

● NGN NCLEX 2026 • ENDOCRINE SYSTEM

# Hypothyroidism

Underactive thyroid → **slowed metabolism**. Everything in the body slows down.  
Lifelong hormone replacement is the cornerstone of care.



01 • OVERVIEW

## Definition & Why It Matters

### What is it?

**Hypothyroidism** is an underactive thyroid gland that fails to produce enough thyroid hormone (T3 & T4), causing every metabolic process in the body to slow down.

Most common cause is **Hashimoto's thyroiditis** — an autoimmune destruction of the thyroid gland. Other causes: iodine deficiency, surgical removal, radiation therapy, and certain medications (lithium, amiodarone).

**Clinical bottom line:** Think "everything SLOW" — slow heart, slow gut, slow mind, slow metabolism, cold body.



#### TSH Elevated

Primary hypothyroidism hallmark



#### Free T4 Low

Confirms gland dysfunction

**5:1**

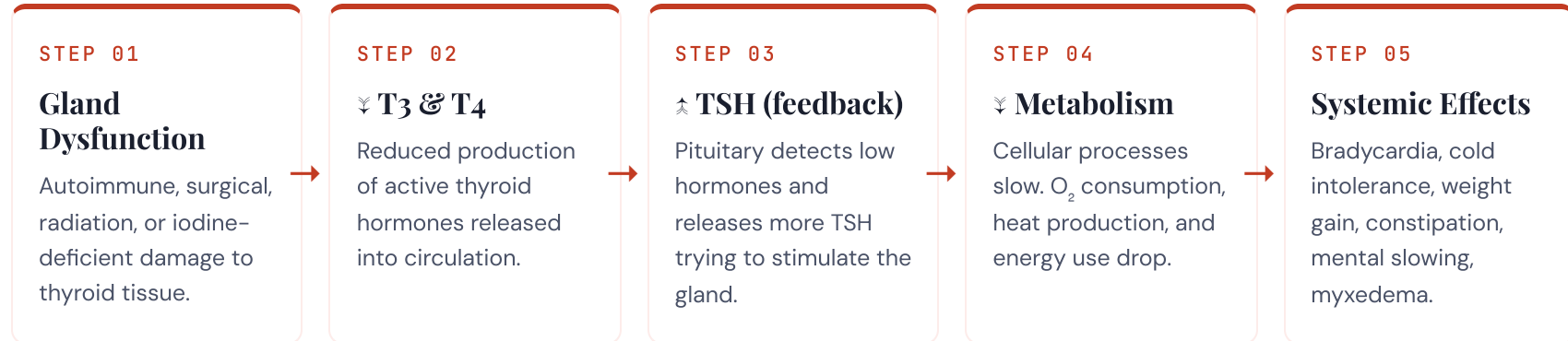
#### Female Predominance

Women affected far more often

02 • PATHOPHYSIOLOGY

## The Cascade

Thyroid dysfunction triggers a systemic metabolic slowdown. Follow the chain from gland → hormones → body-wide effects.



**Key pattern:** In *primary* hypothyroidism (gland problem) → TSH is HIGH, T4 is LOW. In *secondary* hypothyroidism (pituitary problem) → both TSH and T4 are LOW.

03 • ASSESSMENT

## Signs & Symptoms

EARLY /  
MILD

**Gradual onset — easy to miss**

- **Fatigue & lethargy** — often the first complaint

LATE / SEVERE

**Myxedematous features**

- **Bradycardia** — HR often < 60 bpm
- **Hypotension** — low cardiac output

- **Cold intolerance** — wears sweaters in summer
- **Weight gain** — despite poor appetite
- **Constipation** — slowed GI motility
- **Dry skin & brittle hair/nails**
- **Hair loss** — including outer eyebrows
- **Menstrual changes** — menorrhagia
- **Mental slowing** — "brain fog," depression

- **Hypothermia** — poor heat production
- **Periorbital & peripheral edema** — non-pitting "myxedema"
- **Hoarseness** — vocal cord edema
- **Macroglossia** — enlarged, swollen tongue
- **Hyporeflexia** — delayed DTR relaxation
- **Pleural/pericardial effusions**

 Life-Threatening Emergency

## *Myxedema Coma*

The most severe, life-threatening form of hypothyroidism. Often triggered by infection, cold exposure, surgery, sedatives, or abrupt withdrawal of levothyroxine. **Mortality is high — this is an ICU emergency.**



Hypothermia

Hypotension

Hypoventilation

Hyponatremia

Hypoglycemia

Bradycardia

↓ LOC / Coma

Cardiovascular collapse

Interventions follow NCLEX prioritization: **ABCs** → **Safety** → **Physiologic needs**. Myxedema coma requires airway & circulation first.

A • B • C

### Airway & Circulation

- ✓ **Monitor respiratory status** — risk of hypoventilation & respiratory failure
- ✓ **Continuous cardiac monitoring** — bradycardia, arrhythmias
- ✓ Assess LOC every 1–2 hours in severe disease
- ✓ Pulse ox continuously; be ready for mechanical ventilation in myxedema coma

Safety

### Fall & Hypothermia Risk

- ✓ **Provide warm environment** — layered blankets, warm (not hot) room
- ✓ **Never use electric heating pads** — risk of peripheral vasodilation → shock
- ✓ Fall precautions — fatigue + mental slowing
- ✓ Protect skin — dry/fragile skin prone to breakdown

Meds

### Hormone Replacement

- ✓ **Administer levothyroxine** as prescribed, same time daily
- ✓ Give in **AM on empty stomach** — 30–60 min before breakfast
- ✓ Start LOW & go SLOW in elderly / cardiac patients
- ✓ For myxedema coma: **IV levothyroxine** loading dose + supportive care

Comfort

### Metabolic Support

- ✓ **High-fiber, low-calorie diet** — prevents constipation, limits weight gain
- ✓ Adequate fluid intake (unless fluid-restricted)
- ✓ **Avoid sedatives/opioids** — can precipitate myxedema coma
- ✓ Encourage rest balanced with gradual activity

| DRUG / CLASS                                   | MECHANISM                                                                                          | SIDE EFFECTS (= HYPERTHYROID SIGNS)                                                              | NURSING CONSIDERATIONS                                                                                                                     |
|------------------------------------------------|----------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Levothyroxine</b><br>SYNTHROID · LEVOTHROID | Synthetic <b>T4</b> hormone; converted peripherally to active T3. Restores normal metabolic state. | Tachycardia, palpitations, chest pain, insomnia, weight loss, heat intolerance, tremor, diarrhea | <b>AM, empty stomach</b> , 30–60 min before breakfast. <b>Lifelong therapy</b> . Never stop abruptly. Monitor TSH q6–8 weeks until stable. |
| <b>Liothyronine</b><br>CYTOMEL                 | Synthetic <b>T3</b> hormone; faster onset than T4. Used in myxedema coma & short-term therapy.     | Same as levothyroxine but more pronounced — cardiac effects intensify quickly                    | Shorter half-life → more frequent dosing. Watch cardiac patients closely.                                                                  |



### Timing & Interactions

Separate levothyroxine from **iron, calcium, antacids, and fiber supplements by 4 hours** — these drastically reduce absorption. Also separate from bile acid sequestrants (cholestyramine).



### Dose Adjustment Red Flags

Report **chest pain, palpitations, HR > 100, weight loss, or insomnia** — signs of over-replacement (iatrogenic hyperthyroidism). Dose must be reduced.

## 06 • TEST TRAPS

# NCLEX Traps & Pitfalls

Watch for these carefully-worded distractors on the exam. The NCLEX loves testing the *opposite* disease alongside to see if you can tell them apart.

### TRAP 01

**Hypo vs. Hyper confusion**

### TRAP 02

**Empty stomach timing**

### TRAP 03

**"When I feel better, I can stop"**

**HYP0 =**  
**slow**

vs

**HYPER =**  
**fast**

If the stem says **weight loss, tachycardia, heat intolerance, diarrhea** → it's **HYPER**thyroidism. Don't pick the hypo answer just because the question says "thyroid."

"Take levothyroxine with breakfast" is **WRONG**. Must be taken on an empty stomach, 30–60 min *before* breakfast. Food significantly decreases absorption.

Indicates a **need for more teaching**. Therapy is **lifelong**. Stopping abruptly can precipitate myxedema coma.

**TRAP 04**

**Electric heating pad**

Never use for a cold hypothyroid client. Causes peripheral vasodilation → **vascular collapse**. Use layered blankets instead.

**TRAP 05**

**Sedatives / Opioids**

Hypothyroid patients have **increased sensitivity** to CNS depressants. Can precipitate **myxedema coma**. Give cautiously, reduced dose.

**TRAP 06**

**Starting dose in elderly**

Don't pick "full replacement dose." Elderly & cardiac patients need **low starting dose, slow titration** — risk of MI, angina, arrhythmias.

| FINDING               | Hypothyroidism (SLOW)       | Hyperthyroidism (FAST)       |
|-----------------------|-----------------------------|------------------------------|
| Heart Rate            | Bradycardia                 | Tachycardia                  |
| Weight                | Gain (despite ↓ appetite)   | Loss (despite ↑ appetite)    |
| Temperature Tolerance | Cold intolerance            | Heat intolerance             |
| GI                    | Constipation                | Diarrhea                     |
| Skin                  | Dry, cool, coarse           | Warm, moist, smooth          |
| Mental State          | Slowed, depressed, fatigued | Anxious, irritable, restless |
| TSH (primary)         | HIGH ↑                      | LOW ↓                        |

Free T4

LOW ↓

HIGH ↑

07 • TEACHING

## Patient Education



### Medication for Life

Take levothyroxine every day at the same time. Don't stop, don't skip, don't double up. Lifelong therapy is expected.



### Morning, Empty Stomach

Take with a full glass of water 30–60 min before breakfast. Separate from iron, calcium, antacids by 4 hours.



### Report Warning Signs

Report chest pain, palpitations, HR > 100, unexplained weight loss, insomnia, or tremors — may signal over-replacement.



### Lab Monitoring

Follow-up TSH labs every 6–8 weeks after dose change, then every 6–12 months when stable.



### Diet & Lifestyle

High-fiber, low-calorie diet. Adequate fluids. Moderate exercise as tolerated. Avoid excess soy (can reduce absorption).



### Never Stop Abruptly

Stopping suddenly can cause myxedema coma — a life-threatening emergency. Always consult HCP before any change.

08 • MEMORY

## Mnemonics & Memory Boosters

## "SLUGGISH" — Think HYPO

- S** **Slow** everything — HR, gut, thought, metabolism
- L** **Lethargy** & fatigue (#1 early complaint)
- U** **Under**active gland → ↓ T3/T4, ↑ TSH
- G** **Gain** weight despite poor appetite
- G** **Goiter** may be present (Hashimoto's)
- I** **Intolerance** to cold — always bundled up
- S** **Skin** dry, hair thin, voice hoarse
- H** **Hypo** everything — BP, HR, temp, LOC, reflexes

## 7 H's of Myxedema Coma

- H** **Hypo**thermia
- H** **Hypo**tension
- H** **Hypo**ventilation (CO<sub>2</sub> retention)
- H** **Hypo**natremia
- H** **Hypo**glycemia
- H** **Heart** rate: bradycardia
- H** **Haunting** mental status → coma

NCJMM • Clinical Judgment Model

*Scenario: 68 y/o female with fatigue, cold intolerance, HR 52, BP 98/60, T 96.2°F*



*A 68-year-old woman presents to the clinic reporting 3 months of progressive fatigue, constipation, and weight gain of 15 lb. She wears a heavy sweater in a warm exam room. Vitals: HR 52, BP 98/60, T 96.2°F. Labs: TSH 28 mU/L (↑), Free T4 0.4 ng/dL (↓).*

1 • RECOGNIZE

**Recognize Cues**

Fatigue, cold intolerance, weight gain, bradycardia, hypotension, hypothermia, ↑ TSH, ↓ Free T4 → classic primary hypothyroidism pattern.

2 • ANALYZE

**Analyze Cues**

Labs confirm primary hypothyroidism. Risk for myxedema coma given severity. Elderly cardiac vulnerability must guide therapy initiation.

3 • PRIORITIZE

**Prioritize & Generate Solutions**

ABCs first. Initiate **low-dose** levothyroxine, slow titration. Warm passively with blankets. Monitor cardiac status. Fall precautions.

4 • EVALUATE

**Take Action & Evaluate**

Recheck TSH in 6–8 weeks. Monitor for chest pain/palpitations (over-replacement). Teach lifelong therapy & morning empty-stomach timing.