Drinking pattern in persons with alcohol dependence with and without cirrhosis: A hospital-based comparative study

Anil Kakunje, Haridas Kanaradi¹, Ganesh Pai², Ravichandra Karkal, Dilshana Nafisa, Premchand Chandrasekaran

Department of Psychiatry, Yenepoya Medical College, Mangalore, ¹Department of Psychiatry, KMC, Manipal, ²Professor of Gastroenterology, KMC, Manipal, Karnataka, India

ABSTRACT

Background: Worldwide, alcohol is the most frequently used and socially accepted hepatotoxin. However, not everyone who has alcohol dependence develops alcoholic cirrhosis, and does quantity/type or pattern of alcohol intake determine the development of cirrhosis? A study of this nature would help in delineating similarities/differences in the drinking pattern between alcohol dependence and alcohol-induced cirrhosis groups.

Aim: The aim was to study the drinking pattern of persons with alcohol dependence syndrome (ADS) and alcohol-induced cirrhosis.

Materials and Methods: Alcohol Intake database and Severity of Alcohol Dependence Questionnaire (SADQ) were administered to eighty male inpatients with a reliable family member of which forty were in ADS group and forty were in alcohol dependence with cirrhosis group.

Results: Persons in the cirrhosis group were older with longer duration of drinking. There is no statistically significant difference in the educational status, religion, occupation, socioeconomic class, mean age of onset of drinking, mean age of development of dependence, type of beverage preferred, and initiating/maintaining factors between the two groups. The amount of alcohol consumed was significantly high in the cirrhosis group, with 33.5% in the high severity of dependence. They usually were drinking alone, outside meal times with regular and intermittent binge pattern.

Conclusion: Alcohol dependence and alcohol-induced cirrhosis may be on a continuum but form a different group of heavy drinkers who may require different approaches to management.

Key words: Alcohol dependence, alcohol cirrhosis, severity of drinking

INTRODUCTION

Worldwide, alcohol is the most frequently used and socially accepted hepatotoxin.¹ Globally, alcohol consumption is one of the leading risk factors for disease and disability. Alcohol-induced liver injury has been one of the major health consequences of excessive use of alcohol throughout much of the recorded history.² Although 80%–90% of heavy drinkers show evidence of fatty livers, only 30%–35% develop alcoholic hepatitis and 5%–15% develop alcoholic liver cirrhosis. The explanation of the apparent predisposition of certain people to develop alcoholic cirrhosis is unclear.³

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: reprints@medknow.com

How to cite this article: Kakunje A, Kanaradi H, Pai G, Karkal R, Nafisa D, Chandrasekaran P. Drinking pattern in persons with alcohol dependence with and without cirrhosis: A hospital-based comparative study. Indian J Psychiatry 2018;60:189-94.
Jellinek in the 1940s classified five types of alcoholism. Beta-alcoholics are those who are not dependent on alcohol but who often succumb to medical conditions such as liver cirrhosis. Glatt on the basis of his extensive clinical experience concluded that patients with chronic physical damage are usually highly dependent on alcohol. Skinner and Allen using a questionnaire found that alcohol dependence correlated with physical sequelae of alcohol consumption.

Robert Mann in his study in 2003 observed that one of the most enduring insights into the effects of alcohol has been the assertion that heavy alcohol consumption increases mortality rates, especially from cirrhosis of the liver. Smith et al., from the United Kingdom in 2006, looked at the severity of alcohol dependence and drinking pattern in 34 patients who presented to the detoxification services and compared with a similar number of patients with severe alcohol-induced liver disease. Among alcoholic liver disease (ALD) patients, 58% scored mild on the Severity of Alcohol Dependence Questionnaire (SADQ), 32% moderate, and 9% severe. In contrast, 76% of the detoxification group patients were graded severe in the detoxification group and 34% as moderate. ALD patients were significantly older, were more likely to be in a stable relationship, had lower scores on Alcohol Use Disorders Identification Test, and were less likely to be unemployed. Wodak et al., in 1983, determined the severity of alcohol dependence in 263 patients with ALD using SADQ. Only 17% were classified as severely dependent compared to 56% of the patients without overt liver disease attending a neighboring alcohol treatment unit. In a study by Ewusi-Mensah et al., from the unit where Wodak et al. had drawn their sample and in the study by Sarin et al. from India, both using the SADQ, severe dependence was more frequent in ALD group reaching 30%. Gleeson et al. opined that dependence severity varies among heavy drinkers both with and without liver disease and correlates with young age, strong family history of heavy drinking, and the presence of alcohol dependence clinically.

We sought to evaluate how drinking pattern is different in persons with alcohol dependence syndrome (ADS) with and without cirrhosis in an Indian setting.

**MATERIALS AND METHODS**

This study was conducted over a period of 1 year at Kasturba Medical College, Manipal, India, which is a multispecialty tertiary care teaching hospital. Consecutive serial sampling technique was used. The total sample size was 80 with 40 in ADS group and 40 in ADS with cirrhosis group. The participants were all male between the ages of 18 and 60 years, fulfilling ICD-10 criteria of alcohol dependence (assessed by two psychiatrists) for at least 5 years, and with at least one family member to corroborate the history. All participants were inpatients recruited from the department of psychiatry and internal medicine for the ADS group and from gastroenterology and internal medicine for the ADS with cirrhosis group. Patients were interviewed after they were medically stable. These assessments were separate from their regular management. No separate investigations were done for the study.

Patients who could not participate in the interview due to their medical condition and those with intellectual problems were excluded from the study. Written informed consent was taken from all participants and the study was approved by the institutional ethics committee.

ADS without cirrhosis group had no clinical, biochemical, or ultrasonography evidence of ALD as investigated and evaluated by the treating physician. People with a past history of any liver disease were excluded from this group.

Alcohol dependence with cirrhosis patients were newly diagnosed patients by a gastroenterologist. Diagnostic criteria included firm liver, if palpable or reduced liver span; splenomegaly if present, low serum albumin and elevated serum globulin, with or without elevated bilirubin and transaminases; suggestive ultrasound or scan findings; and histology wherever available. Either histological evidence or a combination of abnormalities in at least two of the other three evaluation modalities (clinical, biochemical, and imaging) was necessary to establish a diagnosis. Exclusion of alternative causes (viral and metabolic) for liver disease was by thorough noninvasive screening as decided by the gastroenterologist.

The study instrument used was Alcohol Intake database which is a structured scale containing two parts; one related to the sociodemographic data and the other to the illness-related data. The sociodemographic data obtained were name, age, religion, marital status, education, occupation, and monthly income. Alcohol-related variables included age at first drink, age at the onset of alcohol dependence, maintaining factors, circumstances of use, bingeing, and treatment sought. The time taken was roughly around 25 min.

SADQ measures the severity of alcohol dependence. The total maximum score is 60. The various grades of dependence are mild dependence (<16), moderate dependence (16–30), and severe dependence (>31). The time taken to complete it was around 15 min.

During the study period, a total of 49 alcoholic cirrhosis patients fulfilling the study criteria were approached for the study, out of which nine were excluded for various reasons. Not medically fit were four, refused consent were three, and early discharge were two. The rest 40 were included in the alcohol cirrhosis group. Liver biopsy was done on two patients, computed tomography abdomen was
done for one patient, and ultrasound abdomen and upper gastrointestinal endoscopy were done on all patients. A total of 44 patients with ADS were approached for the study. Four patients had refused consent. Data of the first laboratory investigation after admission were taken for the study. Interviews were done after the patients were stabilized. After an initial interview in establishing rapport, Alcohol Intake database was administered; SADQ was administered the next day. The crude data were computed to the respective groups and various parameters were compared using Statistical Package for the Social Sciences software version 15.

**RESULTS**

Table 1 displays the sociodemographic details. The mean age in years for the ADS group was 39.07 (±8.05) years and for the ADS with cirrhosis group it was 45.10 (±7.60) years. The difference was statistically significant. The mean age in years for the total sample was 42.08 years. Majority of the participants in both the groups were married; however, there were more single persons in the alcohol dependence group which was statistically significant ($P = 0.035$).

| Variable                  | ADS without cirrhosis ($n=40$), $n$ (%) | ADS with cirrhosis ($n=40$), $n$ (%) | Total sample ($n=80$), $n$ (%) | $P$  |
|---------------------------|----------------------------------------|-------------------------------------|---------------------------------|------|
| Age                       | 39.075                                 | 45.100                              | 42.087                          | 0.001|
| Marital status            |                                        |                                     |                                 |      |
| Single                    | 7 (17.5)                               | 1 (2.5)                             | 8 (10)                          | 0.035|
| Married                   | 31 (77.5)                              | 35 (87.5)                           | 66 (82.5)                       |      |
| Separated                 | 1 (2.5)                                | 4 (10)                              | 5 (6.3)                         |      |
| Widowed                   | 1 (2.5)                                | 0 (0)                               | 1 (1.3)                         |      |
| Religion                  |                                        |                                     |                                 |      |
| Hindu                     | 39 (97.5)                              | 38 (95)                             | 77 (96.3)                       | 0.56 |
| Christian                 | 1 (2.5)                                | 2 (5)                               | 3 (3.8)                         |      |
| Educational status        |                                        |                                     |                                 |      |
| Primary                   | 10 (25)                                | 12 (30)                             | 22 (27.5)                       | 0.815|
| Secondary                 | 16 (40)                                | 13 (32.5)                           | 29 (36.3)                       |      |
| Intermediate              | 10 (25)                                | 9 (22.5)                            | 19 (23.8)                       |      |
| Graduate                  | 4 (10)                                 | 6 (15)                              | 10 (12.5)                       |      |
| Occupation                |                                        |                                     |                                 |      |
| Unskilled                 | 11 (27.5)                              | 12 (30)                             | 23 (28.8)                       | 0.850|
| Semi-skilled              | 7 (17.5)                               | 5 (12.5)                            | 12 (15)                         |      |
| Skilled                   | 12 (30)                                | 13 (32.5)                           | 25 (31.3)                       |      |
| Professional              | 8 (20)                                 | 6 (15)                              | 14 (17.5)                       |      |
| Unemployed                | 2 (5)                                  | 4 (10)                              | 6 (7.5)                         |      |
| Socioeconomic class       |                                        |                                     |                                 |      |
| Lower                     | 20 (50)                                | 15 (37.5)                           | 35 (43.8)                       | 0.490|
| Middle                    | 15 (37.5)                              | 20 (50)                             | 35 (43.8)                       |      |
| Higher                    | 5 (12.5)                               | 5 (12.5)                            | 10 (12.5)                       |      |

ADS – Alcohol dependence syndrome

There was no statistically significant difference among the groups in terms of education, religion, occupation, and socioeconomic background.

The mean age for the first drink in years for the total sample was 20.6 years as shown in Table 2. The minimum age was 12 years and the maximum was 35 years. The mean age of the first drink in ADS group was 20.8 years and age at dependence was 26.07 years. The mean age of first drink in ADS with cirrhosis group was 20.4 years and that of dependence was 27.07 years, which was not significant. The mean duration of alcohol use in ADS group was 19.37 (±6.95) years compared to 22.6 (±7.65) years in the ADS with cirrhosis group. The difference was significant.

The amount of alcohol consumed per day was calculated in grams as 30 ml of spirits, 50 ml of arrack, 100 ml of wine, and 250 ml of beer = 10 g.$^{[15]}$ The amount of alcohol consumed in grams/day for the ADS group was 134 (±34) and ADS with cirrhosis group was 157 (±35). The results were statistically significant with $P = 0.005$. The mean amount/day for the total sample was 146 g.

Table 2: Alcohol use variables among the study participants

| Variable                           | ADS without cirrhosis ($n=40$) | ADS with cirrhosis ($n=40$) | Total sample ($n=80$) | $P$  |
|------------------------------------|--------------------------------|-----------------------------|-----------------------|------|
| Age (years)                        | 20.8±4.2                       | 20.4±3.6                    | 20.6                  | 0.653|
| Age at dependence (years)          | 26.07±3.77                     | 27.07±3.14                  | 26.57                 | 0.202|
| Mean duration of alcohol (years)   | 19.37±6.95                     | 22.6±7.65                   | 21                    | 0.05 |
| Amount of alcohol consumed (day/g) | 134±34                         | 157±35                      | 146                   | 0.005|

ADS – Alcohol dependence syndrome
Majority of the participants in both the groups preferred spirits (whiskey, vodka, rum, and brandy) as presented in Table 3. Beer which has low alcohol content was the least preferred in both the groups. Persons drinking a combination/anything available were double in the ADS with cirrhosis group compared to the ADS group (25% vs. 12.5%, respectively). The major reasons for initiation of alcohol use were peer pressure/company of friends followed by experimentation and curiosity which together amounted to around 70% of the cases. Craving and withdrawal symptoms were the most common maintaining factors in both the groups. Coping with stress as a maintaining factor was higher in the ADS with cirrhosis group.

Majority of patients in ADS with cirrhosis group were found to be drinking alone, with regular and intermittent bingeing pattern and outside meal times, which were all significant compared to that of the ADS group.

The severity of alcohol dependence was compared using SADQ scale as summarized in Table 4 which shows that 33 participants (82.5%) in the ADS with cirrhosis group had moderate-to-severe dependence compared to 20 participants (50%) in the ADS group with \( P = 0.003 \).

**DISCUSSION**

There is a paucity of literature looking at the drinking patterns in persons who develop alcoholic cirrhosis. Studies in this area are vastly outnumbered by a massive literature on alcohol dependence. The present study attempted to look at the drinking pattern and severity of alcohol dependence among the ADS group and ADS with cirrhosis group, with samples collected from the same center. This is important to tailor the management of such cases. A study of this nature helps in delineating similarities/differences between the two groups and compare with the global findings in this area.

The study was done on inpatients of a tertiary care teaching hospital using serial sampling technique. Patients with

### Table 3: Drinking factors and pattern

| Variable                  | ADS without cirrhosis \((n=40)\), \(n(\%)\) | ADS with cirrhosis \((n=40)\), \(n(\%)\) | Total sample \((n=80)\), \(n(\%)\) | \(P\) |
|---------------------------|---------------------------------------------|---------------------------------------------|---------------------------------|------|
| Beverage preference       |                                             |                                             |                                 |      |
| Arrack                    | 11 (27.5)                                   | 12 (30)                                     | 23 (28.8)                       | 0.345|
| Beer                      | 1 (2.5)                                     | 0 (0)                                       | 1 (1.3)                         |      |
| Spirits                   | 23 (57.5)                                   | 18 (45)                                     | 41 (51.3)                       |      |
| Combination               | 5 (12.5)                                    | 10 (25)                                     | 15 (18.8)                       |      |
| Reasons for initiation    |                                             |                                             |                                 |      |
| Peer pressure             | 16 (40)                                     | 21 (52.5)                                   | 37 (46.3)                       | 0.560|
| Modeling others           | 5 (12.5)                                    | 2 (5)                                       | 7 (8.8)                         |      |
| Coping with stress        | 4 (10)                                      | 6 (15)                                      | 10 (12.5)                       |      |
| Relieve physical symptoms | 3 (7.5)                                     | 2 (5)                                       | 5 (6.3)                         |      |
| Experimentation/curiosity | 12 (30)                                     | 9 (22.5)                                    | 21 (26.3)                       |      |
| Maintaining factors       |                                             |                                             |                                 |      |
| Craving                   | 17 (42.5)                                   | 13 (32.5)                                   | 30 (37.5)                       | 0.378|
| Coping with stress        | 3 (7.5)                                     | 8 (20)                                      | 11 (13.8)                       |      |
| Peer pressure             | 3 (7.5)                                     | 2 (5)                                       | 5 (6.3)                         |      |
| Withdrawal                | 13 (32.5)                                   | 10 (25)                                     | 23 (28.8)                       |      |
| Mood state                | 4 (10)                                      | 7 (17.5)                                    | 11 (13.8)                       |      |
| Company while drinking    |                                             |                                             |                                 |      |
| Usually alone             | 7 (17.5)                                    | 21 (52.5)                                   | 28 (35.5)                       | 0.005|
| With friends              | 20 (50)                                     | 11 (27.5)                                   | 31 (38.8)                       |      |
| No fixed pattern          | 13 (32.5)                                   | 8 (20)                                      | 21 (26.3)                       |      |
| Frequency of drinking     |                                             |                                             |                                 |      |
| Regular                   | 19 (47.5)                                   | 10 (25)                                     | 29 (36.3)                       | 0.046|
| Regular with intermittent bingeing | 15 (37.5) | 26 (65) | 41 (51.3) |      |
| Bingeing                  | 6 (15)                                      | 4 (10)                                      | 10 (12.5)                       |      |
| Relation to meals         |                                             |                                             |                                 |      |
| With meals                | 23 (57.5)                                   | 11 (27.5)                                   | 34 (42.5)                       | 0.007|
| Outside meal times        | 17 (42.5)                                   | 29 (72.5)                                   | 46 (57.5)                       |      |

ADS – Alcohol dependence syndrome

### Table 4: Severity of alcohol dependence among the two groups

| Variable        | ADS without cirrhosis \((n=40)\), \(n(\%)\) | ADS with cirrhosis \((n=40)\), \(n(\%)\) | Total sample \((n=80)\), \(n(\%)\) | \(P\) |
|-----------------|---------------------------------------------|---------------------------------------------|---------------------------------|------|
| SADQ score      |                                             |                                             |                                 |      |
| Mild            | 21 (52.5)                                   | 7 (17.5)                                    | 28 (35.0)                       | 0.003|
| Moderate        | 14 (35.0)                                   | 20 (50.0)                                   | 34 (42.5)                       |      |
| Severe          | 5 (12.5)                                    | 13 (32.5)                                   | 18 (22.5)                       |      |

ADS – Alcohol dependence syndrome; SADQ – Severity of Alcohol Dependence Questionnaire
alcohol dependence were diagnosed using ICD-10 criteria. Standard scales such as Alcohol Intake database and SADQ questionnaires were used for the study. Information about drinking pattern, frequencies, and other factors was also collected from a reliable informant as persons with alcohol dependence may underestimate their alcohol consumption, which is inherent in studies of this population. The demographic variables of the study reveal that persons in the ADS with cirrhosis group were older when compared to persons with alcohol dependence (45.10 vs. 39.07 years). This is along the same lines as in the study of Smith et al. (mean age was 50 vs. 40 years),[7] but in contrast to the study by Gleeson et al (46 vs 50 years). Studies of Yates et al. (mean age was 46.1 years),[16] and Narawane et al. (mean age was 43 years)[13] had similar aged samples. Majority in both the groups were married. Level of education, occupation, socioeconomic class, and religion were similar in both the groups. Similar findings were observed by Yates et al. in 1998, but in contrast, Smith et al., 2006, compared ADS with cirrhosis and alcohol dependence groups in which ADS patients were taken from an exclusive detoxification center.[7]

Age at first drink and age at dependence were not significant between the two groups and were similar to other Indian data. In a study by Johnson et al., the mean age of onset of drinking was 21.39 ± 5.34 years, the mean age of onset of problem drinking was 24.28 ± 5.42 years, and the mean age of onset of dependence was 27.8 ± 5.7 years.[17] Meena et al. reported that 94.83% of respondents in their study had their first drink between the ages of 15 and 25 years.[18] Another Indian study quoted that the age of onset of alcohol use in a hospital-based population was 18 years and the age of onset of dependence was 27 years. They also found that these patients developed the first criteria of dependence after about 6 years of alcohol use,[19] which is similar to our study.

In the Western population, age at first drink and age at dependence are early. In the study by Schneider et al. in 2001, age at first drink was 15.4 ± 4.7 years, with an early onset in males, and age at dependence was 22.2 ± 7.9 years.[20] Another study has observed age at onset to be between 13 and 15 years.[17] Morean et al. found that, on an average, college students reported an age of onset of 16.16 years (standard deviation = 2.14).[21] a finding that is consistent with national estimates of the United States by the Substance Abuse and Mental Health Services Administration data.[22]

The mean duration of years of drinking was higher in the cirrhosis group compared to the ADS group (22.6 ± 7.65 vs. 19.3 ± 6.95 years), which was significant. Narawane et al.[13] and Kamper-Jørgensen et al.,[23] found that drinking for more than 14 and 20 years, respectively, was significantly more common in ALD. The amount of alcohol consumed in grams is also higher in the ADS with cirrhosis group. This is similar to a prospective study conducted by Becker et al. in 1996 in which cirrhosis is associated with higher alcohol intake.[24] Around 400 g of alcohol per day was associated with death due to liver cirrhosis related to alcohol.[23] Schneider et al. in 2001 found 345 ± 218 g of alcohol consumption per day in dependent persons.[20] Persons taking wine or beer were less as only people who were dependent for at least 5 years were taken into the study, who by that time usually consume a beverage with higher alcohol content.

There was no significant difference seen among the reasons for starting drinking, maintaining factors, and physical withdrawal complications among the two groups. Other Indian studies have observed similar reasons stated for initiation of alcohol use early in life such as pressure from peer groups, experimentation, and curiosity.[25]

In the present study, there was a significant association between drinking alone and alcoholic cirrhosis (52.5% vs. 17.5%), which was also observed by Smith (51%).[7] Regular drinking with intermittent bingeing was the most common drinking pattern. Regular drinking with intermittent bingeing was seen significantly higher in the alcoholic cirrhosis group in comparison to the ADS group (65% vs. 37.5%). This observation is also seen in animal experiments, where after an alcoholic binge, ethanol metabolism causes oxidative stress and hepatic mitochondrial DNA degradation in mice.[26] Food has an attenuating effect on alcohol.[27] It was observed that persons who drink without accompanying food and who drink multiple different alcoholic beverages have a higher risk of ALD.[28] Their progression also depends on the pattern of alcohol intake – drinking alcohol at mealtimes results in a lower risk of liver disease than consumption at other times; intermittent drinking is more sparing for the liver than a continuous supply of alcohol.[29]

There was a significant difference between the two groups in terms of severity of dependence. Nearly 50% of the patients in the cirrhosis group had moderate dependence and 32.5% had severe dependence. Almost 52.5% of the patients in the ADS without cirrhosis group had mild dependence. The findings in the cirrhosis group are in contrast to that observed by Wodak, 1983; Smith, 2006; and Gleeson et al., 2009; however, the comparison group in all these studies had de-addiction patients or community patients with alcohol dependence.[7,8,11] Our results are similar to the studies of Ewusi-Mensah et al. and Sarin et al.,[9,10] with around 30% having severe dependence in the ADS with cirrhosis group. The two study groups appear similar in all parameters until the time of developing dependence.

Some of the strengths of the study to be highlighted are that the entire study sample was from a single hospital setting, unlike few previous studies which had ALD group as inpatients and ADS group as nonhospitalized patients,
standard scales were used; diagnosis of alcohol cirrhosis was done by the best possible method maintaining the ethical standards; psychiatrist interviewed the entire sample population; drinking details were corroborated by a family member, and the study took into account Indian scenario and factors. Limitations are the sample size; few severely sick patients from the cirrhosis group would have been missed. A longitudinal follow-up design will throw more light if the current alcohol dependence group patients move on to develop alcohol cirrhosis.

CONCLUSION

Alcohol dependence and alcohol-induced cirrhosis may be on a continuum but form a different group of heavy drinkers who may require different approaches to management.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Sherlock S, Dooley J. Diseases of the Liver and Biliary System. 11th ed. Oxford: Blackwell Publishing; 2002.
2. Massey VL, Arteel GE. Acute alcohol-induced liver injury. Front Physiol 2012;3:193.
3. Bruha R, Dvorak K, Petrtyl J. Alcoholic liver disease. World J Hepatol 2012;4:81-90.
4. Babar TF. The Classifications of Alcohols. Available from: https://www.pubniaa.nih.gov/publications/ahvr201-0/166-14.pdf. [Last accessed on 2017 Dec 09].
5. Skinner HA, Allen BA. Alcohol dependence syndrome: Measurement and validation. J Abnorm Psychol 1982;91:199-209.
6. Mann RE, Smart RG, Govoni R. The epidemiology of alcoholic liver disease. Alcohol Res Health 2003;27:209-19.
7. Smith S, White J, Nelson C, Davies M, Lavers J, Sheron N, et al. Severe alcohol-induced liver disease and the alcohol dependence syndrome. Alcohol Alcohol 2006;41:274-7.
8. Wodak AD, Saunders JB, Ewusi-Mensah I, Davis M, Williams R. Severity of alcohol dependence in patients with alcoholic liver disease. Br Med J (Clin Res Ed) 1983;287:1420-2.
9. Ewusi-Mensah I, Saunders JB, Johnson RD, Williams R. Alcohol dependence and psychopathology in alcoholic liver disease. Br J Addict 1986;81:231-5.
10. Sarin SK, Bhatt A, Malhotra V, Sachdev G, Jiloha RC, Munjal GC. Pattern of alcohol-related liver disease in dependent alcoholics: The Indian dimension. Addiction 1988;83:279-84.
11. Gleeson D, Jones JS, McFarlane E, Francis R, Gellion C, Bradley MP, et al. Severity of alcohol dependence in decompensated alcoholic liver disease: Comparison with heavy drinkers without liver disease and relationship to family drinking history. Alcohol Alcohol 2009;44:392-7.
12. World Health Organization. The ICD-10 Classification of Mental and Behavioral Disorders: Clinical Descriptions and Diagnostic Guidelines. Geneva: World Health Organization; 1992.
13. Narawane NM, Bhatia S, Abraham P, Sanghani S, Sawant SS. Consumption of ‘country liquor’ and its relation to alcoholic liver disease in Mumbai. J Assoc Physicians India 1998;46:510-3.
14. Stockwell T, Hodgson R, Edwards G, Taylor C, Rankin H. The development of a questionnaire to measure severity of alcohol dependence. Br J Addict Alcohol Other Drugs 1979;74:79-87.
15. Alcohol web India. National drug Dependence Treatment Center. Available from: https://www.alcoholwebindia.in/content/ frequently-asked-questions-faqs. [Last updated on 2013 Aug 10; Last accessed on 2017 Dec 10].
16. Yates WR, Labrecque DR, Pfab D. The reliability of alcoholism history in patients with alcohol-related cirrhosis. Alcohol Alcohol 1998;33:485-94.
17. Johnson PR, Banu S, Ashok MV. Severity of alcoholism in Indian males: A prospective population study. Hepatology 2010;52:243-9.
18. Meena, Khanna P, Vohra AK, Rajput R. Prevalence and pattern of alcohol and substance abuse in urban areas of Rohtak city. Indian J Psychiatry 2002;44:349-52.
19. Manjunatha N, Saddichha S, Sinha BN, Khess CR, Isaac MK. Chronology of alcohol dependence: Implications in prevention. Indian J Community Med 2008;33:233-7.
20. Schneider U, Altmann M, Baumann M, Bernzen J, Bertsch B, Bimber U, et al. Correlation of anxiety and affective disorder in alcohol-dependent patients seeking treatment: The first multicentre study in Germany. Alcohol Alcohol 2001;36:219-23.
21. Morean ME, Corbin WR, Fromme K. Age of first use and delay to first intoxication in relation to trajectories of heavy drinking and alcohol-related problems during emerging adulthood. Alcohol Clin Exp Res 2012;36:1991-9.
22. Substance Abuse and Mental Health Services Administration. Report to Congress on the Prevention and Reduction of Underage Drinking; 2012. Available from: http://www.store.samhsa.gov/product/PEP12-RTCUAD. [Last accessed on 2017 Dec 10].
23. Kamper-Jørgensen M, Grenbaek M, Toilstrup J, Becker U. Alcohol and cirrhosis: Dose – Response or threshold effect? J Hepatol 2004;41:25-30.
24. Becker U, Deis A, Sorensen TI, Grenbaek M, Borch-Johnsen K, Müller CF, et al. Prediction of risk of liver disease by alcohol intake, sex, and age: A prospective population study. Hepatology 1996;23:1025-9.
25. Varma VK, Basu D, Malhotra A, Sharma A, Matteo SK. Correlates of early- and late-onset alcohol dependence. Addict Behav 1994;19:609-19.
26. Mansouri A, Gaoi U, De Kerguenec C, Amselfi S, Haozui D, Berson A, et al. An alcoholic binge causes massive degradation of hepatic mitochondrial DNA in mice. Gastroenterology 1999;117:181-90.
27. Pikaar NA, Wedel M, Hermus RJ. Influence of several factors on blood alcohol concentrations after drinking alcohol. Alcohol Alcohol 1988;23:289-97.
28. Bellantini S, Saccoccio G, Costa G, Tiribelli C, Manenti F, soda M, et al. Drinking habits as cofactors of risk for alcohol induced liver damage. The Dionysos Study Group. Gut 1997;41:845-50.
29. Marugame T, Yamamoto S, Yoshimi I, Sobue T, Inoue M, Tsugane S, et al. Patterns of alcohol drinking and all-cause mortality: Results from a large-scale population-based cohort study in Japan. Am J Epidemiol 2007;165:1039-46.