Original Article

Risk Factors for Substance Use Among Street Children Entering Treatment in India

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ABSTRACT

Background: Although empirical studies have reported on substance use in children in India, multivariable statistical models examining risk factors in children seeking treatment for substance use are largely lacking. The goal of this study was to test a conceptual model predicting age of first use, duration of use of any psychoactive substance, and primary substance of choice from child and family characteristics in a sample of children entering substance use treatment. **Methods:** This was a single-sample cross-sectional study of 159 children entering a treatment and rehabilitation center in Delhi that provides substance use treatment and teaches children the skills to allow for their re-integration into society. De-identified data were extracted from clinical case records. Summary statistics were used to describe the sample characteristics. Regression analyses were used to examine the proposed conceptual model. **Results:** Child's age, schooling, and age at first crime were unrelated to age at first use of a psychoactive substance, duration of use of such substances, or choice of primary substance. However, parental and family factors served as risk factors for predicting one or more of these three outcomes. **Conclusions:** Findings suggest that child psychoactive substance use may have a multidimensional set of possible family and parental origins, and that child factors such as age, education, and age at first crime may play a lesser or insignificant role in a child's psychoactive substance use.

Key words: *Cannabis, India, opium, solvents, street children, substance use treatment*

INTRODUCTION

India is estimated to have the largest child population of any nation in the world. As Reddy and Biswas[1] have noted, substance use in this population, at least in urban adolescents attending schools, would appear "alarming," with more than 20% sniffing glue and 28% using alcohol. The problem of substance use in children in India is compounded by its large population

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of street children, estimated to be the largest in the world.[2] Many of these children faced poverty, hunger, and physical abuse at home.[3]

Perhaps the most thorough examination of substance use in children of India was undertaken by the National Commission for Protection of Child Rights (NCPCR).[4] This survey utilized both random and convenience sampling to examine substance use in more than 4000 children across 135 sites in 27 states. The findings indicated that both tobacco and alcohol were used by more than two-thirds of the sample, with cannabis (35%), inhalants (35%), pharmaceutical opioids (18%), and sedatives and heroin (both 8%) trailing. Injection use was reported by 12.6% of the sample.

Although these and other studies[5-7] have been informative with regard to substance use in Indian children, this line of research has been almost entirely descriptive. Given the findings reported in the literature, particularly in the NCPCR report, it was possible to develop a conceptual model to examine putative risk factors for substance use outcomes in this population. The purpose of the present study was twofold: (1) Summarize basic background and family characteristics and substance use history of children entering a treatment and rehabilitation center in New Delhi that provides substance use treatment and teaches children skills to allow for their re-integration into society and (2) test a conceptual model that would explain the age of first use of any psychoactive substance except tobacco, duration of regular use of any psychoactive substance, and choice of primary substance based on child and family characteristics.

MATERIALS AND METHODS

This study was determined to be exempt by the Institutional Review Board at the University of North Carolina in Chapel Hill.

Setting and participants
The treatment setting was the SPYM Center for Children in Need of Care and Protection, New Dehli which provides treatment services to substance-using children between the ages of 7 and 18. Most children are referred to the center by the Child Welfare Committee of the Government of Delhi which looks after the welfare and protection of children who have no family support/supervision. However, many children with substance use and related behaviors are brought by their caretakers.

Measure
Data were extracted from 2015 to 2016 clinical records, during which time treatment was provided solely to boys. Data were collected on paper forms during a

structured interview conducted by an experienced counselor at intake.

Some variables extracted from the clinical records were continuous (e.g., age at first use of a psychoactive substance) while others were categorical. In regard to outcome measures, age at first use was assumed to follow a normal distribution; duration of regular use of any psychoactive substance other than tobacco was recorded as last 3 months, last 4–6 months, last 7–12 months, last 13–24 months, last 25–36 months, or 37+ months. For the purposes of the present analyses, it was recoded as a binary variable representing short-term versus long-term use (≤ 12 vs. ≥ 13 months).

In terms of explanatory variables, age, family size, and age at first crime were treated as continuous variables; educational level for child, mother, and father had been recorded as primary education (up to 5 years of schooling); middle education (6–8 years); secondary education (9 years and above); never been to school; illiterate; and for mother and father, N/A, indicating no information available. Monthly family income was recorded as 0–5000 Rs./month; 5001–10,000 Rs./month; 10,001–15,000 Rs./month; or 15,001 Rs. and above/month. To create predictors that did not have sparse membership in a category, education and family income were recoded as binary variables.

Statistical analyses
The conceptual model examined the relationship between three outcome measures and nine explanatory variables in three separate regression analyses. Ordinary least square regression was used for the outcomes of age of first illicit substance use, binary logistic regression[8,9] for duration of regular use of any psychoactive substance, and multinomial logistic regression[8,9] for choice of primary substance. The nine explanatory variables were age of the child, child's educational level (some school vs. no school or illiterate), child's age of first crime, number of family members, family income (<5000 Rs./month vs. $\geq$5000 Rs./month), father's and mother's educational level (some schooling vs. no schooling or illiterate), and father's history of and family (other than father and mother) history of illicit substance use (both yes vs. no).

It was necessary to make three changes to test the proposed conceptual model. First, five observations that were missing mother's and four observations that were missing father's educational level were dropped. Second, it was necessary to drop mother's history of illicit substance use as an explanatory variable because there was only one remaining mother who had used any illicit substance. Third, for the multinomial logistic

regression, it was necessary to omit cases whose primary substance was so infrequent (alcohol, stimulants, and pharmaceutical drugs) that it caused problems in achieving a solution. This process omitted 9 cases from the analysis of age of first substance use and duration of use and additional 15 cases from the analysis of primary substance.

RESULTS

Sample characteristics
The mean age in the sample was 14.3 years (standard deviation [SD] =2.5; range = 8–18). No history of formal schooling was reported by 37% of the children, with an additional 7% considered to be illiterate, while 88 (55%) mothers and 69 (43%) fathers were reported to be illiterate. Hindu was the reported religious preference of 98 (62%), with the remaining 61 (38%) children indicating Muslim. Mean number of family members was 5.1 (SD = 1.3); 45 (28%) children lived with their family; 52 (33%) lived on the streets without and 17 (11%) with family; 45 (28%) lived with a peer group during their period of substance use. Family income was ≤ 5000 Rs./month for 55% of the families.

Table 1 provides summarized data regarding substance use-related variables. Cannabis, opioids, and solvents were the primary substances used, with alcohol, cocaine, and pharmaceutical drugs used infrequently. The majority were poly-substance using while few injected drugs. Peer pressure was the primary reason reported for substance use initiation. Duration of use of any psychoactive substance for more than 1 year was reported by 77%; all children indicated that they had engaged in criminal activity, with 82% reporting using criminal activity to support their substance use, with mean age of first crime at 13.3 years (SD = 2.5).

Model testing
Table 2 contains the results of the inferential analyses. Family size and some schooling on the part of the father were significantly negatively associated and higher family income was significantly positively associated with age of first use. There was an increased risk for a longer duration of use associated with lower family income, some schooling on the part of the father, no schooling on the part of the mother, father's history of substance use, and no family history of substance use. *Post hoc* testing of the three significant effects for primary substance indicated that increasing family size was associated with a preference for both cannabis and opium over solvents and opium over cannabis; higher family income was associated with a preference for solvents over opium and cannabis over opium; schooling on the part of the mother was associated with a preference for both cannabis and opium over solvents.

Table 1: Substance use characteristics in the sample of children entering substance use treatment (*n*=159)

Substance use history	
Cannabis	98 (61%)
Opium	63 (40%)
Solvents	54 (34%)
Alcohol	39 (25%)
Pharmaceutical drugs	6 (4%)
Stimulants	2 (1%)
Tobacco	0
Poly drug use: Yes	90 (57%)
Injection drug use: Yes	3 (2%)
Current primary drug of choice	
Cannabis	64 (40%)
Opium	47 (30%)
Solvents	33 (21%)
Alcohol	9 (6%)
Stimulants	4 (3%)
Pharmaceutical drugs	2 (1%)
Primary reason for starting substance use	
Peer pressure	140 (88%)
Dysfunctional family	11 (7%)
Both peer pressure and dysfunctional family	4 (3%)
Fun and enjoyment	2 (1%)
Curiosity	2 (1%)

Notes. Percentages sum to greater than 100% for the 7 substances under the substance use history heading because children could indicate more than one substance. Percentages do not sum to 100% for current drug of choice due to rounding

DISCUSSION

The findings suggest that street children seeking treatment in New Delhi are experiencing serious problems with substance use, most notably with cannabis, opium, and solvents, and more than three-fourth had been using psychoactive substances for more than 12 months. Children reported that peer pressure was the predominant reason they began using substances – with few reporting a dysfunctional family as a causal factor. The children frequently resorted to criminal activities as a source of funds to support their substance use.

In terms of risk factors for substance use, the child factors of age, schooling, and age at first crime were unrelated to either age at first use of a psychoactive substance, duration of use of such substances, or choice of primary substance. In contrast, parental factors served as risk factors for predicting child substance use. Notably, family income was a significant explanatory variable for all three outcomes, with a lower family income associated with an earlier age of use, longer duration of use, and choice of solvents and cannabis over opium – perhaps a cost consideration for the children.

The present study had several limitations. The sample was one of convenience. The study was an analysis of data originally collected for clinical purposes. A study

Table 2: Results of regression analyses testing a conceptual model of substance use

Explanatory variables	Outcome measures						Contrasts for significant primary substance results AOR (95% CI)		
	Age at first use (n=150)		Duration of use (n=150)		Primary substance (n=135)				
	b (SE)	P	AOR (95% CI)	P	Wald χ^2	P	Solvents v. cannabis	Solvents v. opium	Opium v. cannabis
Age	0.14 (0.14)	0.30	0.84 (0.61, 1.17)	0.30	0.69	0.71			
Child's education	−0.44 (0.42)	0.30	0.47 (.19, 1.15)	0.10	3.19	0.20			
Age at first crime	−0.22 (0.14)	0.12	1.24 (0.87, 1.77)	0.06	0.49	0.79			
Family size	**−0.32 (0.16)**	**0.04**	1.02 (0.71, 1.48)	0.90	**16.02**	**<0.001**	**0.38 (0.20, 0.70)**	**0.26 (0.13, 0.50)**	**1.46 (1.01, 2.13)**
Family income	**0.88 (0.40)**	**0.03**	**3.16 (1.30, 7.68)**	**0.007**	**10.53**	**0.005**	2.95 (0.93, 9.93)	**7.78 (2.20, 27.60)**	**0.38 (0.15, 0.94)**
Father's education	**−1.00 (0.50)**	**0.04**	**0.29 (.08, 0.97)**	**0.007**	3.19	0.20			
Mother's education	−0.93 (0.52)	0.08	**6.62 (1.96, 22.44)**	**0.002**	**7.80**	**0.02**	**0.10 (0.02, 0.52)**	**0.13 (0.03, 0.68)**	0.80 (0.27, 2.33)
Father's history of substance use	−0.61 (0.51)	0.24	**0.05 (0.01, 0.29)**	**0.01**	3.07	0.21			
Family history of substance use	0.68 (0.54)	0.20	**65.89 (9.49, 457.61)**	**<0.001**	3.65	0.16			

b – Unstandardized partial regression coefficient; S E – Standard error; AOR – Adjusted odds ratio; 95% CI – 95% confidence interval. Duration of use was coded: 1 = ≥13 months v. 0 = ≤12 months. Child's, mothers, and father's education was coded: 1=Some schooling v. 0=No schooling or illiterate (reference category). Father's and Family's history of substance use was coded: 1=Yes v. 0=No (reference category). Family income was coded: 1=5,000+Rupees/month v. 0 = ≤5,000 rupees/month (reference category). For the analysis of choice of primary substance, Wald χ^2 test is a test of each explanatory variable in the multinomial regression, each test with df=2; AORs and 95% CIs are reported for the three pairwise comparisons among the primary substances of choice for the three outcomes in which the overall test was significant; for these contrasts, the second group in each pair listed was the reference group. Significant effects are in bold

specifically designed to test the conceptual model might yield different conclusions. Power to detect small effects in the population was low, so relationships between the explanatory variables and an outcome variable (s) found to be nonsignificant may exist in the population.

CONCLUSIONS

This study was conducted to examine the child and family factors that might be associated with psychoactive substance use in a sample of 159 boys entering treatment for substance use. A conceptual model that examined child, parent, and familial factors that might be associated with age at first use of a psychoactive substance, duration of use of such substances, and choice of primary substance was examined. None of the three child factors examined – child age, education, and age at first crime – was associated with any one of these three psychoactive substance use outcome variables. In contrast, parental variables were found to predict one or more of these child substance use outcomes. Father's and mother's education and father's history of substance use were found to be associated with duration of psychoactive use, father's education to child's age at first use, and mother's education to choice of primary substance. Moreover, family factors were also found to be associated with these same outcomes. Family history of substance abuse was related to duration of psychoactive use, family size was found to be related to both age at first use of psychoactive substances and choice of primary substance, and family income was associated with all three child psychoactive use variables.

These relationships were examined in separate regression models in which the relationships between the child psychoactive substance use variables and each of the child, parent, and family explanatory variables were examined holding constant all predictor variables in each regression model. Thus, parent and family factors were found to be significant predictors of child substance use controlling for each other as well as the child explanatory variables. In this light, findings suggest that child psychoactive substance use may have a multidimensional set of possible family and parental origins, and that, at the least, child factors such as age, education, and age at first crime may play a lesser or insignificant role in a child's psychoactive substance use.

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Conflicts of interest
There are no conflicts of interest.

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