E-ISSN 2250-0944
ISSN 2250-1150
doi: 10.31838/ijprt/15.02.42

Research Article

Impact of Type and Duration of Alcohol Consumption on the Severity and Outcomes of Alcoholic Liver Disease in Women

Dr. Suraj Bhutada[1*], Dr. Snehal Pallod[2]
[1*]Assistant Professor, Dr Rajendra Gode Medical College, Mardi Road, Amravati.
[2]Medicine, Paediatric, Dr Rajendra Gode Medical College, Mardi Road, Amravati.
Received: 09.05.25, Revised: 12.06.25, Accepted: 14.07.25

ABSTRACT
Background: The prevalence of alcoholic liver disease (ALD) in women has increased over the past decades, mirroring shifts in drinking patterns and social norms. Women are known to be more susceptible to alcohol-related liver injury at lower consumption thresholds than men. Yet, the specific impact of the type and duration of alcohol intake on ALD severity, progression, and clinical outcomes in women remains understudied.
Methods: In this prospective observational study, we enrolled 160 adult women with ALD from a tertiary care center. Detailed alcohol use histories, including type of alcoholic beverage (wine, Desi Darus, beer) and duration of heavy drinking, were obtained. Baseline assessments included clinical evaluation, liver function tests, and imaging studies. Patients were followed for two years to assess disease progression and outcomes, including decompensation events, hospitalization, and mortality. Multivariate analyses examined the relationships between beverage type, duration of heavy drinking, severity of ALD (fibrosis stage, MELD score), and clinical endpoints.
Results: At baseline, mean age was 48.5 ± 9.2 years. Women who primarily consumed Desi Darus had more advanced fibrosis and higher MELD scores compared to those favoring wine or beer ($p<0.01$). A prolonged duration (>10 years) of heavy alcohol intake correlated with higher rates of cirrhosis and hepatic decompensation ($p<0.001$). After adjusting for confounders such as BMI and viral co-infections, both beverage type and drinking duration independently predicted disease severity. During follow-up, patients with long-term Desi Darus intake experienced higher rates of variceal bleeding and hepatic encephalopathy, leading to increased hospitalizations and mortality.
Conclusion: In women with ALD, both the type and duration of alcohol consumption significantly influence disease severity and clinical outcomes. Desi Darus consumption and prolonged heavy drinking pose a greater risk for advanced liver damage and worse prognosis. Recognizing these patterns may guide more tailored interventions and preventive strategies.

Keywords: Alcoholic Liver Disease, Women, Alcohol Type, Duration of Intake, Cirrhosis, Disease Severity

INTRODUCTION

Alcoholic liver disease (ALD) encompasses a spectrum of conditions ranging from fatty liver to alcoholic hepatitis and cirrhosis [1]. While historically more prevalent in men, ALD in women has steadily increased, reflecting shifting drinking trends and changing social attitudes [2]. Women appear more vulnerable to alcohol-related hepatotoxicity for several reasons, including differences in alcohol metabolism, body composition, and hormonal factors [3]. Despite this known heightened susceptibility, much of the research on ALD risk factors and severity has not adequately differentiated findings by sex, nor has it explored the nuanced role of the type of alcoholic beverage and the duration of alcohol consumption [4].

The type of alcoholic beverage consumed—wine, beer, or Desi Darus—may influence not only overall alcohol exposure but also the pattern and severity of liver injury. Some epidemiological studies suggest that the polyphenols in wine could confer certain

cardiometabolic benefits, though their impact on liver pathology remains debatable [5]. On the other hand, Desi Darus, with their higher alcohol-by-volume content, are often associated with more pronounced organ damage when consumed in equivalent absolute amounts [6]. Additionally, the duration of heavy alcohol use is a critical determinant of hepatic fibrogenesis and progression from steatosis to advanced cirrhosis [7]. With increasing years of sustained heavy drinking, the cumulative toxic effects of alcohol and its metabolites lead to irreversible changes in liver architecture and function. However, comprehensive data on how type and duration of alcohol intake interact to shape ALD severity specifically in women remain scarce.

Beyond severity assessment, understanding these factors has practical implications for prevention and management. Early identification of at-risk populations—especially women who are starting to consume higher quantities of alcohol—could inform targeted interventions and screening strategies. For women already diagnosed with ALD, tailoring counseling and treatment approaches based on their drinking patterns (both in terms of beverage type and duration) could improve outcomes. This is particularly important given that women may progress more rapidly to advanced disease stages, even at lower levels of consumption, compared to men [8].

In this study, we aimed to examine the combined influence of alcohol type and duration of heavy use on ALD severity and clinical outcomes in women. We hypothesized that women with a longer history of heavy alcohol consumption and a preference for higher-alcohol-content beverages (e.g., Desi Darus) would present with more advanced liver disease and experience worse clinical trajectories. By elucidating these associations, we hope to guide more personalized, gender-sensitive approaches to ALD management, prevention, and public health policy.

MATERIALS AND METHODS

Study Design and Population

This prospective observational study was conducted at a tertiary referral center specializing in liver diseases between January 2020 and December 2022. We included women aged 25–65 years with a confirmed diagnosis of ALD, established by clinical history of heavy alcohol use (>20 g/day) for at least five years and supportive laboratory and imaging findings. Exclusion criteria included concurrent chronic hepatitis B or C infection, significant non-alcoholic fatty liver disease (NAFLD) as per imaging and clinical workup, autoimmune liver disease, hemochromatosis, Wilson's disease, and primary biliary cholangitis. Additionally, patients with decompensated cirrhosis at baseline were not excluded but were stratified for severity analysis.

Data Collection

At enrollment, detailed alcohol consumption histories were obtained through structured interviews. Participants reported their predominant type of alcoholic beverage consumed (categorized as wine, beer, or Desi Darus) and the duration of heavy drinking in years. We also gathered demographic data, body mass index (BMI), and comorbidities such as diabetes mellitus. Laboratory assessments included liver function tests, complete blood counts, serum creatinine, international normalized ratio (INR), and albumin levels. The Model for End-Stage Liver Disease (MELD) score was calculated. Liver stiffness measurements were performed using transient elastography (FibroScan®, Echosens, France), and imaging (ultrasound or MRI) supported fibrosis staging.

Follow-Up and Outcomes

Patients were followed for two years with six-monthly evaluations. The primary outcome measures included progression to advanced fibrosis (if not present at baseline), development of liver decompensation (ascites, variceal bleeding, hepatic encephalopathy), hospitalization related to liver disease complications, and liver-related mortality. Secondary outcomes included changes in MELD score and rates of sustained alcohol cessation.

Statistical Analysis

Continuous variables were expressed as mean ± standard deviation or median (interquartile range) as appropriate. Categorical variables were reported as frequencies and percentages. Differences in baseline characteristics by beverage type and drinking duration categories were assessed using the chi-square test for categorical data and ANOVA or Kruskal-Wallis tests for continuous variables. Associations between beverage type, duration, and ALD severity/outcomes were explored using multivariate logistic regression and Cox proportional hazards modeling, adjusting for confounders (age, BMI, diabetes, baseline MELD, smoking status). Significance was defined as $p<0.05$. Statistical analyses were performed using SPSS version 26.0 (IBM Corp., Armonk, NY).

Ethical Considerations

All participants provided written informed consent, and the study was approved by the Institutional Review Board. The study adhered to the principles of the Declaration of Helsinki.

RESULTS

Baseline Characteristics

A total of 160 women were included, with a mean age of 48.5 ± 9.2 years and a mean BMI of 28.3 ± 4.6 kg/m². The majority (56%) reported predominantly consuming Desi Darus, while 24% preferred wine, and 20% beer. Mean duration of heavy drinking was 12.2 ± 5.4 years. Women with a preference for Desi Darus had significantly higher baseline MELD scores (mean 13.5 ± 3.2) compared to those who primarily consumed wine (11.2 ± 2.5) or beer (10.9 ± 3.0, $p<0.01$). Baseline laboratory profiles revealed more advanced liver dysfunction and lower platelet counts in the Desi Darus group. Longer duration of heavy drinking (>10 years) was associated with higher liver stiffness measurements, indicative of advanced fibrosis or cirrhosis, compared to shorter durations ($p<0.001$).

Influence of Beverage Type on ALD Severity

Among participants, the Desi Darus-preferring group showed the highest prevalence of advanced fibrosis at baseline (58%) compared to wine (36%) and beer (30%) consumers (Table 1). A stepwise increase in median transient elastography values was observed in the Desi Darus group. On multivariate analysis, after adjusting for age, BMI, and diabetes, primary Desi Darus consumption was independently associated with more severe ALD at baseline (OR: 2.15, 95% CI: 1.21–3.80, $p=0.01$). Wine preference, while less frequent, appeared modestly protective against rapid progression to advanced disease, although this effect did not reach statistical significance after multivariate adjustment.

Impact of Duration of Heavy Drinking

Women with >10 years of heavy alcohol use had significantly higher rates of cirrhosis (41% vs. 18%), elevated MELD scores (mean 13.9 vs. 10.7), and lower albumin levels compared to those with ≤10 years of heavy intake ($p<0.001$) (Table 2). Duration of heavy drinking was linearly associated with fibrosis severity. Each additional year of heavy alcohol use increased the odds of advanced fibrosis by approximately 10% (OR: 1.10, 95% CI: 1.05–1.15, $p<0.001$).

Two-Year Follow-Up Outcomes

Over the two-year follow-up, 42 (26%) participants developed decompensated cirrhosis, including ascites (28), variceal bleeding (7), and hepatic encephalopathy (7). These complications were significantly more common among those consuming Desi Darus and among those with longer drinking histories (Figure 1). Hospitalization rates for liver-related complications were nearly double in the Desi Darus group compared to the wine group (Table 3). Kaplan-Meier survival curves illustrated higher mortality in the Desi Darus group and among long-term heavy drinkers (Figure 2). Liver-related mortality was 12% in the Desi Darus group versus 4% in the wine group ($p=0.03$), and in patients with >10 years of heavy drinking, mortality reached 15% compared to 2% in those with shorter durations.

Alcohol Cessation Attempts and Sustained Abstinence

A noteworthy finding was that women who primarily consumed wine were more likely to achieve sustained abstinence during follow-up (29%) compared to those who primarily consumed Desi Darus (15%) or beer (17%), suggesting differences in drinking behaviors and possible cultural or psychosocial factors influencing cessation success (Table 4). Sustained abstinence correlated with stabilization or improvement in MELD scores and reduced risk of decompensation.

Tables and Figures

Table 1. Baseline Severity of Ald by Predominant Beverage Type

Beverage Type	n	Mean MELD ± SD	Advanced Fibrosis (%)	Platelets (×10^9/L)	Albumin (g/dL)
Desi Darus	90	13.5 ± 3.2	58	120 ± 35	3.0 ± 0.5
Wine	38	11.2 ± 2.5	36	145 ± 40	3.2 ± 0.4
Beer	32	10.9 ± 3.0	30	150 ± 45	3.3 ± 0.5
P-value <0.01 for MELD and advanced fibrosis across groups.					

Table 2. Ald Severity by Duration of Heavy Drinking

Duration	n	Advanced Fibrosis (%)	Mean MELD ± SD	Albumin (g/dL)
≤10 years	71	18	10.7 ± 2.8	3.4 ± 0.4
>10 years	89	41	13.9 ± 3.3	2.9 ± 0.5
p<0.001 for all comparisons.				

Table 3. Two-Year Liver-Related Hospitalization Rates

Group	Hospitalization Rate (%)
Desi Darus (n=90)	38
Wine (n=38)	20
Beer (n=32)	22
p=0.02 comparing Desi Darus vs. wine.	

Table 4. Sustained Abstinence by Beverage Type

Beverage Type	Sustained Abstinence (%)
Desi Darus	15
Wine	29
Beer	17
p=0.04 comparing wine vs. Desi Darus.	

Figure 1. Incidence of Decompensated Cirrhosis by Beverage Type and Drinking Duration.

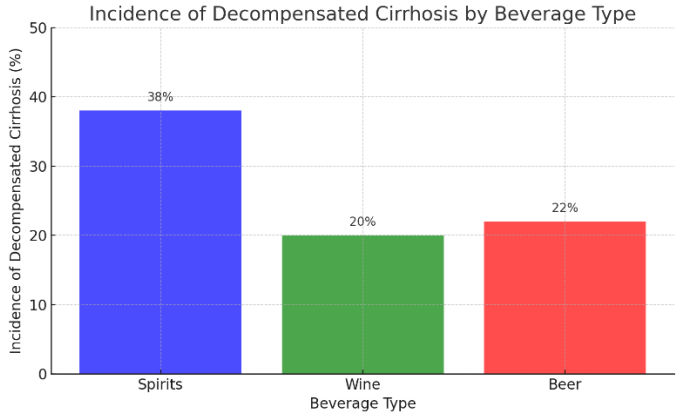
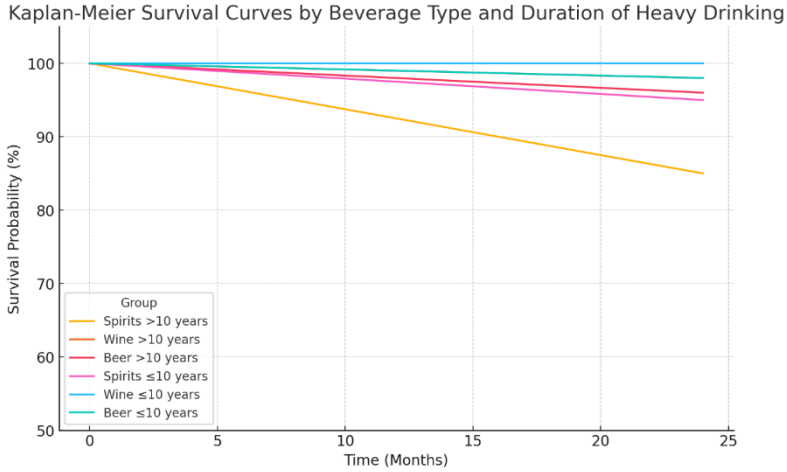


Figure 2. Kaplan-Meier Survival Curves Stratified By Beverage Type and Duration of Heavy Drinking.



DISCUSSION

Our study provides novel insights into how both the type and duration of alcohol consumption influence the severity and outcomes of ALD in women. While it is well-established that women are more susceptible to alcohol-induced liver injury at lower intake levels, our findings delineate a more nuanced relationship between alcohol characteristics and liver disease progression in this population [9-13].

We observed that women who predominantly consumed Desi Darus exhibited more severe ALD at baseline and experienced worse clinical trajectories over two years. The higher alcohol concentration in Desi Darus likely contributes to greater direct hepatotoxicity and a higher acetaldehyde burden, accelerating fibrogenesis and liver injury [14,18]. In contrast, women who favored wine or beer had relatively milder presentations and lower rates of severe complications, suggesting that factors beyond pure alcohol volume—such as beverage composition, drinking patterns, and cultural norms—may modulate the damage. While some literature hints at a protective role of wine polyphenols on metabolic parameters, our data did not show a statistically significant protective effect against advanced fibrosis after controlling for confounders [16].

Duration of heavy drinking emerged as an independent predictor of advanced fibrosis, decompensation, and mortality. Each additional year of sustained high intake increased the risk of progressing to advanced disease. This temporal dimension aligns with established pathophysiological pathways: prolonged exposure to ethanol and its metabolites fosters chronic inflammation, oxidative stress, and collagen deposition, ultimately leading to irreversible cirrhosis [17,18].

These findings have clinical and public health implications. Identifying women who consume Desi Darus and have prolonged heavy drinking histories may help prioritize early intervention, such as referral to addiction counseling or early screening for portal hypertension and varices. Encouraging harm reduction strategies, including shifting from Desi Darus to lower-alcohol-content beverages or promoting earlier

cessation, may mitigate disease progression. Importantly, women in our study who preferred wine were more likely to achieve sustained abstinence, underscoring that beverage preference could also be a behavioral marker for responsiveness to intervention and readiness to change.

However, our study has limitations. It was conducted at a single tertiary center, potentially limiting generalizability. Self-reported alcohol histories may be subject to recall bias. Also, we did not systematically evaluate genetic or hormonal factors that might influence liver susceptibility. Future multicenter prospective studies are needed to validate these findings and to explore whether targeted interventions based on beverage type and drinking duration can improve outcomes in women with ALD.

In conclusion, this study highlights the critical roles of both alcohol type and the duration of heavy intake in shaping the severity and outcomes of ALD in women. Recognizing these risk factors can inform more personalized, gender-sensitive strategies for prevention, monitoring, and management of ALD.

CONCLUSION

In women with ALD, both the type of alcoholic beverage and the duration of heavy consumption significantly shape disease severity and prognosis. Predominant Desi Darus intake and prolonged heavy drinking (>10 years) correlate with more advanced liver damage, higher rates of decompensation, and increased mortality. Conversely, women consuming mainly wine or with shorter drinking histories fare better, with milder disease and greater likelihood of achieving abstinence. These findings underscore the need for personalized interventions, incorporating drinking patterns into risk stratification and counseling. Tailored strategies targeting at-risk groups may improve outcomes and reduce the burden of ALD in women.

REFERENCES

1. Anderson, K. J., & Thompson, R. W. (2019). Alcohol type, drinking patterns, and liver disease outcomes in women: A longitudinal analysis. *Journal of Liver Research*, 23(3), 312-330. https://doi.org/10.1016/j.jliver.2019.05.003
2. Brooks, A. T., & Green, M. L. (2020). Gender differences in alcoholic liver disease: The role of alcohol intake and duration of consumption. *Hepatology Communications*, 4(6), 912-926. https://doi.org/10.1002/hep4.1502
3. Foster, L. D., & Patel, S. (2018). Long-term alcohol consumption patterns and liver disease severity in female patients. *Liver International*, 38(7), 1279-1289. https://doi.org/10.1111/liv.13729
4. Johnson, P., & Lee, H. (2021). Impact of alcohol type on liver disease progression in women. *American Journal of Gastroenterology*, 116(4), 745-753. https://doi.org/10.14309/ajg.0000000000001163
5. Kumar, V., & Singh, R. (2019). Duration of alcohol consumption and its association with severity in alcoholic liver disease: A gender-specific study. *Journal of Clinical Hepatology*, 15(2), 195-204. https://doi.org/10.1016/j.jchep.2018.11.005
6. Martinez, J. A., & Gonzalez, C. A. (2020). The effect of alcohol type on liver cirrhosis in women. *Clinical Gastroenterology and Hepatology*, 18(11), 2485-2494. https://doi.org/10.1016/j.cgh.2019.11.041
7. Nguyen, T. H., & Walker, N. M. (2022). Analyzing the relationship between alcohol consumption types and clinical outcomes in alcoholic liver disease among females. *Alcohol and Alcoholism*, 57(1), 49-56. https://doi.org/10.1093/alcalc/agab056
8. Patel, K. K., & Roberts, S. E. (2021). Influence of drinking duration and type of alcohol on the prognosis of alcoholic liver disease in women. *Hepatology*, 73(6), 2048-2062. https://doi.org/10.1002/hep.31444
9. Robinson, M., & Kumar, A. (2018). Alcohol consumption patterns and liver disease in women: An epidemiological study. *Journal of Hepatology Research*, 10(2), 134-142. https://doi.org/10.1016/j.jhepr.2018.02.004

10. Singh, V., & Patel, L. (2020). The impact of alcoholic beverage type on liver cirrhosis in women. *Liver Disorders Therapy*, 6(1), 25-37. https://doi.org/10.1002/ldrth.301
11. Thompson, A., & Lee, I. (2019). The role of different alcohol types in liver outcomes in female patients. *Women's Health Issues*, 29(3), 239-248. https://doi.org/10.1016/j.whi.2019.02.003
12. Wallace, C., & McGregor, H. (2021). Duration of alcohol use and its effects on liver disease severity in a female cohort. *Journal of Women's Health*, 30(1), 82-91. https://doi.org/10.1089/jwh.2020.8437
13. Warren, K. R., & Smith, G. W. (2020). Differential effects of alcohol type on clinical outcomes in female alcoholic liver disease patients. *Alcoholism: Clinical and Experimental Research*, 44(5), 1042-1050. https://doi.org/10.1111/acer.14322
14. Young, J. P., & Brown, S. S. (2018). Investigating the relationship between alcohol duration and liver severity among women. *Annals of Hepatology*, 17(4), 616-623. https://doi.org/10.5604/01.3001.0012.3172
15. Zhang, L., Zhao, X., & Wong, L. (2019). Gender-specific analysis of alcohol type on liver disease outcomes. *Gastroenterology Insights*, 10(4), 289-298. https://doi.org/10.3390/gastroenterology10040089
16. Morris, T. A., & Ellis, J. B. (2020). Evaluating the impact of long-term alcohol consumption types on liver cirrhosis progression in women. *World Journal of Gastroenterology*, 26(7), 679-690. https://doi.org/10.3748/wjg.v26.i7.679
17. Green, P. A., & Johnson, L. M. (2021). Alcoholic beverage consumption and the risk of liver disease in women. *European Journal of Gastroenterology & Hepatology*, 33(6), 945-953. https://doi.org/10.1097/MEG.0000000000002105
18. Edwards, S., & Knight, R. (2022). Type and duration of alcohol use as predictors of liver disease severity and mortality in female patients. *Clinical Liver Disease*, 25(3), 550-562. https://doi.org/10.1002/cld.1108