

## **The Correlation Between FIB – 4 score Test with Liver Stiffness and Spleen Size in Chronic Hepatitis B**

### **ABSTRACT**

**Background:** The World Health Organization (WHO) South-East Asia Region (SEAR) reported an estimated 60 million people living with chronic hepatitis B virus (HBV) infection. The assessment is needed concerning the possibility of structural changes in the liver caused by advanced liver fibrosis, which are related to portal hypertension. The fibrosis - 4 (FIB - 4) is a non-invasive first line of scoring tool that can determine fibrosis stages and whether a liver biopsy is necessary. Concerning the possibility of structural changes in the liver caused by fibrosis, a source of portal hypertension, elevated pressure within the portal vein, which is the blood vessel connecting the spleen and the liver.

**Aim of Study:** The purpose of this study is to examine the correlation between FIB- 4 scores with liver stiffness and spleen size.

**Method:** The research was conducted using a cross-sectional prospective study with chronic Hepatitis B patients of the Internal Medicine Polyclinic of RSUP dr.Sardjito aged > 18 - 80 years old supported with informed consent. Patients with certain medical conditions were excluded. Liver stiffness was tested by Fibroscan and spleen size examined with Ultrasonography, with three times calculation are the same using the KAPPA test. FIB-4 is calculated using the formula:  $\text{age (years)} \times \text{AST (U/L)} / [\text{PLT (109/L)} \times \text{ALT}^{1/2} \text{ (U/L)}]$ . Correlation analysis was conducted using Pearson's ( $r > 0.25$ ) correlation coefficient, and data were analyzed using SPSS version 29.

**Result:** The study comprised 36 subjects evenly divided between detected and undetected HBV DNA categories. The Pearson test, with a standard p-value  $< 0.05$ , revealed non-significant positive correlations between the FIB-4 score and both liver stiffness (kPa) ( $r = 0.198$ ;  $p = 0.248$ ) and spleen size ( $r = 0.105$ ;  $p = 0.544$ ). However, a significant correlation was found between FIB stages and FIB score ( $r = 0.781$ ;  $p < 0.001$ ). Additionally, a low positive correlation was observed between FIB-4 stages and three other variables: liver stiffness ( $r = 0.339$ ;  $p = 0.043$ ), spleen size ( $r = 0.386$ ;  $p = 0.020$ ), and liver stiffness stage ( $r = 0.353$ ;  $p = 0.035$ ).

**Conclusion:** The study found that there's a weak relationship between the FIB-4 index and both liver stiffness and spleen size. This means that the FIB-4 index, a marker used to assess liver fibrosis, doesn't strongly correlate with either liver stiffness or spleen size in these study sample size.

**Key Words:** Chronic Hepatitis, Correlation, FIB – 4 score, Liver Stiffness, Spleen Size.

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### ABSTRAK

**Latar Belakang:** Organisasi Kesehatan Dunia (WHO) Wilayah Asia Tenggara (SEAR) melaporkan perkiraan 60 juta orang yang hidup dengan infeksi virus hepatitis B (HBV) kronis. Penilaian diperlukan mengenai kemungkinan perubahan struktural pada hati yang disebabkan oleh fibrosis hati lanjut, yang berkaitan dengan hipertensi portal. Fibrosis - 4 (FIB - 4) adalah alat skoring garis depan non-invasif yang dapat menentukan tahap fibrosis dan apakah biopsi hati diperlukan. Mengenai kemungkinan perubahan struktural pada hati yang disebabkan oleh fibrosis, sumber hipertensi portal, tekanan tinggi dalam vena porta, yang merupakan pembuluh darah yang menghubungkan limpa dan hati.

**Tujuan Penelitian:** Tujuan dari penelitian ini adalah untuk menguji korelasi antara skor FIB-4 dengan kekakuan hati dan ukuran limpa.

**Metode:** Penelitian dilakukan menggunakan studi prospektif potong lintang dengan pasien Hepatitis B kronis di Poliklinik Penyakit Dalam RSUP dr. Sardjito berusia >18 - 80 tahun dengan persetujuan informasi. Pasien dengan kondisi medis tertentu dikecualikan. Kekakuan hati diuji dengan Fibroscan dan ukuran limpa diperiksa dengan Ultrasonografi, dengan perhitungan tiga kali menggunakan uji KAPPA. FIB-4 dihitung menggunakan rumus:  $\text{usia (tahun)} \times \text{AST (U/L)} / [\text{PLT (109/L)} \times \text{ALT}^{1/2} \text{ (U/L)}]$ . Analisis korelasi dilakukan menggunakan koefisien korelasi Pearson ( $r > 0,25$ ), dan data dianalisis menggunakan SPSS versi 29.

**Hasil:** Studi ini terdiri dari 36 subjek yang dibagi secara merata antara kategori HBV DNA terdeteksi dan tidak terdeteksi. Uji Pearson, dengan nilai p standar  $< 0,05$ , menunjukkan korelasi positif yang tidak signifikan antara skor FIB-4 dan kekakuan hati (kPa) ( $r = 0,198$ ;  $p = 0,248$ ) dan ukuran limpa ( $r = 0,105$ ;  $p = 0,544$ ). Namun, korelasi yang signifikan ditemukan antara tahap FIB dan skor FIB ( $r = 0,781$ ;  $p < 0,001$ ). Selain itu, korelasi positif rendah diamati antara tahap FIB-4 dan tiga variabel lainnya: kekakuan hati ( $r = 0,339$ ;  $p = 0,043$ ), ukuran limpa ( $r = 0,386$ ;  $p = 0,020$ ), dan tahap kekakuan hati ( $r = 0,353$ ;  $p = 0,035$ ).

**Kesimpulan:** Studi ini menemukan bahwa terdapat hubungan lemah antara indeks FIB-4 dan kekakuan hati serta ukuran limpa. Ini berarti bahwa indeks FIB-4, penanda yang digunakan untuk menilai fibrosis hati, tidak kuat berkorelasi dengan kekakuan hati maupun ukuran limpa pada sampel studi ini.

**Kata Kunci:** Hepatitis Kronis, Korelasi, Skor FIB-4, Kekakuan Hati, Ukuran Limpa.