

ORIGINAL ARTICLE

**ESTIMATING THE SIZE OF THE DRUG USING
POPULATION IN THREE DEEP-SOUTH PROVINCES OF
THAILAND: RESULTS FROM A SERVICE MULTIPLIER
AND RESPONDENT DRIVEN SAMPLING (RDS) METHOD**

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Abstract

Objective: The deep-south provinces of Thailand, the border area where the population is majority Malay ethnic, have faced with armed-conflicts for the decade and are a major route for drug trafficking. Several studies have reported concerns about drug problems among local population but the size of drug using population has not been studied. The objective of this study is to estimate the size of drug using population in the deep-south provinces of Thailand. **Methods:** A cross-sectional survey, including interviews was conducted in 2016. Males aged 18-40 years who had used any drugs in past six months were recruited. Respondent-driven sampling method was used to reach the target population and multiplier method to estimate the size of drug using population. **Results:** The estimated number of male using drug population in three deep-south provinces was 13,545, making the prevalence of 50.2 per 1,000 male population of this age group, twice as high as the national prevalence. Most drug users were in Pattani (60.6%), followed by Narathiwat and Yala provinces. Kratom is the illicit drug with the highest number of current users (85.2% of all users). The majority of current users (60.6%) used more than one type of illicit drug, with kratom and methamphetamine being the most common combination (25.6%). **Conclusion:** This study depicts the situation of drug abuse in deep-south Thailand. Kratom was the most popular substance. The high prevalence of drug users in the area should be of concern by stakeholders and interventions to minimize and control the abuse are needed. *ASEAN Journal of Psychiatry, Vol. 18 (2): July – December 2017: XX XX.*

Keywords: Drug Abuse, Size Estimation, Armed Conflict Area, Respondent-Driven Sampling

Introduction

Evidence clearly indicates a close association between conflict situations and marginalization especially in economics, health and education [1]. This is also reflected in three southern provinces of Thailand, - Pattani, Yala and Narathiwat, the deep-south area with the lowest gross domestic product (GDP) per capita and very low human achievement index in Thailand [2]. This area

is bordered with Malaysia and mostly inhabited by Muslims (80% of the total population) of Malay ethnicity [3]. A separatism movement had occurred in the area from 1960 to 2000 [4] which led to armed conflicts since January 2004. Up to December 2015, the number of violent incidents was estimated to be 15,132 with 6,523 and 11,877 deaths and injuries, respectively [5].

As many areas of illicit cultivation are isolated

and often plagued by ethnic and other conflicts or political instability, government control over them is limited. People in the area have limited or no access to basic services including education, sanitation and health care [6]. Furthermore, the ensuing instability brought about by conflict has created a favorable environment for drug traffickers, similar to that seen in other conflict areas such as Afghanistan, the Democratic Republic of the Congo, Central America, Somalia and West Africa [7]. The deep-south area of Thailand is known for illicit activities, especially drug trafficking, making the Thailand-Malaysia border the most efficient import route for drugs [8]. A survey between February and March 2009 among 1,878 people posited that the worst problems in the area perceived by inhabitants were unemployment (91%), drug abuse (85%) and conflict situations (51%) [9]. Another survey between July-August 2016 among 1,570 inhabitants also found drug abuse the most urgent problem to be tackled [10].

Reports of drug treatment centers in the deep-south area revealed that methamphetamine was the most used substance, followed by heroin and other drugs. Drug abuse has caused vast damage to the community structure in the deep-south area in term of human resources, economics, crime, religious beliefs and national security. Although there have been some studies in this area, a specific study to estimate the number of drug users has never been conducted. A precise estimation of drug users can provide a variety of benefits for assessing possible treatment needs and political demands. There is also a need to improve basic data of public services on which such estimates are based for planning and implementation of prevention and control of drug use as well as management of the health care system that treats drug users. This study aims to estimate the number of young and adolescent male drug users in the three southernmost provinces and describe their drug using patterns.

Methods

Study design

A cross-sectional survey using respondent

driven sampling (RDS) was conducted in three southernmost provinces of Thailand, i.e. Pattani, Yala and Narathiw between January and June 2016.

Sampling

Respondent driven sampling method

A hidden population is a group of people who stay away from mainstream society. There are two main characteristics: (1) No sampling frame exists, so there are no boundaries of that population, and (2) they are living with strict privacy status because of their stigmatized and illegal behaviors [11]. This leads them to refuse to cooperate or give information to protect them from criminalization issues.

Drug users are a group of hidden populations because of illegal and stigmatized behavior. One method to approach hidden populations is RDS, which is modified from a snowball sampling method [12]. It is a novel variant of link-tracing sampling for estimating the characteristics of hard-to-reach groups, such as sex-workers. The main characteristic that distinguished RDS from other chain-referral sampling is that 'seeds' (initial recruiters) are limited in the number of respondents they can recruit by the number of coupons they receive (e.g. three or four), thereby reducing the affectation of initial seeds on the last sample composition [12]. Limiting the number of recruits increases possibility to contribute longer recruitment chains, therefore increasing the 'reach' of the sample into inaccessible area of the population [13].

Data collection

To be eligible, participants needed to be: 1) a current drug user (defined as one who used heroin, methamphetamine, cannabis or kratom in the six-month period prior the interview), 2) male, 3) 18-40 years of age, and 4) living in Pattani, Yala or Narathiw province for at least 6 months prior to the interview. From Thailand national survey we have known that at least 90% of drug users were male [14], thus we restricted the sample to male.

One recruitment center each was set up in Pattani and Yala and two in Narathiw

provinces, with one being in Meaung district and the other in Sungai-kolok district (bordering Malaysia with highest prevalence of IDUs) due to geographical reasons. All centers were set in non-government organization (NGO) offices, located in the heart of downtown, making them easier to build trust among peers of drug users. In each center, three-drug users of different age groups, main drug of use and residential areas were selected as “seeds” of the RDS chain. Three uniquely coded coupons were given to each seed, which was valid for 21 days from the date of the interview. Each coupon contained a code for the data collection center, and due date for the interview. A recruit presented his valid coupon to the recruitment center before the expired date. The recruitment process continued until the required sample size (at least 401) and equilibriums with consideration to the main variables being measured were achieved. Using an RDS method, once the ‘equilibrium’ was reached, the sample composition was stable and independent of the initial seeds. Participants were compensated with 200 Thai Baht (THB; about 6 US\$) for their participation in the study and an additional 50 THB (about 1.5 US\$) for successful recruitment of each eligible participant from their peer network.

Our research team has more than 10 years of experience working with Muslim HIV-AIDS infected intravenous drug users (IDUs) in the area. All interviews were conducted by the principal researcher and six well-trained and experienced interviewers. The participants were initially screened for drug use by asking them to name the street name of the drug of use, price per unit, symptoms of toxicity and withdrawal. This study did not involve any blood or biological sample for serological testing. Ethical approval of this project was obtained from the ethics committee for research in human beings of the Faculty of Medicine at Prince of Songkla University.

Measures

The questionnaire comprised demographic

questions and lifetime history of use of alcohol, cigarette and illegal drugs. Questions on drug use history included age at initial use, types of drugs used in the lifetime and past six-months, as well as frequency of use.

Data management and analysis

The analyses were performed with the Epicalc package in the R language and environment [15]. The multiplier method was used for estimating the number of male drug users. *Benchmark* (M) data were newly admitted male drug users (including new admissions and re-admissions) of the age group 18-40 years in the past six months prior to our study derived from the Drug Treatment Registry of the Ministry of Public Health. This registry contains information on all drug users who enter any treatment facilities in the area, including a specialized drug treatment hospital, general hospitals, and rehabilitation camps. Registered data are input online daily by health personnel working in hospitals and treatment centers all over the country; data are pooled in the national drug abuse database system of the Ministry of Public Health.

Multiplier data (P) were the proportion of our drug user sample who reported being enrolled in each of the above settings in the same period among the entire study respondent. The size of the drug-use population (N) was estimated by M/P.

Results

Eleven seeds produced a total of 414 drug users after 11 waves (the longest chain), including 139, 136 and 139 from Pattani, Yala and Narathiwat, respectively. The mean age of drug users was 26.5 years (standard deviation (SD) = 6.6), with half being 18-25 years of age; 69.8% had never been married and 56.0% were laborers. The average monthly income was 5,355.6 THB (around 178 US\$). Most drug users (68.1%) had a monthly income of less than 6,000 THB. Only 27.4% obtained secondary school education level or above (Table 1).

Table 1. Background characteristics of drug users (n=414)

Variables	Number	Percentage	95% CI
Residential area			
Pattani	139	33.6	29.1-38.4
Yala	136	32.8	28.4-37.7
Narathiwat	139	33.6	29.1-38.4
Age (years)			
18-25	207	50.0	45.2-54.8
26-40	207	50.0	45.2-54.8
Occupation			
Unemployment	72	17.4	13.9-21.5
Student	47	11.4	8.5-14.9
Farmer/ Agriculture	24	5.8	3.8-8.6
Laborer	232	56.0	51.1-60.8
Business owner	39	9.4	6.8-12.7
Monthly Income (THB)*			
No income	17	4.1	2.4-6.6
<3000	153	37.0	32.3-41.8
3000-6000	112	27.0	22.9-31.7
6000-9000	86	20.7	17.0-25.1
> 9000	46	11.1	8.3-14.6
Education			
Illiterate	13	3.1	1.8-5.4
Primary school	186	44.9	40.1-49.8
Secondary school	102	24.6	20.6-29.1
High school	83	20.0	16.4-24.3
Diploma	24	5.8	3.8-8.6
Bachelor and above	6	1.4	0.5-3.3
Marital status			
Never married	289	69.8	65.1-74.1
Married	103	24.9	20.8-29.4
Widowed	5	1.2	0.4-3.0
Divorced	15	3.6	2.1-6.0
Separated	2	0.5	0.08-1.9

*THB: Thai Bath; CI = Confidence Interval

Proportions of current and lifetime drug users

Almost all respondents reported using cigarettes (97.8%). The most common drug reported was kratom, with 85.2% of participants reporting current use. Among all

lifetime users, more than 80% had used methamphetamine, kratom and cigarettes. Alcohol was the least common substance used among this group (4.5% current and 11.5% lifetime users). Heroin was the least popular illicit drug reported with 12.8% being current users (Table 2).

Table 2. Proportion of current and lifetime drug users

Types of drug	Current users in last 6 month (414)			Lifelong users		
	Number	Proportion ^a	95% CI	Number	Proportion ^b	95% CI
Heroin	53	12.8	9.8-16.5	120	44.1	32.5-53.5
Methamphetamine	239	57.7	52.8-62.5	288	82.9	78.0-87.0
Cannabis	121	29.2	24.9-33.9	268	45.1	39.1-51.3
Kratom	353	85.2	81.4-88.4	380	92.9	89.7-95.2
Alcohol	19	4.5	2.8-7.2	165	11.5	7.3-17.6
Cigarettes	405	97.8	95.7-98.9	413	98.0	96.0-99.0

a = Proportion from all participants

b = Proportion of current/lifelong users

CI = Confidence Interval

Age at the time of first usage of drugs (lifelong use)

Age at the time of first usage of drugs was described in Table 3. Cigarettes had the lowest age of first use (15 years) followed by cannabis and alcohol. Heroin had the latest age of first use (20.4 years).

Frequency of drug use

Cigarettes and kratom were substances of daily use by respectively 92.8% and 40.8% of our respondents. Of all methamphetamine current users, 7.0% used it daily while 2.7% and 19.3% used 1-6 days per week and 1-3 times per month, respectively (Table 3).

Table 3. Age of first use and frequency of substance use

Substance	Age of first use (years)			Frequency of current substance use ^a					
	Mean	Min-Max	SD	1/M	2-3/M	1/W	2-3/W	4-6/W	D
Heroin (n=53)	20.4	13-33	4.79	3.6	1.2	0.7	1.7	0.2	6.0
Methamphetamine (n=239)	18.9	11-38	4.72	14.3	5.1	9.4	19.3	2.7	7.0
Cannabis (n=121)	16.9	8-28	3.48	6.8	3.4	6.0	7.0	0.5	5.6
Kratom (n=353)	19.5	10-37	5.18	4.1	4.1	8.5	23.4	3.9	40.8
Alcohol (n=19)	17.3	10-24	3.70	1.2	1.4	0.2	0.7	0.2	0.7
Cigarettes (n=405)	15	7-25	3.05	0.2	0.0	0.5	1.0	3.4	92.8

a= present in percentage of all participants (414)

M=Month, W=Week, D=Daily

SD = Standard Deviation

As shown in Table 4, of all current users, 163 (39.4%) had used only one type of drug, including 135 kratom users, 16 methamphetamine users, 7 cannabis users and 5 heroin users, while 2.4% used all four types of drugs concurrently. Among all, 160 (38.6%) used only two drugs concurrently, with 25.6% using kratom and methamphetamine, 6.0%

kratom and cannabis, and 4.6% heroin and methamphetamine. Multiple drug use was found most common for the combination of kratom, methamphetamine and cannabis (15.4% of all users). The most popular typology of drug use was kratom alone (31.6%).

Table 4. Proportion of combined drug users in the past 6 months

Type of drugs	Combination	Total	weighted	95% CI
1 type (163)	Heroin	5	1.2	0.4-2.9
	Methamphetamine	16	3.9	2.3-6.3
	Cannabis	7	1.7	0.7-3.6
	Kratom	135	32.6	28.2-37.4
2 types (160)	Heroin + Methamphetamine	19	4.6	2.9-7.2
	Heroin + Cannabis	0	0	0.0-1.1
	Heroin + Kratom	2	0.5	0.1-1.9
	Methamphetamine + Cannabis	8	1.9	0.9-3.9
	Methamphetamine + Kratom	106	25.6	21.5-30.1
	Cannabis + Kratom	25	6.0	4.0-8.9
3 types (81)	Heroin + Methamphetamine + Cannabis	6	1.4	0.6-3.2
	Heroin + Cannabis + Kratom	1	0.2	0.0-1.5
	Heroin + Methamphetamine + Kratom	10	2.4	1.2-4.5
	Methamphetamine + Cannabis + Kratom	64	15.4	12.1-19.4
4 types (10)	Heroin + Methamphetamine + Cannabis + Kratom	10	2.4	1.2-4.5

CI = Confidence Interval

Estimation of the size of the drug using population

The number of newly admitted drug users aged 18-40 years derived from the Drug Treatment Registry (benchmark data; M), was 662. Among 414 respondents of our study, 57 reported receiving treatment in the past six months (13.77%; P). The estimated size of the current substance using population obtained by non-classified multiplier method in six months was equaled to 4,808, as derived from 662 divided by 57/414 ($N=M/P$). The estimated number of users in one year was equaled to 9,616, and the prevalence of drug users among young males in the same age group derived

from this estimation was 35.6 per 1,000 populations (9,616 divided by the total number of male population of the same age group (270,000)).

Categorised by province, age group and occupation, the estimated number of drug users in the past year was different from the crude estimate reported above (13,545 vs 9,616). Most drug users were in Pattani province (60.6%), followed by Narathiw and Yala provinces. The prevalence of drug use among young males in the southernmost provinces was calculated to be 50.2 users per 1,000 population or a prevalence of 5% overall (Table 5).

Table 5. Estimation of size of drug users (based on group classification)

Province	Age group	Occupation	M ^a	n ^b	P ^c	6-month (users)	1 year (users)	percentage	lower CI (users)	upper CI (users)
Pattani										
	age 18- 25	unemployment	69	25	6	287	575	4.2	383.4	672.8
		laborer	121	51	3	2,057	4,114	30.4	1,884.00	5,251.80
		others	8	3	1	24	48	0.4	12.1	66.3
	age 26-40	unemployment	65	10	1	650	1,300	9.6	100.7	1,911.90
		laborer	112	40	5	896	1,792	13.2	1,073.90	2,158.40
		others	19	10	1	190	380	2.8	36.1	555.4
Total			394	139	17	4,104	8,209	60.6	6,805.60	8,925.00
Yala										
	age 18- 25	unemployment	10	9	1	90	180	1.3	22.2	260.5
		laborer	18	23	1	414	828	6.1	56.8	1221.5
		others	1	55	2	27.5	55	0.4	-	-
	age 26-40	unemployment	5	2	2	5	10	0.1	10	10
		laborer	32	43	9	152	305	2.3	230.5	344.2
		others	3	4	3	4	8	0.1	8	8
Total			69	136	18	693	1,386	10.2	1,193.90	1,485.20
Narathiwat										
	age 18- 25	unemployment	21	11	3	77	154	1.1	85.2	189.1
		laborer	50	21	1	1,050	2100	15.5	111.8	3,114.40
		others	3	3	1	9	18	0.1	6.2	24
	age 26-40	unemployment	18	15	5	54	108	0.8	75.2	124.8
		laborer	96	72	10	691	1,382	10.2	1,006.10	1,574.40
		others	11	17	2	93	187	1.4	76.9	243.2
Total			125	139	22	1,974	3,949	29.2	3,674.50	4,089.60
Overall			662	414	57	6,773	13,545	100	12,436.90	14,110.40

a =Number of substance users in benchmark data, b= Number of participants is this study, c = Number of participants who enrolled in M 6 months prior to interview, P = p/n

Discussion

Estimated prevalence and type of substance

Our study found a one-year prevalence of current drug use to be 5% among young males in the three armed conflict provinces of the deep south of Thailand. The national household survey on substance use in 2016 reported half the rate (2.5%) in the last 12 months [14]. Kratom and kratom cocktail (a mixture of boiled kratom leaves with Coca Cola Drink and other substances, such as cough syrup and benzodiazepines) were drugs commonly used both in our study and the national survey. Kratom is commonly grown in Southern Thailand and middle-aged and older people in rural areas use it to enhance their work energy and as herbal medicine. However, kratom cocktail is used by adolescents and young adults for entertainment purpose with friends; it is associated with a great deal of criminal activities such as thefts and physical assaults [16]. This picture is similar to what was found in other countries in

that the most common drug used is the one which is most easily available, which could also be the one cultivated in the area. As seen in Afghanistan, opiates are the most commonly used substances because the country produces 90% of the world's heroin [17]. Furthermore, in Pakistan and the Islamic Republic of Iran, which share borders with Afghanistan, a high prevalence of opium users is found [18]. This shows the importance of the demand-supply chain as a factor to be considered in the control of drug abuse in a nation.

While kratom use was high, alcohol consumption was very low among our respondents (5.8% current drinkers), compared to a 53.0% one-year prevalence of drinkers among the general male population of the whole country [19]. This low prevalence is due to the fact that alcohol consumption is strongly prohibited in the Muslim community as drinking is regarded as a severe sin in the Islamic religious teaching [20]. This finding is in keeping with those found in other Muslim

majority countries such as Afghanistan [18], Islamic Republic of Iran and Saudi Arabia [21], reflecting the important role of religion in alcohol use. In the deep-south area of Thailand, the Islam practice has a strong influence on the people's way of life and alcohol consumption in public places is highly stigmatized, with drinkers being socially sanctioned.

Multiple drugs use

About half of our respondents used more than one drug in the past year, with methamphetamine and kratom being the most common combination. As mentioned before, kratom is commonly grown in the area, and chewing kratom leaves is partially accepted in the community [22] while methamphetamine is the common drug of abuse for the whole country. A previous report found that some kratom users switched to other drugs such as methamphetamine and alcohol when kratom trees were eradicated [16]. On the other hand, some 'hard' drug users used kratom as a substitute for other drugs and withdrawal relief when they tried to quit drugs of higher potency [23]. This may explain why kratom was found to be one of the drugs used by these multiple-drug users. Additionally, concurrent use may be of concern if the drugs are used for the purposes of getting high, to experiment, to increase or counter the effects of other drugs, as it may lead to risky behavior, such as unsafe sex or accidental overdose [24].

Marginalization of substances users

In our study, we found that 51.0% of respondents were unskilled laborers and 17.4% were unemployed, with half being illiterate or having a primary level education. About 40% of respondents received less than 3,000 THB (83 US\$) per month, which is close to the poverty line of expenditure of Thailand (2,644 THB) [25]. Unemployment can cause various negative consequences such as stress and anxiety, financial problems, dissatisfaction and estrangement, which are all risk factors leading to a vicious cycle of substance use (initiation, perpetuation, intensification and resumption) [26]. This finding is consistent with that found in other areas of the world. For example, in the USA,

the 30-day prevalence of use of any drug was also high among the unemployed and part-time workers [27]. Data from European countries also reveal that, as of 2013, among all persons accessing treatment for drug use disorders, at least half were unemployed [28]. This supports the finding from Afghanistan that found explicit links between drug use and employment status [18].

Recommendation

Drug-related violence associated with conflict, terrorism and insurgency

As seen in several of drug producing countries such as Afghanistan, Colombia and Myanmar, links between the illicit drugs trafficking and armed terrorist group have materialized [7]. Drug trafficking played an important role in complicating and extending armed conflicts [29]. Such a connection can be alternated, drugs trafficking can fund terrorist group, making them generate more insurgents, perpetuating both crime and insurgency and making conflicts more lethal [29]. Notwithstanding the above-mentioned well-known examples, the connection between drugs, armed conflict and terrorism is not inevitable. Many terrorists and armed groups operate in areas where they could profit by joining in the illicit drug trafficking. However, in the armed-conflict situation in deep south Thailand, no study has accepted association between anti-government activities and drug trafficking. Moreover, the locals tend to associate drug problems with the state officers rather than the anti-government groups [30]. Illegal drug problem in the deep south Thailand appears to be driven by economic and social situation. This should make it easier to solve the drug problem which is not related with political, religion and ethnic issues.

Strengths

RDS which reduces selection bias was used for sampling. All the respondents beyond their geographical barrier to participate in the study were able to be included in the study. Multiplier method: We estimated the number of substance users by standard method. In our study, benchmark from Ministry of Health is the best choice, covers almost all three

systems of treatment (42 places in deep-south). Only a few private and religion treatment places were not included in benchmark. A total of 70 substance users who were treated in last 6 months from any treatment places, 57 (81%) of them were treated in treatment centers which were under the coverage of our benchmark. Thus, it means our benchmark data covered almost all treatments available in the area. Recall bias from treatment history was minimal in this study because we asked about the treatment they had received in last 6 months. This memory of recent treatment is not hard to recall.

Limitations

There were some limitations for the study. Geographical barrier played role in recruiting seeds. The seeds with high recruitment rate may come from areas close to the recruitment centre. Two unsuccessful seeds in the study set an example for this limitation as they were living more than 30 km away from the place of the interview. Our data were from self-report, interviewed by trained interviewers. The reliability and validity of self-report data regarding substance abuse has often been questioned. However, most results examining the reliability and validity of self-reports have been strong [31]. The implication from this study helps policy makers in designing strategies to counter the illegal substance use problem, especially kratom [32]. When kratom was combined with methamphetamine and other drugs, then the clinical and medico-legal issues can be very challenging.

Acknowledgement

We would like to thank to our field staff, who worked in the midst of the unrest situation, for their support and assistance in this study. We also would like to acknowledge all participants for their cooperation.

Disclaimers

None

Source of support

Funding for this study was provided by the Thailand Substance Abuse Academic

Networks (TSAN), Thai Health Promotion Foundation and Epidemiology Unit Faculty of Medicine Prince of Songkla University Thailand and R01 DA027951 (Cottler PI) from National Institute on Drug Abuse (NIDA).

Conflict of interest

None to declare

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Received: 4 May 2017

Accepted: 11 August 2017