



Fatty liver disease, now often termed metabolic dysfunction-associated steatotic liver disease (MASLD), involves excess fat buildup in liver cells, affecting up to 30% of adults globally. It's frequently "silent" with no early symptoms but can progress to serious issues like cirrhosis if unchecked.

**Grades of Fatty Liver:** Fatty liver is graded by fat accumulation severity, typically via imaging or rarely by biopsy.

- Grade 1 (Mild): Fat in 5-33% of hepatocytes; often reversible with lifestyle management (weight loss). Liver enzymes are usually normal but may be slightly elevated (below 100).
- Grade 2 (Moderate): Fat in 34-66% of cells; higher risk of inflammation (steatohepatitis). Fatigue or right upper quadrant discomfort may be present.
- Grade 3 (Severe): Fat exceeds 66%; prone to fibrosis, NASH and scarring. Advanced cases show portal hypertension signs on USG.

Progression links to metabolic syndrome—obesity, diabetes, high lipids—beyond just alcohol (AFLD vs. non-alcoholic). In recent years non-alcoholic fatty liver has become common, largely in diabetics.

### **Diagnostic Tools**

Early detection/ grading relies on non-invasive tools (USG/ Fibroscan) before biopsy.

- Blood Tests: Elevated ALT/AST (transaminases), GGT.
- Ultrasound: First-line evaluation; detects echogenicity (bright liver) and grades steatosis. Limited in obesity due to poor acoustic window
- Fibroscan/Elastography: Measures liver stiffness (kPa for fibrosis) and fat (CAP score >248 dB/m indicates steatosis). Non-invasive, repeatable.
- MRI-PDFF/CT: Gold standard for fat quantification; MRI best for grades. Biopsy confirms NASH/fibrosis if needed but not used much.

High-risk groups: BMI >25, T2DM, dyslipidaemia.

### **Management Strategies**

No FDA-approved drugs yet; focus is lifestyle reversal, as 5-10% weight loss cuts liver fat by 50%.

#### **Lifestyle Core:**

- Diet: veggies, fruits, whole grains, omega-3s (fish/nuts), reduced intake of sugars/fructose, refined carbs, saturated fats. Limit to 1500-1800 kcal/day initially.[7][3]
- Exercise: 150+ min/week aerobic (brisk walk) + resistance training. Also boosts insulin sensitivity.
- Weight Loss: Aim 7-10% over 6-12 months; even 3% helps Grade 1

#### **Medical:**

- Control comorbidities: Metformin/statins for diabetes/lipids; avoid hepatotoxins.
- Emerging: GLP-1 agonists (e.g., semaglutide) show promise in trials for NASH resolution
- Alcoholics: Total abstinence critical

**Monitor:** Every 6-12 months; advanced fibrosis may need hepatologist. Bariatric surgery for BMI >35. Prevention beats cure—regular checks save livers.

### **Major Types (Primary Causes)**

Fatty liver splits into two main forms based on etiology.

- Alcoholic Fatty Liver Disease (AFLD): Heavy alcohol intake (>20-30g/day women, >30-40g/day men) impairs fat metabolism, causing steatosis within weeks. Binge drinking accelerates onset.
- Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD, formerly NAFLD): Non-alcohol related; stems from insulin resistance where free fatty acids flood the liver. Affects 25-30% globally, higher in diabetics (50-70%).

### **Key Risk Factors**

Multiple modifiable and non-modifiable drivers converge.

- Metabolic Syndrome Cluster: Central obesity (waist >90cm women, >100cm men in Asians), type 2 diabetes, hypertension, dyslipidemia (high triglycerides >150mg/dL, low HDL). These amplify via inflammation and oxidative stress.[2][5]
- Lifestyle Culprits: Excess calorie intake, especially fructose (sugary drinks, processed foods), refined carbs, saturated fats; sedentary habits (<150 min/week exercise). Rapid weight loss or malnutrition paradoxically worsens it by mobilizing stored fats.[6][1]
- Medical Conditions: PCOS, hypothyroidism, sleep apnea, hypopituitarism; even lean NAFLD in 10-20% via visceral fat or genetics. Drugs like corticosteroids, tamoxifen contribute rarely.

**Remember – early intervention with life style management halts 80% cases.**