

The Prevalence of Hypothyroidism in a Psychiatric Outpatient Population with Intellectual Disabilities

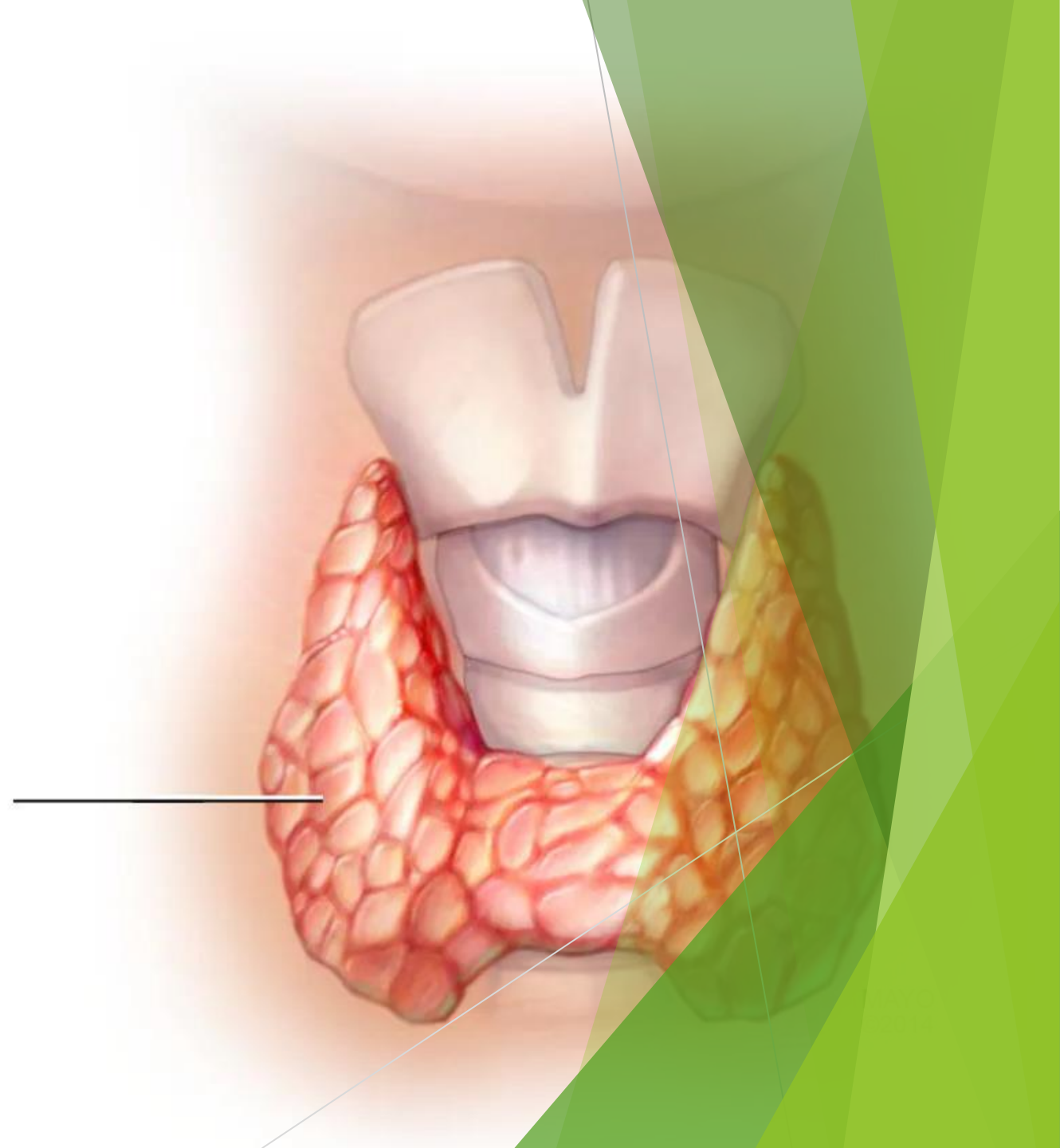
Verity Chester, Dr Nicholas Smith, Medha Cherukat and Elizabeth Patteril

- ▶ Background literature
 - ▶ Hypothyroidism
 - ▶ Hypothyroidism and mental health
 - ▶ Hypothyroidism and intellectual disability
- ▶ Description of current study
- ▶ Practice and Research Implications

Presentation Overview

What is the thyroid?

- ▶ The thyroid is a small, butterfly-shaped gland located at the front of the neck.
- ▶ Part of the endocrine system and controls many important functions by producing and releasing certain hormones.
- ▶ When the thyroid isn't working properly, it impacts the entire body.



Hypothyroidism

Hypothyroidism is the condition resulting from an underactive thyroid gland.

Hypothyroidism is a chronic disease associated with deficiency in the thyroid hormones, thyroxine (T4) and triiodothyronine (T3), which means that the thyroid is not producing enough thyroid hormone for the body's needs.

Hypothyroidism affects around 2% of the UK population (NICE, 2023).

Hypothyroidism Causes



**British Thyroid
Foundation**

- ▶ Autoimmune thyroid disease - the most common cause. This is a self-destructive process in which the body's immune system attacks the thyroid cells as though they were foreign cells. The most common form is known as 'Hashimoto's thyroiditis'
- ▶ Radioactive iodine treatment, or thyroidectomy, to correct hyperthyroidism or to treat thyroid cancer
- ▶ Antithyroid drugs if given for an overactive thyroid disorder in too large a dose
- ▶ Medicines such as lithium (used for certain mental health problems) and amiodarone (used for particular heart problems) checkpoint inhibitors such as pembrolizumab and nivolumab (used to treat certain cancers)
- ▶ Some health foods taken in excess, e.g. kelp (seaweed)
- ▶ A malfunction of the pituitary gland (a gland in the brain that regulates the thyroid hormones)
- ▶ Radiation for head and neck cancers (not common in the UK)
- ▶ Sometimes hypothyroidism is present from birth. In a few babies, the thyroid does not develop or does not form the thyroid hormones properly. This is known as congenital hypothyroidism.

Hypothyroidism Risk Factors

- ▶ Women are 5 to 10 times more likely to be affected than men (Chiovato, Magri, & Carle, 2019).
- ▶ Other risk factors include:
 - ▶ had a thyroid problem before, such as a goiter
 - ▶ have a family history of thyroid disease
 - ▶ were pregnant in the past 6 months
 - ▶ have Turner syndrome, a genetic disorder that affects women
- ▶ Celiac disease
- ▶ Sjögren's syndrome [NIH external link](#), a disease that causes dry eyes and mouth
- ▶ pernicious anemia [NIH external link](#), a condition caused by a vitamin B12 deficiency
- ▶ type 1 or type 2 diabetes
- ▶ rheumatoid arthritis [NIH external link](#), an autoimmune disease that affects the joints
- ▶ lupus [NIH external link](#), a chronic autoimmune inflammatory condition

Hypothyroidism Symptoms



**British Thyroid
Foundation**

Common symptoms include:

- ▶ fatigue and tiredness
- ▶ increased awareness of the cold
- ▶ dry and coarse skin
- ▶ dry and thinning hair
- ▶ hoarse or croaky voice
- ▶ constipation
- ▶ muscle weakness, cramps and aches
- ▶ pins and needles in the fingers and hands (carpal tunnel syndrome)
- ▶ heavier and longer periods
- ▶ fertility problems
- ▶ low libido
- ▶ weight gain
- ▶ puffy face and bags under the eyes
- ▶ slow speech, movements, and thoughts
- ▶ low mood or depression
- ▶ memory problems
- ▶ difficulty in concentration
- ▶ slow heartbeat
- ▶ slightly raised blood pressure
- ▶ raised cholesterol
- ▶ slowed growth (in children)
- ▶ Rarely, severe untreated hypothyroidism may lead to myxedema coma, in which the body's functions slow to a life-threatening point. Myxedema coma requires immediate medical treatment.

Hypothyroidism and Mental Health

Depression

- ▶ A 2022 review paper showed that up to 63.5% patients with hypothyroidism may suffer from depression (Nuguru et al., 2022)
- ▶ If hypothyroidism continues without treatment, this can affect the severity of patients' depression (Nuguru et al., 2022; Heinrich & Grahm, 2003)
- ▶ However hypothyroidism symptoms often present similarly to depression making it more difficult to diagnose
- ▶ This can also affect everyday life e.g., higher risk of suicidal thoughts and behaviours (Nuguru et al., 2022)

Cause

- ▶ The thyroid gland releases triiodothyronine (T3) and thyroxine (T4) (Lekurwale et al., 2023)
- ▶ Hypothyroidism causes low levels of T3 and T4 (Pirahanchi et al., 2018)
- ▶ T3 regulates the body's serotonin activity (Lekurwale et al., 2023)
- ▶ Reduced serotonin can cause depression (Lekurwale et al., 2023)

Hypothyroidism and Mental Health

Psychosis

- ▶ Around 5-15% of patients with hypothyroidism may be suffering from psychosis (Heinrich & Grahm, 2003)
- ▶ Symptoms tend to arise after a few months or even years of having physical symptoms of hypothyroidism (Heinrich & Grahm, 2003).
- ▶ These can include both visual and auditory hallucinations, paranoia etc. (Heinrich & Grahm, 2003)
- ▶ Unfortunately if there is a delay in treatment for hypothyroidism, psychosis symptoms can worsen and may be difficult to treat later on (Patel et al., 2020)

Hypothyroidism and Mental Health

Anxiety

- ▶ 30-40% of patients with hypothyroidism may experience anxiety (Bathla et al., 2016)
- ▶ However we would expect to see anxiety in patients with hyperthyroidism, less common in patients with hypothyroidism (Geraciotti, 2006)
- ▶ Less conclusive evidence on whether the timing of hypothyroidism treatment can affect the severity of the anxiety experienced
- ▶ Similarly to depression, patients are at higher risk of suicide (Yang et al., 2022)

Hypothyroidism and Mental Health

Bipolar disorder

- ▶ One study found between 4.4 to 20.7% of patients with hypothyroidism developing bipolar depression (Wysokiński & Kłoszewska, 2014)
- ▶ Delays in treatment for hypothyroidism can cause patients to still experience symptoms, even after treatment (Heinrich & Grahm, 2003)
- ▶ Patients can experience periods of low mood, depression and irritability along with mania in Bipolar 1 or hypomania in Bipolar 11 (Nierenberg et al., 2023)

Cause

- ▶ One possible explanation suggests this may be due to kindling-hypothesis (Heinrich & Grahm, 2003)
- ▶ The kindling hypothesis describes that environmental factors can induce mood changes and even seizures
- ▶ This can then lower the threshold for future episodes (Weiss et al., 2015)
- ▶ Heinrich & Grahm (2003) suggest that hypothyroidism may also play a role by decreasing threshold needed for a bipolar related seizure

Hypothyroidism Diagnosis

- ▶ Hypothyroidism symptoms begin so gradually that the patient/doctor might not notice them until the condition is well advanced.
- ▶ By a physical examination and blood tests.
- ▶ A thyroid function blood test checks whether the thyroid gland is working properly.
- ▶ An underactive thyroid is typically associated with a thyroid-stimulating hormone (TSH) level above the reference range and a thyroxine (FT4) level that is below the reference range.
- ▶ A blood test for thyroid antibodies to confirm whether the cause is autoimmune (Hashimotos).





Hypothyroidism Management

- ▶ Prescription of levothyroxine, a synthetic version of the thyroxine (T4) produced by the thyroid gland.
- ▶ Levothyroxine doses are dependent upon the person's body weight and their blood test results. Most patients require between 100 and 150mcg a day.
- ▶ Doctors tend to start cautiously and increase the dose gradually. Patience is needed as it can take several months before the person feel better and for the thyroid function tests to return to normal or be judged satisfactory by your doctor.

Hypothyroidism Management

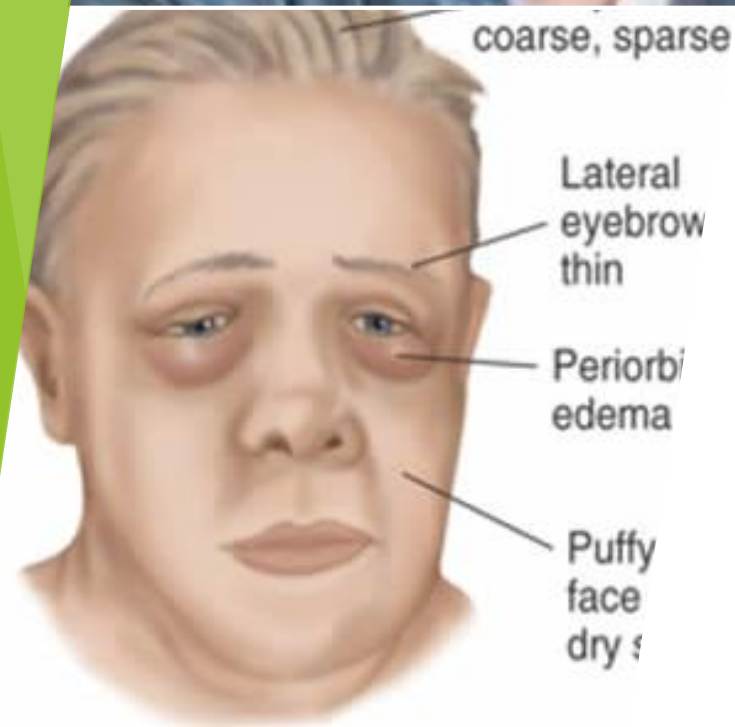
- ▶ During this period regular thyroid function tests are needed, usually every three months, and the dose may need to be adjusted according to the results of the tests.
- ▶ Levothyroxine is best taken in the morning, with water, on an empty stomach, at least half an hour before eating and drinking anything.
- ▶ It is also best taken at least four hours apart from calcium, iron, cholesterol-lowering drugs (cholestyramine, colestipol), and multivitamin tablets, as these too can decrease absorption. A number of other drugs interact with levothyroxine. Pharmacy advice is crucial in managing drug interactions.

Hypothyroidism and Intellectual Disability

- ▶ Very little research has been completed on hypothyroidism and intellectual disability.
- ▶ Prevalence unknown
- ▶ Diagnosis difficulties?
 - ▶ Vague and non-specific symptoms of hypothyroidism which could be overshadowed by symptoms of other physical/mental conditions, lifestyle, psychotropic medication side effects, etc.
 - ▶ Issues with blood tests
- ▶ Management difficulties?
 - ▶ Managing a thyroid condition requires organisation, assertiveness, proactivity, the GP doesn't always prompt for regular blood testing. People with intellectual disabilities may find this difficult.
 - ▶ Managing thyroid medications alongside other medications, managing not eating/drinking after medication is taken etc, may be more difficult for those with intellectual disabilities.

Thyroid and Downs Syndrome

- ▶ Children with Downs Syndrome have a higher chance of developing endocrine disorders and thyroid is most common (Metwalley et al, 2022)
- ▶ Compared to the general population, thyroid dysfunction is 25–38 fold more likely in the DS population (Metwalley et al, 2022)
- ▶ 106 patients were studied in Dinani’s paper, forty-three (40.5%) of the patients showed abnormal thyroid function.
- ▶ Patients with Downs Syndrome often have similar features to hypothyroidism, such as a tendency to gain weight, shorter than average height, being slower and less active and having coarser skin and a hoarser voice (Dinani et al, 1990)



Thyroid and Prader – Willi Syndrome

Prader – Willi syndrome is a genetic syndrome that can lead to hypothyroidism.

In a cohort study with 122 adults with Prader – Willi syndrome, hypothyroidism was found in 17%, compared to only 3% in non-PWS adults (Pellikaan et al, 2021)

Mortality is high in patients with Prader – Willi syndrome (3% per year in children and adults, 7% per year in adults over 30).

This mortality is often related to cardiovascular problems (such as pulmonary embolism or cardiac failure) or obesity.

Therefore, it is important to treat hypothyroidism in patients with Prader – Willi syndrome at an early age.

Congenital Hypothyroidism

- ▶ About 1 in every 2,000 to 3,000 babies born in the UK has congenital hypothyroidism. Babies with congenital hypothyroidism don't have enough of the hormone thyroxine.
- ▶ Without thyroxine, babies don't grow properly and can develop learning disabilities.
- ▶ Babies who have the condition can be treated early with thyroxine tablets, and this allows them to develop normally.



Aim

The prevalence and correlates of hypothyroidism in adult intellectual disability populations is largely unknown.

This project assessed the incidence and correlates of hypothyroidism in a sample of people with intellectual disabilities being treated by an outpatient psychiatry clinic in England.

Method

Participants and Setting

- ▶ Participants were patients treated within the Enhanced Physical Health Clinic (EPHC) hosted by Hertfordshire Partnership University NHS Foundation Trust (HPFT).
- ▶ The EPHC is a new service designed to improve physical health outcomes for patients who are currently open to Specialist Intellectual Disability Services in Essex and are on psychotropic medications.
- ▶ Participants were the caseload of patients supported by the EPHC during the timeframe of the team being operational, from 2021-2023.
- ▶ During this time, the EPHC has treated 463 patients.

Measures and Procedure

- ▶ Data for each patient seen by the EPHC clinic was recorded on a database.
- ▶ This database collects socio-demographic, physical and mental health diagnoses, and medication information.

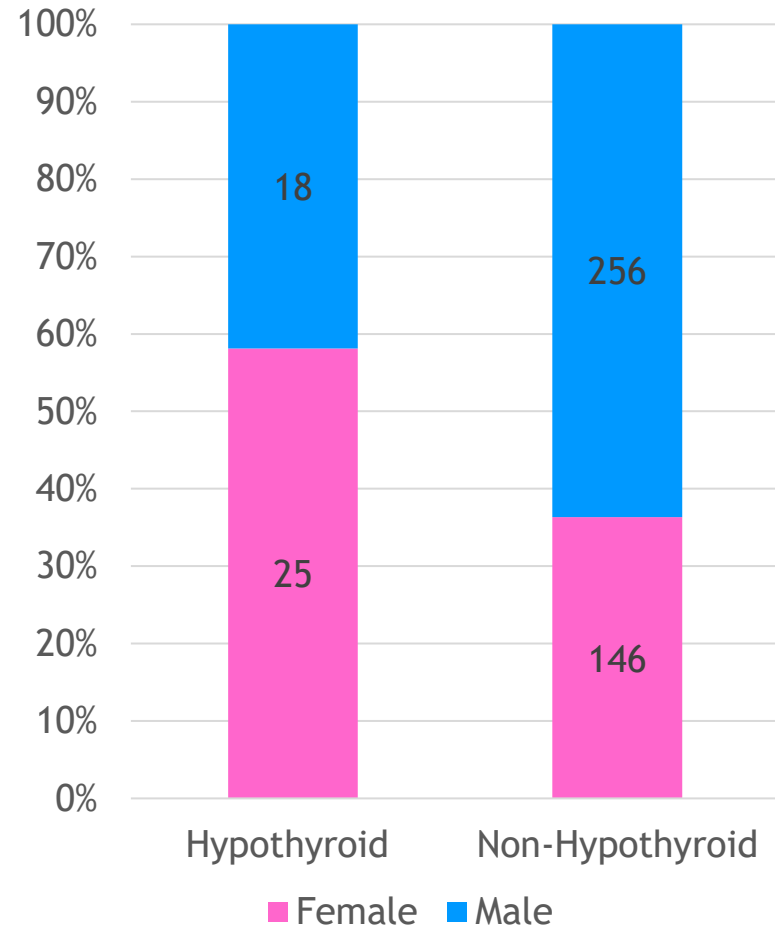
Method

Analysis

- ▶ Data regarding the incidence of thyroid conditions was extracted from the database.
- ▶ Comparisons were made between the hypothyroid and non-hypothyroid group on:
 - ▶ Sex
 - ▶ Physical health comorbidities (arthritis, asthma, high cholesterol, diabetes, hypertension)
 - ▶ Psychiatric comorbidities (anxiety, depression, bipolar, PTSD, personality disorder, obsessive compulsive disorder (OCD), dementia, post-traumatic stress disorder (PTSD), attention deficit hyperactivity disorder (ADHD), psychosis).

Ethics

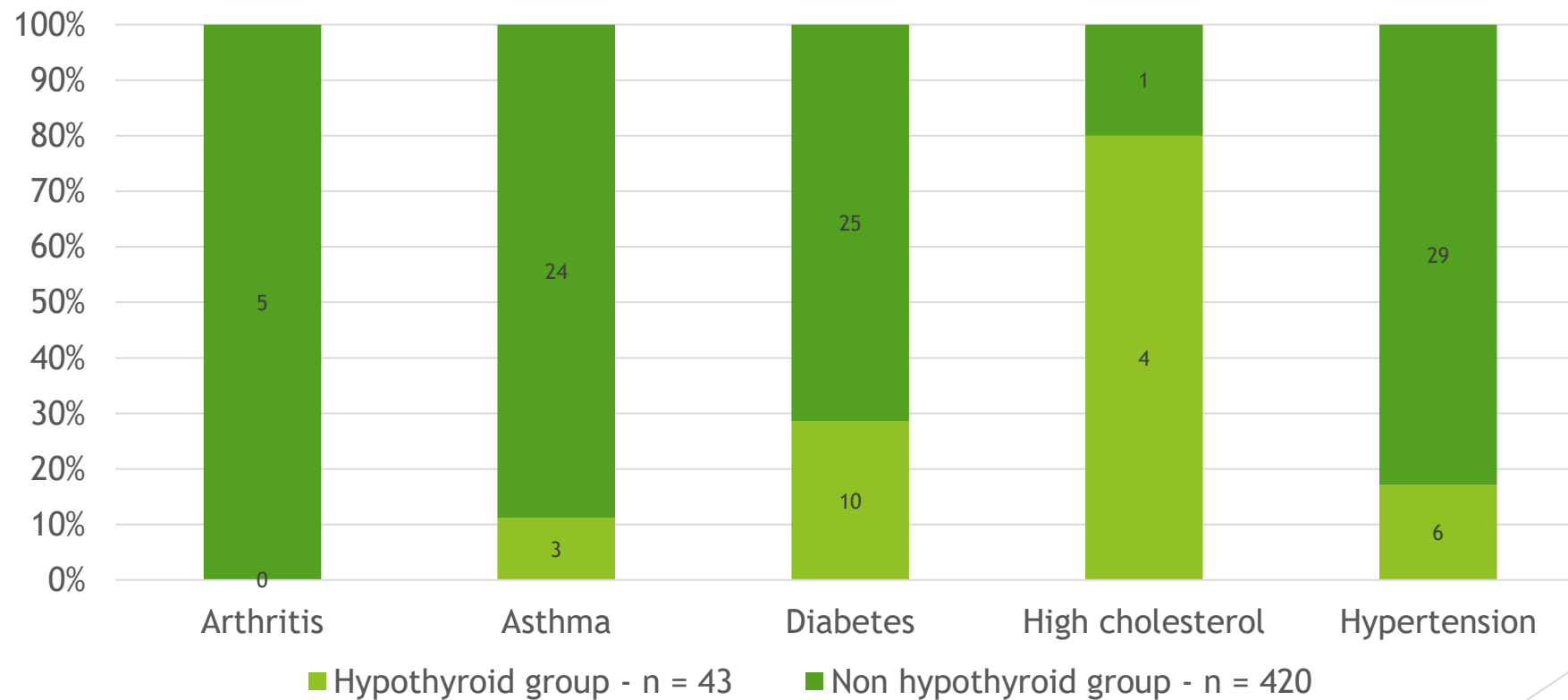
- ▶ As the study utilized routinely collected data, it was treated as service evaluation, thus not requiring approval from an NHS Research Ethics Committee (NHS Health Research Authority, 2017).



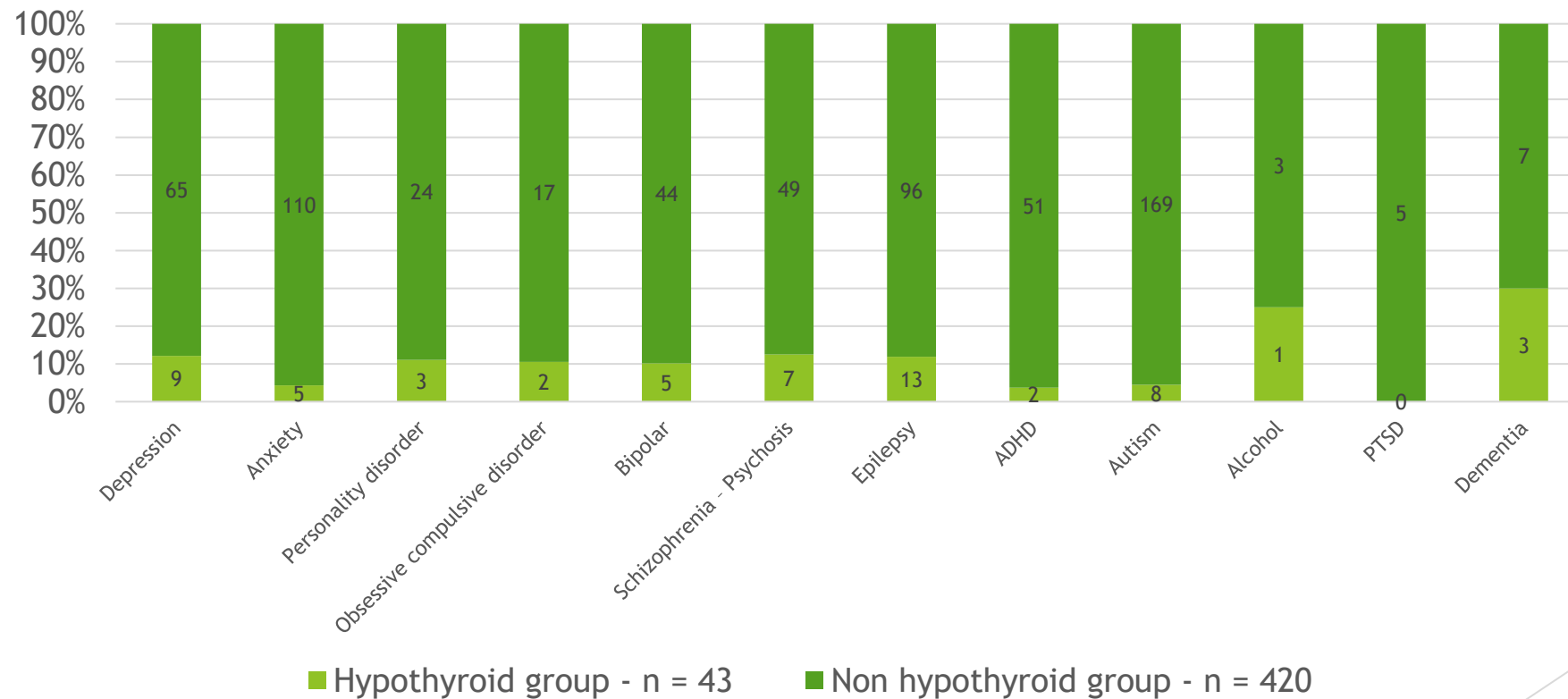
Results - Incidence

- ▶ Hypothyroidism was diagnosed in 43 of the 463 patients (9%). This is over 4x higher than general population estimates.
- ▶ Sex - Hypothyroid group significantly more likely to be female than the non-hypothyroid group, but the gender split is much less pronounced in this sample compared to the “general” hypothyroid population.

Hypothyroidism vs. Non-Hypothyroidism Group Comparisons - Physical Health



Hypothyroidism vs. Non-Hypothyroidism Group Comparisons - Mental Health



Discussion

- ▶ Hypothyroidism was over 4x higher in this sample of adults with ID (9%) than the general population estimate (2%).
- ▶ We cannot conclude hypothyroidism is higher in people with ID at this stage.
 - ▶ May reflect the sample, e.g. that all the patients were being seen by a specialised physical health clinic that was very proactive in offering screening for a variety of conditions.
 - ▶ If hypothyroidism is more prevalent in intellectual disability populations, it may be due to:
 - ▶ Increased rates of congenital hypothyroidism
 - ▶ Genetic disorders
 - ▶ Stress experienced by this population.
- ▶ Drawbacks - service evaluation study relying on retrospective file-based information, designed to evaluate the Essex Physical Health Clinic. The database was not designed to focus on hypothyroidism, so:
 - ▶ Data on the pathway to hypothyroidism diagnosis was limited.
 - ▶ Data on hypothyroidism management was limited.



Thyroid

Easy Read

Clinical Practice Recommendations

- ▶ Raising awareness of hypothyroidism in intellectual disability services.
- ▶ Testing for hypothyroidism when symptoms are present.
- ▶ If hypothyroidism diagnosis is present, checking thyroid symptoms regularly and ensuring thyroid blood tests are being completed at regular intervals.
- ▶ Patient support with condition management, e.g. on the need for regular blood tests, medication optimisation, general support.
- ▶ [Easy read resources on hypothyroidism](#)

Research Recommendations



Future research examines hypothyroidism prevalence in a larger, more representative sample of people with intellectual disabilities, e.g. using GP data.



Future research to assess whether patients with intellectual disabilities are receiving good standards of hypothyroidism care, e.g. regular blood tests and optimal doses of thyroxine.



Research to assess patient/carer knowledge and experiences of their condition.

Thank you
for listening.

Questions or comments?

X @VerityChester

X @RADiANTCRG

v.chester@nhs.net