



Being drafted with United Liver

Vitamins and Minerals

Primary Biliary Cholangitis (PBC)

In PBC, nutrition isn't just about diet, it's about what your body can actually absorb and use. Monitoring and maintaining the right vitamin and mineral levels can play a critical role in long-term health, symptom control, and quality of life.

Bile produced by the liver plays a key role in helping the body absorb fat-soluble vitamins (A, D, E and K). In PBC, damage to the small bile ducts can reduce bile flow, making it more difficult to absorb these vitamins effectively. In addition, liver dysfunction can affect how nutrients are processed, stored and utilised.

For this reason, it is important that people with PBC have their vitamin and nutrient levels monitored regularly. A balanced diet can provide many essential nutrients, but supplementation may sometimes be required. This should only be done with appropriate guidance, as excessive intake of certain vitamins and minerals can be harmful.

Important Notes for PBC Patients

- Fat-soluble vitamin deficiency (A, D, E, K) is the key risk area
- Supplements may be required, but only under medical supervision
- Blood tests are often needed to guide supplementation
- Over-supplementation (particularly vitamins A and D) can be harmful, especially in liver disease
- Bone health (Vitamin D + Calcium) should be proactively managed

It is very difficult to consume excessive amounts of vitamins and minerals through food alone. Most cases of toxicity are linked to high-dose supplements, which is why supplementation should always be guided by clinical advice.



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Fat-Soluble Vitamins

These fat-soluble vitamins (A, D, E and K) are most at risk in PBC due to reduced bile flow, making monitoring particularly important.

Nutrient	Recommended daily intake	Food sources	Why it matters to PBC	Deficiency symptoms	Excess (toxicity)	Notes
Vitamin A	700 µg (women) / 900 µg (men)	1 medium carrot ≈ 500 µg 100g sweet potato ≈ 700–900 µg 1 cup spinach ≈ 470 µg	Fat malabsorption can lead to deficiency → vision and immune issues	Night blindness Dry eyes/skin Increased infections	Headache, dizziness Liver toxicity (important in liver disease as excess can accumulate in liver)	Stored in the liver. Avoid high-dose supplements unless prescribed.
Vitamin D	10–20 µg (400–800 IU), though higher doses are often required if deficiency is present	Salmon (100g) ≈ 10–20 µg Fortified milk (1 glass) ≈ 2–3 µg Egg yolk ≈ 1 µg	High risk of osteopenia/osteoporosis in PBC due to impaired absorption and liver function	Bone pain Muscle weakness Increased fracture risk	High calcium can lead to kidney stones, confusion	Routine monitoring recommended; often requires supplementation
Vitamin E	15 mg	30g almonds ≈ 7 mg 1 tbsp sunflower seeds ≈ 5 mg 1 avocado ≈ 2–3 mg	Antioxidant; protects nerve and muscle function	Neuropathy (nerve damage) Muscle weakness Coordination problems	Increased bleeding risk (especially at high doses)	Deficiency more likely in advanced cholestasis
Vitamin K	90 µg (women) / 120 µg (men)	1 cup kale ≈ 500–1000 µg 1 cup broccoli ≈ 200 µg	Essential for blood clotting. Deficiency risk increases with cholestasis.	Easy bruising Prolonged bleeding Bleeding gums	Rare; may interfere with anticoagulant medications	May be required if clotting is impaired; monitor in advanced disease



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Water-Soluble Vitamins

Water-soluble vitamins are not dependent on bile for absorption.

Nutrient	Recommended daily intake	Food sources	Why it matters to PBC	Deficiency symptoms	Excess (toxicity)	Notes
Vitamin B12	2.4 µg	Beef (100g) ≈ 2–3 µg Eggs (2) ≈ 1 µg	Fatigue is common; B12 deficiency can worsen this and contribute to anaemia and neurological symptoms	Fatigue Nerve damage (tingling, numbness) Anaemia	Rare (generally safe even at high doses)	Absorption depends on stomach/intrinsic factor, not bile. Deficiency less directly linked to PBC but still relevant to fatigue.
Folate (Vitamin B9)	400 µg	Lentils (100g) ≈ 180 µg Spinach ≈ 150 µg	Supports red blood cell production and energy levels	Fatigue Anaemia Mouth ulcers	High doses may mask B12 deficiency (risk of delayed diagnosis of nerve damage)	Important to assess alongside B12. Do not supplement folate alone if B12 deficiency suspected.
Vitamin C	75–90 mg	Orange ≈ 70 mg Red pepper ≈ 150 mg	Immune support and antioxidant protection; may help reduce oxidative stress in liver disease	Fatigue Poor wound healing Gum bleeding (scurvy in severe cases)	Gastrointestinal upset (diarrhoea). High doses (particularly >1000 mg/day) may increase risk of kidney stones	Not affected by bile. Generally well absorbed; usually adequate with a normal diet



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Minerals

Nutrient	Recommended daily intake	Food sources	Why it matters to PBC	Deficiency symptoms	Excess (toxicity)	Notes
Calcium	1000–1200 mg	Milk (1 glass) ≈ 300 mg Yogurt ≈ 200–300 mg	Bone health (osteoporosis risk increased in PBC, especially with low vitamin D)	Weak bones Increased fracture risk Muscle cramps	Kidney stones Constipation High blood calcium (hypercalcaemia)	Closely linked with vitamin D for bone health.
Iron	8 mg (men), 18 mg (women pre-menopause)	Red meat (100g) ≈ 2–3 mg Lentils ≈ 3 mg	Balance is important. Fatigue from deficiency vs risk of iron overload in liver disease.	Fatigue Anaemia Shortness of breath	Iron overload → liver damage, joint pain, fatigue	Supplementation should only be considered if deficiency is confirmed, as excess iron can accumulate in the liver.
Magnesium	300–400 mg	Nuts (30g) ≈ 80 mg Spinach ≈ 150 mg	Supports muscle, nerve, and energy function; may help with fatigue and cramps	Muscle cramps Fatigue Weakness	Diarrhoea (common) Low blood pressure (high doses)	Usually obtained from diet; supplements may be used short-term if needed.
Zinc	8–11 mg	Beef (100g) ≈ 5 mg Nuts ≈ 1–2 mg	Immune function, wound healing, and taste; may be reduced in chronic liver disease	Poor wound healing Reduced appetite Altered taste (dysgeusia)	Nausea Copper deficiency with long-term high doses	Long-term high-dose supplementation should be avoided unless monitored.



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PBC: Vitamins & Minerals – Expanded Practical Food Table

Fat-soluble vitamin
 Water-soluble vitamin
 Mineral

Nutrient	Recommended daily intake	Food sources (approx. amount provided)
Vitamin A	700 µg (women) / 900 µg (men)	Carrot (1 medium) ≈ 500 µg Sweet potato (100g) ≈ 700–900 µg Spinach (1 cup cooked) ≈ 470 µg Kale ≈ 200–400 µg Butternut squash ≈ 400 µg Red pepper ≈ 150 µg Eggs (2) ≈ 150 µg Milk (1 glass) ≈ 75–100 µg
Vitamin B1 (Thiamine)	1.1–1.2 mg	Wholemeal bread (1 slice) ≈ 0.1 mg Brown rice (100g) ≈ 0.2 mg Pork (100g) ≈ 0.8 mg Sunflower seeds (30g) ≈ 0.5 mg Beans ≈ 0.2 mg Peas ≈ 0.2 mg
Vitamin B2 (Riboflavin)	1.1–1.3 mg	Milk (1 glass) ≈ 0.4 mg Yogurt ≈ 0.3–0.4 mg Eggs (2) ≈ 0.5 mg Almonds (30g) ≈ 0.3 mg Mushrooms ≈ 0.4 mg Spinach ≈ 0.2 mg
Vitamin B3 (Niacin)	14–16 mg	Chicken (100g) ≈ 10–12 mg Tuna ≈ 10 mg Turkey ≈ 8 mg Peanuts (30g) ≈ 4 mg Mushrooms ≈ 3 mg Whole grains ≈ 2–4 mg
Vitamin B5	5 mg	Chicken ≈ 1.5 mg Mushrooms ≈ 1.5 mg Avocado ≈ 2 mg Yogurt ≈ 1 mg Eggs ≈ 1 mg Broccoli ≈ 1 mg
Vitamin B6	1.3–1.7 mg	Chicken ≈ 0.5 mg Banana ≈ 0.4 mg Potatoes ≈ 0.3 mg Chickpeas ≈ 0.5 mg Salmon ≈ 0.6 mg



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Vitamin B7 (Biotin)	~30 µg	Eggs (2) ≈ 10–20 µg Nuts ≈ 5–10 µg Seeds ≈ 5–10 µg Salmon ≈ 5 µg Sweet potato ≈ 5 µg
Vitamin B9 (Folate)	400 µg	Lentils ≈ 180 µg Spinach ≈ 150 µg Asparagus ≈ 150 µg Broccoli ≈ 60 µg Orange ≈ 40 µg Avocado ≈ 80 µg
Vitamin B12	2.4 µg	Beef ≈ 2–3 µg Salmon ≈ 2–4 µg Tuna ≈ 2–3 µg Eggs ≈ 1 µg Milk ≈ 1 µg Yogurt ≈ 1 µg
Vitamin C	75–90 mg	Orange ≈ 70 mg Apple ≈ 5–10 mg Strawberries ≈ 60 mg Kiwi ≈ 70 mg Red pepper ≈ 150 mg Broccoli ≈ 90 mg Potatoes ≈ 20 mg
Vitamin D	10–20 µg	Salmon ≈ 10–20 µg Mackerel ≈ 8–16 µg Sardines ≈ 5–10 µg Egg yolk ≈ 1 µg Fortified milk ≈ 2–3 µg Fortified cereals ≈ 2–5 µg
Vitamin E	15 mg	Almonds ≈ 7 mg Sunflower seeds ≈ 7 mg Olive oil (1 tbsp) ≈ 2 mg Avocado ≈ 2–3 mg Spinach ≈ 2 mg Peanuts ≈ 2 mg
Vitamin K	90–120 µg	Kale ≈ 500–1000 µg Spinach ≈ 400 µg Broccoli ≈ 200 µg Brussels sprouts ≈ 150 µg Green beans ≈ 50 µg



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Calcium	1000–1200 mg	Milk ≈ 300 mg Yogurt ≈ 200–300 mg Cheese ≈ 200 mg Sardines ≈ 300–400 mg Kale ≈ 150 mg Almonds ≈ 75 mg
Iron	8 mg / 18 mg	Red meat ≈ 2–3 mg Chicken ≈ 1 mg Lentils ≈ 3 mg Spinach ≈ 2–3 mg Beans ≈ 2–3 mg Fortified cereals ≈ 5–10 mg
Magnesium	300–400 mg	Nuts ≈ 80 mg Seeds ≈ 100 mg Spinach ≈ 150 mg Whole grains ≈ 50–100 mg Dark chocolate ≈ 60 mg Banana ≈ 30 mg
Phosphorus	700 mg	Milk ≈ 250 mg Meat ≈ 200 mg Fish ≈ 200 mg Nuts ≈ 100–200 mg Beans ≈ 100 mg
Potassium	3500–4700 mg	Banana ≈ 400 mg Apple ≈ 150 mg Potatoes ≈ 900 mg Beans ≈ 600 mg Spinach ≈ 800 mg Yogurt ≈ 300 mg
Selenium	55 µg	Brazil nuts (1–2) ≈ 100 µg Fish ≈ 40–60 µg Eggs ≈ 20 µg Chicken ≈ 20–30 µg
Zinc	8–11 mg	Beef ≈ 5 mg Chicken ≈ 2 mg Shellfish ≈ 20–30 mg Nuts ≈ 1–2 mg Seeds ≈ 2–3 mg Dairy ≈ 1–2 mg