

# New Research Highlights Male and Female Differences in Cardiometabolic Drivers of Liver Fibrosis

Analysis by [Dr. Joseph Mercola](#)

May 08, 2026

## STORY AT-A-GLANCE

- › Liver fibrosis develops silently and worsens when metabolic stress builds, meaning early lifestyle changes may help reduce the risk of progressive damage
- › Women experience a sharper increase in liver damage once metabolic risk factors appear, suggesting that the same health issues may lead to faster progression depending on your biology
- › Research suggests that excess abdominal fat and poor blood sugar control have a strong association with liver scarring, making them important areas to focus on
- › Having multiple metabolic problems at the same time creates a compounding effect that was associated with substantially higher risk of liver damage than any single issue alone
- › Removing vegetable oils and alcohol, improving carbohydrate metabolism, supporting fat clearance with choline and staying active may help address factors associated with liver fibrosis

Your liver could be scarring right now, and you might not know it. Liver fibrosis, the gradual buildup of scar tissue from repeated metabolic stress, produces no symptoms in its early stages. By the time fatigue, discomfort, or blood work abnormalities surface, the damage is often well underway. Left unaddressed, this process may progress into more serious conditions like cirrhosis, liver failure, or liver cancer.

Recent findings published in JAMA Network Open highlight a shift in how this condition is understood.<sup>1</sup> Instead of focusing only on how common liver disease is, the research points to how it progresses under different metabolic conditions. The data suggest that underlying metabolic stress – not just the presence of disease – plays a central role in how quickly liver damage develops and worsens over time.

Liver health is tightly tied to how your body manages energy. Factors like blood sugar control, fat distribution, and overall metabolic balance influence how much strain your liver faces every day. When these systems fall out of alignment, your liver absorbs that burden, and the repair process turns into a cycle of damage and scarring. What's more, the same metabolic signals lead to very different outcomes depending on your biology.

## **Metabolic Risks Hit Women's Livers Harder**

A study published in JAMA Network Open analyzed 5,981 U.S. adults in a cross-sectional observational analysis using data from the National Health and Nutrition Examination Survey between 2017 and 2020, aiming to understand how common metabolic problems affect liver scarring differently in men and women.<sup>2</sup>

Researchers used a specialized scan that measures how stiff the liver is – higher stiffness means more scarring. The goal was to identify which risk factors matter most and who they impact the hardest.

- **Women show higher risk despite lower overall rates** – The population included nearly equal numbers of men and women, with an average age in the late 40s. While men had a higher overall rate of significant liver fibrosis at 10.7% compared to 6.9% in women, the pattern flipped when specific metabolic problems were present. Women experienced a much sharper increase in risk once those triggers appeared, suggesting the condition may escalate more quickly.
- **Central body fat shows a strong risk association** – Women had a much higher prevalence of central fat, with 69% exceeding the risk threshold compared to 48.6% of men. More importantly, the impact of that fat differed dramatically. Women with

high waist circumference had over 13 times higher odds of significant fibrosis, compared to about 4.4 times higher odds in men. This shows that where fat is stored matters more than total weight, especially for women.

- **Blood sugar problems show stronger associations with liver damage in women** – Another key factor was glucose intolerance, which refers to difficulty regulating blood sugar. Even though fewer women had this issue compared to men, its effect on liver health was stronger in women. Women with glucose intolerance had nearly three times the odds of fibrosis, compared to about 1.5 times in men.
- **Multiple metabolic issues multiply the danger rapidly** – People with two or more cardiometabolic risk factors, such as high blood pressure, unbalanced cholesterol levels, or elevated blood sugar, had an increased risk. In women, this combination increased fibrosis risk more than tenfold, compared to less than threefold in men. This stacking effect means each additional issue compounds the stress on your liver.

## Key Metabolic Drivers Behind Liver Fibrosis

Interestingly, not every metabolic issue carried the same weight. Conditions like high blood pressure, high triglycerides, and low HDL cholesterol showed similar effects between men and women. The study highlights central fat and blood sugar control as the most important levers to watch closely.<sup>3</sup>

- **Inflammation from visceral fat fuels liver scarring** – Visceral fat – the fat stored deep around your organs – behaves differently from fat under your skin. It releases inflammatory signals and disrupts insulin sensitivity, meaning your body struggles to manage blood sugar efficiently. That combination may create ongoing stress that contributes to liver damage and scarring over time.
- **Impaired glucose control disrupts energy inside liver cells** – Research suggests that when blood sugar stays elevated or unstable, your liver may convert excess glucose into fat, which accumulates in liver tissue. This buildup interferes with

normal cellular function and creates oxidative stress, a process where unstable molecules damage cells. Over time, this may contribute to fibrosis as your liver attempts to repair itself repeatedly.

- **Stacked metabolic stress overwhelms repair systems** – When multiple risk factors occur together, your liver faces simultaneous pressures – inflammation, fat buildup, and metabolic dysfunction. Instead of recovering, the tissue shifts into a cycle of injury and repair that replaces healthy cells with scar tissue. This may help explain why having more than one issue was associated with faster progression rather than simply slightly higher risk.

## **Address the Root Causes Driving Liver Fibrosis**

The encouraging takeaway is that the same metabolic levers driving fibrosis are the ones you have the most control over. Visceral fat and blood sugar regulation are areas where dietary and lifestyle changes may help.

Your liver reflects what you feed it and how you live day to day. The patterns that drive fibrosis don't act in isolation. They stack. Once they do, your liver shifts from repair mode into damage mode. Turning that around requires removing the stressors first, then giving your body what it needs to clear fat and restore function.

- 1. Remove vegetable oils and alcohol to help reduce ongoing liver stress** – If your diet includes packaged or restaurant foods made with soybean, canola, corn, or generic "vegetable oil," your liver deals with a constant stream of linoleic acid (LA).

This fat breaks down into harmful compounds called oxidized linoleic acid metabolites (OXLAMs), reactive byproducts that embed themselves in cell membranes, making them fragile and triggering a chain of inflammatory signals your liver has to process on top of everything else.<sup>4</sup>

At the same time, alcohol breaks down into acetaldehyde, a highly reactive compound that poisons the energy-producing machinery inside your liver cells, slowing their ability to detoxify and repair. Both of these – vegetable or seed oils and alcohol – interfere with your liver's ability to detoxify and regenerate. Removing them reduces the ongoing stress that drives fibrosis, especially if signs like belly fat or poor blood sugar control are already present.

## **2. Use choline-rich foods that may help reduce fat accumulation in your liver –**

Research suggests choline helps keep fat moving through your liver rather than building up inside liver cells. Without adequate choline, fat may accumulate, potentially increasing inflammation and scarring risk.<sup>5</sup> Think of choline as your liver's loading dock – it keeps fat packed and shipped out. When choline runs low, the dock backs up and fat accumulates inside the organ.

Pastured egg yolks offer one of the most effective sources, especially when sourced from eggs low in polyunsaturated fats. Grass-fed beef liver provides another highly absorbable option. This nutrient is involved in forming phosphatidylcholine, which your liver uses to package and export fat.<sup>6</sup> When that process works properly, one of the factors associated with fibrosis may be reduced.

## **3. Use targeted choline supplementation when food intake falls short –** If your diet doesn't include enough animal-based foods, reaching adequate choline intake is difficult. Plant sources contain only small amounts, and relying on them alone leaves a gap. In that case, supplementation may be worth considering to support liver function.

Some research has examined citicoline as a potential option, with doses in some studies ranging from 500 mg to 2,500 mg per day. Consult your health care provider before beginning any supplement regimen. At that level, research suggests it may support your liver's ability to move fat out while also potentially increasing acetylcholine production in your brain, which may help support cognitive function.<sup>7,8</sup>

**4. Stay active daily to reduce visceral fat and improve metabolic control** – Regular activity improves how your body handles blood sugar and reduces the deep abdominal fat tied to liver scarring. This doesn't require extreme workouts. Regular brisk walks, consistent daily movement, and simple resistance exercises keep blood flowing and metabolic signals balanced.

If your waist circumference exceeds 40 inches for men or 35 inches for women, that signals visceral fat accumulation – the type most strongly linked to liver damage. Reducing that measurement has been associated with lower risk.

**5. Focus on simple, whole meals that reduce metabolic strain** – Each processed meal reloads the same metabolic triggers – unstable fats, refined carbohydrates, and chemical additives – that research has associated with fibrosis progression. These may disrupt energy production and increase inflammation inside your liver. Replacing them with whole, nutrient-dense foods stabilizes blood sugar and reduces the burden on your system.

That shift may help redirect signaling inside your liver from fat storage and damage toward clearance and repair.

## **FAQs About Liver Fibrosis and Metabolic Risk**

**Q: What is liver fibrosis and why is it dangerous?**

**A:** Liver fibrosis is the buildup of scar tissue that forms when your liver is repeatedly stressed or injured. Over time, this scarring interferes with normal liver function. Early stages often have no symptoms, which is why it goes unnoticed. As it progresses, it can contribute to fatigue, discomfort, and reduced energy. If it continues unchecked, it can advance into cirrhosis, liver failure, or liver cancer.

**Q: What are the main drivers of liver fibrosis?**

**A:** Research suggests the main drivers are metabolic issues that disrupt how your body handles energy. These include excess abdominal fat, poor blood sugar control, and multiple cardiometabolic risk factors occurring together. When these stack up, your liver may face constant stress from inflammation, fat buildup, and metabolic dysfunction, which is associated with accelerated scarring.

**Q: Do men and women face the same risk of liver fibrosis?**

**A:** No. While men show higher overall rates of liver fibrosis, the study found that women experience a much sharper increase in risk once certain metabolic problems are present. This suggests the condition may escalate more aggressively in women when key risk factors appear, even if baseline rates are lower.

**Q: How does fat buildup actually damage the liver?**

**A:** When your body can't properly manage blood sugar, research suggests that excess glucose may be converted into fat and stored in your liver. At the same time, visceral fat releases inflammatory signals that disrupt normal metabolism. This creates a cycle where your liver keeps trying to repair itself, but repeated stress leads to scar tissue replacing healthy cells.

**Q: What dietary and lifestyle strategies may be worth considering?**

**A:** Focus on removing the root causes and restoring metabolic balance. Eliminating vegetable oils and alcohol reduces toxic stress on your liver. Supporting fat clearance with choline may help reduce buildup inside liver cells. Daily movement lowers visceral fat and improves blood sugar control. Replacing processed foods with whole, nutrient-dense meals stabilizes your metabolism and reduces inflammation, which may support your liver's ability to recover.

*This article is for informational purposes only and does not constitute medical advice. Consult a qualified healthcare provider before making changes to your health regimen.*

## Sources and References

---

- <sup>1, 2, 3</sup> [JAMA Network Open 2026 Mar 9;9\(3\):e260863](#)
- <sup>4</sup> [Nutrients. 2023 Jul 13;15\(14\):3129](#)
- <sup>5, 6</sup> [Adv Nutr. 2016 Jan 7;7\(1\):5–13](#)
- <sup>7</sup> [Neurosci Insights. 2023 Feb 16;18:26331055231152496](#)
- <sup>8</sup> [Hum Psychopharmacol. 2018 Jul;33\(4\):e2662](#)