Published in final edited form as:

J Ethn Subst Abuse. 2017 ; 16(3): 363–379. doi:10.1080/15332640.2016.1196632.

Attitudes toward medication-assisted treatment among fishermen in Kuantan, Malaysia, who inject drugs

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Abstract

Fishermen who inject drugs represent an understudied group at high risk for HIV in Malaysia. This study describes fishing, drug use, and attitudes toward medication-assisted treatment (MAT) for opioid use disorders. Thirty-four male ethnic Malay fishermen completed semistructured interviews analyzed by content analysis. Analysis revealed four themes surrounding opioids, which they called ubat (“medicine”): (a) the fishing lifestyle facilitating substance use, (b) previous unsuccessful attempts to quit, (c) categorizing substances as haram or halal, and (d) attitudes toward MAT. Fishermen’s environment permits substance use, including injecting drugs on boats. Fishermen expressed more positive attitudes toward methadone and negative attitudes toward buprenorphine.

Keywords

Buprenorphine; fishermen; injection drug use; Malaysia; medication-assisted treatment; methadone

Introduction

Southeast Asia had an estimated 2.4–4.4 million people who inject drugs (PWID) as of 2013 (United Nations Office on Drugs and Crime, 2014), with over two thirds of HIV cases in Malaysia among PWIDs (Bergstrom, Kamarulzaman, Khalib, & Kah Sin, 2012). Asian fisherfolk have been identified as a large yet understudied HIV risk group (Allison & Seeley, 2004) with HIV prevalence among them being tenfold that of the general population (Kissling et al., 2005). Malaysia’s Ministry of Health reported in 2008 that fishing was the

second most common work category for Malaysians with HIV, accounting for 3.8% of all new cases (Choo, 2009).

The city of Kuantan is home to one of the busiest commercial fishing jetties in the country, located on the east coast of peninsular Malaysia. In 2009, 38% of Kuantan's fishermen injected drugs, and 34% of PWIDs were HIV-infected (Choo, 2010). High mobility has been cited as a contributor to HIV transmission in fisherfolk (Kissling et al., 2005). A recent mixed-method study of the risk environment and fishing social networks in this region, however, found that social relationships on boats drive drug use and HIV risk and that captains and crewmembers were not only aware of drug use but also, in some cases, provided drugs to their crew (West et al., 2014). Our study focuses on drug use behaviors and attitudes toward medication-assisted treatment (MAT) for opioid addiction among fishermen PWIDs in an effort to identify appropriate treatment options that would not only complement their way of life but also reduce HIV transmission.

Medication-assisted treatments are pharmacological medications that, when combined with behavioral therapies, effectively treat substance use disorders. With three pharmacological MATs available for opioid use disorders, there is significant potential for stemming the epidemic of opioid use disorders: maintenance treatment with methadone (MMT), buprenorphine (BMT), and extended-release naltrexone (XR-NTX). These evidence-based treatments, despite reducing HIV transmission and overdose, are often under-scaled due to personal or structural impediments. For example, methadone is often highly regulated and is often restricted to specialized treatment centers or administered by physicians with specialized training, while both BMT and XR-NTX can be prescribed in a wider variety of clinical care settings (Walley et al., 2008). Each MAT, however, differs with regard to pharmacology, route of administration (oral, sublingual, or injection), duration of effect (daily versus monthly), additional benefits of treating alcohol use disorders (XR-NTX), prevention of overdose and opioid craving, side effects, drug interactions (with HIV or other medications), cost, effect on retention, and patient preferences (Altice, Kamarulzaman, Soriano, Schechter, & Friedland, 2010; Bruce, Kresina, & McCance-Katz, 2010).

MATs to treat opioid addiction have been available privately in for-profit clinics in Malaysia using buprenorphine (BMT) since 2002 (Bruce et al., 2008) and with free government-funded MMT since 2006 (Musa, Abu Bakar, & Ali Khan, 2012); all BMT and MMT at privately operated clinics is available as fee for service (Noordin, Merican, Rahman, Lee, & Ramly, 2008). Despite the availability of MAT, there remain problems with implementing BMT services in Malaysia (Vicknasingam, Dazali, Singh, Schottenfeld, & Chawarski, 2015). One study assessing addiction treatment readiness and attitudes toward MMT and BMT among 460 Malaysian PWIDs identified more use of the two medications outside of treatment settings than as part of addiction treatment (methadone: 55.2% versus 9.3%; buprenorphine: 51.7% versus 12.6%) and a preference for methadone over buprenorphine (Vijay, Bazazi, Yee, Kamarulzaman, & Altice, 2015). Free MMT has been expanded to Malaysian prisons (Wickersham, Marcus, Kamarulzaman, Zahari, & Altice, 2013; Wickersham, Zahari, Azar, Kamarulzaman, & Altice, 2013). A study of HIV-infected Malaysian prisoners who met criteria for opioid dependence found that 70% expressed interest in learning about MAT, 51% believed that MAT would be helpful, but only 33%

believed they needed it to prevent relapse after release from prison (Bachiredy et al., 2011), suggesting there was little support of opioid use disorders as chronic, relapsing conditions.

A 2014 study of prisoners meeting preincarceration criteria for opioid dependence found that only 45% would be willing to receive MMT within prison (Mukherjee et al., 2016). Once in treatment, however, Malaysian opioid-dependent patients reported satisfaction with methadone services (Aziz & Chong, 2014). There is growing interest in patient–treatment matching to improve treatment outcomes by thoroughly assessing patients’ functional status and medical, psychiatric, and psychosocial needs (Center for Substance Abuse Treatment, 2005). The goal of this study was to use qualitative interviewing with Kuantan fishermen to understand attitudes toward MAT as a way to anticipate which treatment might be most successful in this high-risk population, given its distinct occupational culture and risk environment. This research uses the conceptual framework of the risk environment (Rhodes, 2009), which argues that relations between individuals and environments affect the production and reduction of drug harms. Therefore, we attempt to build on recent work on drug use in this population of fishermen to understand how their daily habits, work expectations, and outlook on their occupation may provide opportunities for future patient–treatment matching to treat their substance use.

Methods

This study used a qualitative conventional content analysis strategy (Hsieh & Shannon, 2005) to understand fishermen and their drug use. This approach is typically used to identify a phenomenon that is not well understood—in this case, the attitudes of Kuantan fishermen toward medication-assisted treatment for addressing their HIV risk and opioid use disorders. Thirty-four semistructured qualitative interviews were conducted with fisherman PWID from June to July 2012 in the Malaysian state of Pahang in Kuantan and Beserah, a neighboring fishing village on the eastern coast of peninsular Malaysia. Data from Malaysia suggest there have been no significant changes in MAT scale-up since 2012 (Degenhardt et al., 2014). Inclusion criteria included age 18 years or older, able to speak Bahasa Malaysia or English, working as a fisherman in the previous 6 months, and reporting injecting drugs in the past 30 days, verifiable by presenting or describing active cutaneous injection sites. Recruitment was initially conducted purposively by an outreach worker who was familiar with local fishermen who approached potential participants face to face; snowball sampling with recruited fishermen was an additional recruitment strategy. Interviews were conducted in a private room at the Kuantan jetty by an American graduate student in public health [RE] with a Malaysian research assistant who was fluent in English and the Kuantan dialect of Bahasa Malaysia. Throughout each interview, the Malaysia research assistant interpreted all questions and responses so that interviewer and participant could understand all content. Each interview lasted approximately 90 minutes (range: 19–117 minutes); the shortest interviews ended early because the participant was experiencing symptoms of opioid withdrawal. There were no repeated interviews. Each interview participant was compensated 40 ringgit (12.85 USD) for his time. Institutional review boards at Yale School of Medicine and the University of Malaya approved the study.

An interview guide [developed by JW, AK, and FL] addressed open-ended questions about life as a fisherman, past drug experiences and recent drug use in the previous 30 days, incarceration history, sources of health care and social support for drug dependence, previous attempts to quit drugs, and experience with and attitudes toward three types of MAT for opioid dependence: methadone, buprenorphine/naloxone, and extended-release naltrexone. For the questions about MAT, a brief description of each treatment modality adapted from the Substance Abuse and Mental Health Services Administration (2015) was read to the participant before questions about the medication were asked. Participants are identified by number with some personal characteristics in Table 1. Interviews were digitally recorded and transcribed by local research assistants fluent in Bahasa Malaysia and English. Each transcript was translated into English by a team of five individuals in the United States and Malaysia who were fluent in Bahasa Malaysia and English and back translated to ensure accurate interpretation (Brislin, 1970).

This research fits best in the category of an exploratory thematic survey based on the qualitative studies in the health domain developed by Sandelowski and Barroso (2003). Participants' responses were frequently short sentences and one-word answers, which is not typical of qualitative research, which prides itself on eliciting rich, detailed responses. Despite efforts to probe for additional details during the interviews, participants gave very brief responses. As an example, one fisherman (38) was self-deprecating about his own knowledge, saying that he was not "clever." To prepare the transcripts for analysis, participants' demographic information was entered into the online survey software Qualtrics (2015) instead of qualitative software we originally intended to use to facilitate our analysis. Responses to interview questions were also entered into Qualtrics and downloaded into Microsoft Excel and Word to make themes relating to the risk environment and MAT easier to recognize. We numerically coded similar responses for ease in identifying patterns and analyzed them with IBM SPSS version 21 (IBM Corp, 2013). Three researchers [SB, RM, and AP] reviewed the transcripts, met to discuss the responses, and arranged the responses into salient major themes that comprised underlying or latent patterns in the data. With the goal of identifying patterns, the researchers identified words in the text that captured key concepts relating to potential facilitators and barriers to uptake of substance use treatment. Our desire was to stay close to the language of the participants, especially since the responses had already been translated. Although 39 fishermen were interviewed, two audio files were too damaged to be transcribed and three interviews ended too early to be included in the analysis, resulting in 34 interviews used for analysis.

Results

Demographics and sample characteristics

Participants' socioeconomic information is summarized in Table 2. All participants were male, of Malay ethnicity, and Muslim; 15 (44.1%) were married; 12 (35.3%) had completed at least middle school (Form 3). Three participants reported being HIV-infected. Most of the participants (64.7%) preferred heroin, followed by morphine (11.8%). Several fisherman frequented drug dealers asking for *ubat*, which means "medicine," and they would receive whatever the drug dealer had that day. From the analysis, the following themes emerged: (a)

fishing as a “good job” for ongoing substance use, (b) previous unsuccessful attempts to quit, (c) designation of substances as haram or halal, and (d) attitudes toward medication-assisted treatment. The first two themes allow for description of the risk environment in the participants’ own words, which relates to how the fishermen attempted to stop their substance use. The remaining themes provide insight into how participants fit medication-assisted treatment into their existing viewpoints on substance use treatment.

Fishing as a good job for ongoing substance use

Participants had, on average, worked as fishermen for 13.3 years and earned 1,240 ringgit (~335 USD) monthly. When participants were asked what they liked about being fishermen, they responded that they enjoyed the flexibility of the work, earning a higher income than on land, instant payment, and the ability to bring fresh fish home to eat. Fisherman 10 considered fishing lucrative: “Getting big sums of money means we can buy drugs easily.”

Participants differed in the number of consecutive days spent at sea: 18 spent 8–14 consecutive days, seven spent less than 24 hours away, while six fishermen spent 3–7 days at sea. Two participants stated that they could avoid drugs because they do not take drugs while on the boat. The boat, however, was the most recent site of last injection ($N=12$, 46.2%), with some injections occurring within hours of the interview. Several participants mentioned feeling more productive in their work when they were using drugs while on a fishing boat. For Fisherman 37, drug use was related to productivity: “To lift the fish up, I need drugs.” Fisherman 30 stated that he brings a small supply of drugs with him onto the boat because “I do crave but where can I find it in the middle of the sea? The boss of the boat won’t turn back. So, I cannot go back. I only bring a small amount.” Fisherman 36 also said that he brought drugs on the boat because authority figures seemed to overlook drug use as long as the fishermen were working.

Interviewer: When you are on the boat out at sea, are you allowed to bring drugs?

Fisherman 36: Not all bosses will let you. Some won’t let you, some will. The boss doesn’t give us the thing, we bring it ourselves.

Interviewer: What about your skipper?

Fisherman 36: He allows.

The time away from land increased the risk of cravings, as Fisherman 1 explained: “If I were to stay at sea for 12 days, I can do work, nonstop working even though without drugs. I am able to stop using heroin. Even after 12 days and heading back to shore, I can still endure but you know what they say about addicts, 12 days at sea is suffering for them and in less than half an hour [back on land] they will search for it again.” Fisherman 33 believed doing drugs at sea was safer than on land: “Being an addict at sea would mean they would be less likely to be caught by the police. But if [a fisherman] worked a normal day job with fixed hours, it is much easier to be caught.”

Previous attempts to quit using drugs

Multiple methods were used to stop injecting: on their own, being at sea, MAT, seeking a clinic, or arrest and incarceration. The majority of participants (85.3%) had previously

attempted to entirely stop their substance use, as shown in Table 4. When asked about these attempts, Fisherman 34 succinctly said, “Everyday I hope to quit.” Fisherman 32 stated that successful quitting required first a strong will and second, strong religious faith. Fisherman 23, however, stated that memorizing prayers, although beneficial in other ways, did not help him stop his substance abuse. There were equal numbers ($N=14$) of participants who had used a medication from a medical doctor to quit their substance use or had never used a medication. Five participants sought the services of a *bomoh*, a traditional healer, but explained that the healer’s actions did not curb the cravings. Several participants described temporary lock-up, prison, and compulsory drug detention centers known as *Pusat Serenti* as places where they stopped using drugs because they were detained or incarcerated, as Table 3 shows. Fisherman 15 explained that Pusat Serenti helped him connect more strongly with Islam but did not help his drug problem. Fisherman 14 described his relapse after leaving Pusat Serenti: “I didn’t take [drugs] when I was in Pusat Serenti. When I was released, I took drugs again.”

Designation of substances as haram or halal

The Islamic terms *haram* (forbidden) and *halal* (lawful) were used by the fishermen during the interviews to categorize substances, including MAT medications. As an example, Fisherman 33 stated, “There are types of heroin which are halal but the way in which it is ingested, that’s haram. Since it’s harmful.” Fisherman 12 described his criterion, which he based in intent: “Anything that can make us get high is haram, but if it’s for the good purpose of medication, it might not be haram ... if it does not make us high, it is not haram.” Fisherman 18 also stated that anything that makes someone feel high is haram but also explained that using correct doses of methadone, for example, is halal use. This participant explained that the religious month of Ramadan may change how some substances affect the body because of fasting; some substances, because of the fasting, might cause euphoria and would therefore be haram. Fisherman 36 was concerned about whether the substance was a drug, since “everything made from drugs is haram.” He defined a drug as something that makes a person hallucinate; this is the same designation described by Fisherman 38. Fisherman 14, whose replies were overall less sure about whether MATs were halal, considered them all haram. Three other fishermen considered methadone haram specifically because of its ability to cause euphoria. Fisherman 39 stated that he would prefer to take a medication to address substance use that does not cause euphoria over one that would.

Attitudes toward methadone, buprenorphine, extended-release naltrexone

Some participants (47.1%) stated that they believed people who have problems with heroin use could be treated (Table 4). Fisherman 32, however, stated that he preferred to use willpower to combat cravings. Table 5 presents responses to questions gauging level of interest in each medication after the research assistant read a medically accurate description about each medication-assisted treatment adapted from the Substance Abuse and Mental Health Services Administration (Center for Substance Abuse Treatment, 2005, 2009).

Methadone

Most participants ($n=29$, 85.3%) had previously heard of methadone and nine (26.5%) had been previously prescribed it. Some participants reported bringing drugs and MAT on the

boats. Fisherman 37 said, “To do my job, I take methadone to feel refreshed. If not I could not do my job.” Participants expressed favorable attitudes toward methadone perhaps because, as Fisherman 12 pointed out, this is the medication with which the fishermen have the most familiarity. Fisherman 3 stated that villagers also know methadone: “Yes, drugs are bad but people can accept methadone. The villagers accept us using methadone because it represents that we have stopped using illegal drugs.” Fisherman 12 also noted that taking methadone interferes with their jobs as fishermen and often requires them to travel to the clinic every day, which places them at greater risk for being harassed or detained by the police, who often wait outside methadone clinics to identify possible drug users. He also said, “Most fisherman don’t have their own transport to obtain their methadone supply every day.” Fisherman 15 said that the clinic was far from the docks and they would miss work to go to the clinic. Fisherman 18 was concerned about becoming addicted to methadone: “Methadone just can give harm instead of curing.” Fisherman 6 believed that addiction to methadone had no cure.

Being away from land seemed to interfere with methadone use. Fisherman 39 said, “When I don’t have transport [to the clinic], the bottle I take [on the boat] can last for 3 days. Two caps I drink and twice a day, but how big is one bottle?” Fisherman 9 was concerned about methadone lowering his work productivity: “Because when I use methadone, when I drink it, it’s hard for me to work far away, the addiction is very bad, even worse than the addiction of morphine. I also feel demotivated to work.” Fisherman 10 stated, “I’m interested. When I went to the place where they issue methadone, they asked what I am working as and I told them fisherman. They said methadone won’t work on fishermen because I won’t be on shore daily to take methadone.”

Buprenorphine

Most participants ($N=28$, 82.4%) had previously heard of buprenorphine and six (17.6%) had previously been prescribed it. Most participants were either uninterested or very uninterested in buprenorphine. Buprenorphine was more frequently associated with danger than the other two MATs. Fisherman 13 said, “I am interested in [buprenorphine]; I’m just scared of using it wrongly.” Fisherman 14 stated that he knew two friends who had died from taking buprenorphine. Fishermen 30 and 21 stated that taking buprenorphine would make someone gaunt: “You will become skinny. You become skinny because you are ill” (#21). Another fisherman said that taking buprenorphine would put them at risk with police: I was caught [under Section 12 (2), Dangerous Drugs Act] because I kept as many as 8 [buprenorphine] pills” (#23). Fisherman 37 said that he encountered difficulty getting larger prescriptions to take with him: “Hard to go to and fro, to the clinic. To take it, I want stock. Doctor won’t give stock. He only gives one. I need to go to sea for long periods of time. He won’t give [that to] me. Only 4 mg a day.”

Injection of buprenorphine was discussed; 20 fishermen (58.8%) reported having ever injected buprenorphine. Fisherman 37 stated that methadone was dangerous because of the risk of overdose, but he also said that buprenorphine is “more dangerous because it is sweet and some take [it by] injection” or mix with benzodiazepines. Fisherman 7 seemed afraid of what would happen if he swallowed the medication instead of injecting it, even though

orally is the clinically directed route of administration: “Because it ‘consumes us from the inside’ destroys us internally when we inject it. I don’t know what will happen if I swallow.”

Extended-release naltrexone

Compared to other MATs, only 4 (11.8%) had previously heard of extended-release naltrexone and none had been previously prescribed it. The distribution of interest was more evenly spread across the responses than for methadone and buprenorphine. Only four participants believed that they would be fearful of an injectable medication. Participants stated that they could not give their opinions about something they had not yet tried.

Discussion

This study presents the attitudes of 34 fishermen in Kuantan, Malaysia, toward medication-assisted treatment for opioid use disorders as a way of gauging potential uptake of MAT for future interventions in this local context. Critical issues identified that could potentially increase acceptability of treatment for this population include (a) social marketing that aligns MAT as halal, both by addiction treatment providers and clerics; (b) making MAT like methadone or buprenorphine available as “take-home” doses so that fisher-folk can take the medication with them during prolonged fishing expeditions; and (c) increasing knowledge about longer-acting treatments such as extended-release naltrexone that would neither interfere with their cognition (described for methadone) nor be constrained by daily dosing. This sample is homogenous in terms of ethnicity, religion, and gender but is not a representative sample of all Kuantan fishermen with opioid dependence. Using a conceptual framework of the risk environment, this study extends the work of Project Waves (Choo, 2009, 2010; Choo et al., 2015 Michalopoulos, Jiwatram-Negrón, Choo, Kamarulzaman, & El-Bassel, 2016), a preliminary study on drug use and HIV risks among fishermen from this port city that identified drug use as connected to occupation. Some fishermen rationalized their drug use as necessary for doing their jobs. The environment of fishing seems to facilitate substance use as it is a lucrative and flexible business. Despite the inherent danger in fishing, some fishermen worldwide increase their risk of death and disease with substance use (Ghodse, 2005; Lawrie, Matheson, Ritchie, Murphy, & Bond, 2004). Much less common are studies that assess fishermen’s attitudes toward medications; to our knowledge, only one other study has addressed this (Lam, 2003), and it was completed before MAT was generally available.

There is a clear need for implementation of evidence-based addiction treatment and harm reduction strategies that can be culturally aligned with fishing. Any health intervention targeting this population should be also integrated and in accordance with Muslim teachings (Ahmad, Harrison, & Davies, 2008). Muslim clerics should be made aware of the existence of these medications in case they encounter someone who is seeking treatment for an opioid use disorder. Although the participants admitted that substances like heroin are haram, there is variation in the reasoning for why a substance like ubat would be haram. The designation appears to depend on either the composition of the substance or how that substance is used. How the fishermen frame MATs as haram or halal has public health implications for whether they might uptake a treatment regimen.

Since the fishermen interviewed in this study seemed to recognize their dependence on heroin and other drugs, formal assessment of treatment readiness (Fauziah et al., 2010; Shahrazad et al., 2010; Vijay et al., 2015) is an important next step for addressing substance use in this population. Although the participants stated a desire to quit, their environment permits substance use. They reported being permitted to inject while working on the fishing boats provided that they remain productive in the view of skippers and boat owners. Skippers may represent important key roles for encouraging fishermen to stop using drugs. From their perspective, better work productivity for a staff that is not using drugs would be financially beneficial on the boats.

Some fishermen had initiated methadone treatment at a clinic but were unable to be retained in treatment because they could not get their daily dose when they went out to sea, and some described problems such as distance from the clinic to the docks. A clinic or dispensary should be located near the docks. Fishermen encountered difficulty receiving enough medication to last several days while they are away at sea, which suggests that a daily treatment might not be appropriate for this population. Fishermen described trying to limit the amount of methadone they are taking on the boat so that it lasts, but they could be receiving inadequate dosage to curb their cravings. A comparison of cost effectiveness of buprenorphine, naltrexone, and placebo for heroin dependence in Malaysia found that buprenorphine was more costly but more effective than the other treatments (Ruger, Chawarski, Mazlan, Ng, & Schottenfeld, 2012). According to the data presented here, fishermen carry such negative attitudes toward buprenorphine that either methadone or extended-release naltrexone might be better options for fishermen with opioid dependence, given their occupation and risk environment. The extent of the fishermen's heroin use is troubling, as is the injection of buprenorphine (Bachireddy et al., 2011; Bruce et al., 2008; Vicknasingam, Mazlan, Schottenfeld, & Chawarski, 2010) because this population might be using this medication as another drug to get high.

Study limitations

Participants were asked questions based on their declared drug of choice. For the majority of participants, the preferred drug was heroin, but one participant did choose pil kuda, an amphetamine. Consequently, the questions about dependence and attempts to quit, as well as MAT experiences, might differ. Questions about extended-release naltrexone came at the end of the interview; participants may have given unenthusiastic answers toward this treatment because of participant fatigue. In addition, as extended-release naltrexone is not available in Malaysia, it is not surprising that participants were unfamiliar with it. Paying for sex was not discussed in this interview; this is a possible contributor of HIV transmission for fisherfolk that requires additional study (Setiawan, 2008). Problems of cross translating in situ during the interview may have caused missed opportunities to ask probing questions and misunderstood questions and responses by the participant, interviewer, and translator.

Conclusion

As addiction is a chronically relapsing condition, and as fisherfolk work in an environment that permits opioid use, there is an increased need to curb addictions and take advantage of

missed opportunities for HIV prevention through information about risk, increased access to MATs, and needle/syringe exchange programs.

Acknowledgments

The authors thank the participants for their efforts to participate in this study, as well as Kelly Konesky of Albertus Magnus College, Fara Felisha Fuad, Martin Choo, and Maria Theresa Anthony at Centre of Excellence for Research in AIDS (CERiA).

Funding

This research was supported by a National Institute on Drug Abuse research grant (R01 DA 025943, Altice, P.I.) and career development awards (K01 DA 038529, Wickersham; K24 DA 017072, Altice), the University Malaya High Impact Research Grant (E-000001-20001, Kamarulzaman), and the Yale Global Health Initiative Field Experience Award (Erenrich).

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Table 1

Characteristics of participants.

Participant number	Age (years)	Time spent working as a fisherman (years)	Preferred drug
1	56	15	Heroin
2	48	35	Not answered
3	37	22	Pil Kuda
4	36	10	Dormi
5	36	10	Heroin
6	36	5	Heroin
7	29	16	Heroin
8	34	7	Heroin
9	43	15	Ubat
10	47	15	Heroin
11	42	3	Not answered
12	41	20	Morphine
13	32	12	Heroin
14	38	15	Heroin
15	63	12	Heroin
17	41	5	Not answered
18	47	20	Heroin
20	29	5	Heroin
21	28	10	Heroin
23	44	29	Heroin
24	34	13	Heroin
25	36	22	Dormi
28	28	5	Heroin
29	36	25	Heroin
30	27	12	Heroin
31	38	8	Heroin
32	43	3	Heroin
33	35	3	Heroin
34	47	12	Heroin
35	50	20	Heroin and morphine
36	21	3	Heroin
37	35	3	Heroin
38	35	12	Heroin
39	48	29	Heroin

Table 2Sociodemographic profile of participants ($N=34$).

Characteristic	<i>N</i> (%)
Age (<i>M</i> , <i>SD</i> , range)	38.8 years $\pm$ 8.7 (21–63)
Sex	
Male	34 (100.0%)
Ethnicity	
Malay	34 (100.0%)
Religion	
Islam	34 (100.0%)
Education	
No formal education	1 (2.9%)
Completed primary school	9 (26.5%)
Completed middle school Form 3	12 (35.3%)
Completed high school Form 5	8 (23.5%)
Completed high school Form 6	1 (2.9%)
Marital status	
Unmarried	16 (47.1%)
Married	15 (44.1%)
Separated/divorced from spouse	3 (8.8%)
Employment	
Number of years as a fisherman (<i>M</i> , <i>SD</i> , range)	13.3 $\pm$ 8.4 (3–35)
Monthly income in ringgit (<i>M</i> , <i>SD</i> , range)	1240.9 $\pm$ 576.1 (300–3000)
Number of days spent away from home while fishing	
Less than 24 hours	7 (20.6%)
3 to 7 days	6 (17.6%)
8 to 14 days	18 (52.9%)
Not answered	3 (8.8%)
HIV status – self-reported	
Uninfected or status unknown	31 (91.1%)
Infected	3 (8.8%)

M=mean; *SD*=standard deviation.

Table 3

Self-reported substance use behaviors of participants.

Characteristic	N (%)
Drug of choice	
Heroin	22 (64.7%)
Morphine	4 (11.8%)
Benzodiazepines	2 (5.9%)
Pil Kuda	1 (2.9%)
Ubat	1 (2.9%)
Heroin & Morphine	1 (2.9%)
Not answered	1 (2.9%)
Age at first injection	23.6 years (14–40)
Location of last injection	
On boat	12 (46.2%)
At home	4 (15.4%)
On shore	3 (11.5%)
At the clinic	1 (3.8%)
Total number of times in lock-up	13.0 (1–100)
Total number of times in PUSPEN	1.0 (0–4)
Total number of times in prison	2.5 (0–8)
Substance use, organized by drug of choice	
Heroin	N (% of 34 participants)
Any use	31 (91.2%)
Use—past 30 days	29 (85.3%)
Mean number of days used in past month	18.5
Morphine	
Any use	21 (61.8%)
Use—past 30 days	15 (44.1%)
Mean number of days used in past month	9.3
Benzodiazepines	
Any use	20 (58.8%)
Use—past 30 days	9 (26.5%)
Mean number of days used in past month	6.8
Pil Kuda (amphetamine)	
Any use	23 (67.6%)
Use—Past 30 days	19 (55.9%)
Mean number of days used in past month	10.8
Other substances used	
Buprenorphine	
Any use	23 (67.6%)
Use—past 30 days	6 (17.6%)
Mean number of days used in past month	1.1

Characteristic	N (%)
Ever injected	20 (58.8%)
Alcohol	
Any use	22 (64.7%)
Use—past 30 days	2 (5.9%)
Mean number of days used in past month	0.1
Ketamine	
Any use	7 (20.6%)
Use—past 30 days	2 (5.9%)
Mean number of days	2.2
Cannabis	
Any use	19 (55.9%)
Use—past 30 days	4 (11.8%)
Mean number of days	0.6
Other methamphetamines (syabu, ice)	
Any use	23 (67.6%)
Use—past 30 days	15 (44.1%)
Mean number of days	4.5
Ketum (<i>Mitragyna speciosa</i>)	
Any use	12 (35.3%)
Use—past 30 days	1 (2.9%)
Mean number of days	0.1
Three or more substances on the same day	
Any use	11 (32.4%)
Use—past 30 days	9 (26.5%)
Mean number of days	3.1

Table 4

Participants' attitudes toward quitting drugs.

	<i>N</i> (%)
Do you think people who have problems with heroin use can be effectively treated?	
No	5 (14.7%)
Yes	16 (47.1%)
Maybe	5 (14.7%)
Ever tried to stop using drug of choice entirely?	
Yes	29 (85.3%)
Not answered	5 (14.7%)
Ever taken any medication from a medical doctor to help quitting drug of choice?	
No	14 (41.2%)
Yes	14 (41.2%)
Sought services from a bomoh to help quitting drug of choice?	
No	22 (64.7%)
Yes	5 (14.7%)

Bomoh = traditional healer.

Table 5

Participants' attitudes toward medication-assisted treatment.

	<i>N</i> (%)
Heard of methadone	29 (85.3%)
Ever been prescribed methadone	9 (26.5%)
Interest in methadone (<i>N</i> =27)	
Very interested	13 (38.2%)
Interested	5 (14.7%)
Somewhat interested	4 (11.8%)
Somewhat uninterested	1 (2.9%)
Uninterested	2 (5.9%)
Very uninterested	2 (5.9%)
Heard of buprenorphine	28 (82.4%)
Ever been prescribed buprenorphine	6 (17.6%)
Interest in buprenorphine (<i>N</i> =26)	
Very interested	4 (11.8%)
Interested	2 (5.9%)
Somewhat interested	2 (5.9%)
Somewhat uninterested	1 (2.9%)
Uninterested	10 (29.4%)
Very uninterested	7 (20.6%)
Heard of extended-release naltrexone	4 (11.8%)
Ever been prescribed XR naltrexone	0 (0.0%)
Interest in XR naltrexone (<i>N</i> =24)	
Very interested	7 (20.6%)
Interested	5 (14.7%)
Somewhat interested	6 (17.6%)
Uninterested	6 (17.6%)