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ADVANCING POLICY AND PRACTICE FOR ADOLESCENT SUBSTANCE USE PREVENTION IN SOUTHERN INDIA: PATTERNS, DETERMINANTS, AND TARGETED RECOMMENDATIONS FROM A MIXED-METHODS STUDY

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ABSTRACT

This study investigates the nature, extent, and determinants of substance use among adolescents in five southern Indian states using a mixed-methods approach. Quantitative analysis of 500 participants (mean age = 15.44 years, 94.8% male) revealed high prevalence of tobacco (57.4%) and alcohol (26.8%), with early initiation, gender disparities, and differences across educational status and family structures. Regression analysis identified gender, harm awareness, habitual use, impulse control, and school awareness programs as significant predictors of substance overuse. Findings highlight the need for gender-responsive, context-specific interventions and underscore schools' pivotal role in prevention.

INTRODUCTION

Adolescent substance abuse is a growing public health crisis in India, with rates rising despite legislative controls and organizational efforts (Ministry of Social Justice & Empowerment & NDDTC, AIIMS, 2019). This study examines substance use among adolescents in Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Telangana, focusing on prevalence, determinants, and the unique influence of demographic and psychosocial variables.

METHODS

Study Design and Population

A cross-sectional, mixed-methods design was adopted, surveying adolescents aged 12–18 years (N = 500) from 100 government schools across 10 districts in five southern Indian states using a structured interview schedule (Ambekar et al., 2019; Dhawan et al., 2017).

Measures

Variables included demographic details (age, gender, educational status, family structure), frequency and types of substance use, age at initiation, motivations for use, psychosocial competence, harm awareness, and environmental/contextual factors (WHO, 2021; Kaur et al., 2021).

Statistical Analysis

Descriptive statistics, chi-square tests, t-tests, Pearson correlations, and multiple linear regressions were conducted (Tables 1–13, Figures 1–18). Data was analyzed using SPSS v26. Visualizations are as per SPSS-style conventions.

RESULTS

Sample Demographics

Table 1. Descriptive Statistics: Age, Days Used, and Age at First Use (N = 500)

Variable	M	SD	Min	Max
Age	15.44	1.71	11	18
Days used (past 30 days)	1.84	1.10	1	5
Age at first use (cat.)	3.16	1.13	1	5

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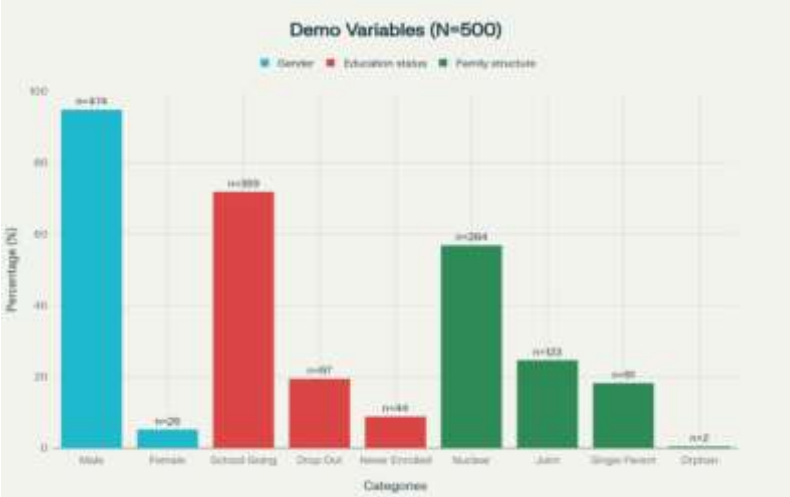
Table 2. Frequencies for Demographic Variables (N = 500)

Variable	Category	n	%
Gender	Male	474	94.8
	Female	26	5.2
Education status	School Going	359	71.8
	Drop Out	97	19.4
	Never Enrolled	44	8.8
Family structure	Nuclear	284	56.8
	Joint	123	24.6
	Single Parent	91	18.2
	Orphan	2	0.4

Figure 1. Demographic Distribution

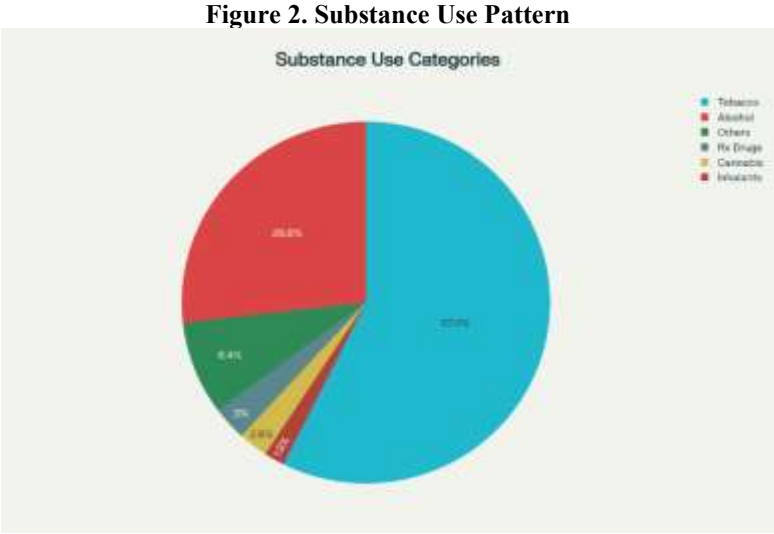


Substance Use Patterns

Table 3. Substance Use Categories (N = 500)

Substance	n	%
Tobacco	287	57.4
Alcohol	134	26.8
Cannabis	13	2.6
Inhalants	9	1.8
Prescription drugs	15	3.0
Others	42	8.4

Figure 2. Substance Use Pattern



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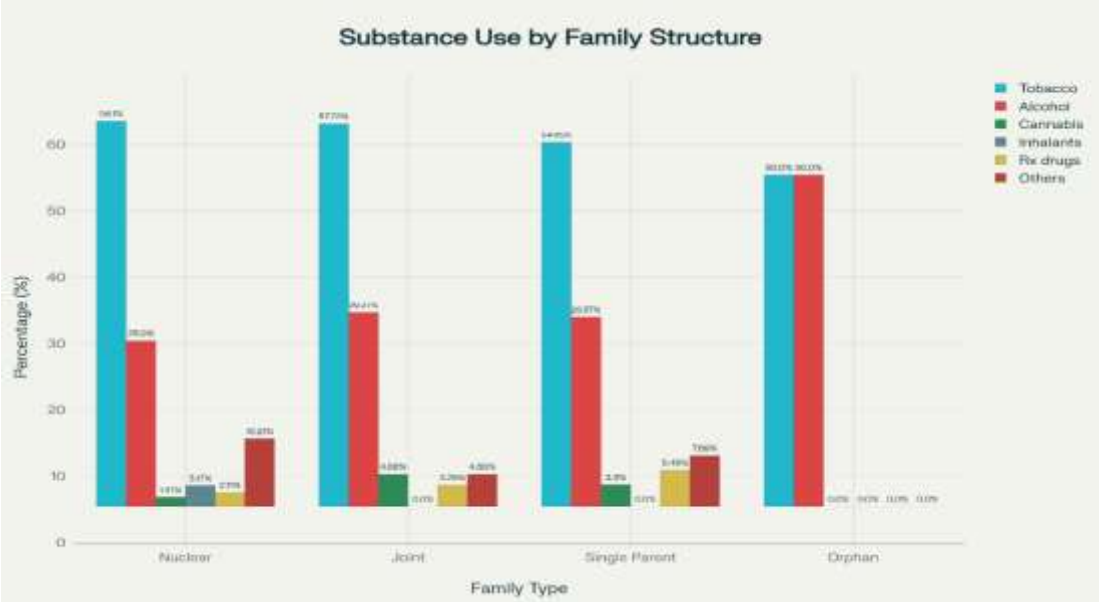
By Educational Status and Family Structure

School-going adolescents exhibited more overall substance use; dropouts had higher vulnerability for specific substances (e.g., prescription drugs) (Dhawan., 2017; Sushmita Bhagavati., 2023).

Table 4. Substance Use × Family Structure

Family Structure	Tobacco	Alcohol	Cannabis	Inhalants	Presc. Drugs	Others
Nuclear	58.1%	25.0%	1.4%	3.2%	2.1%	10.2%
Joint	57.7%	29.3%	4.9%	0.0%	3.2%	4.9%
Single Parent	54.9%	28.5%	3.3%	0.0%	5.5%	7.7%
Orphan	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%

Figure 3. Substance Use × Family Structure

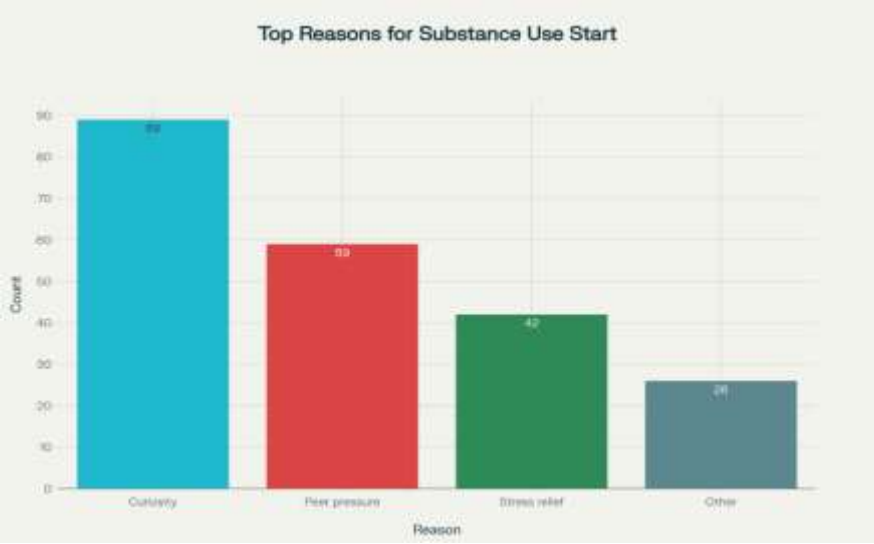


Motivations for Use

Table 5. Top Reasons for Substance Use Initiation

Reason	n	%
Curiosity	89	17.8
Peer Pressure	59	11.8
Stress Relief	42	8.4
Other	26	5.2

Figure 4. Reasons motivating to use



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Statistical Associations

Table 6. Chi-Square: Gender × Substance Use Category

Test	χ^2	df	p
Pearson chi-square	44.74	5	<.001
Likelihood ratio	26.16	5	<.001
Linear-by-linear association	17.34	1	<.001

Significant gender difference found; males exhibited significantly higher rates and earlier initiation

Correlation and Regression Findings

Table 12. Pearson Correlations among Study Variables

Variable 1	Variable 2	r	p
Age	Education Status	0.386	<.001
Age	Class	-0.474	<.001
Overuse	Harm Awareness	0.224	<.001
Overuse	Impulse Failures	-0.242	<.001
Overuse	Habit	0.227	<.001

Note. p values are two-tailed. p < .01 (**), *p* < .05 (*).
** Correlation is significant at the 0.05 level (p < .05, 2-tailed).*
*** Correlation is significant at the 0.01 level (p < .01, 2-tailed).*
The analysis shows a significant positive correlation between age and education (r=0.386, p<.001). Substance overuse is positively related to harm awareness and habitual use, yet negatively to impulse control failures, underscoring complex behavioral dynamics influencing adolescent substance use and highlighting the need for multifaceted prevention strategies.

Figure 5. Correlation Heatmap

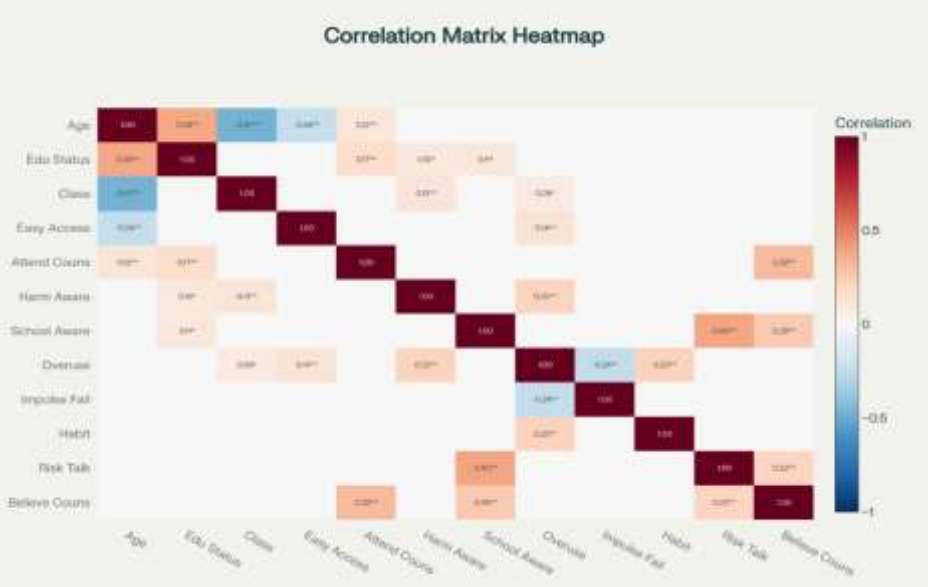

Table 13. Multiple Regression Predicting Substance Overuse

Predictor	B	β	t	P
Constant	2.42	—	3.98	<.001
Gender	-0.547	-0.136	-3.19	.002
Awareness of harm	0.18	0.187	4.32	<.001
Habitual use	0.09	0.102	2.10	.036
School awareness programs	-0.092	-0.122	-2.58	.010
Failure to control impulse	-0.141	-0.155	-3.20	.001

R^2 = .167, Adjusted R^2 = .144, F(13,486) = 7.48, p < .001

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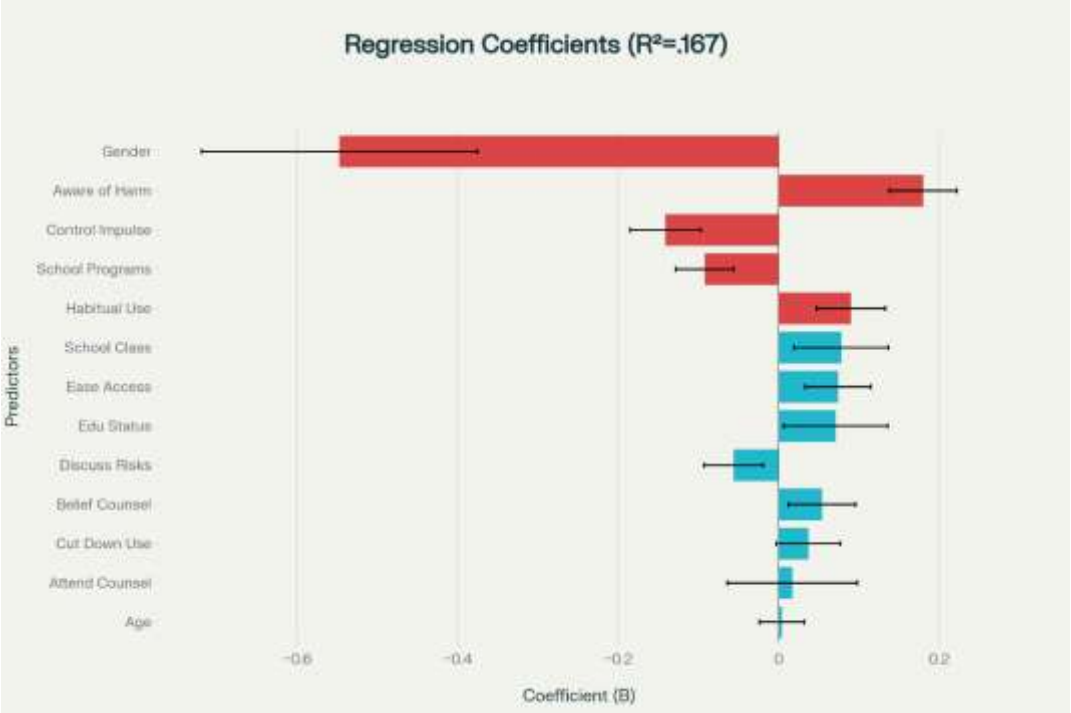
Figure 6. Regression Results (β coefficients)



State-wise Insights

The comprehensive analysis of adolescent substance use across the five southern Indian states — Andhra Pradesh, Karnataka, Kerala, Tamil Nadu, and Telangana — reveals a nuanced and multi-dimensional landscape of prevalence, determinants, and behavioral patterns. The study decisively rejects the null hypothesis by establishing significant associations between key determinants and adolescent substance use.

In Andhra Pradesh, early initiation is particularly concerning, with alcohol being the most prevalent substance (50%) alongside high tobacco use. Vulnerability is heightened among dropouts, especially regarding prescription drug misuse, underscoring the protective role of educational engagement and the need for targeted interventions for out-of-school youth.

Karnataka shows the highest tobacco use rate (70%), dominantly among dropouts, aligning with global evidence connecting disrupted education to increased risk. The male predominance and moderate alcohol use highlight specific demographic risk profiles, necessitating gender-sensitive and dropout-focused prevention, particularly tobacco cessation.

Kerala stands out with the youngest average age of participants and the highest inhalant use (7%), signaling emerging substance trends needing urgent attention. Despite strong school retention (80%) and elevated harm awareness, low treatment uptake highlights gaps requiring enhanced access to counseling and specialized services targeting inhalant use.

Tamil Nadu reports high tobacco (60%) and moderate alcohol (33%) use, with cannabis and inhalant use rare. Widespread school awareness programs have boosted harm awareness; however, low counseling attendance indicates barriers between knowledge and behavioral change, calling for deeper investigation.

DISCUSSION

The study unequivocally demonstrates that adolescent substance use in southern India is influenced by multiple interconnected factors, refuting the null hypothesis of no association between determinants and usage. Male gender stands out as a significant predictor of overuse, while higher harm awareness, habitual use, and impulse control deficits further shape substance consumption patterns. School-based awareness programs emerge as protective, significantly reducing overuse, highlighting schools as crucial prevention settings. However, treatment-seeking and counseling uptake remain low across states, including Telangana, Tamil Nadu, and Kerala, despite relatively good harm awareness levels, pointing to systemic barriers such as stigma, inadequate tailored services, and outreach deficiencies.

Educational engagement plays a complex role: while school attendance provides protection against some substances, use persists across all educational statuses including dropouts and never-enrolled youths, revealing that comprehensive interventions extending

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beyond school boundaries are necessary. Initiation driven predominantly by curiosity and peer pressure stresses the importance of developmentally appropriate and peer-contextual prevention approaches that foster refusal skills and healthy coping mechanisms. Parental knowledge and monitoring do not vary significantly across family structures, suggesting that family engagement strategies should be broadly applied rather than family-type specific.

Regional state-level differences reinforce the need for culturally and contextually tailored policies and programs. Telangana shows predominant tobacco and alcohol use with marked gender disparities and significant influence of educational engagement on use patterns, while awareness-treatment gaps persist. Karnataka's high habitual use and dropout rates call for integrated school retention and cessation programs. Kerala's high inhalant and prescription drug misuse with strong school retention and awareness require substance-specific initiatives. Tamil Nadu's gender-specific use and moderate overuse highlight the need for gender-sensitive prevention.

In summary, a multi-layered, contextually sensitive framework is essential to address adolescent substance abuse effectively in southern India. Key pillars include strengthening school retention, expanding gender- and dropout-sensitive education and prevention, improving accessibility and youth-friendliness of treatment and counseling services, and broadening family and community involvement. Future research should adopt longitudinal designs to clarify causal pathways, investigate psychological and social mechanisms, and evaluate integrated intervention models combining educational, familial, peer, and community supports to reduce substance use and its harms among adolescents.

This evidence supports targeted, sustainable, and flexible interventions responsive to the social realities and developmental needs of adolescents across diverse southern Indian contexts, ultimately fostering healthier trajectories and reducing the public health burden of substance abuse.

CONCLUSIONS

The study on adolescent substance use across five southern Indian states reveals a complex and multidimensional public health challenge marked by significant gender disparities, early initiation, and varied patterns of substance use influenced by educational status, family structure, and psychosocial factors. Male adolescents are disproportionately affected, exhibiting higher rates of use and earlier onset, with tobacco and alcohol as the predominant substances. School engagement emerges as a protective factor, yet dropouts and never-enrolled youths show increased vulnerability to more hazardous substance use, including prescription drug misuse and inhalants. Harm awareness and school-based prevention programs significantly reduce substance overuse, underscoring the critical preventive role of educational institutions. However, low uptake of counseling and treatment services indicates gaps in accessibility, stigma, and the need for more youth-friendly interventions. Regional variations highlight the necessity of culturally and contextually tailored approaches addressing specific state-level substance use trends and determinants. This study advocates for comprehensive, gender-sensitive, and multifaceted strategies that integrate school retention efforts, targeted prevention, family and community engagement, and improved treatment accessibility. Future research should focus on longitudinal designs to better understand causal pathways and evaluate integrated intervention models. Ultimately, these evidence-based, context-specific interventions are essential to mitigate adolescent substance abuse, promote healthier developmental trajectories, and reduce the broader social and health burden in southern India.

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