e-ISSN: 0975-1556, p-ISSN:2820-2643

Available online on www.ijpcr.com

International Journal of Pharmaceutical and Clinical Research 2024; 16(8); 576-581

Original Research Article

Comparison of APRI Scores and Fibroscan for Liver Fibrosis Evaluation in Alcoholic Liver Disease

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Received: 25-05-2024 / Revised: 23-06-2024 / Accepted: 26-07-2024
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Conflict of interest: Nil

Abstract:

Introduction: Alcohol consumption is a major contributor to liver diseases, including fibrosis and cirrhosis. Early detection and management are crucial for preventing disease progression. Liver biopsy remains the gold standard, but non-invasive methods like FibroScan and APRI scores offer safer, cost-effective alternatives.

Methods: This observational cross-sectional study, conducted at Dr. D.Y. Patil Medical College, evaluated the efficacy of APRI scores compared to FibroScan for liver fibrosis assessment in alcoholic liver disease patients. Data from 92 participants were analysed, with APRI scores calculated from AST levels and platelet counts, and FibroScan used to measure liver stiffness.

Results: Participants' ages ranged from 23 to 79 years, with a mean age of 46.49 years. APRI scores ranged from 0.10 to 11.70, indicating varied fibrosis levels. FibroScan scores ranged from 2.1 to 70.6, reflecting significant fibrosis variability. The Pearson correlation between APRI and FibroScan scores was 0.331 ($p = 0.001$), showing a moderate positive relationship. ROC analysis of APRI demonstrated an AUC of 0.657 for predicting significant fibrosis.

Conclusion: APRI is a useful tool for liver fibrosis assessment but should be complemented by FibroScan for more comprehensive evaluation. Further research is needed to refine these methods and validate their effectiveness across diverse populations.

Keywords: APRI, FibroScan, Liver Fibrosis, Alcoholic Liver Disease, Non-invasive Assessment.

Introduction

Alcohol, a widely accepted and integral part of many cultures, often overshadows its serious health and social harms. Its pervasive presence at social, professional, and familial events normalizes its use, leading to underestimation of its contributions to chronic diseases, mental health issues, and social problems. This cultural normalization complicates public health efforts, necessitating comprehensive strategies involving education, policy changes, and community initiatives to address and mitigate alcohol-related harms.

In 2019, alcohol consumption led to about 2.6 million deaths globally, with 4.7% of the disease burden attributed to it. Men experienced a higher burden (6.9%) than women (2.0%), with 2 million deaths among men and 600,000 among women. Alcohol is a major factor in 13% of deaths among 20-39-year-olds. About 0.4 billion people over 15 have excessive alcohol consumption, including 0.2 billion with dependence. Both low and heavy drinking pose health risks. [1] Long-term alcohol consumption is a major cause of liver disease, ranging from simple hepatic steatosis to severe conditions like liver fibrosis and cirrhosis. Early detection of liver fibrosis is crucial for effective management and preventing progression to advanced liver disease. [2] While liver biopsy remains the gold standard for fibrosis assessment, non-invasive methods such as transient elastography (FibroScan) and serum biomarkers like the Aspartate Aminotransferase to Platelet Ratio Index (APRI) and Fibrosis-4 (FIB-4) score offer safer alternatives. FibroScan measures liver stiffness to indicate fibrosis severity, while APRI and FIB-4 use laboratory data to estimate fibrosis levels, providing cost-effective and accessible options for monitoring liver health. [3-4]

The Aspartate Aminotransferase to Platelet Ratio Index (APRI) is a non-invasive serum biomarker used to assess liver fibrosis. It is calculated using the levels of aspartate aminotransferase (AST) and platelet count. APRI is useful for predicting fibrosis severity and cirrhosis, offering a cost-effective and accessible alternative to liver biopsy.[5]

Material and Methods

Study Setting: This observational cross-sectional study aims to determine if APRI scores are comparable to FibroScan for assessing liver fibrosis in patients with Alcoholic Liver Disease. The study was conducted at the OPD and IPD of Dr. D.Y. Patil Medical College, Hospital & Research Institute, Kolhapur, after obtaining ethical approval from the Institutional Research and Ethics Committee (DYPMCK/IEC-35/2022-23) on December 2, 2022. Data collection continued until May 2024.

Participant recruitment: Participants included individuals consuming more than 2 drinks per day for women or 3 drinks per day for men over a period of 5 years, aged 18 years or older, who provided informed consent. Exclusion criteria encompassed those with liver diseases from other etiologies, inability to consent, or co-morbid conditions impacting liver function. The sample size was calculated to be 92, adjusted for a 10% dropout rate.

Data Collection: It involved a structured proforma capturing patient demographics, clinical and physical examination data, and laboratory results necessary for calculating APRI scores. FibroScan was performed to measure liver stiffness in kilopascals (kPa).

The APRI score was calculated using the formula ASTlevel/ASTULNAST level / AST ULNASTlevel/ASTULN × 100 / Platelet count (109/L).

Data analysis included descriptive statistics, correlation analysis, and ROC curve evaluations to compare the diagnostic accuracy of APRI with FibroScan in detecting significant fibrosis.

Ethical considerations ensured that informed consent was obtained from all participants, maintaining confidentiality and adhering to ethical guidelines as outlined by the Institutional Research and Ethics Committee and the Declaration of Helsinki.

Results

Ages ranged from a minimum of 23 to a maximum of 79 years. The mean age of the participants was calculated to be 46.49 years. Among 92 participants, 13 (14.1%) reported abdominal distension, and 11 (12.0%) reported abdominal pain.

Other symptoms included abdominal pain with vomiting and back pain (1.1% each), bilateral lower limb swelling (2.2%), and breathlessness (3.3%). Fever with other symptoms was observed in various combinations, such as fever with breathlessness (4.3%) and fever with loose stools (2.2%). Involuntary movements were noted in 9 participants (9.8%), and yellowish sclera in 10 (10.9%). Headache, hematemesis, and vomiting were also reported in smaller numbers.

APRI scores ranged from 0.10 to 11.70, with a mean of 1.54 and standard deviation of 2.02, reflecting varied levels of liver fibrosis. These scores provide insights into the liver health status and fibrosis severity across the participant group.

Among the 92 participants, 35 (38.0%) showed no significant fibrosis, indicating minimal liver fibrosis. A larger group of 46 participants (50.0%) exhibited severe fibrosis, suggesting more advanced liver damage. The remaining 11 participants (12.0%) were classified as having significant fibrosis, indicating an intermediate stage of liver fibrosis [Figure 1].

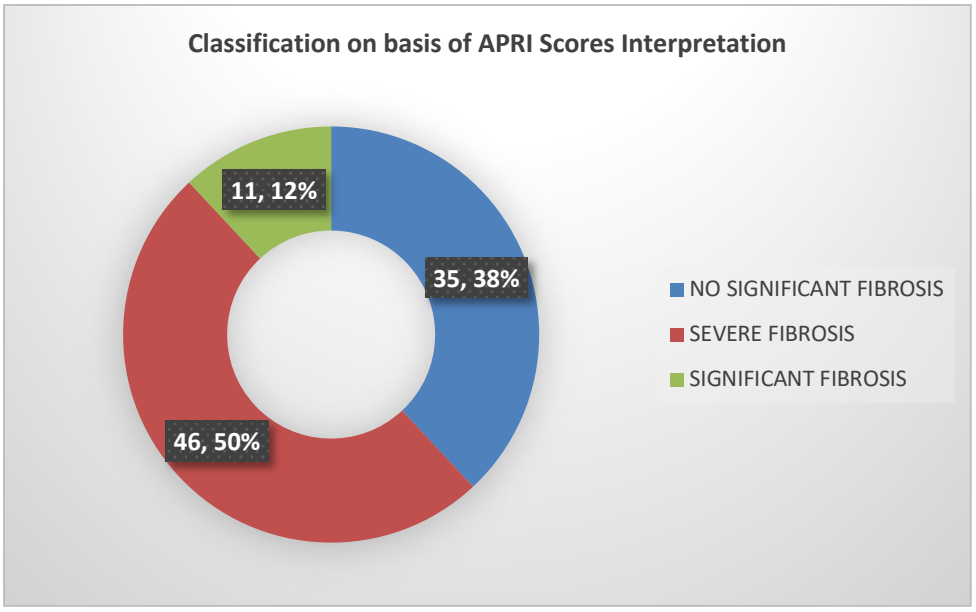

Figure 1: Classification on basis of APRI Scores Interpretation

Fibroscan scores varied from 2.1 to 70.6, with a mean of 9.68 and a standard deviation of 10.14. This wide range and high variability highlight significant differences in liver fibrosis severity among participants, indicating a moderate average level of fibrosis overall [Figure 2].

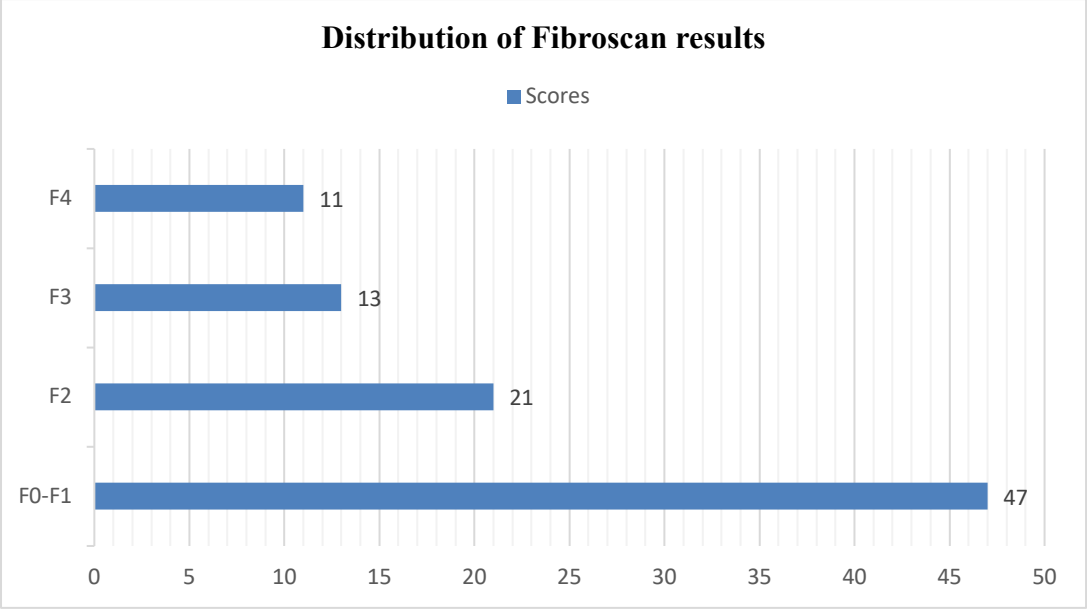

Figure 2: Distribution of Fibroscan results

Table 1: Correlation of different APRI Scores with Fribroscan Scores

		Fibroscan Score
APRI SCORE	Pearson Correlation	0.331**
	Sig. (2-tailed)	**0.001**
	N	92

In Table 1, the correlation between different APRI scores and Fibroscan scores was analysed, revealing a Pearson correlation coefficient of 0.331, which was statistically significant with a p-value of 0.001. This indicated a moderate positive relationship between APRI scores and Fibroscan scores among the 92 participants, suggesting that higher APRI scores were associated with higher Fibroscan scores [Figure 3].

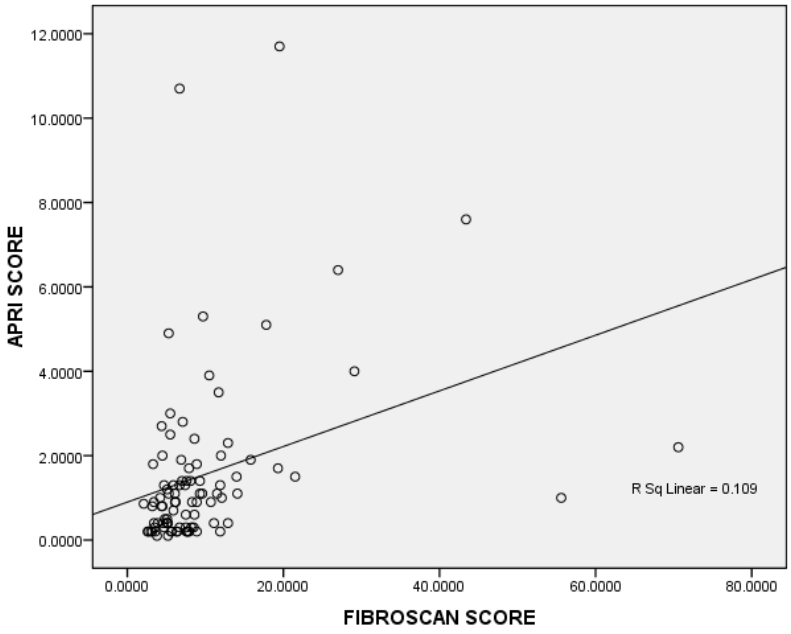

Figure 3: Scatter Plot showing correlation of APRI and FibroScan Scores (A)

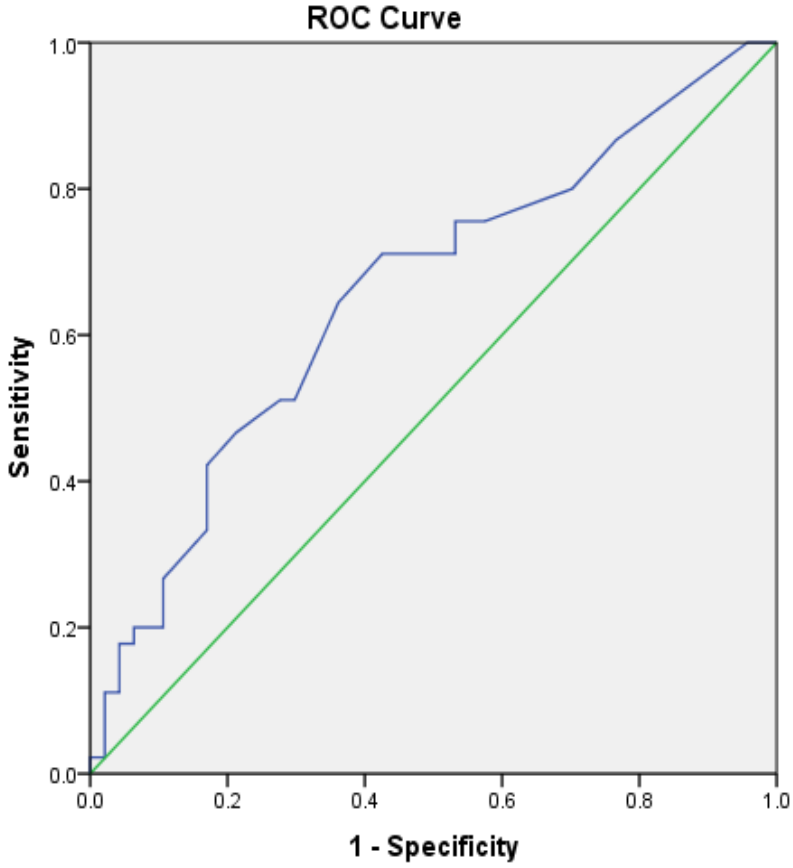

Figure 4: ROC Curve depicting predictive validity of APRI Scores

Figure 4 shows the performance of the APRI score in predicting significant fibrosis by using the Area under the Curve (AUC) from a receiver operating characteristic (ROC) analysis. The AUC for the APRI score is 0.657, indicating a fair ability to distinguish between patients with and without significant fibrosis. The standard error is 0.057, suggesting a reasonable level of precision in the AUC estimate. The significance value of 0.010 indicates that the AUC is significantly different from 0.5, meaning the APRI score provides better discrimination than random chance. The 95% confidence interval for the AUC ranges from 0.545 to 0.769, showing that the true AUC is likely within this range.

Discussion

This study aimed to evaluate and compare the efficacy of APRI scores and FibroScan in assessing liver fibrosis in patients with Alcoholic Liver Disease (ALD). Our findings provide insight into the performance of these non-invasive methods for fibrosis evaluation.

The study included 92 participants with a diverse range of liver fibrosis severities, as indicated by both APRI and FibroScan scores. The mean APRI score was 1.54, with a wide range suggesting varied fibrosis levels. FibroScan scores also showed considerable variability, reflecting the heterogeneity in liver damage among participants. The average age, gender distribution, alcohol consumption, and duration of alcohol abuse in our study cohort closely mirrored those documented in previous studies. [6-8]

The correlation analysis revealed a moderate positive relationship between APRI and FibroScan scores (Pearson correlation coefficient of 0.331, $p = 0.001$), indicating that higher APRI scores generally corresponded to higher FibroScan readings. This correlation suggests that both tools may be used complementarily for assessing liver fibrosis.

The ROC curve analysis demonstrated that the APRI score has a fair ability to predict significant fibrosis, with an AUC of 0.657. Although this indicates that APRI can distinguish between patients with and without significant fibrosis better than chance, its discriminative power is limited compared to more direct measures of liver stiffness like FibroScan. The AUC's confidence interval (0.545 to 0.769) supports the fair performance of APRI, though it falls short of excellent diagnostic accuracy.

A study in a Mexican tertiary health care setting evaluated APRI in patients with alcoholic liver

disease. Using APRI scores and METAVIR staging, the study found APRI had an AUC of 0.776 for significant fibrosis and 0.830 for cirrhosis. Specific APRI cut-off values were identified, indicating that APRI could be a useful non-invasive tool for assessing liver fibrosis stages in this patient population. [9]

As liver fibrosis advances, decreased thrombopoietin production leads to lower platelet counts, and portal hypertension causes platelets to be trapped and removed by the spleen. Continuous liver damage increases AST release from mitochondria and impairs its clearance, resulting in elevated AST levels and reduced platelet counts. [10-12]

In NAFLD patients, APRI scores generally increased with advanced fibrosis stages but rarely exceeded 1. This is due to gradually rising AST levels while platelet counts remain normal, as transaminase levels are typically only mildly to moderately elevate in NAFLD. [13]

Neehar D et al. assessed APRI's effectiveness in identifying advanced fibrosis in cirrhosis patients using a U.S. cohort (2010-2018). Among 10,650 patients, 9.3% had an APRI score of ≥2 at diagnosis, indicating severe fibrosis. APRI's sensitivity was 9.3% and specificity 98.8%. The study found that APRI and similar markers like FIB-4 had suboptimal performance in detecting advanced fibrosis, missing many cases at diagnosis and in prior months. [14]

In comparison, FibroScan remains a robust method for assessing liver fibrosis, offering more detailed insights into liver stiffness and, consequently, fibrosis severity. The APRI score, while valuable for its simplicity and cost-effectiveness, should be viewed as a supplementary tool rather than a standalone diagnostic method. Integrating both APRI and FibroScan could enhance the overall assessment of liver fibrosis in ALD patients, leveraging the strengths of each method.

Rungta S et al. evaluated APRI and FibroScan in 487 patients. ROC analysis identified an optimal APRI cut-off of 1.2 for diagnosing significant fibrosis and cirrhosis. APRI effectively identified patients without liver fibrosis and demonstrated satisfactory accuracy for detecting significant fibrosis, suggesting its use alongside other noninvasive methods for comprehensive liver fibrosis evaluation. [15]

In Conclusion, while APRI provides a useful initial assessment of liver fibrosis, FibroScan offers a more precise measure of liver stiffness. Combining these approaches may improve the accuracy of fibrosis evaluation in clinical practice. Future research could focus on validating these findings across larger and more diverse populations to refine the use of APRI and FibroScan in liver disease management.

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