The Pattern of Alcohol Use in Alcohol-Related Cirrhosis in Indian Patients: AUDIT Indian Liver Study

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Background: **Alcohol is one of the most common causes of liver cirrhosis. Yet, the pattern of alcohol consumption in cirrhosis is rarely studied. This study aims to study the drinking patterns along with the educational, socioeconomic, and mental health in a cohort of patients with and without liver cirrhosis.** ***Methods:*** **This prospective observational study was conducted at a tertiary-care hospital and included patients with harmful drinking. Demographic, alcohol intake history, assessment of socioeconomic and psychological status by modified Kuppuswamy scale and Beckwith Inventory, respectively, were recorded and analyzed.** ***Results:*** **Cirrhosis was present in 38.31% of patients with heavy drinking (64%). Cirrhosis was more among illiterates (51.76%) with early onset (22.4. ± 7.30 yrs *P* = 0.0001) and longer duration of alcohol (12.5 ± 6.5 vs. 6.8 ± 3.4 *P* = 0.001). Higher education qualification was associated with lower cirrhosis (*P* < 0.0001). With the same employment and education qualifications, net income in cirrhosis was lower [USD 298 (175–435) vs. USD 386 (119–739) *P* = 0.0001]. Whiskey (86.8%) was the commonest drink consumed. Similar median alcoholic drinks per week were consumed by both groups [34 (22–41) vs. 30 (24–40), *P* = 0.625], while indigenous alcohol was more consumed in cirrhosis [105 (98.5–109.75) vs. 89.5.0 (69.25–110.0) *P* = 0.0001]. Loss of jobs (12.36%) and partner violence were more in cirrhotic (9.89% vs. 5.80%) with similar borderline depression.** ***Conclusion:*** **Alcohol use disorder-related cirrhosis is present in a quarter of patients with harmful early onset and longer duration of drinking and is inversely related to the education status and affects the socioeconomic, physical, and family health of patients. (J Clin Exp Hepatol 2023;13:437–446)**

Alcohol and liver

The use of alcohol has been a major social and medical problem all over the world for ages. There is a rising prevalence of the use of alcohol worldwide,[1] and despite numerous studies, the safe level of drinking is not certain. Alcohol drinking pattern is influenced by regional, religious, and coexisting environmental factors.[2] In Southeast Asia, alcohol use disorder (AUD) affects younger generations between 15 and 19 years of age, which is more prevalent in low- and middle-income countries.[3] The COVID-19 pandemic has been associated with increased consumption of alcohol, and there was a 54% increase in alcohol consumption in the week ending March 2020 compared to the year before. It would probably be no different in Asia and India.[4]

In India, the pooled prevalence of AUD is around 12.4%, with harmful and hazardous alcohol use in 8.6% of the population, signifying that 1 in 12 Indians have AUD.[5] There is also a wide variety of the pattern of alcohol intake across the country, with the highest intake reported from northeast, Chhattisgarh, Telangana, Himachal Pradesh, Punjab, and Jharkhand.[6] The prevalence of AUD in Indian patients, even in patients with tuberculosis, is 31%[7] thereby highlighting the addiction magnitude even at the time of an ongoing disease. Increased use of alcohol is associated with partner violence, thereby highlighting the social issues related to drinking habits.[8,9]

Despite these data on alcohol use in the general population, the pattern of alcohol intake among patients with liver cirrhosis is inadequate. A small study of 100 patients from a tier-2 Indian city found an early alcohol drinking age translating to earlier onset of liver disease by 28–32 years of age in 80% of the cohort.[10] This has a particular bearing on northeast India[11] where there is a substantial intake of indigenous alcohol from a young age. Alcohol

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Abbreviations: AUD: Alcohol use disorder; AUDIT: Alcohol Use Disorder Identification Test; CIWA-Ar: Clinical Institute Withdrawal Assessment Scale of Alcohol (revised version); SD: Standard deviation
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intake is associated with a significant socioeconomic burden to the patient's family, including loss of jobs.[12]

In the current study, we analyzed the pattern of alcohol intake among Indian patients with alcohol-related liver disease and specifically identified the differences between cirrhotic and noncirrhotic patients. Socioeconomic and psychosocial implications of AUD-related cirrhosis were also analyzed.

MATERIALS AND METHODS

Study Design

This prospective observational study was done between January 2020 and November 2021 at the Asian Institute of Gastroenterology Hospitals, India, a high-volume tertiary care center for gastrointestinal and liver disease. The Institutional Ethics committee approved the study, and informed consent for collecting data was taken from all patients.

All patients with liver diseases who attended the Hepatology clinic of the Institute with a history of alcohol use were screened for eligibility. Those with a history of harmful alcohol intake, defined as more than 14 drinks per week in males and more than 7 drinks per week in females, were enrolled in the study.[13]

After enrollment, a detailed history was taken, recorded in a structured case record form, and transferred to Microsoft Excel for tabulation and analysis.

The study coordinator recorded the patients' demographic, socioeconomic, and educational status. The type and amount of alcohol, including indigenous alcohol, used by each patient were also recorded and converted to the number of standard drinks and average grams of alcohol intake per week. The data about the amount of alcohol use and the period of abstinence were corroborated by the family member who was present during the interview. A clinical psychologist used the Beck Depression Inventory to assess depression related to alcohol use.[14] The following scoring was used to identify the presence of depression:

11–16: Mild mood disturbance
17–20: Borderline clinical depression
21–30: Moderate depression
31–40: Severe depression
Greater 40: extreme depression

Any social and family-related issues such as family conflicts due to alcohol use were also recorded and were considered genuine when it was cross-verified by another member of the family or when the patient did not deny the occurrence of the same.

All patients underwent an assessment with the Alcohol Use Disorder Identification Test (AUDIT)[15,16] to identify AUD and the Clinical Institute Withdrawal Assessment Scale of Alcohol (revised version)[17]– CIWA-Ar to assess withdrawal symptoms. The results were interpreted as shown below with people with scores >10 requiring deaddiction support.

0–9: Very mild withdrawal
10–15: Mild withdrawal
16–20: Modest withdrawal
21–67: Severe withdrawal.

All other relevant clinical details were recorded. Patients underwent routine laboratory investigations, including complete blood counts, viral serology, antinuclear antibody, antismooth muscle antibody, anti-liver-kidney microsomal antibody, serum ceruloplasmin, immunoglobulin G, antimitochondrial antibody M2 fraction, alpha-fetoprotein, renal function test, and liver function test. Imaging studies included doppler ultrasonography of the liver and a triple-phase contrast-enhanced computerized tomography of the abdomen whenever indicated. Esophago-gastroduodenoscopy was done in all patients to look for the presence of varices.

Definitions

The following definitions were used to classify the patient's status of liver disease:

1. **Cirrhosis:** It was diagnosed based on ultrasound imaging showing coarse echotexture of the liver with dilated portal vein greater than 14 mm. Associated clinical and laboratory signs of portal hypertension, such as esophageal varices, splenomegaly, and platelet count below 1.5 lac/mm^3 with or without the presence of ascites, were recorded. In addition, liver stiffness was measured by vibration-controlled transient elastography using the Fibroscan® 502 touch in all patients. Any value greater than 14 was classified as liver cirrhosis, provided the liver enzymes were below 200 IU/ml.
2. **Noncirrhotic AUD:** All other patients with harmful alcohol intake were classified as AUD, not amounting to cirrhosis.

These included patients with alcoholic hepatitis, which was diagnosed if the patient had jaundice defined by serum bilirubin > 3 mg/dl and aspartate transaminase (AST) > 50 IU/ml and a ratio of AST: ALT (alanine aminotransferase) > 1.5 within the last 8 weeks and both values being below 400 IU/ml/. In addition, patients should have had a

Table 1 : The Conversion of Local Expression of Amount of Alcohol Use to Milliliters (ml) of Alcohol.

Local Terminology	Amount of Drink (in ml of Alcohol)
Desi-style pauaa or quarter	180
Aadha or half	375
Khamba or full	750
Peg	30
Patiala peg	90
Large peg	60

Table 2 Percentage of Alcohol in Alcoholic Beverages Available in India.

Drink	Alcohol content
Beer	3–10%
Wine	10–14%
Rum, whiskey, vodka (distilled spirits)	40%
Arrack	33%–45%
Toddy	5–10%
Indian made foreign liquor (IMFL) – rum, whiskey, vodka, and gin made in India	35–42.8%
Feni (South Goa)	43–45%
Bangla Drink (West Bengal)	38%
Apong (Arunachal and Assam)	28–30%
Cholai (Inexpensive Distilled liquor)	40–70%

IMFL: Indian made foreign liquor.

history of consumption of alcohol greater than 40 g/week in females and greater than 60 g/week in males with an abstinence of <60 days.[13]

The other definitions used to identify the pattern of drinking are as follows:

1. **Alcohol use disorder (AUD)** was defined as any drinking pattern in which the patient has an impaired ability to stop alcohol despite adverse social, occupational, and health consequences. It was identified by using the AUDIT questionnaire score of greater than 8.[15]
2. **Heavy drinking** was defined as > 4 drinks per day or >14 drinks/week in males and >3 drinks per day or >7 drinks/week in females (each drink 10 g) or episodes of binge drinking.[18]
3. **Hazardous drinking** was defined as an average consumption of 21 drinks or more per week for men (or ≥7 drinks per occasion at least 3 times a week) and 14 drinks or more per week for women (or ≥5 drinks per occasion at least 3 times a week).[19]
4. **Binge drinking** was defined as more than 5 drinks in 2 h for males and more than 4 drinks for the same duration in women.[20]
5. **One standard drink** was defined in this study as 10 g of alcohol as per WHO standards.[21]
6. **Literate:** A person above 7 years of age who could read, write, and comprehend was considered literate as per the definition used in the 2011 Census of the Government of India.

In India, many patients reported the quantity of alcohol they consumed in a traditional way rather than defining them as milliliters or the number of standard drinks. The amount was converted to a standard alcohol amount and expressed as the number of drinks and grams of alcohol, as shown in Table 1[22]

Furthermore, many of the patients consumed local and homemade alcohol. The conversion that was used in the study for the type of beverage used is listed in Table 2, and the nearest possible corrected value of alcohol amount in the drink was taken. The percentage of alcohol in these drinks is obtained from minimal data[23] but has been well documented in many of the package inserts except for the homemade alcohol.

Statistical Analysis

Sample size calculation was not considered as this was the first study to assess the difference in drinking habits between patients with and without cirrhosis in Indian patients. Continuous variables were expressed as mean and standard deviation (SD) if normally distributed or median and interquartile range (IQR) if non-normally distributed. Categorical variables were expressed as proportions (%). Student unpaired t-tests and chi-square tests were used to compare continuous and categorical variables. A *P*-value of <0.05 was considered statistically significant. The SPSS version 25 (IBM Corp., Armonk, New York, USA) was used for statistical analysis.

RESULTS

The total number of patients who attended the hepatology clinic of the institute with a history of alcohol use was 1478; 950 (64%) patients were found to have an intake of alcohol that fulfilled the definition of heavy drinking for at least 2 years. Among those with heavy drinking, 364 (38.31%) had liver cirrhosis. The remaining 586 (61.68%) patients fulfilled the criteria of noncirrhotic AUD as per the study protocol. Of the patients with a history of heavy drinking, 62 (17%) with cirrhosis and 78 (13.31%) without cirrhosis practiced hazardous drinking.

Demographic Features

Regional Difference

The study population was heterogeneous and involved patients from different parts of the country. The demographic profile of the patients in the two groups is shown in Table 3. The entire cohort of patients was males (100%). In terms of regional differences, the majority of 200 (56.3%) patients with cirrhosis and 258 (64%) of the noncirrhotic cohort were from eastern and northeastern parts of India (chi-square 19.06, $P = 0.002$).

Educational Status

In the entire cohort of patients, 865 (91.05%) were literate, and among them, 388 (40.8%) were graduates, 346 (36.4%) undergraduates, and 131 (12.7%) postgraduates. Among the patients with cirrhosis, 44 (12.08%) were illiterates, 170 (46.7%) were undergraduates, 124 (34.06%) graduates, and 26 (7.14%) completed postgraduation

Table 3 Demographic Characteristics of Patients With and Without Cirrhosis.

	Cirrhosis N = 364	No Cirrhosis N = 586	*P*-value
Zone Representation			
- East and northeast India	203 (56%)	375 (64%)	0.0002
- Western	54 (14.8%)	108 (18.43%)	
- South	78 (21.42%)	80 (13.65%)	
- North	29 (7.96%)	23 (3.92%)	
Educational Status			
- Illiterates [86 (8.94%)]	44 (12.08%)	41 (6.7%)	0.007
- Literates [865 (91.05%)	320 (87.91%)	545 (93.0%)	<0.00001
- Undergraduates [346 (36.4%)]	170 (46.7%)	176 (30.03%)	
- Graduates [388 (40.8%]	124 (34%)	264 (45.05%)	
- Postgraduates [131 (13.7%]	26 (7.14%)	105 (17.91%)	
Marital status			
- Married	310 (85.16%)	521 (88.9%)	0.012
- Single	28 (7.69%)	47 (8.02%)	
- Divorced/ widow(er)	26 (7.14%)	18 (3.07%)	
Nuclear family	291 (80%)	422 (72%)	0.006
Employment status			
- Self-employed	161 (44.2%)	330 (56.31%)	0.01
- Salaried	195 (53.57%)	241 (41.12%)	
- Unemployed	9 (2.47%)	15 (2.55%)	
Monthly income in US dollars [Median IQR: 25–75] *considering 1 USD = 80 Indian rupees	298 (175–435)	386 (119–739)	0.0001

USD: United States dollars; SD: standard deviation; n = number of patient.
$P < 0.005$ considered as statistically significant.

(Table 3). Improving education status was associated with decreased prevalence of cirrhosis decreases (chi-square: 49.174, $P < 0.00001$) (Figure 1). The proportion of illiterate patients [44/85 (51.76%)] developing cirrhosis was more than in literates [320/865 (36.9%) (chi-square 7.15 $P = 0.007$)] (Figure 2).

The onset of drinking in illiterates (22.4 ± 7.30 years) was significantly earlier than in the literates (27.30 ± 8.9 years, $P = 0.0001$). The overall age of onset of drinking was substantially earlier in the cirrhotic arm (23.5 ± 6.2 years) versus the noncirrhotic arm [25.6 ± 9.0 years $P = 0.0001$] irrespective of their education status. Similarly, the duration of drinking before the first documentation of cirrhosis was higher in the cirrhosis patients (12.5 ± 6.8 vs. 6.8 ± 3.4 years, $P = 0.0001$) (Table 4).

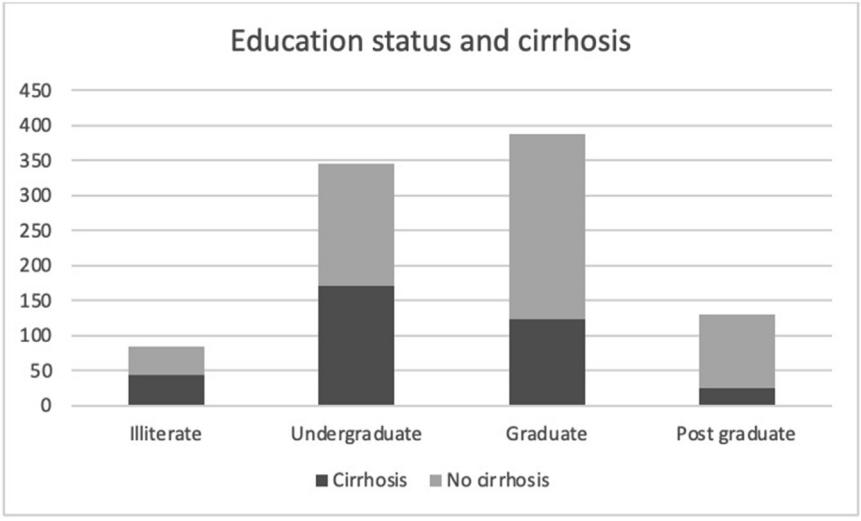

Figure 1 Decrease in cirrhosis with higher educational status among literates.

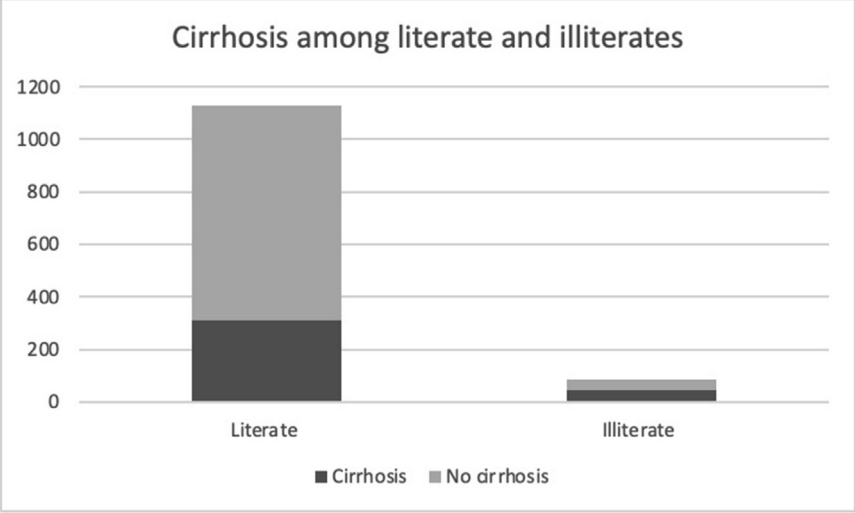

Figure 2 The proportion of patients developing cirrhosis based on their educational status.

Marital Status And Family Structure

There was no significant difference in the marital status of the groups: married 310 (85.9%) in the cirrhosis arm vs. 521 (88.9%. P = 0.09). There was also no difference in the presence of cirrhosis between patients who were married, single, or divorced (chi-square 8.73, P = 0.012). However, in the subanalysis, the number of divorced people was significantly more in the cirrhosis arm [26 (7.14%)] than in the noncirrhotic arm [18 (3.07%) P = 0.003].

There was a significantly more proportion of patients from the nuclear family in both the cirrhotic [291 (80%)] and noncirrhotic AUD arm [422 (72%) chi-square 7.54 P = 0.006] when compared to patients from joint families (Table 3).

Employment and SocioEconomic Status

When the employment status was analyzed, most of the cirrhosis cohort were regularly salaried employees [194 (53.29%)]. In comparison, most of those in the noncirrhotic arm reported their employment status as self-employed [330 (56.31%)]. The status of employment (employed vs. nonemployed) did not affect the development of cirrhosis (chi-square: 0.007, P = 0.933).

Table 4 Presence of Coaddiction in Both Groups.

	Cirrhosis (n = 364)	Noncirrhosis (n = 586)
Smoking	200 (55%)	340 (58%)
Smoking + tobacco	270 (69.9%)	415 (70.8%)
Betel nut	109 (30%)	145 (24.7%)
Others (cannabis, sniffing glue, etc.)	15 (4.125)	20 (3.415)

The median (IQR: 25–75) income of the patients in both arms showed that the income of patients in the cirrhotic arm was significantly lower [USD 298 (175–435) vs. USD 386 (119–739) P = 0.0001)]. One USD was considered as equivalent to 80 Indian rupees.

The median Kuppuswamy score between the cirrhosis and noncirrhosis groups was not different (12 and 13, respectively). Both sections were from lower middle socioeconomic status; 46 (12.36%) patients' families reported a loss of work or inability to continue work due to liver cirrhosis; similarly, 65 (11.09%) reported job-related issues due to AUD in the noncirrhotic arm (chi-square 0.519 P = 0.471).

Place of Drinking

The most common place patients consumed alcohol was at the bar/local alcohol shop 176 (48.9%) in the cirrhotic group versus 358 (61.09%) in the noncirrhotic group. More patients with cirrhosis had a drinking habit at

Table 5 The Type of Alcoholic Beverages Consumed by the Patients With and Without Cirrhosis of the Liver.

	Cirrhosis (n = 364)	Noncirrhotic (n = 586)
Whiskey (IMFL and imported)	316 (86.8%)	442 (75.4%)
Indigenous and moonshine alcohol	40 (10.98%)	36 (4.14%)
Wine	32 (8.79%)	52 (8.87%)
Vodka	29 (7.96%)	68 (11.6%)
Rum	4 (1.09%)	30 (5.11%)
Beer	344 (94.5%)	562 (95.90%)
Combination of alcoholic drinks	276 (75.82%)	468 (79.86%)

IMFL: Indian made foreign liquor.

Table 6 The Pattern of Alcohol Intake Among Both the Groups.

	Cirrhosis	Noncirrhotic AUD	
Age of onset of drinking in years (Mean ± SD)	23.5 ± 6.2	25.6 ± 9.0	$P = 0.0001$
Duration of alcohol to presentation to the clinic in years (Mean ± SD)	12.5 ± 6.8	6.8 ± 3.4	$P = 0.0001$
Binge drinking	204	205	$P < 0.0001$
Median number of drinks/week (median (IQR 25–75)	34 (22–41)	30 (24–40),	$P = 0.625$
Median number of indigenous alcoholic drinks/week (median (IQR 25–75)	105 (98.5–109.75)	89.5.0 (69.25–110.0)	$P = 0.0001$
Craving for alcohol	201	356	$P = 0.92$
Alcohol withdrawal symptoms	24	108	$P < 0.0001$

SD: standard deviation; AUD: alcohol use disorder; IQR: interquartile range.

home [102 (28.02% vs. 105 (17.92%)]. The remaining patients did not have any specific preference for drinking. However, 55 (15.10%) reported drinking mainly at their friend's house in the cirrhosis group compared to 81 (21%) noncirrhotic patients.

Only 6 (1.37%) of cirrhosis patients had a spouse who drank together, while the same was found in 4 (0.68%) patients who did not have cirrhosis.

Coaddictions

Coaddictions included smoking cigarettes in 55% and 58% and a combination of smoking and chewing tobacco in 69.9% and 70.8% in the cirrhosis and noncirrhotic arms, respectively. Chewing of betelnuts was more common in patients from the eastern and northeastern zone (68%) (Table 4).

Type And Amount Of Alcohol Consumed

All patients in the cirrhosis and noncirrhotic AUD arm consumed distilled spirits as the primary drink. Among the hard liquor/spirits (including IMFL and imported spirits), Whisky [316/364 (86.8%) in cirrhosis vs. 442/586 (75.4%) in the noncirrhosis group] was the most commonly consumed alcoholic beverage. In addition, a vast majority of beer was consumed (94.7% in the cirrhosis group and 95.90% in the noncirrhotic group) as a second drink or drink consumed on most days of the week.

The pattern of consumption of alcoholic beverage in both groups is shown in Tables 5 and 6.

Binge drinking episodes were significantly more in the patients who had developed liver cirrhosis [204 (56.01%) vs. 205 (35%), chi-square: 40.62 $P < 0.0001$].

The median (IQR: 25–75) number of drinks (each standard drink is 10 g of alcohol) was similar in patients with and without cirrhosis [34 (22–41) vs. 30 (24–40), $P = 0.625$]. Those people who took indigenous alcohol consumed a far higher statistically significant number of drinks per week in patients with cirrhosis [105 (98.5–109.75) vs. 89.5.0 (69.25–110.0) $P = 0.0001$]. In addition, 81 (95.29%) of all those who consumed such a high volume of indigenous alcohol were illiterate (Table 6).

Alcohol Use Disorder (AUD)

The presence of AUD in the study cohort was diagnosed using the AUDIT questionnaire. The median AUDIT score was 14 for cirrhosis versus 13 for patients without cirrhosis; 327 (89.83%) of cirrhotic and 545 (93.0%) of noncirrhotic patients had AUD.

On stopping alcohol, 201 (55.2%) patients reported an intense craving for alcohol in the cirrhotic group, while it was 356 (60.75%) in the noncirrhotic group and was not significant (chi-square: 2.83, $P = 0.92$).

Clinical Institute Withdrawal Assessment of Alcohol Scale, Revised (CIWA-Ar) showed 24 (6.59%) in the cirrhotic arm, and 108 (18.4%) in the noncirrhotic arm had to value > 10, suggesting significantly the need for deaddiction support in the cirrhotic arm (chi-square: 26.29, $P < 0.0001$).

The most common cause of abstaining from alcohol at the time of enrollment was fear of disease (62%), family responsibility (28%), and realization of mistake (23%) in the cirrhotic arm, while the majority (90%) in the noncirrhotic cohort was using alcohol at the time of enrollment. The most common factors associated with recidivism were grouping 12/30 (40%), loss of a loved one 2/30 (6.7%), and intense craving 8/30 (26.6%).

Family conflict, including spouse domestic violence, was reported by 36 (9.89%) of cirrhotic patients' relatives, while it was around 34 (5.80%) in the noncirrhotic group (chi-square: 5.49 $P = 0.19$).

Another 46 (12.36%) patients' families reported loss of work or inability to continue work due to liver cirrhosis; similarly, 65 (11.09%) reported job-related issues due to AUD in the noncirrhotic arm (chi-square: 0.519, $P = 0.471$).

The median Beck Depression Inventory score was 18 (range 16–22) in the cirrhotic patients, while it was 16

(range 14–21) in the noncirrhotic arm, indicating borderline clinical depression in the cirrhotic patients.

DISCUSSION

The problem of alcohol use is ever-increasing with significant regional variation,[5,6] and most of the consumption is from northeast, Chhattisgarh, Telangana, Himachal Pradesh, Punjab, and Jharkhand. The current study overrepresented patients from eastern and northeastern parts of the country. However, it may not reflect that part's overall increased prevalence of cirrhosis. Indigenous alcohol use in our cohort was more in patients from the northeast and Southern states. The presence of problem drinking, identified in our study cohort with a median AUDIT score of 14, is similar to the pooled prevalence of 12.5% found in a systematic review and meta-analysis.[5] Regional differences may be influenced by the region's religion, education, and economic status. The possible reason that some patients have not developed liver cirrhosis despite having AUD was possibly related to the duration of alcohol use[24] as was found in our study population. In addition, genes like PNPLA3 and TM6SF2 have been shown to influence the development of both alcoholic and nonalcoholic fatty liver disease and also be a reason for the regional differences not only in our study but across studies worldwide.[25]

Most of the patients (91.05%) were literate. Among the literates, it was observed that, with the increase in education, there was a trend toward the decreased proportion of cirrhosis. Lower educational status is associated with higher medical events in alcoholics.[26] Previous studies have shown the rate of illiterates to be 37% in a cohort of patients with alcoholic liver disease,[12] though the number in our cohort was less (12.07%), possibly due to referral bias involved in data collection in a tertiary center when compared to population-based studies. Increased education status as a counterproductive mechanism also improves the financial capacity to purchase alcohol.[27] On the other side, it has been observed that the rising cost of alcohol, which includes government taxation policies, can significantly decrease the alcohol intake in patients who are alcohol dependent.[28]

People of lower socioeconomic status are associated with significantly more alcohol use, as was documented in a survey of 336 287 participants, where 49.9% of patients were from lower and middle-income countries.[29] The majority of the patients in our study cohort were from the lower middle socioeconomic strata. The income of our patient cohort was significantly lower in the cirrhotic group, which may also be partly attributed to the inability and loss of working capacity of the subjects due to the disease. In addition, due to their financial constraints, these patients were taking more indigenous alcohol, where the amount of alcohol in the drink was poorly regulated.[30] However, the modified Kuppuswamy score for assessing socioeconomic status needs to be revalidated at regular intervals[31] and even more so after the COVID-19 pandemic when the economic status of the patients has rapidly changed.[32]

Our study cohort's onset age was in the mid-20s in both arms. There have been, however, reports of much earlier start of drinking in adolescents. The role of the parents and lack of family support has been found to be strongly correlated with the early onset of drinking in college-going students.[33] In India, the mid-20s is when most adolescents get the freedom to go out with friends, and many also gain exposure to hostel life. The pooled prevalence of substance abuse among medical students is around 40.3%, and AUD is present in 27.1% of students who needs timely intervention to prevent liver diseases.[34]

The spouse's behavior and concurrent drinking habit of the partner can affect the alcohol drinking pattern, and one can influence the other. The partner can influence positive health-related behavior changes if they can reduce their drinking habits.[35] In our study, only 1.37% of spouses were drinking alcohol.

Alcohol is a psychoactive substance with a combination of sedation and stimulating brain effects.[36] The most common reason for starting alcohol intake in most (68%) of the patient cohort was peer pressure and the need for socialization with friends and family. Stress and loneliness were reported by a small percentage of patients and have also been previously reported to be associated with the initiation of alcohol intake.[37] This would probably explain the more patients of AUD-related cirrhosis in nuclear families (80%) compared to joint families in our population.[38]

Evaluating the amount of alcohol consumed is a challenging task in Indian settings due to the significant amount of indigenous alcohol used by the patients. The quantity of alcohol in these beverages is not controlled, and the amount of alcohol quantity can vary.[39,40] In addition, Indian patients were found to express the amount of alcohol consumption more in terms of the size of the bottle than the number of standard drinks consumed. The study revealed that most patients taking indigenous alcohol (not IMFL) were primarily illiterate and were from lower socioeconomic status within the defined cohort under investigation. This was possibly due to the lower cost and increased availability of those alcohol products in the regions where they belong. The cirrhotic population consumed approximately 470 g of alcohol per week, which is significantly higher than the safe level of alcohol.[41] Most of the patients are unaware of the total amount of alcohol that they are consuming, as they are unaware that a pint of beer is equal to a peg of distilled spirits.

A significant number of patients (55%) had an intense craving for alcohol intake when they tried abstinence, and approximately a quarter of the entire cohort needed

support for alcohol withdrawal as per the CIWA-Ar scale. Management of alcohol withdrawal needs a structured rehabilitation program.[42] The role of a deaddiction specialist and supportive care is lacking in most institutions treating liver disease. This leads to increased recidivism, as was seen in our patient cohort. To reach a meaningful endpoint, simultaneous treatment of liver disease and AUD is required.[43]

Alcohol use has been shown to affect socioeconomic status and interpersonal relationships, as was found in our study, with loss of work in 12.36% of cirrhotic. Alcohol and co-addictions like tobacco and cannabis have been associated with job loss in many patients.[44] An increase in intimate partner violence, which responds to cognitive behavioral therapy and alcohol abstinence, has been previously reported.[45,46] In our study cohort also, 9.85% of patients with AUD-related cirrhosis reported domestic violence.

The study has its limitation. The problem of alcohol use in liver diseases needs to be compared with AUD in the general population to document the actual magnitude of the problem. Since this was a hepatology department-based study, the number of patients with cirrhosis was more than would be expected if the cohort was selected from the community. Patients attending an AUD clinic would provide a more robust cohort than those following a hepatology clinic. Another limitation of this study was that the patients were not prospectively followed up after enrollment in the study to document the percentage of patients who quit alcohol and the number of patients who restarted drinking on follow-up visits.

One-third of patients with heavy alcohol use presented with liver cirrhosis, which was more common in patients with lower educational status and early age of onset of alcohol. Whiskey is the most common alcoholic beverage consumed though significant indigenous alcohol consumption may go unaccounted. Alcohol use resulted in job loss and family disputes, and underlying borderline depression was possibly an underlying cause. A structured deaddiction program is needed as most subjects have intense cravings and return to alcohol use.

CREDIT AUTHORSHIP CONTRIBUTION STATEMENT

Mithun Sharma: Conceptualization, Formal analysis, Methodology, Validation, Original draft; **Baqar Ali Gora**: Data curation, formal analysis, visualization; **Sabreena Qadri:** data curation, formal analysis; **Sameer Shaikh:** data curation and formal analysis; **Chintam Archana:** data curation; **Nitin Jagtap**: Methodology, software, validation; **Anand V Kulkarni:** resources, validation, and review and editing; **Rajesh Gupta:** Editing and reviewing; **Padaki Nagaraja Rao**: Supervision and review and editing; **Sowmya TR:** Data curation, visualization; **Manasa Alla**: Review and editing; **Rupjyoti Talukdar:** formal analysis and review and editing; **Duvvur Nageshwar Reddy**: Review and editing, project administration.

CONFLICTS OF INTEREST

All authors have none to declare.

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