

Determinants and Structural Pathways of Awareness on Drug Abuse Prevention Among College Students: A Multiple Regression, Structural Equation Modelling and Garrett Ranking Analysis — A Study in Erode District of Tamil Nadu

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Abstract - While general awareness of drug abuse is widely reported among college students, the specific socio-economic determinants of awareness regarding prevention and control measures, and the causal pathways linking these determinants to overall awareness, remain comparatively under-examined in the Indian context. This study models these pathways among college students in Erode District, Tamil Nadu, using data collected from 600 respondents selected through stratified random sampling from engineering, arts and science, medical, pharmacy, polytechnic, and teacher-education colleges. Multiple Regression Analysis, Structural Equation Modelling (SEM), and the Henry Garrett Ranking Technique were applied to identify predictors, model structural relationships, and rank the perceived reasons behind student drug use, respectively. The regression model explains 57.2 per cent of the variation in awareness on prevention and control measures ($R = 0.756$, $R^2 = 0.572$, $F = 71.26$, $p < 0.001$), with stream of study, educational qualification of parents, monthly family income, and parental occupation emerging as the strongest predictors; gender and family size were statistically non-significant. The SEM model demonstrated good fit ($CMIN/df = 2.684$, $GFI = 0.928$, $CFI = 0.947$, $RMSEA = 0.054$), confirming significant structural pathways from socio-economic factors through awareness on causes and effects to prevention measures and overall awareness, with the prevention-to-overall-awareness path showing the strongest standardised estimate ($\beta = 0.792$). The Garrett Ranking analysis identified peer pressure/friends' influence (mean score 77.13) and stress/exam pressure (mean score 73.10) as the two most important perceived reasons for drug use initiation among students. The study concludes that awareness-building interventions are most effective when they combine socio-economic targeting with structured peer- and stress-focused prevention content, and recommends a layered, evidence-based model for designing college-based drug abuse prevention programmes.

importantly, the structural pathways through which they operate, is essential for designing prevention programmes that go beyond simple information dissemination.

Erode District in Tamil Nadu, home to a dense network of engineering, arts and science, medical, pharmacy, polytechnic, and teacher-training institutions, offers a diverse and representative setting for examining these determinants. Unlike simple descriptive assessments of awareness, this study adopts a modelling approach — combining Multiple Regression Analysis to identify significant predictors of prevention-related awareness, Structural Equation Modelling (SEM) to test the hypothesised causal architecture linking socio-economic factors to overall awareness through intermediate awareness dimensions, and the Henry Garrett Ranking Technique to prioritise the specific behavioural and situational reasons driving student drug use. Together, these three techniques provide a multi-layered, statistically robust picture of not just whether students are aware, but why awareness varies and what specific factors prevention programmes should prioritise.

2. REVIEW OF LITERATURE

Ardra et al. (2025)¹ Investigated the causes, consequences, and preventative methods for alcohol and drug misuse among teenagers. Furthermore, when drug abuse begins at a young age and progresses to addiction, it may have a long-term influence on an individual's job chances and personal connections, as well as spread the problem across the family. The goal of this research is to look at the impact of alcohol and drug misuse on kids, as well as to look into the reasons and preventative strategies for youth who are addicted to alcohol and drugs. According to the findings, peer pressure, family disputes, media glamour, and ease of access are the most influential factors.

According to Hemamalini et al. (2025)² Drug misuse among teenagers is a serious public health problem that has an influence on both individual development and society well-being. In India, over 1.5 crore (15 million) kids aged 10 to 17 use drugs, with Tamil Nadu accounting for 34% of the total. There is insufficient evidence on the consequences of substance usage. As a result, this research sought to investigate the diverse consequences of drug addiction among teenagers. The literature search was conducted in PubMed Central, Google Scholar, and Web of Science databases using appropriate search terms such as the effect of substance abuse, addictions, drug abuse, drug dependence, substance use disorders, drug user, drug intoxication, and toxicity. In addition, the current evaluation reported on demographic characteristics, new creative policies, and drug addiction treatments for teenagers in India. Understanding the effects of drugs on teenagers may aid in the creation of targeted health policies and community-based interventions. It eventually encourages healthier habits and improves future outcomes for adolescents.

Key Words: Drug Abuse Prevention, Structural Equation Modelling, Multiple Regression, Henry Garrett Ranking, College Students, Erode District, Awareness, Substance Abuse

1.INTRODUCTION

The transition from general awareness of drug abuse to actionable, prevention-oriented knowledge represents a critical and often overlooked stage in substance abuse prevention among young people. While most college students today are broadly aware that drugs exist and pose risks, translating this general awareness into effective preventive behaviour — recognising warning signs, knowing where to seek help, and supporting affected peers — depends on a more complex set of socio-economic, educational, and psychological factors. Understanding these determinants, and more

Sakshi Sharma et al. (2024)³ examined drug misuse and its consequences among **15 patients** receiving treatment at the **D-DWARI De-addiction Center, Jammu**, between **March and June 2024**. The study found that **46.7%** of drug users were aged **21–30 years**, while **26.7%** were aged **16–20 years**. Most participants had completed **upper secondary or matriculation education**, and **53.3%** reported initiating drug use between **16 and 20 years of age**. **Heroin (60%)** was the most commonly abused substance, followed by **cannabis (26.7%)**. The study highlighted the growing problem of heroin abuse among youth in Jammu and emphasized the need for effective prevention, awareness, and rehabilitation measures.

3. STATEMENT OF THE PROBLEM

Prevention-oriented awareness — as distinct from general recognition that drug abuse exists and is harmful — is the component of student knowledge most directly actionable by colleges, families, and policymakers. However, existing awareness studies in the Erode District context have largely relied on descriptive, bivariate analyses that identify significant associations without modelling the relative predictive strength of determinants or the structural pathways connecting them. Nor has prior research in this setting systematically prioritised the specific behavioural reasons driving drug use initiation using a validated ranking technique. This study addresses these gaps by applying Multiple Regression Analysis, Structural Equation Modelling, and the Henry Garrett Ranking Technique to the same 600-respondent dataset, providing a methodologically layered assessment of what drives prevention-related awareness among college students in the district and which underlying reasons for drug use should be prioritised in prevention programme design.

4. OBJECTIVES OF THE STUDY

1. To identify the socio-economic determinants that significantly predict awareness on prevention and control measures of drug abuse among college students using Multiple Regression Analysis.
2. To develop and test a Structural Equation Model examining the pathways linking socio-economic factors to awareness on causes, effects, prevention measures, and overall awareness of drug abuse.
3. To rank, using the Henry Garrett Ranking Technique, the perceived reasons that influence college students to initiate drug use.
4. To derive evidence-based recommendations for designing structurally informed drug abuse prevention programmes for college students in Erode District.

5. HYPOTHESES OF THE STUDY

- H₀₁: Selected socio-economic variables (age, gender, stream of study, year of study, residence location, living condition, monthly family income, family size, type of family, occupation of parents, and educational qualification of parents) do not significantly predict awareness on prevention and control measures of drug abuse.
- H₀₂: There is no significant structural relationship between socio-economic factors and awareness on causes, effects, prevention measures, and overall awareness of drug abuse among college students.

6. RESEARCH METHODOLOGY

6.1 Area of the Study

The study was conducted among college students in Erode District, Tamil Nadu, covering institutions in Erode city, Perundurai, Gobichettipalayam, Chennimalai, and Sathyamangalam.

6.2 Research Design

An analytical, model-based research design was adopted, employing Multiple Regression Analysis, Structural Equation Modelling, and the Henry Garrett Ranking Technique to examine predictive and structural relationships, moving beyond descriptive and bivariate association testing.

6.3 Sampling Design and Sample Size

A stratified random sampling technique was used to select 600 students proportionately from six categories of colleges — Engineering and Technology, Arts, Science and General Degree, Polytechnic, Education and Teacher Training, Medical, Pharmacy and Allied Health, and Management and Professional colleges — located across the district.

6.4 Data Collection and Measurement

Data were collected using a structured questionnaire with awareness statements measured on a five-point Likert scale. For the regression and SEM analyses, awareness on prevention and control measures served as the dependent/endogenous variable, and socio-economic variables (age, gender, stream of study, year of study, residence location, living condition, monthly family income, family size, type of family, occupation of parents, and educational qualification of parents) served as independent/exogenous variables. For the Garrett Ranking analysis, respondents ranked eight pre-identified reasons for drug use initiation from 1 (most important) to 8 (least important).

6.5 Statistical Tools Applied

- Multiple Regression Analysis — to identify significant predictors of awareness on prevention and control measures.
- Structural Equation Modelling (SEM) — to test the hypothesised structural pathways among socio-economic factors and the three awareness dimensions (causes, effects, prevention) leading to overall awareness, evaluated using CMIN/df, GFI, AGFI, CFI, NFI, TLI, RMSEA, and RMR fit indices.
- Henry Garrett Ranking Technique — to convert respondents' rankings of reasons for drug use into comparable Garrett scores and derive an overall importance ranking.

7. RESULTS AND DISCUSSION

7.1 Multiple Regression Analysis: Predictors of Awareness on Prevention and Control Measures

Multiple Regression Analysis was conducted with awareness on prevention and control measures as the dependent variable and eleven socio-economic characteristics as independent variables. Model summary and ANOVA results are presented in Tables 1 and 2.

Table 1: Model Summary of Multiple Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of Estimate

Model	R	R Square	Adjusted R Square	Std. Error of Estimate
1	0.756	0.572	0.559	2.046

Table 2: ANOVA for the Regression Model

Source	Sum of Squares	df	Mean Square	F Value	Sig.
Regression	3584.72	11	325.88	71.26	.000
Residual	2688.54	588	4.57	-	-
Total	6273.26	599	-	-	-

The model yields an R value of 0.756, indicating a strong positive relationship between the selected socio-economic variables and awareness on prevention and control measures. The R^2 value of 0.572 shows that the model explains 57.2 per cent of the variation in prevention-related awareness, with the adjusted R^2 (0.559) confirming the model's robustness. The overall regression model is statistically significant ($F = 71.26$, $p < 0.001$), validating the appropriateness of the selected predictors.

Table 3: Coefficients of Multiple Regression Analysis

S. No.	Variable	Unstandardized B	Std. Error	Beta	t Value	Sig.	Result
1	Cons	13.2	1.316	—	10.0	.000	Significant

S. No.	Variable	Unstandardized B	Std. Error	Beta	t Value	Sig.	Result
2	Age	0.438	0.114	0.221	3.842	.000	Significant
4	Stream of Study	0.548	0.101	0.301	5.426	.000	Significant
5	Year of Study	0.396	0.119	0.184	3.328	.001	Significant
6	Res	0.3	0.108	0.158	3.2	.00	Significant

S . No .	V a r i a b l e	U n s t d . B	St d. Er r o r	Be ta	t V a l u e	S i g .	R e s u l t
	i d e n c e L o c a t i o n	52			59	01	n i f i c a n t
7	L i v i n g C o n d i t i o n	0 . 3 1 4	0.106	0.136	2 . 9 6 2	0 . 0 0 3	S i g n i f i c a n t
8	M o n t h l y F a m i l y I n c o m e	0 . 4 8 6	0.118	0.246	4 . 1 1 9	0 . 0 0 0	S i g n i f i c a n t

S . No .	V a r i a b l e	U n s t d . B	St d. Er r o r	Be ta	t V a l u e	S i g .	R e s u l t
9	F a m i l y S i z e	0 . 0 6 4	0.093	0.029	0 . 6 8 8	0 . 4 9 2	N o t S i g n i f i c a n t
10	T y p e o f F a m i l y	0 . 3 6 8	0.113	0.152	3 . 2 5 7	0 . 0 0 1	S i g n i f i c a n t
11	O c c u p a t i o n o f P a r e n t s	0 . 4 6 2	0.107	0.236	4 . 3 1 8	0 . 0 0 0	S i g n i f i c a n t
12	E d u	0 . 5	0.112	0.272	4 . 5	0 . 0	S i g

S . N o .	V a r i a b l e	U n s t d . B	St d. E r r o r	B e t a	t V a l u e	S i g .	R e s u l t
	c a t i o n a l Q u a l i f i c a t i o n o f P a r e n t s	14			89	00	n i f i c a n t

The coefficient results identify stream of study ($\beta = 0.301$), educational qualification of parents ($\beta = 0.272$), monthly family income ($\beta = 0.246$), and occupation of parents ($\beta = 0.236$) as the four strongest predictors of awareness on prevention and control measures, all significant at the 1 per cent level. Age ($\beta = 0.221$), year of study ($\beta = 0.184$), residence location ($\beta = 0.158$), type of family ($\beta = 0.152$), and living condition ($\beta = 0.136$) are also significant, though comparatively weaker, predictors. Gender ($p = 0.435$) and family size ($p = 0.492$) are statistically non-significant, consistent with the pattern observed in bivariate analyses of this dataset. These results indicate that prevention-related awareness is shaped predominantly by academic and family socio-economic context rather than by intrinsic demographic attributes, reinforcing the case for targeting prevention programmes by discipline and family background rather than by gender.

7.2 Structural Equation Modelling (SEM)

A Structural Equation Model was developed with socio-economic characteristics (age, gender, stream of study, year of study, residence location, living condition, family income, type of family, parents' occupation, and parents' education) specified as exogenous

variables, and awareness on causes, awareness on effects, awareness on prevention measures, and overall awareness level specified as endogenous variables, structured in a sequential pathway. Model fit was assessed prior to interpreting path estimates.

Table 4: Model Fit Indices of the SEM

S . N o .	F i t I n d e x	Rec o m m e n d e d V a l u e	Ob t a i n e d V a l u e	Res u l t
1	C h i - s q u a r e / d f (C M I N / d f)	< 5.00	2.684	Good Fit
2	G F I (G o o d n e s s o f F i t I	> 0.90	0.928	Good Fit

S . No .	Fit Index	Recommended Value	Obtained Value	Result
	ndex)			
3	AGFI (Adjusted GFI)	> 0.90	0.912	Good Fit
4	CFI (Comparative Fit Index)	> 0.90	0.947	Good Fit

S . No .	Fit Index	Recommended Value	Obtained Value	Result
	ndex)			
5	NFI (Normed Fit Index)	> 0.90	0.931	Good Fit
6	TLI (Tucker Lewis Index)	> 0.90	0.938	Good Fit

S . No .	Fit Index	Recommended Value	Obtained Value	Result
	x)			
7	RMSEA	< 0.08	0.054	Acceptable Fit
8	RMR	< 0.05	0.041	Good Fit

All fit indices fall within recommended thresholds — CMIN/df (2.684) is well below the upper limit of 5.00, GFI, AGFI, CFI, NFI, and TLI all exceed 0.90, and RMSEA (0.054) and RMR (0.041) are within acceptable and good-fit ranges respectively. The model is therefore judged statistically acceptable for interpreting the hypothesised structural pathways.

Table 5: Standardised Regression Weights (Path Estimates) of the SEM

Path	Estimate	S.E.	C.R.	P-Value	Result
Socio-Economic Factors → Awareness on Causes	0.684	0.078	8.746	0.000	Significant
Awareness on Causes → Awareness on Effects	0.741	0.062	11.984	0.000	Significant

All five hypothesised paths are statistically significant ($p < 0.001$), confirming Hypothesis H₀₂ is rejected. Socio-economic factors show a strong direct effect on awareness of causes ($\beta = 0.684$), which in turn strongly predicts awareness of effects ($\beta = 0.741$). Awareness of effects significantly predicts awareness of prevention measures ($\beta = 0.706$), and prevention measures show the strongest path in the entire model to overall awareness ($\beta = 0.792$) — indicating that prevention-oriented knowledge is the single most influential proximate driver of overall awareness among the constructs modelled. Socio-economic factors additionally exert a direct effect on overall awareness ($\beta = 0.518$), independent of the mediating awareness constructs, confirming that family and academic background shape awareness both directly and indirectly through the sequential awareness-building process.

Table 6: Squared Multiple Correlations (R²) of Endogenous Variables

Endogenous Variable	R ² Value	Interpretation
Awareness on Causes	0.468	46.8% variance explained
Awareness on Effects	0.549	54.9% variance

Endogenous Variable	R ² Value	Interpretation
		explained
Prevention Measures	0.498	49.8% variance explained
Overall Awareness Level	0.627	62.7% variance explained

The R² values confirm the model's strong explanatory power, particularly for overall awareness level, where 62.7 per cent of the variance is explained by the modelled pathway — a substantial figure that underscores the value of the staged, mediated conceptualisation of awareness (causes → effects → prevention → overall) over a simple direct-effects model.

7.3 Henry Garrett Ranking of Reasons for Drug Use among College Students

Respondents ranked eight pre-identified reasons for drug use initiation from most to least important. Ranks were converted to Garrett scores, and mean scores were computed and ranked. Results are presented in Table 7.

Table 7: Henry Garrett Ranking for Reasons behind Drug Use among College Students

S · N o ·	Reason	Total Garrett Score	Mean Score	R a n k
1	Peer Pressure / Friends' Influence	46280	77.13	I
2	Stress / Exam Pressure / Depression	43860	73.10	I I
3	Curiosity / Experimentation	42120	70.20	I I I
4	Easy Availability	396	66.07	I

S · N o ·	Reason	Total Garrett Score	Mean Score	R a n k
	ty of Drugs	40		V
5	Fashion / Style / Enjoyment	37280	62.13	V
6	Family Problems	35460	59.10	V I
7	To Stay Awake / Concentrate	33140	55.23	V I I
8	Other Reasons	28420	47.37	V I I I

Peer pressure and friends' influence emerges as the most important perceived reason for drug use initiation (mean Garrett score = 77.13), followed by stress, exam pressure, and depression (73.10), and curiosity/experimentation (70.20). Easy availability of drugs (66.07) and fashion/style/enjoyment (62.13) occupy the fourth and fifth ranks, while family problems (59.10) and the need to stay awake or concentrate (55.23) rank sixth and seventh. Other, unspecified reasons received the lowest mean score (47.37). The clear dominance of peer pressure and academic stress as the top two ranked reasons — well ahead of structural factors such as easy availability — suggests that prevention programmes will yield the highest returns when they prioritise peer-resistance skills training and stress-management support over supply-side messaging alone.

8. FINDINGS OF THE STUDY

- The Multiple Regression model explains 57.2 per cent of the variation in awareness on prevention and control measures ($R^2 = 0.572$, $F = 71.26$, $p < 0.001$), with stream of study, educational qualification of parents, monthly family income, and occupation of parents as the strongest significant predictors.
- Gender and family size are statistically non-significant predictors of prevention-related awareness, consistent with the null association found for these variables elsewhere in the awareness dimensions studied.

- The SEM model demonstrates good overall fit (CMIN/df = 2.684; GFI, AGFI, CFI, NFI, TLI all > 0.90; RMSEA = 0.054), validating the hypothesised sequential structure linking socio-economic factors to awareness on causes, effects, prevention measures, and overall awareness.
- All five structural paths in the SEM are statistically significant, with the strongest path observed between prevention measures and overall awareness level ($\beta = 0.792$), and the model explains 62.7 per cent of the variance in overall awareness.
- Socio-economic factors exert both a strong indirect effect (via the causes $\rightarrow$ effects $\rightarrow$ prevention pathway) and a direct effect ($\beta = 0.518$) on overall awareness.
- The Henry Garrett Ranking analysis identifies peer pressure/friends' influence (rank I) and stress/exam pressure/depression (rank II) as the two dominant perceived reasons for drug use initiation among college students, well ahead of easy availability (rank IV) and family problems (rank VI).

9. SUGGESTIONS

- ✓ Prevention programmes should be structured around the sequential awareness pathway confirmed by the SEM — building awareness of causes first, followed by effects, and culminating in prevention-focused content — rather than delivering prevention messaging in isolation, since this staged approach shows the strongest link to overall awareness.
- ✓ Given that peer pressure ranks as the single most important perceived reason for drug use, colleges should institutionalise structured peer-education and peer-resistance skills-training programmes, using trained student peer leaders rather than relying solely on external experts.
- ✓ As stress and exam pressure rank second among perceived reasons, and given the significant regression role of year of study, colleges should integrate stress-management counselling into academic calendars, with particular attention around examination periods.
- ✓ Since stream of study, parental education, and family income are the strongest regression predictors of prevention-awareness, colleges in streams and localities with weaker predicted awareness should be prioritised for intensive family-inclusive awareness drives.
- ✓ Given the significant direct effect of socio-economic factors on overall awareness independent of the mediating pathway, targeted financial and educational support programmes for lower-income and first-generation college-going families may indirectly strengthen drug abuse awareness outcomes.
- ✓ Future prevention initiatives should de-emphasise generic supply-side messaging (e.g., availability warnings) in favour of psychosocial interventions addressing peer dynamics and academic stress,

which the Garrett Ranking analysis identifies as substantially more influential.

10. CONCLUSION

This study moves beyond descriptive assessment to model the determinants and structural pathways underlying awareness on drug abuse prevention among college students in Erode District. The Multiple Regression Analysis confirms that stream of study, parental education, family income, and parental occupation are the strongest socio-economic predictors of prevention-related awareness, while the Structural Equation Model validates a sequential, mediated pathway in which awareness of causes and effects together shape prevention-focused awareness, which in turn is the strongest driver of students' overall awareness level. The Henry Garrett Ranking Technique further clarifies that, from students' own perspective, peer pressure and academic stress — not the mere availability of drugs — are the dominant reasons behind drug use initiation. Taken together, these findings suggest that the most effective prevention strategies for college students in the district will be those that combine socio-economically targeted outreach with structured, staged awareness-building content and psychosocial interventions addressing peer influence and stress, rather than generic, availability-focused, or one-time awareness campaigns.

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