

Indian Academy of Pediatrics (IAP)



## GUIDELINES FOR PARENTS

# Hypothyroidism: Congenital and Acquired

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### 10 FAQs on HYPOTHYROIDISM: CONGENITAL AND ACQUIRED

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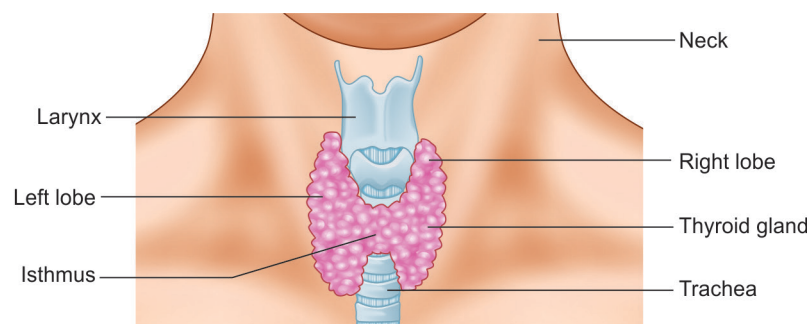
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# Hypothyroidism: Congenital and Acquired

## Q1A

### What is a thyroid gland? Where is it located?

The thyroid gland is an endocrine gland. It is located in the lower front of the neck below the Adam's apple on either side of the windpipe (trachea). It has two lobes which are joined together by isthmus, looking like butterfly wings (**Fig. 1**).

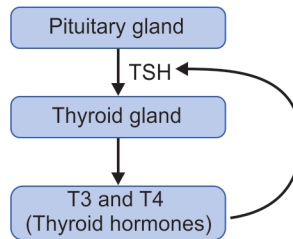


**Fig. 1:** Location of the thyroid gland.

**Q1B**

**What does a thyroid gland do?**

The thyroid gland makes two hormones: (1) Thyroxine (T4) and (2) Tri-iodothyronine (T3), which are released in the blood stream. The secretion of both T3 and T4 is regulated by thyroid-stimulating hormone (TSH), which is secreted from another endocrine gland called pituitary which is located at the base of the brain (**Fig. 2**).



**Fig. 2:** Regulation of thyroid gland.

**Q1C**

**Why is thyroid hormone important in children?**

An optimum amount of thyroid hormone is essential for normal body functions:

- Regulation of:
  - Temperature
  - Heart rate
  - Bowel movements
- Growth of bones, teeth, and muscles
- Critical for normal brain development in the womb and in an infant
- Pubertal maturation

The lack of these hormones, or an excess can cause health problems.

## Q2A

### What is hypothyroidism?

When the thyroid gland makes less T3 and T4. There is an increase in TSH from pituitary gland to signal the thyroid gland to make more T4 except in central hypothyroidism, where the TSH may remain normal or low (**Fig. 3**).

Hypothyroidism: ↓ T4 ↑ TSH

**Fig. 3:** Hypothyroidism.

## Q2B

### What is congenital hypothyroidism?

The word “congenital” means that your baby was born with hypothyroidism, i.e., when the thyroid gland does not develop or function normally before birth.

#### Causes

- Absent or underdeveloped thyroid gland (dysgenesis)
- Developed in the wrong place (ectopic)
- One that has developed but cannot make thyroid hormone because of a “production line” problem (dyshormonogenesis).
- Iodine deficiency in mother or drugs used to treat thyroid disorders in mother.
- Central hypothyroidism caused by structural or production line problems in the pituitary gland while it was developing.

## Q2C

### What is acquired hypothyroidism?

The thyroid gland does not make enough thyroid hormone after birth, usually during later childhood and adolescence.

#### Causes

- Iodine deficiency or excess
- Autoimmune disorder known as “Hashimoto’s thyroiditis”, in which body’s immune system slowly destroys the thyroid gland and decreases production of thyroid hormones.
- Few medicines
- Children with type 1 diabetes mellitus, celiac disease, and chromosomal disorder such as Down syndrome, William syndrome, or Turner syndrome.
- Injury to the thyroid gland either by infection or following radiation for certain cancers to head and neck

**Q3**

**How do I suspect that my child has hypothyroidism?**

Following features are suspicious for hypothyroidism in a child:

<i>Congenital hypothyroidism</i>	<i>Acquired hypothyroidism</i>
<ul style="list-style-type: none"> <li>• Jaundice (yellowish discoloration of skin and eyes) present beyond 2 weeks of age</li> <li>• Constipation (hard stools)</li> <li>• Umbilical hernia (large belly with protruding navel)</li> <li>• Excessive sleep and sluggishness</li> <li>• Hoarse cry</li> <li>• Delay in achieving age appropriate height, developmental and mental milestones</li> <li>• Low body temperature</li> <li>• Large tongue</li> <li>• Swelling around the eyes</li> <li>• Poor muscle tone</li> </ul>	<ul style="list-style-type: none"> <li>• Slowing of height</li> <li>• Delay in tooth development</li> <li>• Neck swelling called as "goiter"</li> <li>• Deterioration in school performance. Poor memory and concentration</li> <li>• Delay in starting of "puberty"</li> <li>• Early or irregular menstrual cycles</li> <li>• Feeling cold</li> <li>• Tiredness and low energy levels</li> <li>• Slow pulse rate</li> <li>• Dry skin and brittle hair</li> <li>• Puffy swollen face</li> <li>• Swelling of the calf muscles of the leg</li> </ul>

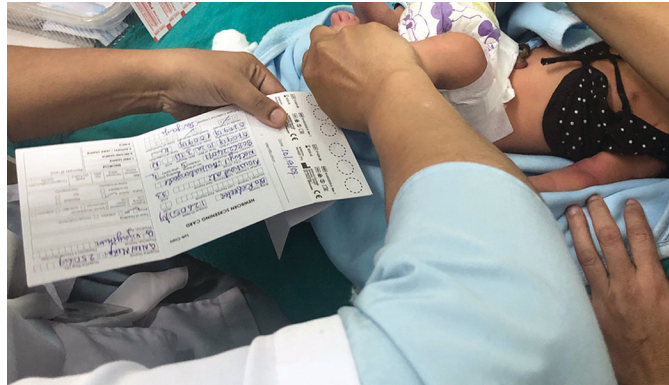
**Q4A**

**What tests can confirm my child has hypothyroidism?**

**Congenital Hypothyroidism Screening Tests (Fig. 4)**

Congenital hypothyroidism is not a very rare problem (affects 1 in 2,000 babies) and, if not detected earliest (ideally within first 14 days of life), can lead to mental subnormality. Most guidelines suggest screening every newborn.

For screening, a small amount of blood is taken from his/her umbilical cord at the time of delivery which is a totally painless procedure, or few drops of blood is taken by performing heel prick after 48–72 hours of life. This will be tested for thyroid stimulating hormone (TSH), and if the result comes high, we should do complete thyroid function tests (both TSH and free T4/T4) to confirm the diagnosis.



**Fig. 4:** Heel-prick screening newborn test for TSH using filter paper.

Rarely, there can be a situation when this test can be negative; still your child is having the problem. In such cases, if the child is having any symptom, we should repeat his/her thyroid function tests.

#### Acquired Hypothyroidism

In children where clinical features are suggestive of hypothyroidism, complete thyroid function tests (TSH and T4 or free T4) is indicated. High TSH and low T4/free T4 values suggest that he/she is having hypothyroidism.

### Q4B

**Does my child need any other tests besides the thyroid function tests? How do they help in the diagnosis or treatment?**

Ultrasound scans of the neck to assess the status of thyroid gland. It can confirm the size, location, and absence of the gland. In some cases, a radionuclide scan is more helpful.

Additionally in acquired hypothyroidism, we should do anti-thyroid peroxidase antibodies (TPO) antibody/anti-thyroglobulin antibody as autoimmune or “Hashimoto’s thyroiditis” affecting his/her immune system is a common cause.

Q4C

### How safe are these tests for children?

These tests are totally safe for children.

Q5

### What is the treatment for hypothyroidism?

#### Congenital

**A. Does my child need treatment for hypothyroidism?**

Yes. Since thyroid functions are abnormal, he/she should take the medications. If your child is not taking the medication, he/she is likely to get mental subnormality.

**B. How and when is this medicine to be given?**

Medicine is given in empty stomach, at least half-an hour before food. It will be better if given at the same time everyday. Crush the tablet and mix with breast milk or water and give it using a spoon. You should not dilute in water and keep it for days together.

**C. How long my child should continue with this treatment?**

If your child is having absence of thyroid gland (agenesis) or abnormally placed gland with a reduction in size (ectopic gland), treatment must be continued lifelong. In a small percentage of cases, the gland may be normal with reduced function at birth. In such cases, function may improve over time and his/her medication can be reduced and stopped at around 3 years, but only after regular follow-up.

#### Acquired

**A. Does my child need treatment for hypothyroidism?**

Yes. Since your child is having reduced functioning of his/her thyroid gland, treatment should be initiated. If the T4/free T4 were normal and TSH is only mildly elevated (<10 mIU/L: subclinical hypothyroidism) or if both T4 and TSH were normal, we would have waited, but in such cases, also frequent follow-up is essential.



**B. How and when is this medicine to be given?**

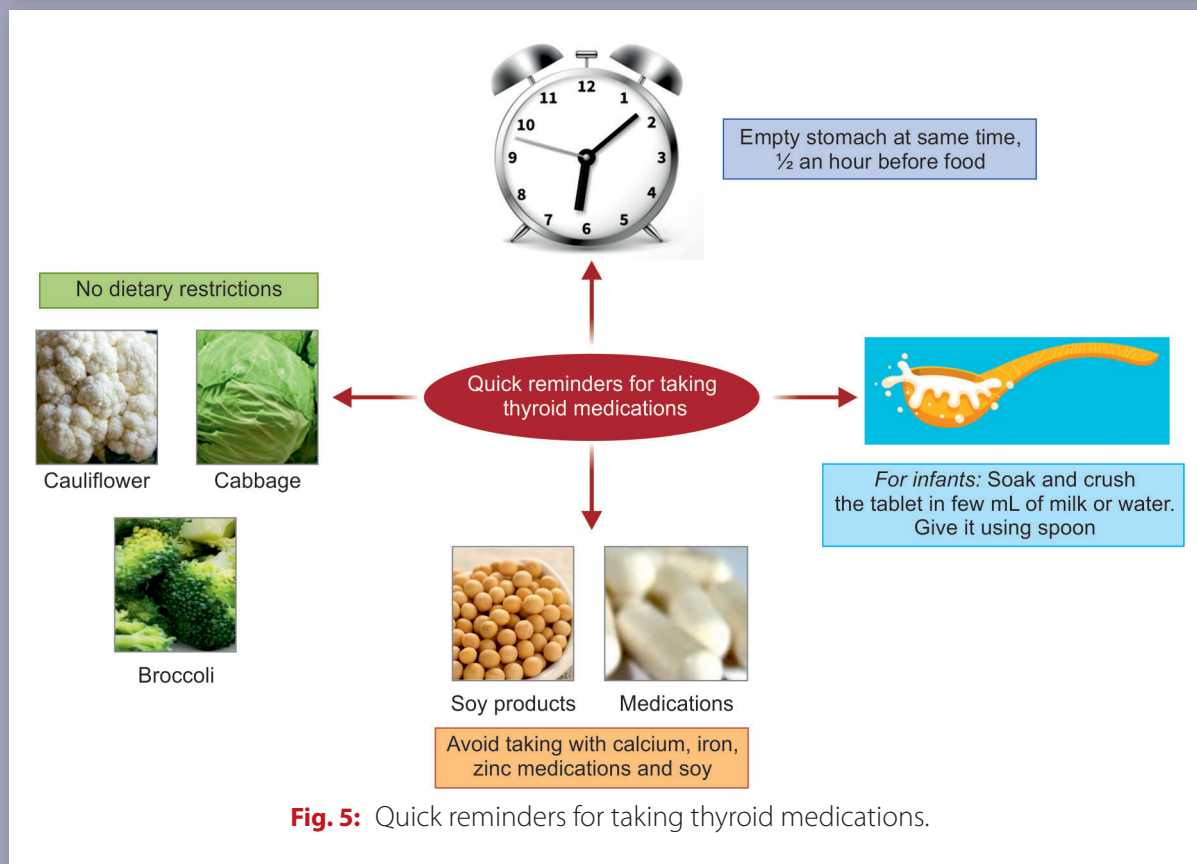
You should give the medication in empty stomach, at least half-an hour before food.

**C. How long my child should continue with this treatment?**

The disease is a long-lasting one and, hence, the drug should be continued for years, even lifelong in some cases. Drug dose will be altered based on the thyroid function tests, which will be measured at regular intervals. Even if we stop the drug based on the results, monitoring should be performed lifelong, and drug may be restarted if the results turn out to be abnormal.

**Q6**

**What else should I know regarding the treatment (Fig. 5)?**



**Fig. 5:** Quick reminders for taking thyroid medications.

**A. Does this drug produce any adverse effects to the child?**

Since your child is receiving only a normal replacement, the drug will not produce any side effects.

**B. Is there any liquid form?**

There is no liquid form.

**C. What should be done if the child misses the dose?**

As far as possible do not miss any dose. It is better to maintain a logbook or do a tablet counting of the tablets remaining in the bottle by weekend. If he/she forgets to take the drug in the morning, he/she can consume it in any other time of the day, but this should not be a regular practice.

**D. Can the child take any other medications along with this drug?**

Better to take this drug alone. Some medications will decrease the absorption of this drug, such as calcium, iron, zinc, and soy preparations.

**E. If the child vomits, then what should be done?**

If the child vomits within half-an hour of consuming the drug, the drug has to be given again.

**F. Is cabbage and cauliflower not good for the child? Should they be stopped? Is there any dietary restrictions?**

No such restrictions. He/She can consume your normal diet.

**G. Is there any other treatment besides the medications that can cure the child?**

No. Thyroid hormone replacement is the only proven treatment.

**Q7A**

**When do I follow-up with the doctor after diagnosis?**

The first follow-up after starting medications is at 2–4 weeks. Parents play an important role in ensuring regular follow-up and continuity of medicines to prevent permanent mental or learning disabilities.

**Q7B**

**How many times I need to do the blood tests?**

For children <3 years, it should be taken every 2–3 months. For >3 years, it is done at an interval of 3–6 months till growth and puberty is complete. After a change in dose, the tests are performed within 4–6 weeks.

**Q7C**

### What will the doctor monitor on follow-up visits?

- *Free T4, TSH:* Done before taking the medicines.
- *Confirm the adequacy of dose:* If too less a dose, the child may have sluggishness, fatigue, constipation, and be less playful. If the dose is too much, the child may be irritable or hyperactive, feel too hot, have trouble sleeping, frequent urination or stooling, decreased weight gain with increased appetite.
- Height/Weight
- Development or school performance/grades
- Pubertal onset and progression

**Q7D**

### Do I still need to give medicines, if the tests and my child both look normal?

Yes, as that is the aim of initiating the medicines. The amount of the thyroid medicine will increase as the child grows. This is a normal process. A re-evaluation is done at 3 years in congenital hypothyroidism or at the completion of growth and puberty in acquired hypothyroidism for deciding the continuity of the medicines, if the cause is not permanent hypothyroidism.

**Q8A**

### Can the child take other medications if there is sickness?

Yes, your child can take other medications if there is sickness but you need to continue your child's thyroid medications along with it.

Q8B

### Can my child take vaccinations when on treatment for hypothyroidism?

Yes, your child can take all the vaccinations as per the National Schedule.

Q9

### Is a child with hypothyroidism more likely to get other diseases later in life?

With early and ongoing care, your baby should develop normally both physically and mentally; however, babies who are not treated at the right time adequately often have permanent health problems such as mental retardation, learning disabilities, and/or growth delays.

Risk of contracting other diseases later is similar to normal population. In cases of hypothyroidism acquired due to Hashimoto's or autoimmune thyroiditis, there is likelihood of acquiring other autoimmune disorders later for which your child will be regularly screened.

Q10A

### Will my other children also have hypothyroidism? Are there any tests I need to do for them?

Majority of cases of congenital hypothyroidism are sporadic, i.e., they occur in people with no family history. However, a small number of cases are inherited (In few cases of permanent dyshormonogenesis, the risk in second infant is 25%). Therefore, the risk of having another child with hypothyroidism is low.

If your child has acquired hypothyroidism, there is more chance of other children having it, but this will depend on the cause. Therefore, all siblings of the affected child should have a regular check-up for timely diagnosis of hypothyroidism.

**Q10B****When a person with hypothyroidism has children, what risk do these children face of having hypothyroidism?**

*Congenital:* In cases where the mother or father has permanent congenital hypothyroidism, their child being affected is minimal.

*Acquired:* Since the disease is most commonly connected to immune disorder, there is a chance that it can run in family. Hence, their child should have a regular check-up for timely diagnosis of hypothyroidism.

**Do's**

- All newborns should be screened for thyroid function test at birth or after 48–72 hours of life.
- All children on thyroid hormone replacement medicine should take the medicine daily, ideally in an empty stomach at a fixed time.
- Regular follow-up with thyroid function tests as advised is important after initiating the medicines to prevent any permanent mental or learning disabilities and affection of growth.

**Don'ts**

- Do not give the medicine with any other medicines or food.
- Do not self-titrate the dose of medicines.
- Do not stop the medications in other illness.