Original Article

Frequency Of Non-Alcoholic Fatty Liver Disease In Type 2 Diabetes Mellitus

Akhtar nawab[1*], Shahab Khan[2], Saddam Ullah[3], Shamshad Ali[4], Muhammad Fahim[5], Fawad khalid[6*], Waleed rawan[7]

1. Senior Registrar Medical C Unit, Saidu Group of Teaching Hospital Swat Pakistan
2. Resident Physician, Medical C unit Saidu group of Teaching Hospital swat Pakistan
3. Resident Physician, Medical C unit Saidu group of Teaching Hospital swat Pakistan
4. Resident physician, Medical C unit, saidu group of teaching hospital swat Pakistan
5. Resident Physician Medical C unit, Saidu Group of Teaching Hospital swat Pakistan
6. Resident physician medical C unit ,saidu group of teaching hospital swat Pakistan
7. Resident physician medical C unit, saidu group of teaching hospital swat Pakistan

COREESPONDING AUTHORS: Akhtar nawab[1]
Email Address: anawab494@gmail.com
CO- COREESPONDING AUTHORS: Fawad khalid[6]
Email Address: fawadkhalid004@gmail.com
DOI: 10.47750/pnr.2023.14.03.497

Abstract

Objective: Non-alcoholic fatty liver disease (NAFLD) is common in T2DM, because of insulin resistance and obesity. In obese diabetic patients, NAFLD can be prevented and treated by reducing weight by diet and making regular exercises. The objective of the study was to evaluate the frequency of NAFLD in patients having Type 2 DM.

Materials and Methods:

Study Design: Descriptive cross sectional study

Place and Duration of the Study: This study was conducted at the department of medicine, Saidu group of teaching Hospital Swat from Jan 2018 to Jul 2018.

Sample size: 145 patients

Blood samples of 145 patients were taken with consecutive (non-probability) technique for lipid and glycemic profiles and liver enzymes. Diagnosis of NAFLD was done with ultrasound using Sonoline 450 (B-mode, Probe 3.5Mhz).

Results: Our results showed the presence of NAFLD in 51% (n=74) in a total of 145 patients 49(71%) male and 51(74%) female patients having raised BMI ($p < 0.001$)and hypertension ($p < 0.001$). Metabolic syndrome was found to be frequent in patients with NAFLD. Serum triglyceride and serum cholesterol were significantly raised in NAFLD patients.

Conclusion: Nonalcoholic fatty liver disease (NAFLD) is more commonly seen in Type-2 diabetic patients with elevated BMI as well as serum triglycerides and serum cholesterol levels. Routine screening of diabetic patients for NAFLD is not currently recommended.

Keywords: Diabetes mellitus (DM), fatty liver, hepatic steatosis, NAFLD

INTRODUCTION

Diabetes Mellitus is aknown cause of cryptogenic cirrhosis, which is the 3rd most common indication for liver transplantation in U.S.[1]Diabetes Mellitus type II andcardiovascular diseases are potential threats to health system throughout the world. Obesity andspecifically visceral obesity are known risk factor for these illnesses.Now a day's fatty liver is also an emerging risk factor for diabetes and cardiovascular Diseases.Recent Data suggests that diabetes is the common cause of liver disease in united states.[2]

NAFLD which is the condition in which there is resistance to insulin and deposition of fat in liver in the absence of any other cause like hepatitis caused by viruses, autoimmune hepatitis, exercise, alcohol use, deficiency of α-1 antitrypsin and medication like steroids and estrogens.[3]NAFLD is a begin condition which if not treated can leads to more severe form of fat deposition known as NASH. NASH can leads to liver fibrosis and in 10% can cause cirrhosis which ultimatelyleads to Hepatocellular Carcinoma.[4]NAFLD patients are more prone to DM, cardiovascular diseases, hypertension and Dislipedemia.[5]Diabetic patient having NAFLD are at increased risk of developing renal diseases.[6]

Current data suggest that we should screen every patienthaving diabetes for fatty liver through noninvasive procedures or with liverbiopsy just like we are screening diabetic patient for micro-vascular and macro-vascular complications.[7]Local studies suggests that the prevalence of NAFLD is 60.8%.As NAFLD is usually asymptomatic therefore very little work has been done on it especially in Asian population[8].

The Rationale of this study is to find the frequency of NAFLD in type 2 DM on the bases of ultrasound. This study will be very helpful to find out the incidence of this disease in our local setup by using simple and noninvasive method like ultrasonography. Unfortunately, many doctors think that NAFLD is a benign condition so very little work has been done on this condition. This study will help the clinician to early detect this condition and prevent its progression to NASH, cirrhosis and HCC. This study will also help to manage the patient, develop new strategies in Patient management and prevent complications.

MATERIAL AND METHODS

(A) Study Design**:** DescriptiveCross sectional
(B) Setting**:** Saidu Group of Teaching Hospital
(C) Duration of study**:** Jan 2018 to July 2018
(D) Sample size**:** 145 patients
(E) INCLUSION CRITERIA
1. Type 2 diabetes mellitus age more than 30 years.
2. Both gender (male and female) included in the study.
3. Non-alcoholics.

(F) EXCLUSION CRITERIA
1. Alcoholic Patients.
2. HBs/Anti HCV positive patients.
3. Patients already having auto immune Hepatitis, Hemochromatosis, Wilson Diseases.
4. Patients on steroids, Statin, Pioglitazones, Amiodarone and female using oral contraceptive pills.
5. Pregnancy.
6. Type 1 diabetic on insulin.

Data collection procedure

Blood samples of 145 patients were taken with consecutive (Non probability) technique for lipids and glycemic profiles and liver enzymes, after getting approval from the hospital ethical committee.

Data of type 2 diabetes mellitus patient (with FBS more than 126 mg/dl, RBS more than 200mg/dl) of any duration, presenting to medical OPD were recorded. For further evaluation of these patients, they were admitted in the department of medicine of Saidu group of teaching hospitals. Those patients who fulfilled the inclusion criteria, informed written consent were taken from them. Type 2DM patients of any duration were worked up with detailed history and clinical examination along with abdominal ultrasound withsonoline 450 (B-Mode probe3.5 MHZ), imaging examination was done.

A pre-design proforma was used to record all the information. To control confounder and biasin the study, strike exclusion criteria were followed.

STATISTICAL ANALYSIS

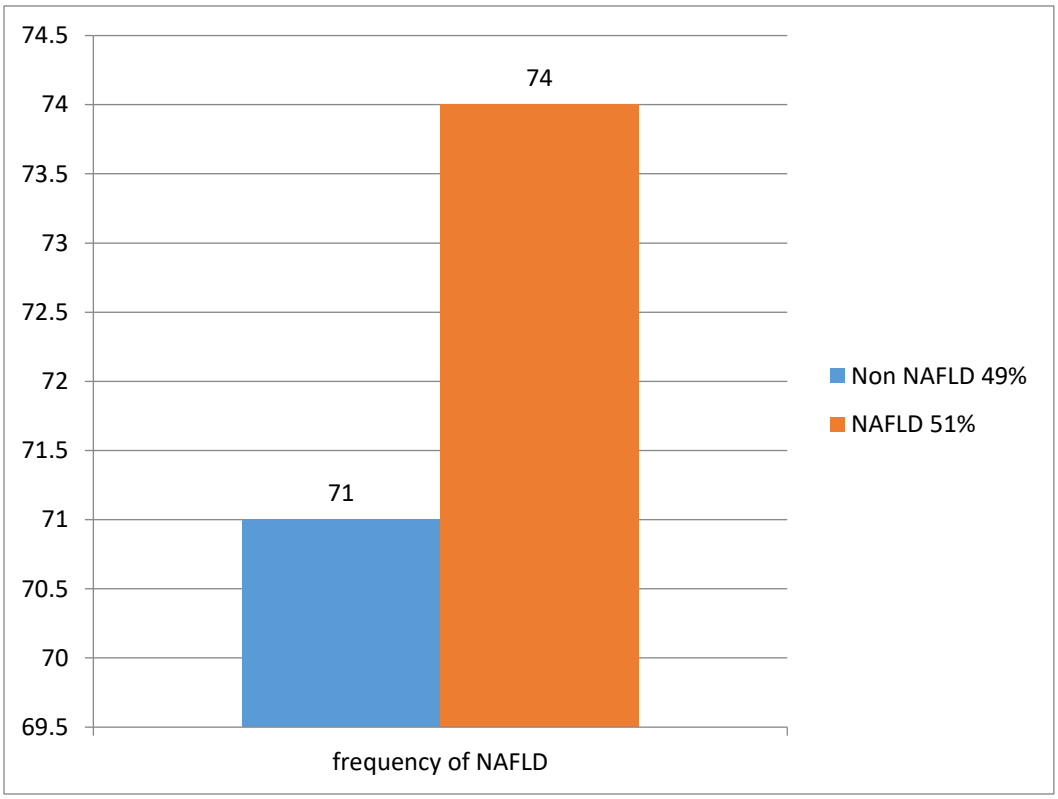
SPSS version 20 was used for entry and analyzing of all the data collected through design proforma. For categoricalvariables like sex and NAFLD, frequency and percentages were calculated. For continuous variables like age mean ± SD was calculated. To see the effect of modifiers, Nonalcoholic fatty liver was stratified among the age, sex and duration of Type -2 Diabetes mellitus. The results were presented as tables and graphs.

RESULTS

A total of 145,71 (49%) male and 74(51%) females with type -2 DM presenting to outpatient department were admitted in the medical unit of Saidu group of teaching hospitals Swat. 51% (n=74) of patients having greater BMI (P<0.001) and Hypertension (P<0.001) showed the presence of NAFLD. Patients with NAFLD and was found to have increased frequency of metabolic syndrome. In patients with NAFLD was found to have significantly raised level of serum triglycerides and serumcholesterol. Patient's agevaried from 40 – 70 years, and mean age of the patients was 45.93 ±8.57 years. Fatty liver was found in 74 (51%) of the patients. For diabetics, age wise distribution was intense in age group 40 – 50 (Table No. 1).

The mean duration of diabetes was 8.85 $\pm$ 6.18 years. Mean BMI was 30 $\pm$ 5.5, and HBA1C was 7.9 $\pm$ 1.1%.

FIGURE NO. 1: FREQUENCY OF NON-ALCOHOLIC FATTY LIVER DISEASE



Main symptoms were itching, weakness and fatigue. Out of 100 patients in which 53 were having NAFLD,fatigue was the main symptom. 93 patients complain was generalized body weakness in which 46 patients had NAFLD. In patients having NAFLD 32% patientshad heaviness in right side of abdomen and 42% patients had pain in right upper part of abdomen. Serum Albumin and Bilirubin of all the patients were normal. Other biochemical abnormalities were given in table No 2.

NAFLD was less common in old age men ex-smoker or current smoker.49% patient i.e. 72 patients had mild hepatomegaly on ultrasound, while there was no hepatomegaly in non NAFLD patient.The patients who don't have NAFLD,the average liver size was 13±2.4cmand patients who had NAFLD, the liver size was 17.2±3.1 cm.Most of NAFLD patients were obese and their body mass index was higher.

Prevalence of HTN, Hyper triglyceredemia HDL and cholesterol had no significant difference in patients having NAFLD compared to those who don't have NAFLD.Similarly, there was no difference in the apparent severity of diabetes with HbA1c values between the two groups. Further, the treatment regimens for diabetes and use of medication for hypertension and hyperlipidemia were similar between the two groups.

TABLE NO. 1: AGE WISE DISTRIBUTION OF PATIENTS

Age Group	Diabetic Patients (No)	Percentages
30-39	16	11
40-49	78	53.7
50-59	29	20
60-69	12	8.2
70 and above	10	6.8

TABLE NO. 3: BIOCHEMICAL PROFILE OF FATTY AND NON FATTY DIABETIC PATIENTS

Investigation	Fatty liver patients	Non fatty liver patients
Triglycerides(more than 150 mg/dl	47(32.4%)	39(26.8%)
Serum cholesterol (> 200 mg/dl)	24(16.5%)	18(12.4%)
Serum alkaline posphatase (> 300 u/l)	8(5.5%)	05(3.4%)
Alanin Amino Transfareses(>40 u/l)	6(4.1%)	6(4.1%)

Discussion

It is predicated that the prevalence of NAFLD and its complications is increasing and willbe double by the year 2025.[9]By understanding, the difference in prevalence of hepatic steatosis and steatosis related liver injury in different ethnic people will help to develop new treatment options and prevention method.NAFLD which is common hepatic disorder is commonly seen in obese and diabetic patients.

Different studies showed different prevalence in different area.Usually NAFLD is asymptomatic in Diabetic patient.A study was done in Karachi by luxemi et al who examined 120 diabetic patients and found that 60.8% had NAFLD.[10]

Astudy was also conducted in Japan in which impaired glusoce metabolism was independently detected in healthy middle-aged Japanese adults with 29% prevalence of NAFLD[11]. Another study which was conducted in Italy showed the prevalence of 20%.[12] Mean while inUS 20% of the general population had NAFLD.[13]Akbar et al in Saudi Arabia done a study in type 2 DM and found that 55% had NAFLD.[14] In India guftaet al study showed that 49% of Diabetic patients had NAFLD.[15]

In our study, the Frequency of NAFLD is 51% which is close to the results from India andother studies conducted in Pakistan. We took abdominal ultrasound as sole entity for the diagnosis of NAFLD, which is having high sensitivity and specificity if the liver fat content is more than 33% but if the liver fat content is less than 33% then liver biopsy is the best diagnostic tool.

NAFLD patients are asymptomatic in initial phase but later on they become symptomatic with main complaints of fatigue and right upper abdomen heaviness which is evident from multiple studies. In our study fatigue was noted as chief complaint in 145 diabetics, out of which, 53 were having fatty liver. Generalized body weakness was observed in 93, out of which 46 (31.7%) were having NAFLD. Among patients with fatty liver disease, pain right upper abdomen was present in 42 and heaviness in right upper abdomen in 32 (64.70%)**.** Most of the symptoms in NAFLD were because of stretching of the liver capsule i.e. right upper abdomen pain and heaviness. Result from wing kin synetal shows that fatigue and heaviness were the two important symptoms of the 33% patients[16]. Diabetic's mellitus in an important risk factor for NAFLD.

CONCLUSION

Type – 2 diabetic patients with metabolic syndrome having raised BMI, serum cholesterol and triglycerides are more prone to NAFLD. Currently T2DM patient are not routinely screened for NAFLD.

REFERENCES

1. Tolman KG, Fonseca V, Dalpiaz A, Tan MH. Spectrum of liverdisease in type 2 diabetes and management of patients with diabetes and liver disease. Diabetes Care. 2007;30:734-43.
2. Stefan N, Kantartzis K, Haring H.Causes and metabolic consequences of fatty liver disease. Endocr Rev. 2008-2009;7:939-60.
3. Ali R, Cusi K. New diagnostic and treatment approaches in nonalcoholic fatty liver disease (NAFLD). Ann Med. 2009;41(4):265-78.(2021).
4. Immunoinformatics approaches to explore B and T cell epitope-based vaccine designing for SARS-CoV-2 Virus. Pakistan Journal of Pharmaceutical Sciences, 34.
5. Anwar, F., Tayyab, M., Salman, M., Abdullah, Din, M., Khan, J., & Haq, I. (2020). Dengue outbreak 2018 in district Shangla KPK; clinical features and laboratory markers of dengue virus infection. Future Virology, 15(10), 693-699.
6. Qamar, Z., Anwar, F., Ahmad, R., Haq, I., Khan, A. M. K., Hussain, R., ... & Khan, J. (2021). Prevalence of Hepatitis C virus and determination of its genotypes in subjects of Tehsil Daggar District Buner, KP, Pakistan. Clinical Epidemiology and Global Health, 12, 100809.
7. Anwar, F., Tayyab, M., Haq, I., & Shah, O. U. (2021). Viral overload of COVID-19 pandemics: Overweight people a soft target to get an infection. International Journal of Clinical Virology, 5(2), 070-071.
8. Haq, I., Ullah, R., Din, M., Ahmad, S., Anwar, F., Ali, M., & Khan, H. U. (2020). Unrecognized HIV infection in asymptomatic volunteer blood donors at district Peshawar, Khyber Pakhtunkhwa, Pakistan. New Microbes and New Infections, 35, 100685.
9. Asif, A., Asghar, M., Khan, H. U., Haq, I., Shuaib, S. L., Khalid, F., ... & Rehman, N. (2021). Antibiotic susceptibility pattern of clinical isolates of methicillin resistant staphylococcus aureus in Peshawar, Pakistan. Annals of the Romanian Society for Cell Biology, 25(6), 20116-20131.
10. Ahmad, S. U., Khan, M. S., Jan, Z., Khan, N., Ali, A., Rehman, N., ... & Zahir, F. (2021). Genome wide association study and phylogenetic analysis of novel SARS-COV-2 virus among different countries. Pakistan Journal of Pharmaceutical Sciences, 34(4).

11. Asif, A., Asghar, M., Khan, H. U., Haq, I., Shuaib, S. L., Khalid, F., ... & Rehman, N. (2021). Antibiotic susceptibility pattern of clinical isolates of methicillin resistant staphylococcus aureus in Peshawar, Pakistan. Annals of the Romanian Society for Cell Biology, 25(6), 20116-20131.
12. Rehman, A. U., Anwar, F., Tayyab, M., Haq, I., Haq, M., Ahmed, A., ... & Khan, A. S. (2022). Incidence of Dengue fever, serotypes, clinical features, and laboratory markers: a case study of 2019 outbreak at district Shangla, KP, Pakistan. African Health Sciences, 22(1), 521-31.
13. Akber DH, Kawther AH. Non-alcoholic fatty liver disease in Saudi type 2 diabetic subjects attending a medical outpatient clinic. Diabetes Care. 2003;26:3351-65.
14. Gupte P, Amarapukar D, Agal S, Baijal R, Kulshreshtta P, Pramik S. Non-alcoholic steato-hepatitis in type 2 diabetes mellitus. J GasteroentrolHepatol. 2004;19:854-58.
15. Syn WK, Nightingale P, Bateman JM. Non-alcoholic fatty liver disease in a district general hospital: clinical presentation and risk factors. Hepatol Int. 2008;2:190-95.