Identifying and Treating Nonalcoholic Fatty Liver Disease

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NAFLD improves with 7% or greater weight loss.

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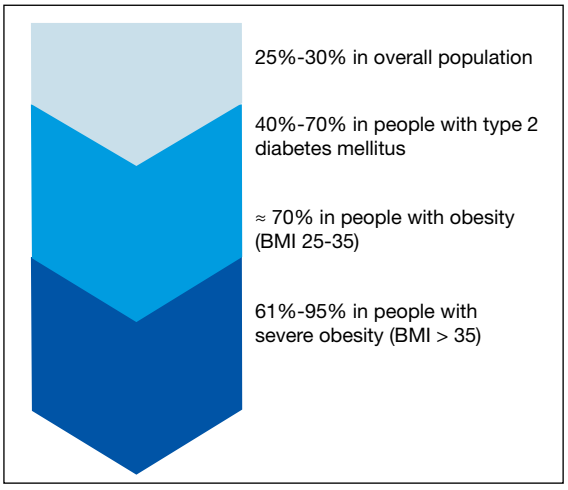
Nonalcoholic fatty liver disease (NAFLD) is a silent epidemic affecting nearly 1 in 3 Americans and is increasing within the Veterans Health Administration (VHA).[1,2] NAFLD independently increases the risk of type 2 diabetes mellitus (T2DM), cardiovascular disease, chronic kidney disease, cirrhosis, liver cancer, and death and impairs health-related quality of life (QOL).[3] NAFLD primarily affects those with metabolic risk factors (prediabetes, T2DM, and metabolic syndrome) or obesity (Figure 1).[4,5] In the US, 1 in 3 adults have prediabetes and 1 in 10 have T2DM (increasing to 1 in 4 aged ≥ 65 years).[6] Among veterans, obesity affects 31% within 6 years postdeployment and 41% overall who receive VHA care.[7,8] Other patient characteristics associated with higher rates of NAFLD include Hispanic ethnicity and older age.[9-11]

FIGURE 1 NAFLD Prevalence



Abbreviations: BMI, body mass index; NAFLD, nonalcoholic fatty liver disease.
Affecting about 25% to 30% of the overall population, NAFLD is highly prevalent in type 2 diabetes mellitus and obesity.

Among those with NAFLD, most have nonalcoholic fatty liver (NAFL), or simple steatosis, affecting > 5% of liver cells (Figure 2).[12] However, 25% to 30% exhibit nonalcoholic steatohepatitis (NASH), with steatosis, inflammation, hepatocyte injury, and often alanine aminotransferase (ALT) elevations.[13] About 4% of patients progress to cirrhosis and/or hepatocellular carcinoma (HCC) on 7- to 15-year follow-up (with 9% cirrhosis or end-stage liver disease rates in 1 recent study with up to 23-year follow-up).[1,14]

In most patients (80%), NAFLD progresses slowly over decades. The progression is related to continuing insulin resistance.[15,16] Greater disease progression is seen in patients with T2DM or concomitant chronic liver disease (such as hepatitis C).[10,11,16] Patients with NAFLD who develop advanced fibrosis or cirrhosis experience increased rates of overall mortality, liver-related events, and liver transplantation.[1,9,17,18] Within the VHA, NAFLD is the third most common cause of cirrhosis and HCC, occurring at an average age of 66 and 70 years, respectively.[19] Less commonly, HCC also can occur in NAFLD without cirrhosis.[20]

Although no pharmaceuticals are yet approved to treat NAFLD, even modest weight loss is beneficial. For example, weight loss > 4% improves fatty liver, ≥ 7% improves liver inflammation, and ≥ 10% decreases liver fibrosis (or scarring).[21-23] In patients with a prior lack of success with weight loss, weight loss medications may be beneficial for short-term use.[24] When comparing the effects of diet, exercise, obesity pharmacotherapy, and combinations for these approaches, intensive lifestyle modification with exercise had the greatest, most

TABLE 1 Noninvasive Fibrosis Scores and Thresholds

Noninvasive Fibrosis Scores	Low Threshold (Advanced Fibrosis Unlikely)	Indeterminate	High Threshold (Advanced Fibrosis Likely)
FIB-4 index [age (y) × AST (U/l)]/ [platelet (× 10^9/l) × √ALT (U/l)]	< 1.3	1.3 to 2.67	> 2.67
NAFLD fibrosis score −1.675 + 0.037 × age (years) + 0.094 × BMI + 1.13 × impaired fasting glucose/diabetes (yes = 1, no = 0) + 0.99 × AST/ALT ratio − 0.013 × platelet (×10^9/l) − 0.66 × albumin (g/dL)	< -1.455	- 1.455 to 0.676	> 0.676

Abbreviations: ALT, alanine aminotransferase; AST, aspartate aminotransferase; NAFLD, nonalcoholic fatty liver disease.

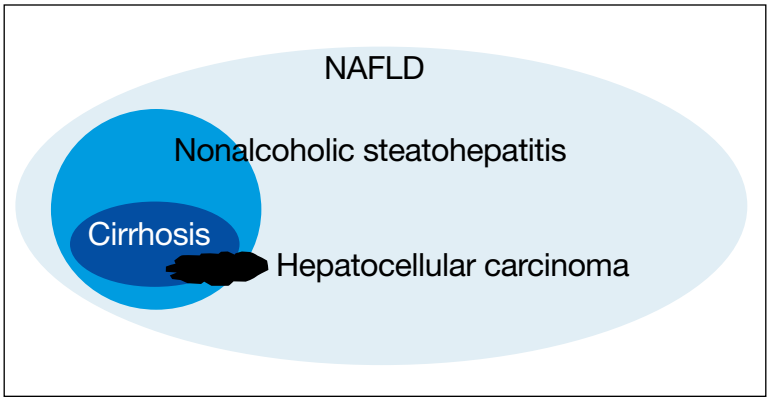
enduring benefit.[25] Additionally, bariatric (weight loss) surgery has significantly improved health and liver-related outcomes for patients with NASH.[26]

In at-risk veterans, NAFLD has myriad negative effects on health and QOL. To improve its early identification and management in the VHA, we summarize strategies that all providers can use to screen and treat patients for this condition.

SCREENING FOR ADVANCED FIBROSIS

Advanced fibrosis in NAFLD is diagnosed by analyzing adequately sized liver biopsies.[27,28] However, noninvasive approaches to quantify advanced fibrosis by imaging or use of a simple fibrosis prediction score also are available. Imaging modalities include measuring liver stiffness, using transient elastography (FibroScan, Waltham, MA) or magnetic resonance elastography.[1,29-31] Fibrosis prediction scores use common clinical and laboratory data to predict the presence or absence of advanced fibrosis (Table 1).[29] Of these, the fibrosis-4 (FIB-4) index requires only ALT, aspartate aminotransferase (AST), platelet count, and age to calculate the score and performs similarly to the NAFLD fibrosis score.[32-35] FIB-4 and the NAFLD fibrosis score are validated in ethnically diverse populations, recommended in evidence-based guidelines, and can be calculated using online calculators (eg, FIB-4).[11,16,33] The easily summed BARD score also detects NAFLD advanced fibrosis yet incorrectly identified advanced fibrosis in many patients without liver biopsy evidence of advanced fibrosis in a recent VHA study.[36,37] With increasing VHA rates of NAFLD, these scores are a simple way to identify patients with probable advanced fibrosis who may benefit from hepatology or gastroenterology consultation.[2]

FIGURE 2 Proportion of US Population With NAFLD-Related Diseases



Abbreviation: NAFLD, nonalcoholic fatty liver disease.
Within the US population, about 25% to 30% exhibit NAFLD. Among these, 25% to 30% exhibit inflammation and liver injury (nonalcoholic steatohepatitis), and about 4% develop either cirrhosis or hepatocellular carcinoma, which can develop in the absence of cirrhosis.

Does This Patient Have NAFLD?

To identify NAFLD, patients with metabolic syndrome and modest or no alcohol use are first assessed for liver injury with ALT, AST, and complete blood count (Figure 3; Case 1).[16] Among patients presenting with incidental liver enzyme elevations to primary care, NAFLD was the most common cause.[38]

Next, common underlying liver diseases that cause liver injury should be excluded by hepatitis B and C virus serology.[11,16] Other underlying liver diseases are uncommon and should be assessed only if clinically indicated. After excluding

TABLE 2 Evaluation of NAFLD

Criteria for Investigation
a. Exhibits metabolic syndrome—as diagnosed by having 3 of the following criteria: 1. BP ≥ 130 mm Hg systolic or ≥ 85 mm Hg diastolic or on antihypertensive medication; 2. Triglycerides ≥ 150 mg/dL or drug treatment for elevated triglycerides; 3. HDL cholesterol < 40 mg/dL in men or < 50 mg/dL in women or on drug treatment for reduced HDL; 4. Fasting glucose ≥ 100 mg/dL or on drug treatment for elevated glucose; and 5. Waist circumference ≥ 40 in (men) or ≥ 35 in (women)
b. Minimal alcohol intake: < 2 alcoholic drinks/d (women) or < 3 alcoholic drinks/d (men)
c. Laboratory evaluation: ALT and AST Complete blood count Hepatitis B and C: hepatitis B surface antigen, hepatitis B core antibody, hepatitis B surface antibody, HCV Ab +/- HCV RNA if HCV Ab positive Fasting blood glucose or HbA_{1c} Fasting serum total and HDL cholesterol, triglycerides
d. Physical evaluation: Body mass index
e. Personal history: 1. Hypertension, diabetes, cardiovascular disease; 2. Assess drugs causing liver steatosis: methotrexate, amiodarone, tamoxifen, corticosteroids; 3. Assess drugs commonly causing metabolic syndrome: clozapine, olanzapine, quetiapine; 4. Exclude fatty liver due to: parenteral nutrition, severe malnutrition; and 5. Chronic liver disease (assess only if clinically indicated): hemochromatosis, Wilson's disease, autoimmune, alpha-1-antitrypsin deficiency

Abbreviations: ALT, alanine aminotransferase; AST, aspartate aminotranferase; BP, blood pressure; HBA_{1c}, hemoglobin A_{1c}; HCV, hepatitis C virus; HCV AB, hepatitis C antibody; HDL, high-density lipoproteins; NAFLD, nonalcoholic fatty liver disease.

secondary causes of fatty liver (eg, drugs causing steatosis, parenteral nutrition, severe malnutrition, etc), NAFLD is likely, particularly in those displaying fatty liver or steatosis on liver imaging (Table 2).[11,16]

Evaluation of fasting glucose or hemoglobin A_{1c} (HbA_{1c}) can identify undiagnosed T2DM. NAFL, or simple steatosis, is independently associated with an increased risk of T2DM, cardiovascular and kidney disease, yet not overall mortality.[16] Over 10 to 20 years, few patients (4%) with simple steatosis progress to cirrhosis.[39] In contrast, NAFLD advanced fibrosis significantly increases overall and liver-related mortality and can be assessed with high probability by calculating the patient's FIB-4, even in those with normal liver enzymes.[11,16] Patients with highly probable advanced fibrosis merit evaluation by hepatology or gastroenterology (Figure 3).

In NAFLD, simple steatosis can resolve, and NASH can significantly improve with 7% to 10% weight loss.[16,23,40] Patients with simple steatosis on imaging and normal liver enzymes should be monitored with periodic liver enzymes and fibrosis prediction scores (eg, FIB-4) and encouraged to pursue intensive lifestyle intervention.[16,33] Without weight loss and exercise interventions metabolic syndrome, T2DM, and NAFLD may progress.

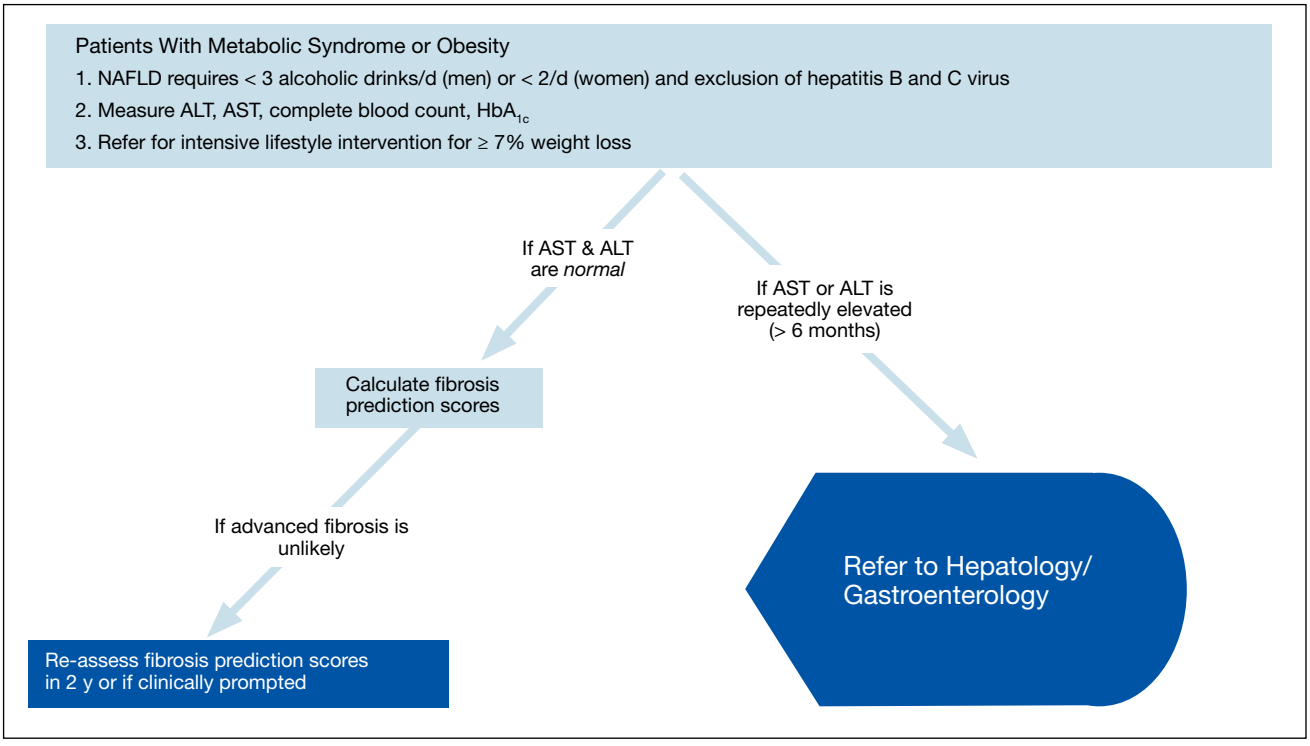
Patients with combined liver steatosis and liver enzyme elevations may exhibit NASH and warrant an evaluation by a hepatologist or gastroenterologist for consideration of additional testing or liver biopsy.[16] While ALT elevations often have been used as a marker of NASH, ALT can be normal in NASH and in advanced fibrosis.[41,42] A liver biopsy is required to establish the diagnosis of NASH, which progresses to cirrhosis in 15% to 20% over a 10- to 20-year follow-up period (Case 2).[39] Fibrosis prediction scores also can evaluate the probability of advanced fibrosis in these patients.

ENCOURAGING PATIENTS TO PURSUE INTENSIVE LIFESTYLE INTERVENTIONS

Most veterans wish to collaborate in their care (Table 3, Figure 4) yet experience many barriers, such as low health literacy, high rates of comorbidities, and ongoing drug/alcohol misuse.[43,44] To motivate patients to action to prevent the progression of NAFLD, patients must understand how it affects the development of T2DM, cardiovascular disease, and liver disease and the value of the intervention. To enhance disease understanding, the VHA provides a simple 2-page patient information sheet about NAFLD and its treatment.[45] A 2-page pictorial patient education handout on NAFLD and its treatment is available as well (eAppendix, available at www.mdedge.com/fedprac).

In addition to patient education, motivational interviewing significantly improves weight loss, resulting in a 3.3 lb (1.5 kg) increased weight loss in the intervention group vs the control group in weight loss studies.[46] By being supportive, empathic, and clearly sharing the rationale for change, motivational interviewing is

FIGURE 3 Identification and Treatment of NAFLD in Patients With Metabolic Syndrome or Obesity



Abbreviations: ALT, alanine aminotransferase; AST, aspartate aminotransferase; HbA_{1c}, hemglobin A_{1c}; NAFLD, nonalcoholic fatty liver disease; T2DM, type 2 diabetes mellitus.
In patients with metabolic syndrome or obesity with limited or no alcohol use and negative hepatitis B and C virus serology, NAFLD is evaluated with liver enzymes, complete blood count, HbA_{1c} and calculation of fibrosis prediction scores, such as FIB-4 or NAFLD fibrosis score. All patients with likely NAFLD, metabolic syndrome, or obesity merit intensive lifestyle intervention to achieve ≥ 7% or greater weight loss to improve their fatty liver and to prevent progression to T2DM. In patients with normal liver enzymes and fibrosis prediction scores suggesting that advanced fibrosis is unlikely, the patient should be followed with liver enzymes and repeat fibrosis prediction scores to assess NAFLD progression, as well as periodic evaluation for the development of T2DM. In those with liver enzyme elevations or fibrosis prediction scores revealing probable advanced fibrosis, the patient is referred to hepatology or gastroenterology for further evaluation.

a collaborative conversation to guide patients to strengthen their motivation and commitment to change.[47] It helps patients examine and address their ambivalence—most recognize they should exercise and lose weight, but it can be difficult.

To start the conversation, the health care provider can explain that NAFLD increases the risk of T2DM, heart disease, and liver injury or scarring and can be effectively treated (or improved) with modest weight loss and regular exercise (ie, 14 lb weight loss if 200 lb, or 21 lb weight loss if 300 lb). Exercise can start with a 5-minute walk and build to 30 minutes daily). Then, the provider can ask the following 4 questions:

1. Why would you want to lose weight and exercise?
2. How might you go about it in order to succeed?
3. What are the 3 best reasons for you to do it?
4. How important is it for you to make this change, and why? The provider can also ask the patient to quantify on a scale of 1 to 10: (a) How likely is it that they will make each required change? (b) How hard will each change be for them?

The provider then summarizes the patient's reasons for wanting change, how he/she can effect change, what their best reasons are, and how to successfully change. The provider then asks a final question:

5. So what do you think you will do?

Most patients report feeling engaged, empowered, open, and understood with motivational interviewing. People are "persuaded by what they hear themselves say," increasing motivation to change.[47]

This personalized action plan facilitates successful health behavior change.[48] Action plans should integrate daily

TABLE 3 Effective Measures to Treat NAFLD

Interventions	Result
Motivational interviewing[47]	Significantly enhanced weight loss (1.47 kg greater) with motivational interviewing vs control treatment.[46]
Personalized action plan	Facilitates successful health behavior change,[48] particularly when integrating daily routines; adherence increases with patient education,[45] peer or social support, and addressing any barriers.[51]
Daily weighing	Associated with significantly greater weight loss and less weight regain[49]; up to overall 9% weight loss in 6 months associated with daily weighing vs less than weekly weighing.[50]
Peer support or telephone coaching	Effective in the Veterans Health Administration for weight loss and glycemic control in patients with diabetes with low health literacy.[53,54]
Diabetes Prevention Program	Racially diverse patients with prediabetes received a lifestyle-modification program with individualized lessons in diet, moderate exercise, and behavior modification over 16 sessions. This intervention was associated with an average 6% weight loss at 6 months and a 58% decreased progression rate to DM over a 3-year follow-up[55] and 27% decrease over a 15-year follow-up.[56]
Bariatric surgery	Bariatric surgery may be considered in patients with: a) BMI > 40 or b) BMI > 35 with comorbidities (eg, diabetes mellitus, hypertension, sleep apnea, etc).[63] in the absence of decompensated cirrhosis[64]; In the VHA, bariatric surgery yielded 21% sustained weight loss from baseline (vs matched nonsurgical population) at 10 years postoperatively in patients undergoing Roux-en-Y gastric bypass[59]; Risks include 3% serious complications, 1% reoperation rates,[61] and 0.4% 30-day mortality.[62]
Filtered coffee consumption	Associated with more favorable liver-related outcomes and lower rates of advanced liver fibrosis.[65]
Mediterranean diet	Reduces liver steatosis.[66]
Statin use	May improve liver chemistries and fibrosis; can be safely used even in the presence of an elevated ALT.[11,67]

Abbreviations: ALT, alanine aminotransferase; BMI, body mass index.

routines. For example, by placing the scale near the toothbrush, daily weighing is encouraged. Daily weighing is associated with significantly greater weight loss and less weight regain.[49] In a 6-month, randomized controlled weight loss trial in men and women, daily weighing (using a scale that automatically transmitted weight data), with weekly e-mails and tailored feedback yielded an overall 9% weight loss and increased use of exercise and diet behaviors associated with weight loss in comparison with those who weighed themselves less than weekly.[50] This simple daily measure seems to reinforce a patient's action plan.

Adherence to an action plan significantly improves with patient education, peer or social support, and addressing barriers to adherence.[51] For example, by providing support with weekly text messaging of "How are you?" and addressing the issues that patients reported in a large randomized treatment trial, adherence was significantly improved.[52] In VHA patients with low health literacy, peer support or telephone coaching also has proven effective in increasing weight loss and glycemic control in patients with T2DM.[53,54] Providing multidisciplinary team support during intensive lifestyle intervention, providers can partner with patients to address questions or issues and applaud progress.

EFFECTIVE VHA INTERVENTIONS

In an ethnically diverse population of patients with prediabetes, up to 7% weight loss was observed in the Diabetes Prevention Program (DPP).[55] In this study patients were randomized to placebo; metformin 850 mg twice daily; or a lifestyle-modification program in which they received one-on-one culturally sensitive, individualized lessons in diet, moderate exercise (≥ 150 minutes weekly), and behavior modification from case managers over 16 sessions. Lessons were reinforced in both group and individual sessions. This intervention was associated with an average of 6% weight loss at 6 months (half of participants attained 7% weight loss) and a 58% decrease in the rate of progression to T2DM over a nearly 3-year follow-up of this population with prediabetes compared with that of the placebo group.[55] Over a 15-year follow-up, the intensive lifestyle intervention group sustained a 27% decrease in the incidence of T2DM compared with that of the placebo group.[56] To emulate the success of the DPP in the VHA, a web-based DPP-like study in female veterans was performed with online coaching and daily weighing. This study achieved a 5.2% weight loss from baseline at 4 months.[57]

To improve outcomes, the VHA MOVE! Weight Management Program has been revised to include more sustained intervention (16 sessions) and multiple modes for participating—in person, by telephone, via video, via MOVE! Coach phone

app, or any combination.[58] Using shared decision making between patients with NAFLD and their providers, a customized MOVE! weight loss program can be developed to enable sustained intensive lifestyle intervention: hypocaloric diet, ≥ 150 minutes of moderate exercise weekly, and behavioral change.

In addition to intensive lifestyle intervention, a prospective study found that bariatric surgery significantly improved outcomes in patients with NASH, with most patients experiencing resolution of their NASH and nearly half exhibiting significantly improved fibrosis.[26] In the VHA, bariatric surgery has yielded excellent long-term outcomes, with 21% sustained weight loss from baseline (vs matched nonsurgical population) at 10 years postoperatively in patients undergoing Roux-en-Y gastric bypass.[59] Bariatric surgery also results in long-term remission of T2DM in most patients and significant improvement in hypertension and dyslipidemia.[60] The risks of bariatric surgery include 3% serious complications, 1% reoperation rates, and 0.4% 30-day mortality.[61,62] Bariatric surgery can be considered in patients with BMI > 40 or in patients with BMI > 35 who have comorbidities and do not have decompensated cirrhosis.[63,64]

Beyond weight loss, more favorable liver-related outcomes and lower rates of advanced liver fibrosis are observed in those consuming filtered coffee; a reduction in liver steatosis also is observed with adherence to a Mediterranean diet.[65,66] In NAFLD, statins may improve liver chemistries and fibrosis; this class of medications can be used safely even in the presence of an elevated ALT.[11,67] As a risk factor for chronic liver disease, alcohol consumption of ≥ 4 drinks per day or > 14 drinks per week for men or > 7 drinks per week for women should be avoided in patients with NAFLD.[11]

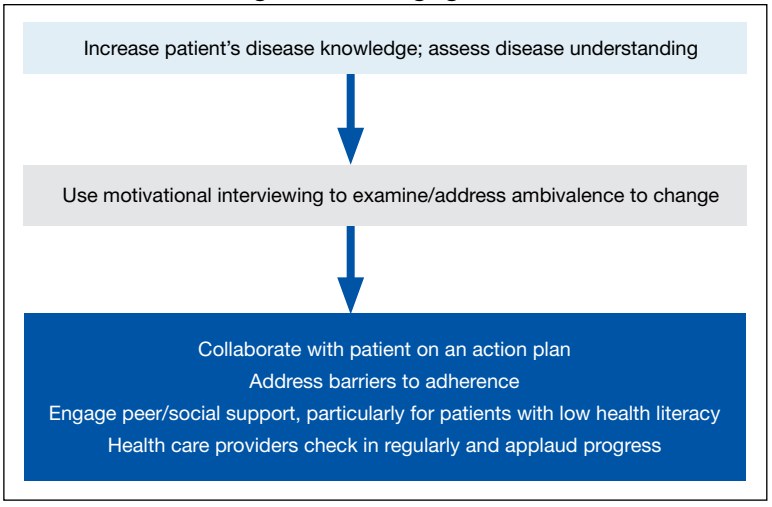
CONCLUSION

Nonalcoholic fatty liver disease independently increases the risk of T2DM, cardiovascular disease and kidney disease. With its rates increasing in the VHA, earlier identification and intervention is warranted in patients at high risk (ie, those with metabolic syndrome, obesity, and T2DM).[2] In patients with metabolic syndrome and modest or no alcohol use, NAFLD can be identified by the presence of fatty liver on imaging in those in whom liver enzymes are measured and hepatitis B and C virus and secondary causes of fatty liver are excluded (aligning with the European Association of the Study of Liver Disease simple algorithm).[16]

NASH is more frequent in those with liver enzyme elevations or with an elevated FIB-4 and is associated with a long-term risk of cirrhosis. These patients merit referral to hepatology or gastroenterology for further evaluation and consideration of a liver biopsy to identify NASH. Patients with likely NAFLD without liver enzyme elevations can be further evaluated with FIB-4 scores to assess their probability of advanced liver fibrosis and potential need for referral to hepatology or gastroenterology.

Early NAFLD detection and intervention with intensive lifestyle modifications has the potential to avert progression to advanced fibrosis—and its associated increased overall and liver-related mortality, and impaired QOL.[3,16,18] Although FIB-4 is a validated predictor of advanced fibrosis, this score is not yet used

FIGURE 4 Increasing Patient Engagement and Action



In patients with likely nonalcoholic fatty liver disease, patients are first informed about the disease and its treatment—they can then review their learnings with providers (to assess disease understanding). Using motivational interviewing, providers can encourage patients to examine their personal reasons for changing behavior and develop their action plan, which addresses barriers to adherence. In reviewing the patient's action plan—providers can ask if there are any areas of concern, and assess support (family, peer, social, and clinical) as the patient pursues action.

nationally to identify and risk stratify NAFLD in the VHA. Additionally, the very low use of VHA diet/exercise programs in eligible patients contributes to NAFLD progression.[68] The cost-effective DPP has successfully yielded weight loss in patients with prediabetes and decreases in the incidence of T2DM through motivational interviewing and intensive lifestyle intervention.[55] By revising MOVE!, the VHA has enhanced its intensive lifestyle intervention program.

To improve NAFLD management, providers can successfully engage patients through motivational interviewing for intensive lifestyle intervention. Their resulting weight loss is enhanced with a personalized action plan, daily weighing, and peer support. When NAFLD is identified in patients with metabolic risk factors, the probability of advanced fibrosis is easily assessed in those with elevated FIB-4 scores who merit gastrointestinal referral.[33,37]

In all those identified with NAFLD, disease information should be provided to patients and their families. Intensive lifestyle modification targeting a ≥ 7% weight loss is recommended; motivational interviewing can increase commitment to change and yield a customized action plan for sustained weight loss. Working with the support and encouragement of their team of primary care providers, dieticians, and MOVE! coaches, patients can actively engage to improve their NAFLD and overall health.

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Author disclosures

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Disclaimer

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CASE 1. DOES THIS PATIENT HAVE NAFLD AND IS TREATMENT NEEDED?

Joe is a 55-year-old trucker with hypertension, obesity (BMI = 33), prediabetes, and hypertriglyceridemia. He consumes 1 to 2 beers weekly. His medications included chlorthalidone 25 mg po qd. Several months ago, after experiencing several hours of moderate right upper quadrant pain, Joe's liver ultrasound revealed liver steatosis. His laboratory evaluation was notable for the following:

- elevated fasting plasma glucose: 120 mg/dL (normal < 100 mg/dL)
- elevated fasting triglycerides: 250 mg/dL (normal < 160 mg/dL)
- normal AST/ALT: 24 U/L (AST), 29 U/L (ALT)
- normal platelet count: 240,000/mm^3
- negative hepatitis B surface antigen and negative hepatitis B core antibody
- negative hepatitis C antibody
- normal FIB-4: 1.07

Assessment

Joe's primary care provider diagnosed him with likely NAFLD with simple steatosis, normal liver enzymes, and metabolic syndrome (exhibiting 3 of 5 criteria: hypertension, prediabetes, hypertriglyceridemia). His favorable FIB-4 of 1.07 makes NAFLD advanced fibrosis highly unlikely (with a 90% negative predictive value). With his obesity, metabolic syndrome, and likely NAFLD steatosis, Joe would benefit from intensive lifestyle intervention with ≥ 150 minutes of moderate exercise weekly, a hypocaloric diet, and behavioral changes with a goal of achieving ≥ 7% weight loss. This has been demonstrated to prevent progression to T2DM and reverse NAFLD steatosis. Using motivational interviewing and shared decision making, Joe acknowledged and agreed with the benefits of this approach.

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CASE 2. DOES THIS PATIENT HAVE NAFLD AND IS TREATMENT INDICATED?

Bill is a 65-year-old mechanic with type 2 diabetes mellitus (T2DM), hypertension, severe obesity (BMI = 36), sleep apnea, depression, hypercholesterolemia, and hypertriglyceridemia. He abstains from alcohol. None of his medications are associated with steatosis. On ultrasonography for abdominal aortic aneurysm screening, Bill was incidentally noted to exhibit an echogenic liver consistent with liver steatosis.

His laboratory evaluation was notable for the following:

- HbA_{1c}: 8.4%
- elevated fasting triglycerides: 350 mg/dL
- elevated AST/ALT: 54 U/L (AST), 45 U/L (ALT)
- decreased platelet count: = 140,000/mm^3
- negative hepatitis B surface antigen and negative hepatitis B core antibody
- negative hepatitis C antibody
- elevated FIB-4: 3.56

Assessment

Bill's primary care provider diagnosed him with likely NAFLD and elevated liver enzymes; his FIB-4 of 3.56 makes NAFLD advanced fibrosis highly likely, and he is referred for hepatology or gastroenterology consultation. With his severe obesity, T2DM, sleep apnea, hypertension, and other comorbidities, Bill would benefit from intensive lifestyle intervention and consideration for bariatric surgery.

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