (p=0.042) dan kaum Cina (p=0.004) dengan emosi positif. Status perkahwinan dan pekerjaan juga menyumbang kepada emosi positif dimana bekerja dan berkahwin mendapat purata markah yang lebih tinggi. Selepas mengawal untuk faktor potensial pembaur, mempunyai emosi positif meramalkan kualiti hidup yang lebih baik dalam kesemua domain kualiti hidup. Domain keselurahan kesihatan umum, pesakit yang tidak menghidap kencing manis mempunyai kualiti hidup yang lebih baik. Selain daripada itu, pesakit yang tidak berkahwin dan tiada sejarah penyakit mental keturunan mempunyai kualiti hidup yang lebih rendah

University of Malaya

dalam domain psikososial dan keseluruhan kehidupan.

Kesimpulan: Kewujudan emosi positif secara ketara meningkatkan kualiti kehidupan di kalangan pesakit yang terlibat dengan program rawatan terapi gantian Methadon. Faktor penyumbang yang lain kepada kualiti kehidupan bagi kumpulan pesakit ini ialah tiada mempunyai kencing manis, berkahwin dan tidak mempunyai penyakit mental keturunan. Untuk itu, pemerhatian perlu diberikan dalam menilai dan mengajar emosi positif semasa program rawatan terapi gantian Methadon dijalankan untuk memastikan pesakit mendapat rawatan yang menyeluruh selain daripada pencegahan penggunan dadah sahaja.

University of Malaya

ACKNOWLEDGEMENTS

Firstly I would like to thank God for his abundant and continuous blessings in the preparation and completion of my dissertation.

My deepest gratitude to my supervisor Dr Manveen Kaur for her continuous support of my study, her patience, motivation and guidance that had helped me in all the time of research and writing of my thesis. I could not have imagined a better mentor and advisor for my dissertation.

I would also like to show my gratitude to my supervisor as well, Prof Ng Chong Guan for helping me through my struggle with my statistical analysis. Without your assistance and dedicated involvement in every step of my analysis, this dissertation would not have been accomplished.

To my other supervisors, a heartfelt thanks to both, Dr Rusdi Abd Rashid and Dr Parameswaran for their insightful comments and encouragement which help incented me to widen my research from various perspectives.

I must also thank, my bosses at Hospital Tuanku Jaa'far, Dr Norizam and Dr Mazita for their continuous support and help.

A special thanks to Mr. Ng Yit Han as well for raising many precious points in the results analysis and helping to guide me with my knowledge gaps in the statistics area.

To the patients who participated in this study, hopefully you benefited from this study during your participation and in the future.

Getting through my dissertation required more than academic support and I have a few important people to thank for listening to and at times having to tolerate me over the past four years. Most importantly, none of this would have happened without my mother. My mother, Miss Rita Angelline, who offered her encouragement and support despite my many short comings. Every time I was ready to quit, you did not allow me

University of Malaya

and I am forever grateful. My dad, Mr. K Narayanasamy, who is my life coach and my pillar of strength, thank you! In addition, I would like to thank my husband, Dr Shankar R who has been a great friend and companion who helped me through this period in the most positive way. A special thank you to my aunt, as well, Miss Josephine.

Lastly, and most importantly, I am forever grateful to my twins, Sherene Aarora Ram and Shiddarth Arya Ram who are the main source of inspiration and motivation behind completing my dissertation on time. To both of them, I dedicate this dissertation.

University of Malaya

TABLE OF CONTENTS

University of Malaya

CHAPTER 5: RESULTS

University of Malaya

University of Malaya

LIST OF TABLES

University of Malaya

University of Malaya

LIST OF ABBREVATIONS

MMT	Methadone Maintenance Therapy
PERS	Positive Emotions Rating Scale
WHOQOL-BREF	World Health Organization Quality of Life-BREF
UMMC	University Malaya Medical Centre
HTJ	Hospital Tuanku Ja'afar
HPT	Hypertension
HPL	Hyperlipidemia
BA	Bronchial Asthma
DM	Diabetic Mellitus
HIV	Human Immunodeficiency virus

University of Malaya

CHAPTER 1: INTRODUCTION

One of the current global problems worldwide is substance dependence. It is also a serious problem in Malaysia, thus prompting the government to give it urgent attention, by investing in research areas. This is an attempt to control the rate of illicit drug use. However, over the recent years, there has been a drastic increase in these illegal drug users. AADK recorded an increase of 23, 642 drug dependents, from the year 2010 to 31,764 drug dependents in the year 2016 (AADK, 2017). Daily there is an average of seventeen new addicts and twenty cases of relapse reported in Malaysia from January to September 2008 (Kaur, Mohd & Mohamed, 2009). The highest number of addicts were from Kuala Lumpur, followed by Penang, Kedah and Johor. Out of these, majority were males, and 69 % of them were between the ages of 19 to 40 years. Based on the world's population, 5.2 % or approximately 243 million people between the ages of 15 to 64 had used an illicit drug (UNODC, 2014). These figures are astounding, demonstrating the use of substances very much involving individuals in their most productive age group.

However, this is only the tip of the iceberg, as these numbers are only of registered patients. There is an estimated three to four addicts who are not registered with the ADK, for every one that is. This gives an estimate, of possibly one million addicts in Malaysia or in other words 4 % of our total population. (Malaysian Psychiatric Association, 2006).

While illicit drug use becomes more widespread, it's consequences to one's life both physically and mentally, has been affected too. The most common drug used is cannabis followed by opioids. About 33 million people used opioids, with 12.7 million people injecting the drug (UNODC, 2014). In Malaysia, there were documented 16,985 opioid addicts that had registered with the government based on the 2016 statistics (AADK, 2017).

University of Malaya

Opioid dependence causes a lot of health and social issues which includes HIV/AIDS, other blood borne infections and overdose (WHO, 2009). In 2013, Eastern Europe had 5 % and Asia had 28 % of HIV prevalence rate among individuals who injected drugs (UNAIDS, 2013). Other infections such as hepatitis B and C, which are also transmitted through sharing of contaminated needles has been known to cause liver disease. Among addicts who inject drugs, a higher percentage of them, 52 % have hepatitis C, compared to a 6.7 % individuals who live with hepatitis B (Gong et al., 2009). As for drug related death, the most extreme form is due to drug overdose which reported 40 deaths per million persons (UNODC, 2014). Drug overdose does not always result in death and may lead to cerebral hypoxia, pulmonary edema, pneumonia and cardiac arrhythmia, which requires hospitalization, causing disabilities and damage to the brain (Warner-Smith, Darke, & Day, 2002).

All substance related disease in particular those with AIDS has a major impact when it comes to its' cost of medical care. The Malaysian government spends a significant amount, RM 50 million a year on drug rehabilitation programs, health education and preventive courses in hopes of combating this problem (Nik Ruzyanei et al., 2012). Furthermore, most of the opioid dependents are also those who work infrequently with low wages or are unemployed. Therefore, their poor employment and financial status makes them easily susceptible to drug trafficking, property and consensual crime such as corruption, accidents and possession of weapons (Mark, T. L., Woody, G. E., Juday, T., & Kleber, 2001).

Since drug users, face multiple problems with their physical health and economic cost, it is quite common to see them struggle with their mental health issues as well. Mental health is an important aspect and is defined as a person's condition with regard to their psychological and emotional well-being. It includes the subjective well-being of the person, their perceived self- efficacy, autonomy and competency, as well as

University of Malaya

the recognition of one's ability to realize their intellectual and emotional potential (World Health Organization, 2003).

Based on the general population data from the National Comorbidity Survey in the United States, 32.5% - 52.8% individuals with addictive disorders have at least one mental disorder (Kessler et al., 1996). The most common psychiatric disorders are major depression and antisocial personality disorder with co-morbid substance use (Brooner, 1997, Astals M et al, 2008). These psychiatric disorders especially major depressive disorder, leads to frequent substance use relapses (Hasin et al., 2002) and poses as a risk factor for suicide (Schneider, 2009). They also develop poorer therapeutic alliances and have worse treatment and physical outcomes (Astals M et al, 2008). Patients with psychiatric disorders and who are in the MMT program have shown vast improvement. This indicates that psychiatric conditions developed prior to or in conjunction with opioid addiction is considered an integral part of the problem as it hampers the treatment prognosis and contributes to the low quality of life of the patients (Carpentier et al., 2009).

Recently, there has been, a growing body of literatures showing that physical health, mental health and longevity are closely associated with both positive and negative emotion related attitudes (Danner, Snowdon, & Friesen, 2001). Mental health can be affected either in a potentially damaging or beneficial manner by patterned emotional responses (Danner, Snowdon, & Friesen, 2001;Peterson et al., 1988).This means an individual's well-being is determined by an independent contributions of their positive affect (Diener, 1984; Henry J, 2007).

Positive emotions serve as markers of flourishing and optimal well-being. Emotions are a broader class of affective phenomena (Cohn, Fredrickson, Brown, Mikels & Conway, 2009; Ed Diener, Suh, Lucas, & Smith, 1999; P Ekman & Davidson, 1994). It can either be a conscious or an unconscious response that has a personal

University of Malaya

meaning of a certain antecedent event, based on an individual's assessment.

One's life satisfaction is balanced out by their positive and negative emotions (Diener, E., & Larsen, 1993). Positive emotions are said to trigger an upward spiral towards enhancing emotional well-being. Based on the Broaden and Build theory (B. L. Fredrickson, 2004), positive emotions encourage an individual to discover novel thoughts and actions by broadening their thoughts and actions unlike the negative emotions, which narrow the individuals thoughts and action.

Advances in positive emotions have grown steadily over the past decade however there has been little sharing or interchanging of knowledge between positive emotions and the addictions field (Krentzman, 2014). Therefore do positive emotions play an important role in addiction patients? Indeed they do. Due to the nature of addiction which is chronic and recurrent, emotion regulation strategies and positive emotions play an important role in preventing substance abuse recurrence (Hoseiny, Jadidi, Nataj, & Za, 2015). Studies have shown that in contrast to a normal person, those with lower positive emotions are often dragged into drugs (Hoseiny et al., 2015). Drugs are used as an avoidant, negative and ineffective coping strategy, to reduce their problems (Sinha R, 2001). Therefore, in these patients especially those in the later stage of rehabilitation, the use of positive emotions will be necessary to double (Narimani M, 2004). By using the positive emotions, they not only discover new ideas and actions but they can re-start building their physical, intellectual, social and psychological resources.

Once the physical health and mental health of opioid users are affected, their quality of life is compromised as well. This is because of the challenges and difficulties that they face in their general health and social functioning. Besides that, experiences of positive emotions are said to contribute to the quality of people' lives (Diener, E., & Larsen, 1993; Myers & Diener, 2011). Quality of life is measured based on the daily functioning of an individual and an individualized perception of one's health (Muldoon,

University of Malaya

Barger, Flory, & Manuck, 1998). It is being recognized as an accurate measure of health and social benefits which is the result of treatment from substance use (Best et al., 2009; Dazord, Mino, Page, & Broers, 1998).

Based on studies, individuals with substance use disorder have a poorer quality of life compared to the non-substance users (Laudet, 2011) and individuals with serious medical problems (Millson et al., 2004). Currently, substance use disorder adopts the characteristics of a chronic condition (Fiumana et al., 2016). The mode of its treatment is similar to other chronic diseases, which address the impact of the disease on the patient's overall well-being. Therefore, assessing the quality of life is important as it is able to verify the effectiveness of the therapy given (Fiumana et al., 2016).

One of the most popular choice for substitution therapy is methadone (Baharom, Hassan, Ali, & Shah, 2012). Methadone had been proposed as an essential medicine in managing opioid dependent patients by the World Health Organization in 2004 (Hiv, 2004). It is a synthetic opioid, which works like morphine by activating the opioid receptors mainly the u type. The methadone maintenance therapy program was first implemented in Malaysia in 2005 and to date, it is continuously used in reducing illicit opiate use in various hospitals and health clinics. Compared to previous rehabilitation therapies, the MMT program had proved to have a higher level of compliance (Rusdi, Noor Zurani, Muhammad, & Mohamad, 2008; Sharifa Ezat, Noor Azimah, Rushidi, Raminder, & Ruhani, 2009). Due to this positive outcome from the MMT program in Malaysia, the government was encouraged to launch more centers through. However this positive outcome seems to be higher in higher doses of methadone (Fullerton et al., 2014).

As for the secondary outcomes, it is more of a mixed opinion although generally it supports the idea that MMT has got a positive impact when it comes to heroine induced criminal activity, as well as decreased mortality for HIV and hepatitis

University of Malaya

C infection (Fullerton et al., 2014). There has also been evidence proving that through MMT, these opioid users have been able to resume social and familial function (Sun et al., 2015). Therefore, generally it can be said that participation in this treatment gives a positive effect on the patient's QOL (Fiumana et al., 2016).

Since methadone maintenance therapy has been here for more than a decade in Malaysia, it is timely for us to review the benefits of this treatment by monitoring these individuals' positive emotions and quality of life. By doing so, hopefully we will be able to approach a more holistic manner of treating patients, which extends beyond just maintaining their abstinence to the drug.

University of Malaya

CHAPTER 2: LITERATURE REVIEW

2.1 Opioid Use Disorder

Opioid dependence is a mix of physiological, behavioral and cognitive phenomena, whereby the use of opioid takes on a much higher priority than other behaviors (Padaiga, Subata, & Vanagas, 2007). Based on the (American Psychiatric Association, 2013) opioid use disorder is a problematic pattern that leads to significant amount of distress or impairment.

Unlike the Diagnostic and Statistical Manual of Mental Disorders (DSM IV) (American Psychiatric Association, 1994), the DSM 5 has combined both substance abuse and substance dependence into a single diagnosis of substance use disorder. DSM 5, has characterized opioid use disorder by as a maladaptive pattern of substance use which leads to a significant amount of distress or impairment. A minimum of 2 criteria is needed to establish the diagnosis of substance use disorder. Among the criteria included are taking the opioid in larger amounts for a longer period than intended, wanting to quit but unable to do so, spending long duration obtaining the opioid, persistent craving or a strong desire to use the opioids, impairment in obligations at work, school, or home due to opioid use, continued use of opioid despite persistent or recurring social or interpersonal problems, giving up or reducing important social, occupational, or recreational activities due to opioid use, recurrent use of opioids in physically hazardous situations and consistent use of opioids despite the knowledge of having persistent or recurrent physical or psychological difficulties from using opioids (American Psychiatric Association, 2013).

2.2 Harm associated with opioid use

It is important to get a clearer picture of the problem raised by opioid use disorder, especially in the social context to effectively deal with the problem. There are

University of Malaya

many harms associated with the use of opioid that affect both the individual as well the society surrounding the individual. These harms range from physical and mental health to economic and social consequences. Opioid users have an increased risk in getting involved in violence or crime, dying from drug overdose, suicide and infectious related causes (Darke & Ross, 2002; English, Dallas R & Holman, C. D'Arcy J, 1995).

The types of crime that these addicts are involved in includes, snatch theft, selling drugs, robbery, frauds, homicide and suicide. When caught, the involvement leads to imprisonment, rejection from society and even stigmatization that addicts are hard core criminals (Rusdi et al., 2008). This can be one of the reasons why these addicts isolate themselves from the others and stay among themselves. Mostly they live in poorly sanitized, abandoned areas and tend to share needles, worsening the addiction problem.

This whole process self explains how infectious disease including HIV, hepatitis C and B are closely associated with addictive behavior. In Malaysia, there has been a rise of infectious disease especially HIV or AIDS among addicts. The highest population at risk are the intravenous drug users followed by the sex workers and transgender. In the 1990s, there were 70% to 80% of new HIV cases secondary to injecting drug use (Ministry of health, 2012). In previous studies, there was a higher mortality rate before the advent of HIV indicating that these heroin users were more likely to die prematurely than their peers (English, Dallas R & Holman, C. D'Arcy J, 1995; Goldstein A & Herrera J, 1995).

Besides HIV, unsafe practice of sharing needles also largely contributes to 90% of new hepatitis C cases (World Health Organization, 2009). In Malaysia, it has been estimated that 89.9% of heroin addicts on MMT have hepatitis C. A study showed that the risk of having hepatitis C among injecting drug users were 2.2 times higher than non-injecting drug users. In the population of drug users, 65% were tested positive for

University of Malaya

hepatitis C and among them, 43.2% of them were co-infected with HIV. Those who are hepatitis C carriers may remain undetected for many years as they can be asymptomatic. When detected they become untreatable as it might have progressed to liver cirrhosis or liver cancer (Vicknasingam, B., Narayanan, S., & Navaratnam, 2009). There is an estimated 7% risk of hepatitis C progressing to cirrhosis in 20 years and 20% risk of its' progression in 40 years. The risk of getting advanced liver disease is higher in the group of those who have co-infection of HIV (Dore, G. J., Freeman, A. J., Law, M. & Kaldor, 2002).

When there is an increase of opioid dependence, there will also be an increase in the risk of opioid overdose especially among the male, and those who use heroin with cocaine, alcohol and benzodiazepines (Darke, S. & Zador, 1996; Warner-Smith et al., 2001). The mortality rate from drug overdose among those injectable opioid users are likewise higher (Mathers et al., 2013).

Opioid dependence is known to have a significant economic burden in the United States as a result of increased health care costs, increased burden on social welfare and more cases in the criminal justice system (Schackman, B. R., Fleishman, J. A., Su, A. E., Berkowitz, B. K., Moore, R. D., Walensky, R. P., & Freedberg, 2015). Due to this burden, productivity of the nation as a result of unemployment, frequent absenteeism and premature mortality is also affected (World Health Organization, 2009). Other cost besides healthcare cost includes cost due to crime, social security benefits, loss of tax revenue and prison costs (Clark, Gospodarevskaya, Harris, & Ritter, 2003).

2.3 Methadone maintenance therapy

The abuse of heroine had increased to a substantial amount in the 1980s that forced the Malaysian government to believe that heroin addiction was a threat to our

University of Malaya

nation. Since then, the Malaysian government had tried to reduce the supply and demand of the drug by using a multifaceted anti-drug strategy (Scorzelli, 1992). Methadone maintenance therapy is one such program that was brought in to help curb the opioid dependence problem. It is known to be a well validated empirically supported treatment with good visible effects. It is also one of the most widely used opiate dependence treatment that is used around the world (Kreek & Vocci, 2002).

Methadone works as a synthetic opioid agonist. It has good oral bioavailability and it is given once daily due to its' long half-life of 24 hours. Methadone is well absorbed from the gastrointestinal tract (Verster & Buning, 2000) and has minimal side effects like constipation and hyperhidrosis which tends to get better over time. Methadone is a full agonist that works by occupying the receptor sites that is affected by heroine or other opiates. This blocks the euphoric and sedating effects of the opiates while relieving the withdrawals (Burgess, P, 2015). These side effects are only experienced by less than 20% of the users (Verster & Buning, 2000).

Over the period of five decades, methadone maintenance treatment had been rigorously studied and thoroughly evaluated in different countries with different treatment groups. Since its' initiation in the 1950s by Dole and Nyswander, it has been the most widely researched treatment for opioid dependency (Dole, V.P., Nyswander, M.E. & Kreek, 1966). The main goals of the therapy includes reducing the narcotic craving, blocking the illicit opioid's euphoric effect and finally preventing one's withdrawal symptoms (Leavitt, 2003).

However, with all the consistent positive results, methadone unfortunately is also the most controversial treatment. This is mainly due to individuals who claim that methadone treatment switches dependence from an "illegal" narcotic to a "legal" narcotic, which encourages the patients to illegally sell their take home methadone (Gossop, 2006). Therefore, it is true that there is a potential that the methadone

University of Malaya

treatment can be abused by those in and out of the program (Belluck, 2003; Chie et al., 2015; Gendreau-Webb, 2004). As for methadone abuse, majority of the cases are due to an overdose of the methadone with other illicit drugs in a cocktail mixture and by injecting this cocktail intravenously (Grichard, A., Lert, F., Calderon, C., Geige, H., Magnet, O., Soletti, J., Brodeur, J. M., Richard, L., Benigen, M. & Zunzuneger, 2003).

After its' launch in 2005 in Malaysia, about 1200 drug users in 10 government hospitals and 2 private clinics were registered in the pilot project. The 2nd stage involved 5000 drug users (Mohamed, M. N., & Kasa, 2007). The results were promising and methadone maintenance treatment proved to improve compliance to treatment program up to 80 % (Mazlan, M., Mazlan, M., Schottenfeld, R. S., Mazlan, M., Schottenfeld, R. S., Chawarski, M. C., & Chawarski, 2006).

Furthermore, the advantages were just not confined to the retention rate but it also helped in maintaining the patient on their occupation and quality of life (Robson, Rashid, Nazar, & Habil, 2015). Individuals on the program were found to be more responsible towards their family, in keeping their jobs, being law abiding and functioning as responsible citizens in the society (De Maeyer, J., Vanderplasschen, W., Camfield, L., Vanheule, S., Sabbe, B., & Broekaert, 2011). Due to its' promising and positive results the program had been scaled up to include 24 district services which covered about 927 clients (Kaur, Mohd, & Mohamed, 2009).

The methadone maintenance program is diverse and the program differs from one center to another. The difference noted are in structures, procedures and practice which includes the number of patients being treated, the staff qualification, the different counselling and medical services provided, policies on urine testing and take home methadone policies (Gossop, Marsden, Stewart, & Treacy, 2001) but the similarities of it being a harm reduction program stays.

University of Malaya

2.4 Positive emotions of patients on methadone maintenance therapy

Until the recent years, positive emotions have been under reviewed and more focus been given on the study of negative emotions (Burgdorf & Panksepp, 2006; Carl J Soskin D Kerns C Barlow D, 2013). Throughout history, philosophers considered the ultimate motivation or goal for human action as happiness. Even so, human unhappiness was explored in depth versus positive subjective well-being. Recently though, this situation had been corrected with research work progressing steadily, and many new literatures emphasizing on subjective well-being, and how it helps the individual experience their lives in positive ways.

Positive emotions are an important contribution to human well-being (B. Fredrickson, 2001). Based on the Broaden and Build Theory of positive emotions, when an individual feel's something positive, they open up. Their horizons broaden making their lives have the potential to get better (B. L. Fredrickson, 2004). By broadening the mindset, the individual becomes more open to discovering new novel and creative actions, ideas and social bonds, thus building their personal resources physically, intellectually, socially and psychologically. This makes them more durable towards emotional regulation and more resilience. By being more resilience, the odds of successful coping and survival improves (B. Fredrickson, 2001; Barbara L Fredrickson, 2004; Tugade & Fredrickson, 2007).

As for substance use, it is seen as a habitual way of avoiding stress related unpleasant emotions and state (Swaby, 2017). In the beginning, for most patients it starts as a pleasure-seeking activity (Krentzman, 2013) which eventually leads to a self-described hell (Swaby, 2017). Their repetitive avoidance of their emotions or problems by using substance develops into a pattern of ineffective coping and an increasingly pessimistic view of life with negative emotions (Alim TN et al, 2012). Therefore, positive emotions can help these substance users by helping them build a more positive

University of Malaya

character which will aid them to address significant life issues (Swaby, 2017). The focus is not only on overcoming their problems but by learning to use positive emotions these addicts also get to move forward and flourish (B Schrank, T Brownell, A Tylee, 2014). This is because positive emotions promotes positive thoughts and behaviors which aids in the recovery of these patients (Krentzman, 2013).

Besides that many opioid dependent patients also tend to persistently use heroin or additional drugs due psychological processes such as cravings, urges and exposure to temptation situations such as drug availability. Some are even socially pressurized to use heroin by their peers (Brewer DD1, Catalano RF, Haggerty K, Gainey RR, 1998; Niaura, 2000). All these psychological processes are capable of causing low mood and has been associated with depression (Peles et al., 2007). A study done abroad (Savant, J. D. et al, 2013) showed about 45% of the opiate dependent patients had lifetime mood disorder, with 19% having a current major depressive episode and 24% of them had at least one episode in the past. This makes it also harder for these patients to achieve their long term addiction recovery goals.

Traditionally, in addiction recovery is a remission of symptoms and abstinence to drugs. Currently, recovery is not just not seen as a remission of symptoms but also about building a more expansive and satisfying life (Swaby, 2017). Part of the problem of addiction is that these patients find it difficult to envision a different future in which there is happiness (Scharff, 2014). In order to do so, they need to be equipped with positive emotions and thoughts. Using positive emotions, medical staff are able to help these addicts see a better drug free future which they previously could not even dream of (Scharff, 2014).

So how does one make this happen? Studies have shown that people who are happy always engage in behaviors that protect their existing state (Emotions, 2000; Isen Franklin & College Paula Levin, 1972; Moore & Chater, 1999). For instance, most of

University of Malaya

the times, the opioid dependent patients come for treatment in a distressed state, which resolves following the initiation of methadone (Gossop, 2006). This is probably because, once on the treatment, their confidence level pick up and they become more compliant to the treatment, in order to maintain that effective outcome (Sharifa Ezat et al., 2009). Therefore, they will have to work towards maintaining and protecting their positive experiences. It also broadens their thoughts and action repertoire and build psychological resilience when coping with daily life crisis and challenges (B. Fredrickson, 2001). Looking at the hedonic contingency model (Wegener DT & Petty RE, 1994) it is essential to employ strategies that can help these patients maintain their positive emotions. Based on this model, over time the patients will associate their benefits with positive emotional experience and again through this they will learn to select behaviors or cognitions that maintain or elevate their positive emotional experience (Wegener DT & Petty RE, 1994).

One cognitive form of emotion regulation that maintains and extends positive emotional experience is known as savoring. It is a conscious awareness of and a state of deliberate attention being paid to a person's pleasant experiences (Bryant, 1989). The savoring model indicates that the positive emotions are maintained because it draws attention to one's feelings of anticipation towards an upcoming positive event, appreciating the current pleasant events and reminiscing about their past positive experiences (Fred Bryant, 2003). For an example, based on the savoring model, a patient on methadone treatment might look forward to his upcoming clinic appointment as he knows that he is drug free, and therefore will be praised by the doctor for his efforts like his visit. This leads to contentment as well, which is an emotion relevant to savoring (B L Fredrickson, 2001). Contentment resonates with the reminiscence part of the savoring process that helps with the way these patients cope with pressures from family, peers and society.

University of Malaya

Many studies have emphasized on both the psychological and physical benefits that one would attain by increasing or enhancing their positive emotions. These opioid dependence patients must practice the positive emotions daily, even when faced with a negative circumstances to actually reap the benefits (Barbara L. Fredrickson, 2000). In the addicts a long term benefit will be more promising as, long term well-being is characterized by good relationship with others, available opportunities for continued personal growth and a positive self–regard (Carol D. Ryff & Burton Singer, 2000; Ryff & Singer, 1998).

Finally, a study (Nalaskowska M, 2014) was conducted on the positive indicators of mental health among patients receiving methadone maintenance treatment. The positive indicators included their capacity to regulate emotions, a sense of coherence and their level of task realization. The results revealed patients who were abstinent from opioids in a period of six months, had a better sense of internal coherence, and could cope better with experienced emotions. In light of these findings, positive emotions of patients on methadone should be given more importance as there are available treatment strategies which may improve their positive emotions, prevent relapses and hopefully improve compliance to methadone as well.

2.5 Quality of life among patients on methadone maintenance therapy

Health is defined as "A state of complete physical, mental, and social well-being not merely the absence of disease" by The Constitution of the World Health Organization (WHO). It means that health does not only cover changes in the frequency and severity of diseases but also the estimation of one’s well-being which is usually assessed by improvement in the quality of life. QOL is defined as how an individual perceives his /herself in life based on the context of the culture and value systems in which they live in, in relation to their individual expectations, goals, standards and

University of Malaya

concern (WHO, 1998). QOL ranges from the person's physical health, their psychological state, the individual's level of independence, personal beliefs, their social relationships, and their relationship towards their surrounding environment (WHO, 1998). In short, it represents an assessment of the patient's functioning level and well-being, based on the impact of treatment given (Giri, O. P., Srivastava, M., & Shankar, 2014; Heslin et al., 2011; Jessica De Maeyer, Wouter Vanderplasschen, 2010). It can also be used as a tool in evaluating effectiveness of the quality of provided care of drug programs (Fiumana et al., 2016). By paying attention to QOL in patients, the care given to these addicts are done with an emphasis on a more holistic view rather than the classical methods of complete recovery and compliance (Yen, Wang, Wang, Chen, & Chang, 2011).

Previous studies have shown that the population of opioid dependent patients have a lower quality of life compared to the general population and the medically ill people (Jessica De Maeyer, Wouter Vanderplasschen, 2010). These patients tend to have higher rates of dissatisfaction with life compared to the general population (Puigdollers E, Domingo-Salvany A, Brugal MT, Torrens M, Alvarós J, Castillo C, 2004). Which is why, methadone maintenance not only plays a role in harm reduction but also in improving the quality of life of these patients (Baharom, Hassan, Ali, & Shah, 2012). Many studies done all over Malaysia and the world also revealed similar results of improved quality of life in patients receiving methadone maintenance treatment (Giri, O. P., Srivastava, M., & Shankar, 2014; Gong et al., 2009; Lin Xiao, Zunyou Wu, Wei Luo, 2011; Marta Torrens, Francina Fonseca, 2013). In fact, studies on QOL, have gone an extra mile by examining the way the opioid dependent patients see, experience and perceive the repercussions of their daily life, other than just simply looking at the usual symptoms of addiction and side effects of treatment (Revicki DA, Osoba D, Fairclough D, Barofsky I, Berzon R, Leidy NK, 2000).

University of Malaya

Addiction, as mentioned earlier, is a cluster of physiological, behavioral and cognitive phenomena (Padaiga et al., 2007). It affects the addicts' health, both physical and mental, the person's role performance and their social adaptation (Kandel, D. B., Davies, M., Karus, D., & Yamaguchi, 1986). QOL on the other hand is affected by several factors too, such as physical health, psychological state, level of autonomy, social relationships, personal beliefs and relationship with the environment (Fiumana et al., 2016). Therefore, factors such as socio- economic status, gender, HIV status, localities, educational level, personality disorder and dual diagnosis are associated with poor QOL among the opioid dependents (Bizzarri J et al, 2005; Fassino S. et al, 2004; Puigdollers E et al, 2004). Another possible reason could be because the QOL of the addicts are linked to subjective experiences such as self-realization, self-esteem, pleasure, inner harmony, love and freedom (Fiumana et al., 2016), which is generally lower in this group of patients.

Thus, this again links back to positive emotions of these patients and whether there is a possible association between positive emotions and QOL. However, studies studying the association between both concepts are lacking in drug abuse research. Up till now, the focus in most of the studies has been only on the absence of pathology or the individual's quality of life.

Finally, measuring QOL, allowed these patients to see their own subjective perspectives of their lives' impairment in a multidimensional view. As we are aware, since opioid dependency is a chronic relapsing problem, it is not easy to treat (Verrando R, Robaeys G, Mathei C, 2005). By assessing the impact of opioid dependence on QOL, it will be easier to make decisions on how aggressive to treat the patient's problematic behavior, to assess the health needs of the patient and to allocate appropriate resources (Yen et al., 2011).

Therefore, this study is conducted not only to evaluate the QOL in this group of

University of Malaya

opioid treatment patients, but also to evaluate the role of positive emotions in improving their QOL. Hence, if there is a positive correlation, it would be of great benefit to include positive emotions teachings as part of the MMT program.

University of Malaya

CHAPTER 3: OBJECTIVES

3.1 GENERAL OBJECTIVE

The aim of this study is to assess the positive emotions and the quality of life among patients on methadone maintenance therapy in Hospital Tuanku Jaa'far, Seremban and University Malaya Medical Centre, as well as their associated factors such as their psychosocial correlates.

3.2 SPECIFIC OBJECTIVES

1. To identify the positive emotions among patients on methadone therapy
2. To assess the quality of life of patients on methadone therapy
3. To examine the association between the presence of positive emotions and quality of life

3.3 RATIONALE OF THE STUDY

Methadone is effective in harm reduction programs. However, studies still demonstrate that depression is common among patients in methadone maintenance treatments (Peles et al., 2007). With new research suggesting that positive affect promotes the prevention of and recovery of depression, this has prompted the researcher to study the concept of positive emotion among patients on methadone (Sin & Lyubomirsky, 2004). In addition that the Quality of life is lower among opioid dependent patents compared with patients with other medical illness (Jessica De Maeyer, Wouter Vanderplasschen, 2010), the association of positive emotions with quality of life is the other area of focus in this study.

This study therefore aims to investigate the positive emotions of patients on methadone maintenance therapy and it's relation to the quality of life on methadone patients to help provide a more holistic treatment and support to these patients.

University of Malaya

CHAPTER 4: METHODOLOGY

4.1 Study setting

This study was conducted in 2 centres, one being the outpatient addiction clinic of University Malaya Medical Centre (UMMC) and the other is the methadone clinic of Hospital Tuanku Jaa'far (HTJ). UMMC is a university affiliated tertiary referral center which has a full range of psychiatric services including addiction psychiatry. It is located in between Kuala Lumpur and Petaling Jaya. Kuala Lumpur is known as the capital of Malaysia and has an estimated population of 1.76 million people in an area of 94 square kilometers (243 square kilometers) (World Population Review, 2016). In terms of population and economy it is one of the fastest growing metropolitan regions in Malaysia. As for Petaling Jaya, located in the Petaling District of Selangor, it was originally developed as a satellite township for Kuala Lumpur. It covers an area of 97.2 square kilometers (37.5 square mi) and has a population of 197 949 people (2010). UMMC sits between these 2 popular cities and is a semi government sponsored facility. Apart from providing health services, UMMC also provides teaching services for the undergraduates and postgraduate students of Faculty of Medicine from the University Malaya.

The methadone maintenance treatment (MMT) program was first initiated in this centre in the year 2005. This program is under strict national policy guidelines which includes suitability of patients for this treatment, contraindications of the treatment, continuous assessment, induction and monitoring. Patients who are enrolled in the program do not pay as it is covered by the government.

The second centre, HTJ is a government based hospital that caters for the population of Seremban and its nearby surrounding areas. It also serves as referral centre that accepts patient from other health and hospitals throughout Negeri Sembilan. Negeri Sembilan is a state in Malaysia on the Malay Peninsula's southwest coast which

University of Malaya

has a population of 1.098 million people. Seremban is the capital of the Negeri Sembilan state with a population of 314 502 people in a 948 kilometer square (2010).

The methadone clinic operates seven days a week. On weekdays, Monday to Friday, there are usually 2 sessions, morning and afternoon sessions, most of the days. As for the weekends and Public holidays, it only operates on the morning session. The methadone clinic has 2 clinic days, Monday and Thursday. There is no take away allowed for the first 4 weeks. Similar too UMMC, patients under the program, need not pay for the methadone and it is given to them free. When the patient first enrolls to the program their urine will be tested on a weekly basis until approximately one month. After the one month period, their urine would be tested only randomly, unless they defaulted their clinic visit or if their urine tested positive in the last visit.

4.2 Study Design and Sampling Method

This is a cross sectional study to assess the positive emotions and quality of life of patients on methadone maintenance therapy. A non-duplicated sample of patient were recruited using the convenient sampling method.

4.2.1 Inclusion Criteria

1. All patients who are receiving methadone maintenance therapy in UMMC and HTJ
2. Diagnosis of opioid dependence at start of methadone treatment
3. Age 18 years and above
4. Length of treatment in methadone maintenance therapy of at least 1 month
5. Patients who are able to read and understand Malay or English adequately well

University of Malaya

4.2.2 Exclusion Criteria

1. Severe behavior disturbances or severe psychotic symptoms
2. Severe cognitive impairment or mental retardation

4.2.3 Data Collection

Data collection for study was done from March 2017 till May 2017. The permission to carry out the study was obtained from both the departmental heads. Upon attaining the permission from the departmental heads, approval from the Medical Research & Ethics Committee, UMMC ethical committee was attained on the 19th April 2017 and approval from the Medical Research & Ethics Committee (MREC), National Medical Research Register was attained on the 5th of March 2017. All patients in the methadone maintenance therapy in UMMC and HTJ who fulfilled the inclusion criteria were selected and invited to participate in the study. In this study, the patient's urine test was not taken into consideration as all patients recruited needed to be at least one month in the program. The patients were then given the Patient Information Sheet and the purpose of the study was explained to them. Before obtaining the patient's consent, confidentiality of the collected data was explained to all of them. All the participants were voluntary and the study posed no risk to them. If any of the patients were found to have any adverse health conditions, appropriate treatment or referral to the appropriate auxiliary services were provided. During the assessment as well, any patients who were suicidal or having risk of harm to self or others were immediately referred to a psychiatrist for further management. Once the patient had agreed to participate in the study, the Patient Consent Form was given. After the consent, using the socio-demographic and clinical data questionnaire, their demographic and clinical information

University of Malaya

were obtained. There were two self- rated questionnaire that was used, the Positive Emotions questionnaire and the World Health Organization Quality of Life – BREF (WHOQOL-BREF) questionnaire. Patients were given sufficient time to answer the questionnaires and in case of assistance, they were assisted by the investigator in a manner that would not influence patients' selection of answers or introduce bias. All data were kept confidentially in a file.

University of Malaya

4.3 Sample size

The sample size was determined using the following formula:

$n = (t^2 \times p(1-p))/m^2$

$n = (1.96^2 \times 0.112(1-0.112))/0.05^2$

$= 3.8416 \times 0.112 \times 0.888/0.0025$

$= 0.3821/0.0025$

$= 152.8$

≈ 153

Description:

n = required sample size

t = confidence level at 95% (standard value of 1.96)

p = estimated prevalence from study by (Shion et al., 2014)

m = margin of error at 5% (standard value of 0.05)

Therefore, the required sample size was 153 subjects.

University of Malaya

4.4 Instruments

4.4.1 Demographic and Clinical Data

A brief and self-generated questionnaire was developed to help obtain relevant socio- demographic data and clinical information from the participating patient. The demographic variables obtained were age, ethnicity, marital status, employment and family history of drug or mental illness. Clinical data included duration of methadone maintenance therapy, co morbid medical illness and history of other substance in the last 1 month.

4.4.2 Positive Emotion Rating Scale (PERS)

The PERS is relatively new self-report questionnaire. It was only invented in 2016, in the aim of facilitating the assessment of positive emotion. The questionnaire consists of 8 items and has 6 domains of positive emotions, contentment, interest, love, gratification, active and pride. There is a score range in each item ranging from one (never) to five (always). The cut off score is 30 based on the previous study (Ng, C. G., Hazli, Z., Zulkifli, G., Firdaus, A. G., Azhar, Z., Au, Y. K. C., & Lim, 2016) had demonstrated significant discriminant validity between depressed and non-depressed patients. In the previous mentioned study, the optimal cut off score 30 had a sensitivity of 0.75, specificity of 0.73 and a positive predictive value of 0.60.

It is a comprehensive assessment of positive emotion and had as well displayed a satisfactory reliability and validity in assessment of positive emotion (Ng, C. G. et al, 2016). The Malay version, has been validated (Mohamed, F. A., Ng, C. G., & Ong, 2017) and showed good internal consistency with Cronbach's alpha coefficient of 0.89. It was also shown to good concurrent validity as well.

Each item of PERS was adopted from existing relevant scales. Although previous literatures had listed different numbers of domain of positive emotion, PERS

University of Malaya

only adopted the core domains to be incorporated into the questionnaire. It provides comprehensive assessment of positive emotion and displayed satisfactory validity and reliability for the assessment of positive emotion (Ng, C. G. et al, 2016).

4.4.3 World Health Organization Quality of Life (WHOQOL)- BREF

Originally the WHOQOL-100 was developed in 15 international field centers to assess the quality of life. The aim for this was so it can be applicable cross culturally. The WHOQOL-100 was developed to increase the emphasis on measurement of health, the impact of disease on a person's daily activities, their perceived health measure and their functional status measure. Other similar questionnaires which measured these individual areas did not measure quality of life per se unlike the WHOQOL-100. This questionnaire has 100 items, 4 items for each 24 facets of quality of life, and 4 items for 'the overall quality of life and general health' facet (UNODC, 2014; World Health Organization, 1996).

However, the WHOQOL-100 was deemed to be too lengthy and time consuming for practical use. This precipitated the development of WHOQOL-BREF. The WHOQOL-BREF is a questionnaire which contains 26 questions, one item from each of the 24 facets, 2 items from overall quality of life and general health facet. There are 4 main domains, which includes physical health, psychological, social relationships and environments and 2 items in the overall quality of life and general health. Each of the item is rated based on the Likert scale ranging from 1 to 5, higher scores indicating a better quality of life. It has been shown to have good reliability and validity based on its psychometric properties which have been analyzed across 23 countries on a wide range of population which includes both sick and well respondents (Skevington, Lotfy, & O'Connell, 2004).

As for the Malay version, both the WHOQOL-100 and WHOQOL-BREF has

University of Malaya

been validated (Hasanah, C. I., & Razali, 1999; Hasanah, C. I., Naing, L., & Rahman, 2003). The Malay version of the WHOQOL-BREF showed good internal consistency, test-test reliability, both discriminant and construct validity. The Cronbach's alpha value for all the domains ranged from 0.64 to 0.80, where else the intra class correlation coefficient ranged from 0.49 to 0.88 (Hasanah, C. I., Naing, L., & Rahman, 2003).

4.5 Statistical Analysis

The data was analyzed using the SPSS Version 19. Appropriate statistical tests were used to analyze the appropriate study parameters.

1. Descriptive statistics were used to summarize the data. The prevalence of positive emotions was computed.
2. Independent t test (parametric) was used to compare the mean differences between two independent variables that were tested to be normally distributed such as medical co morbidities and positive emotions.
3. Mann Whitney U test (non-parametric) was used to compare the median between two independent variables that were not tested to be normally distributed such as domain of social relationship and medical comorbidities.
4. Chi square was used for the categorical data to compare two or more variables from the population of methadone patients. It was used to determine the significant association between the factors and the domains of quality of life. In Chi square, there are certain assumptions to be met, the number of cells with Expected Count (EC) less than 5, must be less than 25% of the total number of cells.
5. Fisher exact test is also a test of significance that was used instead of chi square where the expected number of frequencies is less than 5.
6. Correlation (Pearson and Spearman) was used to measure the strength and

University of Malaya

direction of association that exist between the positive emotions and the domains of quality of life.

7. Multiple logistic regression was used in the final part to examine the associations between the positive emotions rating scale, significant independent variables and the domains of quality of life.

4.6 Ethical Consideration

The thesis proposal was presented to the postgraduate research committee at the department level of UUMC. The ethics approval was obtained from the medical ethics committee of UMMC and National Medical Research Register (NMRR) before the commencement of the study. The permission to interview the patients was obtained from the head of Psychiatry department UMMC and the Hospital Director and Head of Psychiatric Unit, HTJ.

The study detail including the purpose of the study and confidentiality was informed to the patients prior to obtaining consent. Each patient enrolled on voluntary basis was needed to sign a written consent. During analysis of statistical data, they were identified with a specified code. All data gathered were kept safe and only accessible to the researcher.

University of Malaya

CHAPTER 5: RESULTS

5.1 Demographic data of patients on MMT

A total of 154 patients who attended the methadone clinic in HTJS and addiction clinic in PPUM who fulfilled the inclusion and exclusion criteria were enrolled in this study. In terms of gender, majority of the participants were male (97.4%) compared to female (2.6%). Out of that sum, 75.3% were Malays, 13.6% Chinese and 11.0% Indians.

Marital status of the participants, majority of them were married (54.5%) with the remaining being not married 45.5%. As for employment status, a large percentage of them were employed, 82.5% and 17.5% were unemployed. Only 14.3% of these participants had family history of mental disorder or substance use.

University of Malaya

Table 5.1: Demographic data of patients on MMT

Variables	Mean (SD)	n (%)
Age	43.8 (9.03)	
Gender		
Male		150 (97.4)
Female		4 (2.6)
Ethnicity		
Malay		116 (75.3)
Chinese		21 (13.6)
Indian		17 (11.0)
Marital status		
Married		84 (54.5)
Not married		70 (45.5)
Employment		
Employed		127 (82.5)
Not employed		27 (17.5)
Family history		
Yes		22 (14.3)
No		132 (85.7)

University of Malaya

5.2 Clinical variables of patients on MMT

Most of the patients (96.1%) were on MMT for more than a year, with a mean duration of 6 years (SD 3.29). They were mostly on methadone dose ranging from 40 and above (76%), followed by a smaller proportion, 0-39mg/day (24%). The mean daily methadone dose was 63.6 (SD 31.07).

In terms of substance use in the past 1 year, tobacco (96.1%) was the highest, while the rest were alcohol (11,7%), benzodiazepine (5.8%), cannabis (5.2%), stimulants and heroine (8.4%) respectively. These findings were based on the patient's own history as no urine test was done.

Based on medical illness, only about 27.8% of them had co morbid medical illness, predominantly hypertension (9.7%), followed by diabetes mellitus (6.5%), bronchial asthma (5.8%), hyperlipidemia (1.3%) and others (4.5%). As for blood borne diseases, more of them had hepatitis (43.5%) as compared to HIV (7.1%).

University of Malaya

Table 5.2: Clinical variables of patients

Variables	Mean (SD)	n (%)
Methadone dosage*	63.6 (31.07)	
0-39		37 (24.0)
>= 40		117 (76.0)
Duration (years)	6.1 (3.29)	
< 1 year		6 (3.9)
>= 1 year		148 (96.1)
Substance use		
Tobacco		148 (96.1)
Alcohol		18 (11.7)
Benzodiazepine		9 (5.8)
Cannabis		8 (5.2)
Stimulant		13 (8.4)
Heroine		13 (8.4)
Co morbid medical illness		
Diabetes Mellitus		10 (6.5)
Hypertension		15 (9.7)
Hyperlipidemia		2 (1.3)
Bronchial asthma		9 (5.8)
Hepatitis		67 (43.5)
Status HIV		11 (7.1)
Others		7 (4.5)

*methadone dosing: mild: <40, moderate to high: >=40(Strain, E. C., Bigelow, G. E., Liebson, I. A., & Stitzer, 1999)

University of Malaya

5.3 Positive emotions of patients on MMT

5.3.1 Prevalence of positive emotions among patients on MMT

Based on the Positive Emotions Rating Scale, slightly more than half scored above 30 (50.6%) indicating a good range of positive emotions among the methadone patients, while the rest 49.4% had less positive emotions. For individual items, in the PERS questionnaire, the mean was as the table below. Each item can be scored within the scale of 1 to 5. 50% of the patients had scored 3 for each item and the other 50% scored 4.

University of Malaya

Table 5.3: Positive emotions of patients on MMT

	Mean (SD)	n (%)
Positive emotions*	29.1 (6.23)	
Score < 30		76 (49.4)
Score >= 30		78 (50.6)

*Positive emotions: <30: poor positive emotions, >= 30 good positive emotions (Guan et al., 2016)

Table 5.4: Individual items on PERS

Items	Mean (SD)	N
Item 1 (food)	4 (1.06)	154
Item 2 (scenery)	3(1.07)	154
Item 3 (activities)	3(1.13)	154
Item 4 (hobbies)	3 (1.10)	154
Item 5 (love)	4(1.09)	154
Item 6 (thankful)	4 (0.99)	154
Item 7 (energetic)	3 (1.02)	154
Item 8 (proud)	4 (1.04)	154
Total	29.05 (6.23)	154

University of Malaya

5.3.2 Factors associated with positive emotions

When examining the association between demographic variables and positive emotions, initially Kolmogorov– Smirnov test used to look for the distribution to see if it was normally distributed.

As for the association between age and positive emotions the independent t test was used as the data was normally distributed. However there was no significant relationship between both the variables.

University of Malaya

Table 5.5: Association between age with positive emotions of patients on methadone

Variables	N	%	Positive emotions Mean (SD)	P value[a]
Age*				
< 43.8 years old	87	56.5	29.22 (6.44)	0.696
>43.8 years old	67	43.5	28.82 (5.99)	

[a] Independent t test
*Mean age

University of Malaya

For the association between gender and positive emotions, Independent T test was used as it was normally distributed. The results were not statistically significant. However, the mean of positive emotions for male were higher (M=29.09) compared to women (M=27.25).

University of Malaya

Table 5.6: Association between gender with positive emotions of patients on methadone

Variables	N	%	Positive emotions Mean (SD)	P value[a]
Male Female	150 4	97.4 2.6	29.09 (6.21) 27.25 (7.41)	0.731

[a] Independent t test

University of Malaya

For the association between ethnicity and positive emotions, Mann Whitney U test was used as it was not normally distributed. The results indicate a statistically significant association between the Malays and non-Malays ($p=0.042$) and Chinese and non- Chinese ($p=0.004$) with the Malays having the highest mean positive emotions.

University of Malaya

Table 5.7: Association between ethnicity with positive emotions of patients on methadone

Variables	N	%	Positive emotion Mean (SD)	Median (IQR*)	P value[a]
Ethnicity					
Malay	116	75.3%	29.6 (6.35)	30.5 (10)	0.042
Non Malay	38	24.7%	27.3 (5.57)	27.0 (7)	
Chinese	21	13.6%	25.5 (4.69)	26.0 (6)	0.004
Non Chinese	133	86.4%	29.60 (6.28)	30.0 (10)	
Indian	17	11.0%	29.4 (5.95)	30.0 (7)	0.757
Non Indian	137	89.0%	29.0 (6.29)	29.0 (10)	

[a] Mann Whitney U
* Interquartile range (IQR)

University of Malaya

When examining the association between marital status and employment with positive emotions the distribution was not normally distributed for marital status and normally distributed for employment. Therefore, for marital status Mann Whitney U test was used and for employment Independent t test was used. Both the results showed that there was a significant difference in marital and employment status.

For marital status, there was a significant difference (p=0.010) with the patients who are married having a higher mean of positive emotions (M =30.2, SD = 6.18) compared to the non- married (M = 27.7, SD = 6.05). The table below also shows the distribution of employment status with patient's positive emotions. The results showed significant difference (p = 0.008) with the mean of patients, employed (M=29.7, SD = 6.10), having significantly higher positive emotions compared to patients who were not employed (M=26.2, SD = 6.18).

University of Malaya

Table 5.8: Association between marital status and employment with positive emotions of patients on methadone

Variables	N	%	Positive emotions Mean (SD)	Median (IQR*)	P value[a]
Marital status					
Married	84	54.5%	30.2 (6.18)	31.0 (10)	0.010[b]
Non married	70	45.5%	27.7 (6.05)	27.0 (8)	
Employment					
Not employed	27	17.5%	26.2 (6.18)		0.008
Employed	127	82.5%	29.7 (6.10)		

[a] Independent t test
[b] Mann Whitney U

University of Malaya

Independent t test was used to assess the relationship between the duration of the years the patient was on methadone and positive emotions. There was a statistically positive association (p=0.021) between the two, with a higher mean in positive emotions in patients who were in the program for more than 1 year (M=29.38, SD=6.21), compared to those who in the program for less than 1 year (M=25.08, SD=. 5.18).

University of Malaya

Table 5.9: Association between duration of methadone with positive emotions of patients on methadone treatment

Variables	N	%	Positive emotions Mean (SD)	P value[a]
Duration (years)				
<1	12	7.8	25.08 (5.18)	0.021
>1	142	92.2	29.38 (6.21)	

[a] Independent t test

*Duration more than 1 year more favorable outcomes (Devi, Azriani, Wan, Ariff, & Hashimah, 2012)

University of Malaya

When examining the association between comorbid medical illness and blood borne- infections with positive emotions, the independent t test was used. The independent t test indicated that having a comorbid medical illness did not have a significant associated with positive emotions, as seen in the table below ($p > 0.05$).

From the table as well, this was similarly seen with blood borne infections such as HIV and hepatitis ($p > 0.05$).

University of Malaya

Table 5.10: Association between comorbid medical illness, blood borne infections and positive emotions of patients on methadone treatment

Variables	N	%	Positive emotions Mean (SD)	Median (IQR*)	P value[a]
Diabetes mellitus					
Yes	10	6.5	28.0 (4.55)	28.0 (9)	0.584[b]
No	144	93.5	29.1 (6.34)	30.0 (10)	
Hypertension					
Yes	15	9.7	29.1 (6.46)		0.989
No	139	90.3	29.0 (6.23)		
Hyperlipidemia					
Yes	2	1.3	25.5 (2.12)	25.5	0.342[b]
No	152	98.7	29.1 (6.26)	30.0 (9)	
Bronchial asthma					
Yes	9	5.8	27.2 (6.72)		0.367
No	145	94.2	29.2 (6.21)		
Hepatitis					
Yes	67	43.5	29.3 (6.02)		0.717
No	87	56.5	28.9 (6.42)		
Status HIV					
Yes	11	7.1	27.8 (7.05)		0.500
No	143	92.9	29.1 (6.18)		
Others					
Yes	7	4.5	29.9 (8.82)		0.726
No	147	95.5	29.0 (6.12)		

[a] Independent t test
[b] Mann Whitney U
*Interquartile range (IQR)

University of Malaya

An Independent t test was used, as the data was found to be normally distributed, to examine the association between the methadone dosage and the positive emotions. The results however were found to be insignificant (p=0.745).

University of Malaya

Table 5.11: Association between methadone dosages with positive emotions of patients with methadone treatment

Variables	N	Positive emotions Mean (SD)	*P* value[a]
Methadone Dosage* < 40 >= 40	 37 117	28.76 (5.93)	0.748

[a] Independent t test

*Methadone dosing: mild: <40, moderate to high: >=40 (Strain, E. C., Bigelow, G. E., Liebson, I. A., & Stitzer, 1999)

University of Malaya

There is no statistically significant association between concurrent substance abuse (i.e. tobacco, alcohol, benzodiazepine, stimulants and heroine) with positive emotions ($p > 0.05$) except for cannabis use ($p=0.042$). Concurrent use of cannabis had a significantly higher mean of positive emotions ($M=33.0$, $SD= 6.41$) compared to the patients who were not taking cannabis ($M=28.8$, $SD= 6.17$).

University of Malaya

Table 5.12: Association between concurrent substance abuse with positive emotions of patients on methadone treatment

Variables	N	%	Positive emotions Mean (SD)	Median (IQR*)	P value[a]
Tobacco					
Yes	148	96.1	29.1 (6.24)	29.5 (9)	0.929[b]
No	6	3.9	28.3 (6.56)	28.3 (11)	
Alcohol					
Yes	18	11.7	26.5 (7.38)		0.065
No	136	88.3	29.4 (6.01)		
Benzodiazepine					
Yes	9	5.8	26.4 (5.18)	30.0 (10)	0.214[b]
No	145	94.2	29.2 (6.27)	27.0 (8)	
Cannabis					
Yes	8	5.2	33.0 (6.41)	33.5 (6)	0.042[b]
No	146	94.8	28.8 (6.17)	29.0 (9)	
Stimulants					
Yes	13	8.4	27.9 (6.30)	27.0 (9)	0.441[b]
No	141	91.6	29.2 (6.24)	30.0 (9)	
Heroine					
Yes	13	8.4	27.1 (7.38)		0.235
No	141	91.6	29.2 (6.11)		

[a] Independent t test
[b] Mann Whitney U
*Interquartile range (IQR)

University of Malaya

5.4 Quality of life among patients on MMT

Mean scores of quality of life for each domain of WHOQOL-BREF was computed for all patients. The higher the mean scores the better the quality of life of the patient.

University of Malaya

Table 5.12: Quality of life among patients on Methadone Maintenance Therapy

WHOQOL-BREF domains	Mean (SD)
Physical health	25.3 (3.62)
Psychological	21.5 (4.00)
Social relationship	11.0 (3.00)
Environment	28.3 (4.32)
Overall quality of life	3.5 (0.74)
Overall general health	3.7 (0.80)

University of Malaya

5.4.1 Factors associated with physical health domain of quality of life among patients on methadone treatment

When examining the association between demographic and clinical variables and the physical domain of quality of life, chi square analysis was used for categorical data. There was a significant difference in positive emotions ($x2 = 30.39$, $p < 0.01$) with 46.8 % of them scoring above the mean score of 25.29, indicating a significant association between positive emotions and the physical health domain. As for employment there was also a significant association ($x2 = 30.39$, $p \leq 0.05$), with 29.6% of the unemployed patients scoring above the mean score of 25.29 and 50.4% of the employed patients scoring above 25.29. These results show that among the employed there is a higher percentage of patients with a higher mean of score in the physical domain and among the unemployed there is a higher percentage with a scoring lower than the average mean.

In terms of concurrent substance use only stimulants ($x2 = 5.16$, $p<0.05$) and heroine ($x2= 8.70$, $p<0.01$) had significant associations with the same domain. Among those who were not taking stimulant, almost half of the patients (49.6%) scored above the average mean, M=25.29, and among the stimulant users, only 15.4% scored above the average mean. The results for concurrent heroin use was almost similar with 50.4% of the non-heroin users scoring higher than the mean and only 7.7% of heroin users scoring above the mean. No relationship was found between the rest of the factors and the physical health domain.

University of Malaya

Table 5.13: Factors associated to the physical health domain of quality of life among patients on methadone treatment

Category	Factors	Physical health n (%)		χ^2	Odds Ratio	P value
		<25.29	≥25.29			
Main factor	PERS	82 (53.2)	72 (46.8)	30.393[a]	1.228	< 0.01
Social demographic	Age	82 (53.2)	72 (46.8)	0.146[a]	1.007	0.703
	Gender					
	Male	79 (52.7)	71 (47.3)	0.781[b]	0.371	0.623[c]
	Female	3 (75.0)	1 (25.0)			
	Ethnicity					
	Malay	63 (54.3)	53 (45.7)	0.214[b]	1.189	0.644
	Non-Malay	19 (50.0)	19 (50.0)			
	Chinese	12 (57.1)	9 (42.9)	0.148[b]	1.200	0.700
	Non-Chinese	70 (52.6)	63 (47.4)			
	Indian	7 (41.2)	10 (58.8)	1.118[b]	0.579	0.290
	Non-Indian	75 (54.7)	62 (45.3)			
	Marital status					
	Yes	42 (50.0)	42 (50.0)	0.783[b]	0.750	0.376
	No	40 (57.1)	30 (42.9)			
	Employment*					
	unemployed	19 (70.4)	8 (29.6)	3.856[b]	2.413	≤ 0.05
	employed	63 (49.6)	64 (50.4)	3.709[a]		0.054
	Family history					
	Yes	9 (40.9)	13 (59.1)	1.569[b]	0.560	0.210
	No	73 (55.3)	59 (44.7)			
Clinical	Methadone					
	< 40 mg	17 (45.9)	20 (54.1)	1.043[b]	0.680	0.307
	≥ 40 mg	65 (55.6)	52 (44.4)			
	Duration of illness (years)	82 (53.2)	72 (46.8)	0.307[a]	0.973	0.580
	Tobacco					
	Yes	79 (53.4)	69 (46.6)	0.026[b]	1.145	1.000[c]
	No	3 (50.0)	3 (50.0)			
	Alcohol					
	Yes	11 (61.1)	7 (38.9)	0.506[b]	1.439	0.477
	No	71 (52.2)	65 (47.8)			
	Benzodiazepine					
	Yes	7 (77.8)	2 (22.2)	2.311[b]	3.267	0.175[c]

University of Malaya

No	75 (51.7)	70 (48.3)			
Cannabis					
Yes	6 (75.0)	2 (25.0)	1.604[b]	2.763	0.285[c]
No	76 (52.1)	70 (47.9)			
Stimulants					
Yes	11 (84.6)	2 (15.4)	5.612[b]	5.423	< 0.05
No	71 (50.4)	70 (49.6)			
Heroine					
Yes	12 (92.3)	1 (7.7)	8.702[b]	12.171	< 0.01
No	70 (49.6)	71 (50.4)			
Diabetic					
Mellitus	8 (80.0)	2 (20.0)	3.075[b]	3.784	0.105[c]
Yes	74 (51.4)	70 (48.6)			
No					
Hypertension					
Yes	10 (66.7)	5 (33.3)	1.202[b]	1.861	0.273
No	72 (51.8)	67 (48.2)			
Hyperlipidemia					
Yes	2 (100.0)	0	1.779[b]	1.900[d]	0.499[c]
No	80 (52.6)	72 (47.4)			
Bronchial					
Asthma	4 (44.4)	5 (55.6)	0.297[b]	0.687	0.735[c]
Yes	78 (53.8)	67 (46.2)			
No					
Others					
Yes	4 (57.1)	3 (42.9)	0.045[b]	1.179	1.000[c]
No	78 (53.1)	69 (46.9)			
Hepatitis					
Positive	37 (55.2)	30 (44.8)	0.186[b]	1.151	0.666
Negative	45 (51.7)	42 (48.3)			
HIV					
Positive	6 (54.5)	5 (45.5)	0.008[b]	1.058	0.929
Negative	76 (53.1)	67 (46.9)			

a = Wald's chi square
b = Pearson's chi square
c = Fischer's exact test
d = Risk for cohort with psychological scores less than 25.29 (mean)
* = Cross-checked with single factor logistic regression for the validity of p value.
Note = for continuous type data (PERS, age and duration of illness [years]), Wald's chi square in logistic regression is used instead of Pearson's chi square.

University of Malaya

5.4.2 Factors associated with psychological domain of quality of life among patients on methadone treatment

Using the univariate analysis, Chi square analysis was used as it was a categorical data, positive emotions ($x2 = 38.95$, $p < 0.01$), the Malay ethnic group ($x2 = 3.84$, $p \leq 0.05$), Chinese ethnic group ($x2 = 8.46$, $p < 0.01$), marital status ($x2 = 13.37$, $p < 0.01$) and employment ($x2 = 7.34$, $p < 0.01$) were significantly associated with the psychological domain of quality of life.

More than half, 53.2% of patients with good positive emotions scored above the average mean of the psychological domain (M=21.47). Among the Malays, 57.8% of them had scores higher than the mean where-else among the Chinese, 23.8% had scored ≥ 21.47. As for the married group of patients, more than half of them, 66.7% scored ≥ 21.47, only 37.1% of the non- married scored ≥ 21.47. Finally, in the employment status category, 58.3% among the employed group had higher scores than the mean and 29.6% of the unemployed group had similar scores.

The rest were not significantly associated with the psychological domain.

University of Malaya

Table 5.14: Factors associated with psychological domain of quality of life among patients on methadone treatment

Category	Factors	Psychological n (%)		χ^2	Odds Ratio	P value
		< 21.47	≥ 21.47			
Main factor	PERS	72 (46.8)	82 (53.2)	38.947[a]	1.349	< 0.01
Social demographic	Age	72 (46.8)	82 (53.2)	1.199[a]	0.980	0.274
	Gender					
	Male	71 (47.3)	79 (52.7)	0.781[b]	2.696	0.623[c]
	Female	1 (25.0)	3 (75.0)			
	Ethnicity					
	Malay*	49 (42.2)	67 (57.8)	3.844[b]	0.477	≤ 0.05
	Non-Malay*	23 (60.5)	15 (39.5)	3.767[a]		0.052
	Chinese	16 (76.2)	5 (23.8)	8.464[b]	4.400	< 0.01
	Non-Chinese	56 (42.1)	77 (57.9)			
	Indian	7 (41.2)	10 (58.8)	0.239[b]	0.775	0.625
	Non-Indian	65 (47.4)	72 (52.6)			
	Marital status					
	Yes	28 (33.3)	56 (66.7)	13.369[b]	0.295	< 0.01
	No	44 (62.9)	26 (37.1)			
	Employment					
	unemployed	19 (70.4)	8 (29.6)	7.336[b]	3.316	< 0.01
	employed	53 (41.7)	74 (58.3)			
	Family history					
	Yes	7 (31.8)	15 (68.2)	2.300[b]	0.481	0.129
	No	65 (49.2)	67 (50.8)			
Clinical	Methadone					
	< 40 mg	17 (45.9)	20 (54.1)	0.013[b]	0.958	0.910
	≥ 40 mg	55 (47.0)	62 (53.0)			
	Duration of illness (years)	72 (46.8)	82 (53.2)	1.050[a]	1.052	0.305
	Tobacco					
	Yes	69 (46.6)	79 (53.4)	0.026[b]	0.873	1.000[c]
	No	3 (50.0)	3 (50.0)			
	Alcohol					
	Yes	11 (61.1)	7 (38.9)	1.688[b]	1.932	0.194
	No	61 (44.9)	75 (55.1)			
	Benzodiazepine					
	Yes	7 (77.8)	2 (22.2)	3.696[b]	4.308	0.083[c]
	No	65 (44.8)	80 (55.2)			

University of Malaya

Cannabis					
Yes	2 (25.0)	6 (75.0)	1.604[b]	0.362	0.285[c]
No	70 (47.9)	76 (52.1)			
Stimulants					
Yes	8 (61.5)	5 (38.5)	1.247[b]	1.925	0.264
No	64 (45.4)	77 (54.6)			
Heroine					
Yes	9 (69.2)	4 (30.8)	2.882[b]	2.786	0.090
No	63 (44.7)	78 (55.3)			
Diabetic					
Mellitus	5 (50.0)	5 (50.0)	0.045[b]	1.149	1.000[c]
Yes	67 (46.5)	77 (53.5)			
No					
Hypertension					
Yes	7 (46.7)	8 (53.3)	0.000[b]	0.996	0.994
No	65 (46.8)	74 (53.2)			
Hyperlipidemi					
a	2 (100.0)	0	2.308[b]	2.171[d]	0.217[c]
Yes	70 (46.1)	82 (53.9)			
No					
Bronchial					
Asthma	4 (44.4)	5 (55.6)	0.020[b]	0.906	1.000[c]
Yes	68 (46.9)	77 (53.1)			
No					
Others					
Yes	2 (28.6)	5 (71.4)	0.974[b]	0.440	0.449[c]
No	70 (47.6)	77 (52.4)			
Hepatitis					
Positive	30 (44.8)	37 (55.2)	0.186[b]	0.869	0.666
Negative	42 (48.3)	45 (51.7)			
HIV					
Positive	7 (63.6)	4 (36.4)	1.356[b]	2.100	0.244
Negative	65 (45.5)	78 (54.5)			

a = Wald's chi square
b = Pearson's chi square
c = Fischer's exact test
d = Risk for cohort with psychological scores less than 21.47 (mean)
* = Cross-checked with single factor logistic regression for the validity of p value.
Note = For continuous type data (PERS, age and duration of illness[years]), Wald's chi square in logistic regression is used instead of Pearson's chi square.

University of Malaya

5.4.3 Factors associated with social relationships domain of quality of life among patients on methadone treatment

The chi square analysis was used when examining the association between the various factors and the domain of social relationship in the quality of life. There was significant association in the positive emotions ($x2 = 23.78$, $p < 0.01$), with 51.3% scoring same or more than the mean score of 10.69. Ethnicity, the Malays, ($x2 = 7.85$, $p < 0.01$) and Chinese ($x2 = 5.03$, $p < 0.05$) respectively, had significant association with 57.8% of the Malays, 28.6% of the Chinese, scoring ≥ 10.69. In the employment status category, there was also significant association patients ($x2 = 4.23$, $p < 0.05$). Patients who were employed and scored ≥ 10.69% was 55.1% and patients who were unemployed and scored≥ 10.69 was 33.3%.

Among the clinical variables, alcohol ($x2 = 4.51$), stimulant ($x2 = 4.53$) and heroine ($x2 = 4.53$) had a significant association ($p <0.05$) with the same domain. Of the alcohol users, 27.8% scored ≥ the mean and of the non-alcohol users, 55.4% scored ≥ the mean. As for those patients who were not taking heroin and stimulants, 53.9% scored better in the social relationship domain, ≥ 10.69.

University of Malaya

Table 5.15: Factors associated with social relationship domain of quality of life among patients on methadone treatment

Category	Factors	Social relationship n (%)		χ^2	Odds Ratio	P value
		< 10.69	≥ 10.69			
Main factor	PERS	75 (48.7)	79 (51.3)	23.779[a]	1.175	< 0.01
Social demographic	Age	75 (48.7)	79 (51.3)	3.080[a]	0.968	0.079
	Gender					
	Male	73 (48.7)	77 (51.3)	0.003[b]	0.948	1.000[c]
	Female	2 (50.0)	2 (50.0)			
	Ethnicity					
	Malay	49 (42.2)	67 (57.8)	7.852[b]	0.338	< 0.01
	Non-Malay	26 (68.4)	12 (31.6)			
	Chinese	15 (71.4)	6 (28.6)	5.027[b]	3.042	< 0.05
	Non-Chinese	60 (45.1)	73 (54.9)			
	Indian	11 (64.7)	6 (35.3)	1.959[b]	2.091	0.162
	Non-Indian	64 (46.7)	73 (53.3)			
	Marital status					
	Yes	37 (44.0)	47 (56.0)	1.602[b]	0.663	0.206
	No	38 (54.3)	32 (45.7)			
	Employment					
	unemployed	18 (66.7)	9 (33.3)	4.230[b]	2.456	< 0.05
	employed	57 (44.9)	70 (55.1)			
	Family history					
	Yes	9 (40.9)	13 (59.1)	0.624[b]	0.692	0.430
	No	66 (50.0)	66 (50.0)			
Clinical	Methadone					
	< 40 mg	18 (48.6)	19 (51.4)	0.000[b]	0.997	0.994
	≥ 40 mg	57 (48.7)	60 (51.3)			
	Duration of illness (years)	75 (48.7)	79 (51.3)	0.792[a]	1.045	0.374
	Tobacco					
	Yes	73 (49.3)	75 (50.7)	0.590[b]	1.947	0.682[c]
	No	2 (33.3)	4 (66.7)			
	Alcohol					
	Yes	13 (72.2)	5 (27.8)	4.514[b]	3.103	< 0.05
	No	62 (45.6)	74 (54.4)			
	Benzodiazepine					
	Yes	7 (77.8)	2 (22.2)	3.235[b]	3.963	0.092[c]
	No	68 (46.9)	77 (53.1)			

University of Malaya

Cannabis					
Yes	5 (62.5)	3 (37.5)	0.643[b]	1.810	0.487[c]
No	70 (47.9)	76 (52.1)			
Stimulants					
Yes	10 (76.9)	3 (23.1)	4.527[b]	3.897	< 0.05
No	65 (46.1)	76 (53.9)			
Heroine					
Yes	10 (76.9)	3 (23.1)	4.527[b]	3.897	< 0.05
No	65 (46.1)	76 (53.9)			
Diabetic Mellitus					
Yes	6 (60.0)	4 (40.0)	0.546[b]	1.630	0.526[c]
No	69 (47.9)	75 (52.1)			
Hypertension					
Yes	10 (66.7)	5 (33.3)	2.147[b]	2.277	0.143
No	65 (46.8)	74 (53.2)			
Hyperlipidemia					
Yes	2 (100.0)	0	2.134[b]	2.082[d]	0.236[c]
No	73 (48.0)	79 (52.0)			
Bronchial					
Asthma	6 (66.7)	3 (33.3)	1.235[b]	2.203	0.319[c]
Yes	69 (47.6)	76 (52.4)			
No					
Others					
Yes	4 (57.1)	3 (42.9)	0.209[b]	1.427	0.714[c]
No	71 (48.3)	76 (51.7)			
Hepatitis					
Positive	28 (41.8)	39 (58.2)	2.267[b]	0.611	0.132
Negative	47 (54.0)	40 (46.0)			
HIV					
Positive	6 (54.5)	5 (45.5)	0.162[b]	1.287	0.687
Negative	69 (48.3)	74 (51.7)			

a = Wald's chi square
b = Pearson's chi square
c = Fischer's exact test
d = Risk for cohort with social relationship scores less than 10.69 (mean)
Note = for continuous type data (PERS, age and duration of illness [years]), Wald's chi square is used instead of Pearson's chi square.

University of Malaya

5.4.4 Factors associated with environment domain of quality of life among patients on methadone treatment

On univariate analysis, Chi square analysis, only positive emotions ($x2 = 38.65$, $p < 0.01$) and marital status ($x2 = 3.89$, $p < 0.05$) were significantly associated with the environment domain of quality of life. There was no other significant associations.

In the positive emotions category, 48.7% scored ≥than the average mean of this domain, 28.34. As for marital status, like the previous other domains, married individuals, 56% of them scored a better score compared to the non-married individuals, who only had 28% of them scoring ≥ 28.34.

University of Malaya

Table 5.16: Factors associated with environment domain of quality of life among patients on methadone treatment

Category	Factors	Environment n (%)		χ^2	Odds Ratio	P value
		< 28.34	≥ 28.34			
Main factor	PERS	79 (51.3)	75 (48.7)	38.654[a]	1.345	< 0.01
Social demographic	Age	79 (51.3)	75 (48.7)	0.054[a]	0.996	0.816
	Gender					
	Male	76 (50.7)	74 (49.3)	0.923[b]	0.342	0.621[c]
	Female	3 (75.0)	1 (25.0)			
	Ethnicity					
	Malay	59 (50.9)	57 (49.1)	0.036[b]	0.932	0.850
	Non-Malay	20 (52.6)	18 (47.4)			
	Chinese	14 (66.7)	7 (33.3)	2.299[b]	2.092	0.129
	Non-Chinese	65 (48.9)	68 (51.1)			
	Indian	6 (35.3)	11 (64.7)	1.959[b]	0.478	0.162
	Non-Indian	73 (53.3)	64 (46.7)			
	Marital status*					
	Yes	37 (44.0)	47 (56.0)	3.889[b]	0.525	< 0.05
	No	42 (60.0)	28 (40.0)	3.855[a]		≤ 0.05
	Employment					
	unemployed	17 (63.0)	10 (37.0)	1.783[b]	1.782	0.182
	employed	62 (48.8)	65 (51.2)			
	Family history					
	Yes	11 (50.0)	11 (50.0)	0.017[b]	0.941	0.895
	No	68 (51.5)	64 (48.5)			
Clinical	Methadone					
	< 40 mg	18 (48.6)	19 (51.4)	0.137[b]	0.870	0.711
	≥ 40 mg	61 (52.1)	56 (47.9)			
	Duration of illness (years)	79 (51.3)	75 (48.7)	2.371[a]	1.080	0.124
	Tobacco					
	Yes	77 (52.0)	71 (48.0)	0.807[b]	2.169	0.434[c]
	No	2 (33.3)	4 (66.7)			
	Alcohol					
	Yes	11 (61.1)	7 (38.9)	0.786[b]	1.571	0.375
	No	68 (50.0)	68 (50.0)			
	Benzodiazepine					
	Yes	6 (66.7)	3 (33.3)	0.904[b]	1.973	0.496[c]
	No	73 (50.3)	72 (49.7)			

University of Malaya

Cannabis					
Yes	3 (37.5)	5 (62.5)	0.643[b]	0.553	0.487[c]
No	76 (52.1)	70 (47.9)			
Stimulants					
Yes	9 (69.2)	4 (30.8)	1.828[b]	2.282	0.176
No	70 (49.6)	71 (50.4)			
Heroine					
Yes	9 (69.2)	4 (30.8)	1.828[b]	2.282	0.176
No	70 (49.6)	71 (50.4)			
Diabetic					
Mellitus	5 (50.0)	5 (50.0)	0.007[b]	0.946	1.000[c]
Yes	74 (51.4)	70 (48.6)			
No					
Hypertension					
Yes	9 (60.0)	6 (40.0)	0.504[b]	1.479	0.478
No	70 (50.4)	69 (49.6)			
Hyperlipidemia					
Yes	2 (100.0)	0	1.924[b]	1.974[d]	0.497[c]
No	77 (50.7)	75 (49.3)			
Bronchial					
Asthma	6 (66.7)	3 (33.3)	0.904[b]	1.973	0.496[c]
Yes	73 (50.3)	72 (49.7)			
No					
Others					
Yes	3 (42.9)	4 (57.1)	0.209[b]	0.701	0.714[c]
No	76 (51.7)	71 (48.3)			
Hepatitis					
Positive	33 (49.3)	34 (50.7)	0.199[b]	0.865	0.656
Negative	46 (52.9)	41 (47.1)			
HIV					
Positive	7 (63.6)	4 (36.4)	0.722[b]	1.726	0.396
Negative	72 (50.3)	71 (49.7)			

a = Wald's chi square
b = Pearson's chi square
c = Fischer's exact test
d = Risk for cohort with social relationship scores less than 28.34 (mean)
* = Cross-checked with single factor logistic regression for significant validity
Note = For continuous type data (PERS, age and duration of illness[years]), Wald's chi square is used instead of Pearson's chi square.

University of Malaya

5.4.5 Factors associated with overall quality of life among patients on methadone treatment

Using the Chi square analysis, there was a significant association ($p < 0.01$) among firstly positive emotions ($x2 = 29.07$), the Malays ($x2 = 7.05$), Chinese ($x2 = 13.60$), marital status ($x2 = 7.49$) and family history of mental illness ($x2 = 7.24$) and the overall quality of life. For patients with good positive emotions 93% of them scored ≥ 3.73. As for the ethnic group, 77% of the Malays, 45% of the Chinese scored equal or above the mean scoring. Again, married patients scored better, with 70.2% of them having scores ≥ 3.73. Patients with family history of mental illness, 86.4% had $\geq$ mean scores and those who had no family history, 56.1% $\geq$ had mean scores. Being employed ($x2 = 5.28$), and not consuming alcohol ($x2 = 3.94$), was significantly associated with a higher overall quality of life ($p < 0.05$). 64.6% employed patients and 63.2% of patients who don't consume alcohol have scores ≥ 3.73.

University of Malaya

Table 5.17: Factors associated to overall quality of life among patients on methadone treatment

Category	Factors	Overall quality of life n (%)		χ^2	Odds Ratio	P value
		< 3.73	≥ 3.73			
Main factor	PERS	61 (39.6)	93 (60.4)	29.070[a]	1.221	< 0.01
Social demographic	Age	61 (39.6)	93 (60.4)	3.187[a]	0.967	0.074
	Gender					
	Male	59 (39.3)	91 (60.7)	0.185[b]	0.648	0.649[c]
	Female	2 (50.0)	2 (50.0)			
	Ethnicity					
	Malay	39 (33.6)	77 (66.4)	7.051[b]	0.368	< 0.01
	Non-Malay	22 (57.9)	16 (42.1)			
	Chinese	16 (76.2)	45 (33.8)	13.602[b]	6.258	< 0.01
	Non-Chinese	45 (33.8)	88 (66.2)			
	Indian	6 (35.3)	11 (64.7)	0.149[b]	0.813	0.700
	Non-Indian	55 (40.1)	82 (59.9)			
	Marital status					
	Yes	25 (29.8)	59 (70.2)	7.493[b]	0.400	< 0.01
	No	36 (51.4)	34 (48.6)			
	Employment					
	unemployed	16 (59.3)	11 (40.7)	5.284[b]	2.651	< 0.05
	employed	45 (35.4)	82 (64.6)			
	Family history					
	Yes	3 (13.6)	19 (86.4)	7.239[b]	0.201	< 0.01
	No	58 (43.9)	74 (56.1)			
Clinical	Methadone					
	< 40 mg	15 (40.5)	22 (59.5)	0.018[b]	1.052	0.894
	≥ 40 mg	46 (39.3)	71 (60.7)			
	Duration of illness (years)	61 (39.6)	93 (60.4)	1.751[a]	1.070	0.186
	Tobacco					
	Yes	59 (39.9)	89 (60.1)	0.103[b]	1.326	1.000[c]
	No	2 (33.3)	4 (66.7)			
	Alcohol*					
	Yes	11 (61.1)	7 (38.9)	3.939[b]	2.703	< 0.05
	No	50 (36.8)	86 (63.2)	3.725[a]		0.054
	Benzodiazepine					
	Yes	6 (66.7)	3 (33.3)	2.925[b]	3.273	0.156[c]
	No	55 (37.9)	90 (62.1)			

University of Malaya

Cannabis					
Yes	2 (25.0)	6 (75.0)	0.753[b]	0.492	0.480[c]
No	59 (40.4)	87 (59.6)			
Stimulants					
Yes	8 (61.5)	5 (38.5)	2.854[b]	2.657	0.091
No	53 (37.6)	88 (62.4)			
Heroine					
Yes	7 (53.8)	6 (46.2)	1.203[b]	1.880	0.273
No	54 (38.3)	87 (61.7)			
Diabetic					
Mellitus	4 (40.0)	6 (60.0)	0.001[b]	1.018	1.000[c]
Yes	57 (39.6)	87 (60.4)			
No					
Hypertension					
Yes	6 (40.0)	9 (60.0)	0.001[b]	1.018	0.974
No	55 (39.6)	84 (60.4)			
Hyperlipidemia					
Yes	1 (50.0)	1 (50.0)	0.091[b]	1.533	1.000[c]
No	60 (39.5)	92 (60.5)			
Bronchial					
Asthma	3 (33.3)	6 (66.7)	0.157[b]	0.750	1.000[c]
Yes	58 (40.0)	87 (60.0)			
No					
Others					
Yes	2 (28.6)	5 (71.4)	0.374[b]	0.597	0.704[c]
No	59 (40.1)	88 (59.9)			
Hepatitis					
Positive	25 (37.3)	42 (62.7)	0.262[b]	0.843	0.609
Negative	36 (41.4)	51 (58.6)			
HIV					
Positive	6 (54.5)	5 (45.5)	1.105[b]	1.920	0.346[c]
Negative	55 (38.5)	88 (61.5)			

a = Wald's chi square
b = Pearson's chi square
c = Fischer's exact test
* = Cross-checked with single factor logistic regression for significant validity
Note = For continuous type data (PERS, age and duration of illness[years]), Wald's chi square is used instead of Pearson's chi square.

University of Malaya

5.4.6 Factors associated with general health among patients on methadone treatment.

A chi-square test was performed and no relationship was found except in a few categories. One of it was in the positive emotions ($x2 = 20.76$, $p < 0.01$) which reveals a significant association with the general health among patients taking methadone, out of which 83% of them have ≥ mean score, 3.54. The Chinese ethnic group ($x2 = 8.86$, $p < 0.01$), marital status ($x2 = 6.29$, $p < 0.05$) and not having diabetes mellitus ($x2 = 8.29$, $p < 0.01$) have significant association with this domain as well. 23.8% of the Chinese patients, 63.1% of married patients and 56.9% of non-diabetic patients have equal or better mean scores.

University of Malaya

Table 5.18: Factors associated with general health among patients on methadone treatment

Category	Factors	General health n (%)		χ^2	Odds Ratio	P value
		< 3.54	≥ 3.54			
Main factor	PERS	71 (46.1)	83 (53.9)	20.763[a]	1.156	< 0.01
Social demographic	Age	71 (46.1)	83 (53.9)	0.310[a]	0.990	0.578
	Gender					
	Male	69 (46.0)	81 (54.0)	0.025[b]	0.852	1.000[c]
	Female	2 (50.0)	2 (50.0)			
	Ethnicity					
	Malay	49 (42.2)	67 (57.8)	2.823[b]	0.532	0.093
	Non-Malay	22 (57.9)	16 (42.1)			
	Chinese	16 (76.2)	5 (23.8)	8.858[b]	4.538	< 0.01
	Non-Chinese	55 (41.4)	78 (58.6)			
	Indian	6 (35.3)	11 (64.7)	0.899[b]	0.604	0.343
	Non-Indian	65 (47.4)	72 (52.6)			
	Marital status					
	Yes	31 (36.9)	53 (63.1)	6.294[b]	0.439	< 0.05
	No	40 (57.1)	30 (42.9)			
	Employment					
	unemployed	15 (55.6)	12 (44.4)	1.177[b]	1.585	0.278
	employed	56 (44.1)	71 (55.9)			
	Family history					
	Yes	8 (36.4)	14 (63.6)	0.980[b]	0.626	0.322
	No	63 (47.7)	69 (52.3)			
Clinical	Methadone					
	< 40 mg	13 (35.1)	24 (64.9)	2.358[b]	0.551	0.125
	≥ 40 mg	58 (49.6)	59 (50.4)			
	Duration of illness (years)	71 (46.1)	83 (53.9)	2.275[a]	1.079	0.131
	Tobacco					
	Yes	68 (45.9)	80 (54.1)	0.038[b]	0.850	1.000[c]
	No	3 (50.0)	3 (50.0)			
	Alcohol					
	Yes	9 (50.0)	9 (50.0)	0.125[b]	1.194	0.724
	No	62 (45.6)	74 (54.4)			
	Benzodiazepine					
	Yes	4 (44.4)	5 (55.6)	0.011[b]	0.931	1.000[c]
	No	67 (46.2)	78 (53.8)			

University of Malaya

Cannabis					
Yes	1 (12.5)	7 (87.5)	3.835[b]	0.155	0.070[c]
No	70 (47.9)	76 (52.1)			
Stimulants					
Yes	8 (61.5)	5 (38.5)	1.361[b]	1.981	0.243
No	63 (44.7)	78 (55.3)			
Heroine					
Yes	6 (46.2)	7 (53.8)	0.000[b]	1.002	0.997
No	65 (46.1)	76 (53.9)			
Diabetic					
Mellitus	9 (90.0)	1 (10.0)	8.293[b]	11.903	< 0.01[c]
Yes	62 (43.1)	82 (56.9)			
No					
Hypertension					
Yes	9 (60.0)	6 (40.0)	1.291[b]	1.863	0.256
No	62 (44.6)	77 (55.4)			
Hyperlipidemia					
Yes	0	2 (100.0)	1.733[b]	1.877[d]	0.500[c]
No	71 (46.7)	81 (53.3)			
Bronchial					
Asthma	5 (55.6)	4 (44.4)	0.344[b]	1.496	0.733[c]
Yes	66 (45.5)	79 (54.5)			
No					
Others					
Yes	2 (28.6)	5 (71.4)	0.907[b]	0.452	0.453[c]
No	69 (46.9)	78 (53.1)			
Hepatitis					
Positive	34 (50.7)	33 (49.3)	1.029[b]	1.392	0.310
Negative	37 (42.5)	50 (60.2)			
HIV					
Positive	6 (54.5)	5 (45.5)	0.340[b]	1.440	0.560
Negative	65 (45.5)	78 (54.5)			

a = Wald's chi square
b = Pearson's chi square
c = Fischer's exact test
d = Risk for cohort with social relationship scores more than or equal to 3.54 (mean)
Note = For continuous type data (PERS, age and duration of illness[years]), Wald's chi square is used instead of Pearson's chi square.

University of Malaya

5.5 Correlation of positive emotions with domains of quality of life and overall general and quality of life.

Using the Pearson's and Spearman's correlation test, the correlation of positive emotions with domains of quality of life and overall general health and quality of life was analyzed. All four domains of the quality of life and the overall general health and quality of life had a significant correlation ($p<0.001$) with positive emotions. Among them, only the general health domain ($p<0.05$) had a correlation with the first item of the positive emotion which was significant as well.

University of Malaya

Table 5.19: Correlation of positive emotions with domains of quality of life and overall health and general health in QOL

	P1	P2	P3	P4	P5	P6	P7	P8	PERS	D1	D2	D3	D4	O	G
P1															
P2	**														
P3	**	**													
P4	**	**	**												
P5	**	**	**	**											
P6	**	**	**	**	**										
P7	**	**	**	**	**	**									
P8	**	**	**	**	**	**	**								
PERS	**	**	**	**	**	**	**	**							
D1	**	**	**	**	**	**	**	**	**						
D2	**	**	**	**	**	**	**	**	**	**					
D3	**	**	**	**	**	**	**	**	**	**	**				
D4	**	**	**	**	**	**	**	**	**	**	**	**			
O	**	**	**	**	**	**	**	**	**	**	**	**	**		
G	*	**	**	**	**	**	**	**	**	**	**	**	**	*	

*p< 0.05 (two tailed) **p<0.001 (two tailed)
P1: Item 1 in PERS P2: Item 2 in PERS
P3: Item 3 in PERS P4: Item 4 in PERS
P5: Item 5 in PERS P6: Item 6 in PERS
P7: Item 7 in PERS P8: Item 8 in PERS
D1: Domain 1 in QOL D2: Domain 2 in QOL
D3: Domain 3 in QOL D4: Domain 4 in QOL
O: Overall health in QOL G: General health in QOL

University of Malaya

5.6 Multiple logistic regression of the factors associated with quality of life.

Multiple logistic regression was performed to look into the relationship among the four domains of quality of life, overall and general health with the positive emotions rating scale and other significant factors. Table below shows the summarized results.

As seen in the table below, only a few independent variables made a unique statistically significant contribution to the model (positive emotions (PERS), marital status, family history of mental illness and non-diabetic patients). All the six domains show that having positive emotions made a significant contributions ($p < 0.01$) to the improvement of the quality of life of the patients on methadone treatment with an adjusted odd ratio of 1.228, 1.349, 1.175, 1.345, 1.221 and 1.156 respectively. Thus by looking into its strength, the strongest predictor, it was found that positive emotions was 1.349 times higher in improving the psychological domain of the QOL of patients in methadone treatment. It was followed by positive emotions being 1.345 times higher in improving the environment domain, 1.228 times higher in improving the physical domain, 1.221 times higher in improving overall quality of life, 1.175 times higher in improving social relationship domain and finally 1.156 times higher in improving overall general health.

Results also showed that marital status and family history has a significant contribution ($p < 0.05$) to the QOL of the patients in the methadone program. Both marital status and family history has an odd ratio of less than 1, indicating that non married patients were 0.295 times less likely to improve the psychological domain of QOL of patients on methadone treatment and patients without family history of mental illness were 0.201 times less likely to improve the overall quality of life of the same group of patients.

As for non-diabetic patients, there was also a significant contribution with $p < 0.05$ and odd ratio of 11.903 indicating that non- diabetic patients were 11.903 times

University of Malaya

more likely to improve the overall general health of the patients on the methadone program.

Table 5.20: Multivariate analysis of factors associated to physical health, psychological, social relationships, environment, overall quality of life and general health

Domain	Factors	Odd ratio	Adjusted odd ratio	95% confidence interval	P value
Physical health	PERS	1.228	1.240	1.147-1.341	< 0.01
	Stimulants	5.423	2.214	0.348-14.086	0.400
	Heroine	12.171	10.930	0.955-125.025	0.054
Psychological	PERS	1.349	1.331	1.209-1.466	< 0.01
	Chinese	4.400	1.890	0.535-6.683	0.323
	Marital	0.295	0.373	0.158-0.880	< 0.05
	Employment	3.316	2.086	0.661-6.580	0.210
Social relationship	PERS	1.175	1.166	1.094-1.262	< 0.01
	Malay	0.338	0.339	0.097-1.177	0.089
	Chinese	3.042	0.698	0.154-3.152	0.640
	Employment	2.456	1.724	0.633-4.692	0.287
	Alcohol	3.103	1.284	0.321-5.137	0.723
	Stimulants	3.897	2.917	0.524-16.231	0.222
	Heroine	3.897	2.141	0.424-10.801	0.357
Environment	PERS	1.345	1.340	1.220-1.473	< 0.01
	Marital	0.525	0.838	0.370-1.900	0.672
Overall quality of life	PERS	1.221	1.199	1.111-1.293	< 0.01
	Malay	0.368	0.990	0.277-3.546	0.988
	Chinese	6.258	3.868	0.767-19.502	0.101
	Marital	0.400	0.616	0.275-1.379	0.239
	Employment	2.651	1.847	0.639-5.341	0.257
	Family history	0.201	0.155	0.034-0.708	< 0.05
Overall health	PERS	1.156	1.143	1.071-1.219	< 0.01
	Chinese	4.538	2.647	0.837-8.377	0.098
	Marital	0.439	0.600	0.288-1.258	0.171
	DM	11.903	12.639	1.441-110.848	< 0.05

University of Malaya

University of Malaya

CHAPTER 6: DISCUSSION

One of the most well-known and effective treatment for opioid dependence is methadone maintenance therapy. In the past, there have been many studies done to see the effectiveness of methadone in terms of drug related behavior, criminal behaviors, HIV risk related behaviors, transmissions of infections, sexual dysfunction and mortality (Fullerton et al., 2014; MacArthur et al., 2012; Nik Ruzyanei et al., 2012), however studies on positive emotions are a few. Opioid dependence patients are a very vulnerable group with high morbidity (Ward, J., Hall, W., & Mattick, 1999), therefore assessing their quality of life and positive emotions is indeed an area of great concern. Hence, the purpose of this study was to identify the positive emotions and its association with sociodemographic factors. It also investigates the quality of life and factors influencing it, and finally the correlation between both, positive emotions and quality of life of patients on MMT. The results were consistent with the hypothesis that there is an observed effect in positive emotions and QAL, among patients in methadone therapy.

To the author's knowledge, there has been no similar study done in Malaysia that studies positive emotions in the methadone population, and how it correlates with the quality of life.

University of Malaya

Sociodemographic analysis

In terms of the sociodemographic characteristics of the patients, the study consisted of participants who were in the Methadone program for at least a month. The mean age of the respondents in this study, was 44 years. In comparison to previous studies, the patients in this study were slightly older. A study done locally (Baharom et al., 2012) participants had a mean age of 38 years of age, other studies had ranges of 20-39 years (Rusdi et al., 2008) and 26- 30 years (Robson et al., 2015). Among the studies

mentioned, the closest mean age to the current study was the study (Baharom et al., 2012), which was done in a similar setting, Tampin, Negeri Sembilan. Most of the study subjects, in our current study (84%) were from tertiary hospital, Hospital Tuanku Ja'afar, while only 16% were taken from a teaching hospital, UMMC. Therefore the majority of the subjects were from Negeri Sembilan, as in the study by Baharom et al, which shows that, the majority of the patients came from a less urban location. Those living in less urban areas, are less likely to seek medical help, and therefore less likely to attend harm reduction programs, as compared to those living in bigger towns and cities. This is probably due to the lower health literacy level in smaller towns which limits their knowledge on the risks involved, as well as the importance of medical intervention. In view of that, perhaps, the older clients having gained more awareness of their addiction problem through the years, thus making them more liberated in changing their unstable lifestyle to a more positive one (Baharom et al., 2012). This is compared to the urban community who seeks help at a younger age, as they are perceived to be more open minded and more exposed to health related programs.

In terms of gender, out of the 154 participants, only 4 were females, the rest 150 of them were males. The prevalence of female participants were comparable with a study done locally which also had 97% of male participants (Robson et al., 2015). However, there was insufficient information as to why there was a higher prevalence in the male gender in both studies. More research needs to be conducted to attain the association between the two genders.

Predictors of positive emotions and Quality of Life

1. Ethnicity

In regard to ethnicity, Malays represented the largest group with 75.3% followed by Chinese (13.6%) and Indians (11%). This is comparable to other studies that have

University of Malaya

also found the Malay population to be the largest (Baharom et al., 2012; Teoh Bing Fei, J., Yee, A. and Habil, 2016). According to the national data, 2009, the prevalence of Malay drug abusers was 87.09% (National Anti-Drug Agency, 2009). This data reflects on the Malaysian population with the Malays being the largest ethnicity followed by Chinese and Indians. Malays compared to the other races are also more prone to using heroine as their drug of choice (Mohamed, M. N., & Kasa, 2007). This study revealed a strong association ($p<0.05$) between Malay and Chinese ethnicity and positive emotions. The ethnic group with the highest positive emotions score were the Malays. The higher prevalence of positive emotions in this ethnic groups, could be due to many theories, although there is a shortage of evidence, from this research to suggest the main reason behind it. Theories suggest that the Malay culture somewhat prefers living in large families. It was previously pointed out, that Malays desired larger families and the average Malay family size was 4.1, followed by the other races (Asiaweek, 1993). Larger families could mean more social and emotional stability, with better extended support and thus better positive emotions. Hence explaining the significant association with positive emotions among our Malay participants.

Even in the QOL domains, Malays and Chinese had significant associations with the psychological domain, social relationship domain and overall quality of life. This high positive emotions scores in this ethnic groups, reflected a better quality of life, supporting our hypothesis of a positive association between quality of life and positive emotions.

2. Marital status

Another significant association was marital status. There was a reported significant association ($p = 0.010$) between positive emotions and marital status. Patients who were married encompassed more than half (54.5%) while the rest were either single, separated or widowed. In the previous studies, the number of patients who

University of Malaya

were single were more or equal than the number of married patients (Baharom et al., 2012; Rashid et al., 2014). Though not proven in this study, it could be speculated that since the average age of this study patients were older compared to the other two studies, therefore it is likely that this study population have already been committed in long term relationship, such as marriage and family. Perhaps by having responsibilities to care for others, it became a motivational factor to seek stability in their life. These patients are able to share the burden of their problems, hence facilitating the treatment, positive emotions and quality of their life by getting continuous support from their spouses (S. T. Lua PL, 2012). Spousal support proves that by promoting motivation level and positive adjustment, one is able to empower the patient by preventing relapse indirectly by strengthening their positive emotions. Another study indicated that married individuals consistently experienced more positive emotions and greater subjective well-being than single individuals, because marriage was seen as a fulfillment of basic and universal human needs (Diener, E., Gohm, C. L., Suh, E., & Oishi, 2000). By marriage, these patients have a companion, with whom they are able to confide the strains they encounter in life. This improves one's self esteem, provides them with a strong positive sense of identity and self-worth which are all part of positive emotions. As for unmarried and separated individuals, they are seen by society as being deviant from social role expectations and tend to carry a social stigma (Diener, E., Gohm, C. L., Suh, E., & Oishi, 2000). Therefore, these individuals are more prone to develop stress from the daily pressures of society and social norms thus decreasing their positive emotions.

As for QOL domains, there was significant association between marriage and almost all domains of quality of life, the psychological domain, social relationship domain, environmental domain, overall quality of life and general health. This could be due to the reasoning stated above as positive emotions seems to affect the individual's

University of Malaya

QOL. Also one's marital satisfaction based on the study by (Fiumana et al., 2016) significantly correlates with one's life satisfaction, momentary happiness, health and well- being. Therefore based on previous studies, in our population, being married seems to have a beneficial effect on QOL. There is no available data about the extent of marital satisfaction in married patients but our clinical experience has shown that many addicts who were divorced are usually guilty of the separation from the spouse and need to pay alimony (Fiumana et al., 2016). This can impact the economic autonomy of the patient and with the feelings of guilt, it may affect their QOL. Thus, this is probably the reason why the psychological domain of the quality of life in this study on single status addicts, has 0.295 times less likely to improve the patient's quality of life. However, this theory needs confirmation from future studies.

3. Employment status

In the biopsychosocial aspect, stability would also mean, one needs to have a steady income, which is in keeping with the results of the employment status of patients on MMT. Most of the patients were employed, either full time, part time or self-employed, leaving behind a small percentage of 17% who were not employed. Among the factors in this study that had a significant association (p =0.008) with positive emotions, was employment status of the patient. Those that were employed had a higher mean in their positive emotions scoring (M=29.7) compared to the unemployed (M=26.2). Studies have indicated that MMT has had an improved employment rates (Coviello, D. M., Zanis, D. A., Wesnoski, S. A., & Domis, 2009). When a person is employed they become more confident, determined and have a higher self-esteem. They tend to generate a more positive outlook and behavior that helps to boost their self-image and promote their self-agency. A positive frame of mind, helps develop more positive emotions and a more positive view about themselves, thus prompting them to seek out an experience that can maximize their psychological well-being by positively

University of Malaya

reflecting on themselves (Walsh, W. A., & Banaji, 1997). Higher self-esteem and self-confidence are part of positive emotions that might push these addicts to persist and endure their struggles in the midst of their hardships (Smokowski, Reynolds, & Bezruczko, 1999). Being employed is also found to be an important protective factor against mental disorder and is essential in maintaining good mental health (Mak, W. W., Ng, I. S., & Wong, 2011). Good mental health are the key factors of promoting positive emotions.

There was also a significant association between the employment status and the physical health, psychological domain and overall quality of life. This results are in line with the study done in Italy (Fiumana et al., 2016) where unemployment proved to be the most statistically significant predictor for a poor QOL. Based on the same study, (Fiumana et al., 2016), this was due to the fact that heroin addicts had a lack of economic independence such as home, shelter and food. These elements mimic the elements of sufferings which can impact the QOL of the addicts. Furthermore, the employed patients as discussed earlier had better positive emotions which could lead to a better QOL, based on the results of the author's study.

4. Concurrent substance use

As for substance use, there was significant association between cannabis use and positive emotions. The mean positive emotions for cannabis users was higher (M=33) compared to the non-users (M=29). Currently, cannabis has been an important topic of discussion, with its ongoing controversy of trying to legalize the use of cannabis as it can cure multiple chronic illness and is the new medical revolution (Christensen, 2015). A study done previously, reveals that the brain itself has a marijuana (cannabis) neurotransmitter system which is essential in making the individual experience happiness and prevent age-associated depression. However, the same study indicates that it is dangerous to continuously antagonize this neurotransmitter system (Wenk,

University of Malaya

2010). This might explain the higher positive emotions with cannabis users, in this study.

Looking at the QOL domains, there was a significant correlation ($p<0.05$) in three domains physical, social relationship and overall quality of life with abstinence of certain substance. In the social relationship domain, the significant substance predictors was abstinence from alcohol, stimulants and heroine. As for the physical domains QOL, the addicts had significant association with the abstinence of stimulants and heroine. Lastly, in the overall quality of life, the significant predictor for substance use was abstinence from alcohol. In summary, this indicates better quality of life, when it comes to abstinence in con current substance use especially heroine, as quitting substance use improves the quality of life of patients. A good way of enhancing, the patient's motivation is by changing their addictive behavior is by helping them perceive the discrepancy between their present behavior, and their personal goals or value (Miller, W., & Rollnick, 2003).

5. Co-morbid medical illness

As for co morbid medical illness, about 27.8% of the patients that participated had co morbid medical illness. This results were lower compared to other studies (Nik Ruzyanei et al., 2012; Teoh Bing Fei, J., Yee, A. and Habil, 2016). Blood-borne diseases results were relatively lower than previous studies as well (Baharom et al., 2012; T. N. Lua PL, 2012; Teoh Bing Fei, J., Yee, A. and Habil, 2016), with hepatitis (43.1%), followed by HIV (7.1%). The main reason of implementing MMT program was to decrease the upcoming threat of HIV among drug users who inject. These results could be lower due to information bias as the data on co morbidity was collected via self-report. On a positive note, there is also a possibility that because of the life style changes before and after the initiation of MMT, there has been an increase of awareness and reduce of injecting behavior, by reducing drug use.

University of Malaya

Non-diabetic patients had a significant correlation with the general health domain of the QOL of these patients. Non-diabetic patients were 11.903 times higher in improving the general health of the methadone patients. Several studies done before have demonstrated that diabetes has a strong negative impact on the QOL of patients, especially in the presence of complications (Manjunath, K. et al, 2014). While it difficult to monitor the patient's blood glucose in the methadone clinic, however this has to be kept in mind, while treating diabetic methadone patients as with constant support and care, it might be much more effective in bringing a change in QOL.

6. Family history of mental illness

It was observed in this study, that majority of the patients, 85.7% of them had no family history of mental illness or drug abuse. A study revealed that the risk of attaining a mental disorder with positive family history, conferred a 12.09 times higher risk (Baharudin et al., 2013). This previous mentioned study was conducted in Klang Valley and had a prevalence of 87% of positive family history. Interestingly though, in this current study, those without family history, were 0.201 times less likely to improve the overall quality of life. There is a possibility that having better drug and mental health awareness in this era has equipped the patients with positive family history, with more help and information to help sustain their quality of life, as they pose a greater risk in acquiring mental illness. Another possible explanation is that these patients were not aware of their family history due to a lack of closeness, lack of good interpersonal relationships within the family, and presence of possible difficulties in their attachment. In one study (Potik D, Peles E, Abramsohn Y, Adelson M, 2014), substance use patients were linked to avoidant attachment style and vulnerable attachment styles, which were related to a higher rate of drug abuse. In this form of attachment, usually the individual views close relationship as unimportant and they view themselves as self-sufficient without needing to be closely attached to others. This could explain why these patients

University of Malaya

were unaware of their own family history. The percentage of our patients reporting a lack of family history appears relatively high. A possibility could have also been a lack of understanding from the patient, of what conferred mental illness, whether they understood the concept of drug abuse to be a mental illness, and also the stigma attached to admitting a family member had mental health issues, are factors worth considering.

Positive Emotions

The presence of positive emotions in this study was assessed using the Positive Emotion Rating Scale, 50.6% of them had good positive emotions where else the remaining 49.4% had reduced positive emotions. The significant predictors for good positive emotions were as discussed above: being a Malay or Chinese, married, employed and substance users of cannabis.

The positive emotion rating scale, PERS was used in this study, as a brief self-report measurement of positive emotions in this study whereby it gave a better insight into the patient's experience and symptoms. By using the self–report measures, identifying certain symptoms that the patient experiences although their symptoms do not meet the full diagnostic criteria of the illness, can be detected. The other advantage of using the self-report measure, PERS, is that it systematically provides information solely from the patient's perspective. Therefore, in the future, these symptoms could be used to identify what kind of treatment regime or help is required, in a more holistic point of view pertaining to the patient's target problem areas.

Positive emotions, may be beneficial as part of the treatment of depression as it has showed to reduce the sign and symptoms of depression, as well as prevent relapse (Santos, 2013). In this study, there was no data collected on how many patients in this study were actually depressed. However, the 49.4% of the patients that did not rate well

University of Malaya

in positive emotions, were highly likely to have a mood disorder or be predisposed to a mood disorder. It must be remembered that being in the MMT program, does not "normalize" the daily lives of the patients. They are still faced with many other underlying problems that might be neglected. These problems and the lack of resilience are probably the contributing factor as to why they lack positive emotions. Reinforcing positive emotions are an important factor in promoting resiliency and well-being (Santos, 2013) as well curbing depression. Besides that, this group of methadone patients are vulnerable and positive emotions are known to help develop personal forces like strengths and abilities, in these group of patients who are more vulnerable. This is due to the personal forces which are a protective element and produce well-being (Bradley, B. P. et al, 2011).

Quality of Life

As for the assessment of quality of life, it is a well-known fundamental component of healthcare. It is an established fact that, the quality of life among opiate dependent individuals are comparatively lower than the general population or even among those with various medical illness (Baharom et al., 2012). There were four main domains that was studied, i.e. the physical, psychological, social relationships, environment and also the overall general health and quality of life. The WHOQOL-BREF raw scores were used. The mean scores for all 4 domains were then converted to transformed scores, (0-100) scale and compared with previous studies. The mean scores in each domain, physical health (M=63), psychological (M=69), social relationship (M=69) and environment (M=63) were higher, except in the physical domain, when compared with a locally conducted study (Baharom et al., 2012) which had M=65 in the physical domain, M=66 in the psychological domain, M=60 in the social relationship domain and M=65 in the environment domain. In this mentioned study (Baharom et al.,

University of Malaya

2012), patients who had completed the WHOQOL-BREF assessment during enrollment in MMT program, and six months later, were recruited. This was to see the difference in quality of life of patients during the initiation of the program and after 6 months being in it. The results revealed a significant positive mean difference in all the four domains. In this current study, out of 154 participants only 6 of them were in the study for less than a year, which indicates most of the patients in this group were in the program longer. This helps to explain why there was an improvement in some of the domains of quality of life.

Other internationally conducted studies (Chen, Y. Z. et al, 2013; Padaiga et al., 2007; Yen et al., 2011) had much lower mean scores in all domains in the range of 40-50. This could be an indication that the quality of life among MMT patients in Malaysia was better when compared with the quality of life of MMT patients abroad. It could be due to multiple factors (as discussed) better family support, more holistic health care, strong religious, spiritual background and a simpler lifestyle. In a study done by (S. T. Lua PL, 2012) in Terengganu, Malaysia, strong cultural principles and religion were one the coping styles used by the methadone patients, in improving their quality of life.

Looking at strong cultural beliefs, most of the study population studied were Malays who were all raised as Muslims. In Islam, there is a concept or rule of life known as ‘halal’ (lawful) and ‘haram’ (forbidden) which prohibits illicit drug use (S. T. Lua PL, 2012) When faced with a problem, these principles become very empowering, and help to be one of their best forms of guidance. As for religion, it has been widely used in an attempt to deal with sickness and is deemed useful for an individual’s well-being (Beit-Hallahmi, 1996). The results revealed a positive association between quality of life and religion, more pious the patient, better was their well-being. Previously as the well, WHOQOL spirituality, religion and personal beliefs group have suggested that quality of life can be determined by all three, spirituality, religion and personal beliefs

University of Malaya

(WHOQoL SRPB Group, 2006). As Malaysia is seen as a country rich with multiple religions, Islam, Christianity, Hinduism, Buddhism, Sikhism and etc there is a possibility that the people here are religiously inclined. This could mean that they are more capable of improving their quality of life by using religion as a possible coping mechanism.

Association between positive emotions and quality of life

Based on the findings of this study, it is safe to conclude that positive emotions are associated with improved quality of life. As seen in the results above there was a significant correlation ($p < 0.001$) with positive emotions in all domains, overall general and quality of life indicating that there is an association between the both.

After adjusting for potential cofounding factors, in final part of the results it was seen that positive emotions have significantly contributed to the improved quality of life in all domains ($p < 0.01$). In the average, positive emotions had improved each domain of the quality of life of the patient by 1.2 times. It has been previously established that high levels of positive emotions can promote well- being, and is of paramount importance when it comes to human flourishing, which of course includes psychological health (Gruber, J., Kogan, A., Quoidbach, J., & Mauss, 2013). Therefore, positive emotions are an integral aspect in the improvement of the quality of life that needs recognition. There exists A gap exists in literature, where the demonstration that positive emotions are associated with the advancement of quality of life of heroin addicts. This area has not been studied enough. The psychiatric community will benefit from this and future research, to enable an exclusive focus on the effect of positive emotions in the enhancement of quality of life, which naturally will confer favorable outcomes for heroin addicts.

University of Malaya

Essentially, in summary, all the objectives of the study were achieved, i.e. identifying and assessing the positive emotions and quality of life of patients on methadone therapy, as well looking into some of the contributing factors. This study has also revealed a strong association between positive emotions and quality of life in patients receiving methadone treatment. Positive emotions yields better coping skills, thus producing a reduction in psychological distress, improvement in psychological well-being and overall health (Mohamed, F. A., Ng, C. G., & Ong, 2017) which ultimately leads to better quality of life. This findings should be considered by mental health providers to include positive emotions assessment and teachings into their psychological intervention in the MMT program, for a more holistic and comprehensive style of treatment approach.

CHAPTER 7: LIMITATIONS AND STRENGHTS

7.1 Limitation

There were several limitations in this study that needs to be addressed. Some of the limitations are as below:

1. Although this study was done in 2 centres, more than 50% of the patients were recruited from HTJS, narrowing the generalizability of the study findings. This study respondents were recruited based on convenience sampling which might be biased by volunteers.

2. This study had a very small proportion of female patients recruited in this study. Depression and anxiety disorders have higher rates among females, which could have influenced the current prevalence of positive emotions as well as the quality of life. It was also difficult to establish the differences between positive emotions and quality of life among the two genders.

3. This study was cross sectional in nature, where conclusions should be drawn

University of Malaya

cautiously, in regards to the direction of causality. Cross sectional studies are only able to determine whether these associations represented plain correlations without a causal relationship, whether the factors were causes of increased positive emotions or better quality of life, or whether increased positive emotions and quality of life were the cause of these factors or some combinations of all these possibilities.

4. There was a use of self-reported questionnaire for assessing both positive emotions and quality of life. This could have introduced a potential response bias as the respondents may minimize, exaggerate or inaccurately reports their symptoms.

5. Data on concurrent substance use and co morbidity were also collected by subject self- report. Again, these data may subject to bias, recall or comprehension bias. The author did not take the medication, sexual and surgical history which could have contributed to the positive emotions and quality of life of the patient. In the absence of laboratory data, lack of information was attained. Laboratory findings on urine for drugs, fasting serum lipid and glucose would have better strengthened the data.

7.2 Strengths

Although there were limitations, there were also several strengths of the study:

1. This study provided a general view on different aspects of positive emotions and health issues that are faced by patients on the MMT program. These aspects may be overlooked by clinician during their daily reviews in efforts to promote and maintain drug abstinence. Therefore, a more holistic approach in treatment, particularly those on long term methadone will be

University of Malaya

provided.

2. This study findings can be useful to professionals in multiple fields, such as psychological medicine and addiction, primary care medicine and infectious disease, anyone who commonly encounter and treat this population of patients.
3. Although the questionnaires had their own limitations, they were also highly suitable, reliable, valid and sensitive instrument to measure both the positive emotions and quality of life.

University of Malaya

CHAPTER 8: CONCLUSION AND RECOMMENDATIONS

8.1 Conclusion

From the findings, positive emotions were less prevalent than expected in this first local study among patients' with methadone. Overall, the present study concluded that improved positive emotions, improves the quality of life among patients. The few most striking factors that are associated with both are the marital status, employment status and decrease rate of concurrent substance use especially heroine and the absence of hepatitis B. Although there was a lack of urine for drug evaluation, it was reasonable to assume that the positive emotions were not due to other substances use but a rather a wide combination of biopsychosocial factors. In view of that, patients receiving methadone should be routinely asked about their positive emotions as this finding should be sufficient enough to provide our clinicians with a better understanding of the impact of an emotional component towards the well-being of the patient.

A challenge for future studies of positive emotions in methadone maintenance patients would be to broaden the research investigation by assessing the causes of lack of positive emotions in these group of patients. With further clarification, the direction of the association between positive emotions and methadone can be identified.

At present times, there are a wide range of psychological approaches such as motivational interviewing, counselling, for the improvement of an individual's positive emotions. These study findings had highlighted some of the factors that may affect the positive emotions and quality of life of the individual. If continued to be undetected or not treated, it may even have the potential of contributing to psychiatric comorbidity such as suicide, poorer psychosocial status, in addition to affecting the quality of life. Therefore, it is hoped that in the future, the treatment of Methadone will be done in a broader perspective which not only encompasses compliance and abstinence but also looking into improvement of positive emotions and quality of life of the person.

University of Malaya

8.2 Recommendations

Given the findings of this study, there are several recommendations that can be included for further studies:

1. Conducting a study involving multiple centres in different geographical locations, using randomized methods might improve the generalizability of the study.

2. Having a control group of patients not on methadone, for both opioid dependent and non- opioid dependent for comparison.

3. Encouraging and getting more female subjects to enroll in the study to ensure equality of data between both genders to get a better overview of both genders.

4. Finally, conducting a longitudinal prospective study would be the most ideal to ascertain the causality between substance use disorder, positive emotions and quality of life.

University of Malaya

REFERENCES

Aben, I., Verhey, F., Strik, J., Lousberg, R., Lodder, J., & Honig, a. (2003). A comparative study into the one year cumulative incidence of depression after stroke and myocardial infarction. *Journal of Neurology, Neurosurgery, and Psychiatry*, *74*, 581–585. http://doi.org/10.1136/jnnp.74.5.581

American Psychiatric Association. (1994). *DSM-IV Diagnostic and Statistical Manual of Mental Disorder American Psychiatric Organization* (Vol.33). http://doi.org/10.1073/pnas.0703993104

American Psychiatric Association. (2013). *DSM-V*. *American Journal of Psychiatry*. http://doi.org/10.1176/appi.books.9780890425596.744053

Baharom, N., Hassan, M. R., Ali, N., & Shah, S. A. (2012). Improvement of quality of life following 6 months of methadone maintenance therapy in Malaysia. *Substance Abuse Treatment, Prevention, and Policy*, *7*(1), 32. http://doi.org/10.1186/1747-597X-7-32

Baharudin, A., Anuar, L., Saini, S., Bakar, O. C., Razali, R., & Jaafar, N. R. N. (2013). Psychiatric comorbidity among community-based, treatment seeking opioid dependents in klang valley. *Sains Malaysiana*, *42*(3), 417–421.

Baharudin A, Mislan N, Ibrahim N, Sidi H, N. J. N. (2013). Depression in male patients on methadone maintenance therapy. *Asia-Pacific Psychiatry*, *1*, 67–73.

Barrett, L. F., & Russell, J. A. (1999). The Structure of Current Affect. *Current Directions in Psychological Science*, *8*(1), 10–14. http://doi.org/10.1111/1467-8721.00003

Belluck, P. (2003). Methadone grows a killer drug. *New York Times*.

Best, D., Lehmann, P., Gossop, M., Harris, J., Noble, A., & Strang, J. (2009). Eating Too Little, Smoking and Drinking Too Much: Wider Lifestyle Problems Among Methadone Maintenance Patients. *Addiction Research*. http://doi.org/10.3109/16066359809004367

Bizzarri J, Rucci P, Vallotta A, Girelli M, Scandolari A, Zerbetto E, et al. (2005). Dual diagnosis and quality of life in patients in treatment for opioid dependence. *Substance Use & Misuse*, *40*(12), 1765–76.

Bradley, B. P., & Mogg, K. (1994). Mood and personality in recall of positive and negative information. *Behaviour Research and Therapy*, *32*(1), 137–141.

Brady TM, Salvucci S, Sverdlov LS, Male A, Kyeyune H, Sikali E, DeSale S, Y. P. (2005). Methadone dosage and retention: an examination of the 60 mg/day threshold. *Journal of Addictive Disease.*, *24*(3), 23–47.

Brewer DD1, Catalano RF, Haggerty K, Gainey RR, F. C. (1998). A meta-analysis of predictors of continued drug use during and after treatment for opiate addiction. *Addiction*, *93*(1), 73– 92.

University of Malaya

Brooner, R. K. (1997). Psychiatric and Substance Use Comorbidity Among Treatment-Seeking Opioid Abusers. *Archives of General Psychiatry*. http://doi.org/10.1001/archpsyc.1997.01830130077015

Brown, T. A., & Barlow, D. H. (2009). A proposal for a dimensional classification system based on the shared features of the DSM-IV anxiety and mood disorders: implications for assessment and treatment. *Psychological Assessment, 21*(3), 256.

Bryant, F. B. (1989). A Four-Factor Model of Perceived Control: Avoiding, Coping, Obtaining, and Savoring. *Journal of Personality*, *57*(4), 773–797. http://doi.org/10.1111/j.1467- 6494.1989.tb00494.x

Burgdorf, J., & Panksepp, J. (2006). The neurobiology of positive emotions. *Neuroscience and Biobehavioral Reviews*, *30*(2), 173–187. http://doi.org/10.1016/j.neubiorev.2005.06.001

C. Lucas & J. Martin. (2013). Smoking and drug interactions. *Australian Prescriber*, *36*(3).

Cacioppo, J. T., Gardner, W. L., & Berntson, G. G. (1999). The affect system has parallel and integrative processing components: Form follows function. *Journal of Personality and Social Psychology*. http://doi.org/10.1037/0022-3514.76.5.839

Carl J Soskin D Kerns C Barlow D. (2013). Positive emotion regulation in emotional disorders: A theoretical review. *Clinical Psychology Review, 33*(13), 343–360.

Carol D. Ryff & Burton Singer. (2000). Interpersonal Flourishing: A Positive Health Agenda for the new Millennium. *Personality and Social Psychology Review*, *4*, 30–44.

Carpentier, P. J., Krabbe, P. F. M., van Gogh, M. T., Knapen, L. J. M., Buitelaar, J. K., & de Jong, C. A. J. (2009). Psychiatric Comorbidity Reduces Quality of Life in Chronic Methadone Maintained Patients. *American Journal on Addictions*, *18*(6), 470–480. http://doi.org/10.3109/10550490903205652

Chen, Y. Z., Huang, W. L., Shan, J. C., Lin, Y. H., Chang, H. C. W., & Chang, L. R. (2013). Self-reported psychopathology and health- related quality of life in heroin users treated with methadone. *Neuropsychiatric Disease and Treatment*, *9*, 41–48.

Chie, Q. T., Tam, C. L., Bonn, G., Wong, C. P., Dang, H. M., & Khairuddin, R. (2015). Drug abuse, relapse, and prevention education in Malaysia: Perspective of university students through a mixed methods approach. *Frontiers in Psychiatry*, *6*(MAY). http://doi.org/10.3389/fpsyt.2015.00065

Clark, N., Gospodarevskaya, E., Harris, A., & Ritter, A. (2003). Estimating the Cost of Heroin Use in Victoria, (January).

University of Malaya

Cohn, M. A., Fredrickson, B. L., Brown, S. L., Mikels, J. A., & Conway, A. M. (2009). Happiness unpacked: positive emotions increase life satisfaction by building resilience. *Emotion (Washington, D.C.)*, *9*(3), 361–8. http://doi.org/10.1037/a0015952

Coviello, D. M., Zanis, D. A., Wesnoski, S. A., & Domis, S. W. (2009). An integrated drug counseling and employment intervention for methadone clients. *Journal of Psychoactive Drugs*, *41*(2), 189–197.

Dacher Keltner, Keith Oatley, J. M. J. (1996). *UNDERSTANDING EMOTIONS* (2nd ed.). Retrieved from http://bookprem.com/gd-ebooks/1405131039

Danner, D. D., Snowdon, D. a, & Friesen, W. V. (2001). Positive emotions in early life and longevity: findings from the nun study. *Journal of Personality and Social Psychology*, *80*(5), 804–13. http://doi.org/10.1037/0022-3514.80.5.804

Darke, S. & Zador, D. (1996). Fatal heroin "overdose": a review. *Addiction*, *91*(12), 1765–1772. doi:10.1046/j.1360–0443.1996.911217652.

Darke, S., & Ross, J. (2002). Suicide among heroin users: Rates, risk factors and methods. *Addiction*. http://doi.org/10.1046/j.1360-0443.2002.00214.x

Dazord, A., Mino, A., Page, D., & Broers, B. (1998). Patients on methadone maintenance treatment in Geneva. *European Psychiatry*. http://doi.org/10.1016/S0924-9338(98)80011-4

De Maeyer, J., Vanderplasschen, W., Camfield, L., Vanheule, S., Sabbe, B., & Broekaert, E. (2011). A good quality of life under the influence of methadone: A qualitative study among opiate-dependent individuals. *International Journal of Nursing Studies*, *48*(10), 1244–1257. Degenhardt, L., Whiteford, H. A., Ferrari, A. J., Baxter, A. J., Charlson, F. J., Hall, W. D., … Vos, T. (2013). Global burden of disease attributable to illicit drug use and dependence: findings from the Global Burden of Disease Study 2010. *The Lancet*, *382*(9904), 1564-1574. http://doi.org/10.1016/S0140-6736(13)61530-5

Devi, J. P., Azriani, A. R., Wan, Z. W. M., Ariff, M. N. M., & Hashimah, A. N. (2012). The effectiveness of methadone maintenance therapy among opiate-dependants registered with hospital raja perempuan zainab II Kota Bharu, Kelantan. *Malaysian Journal of Medical Sciences*, *19*(4), 18–23.

Diener, E., & Larsen, R. J. (1993). The experience of emotional well-being. In *Handbook of emotions*, (pp. 405–415).

Diener, E., Gohm, C. L., Suh, E., & Oishi, S. (2000). Similarity of the relations between marital status and subjective well-being across cultures. *Journal of Cross-Cultural Psychology*, *31*(4), 419–436.

Diener, E. (1984). Subjective well-being. *Psychological Bulletin*. http://doi.org/<a href= "javascript:doLinkPostBack(’’,’ss%7E%7EDI%20%2210%2E1037%2F0033%2D2909%2E95%2E3%2E542%22%7C%7Csl%7E%7Erl’,’’);" title="Search for

University of Malaya

10.1037/0033-2909.95.3.542" id="link10.10370033-2909.95.3.542">10.1037/0033-2909.95.3.542

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin*, *125*(2), 276–302. http://doi.org/10.1037/0033- 2909.125.2.276

Dole, V.P., Nyswander, M.E. & Kreek, M. (1966). Narcotic blockade. *Archives of Internal Medicine*, *118*(4), 304–309.

Dore, G. J., Freeman, A. J., Law, M. and Kaldor, J. (2002). Is severe liver disease a common outcome for people with chronic hepatitis C? *Journal of Gastroenterology and Hepatology*, *17*(4), 423–430. doi:10.1046/j.1440–1746.2002.02730.x.

Ekman, P. (1994). Moods, Emotions, and Traits. *The Nature of Emotion: Fundamental Questions*.

Ekman, P., & Davidson, R. (1994). Affective science: A research agenda. *The Nature of Emotion*. Retrieved from http://www.paulekman.com/wp-content/uploads/2013/07/Affective-Science-A-Research-Agenda.pdf

Emotions, H. O. F. (2000). *Handbook of emotions*. *New York* (Vol. 54). http://doi.org/10.2307/2076468

English, Dallas R & Holman, C. D'Arcy J. (Cashel D'Arcy James), 1955- & Australia. Dept. of Community Services and Health & National Drug Strategy (Australia). (1995). *The quantification of drug caused morbidity and mortality in Australia (1995 ed). Australian Govt. Pub. Service, Canberra* (Vol. 1).

Fassino S, Daga GA, Delsedime N, Rogna L, B. S. (2004). Quality of life and personality disorders in heroin abusers. *Drug and Alcohol Dependence*, *76*(1), 73–80.

Fred Bryant. (2003). Savoring Beliefs Inventory (SBI): A scale for measuring beliefs about savouring_. *Journal of Mental Health*, *12*(2), 175--196.

Fredrickson, B. (2001). The Role of Positive Emotions in Positive Psychology. *American Psychologist*.

Fredrickson, B. L. (2000). Cultivating positive emotions to optimize health and well-being. *Prevention & Treatment*, *3*(1), 1–25. http://doi.org/10.1037/1522-3736.3.1.31a

Fredrickson, B. L. (2001). The role of positive emotions in positive psychology. The broaden- and-build theory of positive emotions. *The American Psychologist*, *56*(3), 218–26. http://doi.org/10.1037/0003-066X.56.3.218

Fredrickson, B. L. (2004). The broaden-and-build theory of positive emotions. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences*, *359*(1449), 1367–78. http://doi.org/10.1098/rstb.2004.1512

University of Malaya

Fullerton, C. A., Kim, M., Thomas, C. P., Lyman, D. R., Montejano, L. B., Dougherty, R. H., … Delphin-Rittmon, M. E. (2014). Medication-assisted treatment with methadone: Assessing the evidence. *Psychiatric Services*. http://doi.org/10.1176/appi.ps.201300235

Gendreau-Webb, R. (2004). Action Stat. Methadone overdone. *Nursing*, 15–21.

Giacomuzzi SM, Riemer Y, Ertl M, Kemmler G, R. H., & Hinterhuber H, et al. (2005). Gender differences in health-related quality of life on admission to a maintenance treatment program. *European Addiction Research*, *11*(2), 69–75.

Giri, O. P., Srivastava, M., & Shankar, R. (2014). Quality of life and health of opioid-dependent subjects in India. *Journal of Neurosciences in Rural Practice*, *5*(4), 363–368.

Goldstein A & Herrera J. (1995). Heroin addicts and methadone treatment in Albuquerque: a 22- year follow-up No Title. *Drug and Alcohol Dependence*, *40*(2), 139–150.

Gong, A., Huong, W., Guan, N. C., Amer, A. S., Syarinaz, A., Adlan, A., & Habil, H. (2009). Quality of life assessment of opioid substance abusers on methadone maintenance therapy (MMT) in University Malaya Medical Centre. *ASEAN Journal of Psychiatry*, *10*(June), 1– 11.

González-Saiz, F., Rojas, O. L., & Castillo, I. I. (2009). Measuring the impact of psychoactive substance on health-related quality of life: an update. *Current Drug Abuse Reviews*, *2*(1), 5– 10.

Gossop, M. (2006). Treating drug misuse problems: evidence of effectiveness.

Gossop, M., Marsden, J., Stewart, D., & Treacy, S. (2001). Outcomes after methadone maintenance and methadone reduction treatments: Two-year follow-up results from the National Treatment Outcome Research Study. *Drug and Alcohol Dependence*, *62*(3), 255– 264. http://doi.org/10.1016/S0376-8716(00)00211-8

Green CA, Polen MR, Dickinson DM, Lynch FL, B. M. (2002). Gender differences in predictors of initiation, retention, and completion in an HMO-based substance abuse treatment program. *J Subst Abuse Treat.*, *23*(4), 285–95.

Grichard, A., Lert, F., Calderon, C., Geige, H., Magnet, O., Soletti, J., Brodeur, J. M., Richard, L., Benigen, M. & Zunzuneger, M. (2003). Illicit drug use and injecting practices among drug users on methadone and buprenorphine maintenance treatment in France. *Addiction*, *98*(11), 1585 – 1598.

Gruber, J., Kogan, A., Quoidbach, J., & Mauss, I. B. (2013). Happiness is best kept stable: Positive emotion variability is associated with poorer psychological health. *Emotion*, *13*(1).

University of Malaya

Guan, N. C., Zakaria, H., Ghaus, Z., & Gani, F. A. (2016). DEVELOPMENT AND VALIDATION OF THE POSITIVE EMOTION RATING SCALE (PERS) ISSN: 2075- 4124, *8*(1), 31–35. http://doi.org/10.7813/2075-4124.2016/8-1/A.6

Halina Grzymała-Moszczyńska & Benjamin Beit-Hallahmi. (1996). Halina Grzymała-Moszczyńska & Benjamin Beit-Hallahmi. (1996). A Model of Sequential Development of Religious Orientation as a criterion of mental health. Religion, Psychopathology And Coping. International Series In The Psychology Of Religion., 4, 139–157. *Religion, Psychopathology And Coping. International Series In The Psychology Of Religion.*, *4*, 139– 157.

Hasanah, C. I., & Razali, M. S. (1999). The pilot study of WHOQOL-100 (Malay version). *The Malaysian Journal of Medical Sciences: MJMS*, *6*(2), 21.

Hasanah, C. I., Naing, L., & Rahman, A. R. A. (2003). World Health Organization quality of life assessment: brief version in Bahasa Malaysia. *Medical Journal of Malaysia*, *58*(1), 79–88.

Hasin, D., Liu, X., Nunes, E., McCloud, S., Samet, S., & Endicott, J. (2002). Effects of major depression on remission and relapse of substance dependence. *Archives of General Psychiatry*, *59*(4), 375–80. http://doi.org/10.1001/archpsyc.59.4.375

Heslin, K. C., Stein, J. A., Heinzerling, K. G., Pan, D., Magladry, C., & Hays, R. D. (2011). Clinical correlates of health-related quality of life among opioid-dependent patients. *Quality of Life Research*, *20*(8), 1205–1213. http://doi.org/10.1007/s11136-011-9858-y

Hiv, S. A. (2004). PROPOSAL FOR THE INCLUSION OF METHADONE IN THE WHO MODEL LIST OF ESSENTIAL MEDICINES Management of Substance Abuse OCTOBER 2004. *Assessment*, (October).

Huta, V., & Hawley, L. (2010). Psychological strengths and cognitive vulnerabilities: Are they two ends of the same continuum or do they have independent relationships with well-being and ill-being? *Journal of Happiness Studies*, *11*(1), 71–93.

ISEN Franklin, A. M., & College PAULA LEVIN, M. F. (1972). Effect of Feeling Good on Helping. *Journal of Personality and Social Psychology*, *21*(3), 384–388. http://doi.org/10.1037/h0032317

Jesjeet Singh Gill, Ahmad Hatim Sulaiman, M. H. H. (2007). The first methadone programme in Malaysia: overcoming obstacles and achieving the impossible. *ASEAN Journal of Psychiatry*, *8*((2)), 64–70.

Jessica De Maeyer, Wouter Vanderplasschen, E. B. (2010). Quality of life among opiate- dependent individuals: A review of the literature. *International Journal of Drug Policy*, *21*(5), 364–380.

Kandel, D. B., Davies, M., Karus, D., & Yamaguchi, K. (1986). The Consequences in Young Adulthood of Adolescent Drug Involvement: An Overview. *Archives of General Psychiatry*, *43*(8), 746–754.

University of Malaya

Karow, A., Verthein, U., Pukrop, R., Reimer, J., Haasen, C., Krausz, M., & Schäfer, I. (2011). Quality of life profiles and changes in the course of maintenance treatment among 1,015 patients with severe opioid dependence. *Substance Use & Misuse*, *46*(6), 705–715.

Kaur, S., Mohd, H., & Mohamed, M. (2009). Projek perintis program rawatan terapi gantian (RTG) menggunakan methadone di Pusat Khidmat AADK. *Journal Antidadah Malaysia*, *5*(1), 1–30. Retrieved from http://www.adk.gov.my/html/pdf/jurnal/2009/5_3.pdf

Kessler, R. C., Nelson, C. B., McGonagle, K. A., Edlund, M. J., Frank, R. G., & Leaf, P. J. (1996). The epidemiology of co-occurring addictive and mental disorders: Implications for prevention and service utilization. *American Journal of Orthopsychiatry*, *66*(1), 17–31. http://doi.org/10.1037/h0080151

Kreek, M. J., & Vocci, F. J. (2002). History and current status of opioid maintenance treatments: Blending conference session. *Journal of Substance Abuse Treatment*, *23*(2), 93–105. http://doi.org/10.1016/S0740-5472(02)00259-3

Laudet, A. B. (2011). The case for considering quality of life in addiction research and clinical practice. *Addiction Science & Clinical Practice*, *6*(1), 44–55. http://doi.org/10.1186/1940- 0640-7-2

Leavitt, S. B. (2003). Methadone dosing and safety. *Methadone Dosing & Safety in the Treatment of Opioid Addiction*, 1–8.

Lin, C. Y., Chang, K. C., Wang, J. D., & Lee, L. J. H. (2016). Quality of life and its determinants for heroin addicts receiving a methadone maintenance program: Comparison with matched referents from the general population. *Journal of the Formosan Medical Association*, *115*(9), 714–727.

Lin Xiao, Zunyou Wu, Wei Luo, and X. W. (2011). Quality of Life of Outpatients in Methadone Maintenance Treatment Clinics. *J Acquir Immune Defic Syndr*, *53*(Suppl 1), 1–11. http://doi.org/10.1097/QAI.0b013e3181c7dfb5.Quality

Liu E, Liang T, Shen L, Zhong H, Wang B, Wu Z, D. R. (2009). Correlates of methadone client retention: A prospective cohort study in Guizhou province, China. *Int J Drug Policy.*, *20*(4), 304–308. http://doi.org/10.1021/nl061786n.Core-Shell

Lua PL, S. T. (2012). Coping Mechanism Versus Health-Related Quality of Life (HRQoL) Among Methadone Maintance Treatment (MMT) Program Participants. *International Journal of Psychosocial Rehabilitation*, *17*(1), 143–156.

Lua PL, T. N. (2012). A 12-month evaluation of health-related quality of life outcomes of methadone maintenance program in a rural Malaysian sample. *Subst Use Misuse.*, *47*(10), 1100–5.

MacArthur, G. J., Minozzi, S., Martin, N., Vickerman, P., Deren, S., Bruneau, J., … Hickman, M. (2012). Opiate substitution treatment and HIV transmission in

University of Malaya

people who inject drugs: systematic review and meta-analysis. *BMJ*, *345*(oct03 3), e5945–e5945. http://doi.org/10.1136/bmj.e5945

Mak, W. W., Ng, I. S., & Wong, C. C. (2011). Resilience: enhancing well-being through the positive cognitive triad. *Journal of Counseling Psychology*, *58*(4), 610.

Malaysia: where big is still better. For Malays, large families are part of the plan. (1993). *Asiaweek*.

Mark, T. L., Woody, G. E., Juday, T., & Kleber, H. D. (2001). The economic costs of heroin addiction in the United States. *Drug and Alcohol Dependence*, *61*(2), 195–206.

Marta Torrens, Francina Fonseca, C. C. & A. D.-S. (2013). Methadone maintenance treatment in Spain: the success of a harm reduction approach. *Bulletin of the World Health Organization*, *91*, 136–141.

Mathers, B. M., Degenhardt, L., Bucello, C., Lemon, J., Wiessing, L., & Hickman, M. (2013). Mortality among people who inject drugs: a systematic review and meta-analysis. *Bulletin of the World Health Organization*, *91*(2), 102–123. http://doi.org/10.2471/BLT.12.108282

Mazlan, M., Mazlan, M., Schottenfeld, R. S., Mazlan, M., Schottenfeld, R. S., Chawarski, M. C., ... & Chawarski, M. C. (2006). New challenges and opportunities in managing substance abuse in Malaysia. *Drug and Alcohol Review*, *25*(5), 473– 478.

Miller, W., & Rollnick, S. (2003). (2003). Motivational interviewing: Preparing people for change. *Journal for Healthcare Quality.*, *25*(3), 46.

Millson, P. E., Challacombe, L., Villeneuve, P. J., Fischer, B., Strike, C. J., Myers, T., … Pearson, M. (2004). Self-perceived health among canadian opiate users: A comparison to the general population and to other chronic disease populations. *Canadian Journal of Public Health*.

Ministry of health, M. (2005). National Methadone Maintenance Therapy Guideline (1st ed.) Putrajaya, Malaysia. In *Non- Communicable Disease Section*.

Ministry of health, M. (2012). Annual Report Ministry of Health 2012, 351.

Mohamad, N., Bakar, N., Musa, N., Talib, N., & Ismail, R. (2010). Better retention of Malaysian opiate dependents treated with high dose methadone in methadone maintenance therapy. *Harm Reduction Journal*, *7*(1), 30. http://doi.org/10.1186/1477-7517-7-30

Mohamed, F. A., Ng, C. G., & Ong, L. Y. (2017). The Psychometric Properties of The Malay Version Positive Emotion Rating Scale (PERS-M). *Malaysian Journal of Psychiatry, 25*(1).

University of Malaya

Mohamed, M. N., & Kasa, M. D. (2007). Drug substitution therapy: Success and limitations of the methadone and buphrenorphine maintenance programmes. *Anti- Drugs J*, *1*, 25–72.

Moore, S. C., & Chater, N. (1999). The Influence of Affect on Risky Behavior: From the Lab to Real World Financial Behavior. *Proceedings of the 23rd Annual Conference of the Cognitive Science Society*, 822–827.

Muldoon, M. F., Barger, S. D., Flory, J. D., & Manuck, S. B. (1998). What are quality of life measurements measuring? *Bmj*. http://doi.org/10.1136/bmj.316.7130.542

Myers, B. D. G., & Diener, E. (2011). Who Is, *6*(1), 10–19.

Nalaskowska M, C. L. (2014). Social and psychological functioning of opiate dependent patients in methadone maintenance treatment – longitudinal research report. *Alcoholism and Drug Addiction*, *27*(3), 237–254.

National Anti-Drug Agency, M. (2009). National Anti-Drug Agency: Drug Report December 2009. Retrieved fromhttp://www.adk.gov.my/pdf/laporandadah/laporandadahdis09.pdf

Niaura, R. (2000). Cognitive social learning and related perspectives on drug craving. *Addiction (Abingdon, England)*, *95 Suppl 2m*(February), S155-63. http://doi.org/10.1080/09652140050111726

Nik Ruzyanei, N. J., Noormazita, M., Azlin, B., Normala, I., Hazli, Z., Abdul Aziz, S., & Hatta, S. (2012). Clinical correlates of erectile dysfunction among male patients on methadone maintenance therapy (MMT) in Kuala Lumpur. *Malaysian Journal of Medicine and Health Sciences*, *8*(1), 27–35.

Padaiga, Z., Subata, E., & Vanagas, G. (2007). Outpatient methadone maintenance treatment program. Quality of life and health of opioid-dependent persons in Lithuania. *Medicina (Kaunas, Lithuania)*, *43*(3), 235–41. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/17413253

Peles, E., Schreiber, S., Naumovsky, Y., & Adelson, M. (2007). Depression in methadone maintenance treatment patients: Rate and risk factors. *Journal of Affective Disorders*, *99*(1–3), 213–220. http://doi.org/10.1016/j.jad.2006.09.017

Peterson, C., P Seligman, M. E., Vaillant, G. E., Vaillant We thank Linda Blumenthal, G. E., Gluhoski, V., Hahn, M., … Peterson, C. (1988). Pessimistic Explanatory Style Is a Risk Factor for Physical Illness: A Thirty-Five-Year Longitudinal Study. *Journal of Personality and Social Psychology*, *55*(1), 23–27. http://doi.org/10.1037/0022- 3514.55.1.23

Potik D, Peles E, Abramsohn Y, Adelson M, S. S. (2014). The relationship between vulnerable attachment style, psychopathology, drug abuse, and retention in treatment among methadone maintenance treatment patients. *Journal of Psychoactive Drugs.*, *46*(4), 325–33.

Puigdollers E, Domingo-Salvany A, Brugal MT, Torrens M, Alvarós J, Castillo C, et al. (2004). Characteristics of Heroin Addicts Entering Methadone Maintenance

University of Malaya

Treatment: Quality of Life and Gender. *Substance Use & Misuse*, *39*(9), 1353–1368. http://doi.org/10.1081/JA-120039392

Rashid, R. A., Kamali, K., Habil, M. H., Shaharom, M. H., Seghatoleslam, T., & Looyeh, M. Y. (2014). A mosque-based methadone maintenance treatment strategy: Implementation and pilot results. *International Journal of Drug Policy*, *25*(6), 1071– 1075. http://doi.org/10.1016/j.drugpo.2014.07.003

Revicki DA, Osoba D, Fairclough D, Barofsky I, Berzon R, Leidy NK, et al. (2000). Recommendations on health-related quality of life research to support labeling and promotional claims in the United States. *Quality of Life Research.*, *9*(8), 887–900.

Robson, N., Rashid, R., Nazar, M., & Habil, H. (2015). Treating heroin addiction: Bridging the past and future - A Malaysian experience. *Asia-Pacific Psychiatry*, *7*(1), 121–125. http://doi.org/10.1111/j.1758-5872.2012.00194.x

Rusdi, A. R., Noor Zurani, M. H. R., Muhammad, M. A. Z., & Mohamad, H. H. (2008). A fifty-year challenge in managing drug addiction in malaysia. *Journal of Health and Translational Medicine*, *11*(1), 3–6. http://doi.org/10.2139/ssrn.2051347

Ryff, C. D., & Singer, B. (1998). The Contours of Positive Human Health. *Psychological Inquiry*, *9*(1), 1–28. http://doi.org/10.1207/s15327965pli0901_1

Santos, V. (2013). The Role of Positive Emotion and Contributions of Positive Psychology in Depression Treatment: Systematic Review. *Clinical Practice & Epidemiology in Mental Health*, *9*(1), 221–237. http://doi.org/10.2174/1745017901309010221

Schackman, B. R., Fleishman, J. A., Su, A. E., Berkowitz, B. K., Moore, R. D., Walensky, R. P., ... & Freedberg, K. A. (2015). The lifetime medical cost savings from preventing HIV in the United States. *Medical Care*, *53*(4), 293.

Schneider, B. (2009). Substance Use Disorders and Risk for Completed Suicide. *Archives of Suicide Research*. http://doi.org/10.1080/13811110903263191

Scorzelli, J. F. (1992). Has Malaysia's antidrug effort been effective? *Journal of Substance Abuse Treatment*, *9*(2), 171–176.

Sharifa Ezat, W. P., Noor Azimah, H., Rushidi, R., Raminder, K., & Ruhani, I. (2009). Compliance towards methadone maintenance therapy and its associated factors in Selangor primary care centers and Kuala Lumpur hospital. *The Medical Journal of Malaysia*, *64*(1), 65–70. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/19852326

Shion, L. L. D., Ying, S., Ling, D., Aznal, S. S. S., Sulaiha, S., a/l Sambamoorthy, V. R., … Sulaiha, S. (2014). Assessment Effects of Maintenance Therapy on Quality of Life of Opiate Abusers. *ASEAN Journal of Psychiatry*, *15*(December), 131–139. Retrieved from http://scholar.google.com/scholar?hl=en&btnG=Search&q=intitle:ASSESSMEN

University of Malaya

T+E
FFECTS+OF+MAINTENANCE+THERAPY+ON+QUALITY+OF+LIFE+OF+OPIATE+ABUSERS#0%5Cnhttp://ezproxy.lib.uconn.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=95623895&si

Sin, N. L., & Lyubomirsky, S. (2004). Enhancing well-being and alleviating depressive symptoms with positive psychology interventions: A, (2000), 2004–2008.

Skevington, S. M., Lotfy, M., & O'Connell, K. A. (2004). The World Health Organization's WHOQOL-BREF quality of life assessment: Psychometric properties and results of the international field trial a Report from the WHOQOL Group. *Quality of Life Research*, *13*(2), 299–310. http://doi.org/10.1023/B:QURE.0000018486.91360.00

Smokowski, P. R., Reynolds, A. J., & Bezruczko, N. (1999). Resilience and Protective Factors in Adolescence: An Autobiographical Perspective From Disadvantaged Youth. *Journal of School Psychology*, *37*(4), 425–448.http://doi.org/10.1016/S0022-4405(99)00028-X

Strain, E. C., Bigelow, G. E., Liebson, I. A., & Stitzer, M. L. (1999). Moderate-vs High-Dose Methadone in the Treatment of Opioid Dependence. *Jama*, *281*(11), 1000–1005.

Sun, H.-M., Li, X.-Y., Chow, E. P. F., Li, T., Xian, Y., Lu, Y.-H., … Zhang, L. (2015). Methadone maintenance treatment programme reduces criminal activity and improves social well-being of drug users in China: a systematic review and meta- analysis. *BMJ Open*, *5*(1), e005997. http://doi.org/10.1136/bmjopen-2014-005997

Teoh Bing Fei, J., Yee, A. and Habil, M. H. B. (2016). Psychiatric comorbidity among patients on methadone maintenance therapy and its influence on quality of life. *American Journal of Addiction*, *25*, 49–55. doi:10.1111/ajad.12317.

Tugade, M. M., & Fredrickson, B. L. (2007). Regulation of positive emotions: Emotion regulation strategies that promote resilience. *Journal of Happiness Studies*, *8*(3), 311–333. http://doi.org/10.1007/s10902-006-9015-4

UNAIDS. (2013). *GLOBAL REPORT: UNAIDS report on the global AIDS Epidemic 2013*. *Unaids*. http://doi.org/JC2502/1/E

UNODC. (2014). *World Drug Report 2014*. *United Nations publication*. http://doi.org/10.1007/s12117-997-1166-0

Verrando R, Robaeys G, Mathei C, B. F. (2005). Methadone and buprenorphine maintenance therapies for patients with hepatitis C virus infected after intravenous drug use. *Acta Gastroenterol Belg*, *68*(1), 81–5.

Verster, A., & Buning, E. (2000). Methadone Guidelines. *Substance Abuse*.

Vicknasingam, B., Narayanan, S., & Navaratnam, V. (2009). Prevalence rates and risk

University of Malaya

factors for hepatitis C among drug users not in treatment in Malaysia. *Drug and Alcohol Review*, *28*(4), 447–454.

Walsh, W. A., & Banaji, M. R. (1997). The Collective Selfa. *Annals of the New York Academy of Sciences.*, *818*(1), 193–214.

Ward, J., Hall, W., & Mattick, R. P. (1999). Role of maintenance treatment in opioid dependence. *The Lancet.*, *353*(9148), 221–226.

Warner-Smith, M., Darke, S., & Day, C. (2002). Morbidity associated with non-fatal heroin overdose. *Addiction*. http://doi.org/10.1046/j.1360-0443.2002.00132.x

Watson, D., Wiese, D., Vaidya, J., & Tellegen, A. (1999). The two general activation systems of affect: Structural findings, evolutionary considerations, and psychobiological evidence. *Journal of Personality and Social Psychology*. http://doi.org/10.1037/0022-3514.76.5.820

WebMD. (2015). Methadone for Drug Abuse. Retrieved from www.webmd.com/mental- health/addiction/methadone

Wegener DT & Petty RE. (1994). Mood management across affective states: the hedonic contingency hypothesis. *Journal of Personality and Social Psychology*, *66*(6), 1034–48.

WHO. (1998). WHOQOL: measuring quality of life. *Psychological Med*, *28*(3), 551–558. http://doi.org/10.5.12

WHO. (2009). Guidelines for the psychosocially assisted pharmacological treatment of opioid dependence, 1–110. Retrieved from http://books.google.com/books?hl=en&lr=&id=yKV6i3ZK86kC&oi=fnd&pg=PP2&dq=Guidelines+for+the+Psychosocially+Assisted+Pharmacological+Treatment+of+Opioid+Dependence&ots=NtatF6p9lt&sig=batQx8UMQBGwHWDpEa3XFwrj00%5Cnhttp://books.google.com/books?hl=en&lr=&idWHOQoL SRPB Group. (2006). A cross-cultural study of spirituality, religion, and personal beliefs as components of quality of life. *Social Science & Medicine.*, *62*(6), 1486–1497.

World Health Organization. (1992). The ICD-10 Classification of Mental and Behavioural Disorders. *International Classification*, *10*, 1–267. http://doi.org/10.1002/1520- 6505(2000) 9:5<201::AID-EVAN2>3.3.CO;2-P World Health Organization. (2003). World Health Organization.

World Health Organization. (1996). WHOQOL-BREF: introduction, administration, scoring and generic version of the assessment: field trial version, December 1996.

World Health Organization. Department of Mental Health, Substance Abuse, World Health Organization, International Narcotics Control Board, United Nations Office on Drugs, & C. (2009). *World Health Organization. Department of Mental Health, Substance Abuse, World Health Organization, Guidelines for the*

University of Malaya

psychosocially assisted pharmacological treatment of opioid dependence. World Health Organization.

Yen, C. N., Wang, C. S. M., Wang, T. Y., Chen, H. F., & Chang, H. C. (2011). Quality of life and its correlates among heroin users in Taiwan. *Kaohsiung Journal of Medical Sciences*, *27*(5), 177–183. http://doi.org/10.1016/j.kjms.2010.09.003

University of Malaya