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## Identifying the Determinants and Spatial Distribution of Drug Addiction in Sri Lanka.

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### Abstract

*This study explores the complex dynamics of drug addiction in Sri Lanka, focusing on the spatial distribution of drug-related arrests and treatment admissions, as well as the underlying factors influencing individuals' propensity toward drug abuse. Utilizing data spanning from 2011 to 2020, including drug-related arrest statistics, rehabilitation treatment admissions, and primary survey data, the research employs descriptive statistical analysis, factor analysis, and principal component analysis to examine patterns and trends in drug use and identify key determinants of addiction. The findings reveal a concerning increase in drug abuse across various provinces and age groups, with cannabis and heroin emerging as the primary substances of abuse. Factors contributing to drug addiction are categorized into external, environmental, social, psychological, interpersonal, and familial influences. Notably, family dynamics, social pressures, and economic factors play significant roles in predisposing individuals to substance abuse. Based on the analysis, recommendations are proposed to address drug addiction comprehensively, including prevention initiatives targeting vulnerable populations, enhanced treatment and rehabilitation services, community engagement strategies, continued research and monitoring, and advocacy for policy reforms. By implementing these recommendations, Sri Lanka can mitigate the adverse effects of drug abuse and foster healthier communities. Overall, this study provides valuable insights into the multifaceted nature of drug addiction in Sri Lanka and offers actionable recommendations for policymakers, healthcare professionals, and community stakeholders to combat this pressing societal challenge effectively.*

**Keywords:** Determinants, drug addiction, factors analysis, spatial distribution

### Introduction

The violation, disregard, or transgression of societal norms constitutes a breach of social morality. In extreme cases of moral ambiguity, certain activities emerge that are deemed unacceptable by society, often manifesting as social crises or problems. One such crisis is drug abuse, recognized as a significant societal concern by the National Dangerous Drug Control Board (NDDCB,

2017). Drug addiction not only directly contributes to the proliferation of social epidemics but also fosters a culture of experimentation among initial users.

Despite numerous research reports shedding light on various aspects of drug addiction, there remains a notable dearth of studies

examining the underlying factors influencing individuals to turn to substance abuse. Given the pervasive infiltration of drugs within Sri Lankan society, it becomes imperative to focus on understanding these causative factors to effectively combat drug abuse. Aligning with the fifth sub-goal of the Sustainable Development Goals, which aims to ensure a healthy life and promote well-being, efforts to create a drug-free nation, particularly in Sri Lanka, are paramount. The field of social research bears significant responsibility for both preventing substance abuse and enhancing treatment modalities NDDCB (2017).

In this context, identifying and addressing the evolving patterns of drug abuse among new generations becomes essential in mitigating its prevalence and adverse effects. As emphasized by the NDDCB (2017), prevention outweighs the challenges of treatment once addiction has taken hold. Individuals ensnared by drug addiction face formidable physical, emotional, and societal obstacles, often leading to severe health complications and social ostracism.

Overall, concerted efforts aimed at prevention and intervention are crucial in stemming the tide of drug abuse and fostering healthier communities.

It is undeniably tragic to contemplate the future of a nation burdened with such a grim reality. Urgent measures are warranted to offer mental and social assistance to marginalized segments of society, ensuring their inclusion and security. The imperative lies in continually updating data and reports to pinpoint the factors contributing to individuals falling prey to the drug trade, as well as mapping the spatial distribution and repercussions of substance abuse. Such comprehensive research will be pivotal in devising effective solutions to address these pressing issues.

## Literature Review

According to the United Nations Office on Drugs and Crime (UNODC) report of 2021, an estimated 275 million individuals worldwide engaged in drug use in 2020, with over 36 million suffering from drug use disorders. Among these, cannabis emerged as the most prevalent drug, with approximately 200 million users globally. Notably, North America was identified as the region with the highest cannabis consumption rates. Injection drug use was reported by 14.2 million individuals globally, with Europe leading in usage, although the highest number of injection-related deaths occurred in Southwest Asian countries. The report also highlighted a staggering 541 types of antipsychotic drugs circulating globally in 2020, representing a significant increase from the previous decade. Additionally, opioid, ecstasy, amphetamines, and cocaine were among the most commonly used dangerous drugs in 2020, with reported user numbers of 78.26 million, 35.2 million, 32.2 million, and 24.6 million respectively.

In line with these global trends, the annual report by the National Dangerous Drug Control Board (NDDCB) in 2020 revealed that Sri Lanka witnessed a total of 89,321 arrests for drug-related offenses in 2019, marking a 10% decrease from the previous year. Heroin and cannabis offenses constituted a significant portion of these arrests, with 46% and 51% respectively. Geographically, the

majority of arrests (55%) were concentrated in the Western Province, followed by 11% in the North-Western Province and 7% in the Central Province. Among specific districts, Colombo, Gampaha, and Kurunegala reported the highest percentages of arrests, accounting for 34%, 17%, and 8% respectively. Notably, the arrest trend in 2019 equated to 439 individuals per 100,000 people aged 15-64 years.

According to the National Dangerous Drug Control Board (NDDCB) report of 2020, 2019 marked a significant milestone in drug seizure efforts in Sri Lanka, with a record-breaking 1,742 kg of heroin confiscated. This marked the highest seizure of heroin in 27 years, spanning from 1991 to 2019. Notably, arrests related to cannabis, heroin, and methamphetamine numbered 45,923, 40,970, and 2,073 individuals respectively in 2019. The year also witnessed a concerning uptick in methamphetamine abuse, with an increase in both possession and usage reported. Furthermore, there was a notable rise in court cases involving cannabis possession compared to the previous year, paralleled by a substantial increase in the quantity of cannabis seized by authorities (NDDCB, 2020).

The objective of this study was to pinpoint the factors contributing to individuals' inclination toward drug addiction.

## Research Methodology

Between 2011 and 2020, a study was conducted in Sri Lanka to analyze the spatial distribution and trends of drug use. Secondary data, including drug arrests, prison sentences, and referrals to rehabilitation treatment, were collected from the Police Narcotics Bureau and the National Dangerous Drugs Board. Descriptive statistical analysis methods were employed for this investigation. Among the four rehabilitation centers operated by the National Dangerous Drugs Prevention Authority, two were randomly selected: "Setsewana" in Talangama, Koswatta, and "Navadigantaya" in Nittambuwa, Urapola. Additionally, two treatment centers in Avissawella, Puwakpitiya, operated under the Department of Social Services, were included in the study.

A sample of 98 individuals was selected from a group of 130 patients undergoing treatment at "Jayaviru Samadhi" using simple random sampling based on the Yamane method. Primary data were collected through a closed questionnaire with the main objective of identifying factors influencing drug addiction. Statistical tests, including the significance level test and the Keizer Meyer Olkin (KMO) test, were conducted. Following the recommendations of Osborne (2005), Principal Component Analysis (PCA) was used for factor extraction, along with the Varimax factor rotation method. Factor analysis was performed to analyze the data, and the results were interpreted accordingly.

## Data Analysis and Interpretation

The research findings, aimed at identifying the determinants of drug addiction and examining the spatial patterns and trends of drug use, are now analyzed based on criteria such as drug-related arrests, incarceration periods, and referrals to rehabilitation programs.

**Table 1: Arrests related to drug offenses**

Year	Central	East	North	North Central	Northwest	Sabaragamuwa	South	Uva	West
2011	4.31	3.98	0.27	2.22	3.71	2.75	8.57	2.22	71.98

2012	4.19	4.07	0.40	2.42	4.33	9.01	9.01	2.04	70.76
2013	4.53	4.87	0.79	4.07	4.76	8.74	8.74	5.01	64.3
2014	6.47	3.82	1.31	3.37	5.77	10.19	10.19	4.25	61.00
2015	7.73	3.07	1.20	3.68	6.22	9.73	9.73	4.14	59.98
2016	9.62	3.13	1.41	3.19	6.73	8.63	8.63	3.78	60.27
2017	8.10	3.09	1.90	2.71	8.77	9.34	9.34	2.85	60.84
2018	8.32	3.17	1.64	3.39	9.95	5.97	5.97	2.70	62.44
2019	7.12	3.49	2.08	1.96	10.87	8.69	8.69	4.85	55.40
2020	9.27	3.47	4.92	7.66	11.86	10.43	5.50	4.62	42.26

Source: National Dangerous Drugs Control Board, 2021

### Arrests related to drug offenses covering the period from 2011 to 2020

When analyzing drug-related arrest statistics from 2011 to 2020, it becomes evident that drug usage has been progressively increasing across almost every province in Sri Lanka. The Western Province stands out with the highest surge in drug use, followed by the North-Western Province with the second-highest number of drug-related arrests, and the Southern Province with the third-highest. Examining the types of drugs involved, cannabis emerges as the predominant substance across most provinces, followed closely by heroin. Especially, in provinces such as North Central, North, East, Uva, and Sabaragamuwa, there's a unique trend where heroin usage, although gradually increasing, hasn't surpassed cannabis usage. However, the growth rate of heroin consumption has outpaced that of cannabis in the Western, Southern, North-Western, and Central Provinces, particularly notable post-2015. Moreover, the Central Province exhibits a distinct pattern compared to other provinces, with a notable prevalence of other drugs besides the main three.

### Arrests for drug-related offenses by age group for the period 2011 to 2020

Between 2011 and 2020, the three age groups with the highest number of drug-related arrests were individuals over 30, aged 25-29, and aged 20-24. Across these categories, a consistent trend emerges, with a peak observed in 2013 followed by a decline in 2014, and subsequent fluctuations until 2020. Comparing 2011 to 2013, there's an increase of 5.51% in arrests for those over 30, 2.51% for the 25-29 age group, and 2.2% for the 20-24 age group. Conversely, 2014 witnessed a sharp decrease of 9.12%, 4.69%, and 3.31% in these respective age groups compared to 2013. Although there's some resurgence in arrests post-2015, numbers don't surpass those of 2013.

In contrast, the 14-19 age group and those under 14 report the lowest percentage of drug-related arrests, with the former seeing a slight increase in arrests compared to the latter from 2014 to 2020, albeit still lower than the dominant age groups. The highest arrest rate within this age group occurred in 2017, with a 0.3% decrease noted by 2020 compared to 2017. Moreover, throughout this period, men are consistently arrested for drug-related offenses at a significantly higher rate than women. The percentage difference between male and female arrests peaks at 15.16% in 2015, then gradually decreases, reaching 6.21% in 2020.

In terms of ethnicity, Sinhalese nationals top the list of drug-related arrests, followed by Tamils and Muslims. Malays, Burghers, and

other ethnic minorities are arrested in minimal numbers, ranging from 0% to 0.5%. Among Sinhalese nationals, drug use has steadily increased since 2011, peaking in 2013 with a growth of 4.2%. While there's a decline in 2014 compared to 2013, arrests among Sinhalese nationals show slight fluctuations from 2015 to 2020, with variations of 6% to 9%.

### Treatment admissions during the 10 years from 2011 – 2020

From 2011 to 2020, it's evident from Table 2 that the majority of patients referred for rehabilitation treatment originated from the Western Province, with the second-largest number reported from the Southern Province, followed by the North-Western and Central Provinces, respectively. Provinces with lower rates of drug abuse exhibit a different spatial distribution compared to those with higher drug use. The Northern Province reported the fewest patients referred for rehabilitation treatment, followed by the Eastern, Sabaragamuwa, and Uva Provinces. This common spatial distribution is observed across all four provinces with minimal distribution.

The maximum number of reported patients, steadily increasing since 2011, was observed in 2019, with a subsequent decrease reported in 2020 across these provinces. In the Western Province, the highest number of rehabilitation patients was recorded in 2018 over the considered decade, showing a growth of 11.2% from 2011 to 2018. However, there was a significant decrease in patients in 2019 and 2020 compared to 2018, with a 10.3% decrease reported in 2020 compared to 2018.

Similarly, in the Southern Province, as well as in the Western Province, there was rapid growth in patients from 2011 to 2018, but this trend gradually decreased by 2020 compared to 2018. The relative growth in drug use in other provinces contributes to the annual decrease in the percentage of admissions for treatment in the Western Province.

Further numerical analysis by age group reveals distinct trends in rehabilitation treatment admissions. The age group below 14 years exhibited the highest percentage of admissions in 2014, gradually fluctuating since 2011 and peaking in 2014 with a 20.27% increase compared to 2011. However, admissions decreased by 24.33% in 2020 compared to the peak in 2014.

In the 15-19 age group, admissions increased steadily since 2011, reaching a peak in 2019 and declining by 14.5% in 2020 compared to 2019. Meanwhile, the age group between 20-24 years, often

termed as young adults, saw the highest number of admissions throughout the decade, peaking in 2018 with a 24.61% increase from 2011 to 2018, followed by a 5.93% decrease by 2020 compared to 2018.

Across age groups of 25-29, 30-34, 35-39, and 40-44 years, there's a common trend of a gradual increase from 2011 to 2018, peaking in 2018, and declining by 2020. Similarly, the age groups of 45-49 years and over 50 years also displayed gradual increases compared to 2011, peaking in 2016, then fluctuating to relatively lower percentages by 2020.

Throughout the decade, men consistently outnumbered women in drug addiction rehab, with women entering treatment at a very low average rate of 0-0.05%. The low referral rate of women in 2019 and 2020 was attributed to the challenges of securing female inmates during the Covid-19 pandemic. Social Services Officer Mr. Nishantha Jayaweera noted that women referred for rehabilitation often exhibit resistance and engage in social abuses like prostitution, exacerbating drug addiction and related social issues such as AIDS. He emphasized the necessity of experienced counselors and adherence to strict health guidelines when referring women to rehabilitation services.

**Table 2: Annual admissions for rehabilitation treatment (2011 – 2020) (%)**

Year	Western	South	Northwest	Central	Northcentral	Uva	North	East	Sabaragamuwa
2011	936	35	18	18	8	5	2	5	8
	90.34	3.38	1.74	1.74	0.77	0.48	0.19	0.48	0.77
2012	985	39	26	24	10	8	5	7	5
	88.82	3.52	2.34	2.16	0.90	0.72	0.45	0.63	0.45
2013	1136	49	8	38	40	24	2	16	17
	85.41	3.68	0.60	2.86	3.01	1.80	0.15	1.20	1.28
2014	1309	71	72	50	37	28	53	20	9
	79.38	4.31	4.37	3.03	2.24	1.70	3.21	1.21	0.55
2015	1163	187	37	44	13	22	1	7	8
	78.48	12.62	2.50	2.97	0.88	1.48	0.07	0.47	0.54
2016	1670	448	92	48	15	44	1	23	14
	70.91	19.02	3.91	2.04	0.64	1.87	0.04	0.98	0.59
2017	1867	506	145	60	60	42	0	6	20
	68.99	18.70	5.36	2.22	2.22	1.55	0.00	0.22	0.74
2018	2606	911	384	167	255	76	6	19	23
	58.60	20.49	8.64	3.76	5.73	1.71	0.13	0.43	0.52
2019	2263	365	312	139	165	134	10	18	63
	65.23	10.52	8.99	4.01	4.76	3.86	0.29	0.52	1.82
2020	1071	185	131	65	14	58	12	6	22
	68.48	11.83	8.38	4.16	0.90	3.71	0.77	0.38	1.41

Source: National Dangerous Drugs Control Board, 2021

**Identifying factors influencing drug addiction.**

For the data set used to identify the factors that influenced drug addiction, the value of the variance test was 0.745. According to these factors, it was clear that there was consistency, and that this data set was suitable for analysis. Also in the factor analysis, the adequacy of the sample was tested by the null test and the

Sphericity criterion of the sample was tested by Batelett's test. The KMO value obtained from the test is 0.506 and the p value is 0.000. it can be concluded that this factor analysis is an appropriate test.

**Table 3: Component matrix**

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.017	14.404	14.404	2.017	14.404	14.404
2	1.595	11.393	25.797	1.595	11.393	25.797

3	1.466	10.475	36.272	1.466	10.475	36.272
4	1.367	9.766	46.038	1.367	9.766	46.038
5	1.212	8.655	54.692	1.212	8.655	54.692
6	1.062	7.586	62.278	1.062	7.586	62.278
7	.938	6.701	68.979			
8	.901	6.436	75.415			
9	.812	5.800	81.215			
10	.742	5.297	86.512			
11	.631	4.508	91.021			
12	.570	4.072	95.092			
13	.524	3.740	98.832			
14	.163	1.168	100.000			

Source: Survey data, 2023

According to the variance analysis of the factors performed under the principal component factor extraction method. According to Table 03, it can be seen that there are six components with an eigenvalue greater than 1. The six principal components explain 62.2% of the variance in the total factors.

component encompasses a distinct set of variables, as follows: the first component comprises 2 variables, the second component has 3 variables, the third component includes 3 variables, the fourth component consists of 2 variables, the fifth component encompasses 2 variables, and the sixth component comprises 2 variables.

Table 4 illustrates the distribution of variables across six principal components through the Varimax factor rotation method. Each

**Table 4: Varimax method under principal component analysis**

Variables	Components					
	1	2	3	4	5	6
At the encouragement of friends	0.071	-0.782	<b>0.102</b>	0.065	-0.031	-0.026
As a result of parental disagreements	-0.024	0.055	0.001	-0.033	0.062	<b>0.769</b>
Due to marital conflict	0.150	0.000	-0.446	<b>0.322</b>	-0.067	-0.263
Influenced by living environment	0.129	<b>0.786</b>	0.055	0.007	-0.066	0.002
Due to mental or physical health issues	-0.012	0.008	-0.006	0.263	<b>0.689</b>	0.326
Due to unemployment	0.051	0.054	-0.026	<b>0.603</b>	-0.013	-0.271
Through engagement in informal employment	-0.267	0.175	<b>0.720</b>	0.096	-0.107	-0.102
Under the influence of family members	<b>0.922</b>	0.054	-0.013	0.049	-0.044	0.005
Due to the absence of offspring	0.048	<b>0.103</b>	-0.014	-0.782	-0.029	-0.154
As a consequence of household negligence	0.171	-0.068	0.286	-0.014	-0.488	<b>0.344</b>
Due to a friend's negligence	0.314	-0.213	<b>0.691</b>	-0.032	0.011	-0.030
Through involvement in criminal activities	0.044	-0.087	0.070	-0.419	<b>0.673</b>	-0.075
As a consequence of incarceration	<b>0.934</b>	0.039	-0.032	-0.025	-0.004	-0.056
Due to limited educational opportunities	0.102	<b>0.405</b>	0.281	0.149	0.328	-0.433

Source: Survey data, 2023

The factors associated with the first component, namely the influence of family members and incarceration, collectively represent "external influence" on drug addiction. The second component, characterized by the influence of the living environment, due to the absence of offspring, and due to limited

educational opportunities, is labeled as "environmental impact." The third component, encompassing the encouragement of friends, through engagement in informal employment, and due to friend negligence and is termed "social influence."

The fourth component, comprising due to marital conflict and unemployment, represents "psychological impact".

Factors linked to the fifth component, namely due to mental or physical health issues and involvement in criminal activities, signify "interpersonal influence." Finally, the sixth component, consisting of the result of parental disagreements and the consequence of household negligence, denotes "family influence" as these factors are closely tied to household dynamics.

Figure 1 provides an overview of how these factors are categorized according to the principal component extraction method.

**Figure 1: Identified factors**

<b>External Influence</b>	Influence of family members
	Consequence of incarceration
<b>Environmental Impact</b>	Influenced by living environment
	Due to the absence of offspring
	Due to limited educational opportunities
<b>Social Influence</b>	Encouragement of friends
	Through engagement in informal employment
	Friend's negligence
<b>Psychological Impact</b>	Unemployment
	Marital conflict
<b>Interpersonal Influence</b>	Mental or physical health issues
	Involvement in criminal activities
<b>Family Influence</b>	Result of parental disagreements
	Consequence of household negligence

Source: Survey data, 2023

## Conclusion

The comprehensive analysis of drug-related trends and factors influencing drug addiction in Sri Lanka sheds light on the multifaceted nature of this societal challenge. Over the past decade, drug abuse has escalated across various age groups and provinces, posing significant threats to public health and social well-being. The spatial distribution of drug-related arrests and treatment admissions underscores the pervasive nature of this issue, with certain regions experiencing disproportionate impacts.

Factors contributing to drug addiction, as identified through rigorous statistical analysis, encompass a spectrum of external, environmental, social, psychological, interpersonal, and familial influences. Understanding these determinants is pivotal for developing targeted interventions aimed at prevention, rehabilitation, and social support.

## Recommendations

**Prevention Initiatives:** Prioritize prevention efforts targeting vulnerable populations, including youth, by implementing evidence-based education and awareness programs in schools and communities. These initiatives should focus on promoting healthy lifestyles, building resilience, and fostering positive peer relationships.

**Treatment and Rehabilitation:** Enhance access to quality treatment and rehabilitation services, particularly in regions with high prevalence rates of drug abuse. Invest in expanding the capacity of rehabilitation centers and ensuring comprehensive support for individuals undergoing recovery, including mental health services and vocational training.

**Community Engagement:** Empower communities to play an active role in drug prevention and intervention efforts through community-based initiatives, support networks, and peer counseling programs. Promote community cohesion and resilience to mitigate the underlying social factors contributing to drug abuse.

**Research and Monitoring:** Continue researching to monitor evolving trends in drug abuse and identify emerging challenges and opportunities for intervention. Invest in longitudinal studies and data analytics to inform evidence-based policy-making and program development.

**Policy Reform:** Advocate for policy reforms aimed at addressing systemic issues underlying drug addiction, including socioeconomic disparities, access to education and employment opportunities, and healthcare inequalities. Prioritize harm reduction strategies and diversion programs to reduce the negative consequences of drug abuse on individuals and communities.

By implementing these recommendations in a coordinated and sustained manner, Sri Lanka can strengthen its response to drug addiction and work towards building healthier and more resilient communities for future generations.

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