A 5-year Evaluation Study on Retention Status Among Patients Attending Methadone Replacement Therapy (MRT) in Kuala Selangor District, Malaysia

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ABSTRACT

This retrospective observational cohort study involved patients who received Methadone Replacement Therapy (MRT) in Kuala Selangor from January 2019 to April 2023. It evaluates a 5-year retention rate and factors influencing 1-year retention among 113 MRT patients in Kuala Selangor. Samples were recruited using universal sampling and data were collected using 3 sets of questionnaires: patient's demographic, Opiate Treatment Index (OTI), and WHO Quality of Life (WHOQOL)-Brief. Significant factors include physical health perception (p=0.009, OR=0.840), poor social functioning (p=0.023, OR=0.854) and poor health status (p=0.031, OR:1.797). Distance, education, employment, and marital status were found to be not significant. In conclusion, improving patient insights regarding their health conditions and social support are critical for continuity in care.

1. INTRODUCTION

Methadone is a synthetic drug that acts on similar receptors to opiates however with fewer sedative effects. In many countries, opiate addiction and needle-sharing behaviour have historically led to substantial numbers of HIV infections among drug users. This later had profound economic and social repercussions. In 2005, Malaysia implemented a harm reduction program that included Methadone Replacement Therapy (MRT) as a key strategy to curb opiate abuse and HIV transmission. This program has proved its efficacy, as shown by the government's reduction in costs related to HIV transmission by RM3.85 million from 2000 to 2015.[1] Additionally, there has been a notable decline in the number of opiate users in the country from 2005 to 2009.[2]

However, the trend of opiate users was now high with an estimated 61 million people using opioids in 2020, with half of them being from South Asia and South West Asia.[3] This concerning phenomenon also can be seen in Malaysia where the number increased from 8472 in 2012 to 16985 in 2016, and shooting up to 37037 in the year 2022.[2] This rising burden of opiate use and its associated disorders poses significant complications to our developing nation. It can lead to increase number of illegal drug used, criminal-related injuries, blood borne viruses and other infectious disease like pulmonary tuberculosis.

Looking at a global perspective, the retention rate for methadone treatment in Germany was 52.1% and a recent meta-analysis in 2021 described a variable in retention rate at 30% to 84%.[4,5] Malaysia MRT program aimed to increase the accessibility of methadone therapy within the community, assist patients in receiving methadone therapy, and enhance primary health care services. The program was evaluated once

by Norsiah et al. in a MyTOS study published in 2016.[6] The study concluded that the implementation of the Methadone Replacement Therapy (MRT) program in primary health clinics was effective, with significant improvements in quality of life and social functioning among methadone patients attending these clinics.[6]

As the services expand year by year, limited studies have been published. One study in Kuantan showed a 62% retention rate for methadone treatment, while another study in Kuala Lumpur showed a retention rate of only 55%. [7,8] These studies showed that the retention rate among methadone patients seems to be moderate and there was an urgent need to enhance the MRT program further.

Numerous global research studies, but only some local ones, have showed variables linked to retention rates. This includes family support, employment status, quality of life, and dose of methadone. [4,9-12]. All these factors may influence retention rate which hypothetically to be reduce after several period of follow up. Therefore, this Malaysian study was done to find the retention rate of MRT patients in a Sub-Urban district of Kuala Selangor and the factors that could be associated with it. The findings would be helpful in improving our clinical intervention and advocating suitable policies to improve the outcome of the methadone therapy by reducing complications associated with opioid abuse.

2. METHODOLOGY

This observational retrospective cohort study involved clients attending MRT in the Kuala Selangor health district. The study was done at methadone clinics in Kuala Selangor district, which were Tanjung Karang Health Clinic, Jeram Health Clinic, and Bestari Jaya Health Clinic. 147 patients who were registered in the Kuala Selangor Methadone Registry Database from January 2019 until April 2023 under the Kuala Selangor Health District were included in the study. The exclusion criteria were pregnant ladies and incomplete patient records. Pregnant patients were excluded due to potential physiological differences affecting treatment response and retention, as well as other clinical considerations required for managing opioid dependence during pregnancy.

Data were collected using a standardized questionnaire set by the Ministry of Health Malaysia.[1] This set has 3 parts. Part 1 was the Patient's Details Form, which included patient's gender, ethnicity, and address. Part 2 was the validated Opiate Treatment Index (OTI). [14] It include patient's marital status, educational background, religion, employment, and family history of substance use or psychiatric problems. It also contains the scores for the five OTI sections, which were drug use, injecting and sexual practices, social functioning, crime, and health. Part 3 was the validated WHO Quality of Life (WHOQOL)-Brief questionnaire, which contains four domains: physical health, psychological health, social relationships, and environmental health. [15] The physician completed Part 1 and 2, while the third part was a self-administered questionnaire. All these questionnaires were administered during registration at the first visit as part of office policy.[1]

Data entry and statistical analysis will be performed using the IBM Statistical Package for Social Sciences (SPSS) program version 28. 34 record has no available follow-up data thus were excluded from the analysis. Given that this study used universal sampling, missing data were not the result of a selective process. Clinical characteristics of the excluded patients were not available for further analysis, therefore the findings from this study were representative of the analyzed cohort which were performed on remaining 113 patients. There were 81 patients from cohort 2019, and the retention rate for the first to fifth year from this cohort was calculated using this formula:

$$((\alpha-\beta)/\alpha)100 \qquad (1)$$

α = active patients
β = dropout at specific point of time

Descriptive statistics using frequencies and percentages was used to measure the categorical variables meanwhile continuous variables were presented as mean with standard deviation or median with interquartile range (IQR). Subsequently, based on the previous literature review, simple logistic regression (SLogR) was used on the variables that were found to be contributory to retention among MRT patients. It was further analyzed using multiple-log regression (MLogR) to determine the predictor of the retention status. All statistical significance will be taken at $p < 0.05$ (Confidence interval of 95%).

3. RESULTS

3.1 Retention rate among MRT patients across five years of follow-up.

A total of 81 patients from the study were from cohort 2019. Their retention rate (Figure I) was 100% (81/81) after a year of follow-up. Subsequently, the rate was 91.3% (n=74), 85% (n=69), 81.5% (n=66) and 76.5% (n=62) at second to fifth year consecutively.
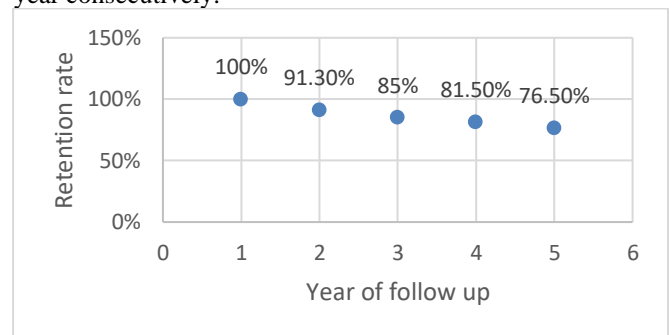
Fig. 1. 5-year trend of Retention Rate among MRT patient in Kuala Selangor

3.2 Sociodemographic characteristic, OTI score, WHOQOL score and retention status among MRT patients.

Table I illustrates the sociodemographic characteristics of MRT patients in Kuala Selangor and Table 2 showed the scores from five OTI sections and four WHOQOL domains. The patients were mostly males, with 85% being Malay and 89.4% being Muslim. Approximately one-third of MRT patients in Kuala Selangor had basic qualifications *ie* diplomas or STPM, and 90% remained in the program after 1 year. Employment status was reported for 75.2% of the patients, with retention status nearly identical between those employed and unemployed. Nearly half of the patients were single, and most of the, maintained their follow-up after one year.

Table 1. Sociodemographic characteristics and retention status among the MRT patients.

Demographic	Total, n (%)	Retention status at 1-year	
		No	Yes
Gender			
Male	111 (98.2%)	12(10.8%)	99(89.2%)
Female	2 (1.8%)	1(50.0%)	1(50.0%)
Ethnic			
Malay	96 (85.0%)	12(12.5)	84 (87.5%)
Chinese	6 (5.3%)	0 (0%)	6 (100%)
Indian	10 (8.8%)	0 (0%)	10 (100%)
Others	1 (0.9%)	1(100%)	0 (0%)
Education			
Primary	16 (14.2%)	3 (18.8%)	13 (81.2%)
Secondary	56 (49.6%)	6 (10.7%)	50 (89.3%)
Basic qualification	41 (36.3%)	4 (9.8%)	37 (90.2%)
Religion			
Islam	101 (89.4)	13 (12.9%)	88(87.1%)
Christian	1 (0.9%)	0(0.0%)	1(100.0%)
Buddha	5 (4.4%)	0(0.0%)	5(100.0%)
Hindu	6 (5.3%)	0(0.0%)	6(100.0%)
Employment status			
Yes	85 (75.2%)	3(10.7%)	25(89.3%)
No	28 (24.8%)	10(11.8%)	75(88.2%)
Family history			
Yes	21 (18.6%)	10(10.9%)	82(89.1%)
No	92 (81.4%)	3(14.3%)	18(85.7%)
Marital status			
Single	54 (47.8%)	3(5.6%)	51(94.4%)
Married	40 (35.4%)	6(15.0%)	34(85.0%)
Divorced	16 (14.2%)	3(18.8%)	13(81.3%)
Widowed	3 (2.7%)	1(33.3%)	2(66.7%)
Distance			
<5km	33 (29.2%)	3(9.1%)	30(90.9%)
5-10km	41 (36.3%)	6(14.6%)	35(85.4%)
>10 km	39 (34.5%)	4(10.3%)	35(89.7%)

Table II outlines the scores for each domain in the OTI and WHOQOL-Brief assessments. MRT patients in Kuala Selangor showed a mean score of 11.58 in social functioning, which was less than half of the maximum possible score. Other sections in OTI showed even lower scores which could be explained by lack of transparency regarding crime and drug seeking behaviour. A similar trend was observed in other sections as well. For the WHOQOL-Brief assessment, the mean scores showed a positive direction across all four domains of quality of life.

Table 2. OTI and WHOQOL-Brief score among the MRT patients.

Item Scored	Mean (SD)	Median (IQR)
OTI score		
Drugs seeking behaviour[b]	0.69 (2.67)	0.0 (0.00)
Sexual Practice[s]	2.79 (5.13)	0.0 (4.00)
Social relationship[a]	11.58 (6.20)	11.0 (8.00)
Crime [b]	0.04 (0.21)	0.0 (0.00)
Health status[a]	3.15 (4.16)	1.0 (5.00)
WHOQOL-Brief		
Physical[a]	67.48 (10.86)	65.71 (14.29)
Psychological[a]	67.52 (12.03)	66.67 (16.67)
Social[a]	65.48 (15.18)	60.00 (20.00)
Environment[a]	66.99 (11.93)	67.50 (17.50)

[a]: Result interpreted using mean (SD) | [b]: Result interpreted using median (IQR). The interpretation is due to skewness and kurtosis.

3.3 Logistic Regression Analysis of Factors Influencing Retention in the MRT Program

Building upon previous literature, this study analyzed several variables associated with retention status among MRT patients, including educational background, employment status, family history, marital status, and quality of life.[4,9-12] The OTI (health and social sections) and distance from the clinic were also incorporated given their potential impact on retention. The inclusion of these variables was based on prior evidences, their clinical relevance in influencing treatment adherence and statistical significance in univariate logistic regression (SLogR, $p < 0.05$). Confounding was assessed by evaluating changes in effect estimates when adjusting for these variables.

The data were analyzed using SLogR to determine the significant crude Odds Ratios (OR), followed by MLogR to identify significant predictors of retention among MRT patients (Table III).

The OR for patients with a good physical perception in WHOQOL was 0.840, indicating less chance of remaining in the MRT program after one year. A similar trend was observed in patients experiencing severe social relationship dysfunction (OR: 0.854, CI: 0.749-0.974), suggesting a reduced likelihood of retention at the one year follow-up.

Furthermore, the study found that patients with higher health status scores in the OTI were 1.797 times more likely to remain in the program after one year. However, no significant associations were identified between retention status and educational background, employment status, family history, marital status, or distance from the clinic.

Table 3. Relationship analysis between sociodemographic characteristics, OTI, and WHOQOL-Brief with retention status using logistic regression.

	Crude OR (95% CI)	P	Adjusted OR (95% CI)	P
Education background				
Primary	0.468 (0.092 - 2.379)	0.621	2.146 (0.184 - 25.07)	0.543
Secondary	0.901 (0.237 - 3.422)	0.360	1.383 (0.109 -17.55)	0.803
Basic qualification	1			0.800
Employment status				
Unemployed	1.111 (0.283 – 4.361)	0.880	0.965 (0.121 - 7.687)	0.973
Family history				
No history of substance abuse or psychiatric disorder	1.367 (0.341 – 5.473)	0.659	1.008 (0.126 - 8.083)	0.994
Marital status				
Widowed	1			0.632
Single	8.500 (0.590 – 122.48)	0.116	4.248 (0.090 - 200.0)	0.462
Married	2.833 (0.221 - 36.37)	0.424	1.915 (0.055 - 67.24)	0.721
Divorced	2.167 (0.144 - 32.528)	0.576	1.115 (0.021 - 58.14)	0.957
Distance				
5 – 10 km	1			0.961
<5km	1.714 (0.394 - 7.450)	0.472	1.265 (0.170 - 9.441)	0.819
>10km	1.500 (0.389 - 5.781)	0.556	1.279 (0.182 - 8.967)	0.805

OTI score				
Drugs seeking behaviour	0.936 (0.789 - 1.110)	0.446	NT	
Sexual Practice	1.001(0.893 - 1.121)	0.989	NT	
Social relationship	0.944 (0.862 - 1.033)	0.212	0.854 (0.745 - 0.979)	**0.023**
Crime	0.500 (0.052 - 4.849)	0.550	NT	
Health status	1.464 (1.008 - 2.126)	**0.045**	1.797 (1.056 - 3.057)	**0.031**
WHOQOL-Brief				
Physical	0.981 (0.931 - 1.035)	0.487	0.840 (0.738 - 0.957)	**0.009**
Psychological	1.025 (0.977 - 1.074)	0.314	1.134 (0.982 - 1.309)	0.086
Social	1.105 (0.977 - 1.054)	0.459	0.999 (0.926 - 1.077)	0.974
Environment	1.034 (0.981 - 1.088)	0.211	1.088 (0.984 - 1.203)	0.100

CI = Confidence interval, OR = Odds ratio

The model fitness was assessed using Hosmer Lemeshow = 0.863, indicating that the model fitted well. The model assumption was met. The model explained 43.9 % (Nagelkerke R Square) of the variance in the factor associated with the retention of the MRT program. The classification table demonstrated that the model correctly classified 88.5 % of patients with 97.0% were correctly predicted to have retention in the program and 23.1% not to. There was no significant interaction nor multicollinearity found. The ROC curve analysis yielded an AUC (Area Under the Curve) value of 0.812, indicating that this logistic regression model has excellent discrimination ability.

4. DISCUSSION

4.1 The trend of retention after one-year follow-up

There was a downward trend in the retention rate among patients attending MRT in Kuala Selangor district. This pattern is consistent with findings by Nong et al. and Kermode et al., who also observed a decline in retention rates over time. [11,14] The declining trend could be attributed to factors such as the patient's motivation, poor self-perception of health status, and lack of social support.

4.2 Describing the demographic characteristics among MRT patients in Kuala Selangor

This study also revealed a high percentage of the Malay population receiving MRT, which statistically aligns with Malaysian national data indicating the highest prevalence of drug use among Malays, with Chinese and Indian populations each comprising only 6% of users.[2] Retention rates were better among those with higher education. A 2019 study in Pahang demonstrated that education level significantly influences retention among MRT patients. Educating patients about the benefits of MRT and fostering self-empowerment to improve their lifestyle may enhance retention rates.[15]

Previous research has identified employment status as influencing retention among MRT patients.[10] In this study, the retention rates were nearly identical after one year of follow-up: 89.3% for employed individuals and 88.2% for unemployed individuals. Employed patients might recognize the benefits of MRT in maintaining their employment, while unemployed patients may find it easier to stay in treatment since they don't have job-related constraints. Additionally, marital status may also influence retention rates among MRT patients.[12] Marital status could reflect the social and community background of these populations. Among MRT patients in Kuala Selangor, single and married patients had retention rates of 94.4% and 85%, respectively, meanwhile divorced patients had a lower retention rate of 66%.

4.3 Factors influencing retention among MRT patients in Kuala Selangor; a year follow-up

This study has found that the health and social relationship section score in OTI and the physical domain in the WHOQOL-Brief may contribute to retention in the program among MRT patients. The OTI and WHOQOL-Brief instruments were administered to patients upon enrolment into the program, to evaluate diverse facets of their physiological and psychological well-being. Higher OTI scores indicate greater severity of the assessed parameter, whereas higher WHOQOL scores signify a positive direction *ie* better quality of life.

This study revealed that individuals experiencing severe social-relationship dysfunction were 14.6% less likely to stay in the program (OR: 0.854, 95% CI: 0.745 - 0.979). These patients exhibiting social dysfunction often face challenges such as unstable housing, interpersonal conflicts within family and social circles, frequent employment transitions, and lack of close social connections. Thus, it is imperative to strengthen the social support system for MRT patients. This can be achieved by optimizing the function of non-governmental organizations (NGOs) or by establishing local NGOs in the district to foster a sense of belonging and responsibility among patients. Structured government programs like employment opportunities for MRT patients, financial assistance for business start-ups or agricultural ventures, and vocational training may help in reducing social problems among methadone patients, as well as their families and the broader community. Furthermore, in the era of social media, digital campaigns about methadone treatment and its positive effects can help reduce the social stigma associated with MRT patients.

This study also showed that patients with more severe health status were more likely to remain in the MRT program (OR: 1.797, CI: 1.056 - 3.057), suggesting that poorer health may serve as a motivator for continued treatment. Conversely, those who perceived themselves to be in good physical health had a 16% lower likelihood of retention (OR: 0.840, CI: 0.738 - 0.957), indicating that individuals who feel physically well may underestimate the necessity of continued treatment. A health-seeking behaviour study in 2022 among Malaysians demonstrated that self-reported sickness among urban and rural populations who rated their health as good to excellent were less likely to seek treatment than those who rated poor to very poor.[16] This aligns with our findings, emphasizing the need for targeted interventions in MRT. Even more, for individuals with a history of heroin abuse, remaining in the MRT program is crucial for maintaining functionality and ultimately achieving abstinence.

Therefore, consultation sessions with MRT patients should emphasize their understanding of their health condition and the importance of continuing MRT. They must know that MRT, like other chronic diseases, aims to improve their quality of life and functionality through treatment. Adapting the patient documentation system currently used for noncommunicable disease (NCD) patients in Malaysia, the MRT program should also implement structured documentation at every appointment. This structured documentation should highlight patient's understanding of their health status, rather than relying solely on regular continuation sheets which could miss several aspects of patient care.

Our study found that the distance from the clinic was not significantly associated with patient retention in the MRT

program. We analyzed the distance by grouping patients into those living within 5 km of the clinic as the closest group, and those living more than 10 km away as the farthest group. Regardless of their location, patients may or may not attend the MRT clinic for continuation of care. Therefore, instead of establishing multiple centers in the district to address logistical issues among MRT patients, medical care should focus on other aspects such as healthcare personnel training to improve service delivery in the MRT program. A study in 2022 on HIV care found that patient-centered approaches, including case management and socioeconomic support, significantly improved retention in care.[17] Consequently, empowering medical providers by implementing comprehensive and consistent training modules is essential to achieve better long-term retention.

4.4 Strength and limitation

The study analyzed patients from socio-demographic backgrounds that reflect the true diversity among the Malaysian population. However, the missing record could represent the non-retention patient which could be included in the analysis if the data were available. We also could not analyzed in detail regarding OTI drug-seeking behaviour, sexual activity, and criminality as most scores given by the patients were likely limited by their ability to reveal their true activity and perception.

5. CONCLUSION

Retention rate in Kuala Selangor was decreasing in trend over 5 years. Patients with poor physical perception of QOL and a higher degree of health dysfunction in OTI were more likely to remain in the program. Social dysfunction leads to poor retention in the MRT. Knowing this, addressing their health condition during consultation and building up resources for social support is the key to ensuring their continuity in follow-up. This effort could eventually leads to reduce complication associated with opioid abuse and healthcare cost associated with it.

ETHICS APPROVAL

Ethical approval to conduct the study was obtained from the Medical Research and Ethics Committee Ministry of Health, Malaysia. Data collection approval was also obtained from Kuala Selangor Health District, Selangor, Malaysia. Data collected were collected using coded patient record and remain anonymous. All collected information was kept confidential in and only accessible by our researchers.

CONFLICT OF INTEREST

We declare that we have no conflict of interest related to this study.

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