

Frequency of Euthyroidism among Patients with Goiter in Algeneina Town, West Darfur State

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Abstract

This is a cross sectional hospital-based study carried out to measure the levels of thyroid hormones (T3, T4 and TSH) in Sudanese patients with goiter in west Darfur state (Algeneina City) during the period from April to July 2011.

Eighty Sudanese patients with goiter; including 20 males (aged 10-65years), and 70 females (aged 10-65years), were enrolled in this study; also 40 healthy individuals to serve as control group; including 20 males (aged 10-65 years), and 20 females (aged 10-65 years).

Five ml of venous blood were collected from each participant to obtain serum. T3, T4 and TSH levels were measured by Enzyme linked immuno assay (ELISA) technique.

Statistical analysis revealed that 64 samples (82.5%) were found to have normal thyroid hormones levels (euthyroid), while 6 samples (7.5%) were found to have hyperthyroidism, 4 samples (5.0%) were found to have hypothyroidism, and four samples (5.0%) had high TSH and normal T3 and T4 .

Results showed that T4 and TSH were significantly decreased in patients with goiter compared with control group, (p value 0.00) and (p value 0.01) respectively. Unlike T3 since no difference was found between patients and the healthy control group (p value 0.76).

This study concluded that the frequency of goiter was high among people in west Darfur state (Algeneina city) with higher percentage in females than males. Also, the frequency of goitrous euthyroidism was higher compared to both, goitrous hyperthyroidism and goitrous hypothyroidism.

Keywords: Euthyriosism. Euthyroid, goitrous, goiter, TSH, hyperthyroidism

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Introduction:

Thyroid gland is a small gland located in the front of neck (Fox, 2006). It secretes thyroid hormones that play an essential role regarding increase of oxygen consumption, normal growth and mental development, increase the sensitivity to the cardiovascular and central nervous systems to catecholamine and so influence cardiac output and heart rate. Also control energy expenditure and protein synthesis; and play a role in lipid metabolism (Burtis *et al*, 2008).

To synthesize thyroid hormones, two raw materials are required: thyroglobulin (a glycoprotein synthesized intracellularly) and iodine (a natural compound of many foods (mainly sea food) (Baynes, 2005).

Goitre (thyroid enlargement) can occur in cases of hyperthyroidism, hypothyroidism, or euthyroidism (nontoxic goiter).

Non-toxic goitre is divided into two groups: endemic goiter (whole community or population may have a high incidence of goiter); and sporadic goiter (only some individuals are affected).

Deficiency of iodine may have a mental and a physical effect, and after many months a goiter may develop. Women with iodine deficiency may give birth to babies with severe neurological and mental impairment (Myers, 2001).

In Sudan, especially Western region (Darfur), iodine deficiency is a serious public health problem results in mental retardation and lower resistance against infections.

Goiter is one of the major problems in Sudan especially in Western area where the iodine deficiency is quite prevalent. The aim of this study

This study was carried out in 2011, the aim was to measure thyroid hormones in patients with goiter in Algeneina area; this may help to control the disease, raise people awareness about iodine deficiency and improve the behaviors of good nutrition.

Methods:

All the study population that agreed to participate in the study were Sudanese volunteers from Algeneina area in west Darfur state. Goiter patients were investigated for thyroid and goiter disease. Pregnant women were excluded. All participants were informed about the aim of the study. All information obtained from patients was kept as a high security data.

Samples were selected through a simple random sampling method. The study sample size was set as (120) samples as shown in (table 1).

Venous blood samples were obtained from each subject (5ml). Each sample was collected in a plain container, then allowed to clot and immediately centrifuged at 13000 x g for 5 minutes. Serum was stored at -20°C and transported from Darfur to Khartoum in ice bag by the means of airplane. The collected data were statistically analyzed using statistical package for social sciences (SPSS) computer program.

T3 and T4 were measured using ELISA microtiter reader (HU-MAREADER) with the wavelength set at 450nm. Specimen's concentration was interpolated from a dose response curve generated by utilizing serum calibrators of known antigen concentrations (Micallef, 1994). Also TSH was measured according to (Micallef, 1994).

Results:

As shown in figure (1), results revealed that the mean of TSH was significantly decreased in females group compared to males group (p value 0.04) unlike T3 and T4 since no difference was

found between females group and the male group among patients with goiter (p value 0.9), (p value 0.07) respectively.

Table (1) Frequency of Sex among study groups.

Sex	Study groups	Frequency
Males	Patients	10 (10-65years)
	Healthy control	20 (10-65years)
Females	Patients	70 (10-65years)
	Healthy control	20 (10-65years)

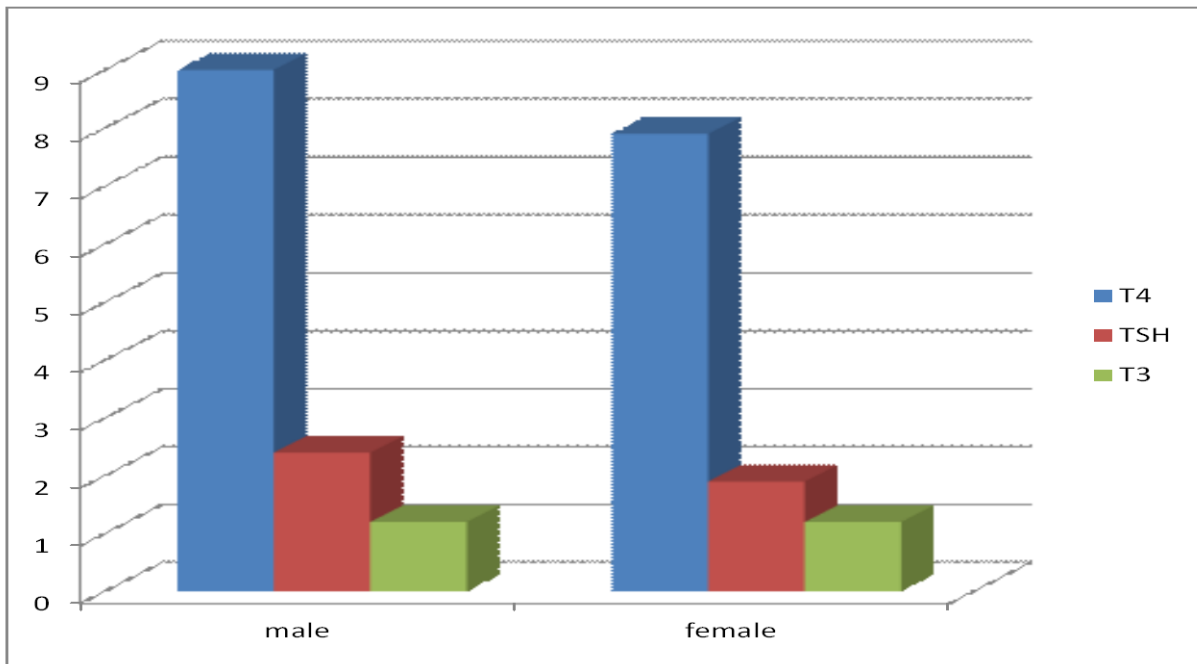


Figure (1) Comparison of Thyroid hormones between males and females among goiter patients

T4 and TSH (as shown in figure 2) were found to be significantly decreased in patients with goiter compared to control group (p value 0.00) and (p

value 0.01) respectively. Unlike T3 since no difference was found between patients and the healthy control group (p value 0.76)

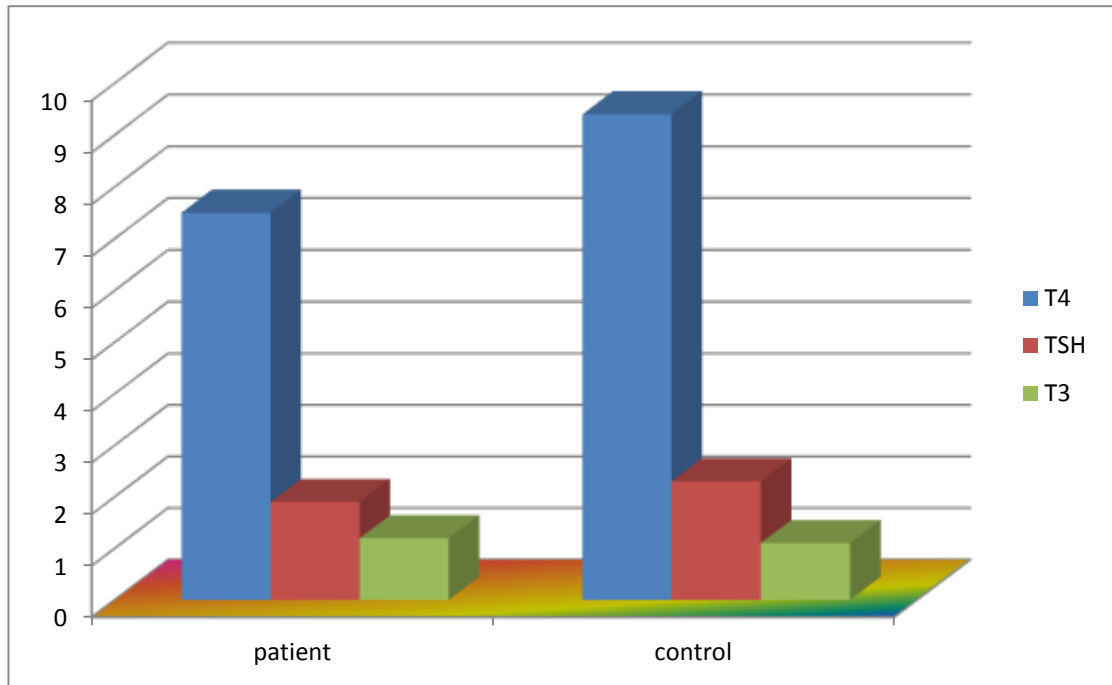


Figure (2) Comparison of Thyroid hormones between patients and control group among study groups.

Results Showed that 66 of patients were suffering Euthy-roidism (accounting for 82.5%), whereas six patients were found hyperthyroidism (representing 7.5%),

only four patients were hypothyroidism (representing 5%) and only four patients have high TSH and normal T3,T4 (representing 5%) (figure 3).

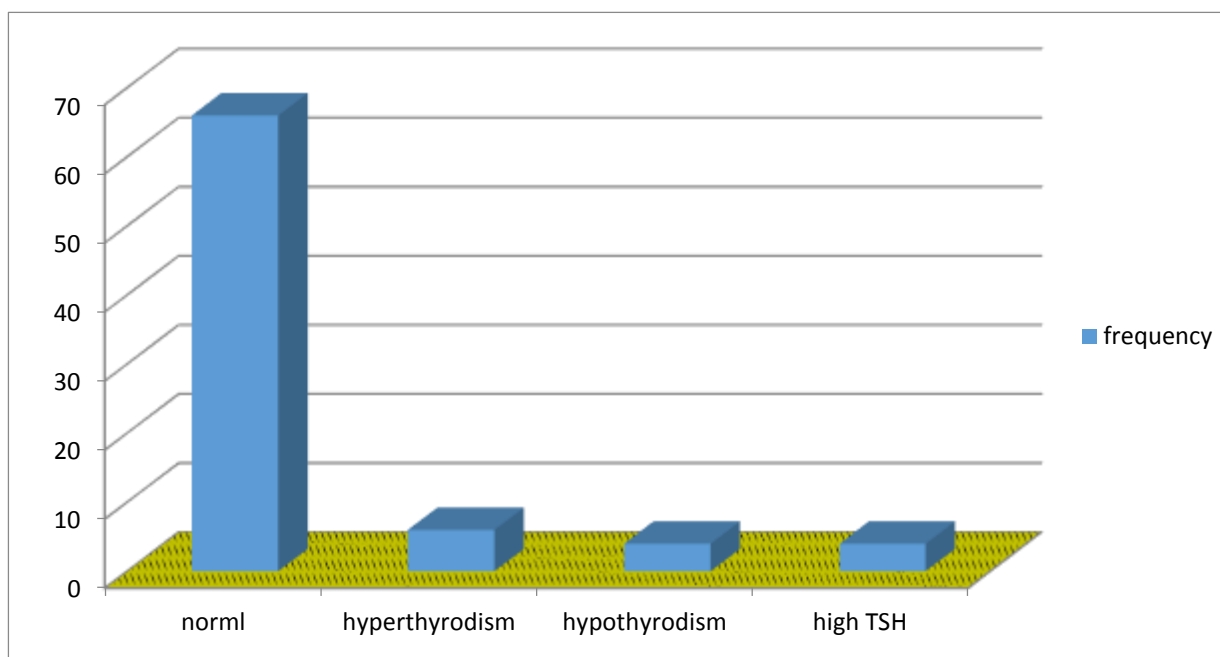


Figure (3): Frequency and Percentage of patient's results.

Discussion

Thyroid diseases and goiter pose a major health problem that has great impact on both individuals and society. Goiter is one of the major problems in Sudan especially in western area where the iodine deficiency is quite prevalent. The aim of this study was to measure thyroid hormones in patients with goiter in Alg-eneina area. This might help to control the disease,, raise people awareness about iodine def-iciency, and improve the beh-aviors of nutrition.

This study was carried out to investigate and estimate the thy-roid hormones levels (T3, T4, TSH) among patients with goiter in west Darfur state (Algeneina town).

One hundred and twenty individuals (aged 10-65years) were investigated for thyroid hormones levels. Results of this study showed that, goiter and thyroid disorder are distributed in all age groups from childhood to older ages. Goiter

diseases are more common in the middle and old ages. These results agree with a previous study which confirms that patients with thyroid disorders are usually common in old ages.

A goiter disease was found to be more common in females than in males. These results are in line with observation of Rallison *et al* (1991) who claimed that thyroid disease is more common in women than men, and that was later confirmed through many studies.

In this study there were no significant differences between thyroid hormones levels (T3, T4, and TSH) among age groups and gender groups.

The study showed no significant differences between patients T3 hormone when compared with control groups (p value 0.76). That may be due to the effect of some drugs taken by the patients, like beta blocker drugs.

There was a significant decrease in patients TSH hormone when compared with control groups (p

value 0.01) and significant decrease in patients T4 hormone when compared with control groups (p .value 0.00). So the laboratory investigations and monitoring of thyroid diseases, both, depend on (T4, TSH) levels for international diagnosis of thyroid disease. These findings were supported by a study conducted in New Guinea which showed that the mean of serum T4 was significantly lower in goitrous patients than that in non goitrous individuals. However, serum T3 and TSH reveals no difference in presence or absence of goiter (Chopra *et al*, 1975).

The results of patients with goiter showed that the frequencies of euthyroidism re-presented (82.5%) due to iodine deficiency. Hyperthyroidism accounted for (7.5%), hypothyroidism represented (5%), whereas high TSH with normal T₃ and T₄ represented (5%).

Thyroid diseases are mostly caused by iodine deficiency as previously reported by (ELtom, 2000) particularly in Kurdfan, around the Nuba mountains and Darfur state due to heavy rain fall that washes the iodine content off the soil.

Iodine deficiency remains a major public health problem in Sudan. More than 20% of school – age children are goitrous, and the prevalence richest 40% in Darfur region of western Sudan; only 1% of the population has access to adequately ionized salt. (Peter L, Susanne B. 2002).

Further studies including more sample size should be conducted to evaluate the incidence and prevalence of euthyroid among goitrous patients in Sudan. Also, screening programs including patients with goiters should be established by Sudanese Federal Ministry of Health. Estimation of iodine level in the urine is essential to clarify its effect in development of goiter. Finally, development of a network of goiter centers would be invaluable to provide high quality care and support across Sudan.

Conclusion

From this study the following could be concluded:-

- 1-The frequency of goiter was high among peoples in west Darfur state.
- 2- The frequency of euthyroidism was high among goitrous patients in west Darfur State (Algeneina town).
- 3- The percentage of goiter diseases in females was higher than males.
- 4- Most of patients with goiter had normal life and normal thyroid hormones function.

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[Attached pictures are pictures for some patients enrolled in the study of euthyroid goiter].



Result of this patient was normal thyroid hormones (T3, T4, and TSH)



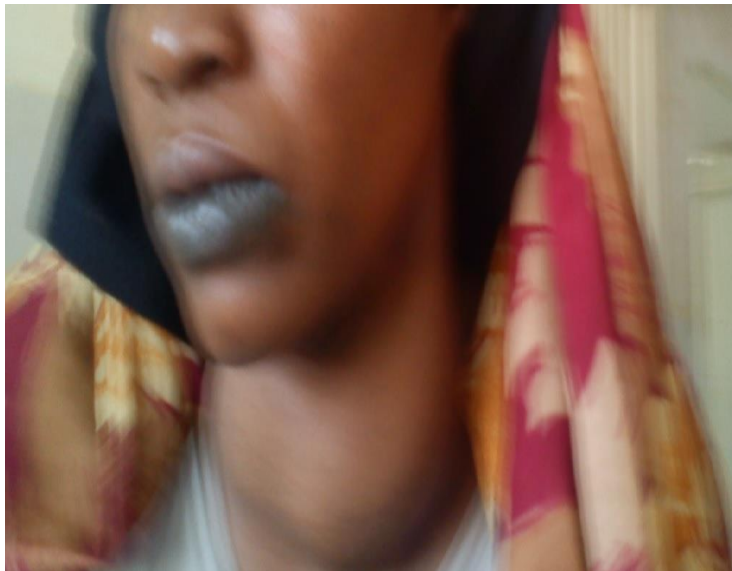
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