

Profile of injectable opioid users in a tertiary care hospital

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ABSTRACT

Introduction. The global burden of opioid misuse has been increasing, with injectable opioid users (IOUs) facing heightened risks of infectious diseases, overdose, and psychiatric disorders. In Telangana, India, opioid dependence is a growing challenge, with limited regional research on the demographic and clinical profiles of IOUs. This study aims to analyze the demographic characteristics, co-morbid substance use, and health conditions of IOUs attending an Opioid Substitution Therapy (OST) center in a tertiary care hospital in Telangana.

Material and methods. This retrospective observational study reviewed case records of 200 patients undergoing OST at Gandhi Hospital between January 2024 and August 2024. Data were collected on demographic factors, substance use history, and co-morbid conditions. Statistical analyses, including Chi-square tests and logistic regression, were conducted to assess associations between demographic variables and substance use patterns.

Results. The study population had a mean age of 40 years, with males constituting 61.23%. A significant proportion belonged to lower socioeconomic backgrounds (41.11%). Co-morbid substance use was prevalent, with high usage of alcohol (21.40 days/month), tobacco (28.91 days/month), and benzodiazepines (8.76 days/month). Mental health disorders were common, with 29% experiencing depression and 48% anxiety. Logistic regression indicated that higher education and employment reduced the risk of co-morbid substance use. OST treatment for more than 12 months was associated with an 86.14% recovery rate, while dropouts were primarily due to relapse (28.62%) and lack of family support (15.37%). Methadone (78.12% effectiveness) slightly outperformed buprenorphine (71.73%).

Conclusion. This study shows the need for targeted interventions addressing socio-economic disparities, mental health support, and long-term OST adherence. Education and employment play critical roles in reducing substance co-morbidities. Strengthening harm reduction strategies, community-based interventions, and psychiatric care integration into opioid treatment programs is essential for improving outcomes among IOUs. Future research should explore long-term follow-ups and relapse prevention strategies.

Keywords: injectable opioid users, opioid substitution therapy, co-morbid substance use, socioeconomic factors, mental health, Telangana, India

INTRODUCTION

The global burden of opioid misuse has been steadily increasing, posing significant public health challenges due to its association with morbidity, mortality, and

socio-economic disruption. Injectable opioid use, in particular, is linked to a heightened risk of severe health complications, including infectious diseases such as HIV and hepatitis C, drug overdose, and mental health disorders [1]. The United Nations Office on Drugs and

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Crime (UNODC) has reported a substantial rise in opioid use disorders globally, with developing countries like India experiencing an increasing prevalence of opioid dependence (UNODC, 2021) [2]. While national data clearly explains growing concern, so there is a need to examine its impact at the regional level, particularly in states like Telangana, to understand local trends and healthcare challenges. India has witnessed a concerning surge in opioid use, particularly among younger populations, as highlighted by the National Survey on Extent and Pattern of Substance Use in India [3]. Among opioid-dependent individuals, those who inject opioids represent an especially vulnerable subgroup due to their high-risk behaviors, such as needle sharing, which significantly increases the transmission of blood-borne infections [4]. Despite various harm reduction measures, including Opioid Substitution Therapy (OST) programs, injectable opioid users (IOUs) continue to face significant health and social challenges, underscoring the urgent need for targeted interventions and policy frameworks.

In Telangana, the rising prevalence of injectable opioid use presents a unique and evolving challenge, particularly in the context of increasing dependence rates and associated co-morbid conditions. While opioid dependence is well-documented in northern states such as Punjab and Delhi, limited research has been conducted on the epidemiological patterns of opioid use in Telangana, making it imperative to explore the characteristics and health outcomes of IOUs in this region [5]. Previous studies conducted in northern India have established a strong association between opioid dependence and co-morbid substance use, including alcohol, benzodiazepines, and cannabis [5]. These studies have also highlighted a high prevalence of psychiatric disorders among opioid-dependent individuals, including depression, anxiety, and schizophrenia, which further complicates their treatment and rehabilitation [6]. Additionally, evidence from international research suggests that people who inject drugs (PWID) are disproportionately affected by social stigmatization, unemployment, homelessness, and legal issues, which exacerbate their health and social vulnerabilities [7]. However, there remains a significant research gap concerning the specific demographic and clinical profiles of IOUs in Telangana, particularly those seeking treatment at OST centers in tertiary care settings. Understanding the demographic trends, co-morbid substance use, and associated health conditions of this population is crucial for designing effective harm reduction strategies and improving treatment outcomes.

The study aims to profile the demographic characteristics and examine treatment-related factors, including co-morbid substance use patterns and associated health conditions, among injectable opioid users (IOUs) attending an Opioid Substitution Therapy (OST) center

in a tertiary care hospital in Telangana. It seeks to assess key demographic factors, the prevalence of co-morbid substance use, and the burden of health conditions such as HIV, hepatitis C, and mental health disorders, with a focus on informing targeted interventions and public health strategies to enhance treatment outcomes.

MATERIALS AND METHODS

This study was a retrospective observational analysis, conducted with a total of 200 patients at the Opioid Substitution Therapy (OST) center of Gandhi Hospital, a tertiary care facility in Telangana, India. Case records of patients receiving treatment at the OST center between January 2024 and August 2024 were reviewed for data collection. As this study relied on retrospective data, causal relationships could not be established, and there was a risk of incomplete records. To address this, missing data were systematically handled by excluding cases with substantial gaps while using available data for analysis whenever possible.

The sample size of 200 patients was chosen based on feasibility and the availability of records at the OST center during the study period. However, no formal power calculation was performed to determine the sample size. Given the retrospective nature of the study, the selection was limited to patients whose case records were complete and met the inclusion criteria.

Inclusion Criteria

- Patients aged 18 years and above.
- Patients who had previously provided general consent for their medical records to be used for research purposes.
- Patients undergoing treatment for injectable opioid use at the OST center.

Exclusion Criteria

- Patients unwilling to participate or provide informed consent.
- Patients with severe physical or mental illnesses that impair their ability to give consent.
- Patients with incomplete case records were excluded if essential variables were missing and could not be reasonably inferred.

Data were extracted using a structured Proforma Case Sheet, which comprised three main sections:

1. Demographic information: age, sex, gender, religion, family type, education level, employment status, and socioeconomic status.
2. Substance use history: type of substances used, frequency, and duration of use.
3. Co-morbid conditions: self-reported and clinically diagnosed conditions such as HIV, hepatitis C, and psychiatric disorders.

Statistical Analysis

Data were analyzed using SPSS software (Statistical Package for the Social Sciences). Descriptive statistics were used to summarize demographic variables and substance use patterns. Continuous variables were expressed as means and medians, while categorical variables were represented as proportions.

To examine associations between demographic variables and co-morbid substance use, Chi-square tests were performed for categorical variables, and logistic regression analyses were conducted to identify potential predictors. A p-value of <0.05 was considered statistically significant. Cases with missing values for key variables underwent sensitivity analysis to assess their impact on the findings.

Ethical Considerations

As this was a retrospective study utilizing existing case records, ethical approval was obtained in compliance with institutional guidelines. Patients had previously provided general consent for their medical records to be used for research. In cases where explicit prior consent was not available, the Institutional Ethics Committee (IEC) granted a waiver of informed consent, given that only anonymized data were used. Patient confidentiality was strictly maintained, and all data were anonymized before analysis. Efforts were made to ensure data completeness and accuracy, minimizing potential biases associated with missing records.

RESULTS

Table 1 presents the age and sex distribution of injectable opioid users (IOUs) attending the Opioid Substitution Therapy (OST) center. The mean age of the study population is 40 years with a standard deviation (SD) of 5.14, indicating a relatively homogeneous age group within the middle-aged adult category. Regarding sex distribution, the majority of the participants are male (mean: 61.23%, SD: 5.23), while females constitute 27.95% (SD: 6.70).

TABLE 1. Age and sex distribution of injectable opioid users

Demographic variable	Mean	Standard deviation (SD)
Age (years)	40.0	5.13
Male	61.23	5.23
Female	27.95	6.70

Table 2 shows the religion distribution of injectable opioid users (IOUs) attending the Opioid Substitution Therapy (OST) center. The majority of the study population identifies as Hindu (mean: 63.28%, SD: 8.46), followed by Muslims (mean: 20.80%, SD: 8.07) and Christians (mean: 14.58%, SD: 4.33).

TABLE 2. Religion distribution of injectable opioid users

Demographic variable	Mean	Standard deviation (SD)
Religion (Hindu)	63.27	8.46
Religion (Muslim)	20.80	8.07
Religion (Christian)	14.57	4.33

Table 3 provides insights into the family structure and employment status of injectable opioid users (IOUs) attending the Opioid Substitution Therapy (OST) center. A nearly equal distribution is observed between individuals from nuclear families (mean: 51.43%, SD: 6.85) and joint families (mean: 47.79%, SD: 8.47), suggesting that opioid use affects individuals across various family structures. The slightly higher standard deviation in joint families indicates greater variability in their representation.

TABLE 3. Family type and employment status of injectable opioid users

Demographic variable	Mean	Standard deviation (SD)
Family type (nuclear)	51.425	6.84
Family type (joint)	47.794	8.46
Employment status (employed)	37.167	7.16
Employment status (unemployed)	59.323	7.62

In terms of employment status, a significant proportion of IOUs are unemployed (mean: 59.32%, SD: 7.62), compared to employed individuals (mean: 37.17%, SD: 7.16). The high unemployment rate among opioid users is a common trend, as substance dependence often leads to economic instability, job loss, and reduced productivity (Figure 1).

Figure 1 presents the educational background of injectable opioid users (IOUs) attending the Opioid Substitution Therapy (OST) center. A significant portion of the study population has secondary education (mean: 37.37%, SD: 7.87), followed by those with primary education (mean: 23.41%, SD: 6.82). A smaller proportion of users have attained higher education (mean: 15.85%, SD: 4.05), while a notable percentage has no formal education (mean: 12.11%, SD: 3.64).

Figure 2 presents the socioeconomic status (SES) distribution of injectable opioid users (IOUs) attending the Opioid Substitution Therapy (OST) center. The majority of users belong to the low socioeconomic group (mean: 41.11%, SD: 8.30), followed closely by those in the middle socioeconomic class (mean: 37.52%, SD: 9.66). A significantly smaller proportion of users come from the high socioeconomic class (mean: 19.53%, SD: 2.67), indicating that opioid use is more prevalent among individuals from economically disadvantaged backgrounds.

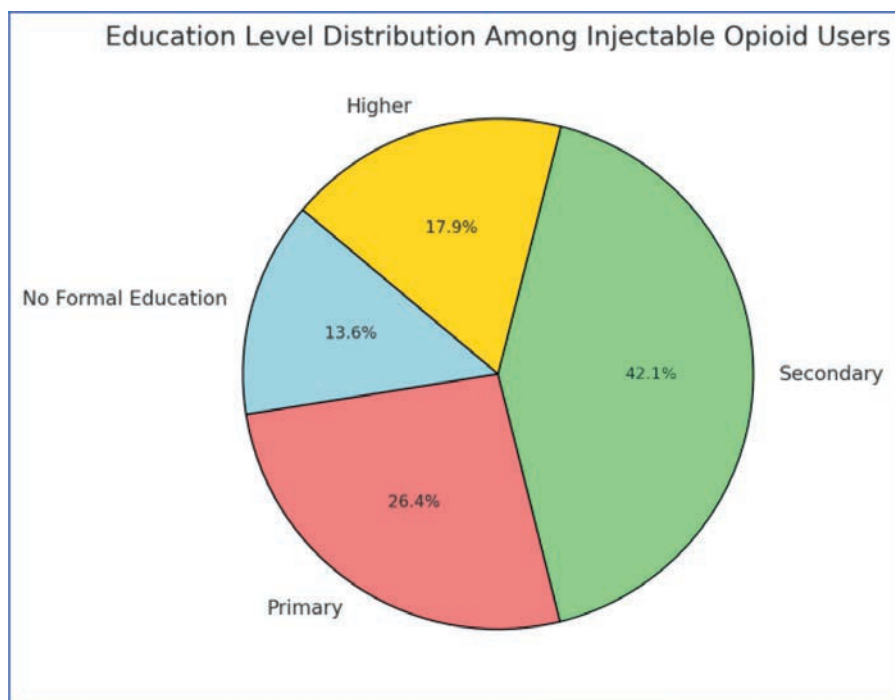


FIGURE 1. Education level distribution of injectable opioid users

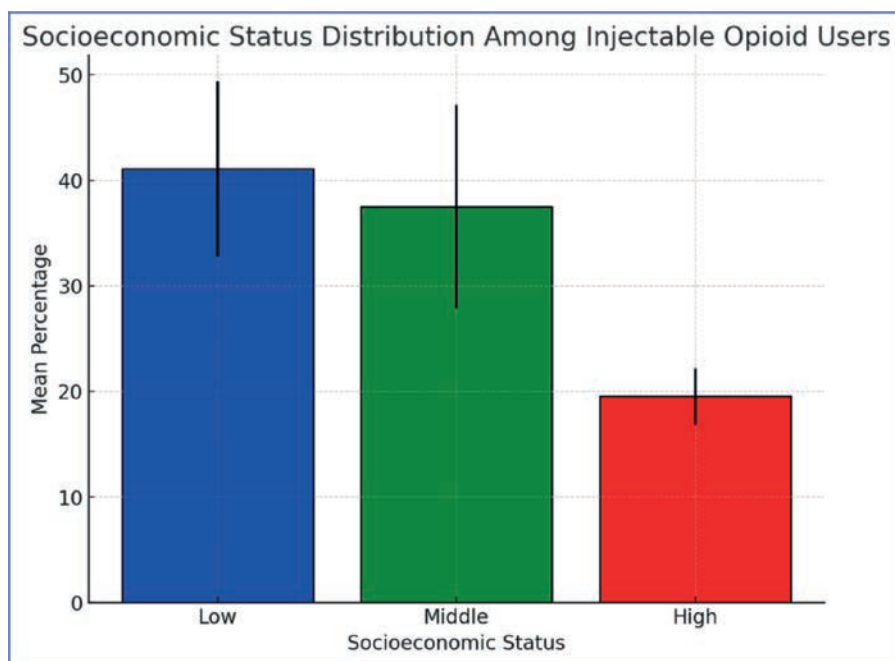


FIGURE 2. Socioeconomic status distribution of injectable opioid users

The Chi-square test results reveal significant associations between demographic factors and co-morbid substance use among injectable opioid users (IOUs). Age group, sex, education level, employment status, and socioeconomic status were analyzed to determine their impact on substance use patterns. The findings indicate a statistically significant association ($p < 0.05$) between younger age groups (18-30, 31-45), male sex, lower education levels, unemployment, and low socioeconomic status with a higher prevalence of co-morbid substance use. The strongest association was observed in male users

(Chi-square = 50.00, $p < 0.001$), suggesting that opioid dependence and co-morbid substance use are more prevalent among males. Additionally, education level and employment status significantly influenced substance use patterns, with individuals having no formal education and being unemployed showing higher co-morbid substance use rates (Table 4).

Logistic regression analysis revealed that age, education level, and employment status were negatively associated with co-morbid substance use, suggesting a lower risk among older, educated, and employed indi-

TABLE 4. Associations between demographic variables and co-morbid substance use

Demographic variable	Chi-square value	P-value
Age group		
18-30	7	0.03
31-45	11.30	0.00
>45	5	0.08
Sex		
Male	50	0.001
Female	36	0.001
Education level		
No formal education	31.81	0.001
Primary	20.58	
Secondary	16.66	
Higher	12.96	
Employment status		
Employed	25.71	0.001
Unemployed	20	0.001
Socioeconomic status		
Low	7	0.03
Middle	2.85	0.23
High	4	0.13

viduals. While males showed a lower likelihood of co-morbid substance use, the association was not statistically significant. These findings emphasize the importance of education, employment support, and socio-economic stability in reducing substance co-morbidities among opioid users (Table 5).

Table 6 shows the analysis of substance use patterns among injectable opioid users (IOUs) attending the OST center reveals high poly-substance use prevalence, with opioids (heroin, fentanyl, etc.) being the most fre-

quently used (28.69 days/month, 14.28 years) alongside chronic tobacco dependence (28.91 days/month, 20.13 years). Alcohol consumption (21.41 days/month, 12.69 years) is also significant, indicating frequent co-use with opioids. Moderate use of cannabis (8.77 days/month, 4.54 years) and benzodiazepines (8.76 days/month, 4.99 years) suggests self-medication for anxiety or sleep disturbances. Stimulants like cocaine (3.53 days/month) and amphetamines (4.35 days/month) are less common, while hallucinogens (2.84 days/month, 1.76 years) show occasional or experimental use. These findings emphasize the need for comprehensive rehabilitation strategies that address multiple substance dependencies for effective treatment outcomes.

Figure 3 explains the Comorbidities of injectable opioid users (IOUs) highlights the presence of multiple neurological, infectious, and metabolic disorders. Among neurological conditions, seizures (9 patients), neuropathy (6 patients), and cognitive impairment (5 patients) are reported, possibly linked to prolonged substance use and neurotoxic effects. Infectious diseases are a significant concern, with HIV (2 patients), Hepatitis B (5 patients), and Hepatitis C (5 patients) identified, emphasizing the risks associated with needle-sharing practices. Additionally, metabolic disorders such as diabetes (4 patients), obesity (8 patients), and hyperlipidemia (3 patients) are prevalent, indicating an overall deterioration in health status due to lifestyle factors and opioid-related metabolic disturbances.

Table 7 shows the clinical profile of the 200 injectable opioid users (IOUs) revealed a range of co-morbid health conditions. Among respiratory conditions, chronic bronchitis (5.5%) and pulmonary infections (4.5%) were noted. Hypertension (8.5%) was the most reported cardiovascular issue, while gastritis (4.5%)

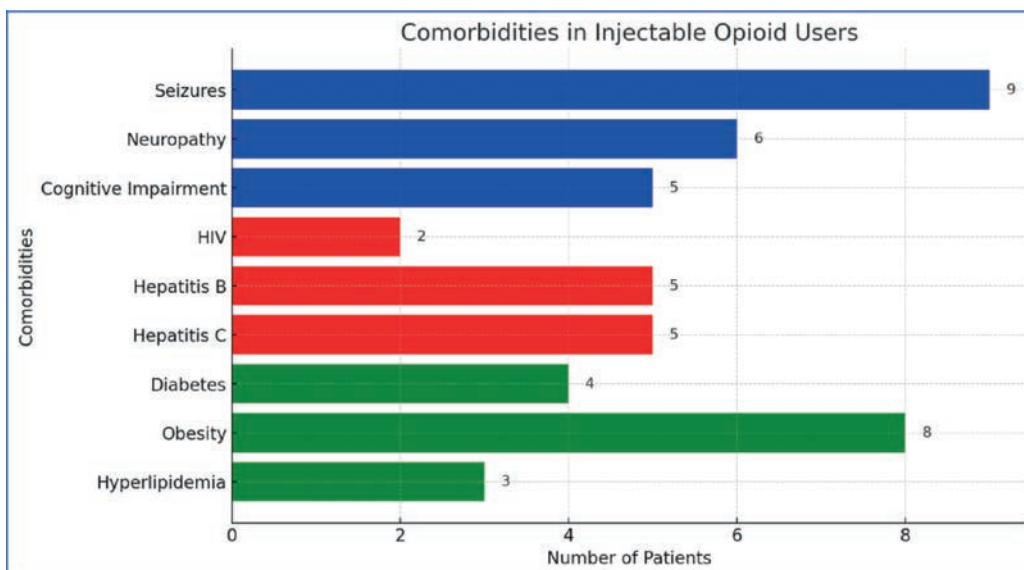


FIGURE 3. Comorbidities of injectable opioid users

TABLE 6. Substance use patterns among injectable opioid users

Substance use variable	Mean frequency of use (days per month)	Mean duration of use (years)	Standard deviation (SD)
Opioids (Heroin, Fentanyl, etc.)	28.69	14.27	3.39
Alcohol	21.40	12.64	3.87
Cannabis	8.774	4.40	4.13
Benzodiazepines	8.761	4.96	3.37
Tobacco	28.91	20.13	8.34
Cocaine	3.531	4.17	2.50
Amphetamines	4.346	1.58	1.93
Hallucinogens	2.839	1.75	1.20

was observed under gastrointestinal disorders. Mental health conditions were prevalent, with depression (14.5%) and anxiety (24%) being frequently reported. Regarding past medical interventions, 46% of patients had undergone previous rehabilitation, and 39% had a history of long-term medication use.

TABLE 7. Comorbidities among injectable opioid users

Clinical Profile	Variables	No. of patients (%)
Respiratory conditions	Chronic bronchitis	11 (5.5%)
	Pulmonary infections	9 (4.5%)
Cardiovascular issues	Hypertension	17 (8.5%)
Gastrointestinal disorders	Gastritis	9 (4.5%)
Mental health conditions	Depression	29 (14.5%)
	Anxiety	48 (24%)
History of medical interventions	Previous rehabilitation	92 (46%)
	Long-term medication use	78 (39%)

Table 8 shows the relationship between income level, education, and employment status with opioid use, treatment-seeking behavior, and relapse rates reveals key trends. Individuals from low-income groups show the highest opioid use frequency (27.96 days/month), lower treatment-seeking rates (42.75%), and high relapse rates (66.52%), whereas those from high-income backgrounds report significantly lower opioid use (8.36 days/month), higher treatment-seeking rates (88.15%), and reduced relapse rates (27.77%).

Similarly, education level significantly influences opioid use patterns. Those with no formal education have the highest opioid use frequency (28.83 days/month), low treatment-seeking behavior (20.90%), and high relapse rates (81.78%). In contrast, individuals with higher education show lower opioid use (8.45 days/month), greater treatment-seeking likelihood (85.91%), and reduced relapse rates (17.23%).

Employment status plays a crucial role, with unem-

TABLE 8. Socioeconomic factors and their impact on opioid use

Factor	Mean frequency of opioid use (days per month)	Likelihood of seeking treatment (%)	Relapse rate (%)
Income level			
Low	27.957	42.74	66.51
Middle	16.908	55.57	57.44
High	8.3590	88.15	27.77
Education level			
No formal education	28.835	20.89	81.78
Primary	23.044	51.73	50.13
Secondary	12.944	62.97	31.04
Higher	8.4529	85.91	17.23
Employment status			
Employed	10.813	76.13	32.03
Unemployed	27.010	37.94	79.75

ployed individuals exhibiting higher opioid use (27.01 days/month), low treatment-seeking rates (37.95%), and high relapse rates (79.75%), compared to employed individuals, who show lower opioid use (10.81 days/month), better treatment-seeking behavior (76.13%), and reduced relapse risk (32.04%).

TABLE 9. Treatment patterns and outcomes among injectable opioid users

Treatment Factor	Recovery rate (%)	Adherence rate (%)	Dropout rate (%)
OST treatment duration			
<6 months	39.83		
6-12 months	68.41		
>12 months	86.14		
Medication adherence			
High	80.22	89.15	
Moderate	60.86	74.71	
Low	30.07	31.30	
Dropout rate from OST (%)			27.97
Reason for dropout			
Financial constraints			8.909
Lack of family support			15.37
Side effects			6.629
Relapse			28.62
Methadone effectiveness (%)	78.12		
Buprenorphine effectiveness (%)	71.73		

Table 9 shows the analysis of opioid substitution therapy (OST) duration, medication adherence, and dropout rates provides key insights into treatment effectiveness. Longer OST duration is associated with higher recovery rates, with those in treatment for more than 12 months showing an 86.14% recovery rate, com-

pared to 68.41% for 6-12 months and only 39.83% for those treated for less than 6 months.

Medication adherence significantly impacts recovery, as individuals with high adherence (89.16%) achieve an 80.23% recovery rate, while moderate adherence leads to a 60.87% recovery rate, and low adherence results in only a 30.07% recovery rate. The overall dropout rate from OST programs is 27.97%, with relapse (28.63%) and lack of family support (15.38%) being the most common reasons for discontinuation, followed by financial constraints (8.91%) and side effects (6.63%). Comparing different treatment regimens, methadone (78.12% effectiveness) is slightly more effective than buprenorphine (71.73%), suggesting both medications play a critical role in opioid recovery.

DISCUSSION

The findings of this study provide crucial insights into the demographic, clinical, and treatment patterns of injectable opioid users (IOUs) attending an Opioid Substitution Therapy (OST) center in Telangana, India. The study revealed a predominance of male opioid users (61.23%), with a mean age of 40 years, aligning with previous studies conducted in India, which indicate that opioid dependence is more common among men in the 30-50 years age group [8]. The socio-demographic data suggest that a significant proportion of users belong to lower socioeconomic backgrounds, reinforcing the association between economic hardship and substance use disorders [9].

The high prevalence of co-morbid substance use, particularly alcohol (21.40 days/month), tobacco (28.91 days/month), and benzodiazepines (8.76 days/month), aligns with previous studies, indicating that poly-substance use is a common pattern among opioid users [5]. The findings also highlight the significant burden of co-morbid conditions, with 29% of users suffering from depression and 48% from anxiety, which is consistent with international research linking opioid dependence to mental health disorders [6]. Additionally, infectious diseases such as HIV (2%) and Hepatitis C (5%) were identified, reinforcing the importance of harm reduction strategies such as needle exchange programs and OST.

Statistical analyses revealed significant associations between demographic factors and co-morbid substance use. The chi-square tests demonstrated that younger age groups (18-30, 31-45), male sex, lower education levels, and unemployment were significantly correlated with higher substance use, which is in line with prior research from India and global studies on opioid dependence [10]. However, logistic regression analysis did not show a statistically significant protective effect of employment or higher education levels on reducing the risk of co-morbid substance use. There-

fore, while these factors may be linked to better treatment outcomes, their direct role in lowering co-morbid substance use remains inconclusive.

The treatment outcomes from this study emphasize the importance of medication adherence and sustained OST. Patients receiving OST for more than 12 months showed an 86.14% recovery rate, whereas those in treatment for less than six months had only a 39.83% recovery rate. These findings align with previous studies that emphasize the benefits of long-term OST in preventing relapse [11]. Methadone and buprenorphine were both effective, with methadone (78.12%) slightly outperforming buprenorphine (71.73%), similar to findings from previous studies in opioid treatment programs in India and abroad [12].

The study also identified key reasons for dropout from OST programs, with relapse (28.62%) and lack of family support (15.37%) being the primary contributors. Similar studies from northern India have reported comparable dropout rates, emphasizing the need for community-based interventions and family engagement in opioid recovery programs [13]. However, while the high relapse rate (28.62%) is noted, additional exploration of risk factors for relapse is essential. Studies indicate that factors such as psychological distress, lack of social support, poor treatment adherence, and financial instability significantly contribute to relapse. Addressing these through integrated counseling, peer support networks, and employment rehabilitation programs may help mitigate the risk of relapse.

The findings reinforce the importance of integrating mental health services into OST programs to address the high prevalence of psychiatric co-morbidities. Expanding psychosocial support through structured counseling, cognitive behavioral therapy (CBT), and peer-led support groups could enhance treatment outcomes. Additionally, ensuring employment assistance, vocational training, and family-centered interventions may help improve long-term recovery. Further research exploring targeted interventions to reduce relapse, such as contingency management and medication-assisted therapy enhancements, could strengthen OST programs.

CONCLUSION

This study provides a comprehensive profile of injectable opioid users in Telangana, India, highlighting key demographic patterns, co-morbid substance use, and treatment outcomes. A strong association between unemployment, lower education levels, and opioid dependence was observed, suggesting that rehabilitation programs should integrate vocational training and economic support, though causality cannot be inferred. The high prevalence of mental health disorders, par-

ticularly depression (29%) and anxiety (48%), shows the need for integrating psychiatric care into OST programs. Long-term OST adherence was linked to higher recovery rates (86.14%), reinforcing the importance of sustained treatment and relapse prevention strategies. Future research should conduct longitudinal follow-ups to assess sustained recovery, explore randomized trials comparing different OST strategies, and investigate so-

cio-economic and psychological factors influencing treatment adherence and relapse. Implementing comprehensive, integrated interventions can improve opioid recovery outcomes and reduce substance use burden in vulnerable populations.

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