

Age of onset of substance use in patients with dual diagnosis and its association with clinical characteristics, risk behaviors, course, and outcome: A retrospective study

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ABSTRACT

Research Question: Do patients with dual diagnosis (DD) with an early initiation of substance use and subsequent early onset substance use disorder (EOS) differ from those with late onset substance use disorder (LOS) regarding characteristics, sex-related risk behaviors, course, and outcome?

Objectives: The aim is to study EOS and LOS groups of patients with DD attending a treatment center with regard to clinical characteristics, type of psychiatric disorders, risk behaviors, and short-term outcome.

Materials and Methods: Retrospective chart review of patients diagnosed with DD ($n = 307$) with regard to the above variables. Diagnoses of both substance use disorders (SUDs) and psychiatric disorders were made by qualified psychiatrists as per the International Classification of Diseases, 10th revision.

Results: Among 307 participants with DD, 100 were in EOS group (onset of SUD before 18 years of age as assessed clinically) and 207 in LOS group. Cannabis as the primary substance was more prevalent in the EOS (30%) than that of the LOS group (12%). Psychotic disorders were more prevalent in the EOS group (41%) followed by mood disorders (30%), while the reverse was true in the LOS group (27.5% and 56.5%, respectively). When compared to the LOS group, the EOS group had higher number of psychiatric admissions, reported higher prevalence of risky sexual behaviors (unprotected sexual intercourse, multiple sexual partners, and history of sexual intercourse with commercial sex workers), showed poorer treatment adherence, and worse outcome regarding both psychiatric disorder and SUD (all differences significant at $P < 0.05$).

Conclusions: DD patients differ significantly based on the age of onset of substance use. These may have therapeutic and management implications.

Key words: Age of onset, dual diagnosis, outcome

INTRODUCTION

Age of initiation of substance use during childhood/adolescence has been associated with various long-term

health and social complications. Early onset of substance use (EOS) occurs generally in the early to late adolescent period (<18 years) of age.^[1] Various studies have revealed strong associations between the age of first

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alcohol/cannabis/cocaine/psychostimulants use and the development of dependence.^[2-8] Earlier studies had defined early age of onset (more particularly to that of alcohol) to be <25 years of age.^[9] However, recent literature have highlighted the issue of a more earlier age of onset of substance use, i.e., on or before 17–18 years of age which is mostly the preadolescent and/or adolescent age to be more common and is adversely associated with various psychosocial problems.^[1,10-14] Therefore, newer data suggest to limit the cutoff age to define early and late substance use disorder (SUD) with regard to the age of onset to be at 17 or 18 years of age.^[1,10-14] Apart from having more severe complications and frequent treatment admissions, the individuals with EOS have an early indicator for the development of the psychiatric disorder.^[1,15-17] Few studies have demonstrated association between early-onset cannabis use and earlier development of the major depressive disorder, suicidal ideations, and suicidal attempts.^[18-21]

Epidemiological-based and clinical-based studies had revealed that dual diagnosis (DD) or co-occurring disorders exist in about one-third of patients with SUDs.^[22-24] Early age of initiation of substance use and subsequent development of SUD at an early age have been found to be associated with a longer duration of untreated illness of psychiatric disorder and poorer clinical and functional outcomes.^[25-27] Poorer treatment-seeking behavior is also linked with EOS group of individuals with DD.^[28-30] However, there is currently almost no evidence in the available literature regarding any difference in the clinical characteristics, course, and outcome of patients with DD with respect to the age of onset of substance use (i.e., EOS vs. LOS).

With this background, the current study was intended to compare patients with DD with early-onset of substance use (EOS group) with those with DD with late-onset substance use (LOS group) on various parameters (clinical characteristics, risk behavior, and short-term course and outcome).

MATERIALS AND METHODS

The participants of the present study were outpatients visiting the Drug De-addiction and Treatment Centre (DDTC) at the Post Graduate Institute of Medical Education and Research (PGIMER), Chandigarh, India. DDTC, PGIMER caters to 20 inpatients and yearly average of 2500–3000 new patients. Out of all these patients, detail workup is made for yearly average of 700–1000 patients. In the outpatient services of DDTC, PGIMER, all the participants visiting for the first time are evaluated by a qualified psychiatrist, diagnosis is made as per the International Classification of Diseases, 10th revision (ICD-10)^[31] and treatment is initiated. A unique Central Registration Number is assigned to every subject seeking treatment. After an average of 2–3 follow-up

visits, the detail workup is done by a trainee psychiatrist in a structured format under the supervision of a qualified psychiatrist and later on is reviewed by the Consultant. During this visit, a DDTC file number is assigned to the subject and if the participant is diagnosed with a comorbid psychiatric disorder, i.e., DD, then an additional DD clinic number is assigned to the same participant. Psychiatric diagnosis was confirmed by two-stage method. The psychiatric diagnosis (both substance use and psychiatric diagnosis) was made clinically by the qualified psychiatrist as per the ICD-10. Later, the diagnosis was confirmed by the consultant. For this study, the DDTC files with DD numbers from 1 to 307 were retrieved and inspected retrospectively. The sociodemographic and clinical details from the detail workup file which included the age of initiation of substance and subsequent development of SUD was recorded. Those with the initiation of substance and onset of clinically diagnosable SUD before the age of 18 years were categorized under the EOS group and others having the initiation of substance use and development of SUD later than 18 years were grouped under the LOS group. The treatment records in these files were analyzed in detail to find out the outcome in terms of no of follow-ups, course of the psychiatric disorder, high-risk behaviors, and consequences in various domains (health, social, marital, family, legal, and occupation). The study protocol was approved by the Institutional Ethical Review Board of the Institute.

Statistical analysis

The analysis was performed using SPSS software version 16 (Statistical Package for the Social Sciences, Chicago, IL, USA). Frequencies and percentages were computed for discontinuous sociodemographic and clinical variables. Mean and standard deviation (SD) for the continuous variables were calculated. Both the groups were compared using *t*-test, Chi-square test, Fisher's exact test, and Yate's correction wherever applicable. For multiple comparisons, Bonferonni *post hoc* test correction was carried out. The statistical significance was kept at $P < 0.05$.

RESULTS

Of the 307 patients with DD, 100 patients had the initiation of substance use and development of SUD before <18 years of age and were categorized into the EOS group and rest 207 patients fell into the LOS group. Both the groups were compared across different variables.

Sociodemographic profile

As evident from Table 1, the difference in age at first presentation to our services in both the groups was statistically significant. There were no females in the EOS group and only four females in the LOS group, but it was not statistically significant. More married and employed individuals were present in the LOS group and the difference was significant too. However, there was no difference in the

level of education, locality, religion, and type of family in both the groups.

Clinical profile of the two groups

As depicted in Table 2, the mean age of onset of primary substance use in the EOS and LOS group was 15.65 (SD – 2.33) years of age and 25.51 (SD – 6.74) years, respectively. However, no difference was noted in the mean duration (in months) of the dependence of primary substance in both groups. The age of onset of psychiatric disorder in both the groups was found to be statistically significant (EOS – 23.25 [SD – 8.55] vs. LOS – 32.44 [SD – 10.99]; $P < 0.001$). In both groups, alcohol was the primary substance abused (EOS – 43% vs. LOS – 59.9%). However, cannabis as the primary substance was more prevalent in the EOS (30%) than the LOS group (12.6%). Overall, the difference in the prevalence of primary substance use in both groups was statistically significant for alcohol ($P = 0.005$), tobacco ($P = 0.001$), and cannabis ($P < 0.001$). While more number of participants in the EOS group had a history of admission to hospital (40%) as compared to the LOS group (28.5%), more number of participants in the LOS group had a poor outcome after admission (EOS – 24% vs. LOS – 54.5%; $P = 0.005$). With regard to the diagnosis of psychiatric disorder in both groups, psychotic disorders were more prevalent in the EOS group (41%) followed by affective/mood disorders (30%) while the reverse was true in the LOS

group (56.5%, 27.5%) [Figure 1]. However, the statistical significant difference after applying correction for multiple comparisons was only for psychotic disorders ($P = 0.018$) and affective disorders ($P < 0.001$). Anxiety disorders were the third-most common psychiatric diagnosis in both groups. There was no difference in the presence/absence of externalizing symptoms, history of treatment by faith healers, and family history of SUD in both the groups.

Comparison of clinical parameters in both the groups

EOS group had both onset of tobacco use and development of dependence at an earlier age as compared to LOS group and the difference was statistically significant in both cases [Table 3]. Both the groups had the almost the same number of participants with intravenous drug

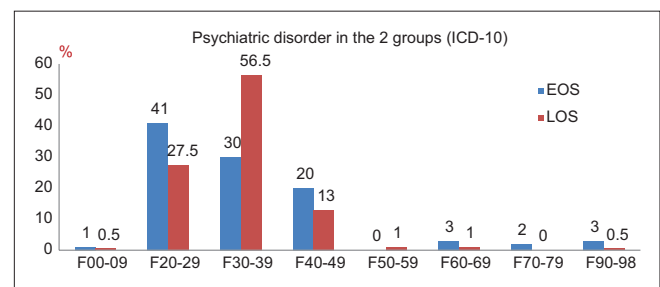


Figure 1: Psychiatric disorders in the early onset substance use disorder (EOS) and late onset substance use disorder (LOS) dual diagnosis patients groups

Table 1: Comparison of sociodemographic parameters between early onset (EOS; $n=100$) and late onset (LOS; $n=207$) substance use group

Parameters	Mean (SD)/n (%)		t -test/ χ^2 (P)
	Early onset SUD ($n=100$)	Late onset SUD ($n=207$)	
Age at presentation	29.56 (9.52) (range: 14-67)	39.35 (11.21) (range: 19-84)	$t=-7.516$ (<0.001)*** (CI: -12.35--7.22)
Sex			
Male	100 (100)	203 (98.1)	$\chi^2=1.95$ (0.161)
Female	0	4 (1.9)	
Education			
Illiterate	7 (7)	11 (5.3)	$\chi^2=0.381$ (0.943)
Under matric	23 (23)	48 (23.18)	
Matriculate	25 (25)	51 (24.6)	
Above matric	45 (45)	97 (46.8)	
Marital status			
Single	50 (50)	43 (20.7)	$\chi^2=27.33$ (<0.001)***
Married	48 (48)	156 (75.4)	
Divorced	2 (2)	8 (3.86)	
Occupation			
Unemployed	52 (52)	53 (25.6)	$\chi^2=20.87$ (<0.001)***
Employed on paid wages	48 (48)	154 (74.3)	
Religion			
Hindu	63 (63)	130 (62.8)	$\chi^2=0.001$ (0.973)
Non-Hindu	37 (37)	77 (37.1)	
Family type			
Nuclear	58 (58)	102 (49.3)	$\chi^2=2.05$ (0.151)
Nonnuclear	42 (42)	105 (50.7)	
Locality			
Urban	55 (55)	118 (57)	$\chi^2=0.11$ (0.739)
Rural	45 (45)	89 (42.9)	

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$. SUD – Substance use disorders; SD – Standard deviation; CI – Confidence interval; EOS – Early onset substance use disorder; LOS – Late onset substance use disorder

Table 2: Comparison of clinical profile EOS versus LOS

Parameters	Mean (SD)/n (%)		t-test/ χ^2 (P)
	EOS (n=100)	LOS (n=207)	
Age of initiation of primary substance use	15.65 (2.33)	25.51 (6.74)	$t=-14.206$ (<0.001)*** (CI: -11.22--8.49)
Duration in months of dependence of primary substance	128.38 (96.48) (range: 10-456)	127.35 (97.70) (range: 2-480)	$t=0.086$ (0.931) (CI: -22.31-24.36)
Number of substance dependence			
1	15 (15)	48 (23.2)	$\chi^2=4.355$ (0.226)
2	46 (46)	97 (46.9)	
3	30 (30)	51 (24.6)	
>3	9 (9)	11 (5.3)	
Most common primary substance			
Alcohol	43 (43)	124 (59.9)	$\chi^2=7.766$ (0.005)*
Tobacco	11 (11)	4 (1.9)	$\chi^2=11.930$ (0.001)***
Cannabis	30 (30)	26 (12.6)	$\chi^2=13.751$ (<0.001)***
Opioids	15 (15)	47 (22.7)	$\chi^2=2.484$ (0.115)
Sedatives/hypnotics	1 (1)	5 (2.4)	$\chi^2=0.705$ (0.401)
Inhalants	0	1 (0.5)	$F=0.001$
			Adjusted <i>post hoc</i> $\chi^2=29.28$ (<0.001)***
Age of onset of psychiatric disorder	23.25 (8.55) (range: 2-55)	32.44 (10.99) (range: 7-83)	$t=-7.354$ (<0.001)*** (CI: -11.65--6.73)
Classification of psychiatric disorder			
F00-F09	1 (1)	1 (0.5)	$\chi^2=0.546$ F
F20-F29	41 (41)	57 (27.5)	$\chi^2=5.624$ (0.018)*
F30-F39	30 (30)	117 (56.5)	$\chi^2=19.005$ (<0.001)***
F40-F48	20 (20)	27 (13.0)	$\chi^2=2.517$ (0.113)
F50-F59	0	2 (1.0)	$F=1.000$
F60-F69	3 (3)	2 (1.0)	$F=0.334$
F70-F79	2 (2)	0	$F=0.105$
F90-F98	3 (3)	1 (0.5)	$F=0.103$
			Adjusted <i>post hoc</i> $\chi^2=26.23$ (<0.001)***
Past history of admission			
Yes	40 (40)	59 (28.5)	$\chi^2=4.080$ (0.043)*
No	60 (60)	148 (71.49)	
Outcome of admission			
Improved	56 (56)	94 (45.4)	$\chi^2=13.984$ (<0.001)***
Not improved	24 (24)	113 (54.5)	
History of externalizing symptoms			
Yes	31 (31)	35 (16.9)	$\chi^2=7.934$ (0.005)**
No	69 (69)	172 (83.1)	
History of treatment by faith-healers			
Yes	13 (13)	27 (13)	$\chi^2=0.00001$ (0.991)
No	87 (87)	180 (87)	
Family history of substance dependence			
Yes	46 (46)	87 (42)	$\chi^2=0.433$ (0.511)
No	54 (54)	120 (58)	

* $P<0.05$; ** $P<0.01$; *** $P<0.001$. SD – Standard deviation; CI – Confidence interval; EOS – Early onset substance use disorder; LOS – Late onset substance use disorder

use. There was more prevalence of unprotected sexual intercourse, multiple sexual partners, and history of sexual intercourse with commercial sex workers (CSW), history of premarital sexual contact in the EOS group as compared to the LOS group, the difference in all these parameters being significant statistically. With regard to nature of the psychiatric disorder, both the groups did not differ in relation to number of relapse of psychiatric illness due to poor drug compliance, number of relapses, family history of psychiatric disorder, and history of suicide attempt. However, there was more continuous type of psychiatric illness in the EOS group than the episodic type of illness in the LOS group. Clinical insight of psychiatric illness was absent in more subjects in the EOS group, the difference being significant statistically.

Comparison of substance use disorder-related consequences in both groups

Although there were several SUD-related complications at the time of initial presentation in both the groups, there was no difference between the two groups statistically [as evident from Table 4].

Comparison of short-term course and outcome

At 1-month follow-up, more subjects in the EOS group worsened than the LOS group in relation to SUD (21% vs. 1%; $P < 0.001$). At 3-month follow-up, no difference between the groups with regard to either psychiatric disorder or SUD was noted. In addition, when evaluated at 6 months it was seen that the subjects that followed up in the clinic (EOS: 39%; LOS: 34%; $P > 0.05$), outcome was noted as improved

Table 3: Comparison of clinical parameters in both the groups

Clinical parameters	Mean (SD)/n (%)		t-test/ χ^2 (P)
	EOS	LOS	
Age of onset of tobacco use	n=82 18.06 (3.80)	n=149 21.75 (5.57)	t=-5.345 (0.003)** (CI: -5.05--2.33)
Age of tobacco dependence	n=82 19.10 (3.84)	n=149 22.97 (5.22)	t=-5.898 (0.024)* (CI: -5.17--2.58)
IDU parameters	n=100	n=207	
ID dependence	3 (3)	7 (3.4)	$\chi^2=0.001$ (1.00)
History of IDU by IV route	3 (3)	6 (2.9)	$\chi^2=0.001$ (1.00)
Sharing of needles	3 (3)	2 (1)	F=1.74 (0.334)
Sharing of mixer/vials/cottons	2 (2)	4 (1.9)	F=0.002 (1.00)
Sharing of syringes	2 (2)	2 (1)	F=0.56 (0.599)
Reuse of needles/syringes	2 (2)	3 (1.4)	F=0.106 (1.00)
History of unprotected sexual intercourse			
Present	14 (14)	9 (4.3)	$\chi^2=9.064$ (0.003)**
History of multiple sexual partners			
Present	14 (14)	11 (5.3)	$\chi^2=6.801$ (0.009)**
History of sexual intercourse with CSW			
Present	16 (16)	17 (8.2)	$\chi^2=4.262$ (0.039)*
History of premarital sexual intercourse			
Present	12 (12)	9 (4.3)	$\chi^2=6.196$ (0.013)*
History of surreptitious use of medications			
Present	33 (33)	49 (23.7)	$\chi^2=2.997$ (0.083)
Relapse of psychiatric illness due to poor drug compliance			
Present	55 (55)	104 (50.2)	$\chi^2=0.611$ (0.434)
Number of relapses of psychiatric illness	1.11 (1.12)	1.02 (1.14)	$\chi^2=0.652$ (0.715)
Family history of psychiatric illness			
Present	34 (34)	76 (36.7)	$\chi^2=0.216$ (0.642)
History of involuntary admission due to psychiatric illness			
Present	15 (15)	34 (16.4)	$\chi^2=0.102$ (0.749)
Course of psychiatric illness			
Continuous	75 (75)	126 (60.9)	$\chi^2=5.955$ (0.015)*
Episodic	25 (25)	81 (39.1)	
History of suicide attempt			
Present	17 (17)	33 (15.9)	$\chi^2=0.055$ (0.814)
Insight of psychiatric illness			
Absent	33 (33)	51 (24.6)	$\chi^2=6.09$ (0.048)*
Partial	50 (50)	95 (45.9)	
Present	17 (17)	61 (29.5)	

* $P<0.05$; ** $P<0.01$; *** $P<0.001$. F – Fischer's exact. SD – Standard deviation; CI – Confidence interval; EOS – Early onset substance use disorder; LOS – Late onset substance use disorder; IDU – Intravenous drug use; IV – Intravenous; CSW – Commercial sex worker; ID – Intravenous drugs

in the EOS group compared to LOS group regarding both psychiatric disorder (87% vs. 62%; $P = 0.007$) and SUD (82% vs. 62%; $P = 0.012$), despite a further drop in the follow-ups in both the groups (which was comparable in both the groups (Follow-up: EOS – 39% vs. LOS – 34.29%) [Table 5].

DISCUSSION

The present study aimed to find out whether there was any relationship between the age of initiation of substance use in patients with DD in the overall course and outcome of DD. To the best of our knowledge, this is the first study in this regard from a tertiary drug de-addiction center in India. Although it was a retrospective study, every possible effort was made to document and analyze all variables related to the diagnosis and management of every subject included in the study.

In the present study, we assessed the treatment details and follow-up data of 307 patients with DD and based on age

cutoff of 18 years, the cases were recruited into EOS and LOS group. As evident from the results, participants in the EOS group presented to the healthcare services earlier. It can be because earlier the substance use and development of dependence, earlier is the dysfunction noted in academic, social and work domains by the caregivers and early is the treatment sought by the family. This is in accordance with the report by Substance Abuse and Mental Health Services Administration report^[10] which also suggested that 74% of treatment admissions from age 18 to 30 years had the initiation of substance by the age of 17 years or less. Thereby, we can suggest that it is not an uncommon scenario in the adolescent age group to initiate substance earlier.

The mean age of onset of primary substance use in our EOS group was 15.65 (SD – 2.33) years, which is in accordance with the previous studies regarding the age of onset of substance abuse.^[3,4,32-36] Although in both the groups, more number

Table 4: Comparison of substance use disorders related complications

Complications	Frequency (%)		χ^2 (P)
	EOS (n=100)	LOS (n=207)	
Health related			
Nil	20 (20)	50 (24.2)	$\chi^2=1.471$ (0.689)
Mild	37 (37)	81 (39.1)	
Moderate	41 (41)	71 (34.3)	
Severe	2 (2)	5 (2.4)	
Occupation related			
Nil	15 (15)	46 (22.2)	$\chi^2=2.60$ (0.457)
Mild	48 (48)	90 (43.5)	
Moderate	31 (31)	56 (27.1)	
Severe	6 (6)	15 (7.2)	
Finance related			
Nil	25 (25)	59 (28.5)	$\chi^2=2.78$ (0.427)
Mild	42 (42)	91 (44.0)	
Moderate	32 (32)	51 (24.6)	
Severe	1 (1)	6 (2.9)	
Legal related			
Nil	71 (71)	146 (70.5)	$\chi^2=4.010$ (0.260)
Mild	27 (27)	55 (26.6)	
Moderate	2 (2)	1 (0.5)	
Severe	0	5 (2.4)	
Family related			
Nil	26 (26)	71 (34.3)	$\chi^2=2.158$ (0.540)
Mild	52 (52)	96 (46.4)	
Moderate	21 (21)	38 (18.4)	
Severe	1 (1)	2 (1.0)	
Marital related			
Nil	50 (50)	77 (37.2)	$\chi^2=3.441$ (0.064)
Mild	38 (38)	100 (48.3)	
Moderate	11 (11)	28 (13.5)	
Severe	1 (1)	2 (1.0)	
Social related			
Nil	26 (26)	68 (32.9)	$\chi^2=2.419$ (0.548)
Mild	59 (59)	105 (50.7)	
Moderate	15 (15)	33 (15.9)	
Severe	0	1 (0.5)	

EOS – Early onset substance use disorder; LOS – Late onset substance use disorder

of participants were dependent on two substances, yet about 40% of participants in the EOS group were dependent on >3 substances which about 10% was less in the LOS group. Existing literature also supports this view that earlier the age of onset of substance, more is the prevalence of polysubstance dependence.^[1,37,38] Alcohol was more common in both groups, but cannabis was the second-most prevalent substance in the EOS group. Similar findings have been reported by various studies which have reported cannabis to be more commonly abused by adolescents worldwide.^[39-42] Higher prevalence of cannabis use has also been regarded as a predictor of subsequent initiation with other illicit and licit drugs or commonly known as the “gateway hypothesis” in the adolescent population.^[43-46] With regard to tobacco use, the EOS group had very early onset of initiation and subsequent dependence and the same had been replicated across several studies. In addition, studies have also reported a strong relationship between early-onset regular smoking to later alcohol use and other risky behaviors in adolescence.^[6,47-49]

When we introspect about the nature of the psychiatric illness in the two groups, a higher prevalence of psychotic disorders in the EOS group and a higher prevalence of affective disorders in the LOS group were noted. Studies which have evaluated first episode psychosis (mostly in adolescents) have found a high prevalence of comorbid SUD and more particularly cannabis in this age group.^[50-55] Similarly, studies which have tried to link between substance abuse and affective disorders/Bipolar disorder have found the association of alcohol use/dependence after 18 years of age.^[56-59] Few Indian studies on patients with DD have also reported a higher prevalence of affective disorders and anxiety disorders.^[60-63] However, we were unable to find any previous Indian/Western studies which had tried to compare EOS and LOS patients with DD.

As compared to the LOS group, the EOS group had more high-risk sexual behavior in the form of unprotected sexual encounter, multiple sexual partners, and sexual encounter with CSW. This is also been replicated across several studies that earlier age of onset of SUD has been associated with high-risk sexual behaviors,^[64] infrequent condom use and pregnancy,^[65,66] sexually-transmitted diseases,^[67] violence,^[68] depression, and suicide.^[69-71] With regard to high-risk sexual behavior in those who had early initiation of substance use and subsequent early development of SUD, the role of difficult temperament could not be excluded as it has been well established from number of studies that temperamental characteristics increases one's to various risk-taking behaviors early in the childhood.^[72-74] Although in this study, we were unable to find any association between temperament and sexual risk behaviors, there is evidence of the high prevalence of sexual risky behaviors in the EOS group suggesting temperamental predisposition.

As far as the SUD-related consequences are concerned, no significant differences were found between the two groups on the various psycho-social-legal domains. It could be because most of the participants with DD had a similar profile of SUD-related complications at the time of presentation. This is in contrast to some studies which have found earlier age of onset of SUD to be associated with more severe psychosocial problems.^[11,75]

Another aspect of the present study was to look for any difference in the short-term outcome with regard to follow-up patterns in the two groups. From the study findings, we are able to conclude that (1) At 1 month follow-up, there was not much difference between the two groups in different parameters of adherence, compliance to treatment, insight about psychiatric illness, and outcome of psychiatric illness. Only difference was noted in the worsening in the short-term outcome of SUD in about one-fifth of patients in the EOS-DD group which can be related to the difficulties usually encountered

Table 5: Comparison of follow up status in both groups

Table 5: Comparison of follow up status in both groups			
Follow up status	Mean (SD)/n (%)		t-test/ χ^2 (P)
	EOS (n=100)	LOS (n=207)	
At 1 month			
Number of follow ups	1.50 (1.106) (range: 0-4)	1.37 (1.21) (range: 0-5)	t=0.924 (0.356) (CI: -0.15-0.416)
Adherence			
Poor	30 (30)	77 (37.19)	$\chi^2=1.54$ (0.462)
>50	24 (24)	45 (21.7)	
>75	46 (46)	85 (41.1)	
Compliance			
Yes	67 (67)	121 (58.5)	$\chi^2=2.075$ (0.149)
No	33 (33)	86 (41.5)	
Motivation			
Precontemplation	43 (43)	99 (47.8)	$\chi^2=0.836$ (0.840)
Contemplation	37 (37)	71 (34.3)	
Preparation	12 (12)	20 (9.7)	
Action	8 (8)	17 (8.2)	
Maintenance	0	0	
Insight			
Absent	28 (28)	75 (36.23)	$\chi^2=4.707$ (0.095)
Partial	46 (46)	69 (33.3)	
Full	26 (26)	63 (30.4)	
Outcome of psychiatric disorder			
Worsened	0	3 (1.4)	$\chi^2=2.096$ (0.350)
Unchanged	35 (35)	81 (39.13)	
Improved	65 (65)	123 (59.4)	
Outcome of substance dependence			
Worsened	21 (21)	2 (1.0)	$\chi^2=48.877$ (<0.001)
Unchanged	17 (17)	87 (42.02)	
Improved	62 (62)	118 (57.0)	
At 3 months			
Number of follow ups	n=85 1.52 (1.436) (range: 0-6)	n=175 1.35 (1.52) (range: 0-6)	t=0.828 (0.409) (CI: -0.225-0.552)
Adherence			
Poor	52 (61.11)	15 (7.24)	$\chi^2=92.26$ (<0.001)***
>50	10 (11.76)	106 (60.57)	
>75	23 (27.05)	54 (26.08)	
Compliance			
Yes	45 (45)	73 (35.3)	$\chi^2=2.909$ (0.088)
No	40 (47.05)	102 (58.28)	
Motivation			
Precontemplation	57 (67.05)	45 (25.71)	$\chi^2=54.44$ (<0.001)***
Contemplation	22 (25.88)	80 (45.71)	
Preparation	3 (3.52)	50 (28.57)	
Action	3 (3.52)	0	
Maintenance	0	0	
Insight			
Absent	18 (21.17)	6 (2.9)	$\chi^2=23.58$ (<0.001)***
Partial	55 (64.70)	123 (70.28)	
Full	12 (14.11)	46 (22.2)	
Outcome of psychiatric disorder			
Worsened	2 (2.35)	3 (1.4)	$\chi^2=2.409$ (0.299)
Unchanged	36 (42.35)	92 (52.5)	
Improved	47 (55.29)	80 (38.6)	
Outcome of substance dependence (%)			
Worsened	2 (2.35)	7 (4)	$\chi^2=0.662$ (0.718)
Unchanged	42 (49.41)	90 (51.42)	
Improved	41 (48.23)	78 (37.7)	
Follow ups at 6 months			
Number of follow ups	n=39 2.31 (1.52) (range: 1-9)	n=71 2.52 (1.48) (range: 1-9)	t=-0.715 (0.412) (CI: -0.805-0.378)

Contd...

Table 5: Contd...

Table 5: Contd...			
Follow up status	Mean (SD)/n (%)		t-test/ χ^2 (P)
	EOS (n=100)	LOS (n=207)	
Follow ups at 6 months			
Adherence			
Poor	6 (15.4)	14 (19.7)	$\chi^2=2.284$ (0.319)
>50	8 (20.5)	22 (31)	
>75	25 (64.1)	35 (49.3)	
Compliance			
Yes	32 (82.1)	45 (63.4)	$\chi^2=4.179$ (0.041)*
No	7 (17.9)	26 (36.6)	
Motivation			
Precontemplation	7 (17.9)	17 (23.9)	$\chi^2=4.87$ (0.301)
Contemplation	15 (38.5)	24 (33.8)	
Preparation	3 (7.7)	11 (15.5)	
Action	14 (35.9)	17 (23.9)	
Maintenance	0	2 (2.8)	
Insight			
Absent	3 (7.7)	4 (5.6)	$\chi^2=0.662$ (0.718)
Partial	12 (30.8)	27 (38.0)	
Full	24 (61.5)	40 (56.3)	
Outcome of psychiatric disorder			
Worsened	0	10 (14.1)	$\chi^2=8.766$ (0.007)
Unchanged	5 (12.8)	17 (23.9)	
Improved	34 (87.17)	44 (62)	
Outcome of substance dependence			
Worsened	0	9 (12.7)	$\chi^2=8.027$ (0.012)
Unchanged	7 (17.9)	18 (25.3)	
Improved	32 (82.1)	44 (62.0)	

* $P<0.05$; ** $P<0.01$; *** $P<0.001$. SD – Standard deviation; CI – Confidence interval; EOS – Early onset substance use disorder; LOS – Late onset substance use disorder

while treating adolescents with SUD^[76-79] and nature of psychiatric illness (mostly psychosis) during initial phases of treatment (2) At 3-month follow-up, despite comparable dropout rates in both the groups, there was a significant difference noted in the adherence rates in the EOS group which was poorer (in those retained in the study after 3 months) than the LOS group. In addition, there was more number of subjects in the EOS-DD group who had the poor motivation to quit substances even at the end of 3 months suggesting that there are several difficulties in ensuring motivation to quit substances in early-onset SUD.^[11,76] However, by 3 months, there was not much difference in the short-term outcome of psychiatric illness and substance dependence in both the groups which further suggested that more the contact with treatment services, better is the outcome whether it is EOS or LOS. Retention in the treatment network is the cornerstone of improvement in individuals with DD.^[80-83] (3) At the end of 6 months, despite similar dropout rates in both groups, there was a significant difference noted in the outcome of psychiatric illness and SUD, i.e., EOS group had better outcome in both psychiatric illness and SUD as compared to the LOS group. This can be because that there was more number of subjects with psychotic disorders or cannabis-induced psychotic disorders in the EOS group and keeping them in the treatment net could have possibly led to better outcome in the EOS group with regard to more number of participants with affective

disorders in the LOS group which possibly be having an episodic course with periodic relapses leading to more number of unchanged outcome.

We are well aware of our limitations. It was a retrospective study, and there is every possibility that many facts regarding the illness may not have been documented or would have been missed to be documented in the DD case files. The sample was limited to clinic-based treatment-seeking subjects and hence could not be generalized to the community. The study was based on clinical assessment only, without any instrumental or laboratory validation. Moreover, another important limitation of the present study was the short-term outcome was based on those subjects (in both groups) retained in follow-up. Further, we did not use any instrument to measure adherence, compliance, motivation, and insight and these assessments were limited to the assessment clinically by the treating psychiatrists during the follow-ups. All these parameters were rated as per the notes in the available treatment records, and there could be subjective/therapist variation in interpreting the same. Further, it is also a known fact that different SUDs have different clinical courses and have different psychosocial trajectories. However, to demonstrate the impact of age of onset of substance use and subsequent development of SUD of any substance category, we have clubbed all the SUDs into one category. Although it would have been ideal to analyze all the

sub-groups, the sample size was too small to go for multiple subgroup analysis. Future studies with a larger sample size should overcome these limitations.

CONCLUSIONS

Despite the above limitations, the present study provided for the first time that there are significant differences in the clinical characteristics, psychiatric diagnosis, and risk behaviors in patients with DD based on the age of onset of SUD suggesting that the short-term course and outcome of patients with DD could be different if taken into account the age of onset of SUD. Of those retained in the follow-up, patients with EOS may actually fare better than the LOS group. This is a new finding that may be due to the type of substances used and type of psychiatric disorders in the EOS group. This study lays the foundation of further prospective studies, which if replicated with appropriate instruments, might have important management implications in DD patients.

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Conflicts of interest

There are no conflicts of interest.

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