

Estimation of out-of-pocket costs of patients at the methadone maintenance therapy clinic in Malaysia

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Abstract: Out-of-pocket (OOP) payments may burden Methadone Maintenance Clinic patients. Since treatment is fully subsidized by the government, financial constraint might lead to patients being made to pay or be given incentive for inconvenience of therapy. This study thus evaluates the characteristic and commitment of methadone therapy patient's in terms of OOP cost, Willingness-To-Pay (WTP) and Willingness-To-Accept (WTA) concept. This survey utilizes the questionnaire by Boris ova & Goodman (2003) on the OOP, WTP and WTA. The forty adult patient's selected medical records from year 2009-2011 were from an urban government methadone clinic. Subject's selection was by convenient sampling based on the predetermined criteria. Most were male (95%) and Malay (60%) was the predominant group. Patients were group into three income groups; \leq RM1000, \geq RM1000 - \leq RM2000 and \geq RM3000. The average OOP cost per month was RM391.30 (s.d RM337.50), which is about 35% of employed patient's monthly income. The wide variation could be attributed by high inter-individual and significant differences between patients in terms of transport, times taken to clinic, cost per trip and weekly household income ($p < 0.05$). Patients with income of less than RM1000 showed the highest tendency to pay for treatment, asked for the least money for inconvenience and many are unwilling to accept any payments. These findings showed that WTP and WTA is less of a concern for patients in the low-income group. To conclude, OOP payment is not a treatment barrier for most of the urban MMT patients.

Keywords: Methadone, out-of-pocket cost, willingness-to-pay, willingness-to-accept.

INTRODUCTION

The Ministry of Health Malaysia introduces guidelines for methadone maintenance therapy for opioid abusers (Ministry of Health 2005). This is in response from the Malaysian Drug Treatment Policy where the objective moved from total abstinence to harm reduction (Vicknasingam and Mazlan 2005). The pharmacy division named this activity as Methadone Maintenance Therapy Clinics (MMTC) where trained pharmacists are responsible in administering and monitoring methadone to opioid abusers. By the end of 2009, 10,730 patients have enrolled in the methadone maintenance therapy programs at 162 urban and non-urban centres (UNGASS Country Progress Report, Malaysia, 2010). Patient's entry requirements include their willingness to receive therapy on a daily basis and to remain in therapy for at least two years.

Methadone maintenance therapy reduces medical comorbidities associated with opiate addiction. In addition it decrease costs incurred by social services agencies and the criminal justice system. As a result, methadone maintenance therapy is cost-effective. According to National Institute on Drug Abuse (NIDA), the costs associated with providing methadone maintenance treatment are much less than annual costs of untreated heroin use, incarceration or abstinence treatment program (National Institute on Drug Abuse, 1995).

The reluctance of many opioid abusers to enrol in the program could be due to the out-of-pockets commitments. The health insurance definition by Bobbie Sage at About.com Guide states that: "of out-of-pocket costs is any amount of money that will have to come from the person". Out-of-pocket payments may burden these patients' often-limited source of income. The "Out Of Pocket" (OOP) estimation is useful of one's calculation on how much money has come out of your pocket. In patients at the Methadone Maintenance Clinic, their daily visits incur cost not only to loss time but also to loss of wages. Since treatment duration is unknown, the out-of-pocket payments can be a burden to themselves and families. However, in some countries, these are an important source of treatment revenue, and failure to pay these costs is an important reason why the treatment is discontinued (Padaiga, Vanagas and Bagdonas, 2004). A study by Bishai *et al* (2008) further reported heroin users were willing pay for higher rate of treatment and better case management. However, they also proposed that a combined approach of users fees and subsidization maybe optimal financing strategy for the drug treatment program.

Jones *et al* 1999 described lack of childcare and transport as two important factors among the numerous barriers to treatment. Clients in methadone maintenance are required to attend a clinic every day, so treatment attendance becomes necessary for clients' compliance and treatment effectiveness. Consequently, irregular treatment attendance entails wasted resources in terms of staff time

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and the under utilization of equipment; therefore, it is important that the factors contributing to irregular attendance be clearly understood (Borisova & Goodman, 2004).

Methadone is free of charge or for a nominal fee at most clinics. Nadelmann & McNeely (1996) argued that methadone be accessed as easily as possible to addicts in order to attract and to retain higher proportions of opiate drug users in treatment. However, the out-of-pocket transport costs and more importantly the travelling time, waiting time, and treatment time costs on a daily basis may be substantial, and possibly prohibitive. These economic barriers are identifiable and measureable and ways of minimizing or even removing them must be considered. The existence of economic barriers to treatment for addicts is important in methadone provision research (Borisova and Goodman, 2004).

Researches and evaluations that prove the effectiveness of methadone maintenance treatment is often ignored or trivialized. Most could not differentiate between methadone as used as a medication in maintenance and heroin as used in an extended addiction. As a result, stigma concerning heroin addiction changes from a modified form to methadone maintenance. Therefore, methadone maintenance patients, especially those who are employed and socially stable, suffer of an invisible stigma that affects every aspect of their lives. Stigma, therefore, is the major social issue that confronts socially rehabilitated methadone patients (Gordis, 1991).

Thus, this study aimed to evaluate the characteristic and commitment of Malaysian patients' towards methadone therapy at the MMTC in terms of their out-of-pocket cost and willingness to pay. Estimation of OOP, WTP and WTA will ultimately show the impact of MMTC patient's financial burden and perceptions on the importance of methadone therapy.

METHOD

Study design

This was a survey conducted at an urban government methadone clinic in Klang, Malaysia between 2nd February 2010 to 1st April 2010. The study received ethical approval from the Medical Research Ethical Committee (MREC), Ministry Of Health, Malaysia and the Research and Management Institute (RMI) of MARA University of Technology, Malaysia.

This survey utilizes the questionnaire by Borisova & Goodman (2003) on the OOP, WTP and WTA concept. Subject's selection was by convenient sampling based on the predetermined criteria. The inclusion and exclusion criteria: patients can be of both sexes, from any race, on continuous treatment for at least one year, age between 18 to 65 years and patients with records on interruptions in treatment or incomplete medical records excluded.

Respondent data

A data collection form recorded patient's information regarding demographic, social characteristics and laboratory examinations. All registered patients at the MMT clinic were approached and asked to participate. Details on the nature and purpose of the study were for patients who agreed and given their consent.

Out-Of-Pockets (OOP) costs estimation

The factors that can affect OOP cost towards patients' attendance, namely items of money price and time price, using a self-administered 14-question instrument by Borisova & Goodman (2003). Money price (MP) is the client's out-of-pocket expenses related to treatment. The out-of-pocket expenses included transportation cost and childcare costs. All these expenses were assessed by the self-administered questionnaire (questions 2 to 7), by asking clients by face-face interview on how much money they usually pay for their usual round-trip transportation, and for the childcare or for care of another person if needed regularly in order to attend treatment. For those clients who drove to the clinic, the estimated cost of petrol for travelling to clinic is the transportation cost.

The definition of time price is the sum in minutes required to obtain treatment by a client multiplied by the client's value of time. Time required obtaining treatment included the round-trip travel time to the clinic and the waiting time for taking methadone in the clinic. The monthly salary of employed clients gives an estimate as the value of time spent at the clinic and the reservation monthly salary as the value of time for unemployed individuals. The individuals' reservation monthly salary is valued by asking unemployed clients the minimum salary rate per month they would be willing to accept a job.

STATISTICAL ANALYSIS

Statistical analysis is by SPSS 17. Analyze data is presented in tables and charts. Chi-square tests or Fisher's Exact test were used for categorical variables. Numerical variables were however with the Mann-Whitney U-test. The limit of significance was set at $p \leq 0.05$.

RESULTS

Forty of the sixty-two patients' fulfilled the inclusion criteria and their mean age (years, SD) was 41.90(9.61). The majority of patients were male and the percentages of Malay, Chinese and Indian were 60%, 30%, 10% respectively. The mean duration of therapy (weeks, SD) was 107.99 (31.36) weeks at the time of study. Overall, 70% were employed, 2% of had more than 11 years of education while 42.5% were married.

Demographic features, pattern of substance use, health status is summarised in table 1. The mean age (SD) of starting drug abuse was 22.22 (6.81) years and 45% of

Table 1: Baseline demographic characteristics

Patients characteristics	N= 40
Mean age in years (\pm SD)	41.90 \pm 9.62 Age range: 30-58 years old
Gender	
• Female	2 (5.00%)
• Male	38 (95.00%)
Race	
• Malay	24 (60.00%)
• Chinese	12 (30.00%)
• Indian	4 (10.00%)
Education	
• No formal education &Primary	10(25.00%)
• Less than 11 years of education	28(70.00%)
• More than 11 years of education	2(5.00%)
Marital Status	
• Married	17(42.50%)
• Single	17(42.50%)
• Divorced	6(15.00%)
Working status	
• Employed	28(70.00%)
• Unemployed	12(30.00%)
Mean weeks on treatment (\pm SD)	107.9 \pm 31.36
Minimum weeks on therapy	47.30
Maximum weeks on therapy	158
History of intravenous drug use	27(67.50%)
Mean age of starting drug abuse (\pm SD)	22.22 \pm 6.81
Starting age of drug abuse	
13-20	18(45.00%)
21-30	17(42.50%)
31-40	5(12.50%)
41-50	1(2.50%)
Hepatitis B/Hepatitis C/HIV	34(85.00%)
Impaired liver function/Elevated liver Enzymes	26(65.00%)
Urinalysis negative result for 6 months prior to study	23(57.50%)

clients started substance abuse at a very early life of 13 to 20 years old. Three- fourth of the clients were hepatitis positive. Most of them had history of intravenous substance use (IVDU). 52.5% of the clients had abnormal liver function associated with hepatitis.

The initial starting dose of methadone was 20 mg in 92.50% of the patients while the highest reported dose of methadone was 130 mg per day. Attendance rate during the last one year was 87.00%. According to the patients' records, abnormalities of sleeping (46.34%) and constipation (34.15%) are the most common side effects reported by the patients. Urine samples screened for amphetamine, tetrahydrocannabinol, opioids and benzodiazepines showed negative (drug-free) for 56.10% of the clients.

Table 2 summarised the direct and indirect cost attributed to attending the MMTC for all patients. All parameters showed wide variations between patients. One patient had

no income stated and only two patients responded to indirect cost evaluation question. Thus, the final calculation for total loss of income excluded the indirect cost values. The mean Time Price and Money Price is RM248.30 and RM391.30 respectively. Time Price contributed to about 63.35% of the average cost for monthly treatment.

The average OOP cost per month was RM391.30 (s.d RM337.50), which is about 35% of employed patient's monthly income. The wide variation could be attributed by high inter-individual and significant differences between patients in terms of transport, times taken to clinic, cost per trip and weekly household income ($p < 0.05$). Thirty-five percent of patients had a total household income of less or equal to RM1000.00 while 25% had more than RM3000.00. Deduction of the total loss of income from the total household income showed that 60% of patients have income of RM1000.00 or less.

Table 2: Types of Direct and indirect cost for treatment at MMTC

Parameters	Mean values (RM, sd)	Range (RM)	Comments
Actual productivity loss due to attending clinic/trip (1)	5.13,4.18	1.11-22.22	-
Extra payment for therapy/trip (2)	8.28,7.24	2.11-34.07	-
Time price: Total extra cost per/month (1+2 X 30 days)	248.30,217.10*	63.30-1022.00	-
Income loss for trip/month (3)	94.40,97.30	30.00-488.70	-
Income loss at clinic/day (4)	1.62,1.56	0.26-8.89	-
Income loss at clinic/month (5=4 X 30 days)	48.57,46.94	7.78-266.67	-
Income loss/month (3 + 4)	143.00,129.70 [#]	41.10-755.40	-
Indirect cost/month (child-care etc)	350.00	350.00	Only 2 patients
Money Price: Total income loss/month (* + [#]) excluding indirect cost	391.30,337.50	116.70-1774.40	-
Salary/month (employed)	1256.00, 558.00	600-3500	31 patients only
Salary expected (unemployed)	1131.00, 509.00	500-2150	8 out of 9 patients only
Balance salary/month	582.00,746.00	-777.40-2930.66	No income (1 patient)
Total household income	1856, 1329	0-5000	No income (1 patient)
Total household income (RM, group) Group 1 (≤1000), N=14 Group 2 (≥1000 - ≤2000), N = 15 Group 3 (>3000), N=10	810.70,204.00 1503.30, 280.60 3850.00, 973.30		P=0.00
Balance household income	1254, 1494	143-527	No income (1 patient)
Balance household income (RM, group) Group 1 (≤1000), N=24 Group 2 (≥1000 - ≤2000), N=7 Group 3 (>3000), N=8	347.90,204.60 1311.60,183.80 3924.90,991.40		P=0.00

Group 2 displayed the highest percentage of patients who were unwilling to pay and had intention to stop treatment. They also asked for the most money for inconvenience due to relocation and only 26.67% (4 patients) were unwilling to accept payment and stopped treatment.

Group 3 were patients with a total household income of more than RM3000. 39% and 40% of these patients were however unwilling to pay for therapy even if the clinic is near or the travelled distance is double. However, 90% of patients were willingly to accept payment for inconvenience due to clinic relocation.

Table 3 summarized the outcome variables for money price (MP) and time price (TP). Results showed significant correlation for MP to household income, mode of transport and employment. This showed that those with highest income were less concern on the amount of money for treatment. Race, marital status and attendance had no effect on MP.

Finally, the questions 10 to 13 of the questionnaire provided an estimation of WTP and WTA. Table 4 summarised the patients' answers to WTP and WTA questions. Group 1 patients showed the highest tendency to pay for treatment although their income was less than RM1000 per month. Six patients (42.86%) intended to

stop therapy if treatment fee is charge when the distance is double. Group 1 patients asked for the least money for inconvenience if the facility is move back to its original location and 50% of them are unwilling to accept any payments.

TP showed correlation with patient's income and mode of transport only. Household income and attendance factors although showed insignificant correlation could possibly highlight the link between family supports towards patient's treatment. Marital status, race and attendance similarly had no effect on TP.

The results in table 5 showed that although most patients were willing to pay for therapy, some still opt to stop therapy is ever any fee is charge. The differences in response between the three groups of patients for all four questions were however not significant. The findings highlight that income might not the important parameter in quantifying patient's willingness to-pay for methadone therapy.

DISCUSSION

MMT practice in Malaysia is in line with the WHO guidelines and of other countries (Anton Hart 2006, White and Mojer-Torres 2010, Gerlach 2004). The method of

Table 3: Effect of money price and time price on variables

Variables	Money Price (RM, SD)	P value	Time Price (RM, SD)	P value
Income (RM)				
≤1000	2.19,3.27	0.67	1.15,0.72	0.03
>1000 - ≤2000	3.47,3.34		1.63,0.96	
>2000	5.60		3.24	
Household income				
≤1000	2.40,1.24	0.03	1.12,0.71	0.23
>1000 - ≤2000	2.50,1.40		1.71,1.02	
>2000	5.49,5.62		1.39,0.91	
Mode of transport				
Drive	7.52,3.83	0.00	2.32,1.36	0.02
Motorcycle	2.49,2.78		1.27,0.69	
Others	2.75,1.89		0.98,0.69	
Marital status				
Married	3.09,2.29	1.00	1.49,0.79	0.88
Unmarried	3.19,3.64		1.32,1.12	
Divorce	3.17,4.83		1.41,0.55	
Employment				
Employed	3.56,3.59	0.02	1.54,0.92	0.07
Unemployed	2.11,1.27		0.90,0.62	
Race				
Malay	4.12,3.83	0.24	1.36,0.85	0.70
Non-Malay	1.69,1.01		0.90,0.62	
Attendance				
No missed attendance	3.44,3.86	0.71	1.39,1.05	0.88
With missed attendance	3.05,2.69		1.43,0.69	
Mean, SD	3.15,3.24		1.41,0.90	

studying on patients treated for more than a year is applicable (Strike *et al.*, 2008) while evaluation of outcome before one year would be problematic as patients dose needs to be stabilized (Mohamad *et al.*, 2010). MMT clinics in Malaysia are mostly in the primary healthcare setting for easier accessibility and practitioners are empowered to scale up the service (Norsiah *et al.*, 2010).

Out-of-pocket payment is an important health-care issue for the treatment of many chronic diseases. High levels of out-of-pocket spending on medical care often contribute to financial difficulties for families, including bankruptcy. Such costs can also induce people to delay or even forgo entirely-needed medical care (Cunningham 2009). As a result, the financial burden of out-of-pocket expenditures has increased commensurately (Banthin *et al.*, 2008, Foster 2010). Since addiction can be considered a chronic disease, persistently high out-of-pocket expenditures pose an even greater threat to families' financial well-being.

The above problem is clearly observed by the high percentage of mean time price (63.35%) that is similar to that observed by McCollister *et al* (2009) (59%). These findings clearly showed the high out-of-pocket cost for therapy with respect to the patient's own and household monthly income. A report by Mondal *et al* 2010 also highlighted that high out-of-pocket can be catastrophic for

the household in East Bengal is a possibility in Malaysia. Thus, the report by Blankertz *et al* 2003 that stresses that employment is crucial for the success of methadone maintenance therapy is true and needs serious attention.

In Malaysia, the number of drug abusers has risen significantly. The percentage of those undergoing treatment at MMTC is targeted at 25,000 patients and can be considered as very low to the total number of drug abusers (Ministry of Health 2010). This is due to the treatment is voluntary and many opted for other types of therapy. However the reasons for patient's reluctance to participate could be possibly be due to inconvenience, out-of-pocket and medical cost and therapy related case management (Bishai *et al* 2008).

This study examined the OOP payments and WTP by patients attending the MMTC. The patients are rather young and Malays are the predominant race. Treatment is free-of charge and many remained treated beyond two years and similar to that reported by Musa *et al* 2011. Most of these patients observed the compulsory daily visits to the clinic.

OOP payments are not affected by the differences on mode of transport and treatment round trip cost only but also by employment status. This is logical since those

Table 4: Total household income groups respond to WTP questions

Questions	Group 1(14)	Group 2(15)	Group 3(10)	P value
10) If you had to pay for each visit, what is the most money (RM) you would be willing to pay.	26.29,78.87	5.07,8.13	9.10,8.96	0.47
No of patients not willing to pay and stopped therapy	1(7.14%)	6 (40%)	3(39%)	-
11) If it took you twice as long as usual to travel to this clinic and if you had to pay(RM), what is the most money you would be willing to pay for each visit.	3.57,5.53	3.27,5.80	6.00,7.38	0.52
No of patients not willing to pay and stopped therapy	6 (42.86%)	7 (46.67%)	4 (40%)	-
12) If this clinic were moved right NEXT DOOR to where you live for your convenience and if you had to pay, what is the MOST money you would be willing to pay for each visit. (RM).	8.43,8.02	8.80,13.69	10.80,7.92	0.85
No of patients not willing to pay and stopped therapy	1(7.14%)	3 (20%)	0 (%)	-
13) If this clinic was move back to its original place and offered you money for your inconvenience, what is the LEAST money you would be willing to receive for each visit. (RM)	5.07,7.26	13.47,18.19	8.76,6.76	0.21
No of patients not willing to accept payment	7 (50%)	4 (26.67%)	1(10%)	-

Group 1 (≤ 1000), Group 2 ($\geq 1000 - \leq 2000$), Group 3 (> 2000)

who drove would incur more cost per trip when compared with those who came on motorcycle and other cheaper transport. Employability improvement indicates that there is considerable relationship between entering methadone maintenance therapy and employment status. This emphasizes that entering a maintenance therapy may help the patients to re-integrate within the society. This finding is consistent with the report by Francis *et al* 2004 where they evaluated forty-four clients for one to 278 months and the result showed that 61.4% of the participants gained employment status.

This study contradicts with the findings by Boris ova & Goodman (2004) stating higher financial status, money and time prices are associated with lower attendance rate. The reason for these differences could be treatment in Malaysia is free and patients only pay for their transport to the clinic. However, the present study showed the possibility of lower attendance for the lower income group if ever this service is charged. Boris Ova & Goodman (2004) suggested that both time and money function as rationing devices for methadone maintenance clients are for those with higher financial status only.

The elimination of methadone treatment benefits could change the scenario of the socio-economic drug abusers in Malaysia. Problems such as poor retention rate, absenteeism, employability and even housing is a possibility. These problems were listed by Fuller *et al* 2006 when the elimination of methadone benefits in the Oregon Health Plan (OHP). The findings showed substantial negative impacts for patients with the greatest indicators of need and more importantly patients left treatment because they were unable to pay for methadone services. They further iterated that patients showed

significant elevations in Addiction Severity Index (ASI) composite scores for drug and legal problems at baseline and at two and three months after the policy change. The patients who attempted to self-pay however experienced significantly more employment problems and stable housing. These issues are nevertheless not observed in this current study because of the possible strong family support and free treatment.

However, generally, present findings are questionable due to the small number of respondents and the facility urban location. Thus, future multi-center study on urban and non-urban facility patients would be more appropriate.

CONCLUSION

The aim of this study was to examine the effect of OOP, WTP and WTA on methadone maintenance therapy treated patients. Although there were limitations such as small sample size and its urban patients' location, this study was able to highlight several invaluable informations.

Firstly, the study showed that admission to the MMTC program led to better employability with at least a quarter gained employment after one year. The average OOP cost per month was RM391.30 (s.d RM337.50), which is about 35% of employed mean patient's monthly income. The wide variation could be attributed by high inter-individual and significant differences between patients in terms of transport, times taken to clinic, cost per trip and weekly household income. OOP payments are not affected by the differences on mode of transport and treatment round trip cost only but also by employment status.

Patients with income of less than RM1000 showed the highest tendency to pay for treatment, asked for the least money for inconvenience, and many are unwilling to accept any payments. These findings showed that WTP and WTA is less of a concern for patients in the low-income group. Finally, OOP payment is not a treatment barrier for most of the urban Malaysian MMT patients.

REFERENCES

- Anton Hart W (2007). Report of the methadone treatment practices task force. *Ontario Canada*, Ontario Canada. Ontario Ministry of Health and Long term care.
- Banthin JS, Cunningham PJ and Bernard DM (2008). Financial Burden of Health Care 2001-2004. *Health Affairs*, **27**(1): 188-195.
- Bishai D, Sindelar J and Ricketts EP *et al* (2008). Willingness to pay for drug rehabilitation: Implementation for cost recovery. *J. Health Econ.*, **27**(4): 959-972.
- Blankertz L, Magura S, Madison E and Spinelli M (2003). Chapter 1: Importance of work of methadone patients and the origin model. Comprehensive employment support manual. National Development and Research Institute, Inc. New York.
- Bobbie Sage. <http://personalinsure.about.com/od/insurancetermsglossary/g/Out-Of-Pocket.htm>
- Borisova NN and Goodman AC (2004). The effects of time and money prices on treatment attendance for methadone maintenance clients. *J. Subst. Abuse Treat.*, **26**(1): 43-45.
- Borisova NN and Goodman AC (2004). The effects of time and money prices on treatment attendance for methadone maintenance clients. *J Subst. Abuse Treat.*, **30**: 345-352.
- Cunningham PJ (2009). Chronic burdens: The persistently high out-of-pocket expenses faced by many Americans with chronic conditions. *The@ Commonwealth Fund*, **63**: 1-14.
- Foster AC (2010). Out-of-pocket healthcare expenditure: A comparison. *Monthly Labour Review*, pp.1-19.
- Fuller BE, Rieckman TR and McCarty DJ *et al* (2006). Psychiatric Services, *pspsychiatryonline.org*, **57**(5): 606-691.
- Gerlach R (2004). Methadone and other opiates substitution treatments in Germany. www.indro-online.de/regssgermany.htm
- Gordis E (1991). From science to social policy: An uncertain road. *Journal of Studies Alcohol (NIAAA,RUTGERS)*, **52**(2): 101-109
- Jones HE, Velez ML, McCaul ME and Svikis DS (1999). Special treatment issues for women. In: E.C. Strain and M.L. Stitzer (Eds), *Methadone treatment for opioid dependence*, pp.251-280.
- McCollister KE, French MT and Pyne JM *et al* (2009). The cost of treating addiction from the client's perspective: Results from a multi-modality application of the Chart DATACAP. *Drug Alcohol Dependence*, **104**(3): 241-248.
- Ministry of Health Malaysia (2010). AIDS/STD sections, disease control division. UNGASS country progress Report - Malaysia, pp.46-47.
- Ministry of Health Malaysia Putrajaya. (2005). National methadone maintenance therapy guidelines, p.49.
- Mondal S, Kanjilal B, Peters DH and Lucas H (2010). Catastrophic out-of-pocket payment for health care and its impact on household: Experience from West Bengal India. Received from <http://www.futurehealthsystems.org>.
- Nadelmann E and McNeely J (1996). Doing Methadone Right. *Public Interest*, **123**: 83-93.
- Nasir M, Nor Hidayah AB and Nurfadhlin M *et al* (2010). Better retention of Malaysian opiate dependents treated with high dose methadone in methadone maintenance therapy. *Harm Reduction Journal*, **7**(30): 1-8.
- Nasir M, Nor Hidayah AB and Sanjaya KC *et al*. Personalized methadone therapy: Clinically stable patients with high dose plasma methadone and prolonged QTC, a safer approach in methadone maintenance therapy, pp.1-4.
- National Institute on Drug Abuse (1995). Methadone Maintenance: Translating Research into policy. National Institute on Drug Abuse (NIDA), 251 Bayview Boulevard, Baltimore, Maryland, 21224.
- National Institute on Drug Abuse (2009). The science of Drug Abuse & Addiction. Retrieved from <http://drugabuse.gov/infofacts>
- National Institute on Drug Abuse (2009). Principle of drug addiction treatment: A research –based guide. Retrieved from <http://www.drugabuse.gov/PODAT/>
- Norsiah A, Dharmananda S, Nazri MM, BWH Lee and Khalijah MY (2010). Can primary care clinics run MMT service well. *Malaysian Family Physician Journal*, **5**(1): 19-23.
- Padaiga Z, Giedrius V and Eugenjus B (2004). Cost analysis in economic evaluation of methadone maintenance treatment: A methodological approach. *Alcoholism*, **17**: 21-28.
- Pharmacy Division, Ministry of Health, Malaysia (2005). Methadone Replacement Therapy Dispensing Guideline, pp.1-30.
- Strike CJ, Gnam W and Urbanoski K, Fischer B, Marsh D and Millson M (2008). retention in methadone maintenance treatment: A preliminary analysis of the role of transfers between methadone prescribing physicians. *The Open Addiction Journal*, **1**: 10-13.
- Vicknasingam B and Mazlan M (2008). Malaysian Drug Treatment Policy: An evolution from abstinence to harm reduction. *Malaysian Anti Drugs Journal*, 107-121.