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www.msosocialsciences.com**A Three Year Study on Drug Abuse Tests at Hospital Tengku Ampuan Rahimah (HTAR), Selangor Malaysia****Lee Seow Phing¹**¹Hospital Tengku Ampuan Rahimah (HTAR), Klang

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Abstract

This study focused on drug epidemic in Selangor for 3 consecutive years (2016-2018). Hospital Tengku Ampuan Rahimah (HTAR) analysed an estimate of 12988 samples for drug abuse (opiates and cannabinoids) from 2016 until 2018. Being the centre for receiving samples collected by Police and National Anti-Drug agencies in Southwest Selangor, these areas were combed for analytical study of habitual abusers, their age-related patterns and ethnic origins for better understanding and planning for advocates of control.

Keywords: drug abuse, drug abuse tests, Opiates, Cannabinoids

Introduction

This study focused on drug epidemic in Selangor for 3 consecutive years (2016-2018). Hospital Tengku Ampuan Rahimah (HTAR) analysed an estimate of 12988 samples for both opiates and cannabinoids for 3 years (2016 until 2018) from samples collected by Police and National Anti-Drug agencies. Retrospectively, the area under HTAR were combed for analysis of habitual abusers, age-related patterns and their ethnic origins.

Data is dependent on samples collected by the authorities involved in drug control like the police force, National Drug Agencies/AADK (*Agensi Anti-Dadah Kebangsaan*), a small study with some benefit of data for the purpose of many relevant bodies interested in combating drug abuse. Data was ample to meet requirements of statistical analysis and confirm trending in certain areas in Selangor.

The WHO (World Health Organization) has classified Drug Abuse as a global burden after obtaining data from countries with large human suffering and predicaments resulting from drug abuse. Drug abuse, is a worldwide epidemic and it did not differentiate developed nations or otherwise. While dwelling on reasons for spread it is important to understand the countours in our own area for more effective control by law enforcement and awareness through continuous education.

Background and significance at Hospital Tengku Ampuan Rahimah (HTAR)

Hospital Tengku Ampuan Rahimah's (HTAR) Chemical Pathology laboratory conducts analytical runs on 2 types of abused drugs like Opiates (Morphine) and Cannabinoids (11-nor-delta⁹-tetrahydrocannabinol-9 carboxylic acid/THC). This study focusses on a large collection of data

generated over 3 years from 2016 until 2018. Data was effectively collected and maintained through strict confidentiality throughout the period of study. The drug laboratory is a prohibited area where only designated staffs are allowed access within the corridors of Chemical Pathology Unit. This ensures the safety of exhibits, protecting the “chain of custody” at all times as the whole cycle from reception to disposal of these exhibits would in due course be subjected to medical litigation. The Dangerous Drugs Act, DDA 1952 and Evidence Act, 1950 are main Malaysian laws governing drug abuse activities. As sampling are litigious under criminal content, the burden of proof indirectly falls onto the shoulders of those involved in the generation of results. Generating a 3-yearly estimate of 12 988 reports, nearly 50% failed the drug tests. This laboratory has been subjected to many internal and external audits (ISO 15189, ISO 9000) besides having participated in National Drug Quality Control Programmes (NDQCP) to ensure quality and consistency in its reports.

Two types of analysis were designed at the laboratory, its conception nearly 25 years ago, where methods regarding firstline screening followed by an economical method of Thin Layered Chromatography (TLC) was defined by the Institutes of Medical Research for all laboratories under the purview of Ministry of Health.

Methods

Drug analysis

There are 2 distinct protocols, the first being a screening method which deploys a chemistry analyser. The positive subjects from here are further transferred to the second section for further stringent processes in the confirmatory tests.

Screening (Enzyme Multiplied Immunoassay Technique)

We utilize *Siemens Viva-E* which operates on *Enzyme Multiplied Immunoassay (EMIT)* platforms. It is semiquantitative with urine level cutoffs at 300ng/ml for Opiates and 50ng/ml for Cannabinoids. The assay is designed for quantifying sampled drug in competitive binding with synthetically labelled drug- enzyme glucose-6-phosphate dehydrogenase (G6PDH) at antibody binding sites.

The 300ng/ml opiate calibrator is used as a reference for distinguishing “positive” from “negative” specimens. A specimen that gives a lower absorbance from the cutoff is interpreted as negative. A positive result indicates the presence of opiates but does not measure levels in intoxication. Goals for analytical performance with EMIT immunoassays were set at (coefficient of variation, CV<20%) by the Substance Abuse and Mental Health Services Administration (SAMHSA) (Luzzi et. al.2004). This precision goal has been constantly maintained at this laboratory in Hospital Tengku Ampuan Rahimah.

Opiate and Opioids are different structurally though they result in significant toxicities and clinical problems. Wu et.al.(2003) described the confusion when physicians expect the immunoassay request for opiates to result in any opioids detection. The assay detects free morphine and have various degrees of cross activity with codeine, 6-monoacetylmorphine (6-MAM), oxycodone and hydromorphone conjugates.

Further confirmation by another method to differentiate the same group but structurally dissimilar compounds would not be the scope in this study. On a similar vein, challenging adulterants in the form of synthetic opioids and cannabinoids are escaping current detection limitations.

Confirmation (Thin Layer Chromatography)

The positives in screening tests would be confirmed by the tedious Thin Layer Chromatography (TLC) manual method. It takes almost 2 days and 3 final processes in a)Hydrolysis b)Extraction c)Chromatography to obtain results in thin-layer chromatographic form. Interpreting chromatograms requires training and skill.

Design

A prospective study and collection of data for 3 years from 2016 until 2018 was conducted. The laboratory receives samples from another party (Police, Narcotic agencies) therefore no consent form was issued. This is a statistical study based on samples collected by the authorities. The privacy of personal data is protected as the data collection worksheet does not capture names or identity numbers.

Inclusion criteria

The laboratory receives samples from Selangor Police and National Anti-Narcotic Agencies(AADK). Data will be analysed according to settings by area, race, age, and types of drug abused. The areas captured are Klang, Shah Alam, Subang Jaya, Petaling Jaya, Sungai Buloh, Sabak Bernam, Kuala Selangor and Kuala Langat. Malaysian male and female subjects were categorized chronologically from the year born ex:1950s,1960s till 1990s tallying to their age groups in Group 1(61-70 years old) Group 2 (51-60 years old), Group 3 (41-50 years old), 4 (31-40 years old), Group 5(21-30 years old) and teenagers.

Results

Retrospectively, there were 4866 positive cases identified in 2016. An estimated 12988 samples were identified by the end of the project. Positive data from monthly analysis were treated to further study on its prominence by popular areas as sampled by authorities, types of drug abused, age groups and race in the state of Selangor.

Data is dependent on Police and their agencies and the laboratory has no control over the amount of positive cases. In year 2016 a total of (4866) cases were identified. The trend lowered the following year in 2017 (3974) and increased in 2018 (4148).

Figure 1: Monthly data from 2016 until 2018 (Opiates)

Figure 2: Monthly data from 2016 until 2018 (Cannabinoids)

Table 1: Monthly positive data for Opiates and Cannabinoids and Total collection (2016-2018)

	2016	2017	2018	OP	2016	2017	2018	THC	2016	2017	2018	Combined
Jan	165	259	140	564	30	62	31	123	289	622	369	1280
Feb	36	81	164	281	36	26	47	109	341	246	412	999
Mac	195	141	131	467	31	49	30	110	427	437	380	1244
April	150	125	169	444	53	54	41	148	327	263	325	915
May	228	117	127	472	59	47	54	160	510	311	319	1140
Jun	161	90	81	332	49	41	13	103	368	212	172	752
July	147	137	130	414	44	38	48	130	343	311	402	1056
Aug	209	158	146	513	72	43	53	168	570	404	372	1346
Sept	201	97	158	456	55	35	50	140	358	281	431	1070
Oct	289	134	9	432	44	37	24	105	450	297	460	1207
Nov	207	167	114	488	45	54	39	138	417	378	233	1028
Dec	156	93	94	343	25	45	28	98	466	212	273	951
Total	2144	1599	1463	5206	543	531	458	1532	4866	3974	4148	12988

Figure 1 & 2 and Table 1 shows a 3 -year data collection on both drugs (Opiates and Cannabinoids) from the samples collected by Police and National Anti- Drug Agencies (AADK) for Hospital Tengku Ampuan Rahimah Klang, Selangor. Preference for Opiate drugs were 4 times higher than Cannabis as total positive Opiate samples were generally over 400 per month compared to over 100 in Cannabis. From Table 2 Opiate cases contributed to nearly (35% to 44%) of total samples collected every year from 2016 until 2018. There is a slight decreased trend throughout the years for Opiate positive cases as Cannabis cases maintained steadily at 11%.

Table 2: Percentage of total positive drugs over total collection

(2144/4866)	(543/4866)	(1599/3974)	(531/3974)	(1463/4148)	(458/4148)
44.10%	11.20%	40.20%	13.40%	35.30%	11.00%
OP	THC	OP	THC	OP	THC
2016	2016	2017	2017	2018	2018

The trend of addiction for individual drugs differed where the month of January was projected highest for Opiates and in August, Cannabinoid users were most active (Table 1). HTAR received and analysed a total of 12988 samples for 3 years and reported the highest amount (1346) of positively combined Opiate (Morphine) and Cannabis in the month of August. School holidays and festive seasons may have been contributory to the increase in drug activities both in January and August.

Figure 3: Peak areas from monthly data (2016)

Figure 4: Peak areas from monthly data (2017)

Figure 5: Peak areas from monthly data (2018)

Analysis of Area

Significant areas were identified by investigating monthly topology in each year. Analysis using pivot methods by Microsoft Excell produced trending addiction patterns at Figures 3, 4 and 5. In 2016, opiate samples collected were highest from areas like Klang Utara (166), Kuala Langat recorded high in both years, (130) in 2017 and (214) in 2018. Cannabinoids were favourable for two consecutive years in Subang Jaya where in (2016 and 2017) maintained its numbers respectively, (54) in 2016 and (55) in (2017). However, the newest trend in Cannabinoid addiction were captured in Shah Alam, (60) in 2018.

Data across three years showed significant increasing numbers of Cannabis trend from Subang Jaya and Shah Alam. Samples from Kuala Langat for Opiates recorded an active upward trend recently. The National Anti-Drug agencies (AADK) became active in recent years with the numbers of Opiate addiction 122(2017), 144(2018) reported increasing in Selangor.

The peaks from Figures (3, 4, 5) were reanalyzed for the actual total number of positive drug for significant areas namely Kuala Langat, Klang Utara, Subang Jaya, Shah Alam, categorized into age groups and race.

Figure 6 summarizes the *within* race population of drug addicts (%) from 4 areas identified above in 3 years. *Kuala Langat* visualized a significant 0.158% / 0.160% within Malay / within Indian population in year 2018. There is emerging new trend in *Shah Alam* with rise in 0.054% (2016) and 0.179% (2018) within Indian communities.

Figure 6: Drug addicts within race in Selangor from 2016-2018 (%)

Table 3: Race Distribution (Klang, SubangJaya, Kuala Langat, Shah Alam)

Area	Total Population	Malay	Chinese	India
Klang(Klang Kapar/Meru)	744062	335439	190854	140519
Subang Jaya	708296	264176	288752	80080
Kuala Langat	220214	132053	38095	33165
Shah Alam	541306	346411	83079	55867

Table 4: Data on age,gender and area

Male	Female	0-14 Yrs	15- 64yrs	65+	Area
127.4	119.2	64T	167.4T	15.3T	Kuala Selangor
63	60.8	28.5T	81.9T	13.5T	Sabak B
140	125.4	76.3	173.3	15.8	Klangat
543.3	465.3	243.6	714.2	50.9	Klang
1097.1	1025.1	497.5	1520.6	104	Petaling

In 2010, the department of statistics Malaysia published a booklet regarding populations in Malaysia. An excerpt on the identified areas were summarized in Tables 3 and 4. Population densities from Klang Utara, Subang Jaya, Kuala Langat and Shah Alam were searched with the assistance from the Department of Statistics, Malaysia.

From Appendix 1, *Kuala Langat* remained highest in Opiate density (285subjects/0.16%,2018) proportional to its population of 173.3 thousand when compared to *Klang Utara* (192 subjects/ 0.03 %,2018) with the population of 714.2 thousand (Table 4).

Data was collected according to Group 1(61-70 years of age) Group 2 (51-60 years of age), Group 3 (41-50 years of age), Group 4 (31-40 years of age), Group 5 (21-30 years of age) with the inclusion of females and teenagers.

Opiate abusers from *Kuala Langat* and *Klang Utara* recorded high in these age groups in 3 years consecutively from figure 7 and 8. On the other hand, Cannabinoid addiction seemed to be the favour of groups 4(31-40 years of age) and 5(21-30 years of age) as seen in *Subang Jaya* and *Shah Alam* from Figures 9 and 10.

While persons from age groups 3 and 4 were more likely to indulge in opiates, notable peaks in the younger generation, group 5 (21-30s) were obvious in Shah Alam for Cannabinoid addiction (Appendix 1).

Figure 7: Opiate addiction vs Age groups (Kuala Langat)

Figure 8: Opiate addiction vs Age groups (Klang Utara)

Figure 9: Cannabinoid addiction vs Age groups (Subang Jaya)

Figure 10: Cannabinoid addiction vs Age groups (Shah Alam)

Drug addiction in Women and Teenagers

The drug menace is uglier when women and children were involved. Some data on women and teenagers were detected in this study. Although the numbers are few, they are a silent warning to dangers ahead when women have important roles in child bearing, upbringing and leadership in families.

In 2016, from (30) female drug addicts, 6 were detained in Sabak Bernam. However (4) teenagers aged 16 were found to have used Cannabinoids. In 2017, (20) women were involved and the trend lowered in 2018 with only (12). The drug addiction prevalence is higher in men. The numbers in teenagers are slowly rising with (4) 2016, (7) 2017 and (11) 2018, in activities abusing Cannabinoids.

Discussion

The study concentrates on subjects contributory to the drugs menace in the state of Selangor. Deliberation on parameters like Area prone to drug addiction, popular age-groups and race can help authorities in their control through regulations.

As the endemic of drug addiction is ever increasing, continuous efforts to educate, rehabilitate and control is a concern. Malaysian young adults were the targeted groups. Identified from their ages being in the range of group 3 (41-50s), group 4 (31-40s) and group 5 (21-30s), these timelines are prime years of productive life. Failure to overcome stressful living circumstances can result in wasted educational resources and opportunities.

The remote geographical areas in Selangor like Kuala Langat could have been recreational for Opiate abuse but it is difficult to decipher reasons of popularized Cannabinoid abuse in Shah Alam and Subang Jaya. Psychological errors due to social pressures in smoking, vaping were often traps of modernization especially in the cities.

The study has achieved its goal in combining areas under the view of Hospital Tengku Ampuan Rahimah Klang for drug abuse in Selangor. Systematic reviews on drug detection are limited despite the large source of data available. This study was aimed for statistical practice, to obtain an overview of drug addiction contours in the state of Selangor. The capture of samples from National Anti-Narcotics and its agencies are landscapes of efficiency when combating the drug menace. By combining the contours in Selangor prone to drugs activities, data provided can inform, alert authorized planning for rehabilitation, promote drug- education and regulate anti-drug activities by law enforcement.

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