

**Research Article****Meta-Analysis of the factors influencing the Liver Stiffness Measurement  
(LSM) Detected by Fibro Scan in Chronic HBV Infectors****<sup>1</sup>Qudous ul Hassan, <sup>2</sup>Naiha Batool, <sup>3</sup>Noreen Khalid,****<sup>4</sup>Hina Ameen and <sup>5</sup>Muneeba Akbar**<sup>1</sup>Aziz Bhatti Shaheed Hospital, Gujrat, Pakistan.<sup>2</sup>THQ Pasrur, Sialkot, Pakistan.

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**Purpose:** For the hepatic fibrosis evaluation the useful technique is non-invasive Fibro-Scan for the performance of Transient Elastography. Current Meta-analysis aims at the review presentation of influence of numerous factors for the Stiffness Measurement of Liver with the help of Fibro-Scanning the patients of chronic HBV infection. Gamma glutamyl transpeptidase, body mass index, thickness of spleen, portal vessel diameter, HBV DNA loads, level of total bilirubin, aspartate transaminase, inflammation of liver, albumin, gender and age are numerous factors that influence the Meta-analysis.

**Methods:** Manual and electronic searches identify the research potentials were held in order to analyze and evaluate. All the researches were formed on the hypothesis of the accuracy of Fibro-Scan research studies for the chronic HBV infection in patients. Liver Stiffness Measurement was carried with the help of various influencing factors in this Meta-analysis.

**Results:** Values have been monitored and measured through forty different research studies that used Fibro-Scan for the identification of chronic HBV infection in the patients. Overview is given in the light of multiple factors influencing the Stiffness of Liver diagnosed by Fibro-Scan method of non-invasive nature. Main highlighted factors influencing Liver Stiffness include GGT, BMI, thickness of spleen, PVD, HBV DNA, level of TBIL, AT, ALT, albumin, gender and age.

**Key words:** AT, ALT, Fibro scan, HBV Chronic Patients, Liver Fibrosis, BMI, Albumin, LSM and TBIL.

**INTRODUCTION**

According to Bravo (2001), most important factor of liver fibrosis assessment is liver biopsy. Liver biopsy has rare complications association. Hypotension and pain are present in the patients as common complications. Liver hepatic fibrosis is assessed through a non-invasive tool of Fibro-Scan. According to Jane (1993), it uses ultrasound's elastic imaging techniques. Though the measurement of instant liver elasticity liver solidity performs an important role as it is reflected by liver

intensity. With the help of fibro scan, liver intensity was noticed and elasticity of the liver was evaluated. According to EchoSens France and Paris with the help of transient elastography stiffness of the liver was measured. Nowadays with a newly introduced process of fibro-scan same can be measured through a non-invasive cure of liver fibrosis. Accuracy and similarity has been observed in the earlier and current studies regarding Hepatitis B & C as shown by elastography. The

focus of the studies have been the patients affected by hepatitis-C and hepatitis B of chronic nature. The principle objective of the research paper was hepatic fibrosis evaluation the useful technique is non-invasive Fibro-Scan for the performance of Transient Elastography. Current Meta-analysis aims at the review presentation of influence of numerous factors for the Stiffness Measurement of Liver with the help of Fibro-Scanning the patients of chronic HBV infection. Gamma glutamyl transpeptidase, body mass index, thickness of spleen, portal vessel diameter, HBV DNA loads, level of total bilirubin, aspartate transaminase, inflammation of liver, albumin, gender and age are numerous factors that influence the Meta-analysis.

## MATERIAL AND METHODS

Research paper was aimed at the determination and identification of liver stiffness measurement due to numerous factors that contribute in the stiffness of the liver and earlier studies evaluation was also the part of the research paper. An electronic research was run on the various databases such as Blackwell, Francis, Tylor, springer, JSTOR, Emerald, Elsevier, EBSCO, MEDLINE and few other manuscripts. For the Meta-analysis used terms were LSM (Liver Stiffness Measurement), Fibro-Scan, and chronic hepatitis B (HBV). Evidence of additional research works was also identified with the help of related materials and references. Research studies selected for reference and literature review fulfilled the following criteria:

With the help of Fibro-Scan evaluation of liver stiffness.

- Reference taken as slandered was the biopsy of liver for the assessment of fibrosis levels  $F \geq 2$ ,  $F \geq 4$ ; the Ishak system was  $F \geq 3$ ,  $F \geq 5$ .
- More than thirty patients were included in the research paper, due to the factor poor reliability small research studies were excluded from the meta-analysis process.

- The in hand clinical question under discussion was handled with relevant population.
- Moreover, sampling and recruitment was also described carefully.

## Data Extraction

Data was independently abstracted for the basic research by the reviewers. Furthermore, the factors of gamma glutamyl transpeptidase, body mass index, thickness of spleen, portal vessel diameter, HBV DNA loads, level of total bilirubin, aspartate transaminase, inflammation of liver, albumin, gender and age were pre-specified. The variables of chronic patients of HBV infection and liver fibrosis that scans the measurements of stiffness of liver with the help of Fibro-Scan were also accounted, patients with other diseases in the research paper were excluded.

## RESULTS

Eligibility of the research needs a full-scale hypothetical investigation. Table-I explains all the research paper. It also explains the clinical and demographic features of the patients included in the study. Sensitivity and specificity is also a component of this meta-analysis and it is reflected in figure one. Heterogeneity is attributed to the biased threshold performance of the test. In Figure-I the specificity and sensitivity is also noted in contrast through the help of ROC plot. Whereas sensitivity and specificity is denoted by the curve of ROC. Treatment progress in the patients of chronic hepatitis infection relates to the liver fibrosis staging. Designing and determination of the liver fibrosis staging is also important in drug treatment and combination. Hepatitis infection of chronic nature elevates in the levels of ALT and contributes the progression of the fibrosis in human body. Dependence of the anti-viral therapy is attributed to fibrosis staging.

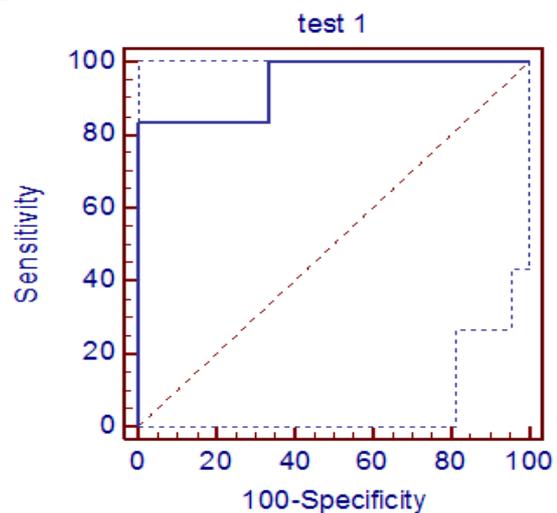
Back in 2011, according to Zhu research the alanine amino-transferase and hepatic fibrosis, in a total of 175 cases of HBV infections, in terms of non-invasiveness superior consideration is given to Fibro-Scan over Liver Biopsy. According to Kim (2012), in a sample

of 128 cases of CHB infection Fibro-Scan was treated after Liver biopsy for the assessment of liver related events. It was observed that in histological advancement heavy HBV DNA was found in liver fibrosis, its load was measured [HBV DNA  $\geq 2,000$  IU/mL]. For the factor of age, in the multivariate analysis Alanine amino-transferase, Bilirubin, LSM and Serum Albumin were measured through a run of Fibrosis. In the research cases were included from the region of western China. According to Miailhas (2011), there was an observable correlation among Alt, Liver Fibrosis and LSM. Another reserved study in the setting of non-endemic Europe in 253 cases of chronic hepatitis-B infection were observed in the research after through Liver Biopsy. Some persistent normal transaminases was observed in thirty-nine cases; whereas, in eighty-six patients in the upper limit ALT was measured as 1 – 2 X ULN. The measurement of ALT in 128 cases was measured as ALT > 2 X ULN. In thirty-six percent of the cases Liver Fibrosis was (F  $\geq 2$ ), eighteen percent reflected cirrhosis and inflammation was significant in twenty-seven percent of the cases with a measure of (G  $\geq 2$ )(Go bel, et al., 2011). Researches conducted in this respect reflected that there is a proportion as LSM and Liver Fibrosis was greater and higher in the infection of CHB cases with elevated level of ALT. Correlation of positive nature was also found in among the cases of HBC chronic infection in the factors of male gender, ALT and LSM. However, according to Gobel (2011), the normal cases reporting was observed in the case of cirrhosis and LSM in the setting of Europe. Male sex and age factor were noticeable factors as age greater than equal to forty years and p-value was significantly noted as < 0.003.

**DISCUSSION**

For the hepatic fibrosis evaluation, the useful technique is non-invasive Fibro-Scan for the performance of Transient Elastography. Current Meta-analysis aims at the review presentation of influence of numerous factors for the Stiffness Measurement of Liver with the help of Fibro-Scanning the patients of chronic

HBV infection. Gamma glutamyl transpeptidase, body mass index, thickness of spleen, portal vessel diameter, HBV DNA loads, level of total bilirubin, aspartate transaminase, inflammation of liver, albumin, gender and age are numerous factors that influence the Meta-analysis. Manual and electronic searches identify the research potentials were held in order to analyze and evaluate. All the researches were formed on the hypothesis of the accuracy of Fibro-Scan research studies for the chronic HBV infection in patients. Lever Stiffness Measurement was carried with the help of various influencing factors in this Meta-analysis. Values have been monitors and measured through forty different research studies that used Fibro-Scan for the identification of chronic HBV infection in the patients. Overview is given in the light of multiple factors influencing the Stiffness of Liver diagnosed by Fibro-Scan method of non-invasive nature. Main highlighted factors influencing Liver Stiffness include GGT, BMI, thickness of spleen, PVD, HBV DNA, level of TBIL, AT, ALT, albumin, gender and age. According to Jung (2011), estimation of liver stiffness for the identification of liver cirrhosis of histological nature is attributed to high rate of specificity and affectability. It is calculated in Kilo-Pascal (kPa). Patients with higher rates of ALT are prone to higher LSM in comparison to lower ALT cases on the same Liver-Fibrosis phases.



**Figure 01:** ROC curve which shows the specificity and sensitivity

**Table 02:** Area under the ROC curve (AUC)

Area under the ROC curve (AUC)	0.944
Standard Error <sup>a</sup>	0.0786
95% Confidence interval <sup>b</sup>	0.586 to 1.000
z statistic	5.657
Significance level P (Area=0.5)	<0.0001

According to Mialhes (2011), regardless of same levels of Liver-Fibrosis higher LSM was observed in the patients with hoisted levels of ALT serum. An innovative form of ultrasound flexible imaging, a non-intrusive instrument is Fibro-Scan. Ding is of the view (2012), liver flexibility can be measured through robustness of liver mirroring the liver fibrosis power. Estimation of stiffness of liver was made by the employment of Fibro-Scan as deduced by EchoSens. ALT levels significantly influence the estimation of Fibro-Scan where the vice-versa is observed in Lect-Hepa tests results (Du et al., 2012). Many assessments have been conducted on the cases of perpetual Hepatitis-C in the view of less available information about Hepatitis-B. The proportion of whites to globulin eggs, alpha 1&2 globulin, whites eggs, GGT, bilirubin, ALT and AT were evaluated in liver biopsy through the perspective of organic chemistry. Additional tests of hematology were also performed as they incorporated WBCs, platelet tally, prothrombin duration, alpha-fetoprotein and hemoglobin (Fung et al., 2010). Hsu introduced new fibrosis count with the title of HB-F, it was actually a mixture of four variables with a significant p-value of 0.001. Expansion of HBV patients contamination and infection produced the score of HB-F, it is pertinent to mention that infection of HBV is etiology of fibrosis. Minor relationship was found between the nonattendance or nearness of HBeA g and ISH AK with a significant P=0.03. HB-F do not includes the factors of HBV. Age, proportion of AST and ALT tested by organic chemistry, prothrombin and platelet tally are four factors responsible for the differentiation of hematological test from prolongation (Hsu et al., 2010).

According to Jung (2011), as a predicator LSM is very useful for the progression HCC in

patients suffering from Hepatitis-B (CHB). Multivariate probes with the utilization of substantial liquor, sex and seniority more than eighty per day, eggs of white serum, inspiration of antigen of Hepatitis-B, and the patients of higher levels of LSM more than 8kPa are more seriously in danger of improvement of HCC. Jung furthers the probe as LSM is a useful predictor for CHB patients for the improvement of HCC.

In additional liver biopsies are successively possible through these advantages. Specially in the case of rehashed evaluations necessary for the screening of reaction to hostile or antiviraltreatment of fibrosis. Few parameters of biochemical are presented for the non-invasive consolidation of techniques utilized in parameters collection. These parameters include aspartate amino-transferase to platelet proportion, alanine amino-transferase proportion and Fibro and Forns test as proposed by Fung (2010), Gobel (2011) and Jin (2012) respectively. Out of these commercially prominent, accessible and non-obtrusive surrogate is FT. It is approved for the Caucasian cases with CHC and for the Asians CHB as pointed by Kim and Jung (2012). Liver Stiffness Estimation through transient elastography figures the liver's flexibility by the utilization of low recurrence versatile transmission of wave through the liver. It is also presented helpful for the liver fibrosis appraisal that is non-intrusive and subject to an endless illness of liver in the light of various etiologies (Kim et al., 2011). Influence of LSM precision in non-ending Hepatitis-B, BMI and other related statistical parameters were found through the examination of aspartate and alanine amino-transferase, egg whites, gamma-glutamyls, add up to bilirubin, a peptidase (GGT), platelet tally, prothrombin time and soluble phosphatase (Kim et al., 2012). HBsAg was estimated utilizing standard protein connected immunosorbent measures. Among the investigation factors, the most astounding connection was noted between ALT level and maximal movement review (P=0.001), trailed by a relationship amongst ALT and age

( $P=0.001$ ) and another amongst ALT and sexual orientation (relationship coefficient, 2 0.170;  $P = 0.038$ ) (Kim et al., 2011). The information about clinical values was gathered included sex, age and past therapeutic history; the biochemical parameters were collected AST, ALT, egg whites/globulin (A/G), add up to bilirubin (TBIL), egg whites, coordinate bilirubin (DBIL), platelet check (PLT), prothrombin time (PT) and c-glutamyl-transpeptidase (c-GT). Fibro Scan or Ultrasonic transient elastography (Echosens, France, Paris), is another way for assessing the non-invasive hepatic fibrosis. FS is a predictor of histological fibrosis in the cases of CHC (Jin, 2012). However, the participation with FS in cases with endless HBV infection (solely) is less broad. In these cases, liver stiffness estimation (LSM) potentials might be forced by raised ALT, and the LSM cutoff esteems for every sickness arrange change from focus to think about because of differences in hepatic fibrosis etiology and populaces (Kim et al., 2009).

## CONCLUSION

Objective of the research study was the effectiveness assessment analysis of elastography in the cases of chronic HBV infection by Fibro-Scan and also to check the solidity level of AT and ALT and other contributing factors. Primarily it was aimed at the measure of effectiveness in the non-invasive stiffness measurement of Liver and associated factors of Gamma glutamyl transpeptidase, body mass index, thickness of spleen, portal vessel diameter, HBV DNA loads, level of total bilirubin, aspartate transaminase, inflammation of liver, albumin, gender and age also referred as GGT, BMI, thickness of spleen, PVD, HBV DNA, level of TBIL, AT, ALT, albumin, gender and age, considered as the secondary level objectives.

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