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Research Article

Epidemiological Profile of Substance uses among Male Adolescents in Rural Southern Haryana: A Community-Based Cross-Sectional Study

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A B S T R A C T

Background: Substance abuse among adolescents represents a significant public health challenge in rural India, with limited epidemiological data available from aspirational districts. This study aimed to determine the prevalence and associated factors of substance use among male adolescents in rural southern Haryana.

Methods: A community-based cross-sectional study was conducted among 322 male adolescents aged 15-19 years in rural areas of the district Nuh, Haryana, from November 2021 to December 2022. A multistage sampling technique was employed for participant selection. Data collection utilized a structured questionnaire based on the National Commission for Protection of Child Rights framework. Statistical analysis was performed using appropriate tests with significance set at $p<0.05$.

Results: The overall prevalence of substance use was 44.7% (n=144). Tobacco products were the predominant substances used (41.9%, n=135), encompassing both smokeless and smoked forms. Alcohol consumption was reported by 1.6% (n=5) participants, while opioids and pharmaceutical preparations were used by 0.6% (n=2) and 0.3% (n=1), respectively. Cannabis use was minimal (0.3%, n=1). Among substance users, 77.1% (n=111) had friends who engaged in substance use. The primary motivational factors included mood enhancement (36.1%, n = 52) and peer influence (35.4%, n=51). Academic performance decline preceded substance initiation in 24.3% (n = 35) of cases.

Conclusion: The substantial burden of substance use (44.7%) among rural male adolescents, with an average initiation age of 14.8 years, necessitates urgent implementation of targeted prevention strategies. The predominance of tobacco uses and strong peer influence patterns highlight the need for comprehensive school and community-based interventions.

Keywords: Substance Abuse, Adolescents, Epidemiology, Rural Health, Tobacco Use, Alcohol, India

Introduction

Substance abuse, as defined by the World Health Organization, encompasses persistent or sporadic drug use inconsistent with or unrelated to acceptable medical practice.[1] This phenomenon represents a growing public health concern in India, where substance use patterns demonstrate significant geographic and demographic variations. Current epidemiological data indicate that following alcohol (14.6%), cannabis (2.8%), opioids (2.1%), and cocaine (0.10%) constitute the most prevalent substances of abuse in the Indian context.[2] India ranks as the world›s second-largest consumer of tobacco products after China.[3]

The adolescent population faces particularly heightened vulnerability to substance use initiation, with approximately 5,500 adolescents commencing tobacco use daily across India.[4] Early onset substance use typically correlates with more severe long-term consequences, including adverse effects on educational attainment, family relationships, and overall psychosocial development. These consequences extend beyond individual health impacts to encompass behavioral disturbances, academic disruption, and increased risk of school dropout.

Rural populations demonstrate higher tobacco consumption rates compared to their urban counterparts, yet comprehensive epidemiological data from aspirational districts remain limited[5]. District Nuh in Haryana, classified as an aspirational district, exhibits unique sociodemographic characteristics that may influence substance use patterns among adolescents. The paucity of primary research data from this region necessitates systematic investigation to inform evidence-based prevention strategies. This study was designed to assess the prevalence, patterns, and determinants of substance use among male adolescents aged 15-19 years in rural areas of District Nuh, southern Haryana.

Materials and Methods

Study design and setting

This community-based cross-sectional study was conducted in the rural catchment areas of the Primary Health Centre Nuh and the Primary Health Centre Nagina in Nuh District, Haryana, from November 2021 to December 2022.

Study population and sample size

The study population comprised male adolescents aged 15-19 years residing in the selected rural areas. The sample size calculation was based on the prevalence of substance use among male adolescents (15-19 years) in Haryana, reported as 18.5% in the National Family Health Survey-4 data. Using a 95% confidence interval and a 3% absolute permissible error, the calculated sample size was 322 participants, determined by the formula: $n = (Z_{1-a/2})^2 \times p(1-p)/d^2$.

Sampling method

A multistage sampling technique was employed. In the first stage, all villages under the sub-centres of PHC Nuh and PHC Nagina were included. The second stage employed Probability Proportional to Size (PPS) sampling for allocating subjects across the selected villages. Simple random sampling was employed in the third stage to choose the final participants within each village.

Data collection

Data collection was performed through house-to-house surveys using a structured questionnaire adapted from the National Commission for Protection of Child Rights study on substance use patterns among Indian children[6]. The questionnaire encompassed sociodemographic characteristics, substance use patterns, initiation factors, and associated behavioral parameters.

Ethical considerations

Ethical approval was obtained from the Institutional Ethics Committee (Letter No. SHKM/IEC/2021/35, dated August 16, 2021). Written informed consent was secured from all participants and their guardians. For participants under 18 years, written assent was obtained after providing comprehensive information through participant information sheets in Hindi.

Statistical analysis

The data were coded and entered into MS Excel, and subsequently analyzed using statistical software. Categorical variables were presented as frequencies and percentages, while continuous variables were summarized using mean and standard deviation. Statistical significance was evaluated using appropriate tests, with $p<0.05$ considered significant.

Results

Demographic characteristics

The study enrolled 322 male adolescents with a mean age of 16.2 (±1.8) years. The largest age group comprised 18-year-olds (n=78, 24.2%), followed by 17-year-olds (n=73, 22.7%) and 16-year-olds (n=73, 22.7%). The majority identified as Muslim (n = 239, 74.2%), with Hindu participants comprising 24.8% (n = 80).

Educational status revealed that 77.0% (n=248) were current students, while 8.1% (n=26) had middle school education, 5.0% (n=16) had primary education, and smaller proportions had higher education levels or were literate only. Regarding socioeconomic status based on the Modified BG Prasad scale, 41.0% (n=132) belonged to the lower-middle class, with equal proportions in middle and upper-middle classes (19.3% each, n=62).

Family structure analysis revealed that 50.0% (n = 161) of the participants belonged to joint families, while 49.4% (n=159) resided in nuclear families. Among participants with a family history of substance abuse (n=223), 52.9% (n=118) were current substance users, compared to 27.3% (n=27) among those without a family history (n=99).

Prevalence and patterns of substance use

The overall prevalence of substance use was 44.7% (n=144). The table illustrates the distribution of various types of substances used by the study participants. Among the different substances reported, tobacco (smoking or smokeless forms) was the most prevalent, accounting for 135 individuals (41.9% of the total sample), signifying its dominant role in substance use patterns within the study population. Alcoholic beverages were used by 5 participants (1.6%), while opioids such as doda and phukki were reported by 2 participants (0.6%). (Table 1)

Table 1.Distribution of substance use patterns among study participants

n=144

Substance Type	Frequency	Percentage (%)
Tobacco (smoking/ smokeless)	135	41.9
Alcoholic beverages	5	1.6
Opioids (doda, phukki)	2	0.6
Pharmaceutical preparations	1	0.3
Cannabis products	1	0.3
Volatile substances	0	0.0
Total substance users	144	44.7

Table 2.Motivational factors for substance use among participants

n=144

Motivational Factor	Frequency	Percentage (%)
Mood enhancement	52	36.1
Peer influence	51	35.4
Stress relief	23	16.0
Academic performance decline	35	24.3
Friends' substance use	111	77.1
Curiosity	28	19.4
Family problems	15	10.4

Multiple responses permitted

Among tobacco users, smokeless forms predominated, including gutkha, khaini, and zarda. No participants reported volatile substance use. The mean age of substance use initiation was 14.8 (±1.2) years.

Factors associated with substance use

Table 2 illustrates the primary motivational factors for substance use as perceived by participants. The distribution of motivational factors for substance use among the study participants (n=144), allowing for multiple responses per individual. The most frequently reported factor was friends' substance use, cited by 111 participants (77.1%). Data underscore that substance use motivation in this cohort is predominantly shaped by peer-related and social factors, with emotional, academic, and familial influences also contributing. (Table 2)

Procurement and usage patterns

Regarding substance procurement, 55.6% (n=80) obtained substances from tobacco/wine shops, 36.1% (n=52) from friends, 2.8% (n=4) from pharmacies, and 2.8% (n=4) from drug peddlers. Usage frequency analysis revealed that 49.3% (n = 71) were daily users, 30.6% (n = 44) were lifetime users, 13.2% (n = 19) had used substances in the past year, and 6.9% (n = 10) had used substances in the past month.

Statistical associations

Family history of substance abuse showed a significant association with adolescent substance use (χ^2 = 18.42, p<0.001). Participants from families with a substance abuse history demonstrated 2.3 times higher odds of substance use compared to those without such a history (OR = 2.31, 95% CI: 1.45-3.67).

Age group analysis revealed increasing prevalence with age: 38.5% among 15-16 years, 45.2% among 17 years, and 51.3% among 18-19 years (χ^2 for trend = 4.82, p<0.05).

Discussion

This study revealed a substantial prevalence of substance use (44.7%) among rural male adolescents in southern Haryana, which aligns with findings from similar studies conducted in rural Indian settings.[7,8] The observed prevalence is comparable to the 42.3% reported by Singh et al. in rural Punjab[9] and slightly lower than the 48.2% documented by Sharma et al. in rural Rajasthan.[10]

Tobacco products constituted the predominant substances of abuse (41.9%), consistent with national trends and previous research from rural areas[11,12]. The preference for smokeless tobacco forms reflects cultural acceptability and accessibility within rural communities. These findings corroborate the National Sample Survey Organization data indicating significant tobacco use among rural adolescents.[13]

The mean initiation age of 14.8 years represents a critical finding, as early onset substance use strongly predicts continued use into adulthood and increased risk of dependence[14]. This age corresponds with the transition period between middle and high school, suggesting the importance of targeted interventions during this vulnerable developmental phase.

Peer influence emerged as the primary motivational factor (35.4%), consistent with established literature on adolescent substance use initiation[15,16]. The finding that 77.1% of substance users had friends who also engaged in substance use underscores the role of social networks in behavior adoption. This pattern aligns with social learning theory the importance of peer-based prevention strategies.

Family history of substance abuse demonstrated a significant association with adolescent use, with participants from affected families showing 2.3 times higher odds of substance use. This finding supports the intergenerational transmission hypothesis and highlights the importance of family-based interventions[17].

The predominance of tobacco/wine shop procurement (55.6%) suggests inadequate enforcement of age-restriction policies in rural areas. This finding indicates the need for strengthened regulatory compliance and vendor education programs.

Limitations

Several limitations warrant consideration. The exclusion of female adolescents due to sociocultural constraints limits the generalizability of the findings. Potential recall bias and deliberate misrepresentation may have affected the accuracy of self-reported data. The cross-sectional design precludes causal inference, and the study's geographic specificity may limit broader applicability.

Public health implications

The findings underscore the urgent need for comprehensive substance abuse prevention strategies targeting rural adolescent populations. School-based programs incorporating peer education, family involvement, and community engagement appear most promising. Enhanced enforcement of age-restriction policies and vendor accountability measures requires implementation.

Conclusion

The substantial burden of substance use (44.7%) among rural male adolescents in southern Haryana, with predominant tobacco use and early initiation age, represents a significant public health challenge. The strong association with peer influence and family history underscores the need for multi-level intervention strategies that encompass individual, family, and community components. Immediate implementation of evidence-based prevention programs is essential to mitigate long-term health and social consequences.

Declaration Section

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Data Availability Statement: Data will be made available upon request.

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Conflict of Interest: None

Sources of Funding: None

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