Original Article

Presenting Pattern and Psychiatric Comorbidities in Rural versus Urban Substance Dependent Patients: A Hospital-Based Cross-Sectional Study

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Abstract

Background: "Locality" is a significant factor in substance initiation, maintenance, and relapse. The pattern of substance dependence among rural and urban populations varies across studies and is scarcely studied, warranting further research. To compare presenting patterns (sociodemographic and drug-related variables), reasons for substance use, and psychiatric comorbidities (prevalence, type, and severity) between rural and urban substance-dependent groups. **Materials and Methods:** This study was a cross-sectional analytical study in a government de-addiction center, including rural and urban patient groups aged 18–65. International Classification of Diseases, Tenth Revision (ICD-10) criteria, and severity of dependence scale were used for diagnosing substance dependence. After detoxification, psychiatric comorbidity was assessed using brief psychiatric rating scale, Young's mania rating scale, and patient health questionnaire – somatic, anxiety, and depression symptoms scale. Post-analysis was performed to assess socioeconomic variables and access to de-addiction services. **Results:** The final sample was 500 (250 rural and 250 urban). The post-analysis sample size was 386 (211 rural and 175 urban). The mean age was 38.2 ± 12.4 years, mostly males (n = 495, 99%). Substance frequency was opioids (92%)> benzodiazepines (24.8%) > alcohol (22%) > cannabis (1.6%) for rural and opioids (91.2%) > alcohol (29.6%) > benzodiazepines (14.8%) > cannabis (2%) for urban patients. More than half of patients had comorbid nicotine dependence. Rural patients were more benzodiazepine dependent (P = 0.007), and urban were more opioid + alcohol dependent (P = 0.001). Rural patients had higher age (P = 0.012), less education (P < 0.001), positive family history of substance (P = 0.028), daily wagers, and farmers (P < 0.001) than urban patients who were younger, students (P = 0.002), businessmen and government employed (P < 0.001). Urban patients expended more on drugs (P < 0.001), had higher treatment attempts (P = 0.008), and had better availability and accessibility of de-addiction services (P < 0.001). More rural users initiated substances to "enhance performance," whereas urban ones initiated for "stress relief/novelty" (P < 0.001). For treatment seeking, "External pressure" was a more common reason in urban patients (P < 0.001), who also had more psychiatric comorbidities (P = 0.026). **Conclusion:** Significant pattern differences exist between rural and urban substance dependents, warranting emphasis on locality-specific factors for appropriate intervention.

Keywords: Dependence, dual diagnosis, locality, psychiatric comorbidity, residence, rural, substance, urban

Introduction

For decades, the substance-dependence menace has haunted families of Punjab. The National Mental Health Survey (NMHS) 2015–16 showed that Punjab has 2–4 times prevalence of alcohol and other substance use disorders (SUDs) compared to the rest of the Nation.[1,2] Sociodemographic and cultural factors including locality have significant roles in substance initiation, maintenance and relapse,[3] and the pattern of use

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changes over time.[4] Community surveys show a rural–urban prevalence of substance users as 56.8% versus 43.2% [5]; while hospital-based studies show a prevalence of 38.2% versus 61.9%, respectively.[6] Previous research found differences in the types of substances used,[7] preparations/routes of use[8] and economic differences.[9] Rural patients had higher treatment gaps and more drop-outs.[10–12] Psychiatric comorbidities, however, were more prevalent in urban patients. Fewer social risk factors and stigmatization among rural patients were factors sighted.[6,13,14] Underpinnings of these differences are speculative. Although urban living is associated with more stress, breakdown of support systems, and economic instability; lack of availability, accessibility, and affordability of mental health services in rural areas still remain important.[15] This has caused rural-specific barriers in health services like provider bias, lack of screening and follow-ups.[16,17] In the past decade, few studies in India compared substance use patterns in rural and urban patients; and those which did, found variable results.[7,9,18,19] Even fewer studies compare psychiatric **co**morbidity in such patients viewing locality as a viewpoint.[6,20] Considering scant research and public health importance, this study aimed to compare the presenting pattern (sociodemographic and drug-related variables), reasons for substance use, and psychiatric comorbidities (prevalence, type, and severity) among rural and urban substance-dependent patients in the hope to provide insights into area-specific factors needed for drug policy.

Material and Methods

Study Design and Duration

The study was a cross-sectional analytical study conducted in the de-addiction center of a government hospital in Punjab. Data collection was made from April 2021 to June 2021. The hospital Ethics committee approved the study protocol.

Study Population and Setting

The study was conducted on newly registered outpatients presenting to Drug De-addiction and Treatment Centre (DDTC), District Hospital, Bathinda, Punjab. The center is located within a tertiary-care government-run hospital on the outskirts of the city. A catchment area includes rural and urban backgrounds, including populations from within and some adjacent districts of southwestern Punjab. Occasionally, few patients present from other regions of the State. The center provides integrated care, including diagnosis, investigations, and treatment, both for drug dependence and related medical disorders like Human Immunodeficiency Virus (HIV), Hepatitis C Virus (HCV), etc., free of cost. Management includes both pharmacological and nonpharmacological measures (e.g., brief intervention, motivation enhancement, etc.) by a team of Psychiatrist, Medical Officer(s), De-addiction social workers, and counselors. Due to low availability of Psychiatrist(s) at periphery, this center acts as one of the few treatment centers in the district, tending to both near and far-residing persons.

Operational definitions:

a. **Locality –** For all purposes of the study, locality refers to "rural" or "urban" places of residence of the patients.
b. **Rural–urban classification –** This was based on the list of respective rural and urban areas as specified in the Government of India Census 2011.[21] The self-reported place of residence was matched against the list.
c. **Duration of stay –** This was decided keeping in reference the Punjab Government rules for issuing Residence Certificate.[22] For the purpose of the study, patients residing at the same place for most part of the year, for at least 5 years were included.

Sample Size and Sampling Technique

The proportion of rural and urban SUD patients was 38.2% and 61.9%, respectively, in a hospital-based study from north India.[6] Previous year prevalence data from the de-addiction center at the study hospital was-

Total no. of patients = 7828; Rural = 3977 (50.8%); Urban = 3851 (49.2%).

The sample size was calculated as follows:-

$$n = (Z\alpha_{/2} + Z_{\beta})^{2} * (p1\ (1 - p1) + p2\ (1 - p2))/(p1 - p2)^{2}$$

Taking confidence level of 95% and power of 80%,

$$n = (1.96 + 0.84)^{2} * (0.382(1 - 0.382) + 0.508(1 - 0.508))/(0.382 - 0.508)^{2}$$

$n = 241$ each

As per patient availability, time restraints, and feasibility of researchers, a non-probability consecutive sampling method was employed for enrollment.

Inclusion and Exclusion Criteria

Newly registered outpatients presenting to the de-addiction center, giving a written informed consent, aged 18–65 years, and meeting ICD-10 criteria for substance dependence (F10.2–19.2) were included. Subjects with Intellectual disability, head injury, neurological illness, or severe cardio-respiratory or other medical illnesses were excluded.

Study Procedure

A written informed consent was obtained. Patients were selected as per the inclusion and exclusion criteria and evaluated for sociodemographic variables using Psychiatric proforma devised by the researcher. Drug-related variables were assessed keeping in reference to the Drug Abuse Monitoring System proforma, India.[23] Further, reasons for substance use were asked as self-report answers in terms of initiation, continuation, treatment seeking, and relapse, if any, for the primary substance. Based on the patients' locality, two groups of rural and urban patients were made. Diagnosis of dependence was established using ICD-10 diagnostic guidelines for substance dependence (F10.2–F19.2).[24] Further confirmation and assessment of substance severity was made using Severity of Dependence Scale (SDS);[25] a reliable and valid instrument. The patients were subjected to appropriate

investigations justifying inclusion/exclusion criteria (complete blood counts, liver and renal functions, blood sugar, serum electrolytes, viral markers, ECG, and chest x-ray; specific investigations like Electroencephalogram (EEG) or CT head, wherever required). The presence of independent psychiatric **co**morbidity was assessed using the ICD-10 classification.[24] Further, the presence of psychiatric **co**morbidity and its severity was assessed using structured scales – Brief Psychiatric Rating Scale (BPRS) (for psychotic symptoms),[26] Young's mania rating scale (YMRS) (for manic symptoms),[27] and Patient health questionnaire – somatic, anxiety, and depression symptoms scale (PHQ-SADS).[28] The BPRS is a reliable and valid tool for assessment of psychotic disorders including schizophrenia. Scored from 18 to 126, it has 18 items, each graded from 1 (not present) to 7 (extremely severe). The YMRS is a widely accepted tool for rating people with Bipolar disorders – Manic episodes, having a positive predictive value of 83%. It has 11 items which are scored from 0 to 8 for four and 0 to 4 for seven items. The PHQ-SADS is a combination of three scales – the PHQ-9 (Depression), GAD-7 (Generalized Anxiety Disorder), PHQ-15 (Somatic symptom scale), plus a panic symptoms question. Each scale is rated individually with a global score to assess for severity of these conditions. To avoid bias from substance-induced psychiatric conditions, assessment on all scales was performed after the detoxification phase. Further, the diagnosis was confirmed by the psychiatrist in-charge of the De-addiction Unit. Confidentiality of data was strictly maintained. After data collection, an analysis of the pattern of substance dependence and psychiatric comorbidities was performed.

Statistical Analysis

Data were entered in Microsoft Excel and analyzed using IBM SPSS v23. Descriptive statistics for categorical variables are presented in the form of frequencies, and for continuous variables; in the form of means and standard deviations. A comparison of categorical variables was made using Pearson's Chi-square test, with Bonferroni correction for multiple comparisons. Fischer's exact test was used where the expected cell count (≥20% cells) was less than five. A comparison of continuous variables was made using the Mann–Whitney *U* test. Kendall's tau B was used for correlation analysis. "*P*" values of significance were determined, and values <0.05 were considered significant.

Post-analysis: After analysis of results and internal discussion among researchers, more factors like socioeconomic variables and access to de-addiction services were assessed to study their impact on the rural–urban divide. For this, all patients were contacted physically or via phone/messages for their consent and further queries. Perceived access to de-addiction services was assessed using five questions, one for each domain of availability, affordability, accommodation, acceptability, and accessibility of service put to patients in the local language (Punjabi) in a "Yes/No" format.

Results

A total of 520 substance-dependent patients were enrolled. After initial screening as per inclusion/exclusion criteria, 20 patients were excluded, who either changed their locality of residence during the past 5 years or those not providing a written informed consent for the study (nonresponse rate = 0.04%). The final sample size was 500, with 250 rural and 250 urban patients. For post-analysis, the response rate was 77.2% (total *n* = 386; rural *n* = 211, urban *n* = 175).

The mean sample age (*N* = 500) was 38.2 ± 12.4 years, most belonging to 26–35 years age-group (*n* = 169, 33.8%). Most were males (*n* = 495, 99%), with only five females (1%). Mean years of education were 6.6 ± 4.8 years. Most were farmers (*n* = 123, 24.6%) or daily wagers (*n* = 116, 23.2%) by occupation, married (*n* = 368, 73.6%), resided in joint families (*n* = 203, 40.6%), followed Sikh religion (*n* = 425, 85%), and belonged to upper-lower socioeconomic status (SES; *n* = 315, 63%). Patients presented with a five types of substance dependence, the most common being opioids (*n* = 458, 91.6%), followed by nicotine/tobacco (*n* = 267, 53.4%), alcohol (*n* = 129, 25.8%), benzodiazepines (*n* = 99, 19.8%), and cannabis (*n* = 9, 0.02%), respectively. Psychiatric **co**morbidity was found in 31% patients (*n* = 155).

A sociodemographic comparison of rural and urban patients [Table 1] showed that rural patients were of higher age, obtained fewer years of education, had positive family history of SUD and higher distance to the de-addiction center than urban patients. Most of them were daily wagers and farmers, whereas urban patients were more students, businessmen, or in government jobs. Urban patients included more Hindu populations than rural ones. The socioeconomic comparison showed no differences based on SES, or post-analysis variables of caste, type of house, availability of basic amenities, overcrowding, and availability of vehicle(s).

Considering substance types [Table 2], patients in both groups were more opioid-dependent (*n* = 129, 86.6% rural and *n* = 134, 85.5% urban). The number increased to 230 (92.0%) among rural and 228 (91.2%) among urban patients when multiple substance dependence was taken into account. The frequency trend hence was opioids (92%)> benzodiazepines (24.8%)> alcohol (22%)> cannabis (1.6%) for rural and opioids (91.2%)> alcohol (29.6%)> benzodiazepines (14.8%)> cannabis (2%) for urban patients. Rural patients had more benzodiazepine dependence and more opioid + benzodiazepine dependence compared to urban ones, who had more opioid + alcohol dependence. Considering the form and routes of substances used, rural and urban alcohol dependents maximally consumed country-made liquor (78.2% and 48.6%, respectively, *P* = NS), however, more urban patients consumed branded liquor (12.7% and 43.2%, respectively, *P* = 0.001). Among opioid dependents, most used heroin (49.6% and 56.6% respectively, *P* = NS) via smoking (25.7% and 30.7%, respectively, *P* = NS) or intravenous route (23.9% and 25.9%, respectively, *P* = NS), whereas cannabis dependents used ganja (75% and 40%,

Table 1: Sociodemographic comparison

Parameters		Rural – *n* (%) *n*=250	Urban – *n* (%) *n*=250	*P**
Age (years) (u±SD)		39.6±12.6	36.8±12.1	0.012
Age group (years)	18–25	37 (14.8)	46 (18.4)	0.108
	26–35	78 (31.2)	91 (36.4)	
	36–45	52 (20.8)	54 (21.6)	
	46–65	83 (33.2)	59 (23.6)	
Sex	Male	247 (98.8)	248 (99.2)	1.000
	Female	3 (1.2)	2 (0.8)	
Years of education (u±SD)		5.7±4.9	7.6±4.4	<0.001
Occupation	Unemployed	51 (20.4)	47 (18.8)	<0.001†
	Housewife	2 (0.8)	2 (0.8)	
	Student	7 (2.8)	24 (9.6)	
	Daily wager	79 (31.6)	37 (14.8)	
	Farmer	79 (31.6)	44 (17.6)	
	Business	11 (4.4)	43 (17.2)	
	Private job	19 (7.6)	37 (14.8)	
	Govt.‡ job	2 (0.8)	16 (6.4)	
Marital Status	Unmarried	28 (11.2)	34 (13.6)	0.428
	Married	181 (72.4)	187 (74.8)	
	Divorced/separated	28 (11.2)	19 (7.6)	
	Widowed	13 (5.2)	10 (4)	
Family type	Nuclear	94 (37.6)	100 (40)	0.248
	3-generation	46 (18.4)	57 (22.8)	
	Joint	110 (44)	93 (37.2)	
Religion	Hindu	6 (2.4)	65 (26)	<0.001
	Sikh	243 (97.2)	182 (72.8)	
	Muslim	1 (0.4)	3 (1.2)	
Family History of SUD	Absent	182 (72.8)	201 (80.4)	0.028
	Present	68 (27.2)	49 (19.6)	
Distance from the center (in km)		23.6±10.3	14.0±16.6	<0.001
SES‡	Upper	0	4 (1.6)	0.011§
	Upper middle	21 (8.4)	38 (15.2)	
	Lower middle	53 (21.2)	58 (23.2)	
	Upper lower	168 (67.2)	147 (58.8)	
	Lower	8 (3.2)	3 (1.2)	
Other socioeconomic variables‖				
Caste	General	135 (64.0)	99 (56.6)	0.212
	Scheduled caste	60 (28.4)	55 (31.4)	
	Backward caste	16 (7.6)	21 (12)	
Type of house¶	Pucca	168 (79.6)	144 (82.3)	0.508
	Kutcha/semi-pucca	43 (20.4)	31 (17.7)	
Availability of basic amenities¶	Yes	196 (92.9)	159 (90.9)	0.464
	No/partial	15 (7.1)	16 (9.1)	
Overcrowding**	Yes	23 (10.9)	26 (14.9)	0.245
	No	188 (89.1)	149 (85.1)	
Availability of transport vehicle in the family	≥1 car/tractor	44 (20.8)	29 (16.6)	0.282
	≥1 bike/scooter	103 (48.8)	99 (56.6)	
	≥1 cycle/"rehra" rickshaw	59 (28.0)	40 (22.9)	
	None	5 (2.4)	7 (4)	

*Chi-square test used; Fisher's exact test used when expected cell count was <5; Mann–Whitney *U* test used for variables "Age" and "Years of education"; all mean score variables controlled for SES; $P \leq 0.05$ considered statistically significant. †Adjusted *P* value of significance as per Bonferroni correction was set at ≤0.003. At this level, significant results were achieved for the category of Students (0.002), Daily wagers (<0.001), Farmers (<0.001), Business (<0.001), and Govt. Job (<0.001) versus rest. ‡Govt – Government; SES- Socioeconomic status, as per Kuppuswamy socioeconomic scale modified for year 2021.[29]. §Adjusted *P* values as per Bonferroni correction (set at ≤0.005) were nonsignificant. ‖Assessed during post-analysis; Rural *n*=211 and Urban *n*=175 (Total=386). ¶Kutcha – made of relatively nonpermanent material like mud/grass/stones/thatch/straw/tin/unburnt bricks, etc.; Pucca – made of relatively permanent material like cement/concrete/burnt bricks/timber, etc.; Basic amenities – Tap water, electricity supply, personal sanitary latrine/toilet. **Overcrowding assessed as per persons per room and sex selection criteria defined under "Housing standards" of Park's textbook of preventive and social medicine, 25th ed..[30]

Table 2: Comparison of substance types among rural and urban patients

Parameters		Rural – *n* (%) *n*=250	Urban – *n* (%) *n*=250	*P**
F10 (Alcohol)		12 (8.1)	12 (7.7)	0.755
F11 (Opioids)		129 (86.6)	134 (85.9)	
F12 (Cannabis)		3 (2.0)	5 (3.2)	
F13 (Benzodiazepines)		2 (1.3)	4 (2.6)	
F17 (Tobacco)		3 (2.0)	1 (0.6)	
F19† (≥2 primary substances)	F10, F11	40 (16)	61 (24.4)	0.001
	F11, F13	58 (23.2)	32 (12.8)	
	F10, F11, F12	1 (0.4)	0	
	F10, F11, F13	2 (0.8)	1 (0.4)	
	Total	101 (40.4)	94 (37.6)	
Alcohol dependence‡				
Present		55 (22.0)	74 (29.6)	0.066
Absent		195 (78.0)	176 (70.4)	
Opioid dependence‡				
Present		230 (92.0)	228 (91.2)	0.872
Absent		20 (8.0)	22 (8.8)	
Cannabis dependence‡				
Present		4 (1.6)	5 (2.0)	1.000
Absent		246 (98.4)	245 (98.0)	
Benzodiazepine dependence‡				
Present		62 (24.8)	37 (14.8)	0.007
Absent		188 (75.2)	213 (85.2)	

*Chi-square test used; Fisher's exact test used when expected cell count was <5; $P \leq 0.05$ considered statistically significant. †Due to high coexisting nicotine dependence, this data is covered separately in Table 3 to prevent overlap. ‡Includes patients consuming the respective substance alone or along with other substances

Table 3: Comparison of drug-related variables among rural and urban patients

Parameters*	Rural – *n* (%) *n*=250	Urban – *n* (%) *n*=250	*P**
Age of first use (yrs.)	20.6±4.6	20.7±4.8	0.798
Duration of regular use (yrs.)	14.1±10.2	12.4±9.3	0.132
SDS score	10.3±2.6	10.7±2.4	0.139
Expenditure on drugs (INR)†			
<5000	129 (51.6)	72 (28.8)	<0.001
5000–10000	84 (33.6)	87 (34.8)	
10000–20000	33 (13.2)	68 (27.2)	
≥20000	4 (1.6)	23 (9.2)	
Comorbid nicotine dependence			
Present	128 (51.2)	139 (55.6)	0.370
Absent	122 (48.8)	111 (44.4)	
IDUs			
Yes	55 (22.0)	59 (23.6)	0.749
No	195 (78.0)	191 (76.4)	
Apprehension by authorities (if applicable)			
Possession	10 (4)	5 (2)	0.094
Selling	6 (2.4)	14 (5.6)	
Unruly behavior	4 (1.6)	3 (1.2)	
Total	20 (8)	22 (8.8)	
Previous treatment attempts (in the past 5 years, if any)			
1–2 attempts	113 (45.2)	100 (40)	0.008
3–4 attempts	27 (10.8)	43 (17.2)	
≥5 attempts	8 (3.2)	21 (8.4)	
Total	148 (59.2)	164 (65.6)	

*Chi-square test used; Fisher's exact test used when expected cell count was <5; Mann–Whitney *U* test used for comparing mean score variables; all mean score variables controlled for SES; $P \leq 0.05$ considered statistically significant. †INR- Indian Rupee; Adjusted *P*-value of significance as per Bonferroni correction was set at ≤0.006. At this level, significant results were achieved for all ($P<0.001$) except the 5000–10000 category

respectively, *P* = NS) via the smoking route (100% and 80%, respectively, *P* = NS).

Comparison of drug-related variables [Table 3] showed that urban patients spent more money on drugs and had more treatment attempts in the past 5 years. No significant group differences were found for the age of first use, duration of regular use, and severity of substance dependence. More than half of patients (*n* = 128, 51.2% rural and *n* = 139, 55.6% urban) had comorbid nicotine dependence, whereas 55 (22.0%) rural and 59 (23.6%) urban patients were injecting drug users (IDUs). Twenty (8%) rural and 22 (8.8%) urban patients were apprehended by authorities in the past.

Table 4 shows that the most common reason for first-time use was "peer pressure" in both groups. Although more rural first-time users consumed substances to enhance performance, urban ones consumed these for stress relief or novelty. The most common reason for continued use was "withdrawal symptoms" in both groups. "Difficulty in obtaining substances" was the most common reason for seeking treatment in both groups, whereas "external pressure" by family/society was more common in urban patients. "Peer pressure" again was the most common reason for relapse. Post-analysis showed that perceived access to de-addiction services was better in urban patients in terms of satisfactory availability and geographic accessibility of services.

A comparison of psychiatric comorbidities [Table 5] showed that more urban patients had psychiatric comorbidities (*n* = 89, 35.6%) than rural patients (*n* = 66, 26.4%). The frequency trend in both groups was – mood disorders (16.8% rural and 22% urban) > neurotic disorders (5.6% rural and 11.6% urban) > psychotic disorders (4% rural and 2% urban). No difference was found between individual disorder types/severity. A distinct rural–urban comparison was also made among patients with psychiatric comorbidities (*n* = 66 rural and *n* = 89 urban) based on sociodemographic and drug-related variables (not depicted in table). Apart from the already existing differences between total rural and urban patients (*n* = 250 each), no new differences were seen.

Considering "distance to de-addiction centre" being significantly high in rural patients, its effect on other variables was studied.

Table 4: Comparison of reasons for consuming substance(s) and perceived access to de-addiction services among rural and urban patients

Parameters		Rural – *n* (%) *n*=250	Urban – *n* (%) *n*=250	*P**
Reason for first use				
Peer pressure		127 (50.8)	121 (48.4)	<0.001†
Enhancing performance		81 (32.4)	36 (14.4)	
Stress relief		34 (13.6)	70 (28.0)	
Novelty seeking		8 (3.2)	23 (9.2)	
Reason for continued use				
Withdrawal symptoms		175 (70)	167 (66.8)	0.556
Peer pressure		32 (12.8)	37 (14.8)	
Easy availability		26 (10.4)	22 (8.8)	
Continued stress		17 (6.8)	24 (9.6)	
Reason for seeking treatment				
Difficulty obtaining drugs		167 (66.8)	142 (56.8)	<0.001‡
External pressure (peers/family/society)		36 (14.4)	82 (32.8)	
Developed medical/ psychiatric disorder		34 (13.6)	21 (8.4)	
Own will		13 (5.2)	5 (2)	
Reason for relapse (if applicable)				
Peer pressure		84 (33.6)	80 (32)	0.128
Stress relief		19 (7.6)	35 (14)	
Unsatisfactory treatment		17 (6.8)	28 (11.2)	
Unable to resist cues		3 (1.2)	4 (1.6)	
Total		123 (49.2)	147 (58.8)	
Perceived access to de-addiction services§				
Satisfactory availability	Yes	150 (71.1)	158 (90.3)	<0.0001
	No	61 (28.9)	17 (9.7)	
Affordability	Yes	174 (82.5)	146 (83.4)	0.802
	No	37 (17.5)	29 (16.6)	
Timely	Yes	166 (78.7)	128 (73.1)	0.204
Accommodation	No	45 (21.3)	47 (26.9)	
Acceptability	Yes	173 (82.0)	152 (86.9)	0.192
	No	38 (18.0)	23 (13.1)	
Geographic accessibility	Yes	147 (69.7)	150 (85.7)	0.0002
	No	64 (30.3)	25 (14.3)	

*Chi-square test used; Fisher's exact test used when expected cell count was <5; $P \leq 0.05$ considered statistically significant. †Adjusted *P* value of significance as per Bonferroni correction was set at ≤0.006. At this level, significant results were achieved for categories "Enhancing performance" (<0.001), "Novelty seeking" (0.005), and "Stress relief" (<0.001). ‡Adjusted *P* value of significance as per Bonferroni correction was set at ≤0.006. At this level, significant results were achieved for category of External pressure (<0.001). §Assessed during post-analysis; Rural *n*=211 and Urban *n*=175 (Total=386)

The mean distance was compared between patients with and without the respective type/form of substance from both groups, but no significant difference was found (*P* range = 0.352–0.732 for rural and 0.080–0.948 for urban). Results were also nonsignificant for any drug-related variables or for psychiatric comorbidities (*P* range = 0.052–0.830 for rural and 0.080–0.942 for urban). No correlation was found between distance and age, years of education, age of 1st use, duration of regular use, substance and psychiatric severity scores (SDS, BPRS, PHQ-SADS, and YMRS) in either group (*r* range = -0.336 to 0.081, *P* range = 0.076 to 0.952 for rural and *r* range = -0.105 to 0.071, *P* range = 0.074 to 0.835 for urban).

Table 5: Comparison of psychiatric comorbidities in rural and urban patients

Parameters	Rural – *n* (%) *n*=250	Urban – *n* (%) *n*=250	*P**
Psychiatric comorbidity			
Present	66 (26.4)	89 (35.6)	0.026
Absent	184 (73.6)	161 (64.4)	
Psychiatric disorder groups			
Psychotic disorders (F20–29)	10 (4)	5 (2)	0.069
Mood disorders (F30–39)	42 (16.8)	55 (22)	
Neurotic disorders (F40–48)	14 (5.6)	29 (11.6)	
Individual psychiatric disorder			
Schizophrenia (F20)	7 (2.8)	4 (1.6)	0.232
Delusional disorder (F22)	3 (1.2)	1 (0.4)	
Bipolar disorder (F31)	11 (4.4)	23 (9.2)	
Depressive disorder (F32)	31 (12.4)	32 (12.8)	
Anxiety disorders (F40,41)	7 (2.8)	15 (6)	
Adjustment disorder (F43)	6 (2.4)	11 (4.4)	
Somatoform disorder (F45)	1 (0.4)	3 (1.2)	
Psychiatric severity scores†			
BPRS (Psychotic disorders)	53.6±16.6	47.2±18.1	0.297
YMRS (Bipolar disorder)	28.4±5.6	29.1±6.4	0.853
PHQ-SADS (Depressive and neurotic disorders)	15.7±6.7	17.8±7.7	0.163

*Chi-square test used; Fisher's exact test used when expected cell count was <5; $P \leq 0.05$ considered statistically significant. †Mann–Whitney *U* test used; mean score variables controlled for SES

Discussion

Sociodemographic Variables

As for the sociodemographic differences, cultural factors may account for the older age of rural patients, and not drug-related factors like age of 1st use or duration of regular use, considering these were similar in both groups. One notion for consuming substance(s) among the rural population is to enhance physical/ sexual performance, which is perceived to have declined with age. Conversely, urban patients, due to more awareness and easy access to treatment may have presented at a lower age. Differences in distance to the center and education may be due to geographical and/or occupational variations. Again, more awareness and more education among urban patients may have brought them to the center, although assessment of awareness needs further study. Use of substances like alcohol, "bhukki" (poppy husk)/"afeem" (raw opium), etc., is normalized among families, especially rural ones, which explains the high family history of SUD in them. Occupational differences between rural and urban patients may be due to local job availabilities and personal preferences. Rural areas in Punjab comprise Sikh population to a high extent. Also, high migration from other states or shifts due to job opportunities may account for more Hindu population in urban patients.

These results were similar to an earlier study from Punjab with 99% and 71% rural, whereas 95% and 66% urban patients aged ≥45 and 36–44 years, respectively. The urban group had higher education level, more of them being in service, whereas the majority among rural being landless workers and farmers.[9] Although in a United States study, one-third from rural and one-fourth from urban aged ≤26 years, patients having high school education were more rural (46.1%) than in urban (40.7%) areas. Also, the number of those employed was higher in the rural group than urban, which may be due to demographic variations from the current study.[31]

Socioeconomic Variables

There were no rural–urban differences based on any socioeconomic variables in the current study. Previous data from the NMHS 2015–16[1] and a study by Saikia *et al.*[32] based on the National Family Health Survey 2015–16 (NFHS-4) suggest that rural substance users belonged to lower SES. It may be that the current study being conducted in Punjab posed a different profile. This is supported by the focus group discussions of NMHS 2015–16,[1] which found that although some drugs like cannabis were common in lower SES states like Chhattisgarh, but in Punjab, they are common among urban students as well. A study by Saikia *et al.*[32] also found significant caste differences, that is, urban SCs/STs/OBCs consumed more tobacco and alcohol than unreserved rural persons. But the study only included two substances, which may have caused differences from the current study. According to a report on social determinants of drug use in rural-urban dwellings,[33] sub-optimal housing quality increases problems due to alcohol use and promotes unsafe injecting practices. Planned accommodations in urban areas prevent the same. This was not reflected in the current study, maybe because of improved living conditions in rural areas due to favorable Indian government schemes like the Pradhan Mantri Awaas Yojana-Gramin 2016.[34] Considering overcrowding, a study by Rigg *et al.*[35] calculated the odds of the number of persons in households for prescription opioid misuse in urban and rural persons but did not find significant results, similar to the current study.

Drug-Related Variables

The majority of patients from either group were opioid dependent. Rural ones had higher relative preponderance for benzodiazepines and opioids + benzodiazepines, whereas urban had for opioid + alcohol. Previous research, however, presents variable data. A study from Gujarat, India found tobacco to be the most abused in both groups, followed by alcohol (5.9%)> cannabis (4.4%)> opioids (1.5%) in urban and alcohol (7.96%)> opioids (4.4%)> cannabis (3.5%) in rural population.[7] Similarly, the Global Adult Tobacco Survey of India 2016–17 shows tobacco to be the most common substance consumed in India.[36] This was not reflected in the current study, which may be due to high number of followers of the Sikh religion in the state of Punjab, which sanctions against tobacco use.[37] Warner *et al.*[38] compared inmates from rural and urban areas and found that alcohol was the most used drug and was significantly higher among rural inmates than urban ones ($P = 0.032$), whereas opiates were much lower on the frequency list. According to a Treatment Episode Data Set (TEDS) report by Substance Abuse and Mental Health Services Administration (SAMHSA), America on substance abuse admissions, the frequency was alcohol (49.5% rural and 36.1% urban) > heroin and non-heroin opioids (13.7%% rural and 25.8%% urban) > marijuana (20.9% rural and 17% urban) > cocaine (5.6% rural and 11.9% urban).[31] The Opioid epidemic in Punjab has remained prominent for decades, hence a high prevalence in the current study, compared to national/international data. Higher benzodiazepine dependence in rural populations may either be due to easy availability caused by unchecked sales in remote areas or due to higher prescription generation caused by a non-judicious use by less qualified persons in local pharmacies, which is easier in isolated rural settings. These findings are supported by a recent international study on benzodiazepine trends in primary settings.[39]

No rural-urban differences were found comparing types/routes of substances except that urban alcoholics consumed more branded liquor than rural ones. This may be due to the differential availability of drugs in the market. The study from Gujarat, India found that the most common route of consumption of substances as chewing (73%) followed by smoking (14%) and drinking (13%).[7] Considering the highest prevalence of tobacco in the Gujarat study, these results are expected. Warner *et al.*[38] also found no group differences based on opioid types of heroin and methadone, whereas other opiates were significantly higher among rural inmates ($P = 0.001$). The TEDS report found that among opioids, abuse of heroin was more in urban (21.8%), whereas non-heroine opiates were more abused among rural (10.6%) persons, which may be due to differential access to substances.[31]

Age of first use and duration of regular use were similar among both groups, with moderate severity of dependence in each. But, urban patients expended more on substances. Considering no difference in severity, this difference may be attributed to local market variations in drug supply or that urban patients had access to more "branded" substances, hence the higher cost. More treatment attempts in urban patients may be due to easy availability of services, although more research is needed, considering many primary-care government policies in place. Previous locality-specific studies have shown variable results. A study from Kentucky, America found that rural respondents reported fewer years of regular lifetime use than urban ones ($P = 0.004$).[40] Regarding severity, a study from Washington, USA, found higher screening scores ($P < 0.05$) in urban ($u = 1.1 \pm 1.7$) than in large rural populations ($u = 0.9 \pm 1.6$).[17] Warner *et al.*[38] found that apprehended and incarcerated inmates belonged more to rural (92.3–93.3%) than urban communities (83.4%). A study from Punjab noted that per capita monthly income as well as percentage of income spent on substances among rural users (INR 2392.6 and 19.6%) was more than the urban (INR 2238.1 and 14.6%).[9] Differences in study population or design may have contributed to variability in the current study.

Reasons for Substance Use

Peer pressure was the prime reason for first-time use and relapse in all, whereas withdrawal was the driving force for continued use. Rural–urban difference in substance initiation may be accounted to sociocultural variations. "External pressure" by society/family was a more common reason for treatment seeking in urban patients. A higher family history of SUD may have led to less external pressure by family in rural patients due to normalization. In this regard, previous studies by Jasani *et al.*[7] and Avasthi *et al.*[41] similarly found "fun"/"pleasure" (70%) and "peer pressure" (43%) to be the most common reason for starting substances. The least common reason was "depression" in both groups.[7] An Indian study similarly found that the reason for continuing substance abuse was avoidance of withdrawal symptoms (60.5%) > social stigma (56.5%) > to ward off fatigue (47%). "Family influence" and "increasing self-confidence" (2.5%) were the least common.[11] Reasons for stopping substances in another Indian study were religiosity (8.2%)> fed up of living as an addict (4.2%)> nonavailability of drugs (1.3%) > fear of developing serious medical illness (1.1%) > social pressure (0.9%).[42] This is in contrast to the current study where the reason for treatment was not an active one as listed above, rather a passive one, that is, difficulty in obtaining substance(s). Differences in personality factors like conscientiousness and religiosity might have contributed to the same. Kadam *et al.*[43] found desire for a positive mood as the most common cause for relapse among patients with alcohol and opioid use, with the latter having a significantly higher craving and perceived criticism ($P < 0.001$),[43] which was in contrast to current study's finding that 'unable to resist cues' as a cause for relapse, was the least common. Considering a close-knit bond shared among Indian communities, factor of "peer pressure" might have overshadowed other factors for relapse.

Access to De-addiction Services

Although de-addiction services were affordable, accommodative, and socioculturally acceptable in both groups likewise, availability and geographic accessibility were perceived as suboptimal by rural patients. Limited de-addiction services and staff including psychiatrists at the primary level, fewer public transportation options and higher distance of rural patients from the study center are potential reasons. Previous literature supports these findings. Borders *et al.*[44] found that rural populations have lower availability and resource utilization than their urban counterparts. Rural residents reported longer perceived travel times (low accessibility), but no difference in perceived waiting times (accommodation), or acceptability, as in the current study. Pullen *et al.*[45] conducted a qualitative study utilizing counselors to collect information on barriers to substance-abuse treatment. They found more transportation challenges, that is, low accessibility in rural communities while similar funding and bureaucratic challenges like excessive paperwork in both rural and urban communities. Although lengthy paperwork under accommodation issues was present in the current study, but most people found the services affordable, as most treatment was free of cost. Spooner *et al.*[33] reported that rural communities have less access to resources and suffer from geographic isolation causing low accessibility. Isolation, travel, and distance barriers were also elaborated in a United Nations Office on Drugs and Crime (UNODC) report with fewer public transportation options and dependability on family for transportation to de-addiction centers.[46] Considering the Indian scenario, the NMHS 2015–16[1] reported a treatment gap of 91.1% for SUDs. Utilizing this data, Mirza *et al.*[47] in their analysis on mental health policy in India found a lower access to healthcare in rural regions. Similarly Bashir *et al.*[48] in their study in Kashmir, India, found addiction service provisions to be almost nonexistent in rural areas.

Psychiatric Comorbidity/Dual Diagnosis

Dual diagnosis is defined as the concurrent existence in an individual of substance misuse (dependence in the current study) and mental disorder.[49] Total prevalence in the current study (31%) matched with the previous study from north India by Subodh *et al.*[13] that is, 32.4%. However, their study did not replicate the rural-urban divide found in the current study, with urban patients having more dual diagnoses. This may either be due to a higher sample size and hence higher power to detect a difference in the current study or a difference in the study population, that is, the current study only took substance-dependent patients and not all SUDs. Even so, the frequency of the type of disorder was similar to the study by Subodh *et al.*[13] which was mood disorders > anxiety disorders > psychotic disorders. Another study by Basu *et al.* (2013)[6] found dual diagnosis as 13.2% with mood disorders being the most common (49.1%), followed by psychotic (22.6%) and anxiety disorders (20.2%). This difference from the current study may be due to variations in their study setting, which included both out- and inpatients, or the study method of retrospective chart review. Speculation on factors for this rural-urban divide tells that urban living being fast-paced has rapidly changing stressors. Better awareness of mental health problems and better access to de-addiction services as found in the current study may promote early identification. A recent systematic review by Ventriglio *et al.*[50] also found urbanization to impact mental health negatively. Factors recognized were social insecurity, pollution, and lack of contact with nature.

No rural–urban differences were found for disorder type and severity in the current study. An Italian study in rural users found psychiatric comorbidities with SUD as – mood disorders (72%) > personality disorders (60%) > psychotic disorders (24%) > cognitive disorders (17%) > anxiety disorders (7%).[14] Bhat *et al.*[51] in a study from Kashmir, India found that 62.2% patients with opioid use and another psychiatric illness were from a rural background, most commonly ADHD (24.3%) > depressive disorder (10.8%) > panic disorder (4.1%) > OCD and personality disorders (1.4%). In all these studies, mood disorders are significantly more prevalent in patients with SUDs, similar to the current study, however,

prevalence of neurotic/anxiety disorders and psychotic disorders is variable. This could be due to sociodemographic variations in the sample or, to some extent, the type of substance consumed, for example, patients with Schizophrenia consuming nicotine as a self-medication.

Strengths and Limitations

Strengths include a locality-specific comparison of substance dependence; studies of which are scarce in India. Rigorous inclusion criteria were set beforehand to reduce selection bias, clear operational definitions for rural–urban classification were used to control for change in residence due to any reason; diagnosis and severity were reviewed by the psychiatrist in-charge of unit to address interviewer bias. The study's limitations include a cross-sectional design. Longitudinal follow-up of patients will provide better insight into factors causing differences in substance patterns, course of psychiatric comorbidities, and differences in response to treatment. Generalizability is limited due to a hospital-based consecutive sampling design and data collected from a single center. Although variables were controlled for SES, other demographical factors like urban slums and cultural factors need further study.

Conclusion

Significant pattern differences exist between rural and urban substance-dependent patients. Differences also exist for factors related to substance initiation and treatment seeking. Urban patients suffered more from psychiatric comorbidities. Potential factors include capricious stressors, social insecurity, better awareness, and access to de-addiction services. Emphasis on locality-specific prevention and treatment factors, including awareness strategies, is needed to guide intervention policies.

Recommendations and Future Direction

Awareness into substance use and mental healthcare require strengthening in rural and urban patients, respectively. Myths on substance initiation, treatment seeking, and normalization of drugs in families need to be addressed. Increasing benzodiazepine use in rural areas needs control. Reinforcement of the Indian government three-pronged strategies is suggested: (1) demand reduction – youth awareness in schools/colleges, (2) supply reduction – curb by authorities and training of physicians/pharmacists at peripheries for judicious use of prescription drugs, and (3) harm reduction – programs like needle exchange or maintenance treatment of substance dependence.

In future work, we will incorporate data from multiple centers. Patients will be followed up to assess differences in treatment response and relapse rates. Assessing personality factors, awareness, and culture-specific views on substance use like normalization or co-dependency will be one of the aims.

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Conflicts of Interest

There are no conflicts of interest.

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