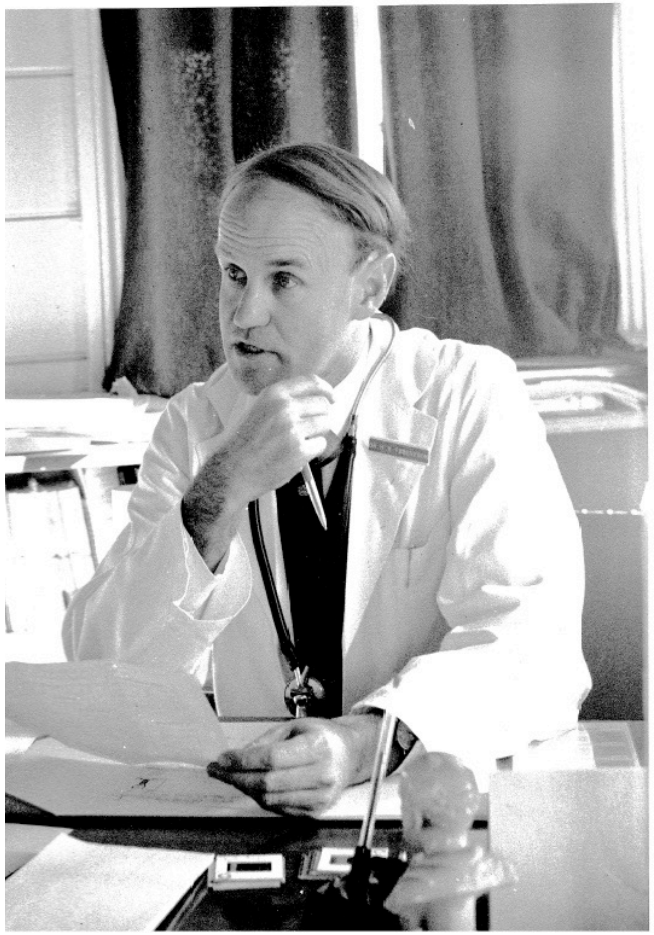
Dr Kaye Ibbertson and iodine deficiency in the Himalayas: the legacy of Dr Kaye Ibbertson



Who was Dr. Henry Kaye Ibbertson?

- Born on the 26th November 1926
- A New Zealand doctor and Emeritus Professor of Endocrinology (the study of hormones) at the University of Auckland
- Graduated from the University of Otago in 1951
- Postgraduate training at Hammersmith Hospital and the Royal Free Hospital (London)
- Headed the Auckland Radioisotope Unit (1963)
- Was a medical tutor and trained many New Zealand physicians
- Established the Department of Endocrinology at Auckland Hospital in the mid-1960s and was head of department
- Passed away on the 12th of July, 2018

"The contributions he made throughout his career to osteoporosis research, thyroid disease, growth disorders in children, and endocrinology education have helped countless people worldwide." – The Auckland Medical Research Foundation

Nepal in the mid 20th century

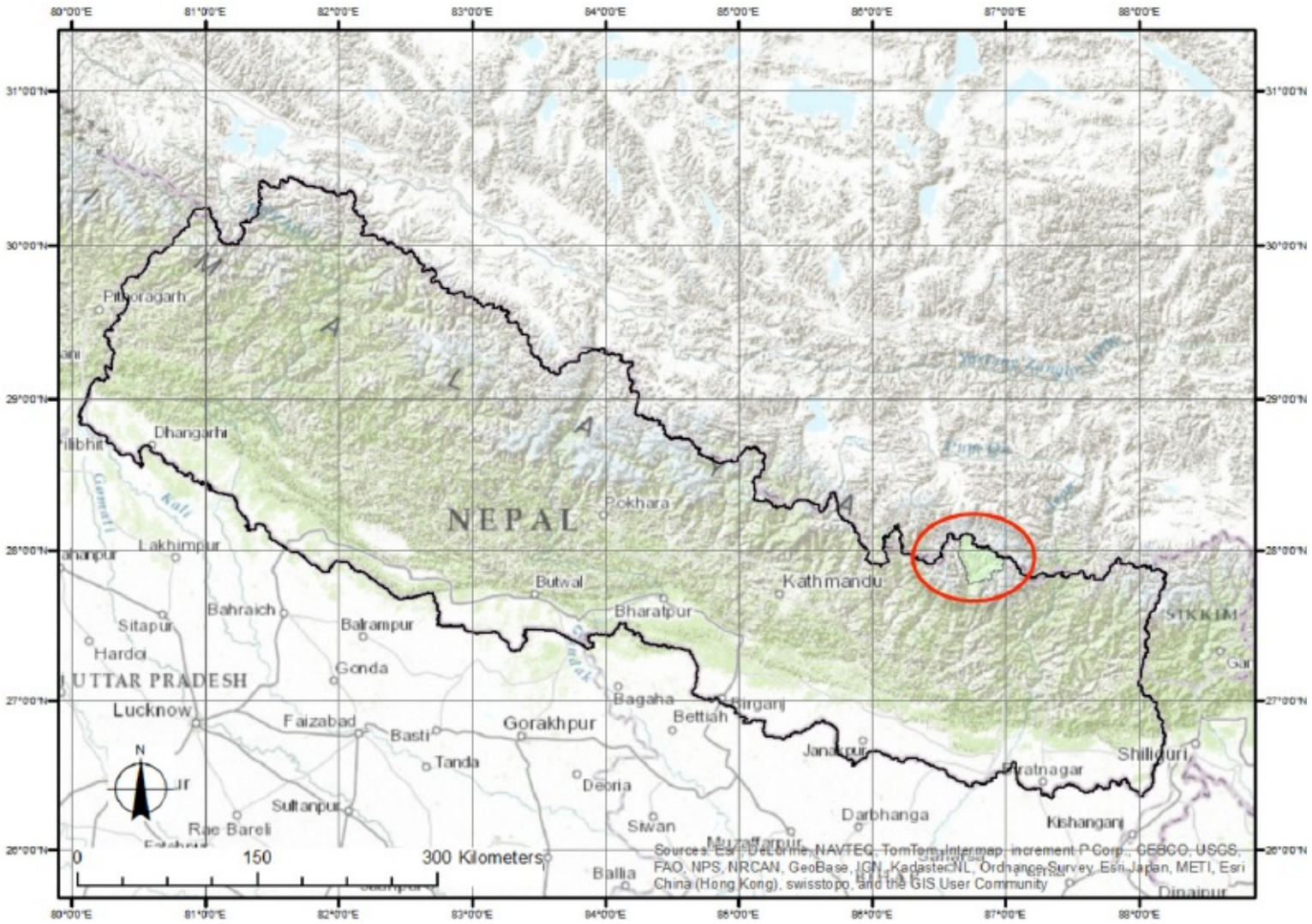
- Population: approximately 8 million people
- Average life expectancy: approx. 38 years

Dr Ibbertson and the Nepalese Himalayas

Source: Faculty of Medical and Health Sciences History (University of Auckland)

- From 1966-1972, Dr. Ibbertson travelled to Nepal thrice with Sir Edmund Hillary to study the effects of iodine deficiency among the Sherpa population of the high Himalayas
- This led to a programme of iodinisation that significantly improved the health of the Sherpa population

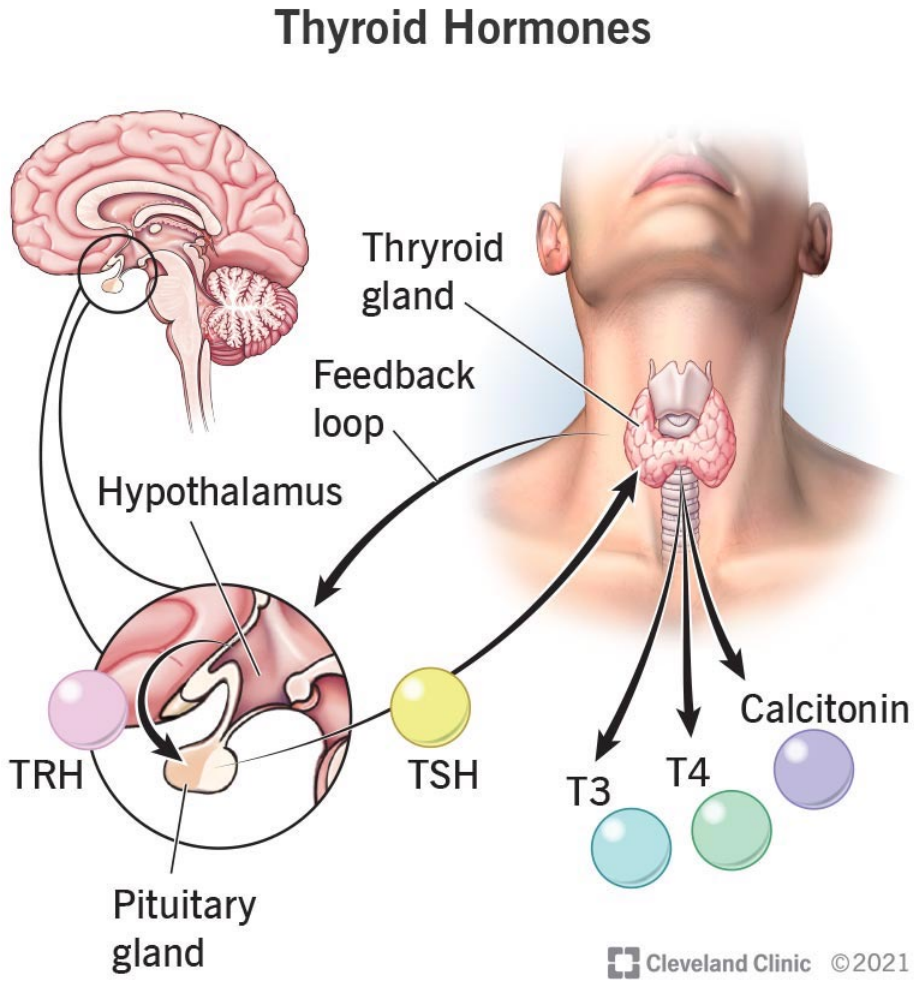
The Khumbu region – 3000-5000m



Namche Bazaar

The importance of iodine

- Production of thyroid hormones
  - Control metabolism
  - Brain development in babies
- Iodine deficiency can cause several health conditions, including:
  - Miscarriage
  - Cretinism (now called congenital hypothyroidism)
  - Goitre (the enlargement of the thyroid gland)
  - Hypothyroidism (an underactive thyroid)



Source: Cleveland Clinic

Goitres in the Sherpa population

Goitres can cause:

- Difficulties breathing and swallowing
- Hoarseness
- Pain

- 92% incidence of goitre
- 63% incidence of clearly visible goitre

(Among 1294 Sherpas -1971)

Dr. Ibbertson examining an enlarged goitre (1966).

Source: Ernest & Marion Davis Library and Prof. K. Ibbertson Archives. Used with permission.

Congenital hypothyroidism (cretinism) in the Sherpa population

Traits shown by those with congenital hypothyroidism may include:

- Intellectual disability
- Deaf mutism
- Short stature
- Spasticity (stiff muscles, exaggerated reflexes, spasms)

Causes:

- Maternal iodine deficiency in the developing foetus
- Early postnatal iodine deficiency

- 5.9% incidence of congenital hypothyroidism
- 4.7% incidence of deaf mutism

(Among a subset of 475 Sherpas studied by Ibbertson himself – 1971).

Iodine deficiency confirmed amongst the Sherpa population

- The mean excretion of iodide was 16.7±13.2 mcg/g creatinine across the population (urinary iodine concentrations)
- This classified the Sherpa population as severely iodine deficient
- More modern World Health Organisation (WHO) criteria (using different units for individuals) states that the optimum urinary iodine concentration is 100 µg/L or greater
- Dr Ibbertson and his team were able to conclude that iodine deficiency was the cause of these adverse health conditions

Treatment with iodised oil & its effects

- Iodised oil lasts for approximately a year if taken orally, or for 3-7 years if administered by intramuscular injection

Effects on the Sherpa population:

- Children born with an adequate iodine exposure in utero and postnatally did not display the health problems of those who had experienced iodine deficiency
- Many goitres drastically decreased in size

The spectrum of iodine deficiency

Three brothers living in the Nepalese Himalayas

- Left: 7 years old, normal speech and hearing, normally functioning thyroid gland
- Middle: 18 years old, suffers from deaf mutism, intellectual disability, spasticity, large goitre, short stature
- Right: 19 years old, deaf, mild speech defect, normal intelligence, normally functioning thyroid gland, small goitre

Source: Ibbertson, H.K. "8 Endemic Goitre and Cretinism." Clinics in endocrinology and metabolism 8.1 (1979): 97–128.

The lasting impacts of Ibbertson's work

University of Otago study (2009):

- Incidence of goitre had dropped from 92% in the 1960s to 31%
- Median urinary iodine concentration was 96.5 µg/L (nearing the optimum median concentration defined by the WHO - 100 µg/L)

- Marked improvements since the 1960s

Other interventions

- Iodised salt implementation by the Nepalese government - 1973
- Iodised oil administration phased out in 1998 in favour of salt iodisation

- Remote Himalayan villages had limited access to newly implemented iodised salt

Dr. Ibbertson and his colleagues improved the lives of many in remote Himalayan villages at a time when iodised salt was not readily available to them.