International Journal of Healthcare Sciences ISSN 2348-5728 (Online)
Vol. 4, Issue 2, pp: (607-616), Month: October 2016 - March 2017, Available at: www.researchpublish.com

Subclinical Hypothyroidism Age & Sex Distribution Association with Some Symptoms & Lab Investigations

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Abstract: **To determine the prevalence of subclinical hypothyroid in our population and to determine the clinical character of those patients. To determine age and sex distribution of sub clinical hypothyroidism cases to determine the association of sub clinical hypothyroidism with some clinical symptoms and some biochemical lab investigations.**
Methods: Retrospective study where we reviewed all thyroid function test done in our hospital from 2009- mid of 2015.
Results: the prevalence of subclinical hypothyroidism is 7% and more common in female.
Conclusions: subclinical hypothyroidism is not rare and associated with hyperlipidemia and ischemic heart disease and should be treated if indicated.

Keywords: **Subclinical Hypothyroid, All Thyroid Function, Biochemical Lab.**

1. INTRODUCTION

Subclinical hypothyroidism is defined by raised TSH (>4.2 to <10.0 mUL) with normal T3 and T4 levels (2). Subclinical hypothyroidism or mild thyroid failure is a common problem, with a prevalence of 4% to 8.5% in the adult population (16;40).The prevalence of subclinical hypothyroidism increases with advancing age and is higher in women (3). The main causes of hypothyroidism are autoimmune disorders, inflammation, iodine deficiency, drugs, radio ablated thyroid gland, post surgical resection, and pituitary disorders (4-7). Patients with subclinical hypothyroidism may occasionally present with signs and symptoms of clinically apparent hypothyroidism, such as fatigue, weight gain, and dry skin (8,9). Patients with subclinical hypothyroidism may have vague, non-specific symptoms of hypothyroidism. Thus, this disorder can only be diagnosed on the basis of laboratory test results **(2).**

The evidence for subclinical hypothyroidism and heart disease is mixed. Some studies suggest that subclinical hypothyroidism increases the risks for coronary artery disease and heart failure. However, a 2006 study in the *Journal of the American Medical Association* found that while subclinical hypothyroidism was associated with atrial fibrillation (irregular heart beat), it was not associated with other types of heart disease (10-12). Many experts believe that treatment of subclinical hypothyroidism will not help prevent or improve heart problems **(13)**

A small study from Saudi Arabia found that about a third of elderly women attending an outpatient clinic had subclinical hypothyroidism. The women were found to have no increased risk of hypertension, hyperlipidemia, ischemic heart disease, or diabetes, researchers said (1). D.H. Akbar and colleagues conducted the study "to determine the frequency of subclinical hypothyroidism (SH) in elderly women where our study looked to subclinical hypothyroidism in all ages and its relations to ischemic heart disease and hyperlipidemia.

2. METHODOLOGY

Type of the study:

Cross sectional study

Setting:

Outpatient clinic, King Abdulaziz University Hospital

Data collection technique:

We have selected first all those patients of 2007 with an elevated thyroid-stimulating hormone level (>4.2 to <10.0 mU/L) and normal T3 & T4 levels. Then, data on presence of diabetes mellitus, hypertension, ischemic heart disease, infertility and body mass index were collected from their files together with some of the available biochemical lab investigation, such as serum sodium, potassium, chloride, urea, creatinine, and fasting blood sugar.

Study population:

All visitors of outpatient clinic of King Abdulaziz University Hospital through a period between 1/1/2010 till 31/12/2014

Sampling:

Those with a high level TSH (>4.2 to <10.0 mU/L) and normal range of T3 and T4

Data processing and analysis:

1. Data was checked for completeness and accuracy
2. Data was handled and stored in personal computer
3. Analysis and correlation studies between different variables were carried out by using the SPSS program.

3. RESULTS

The number of the patients were interviewed 5137. The number of the patients fulfill the criteria of subclinical hypothyroid were 813 but after excluding the patients whose has previous thyroid diseases such hypothyroid on thyroxin, or thyrotoxicosis received Radioactive Iodine the number decreased 364 patients. The age distribution of those with subclinical is between 40-60 year (figure1). More common in female than male 3:1 (figure 2). The clinical symptoms mainly fatigue , joint pain as seen in figure 16.

More obesity, hyperlipidemia and hypertension in our patients with subclinical hypothyroidism (see all figures which explained all finding).

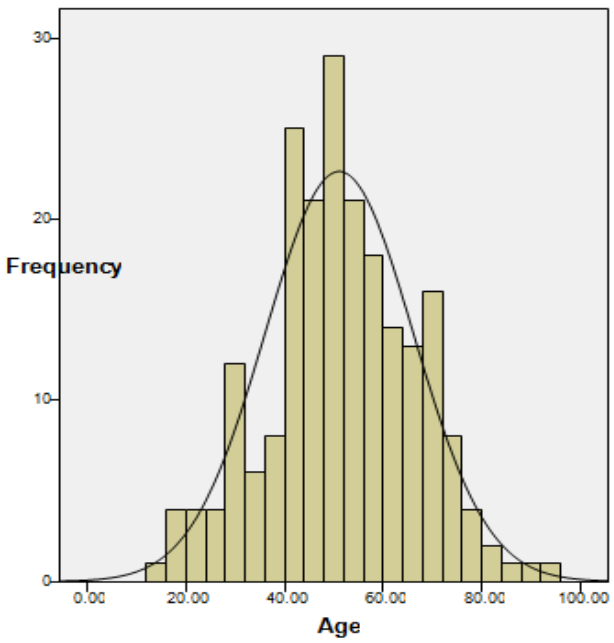


Figure (1)
Subclinical Hypothyroidism: Age Distribution

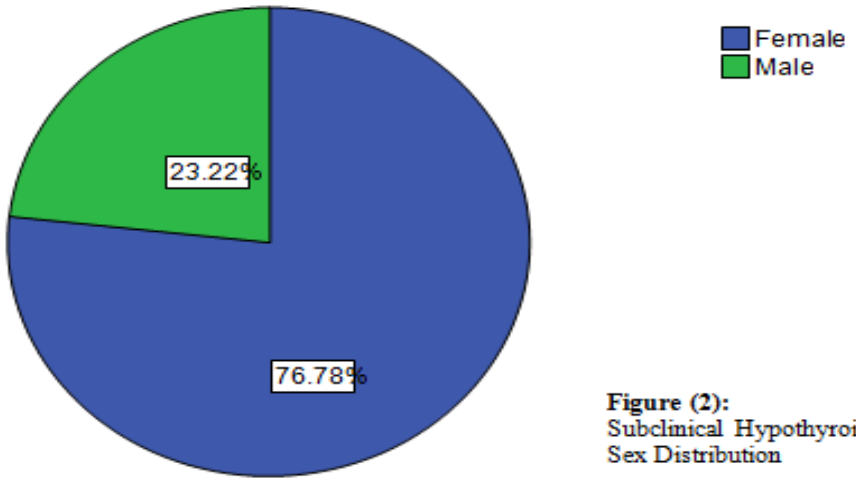
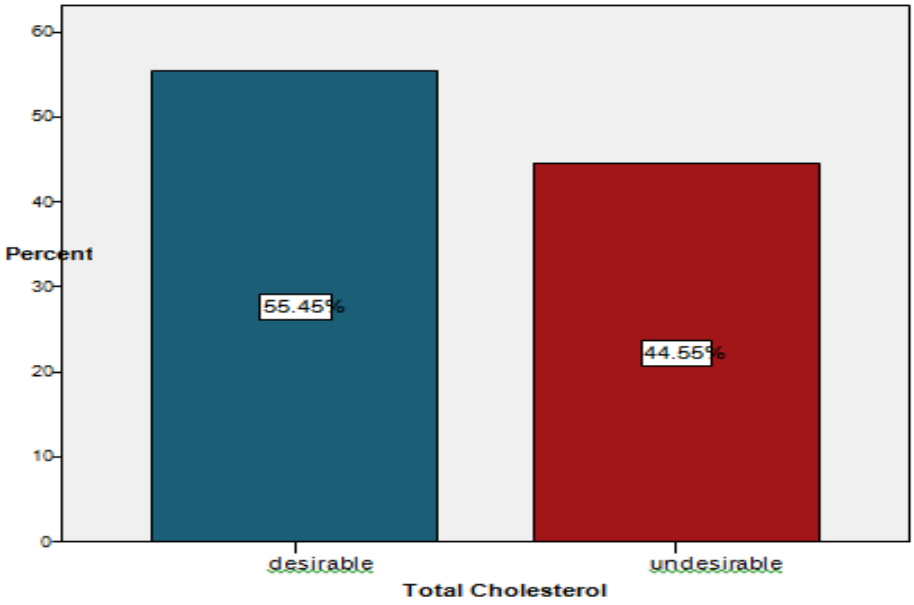


Figure (2):
Subclinical Hypothyroidism
Sex Distribution

Figure (3): Total cholesterol level among subclinical hypothyroidism cases



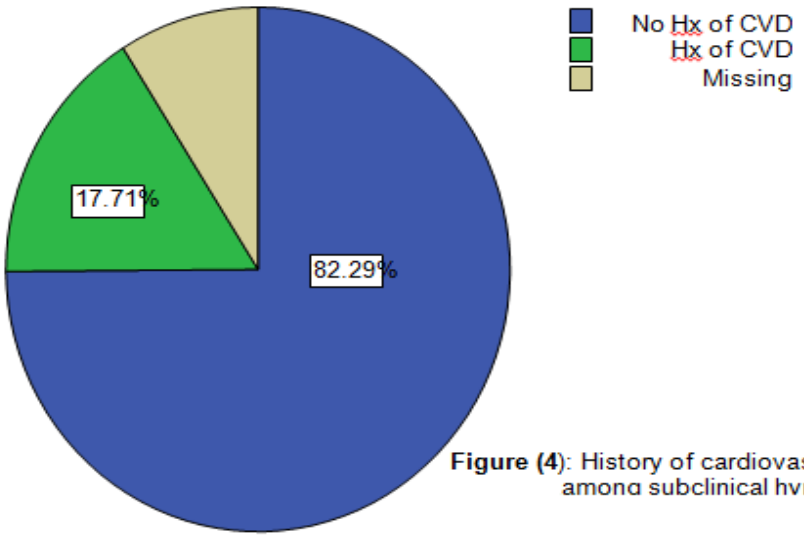
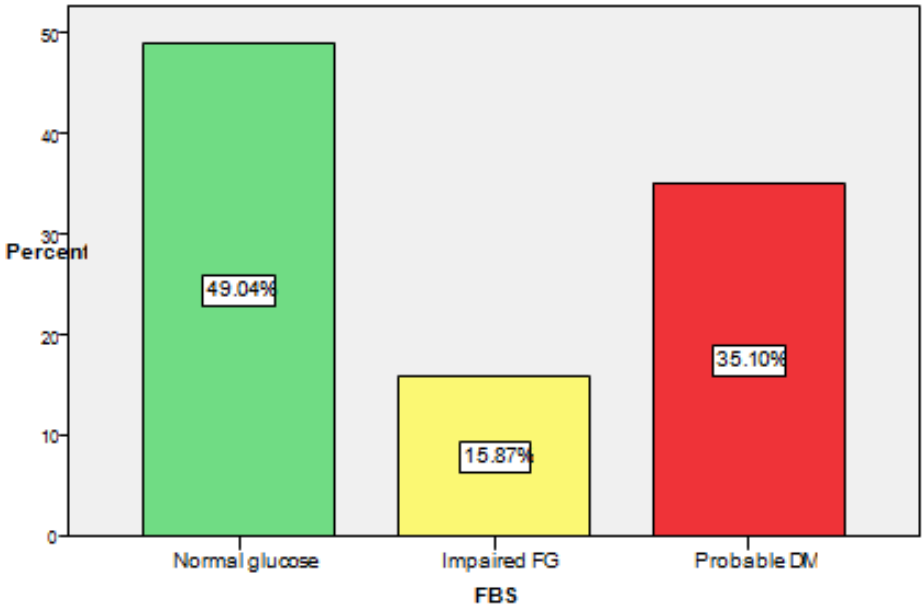


Figure (4): History of cardiovascular disease among subclinical hypothyroidism

Figure (5): Fasting blood sugar among subclinical hypothyroidism cases



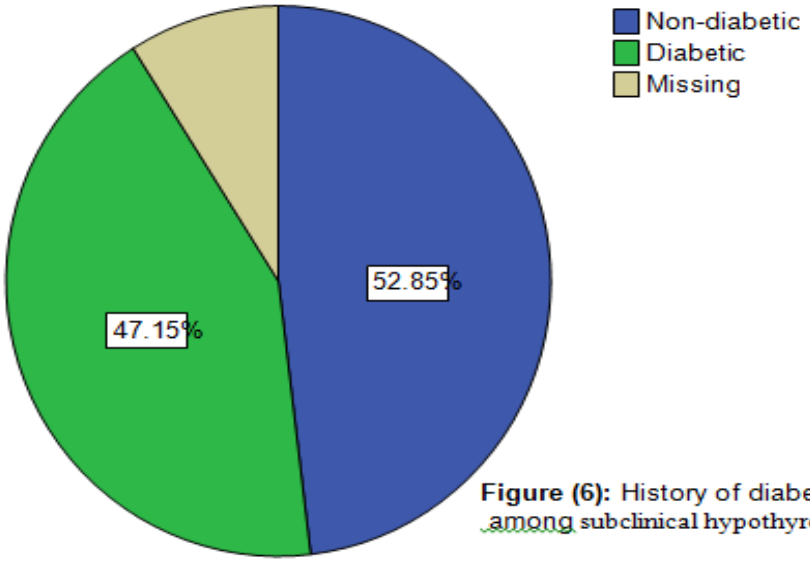


Figure (6): History of diabetes mellitus among subclinical hypothyroidism cases

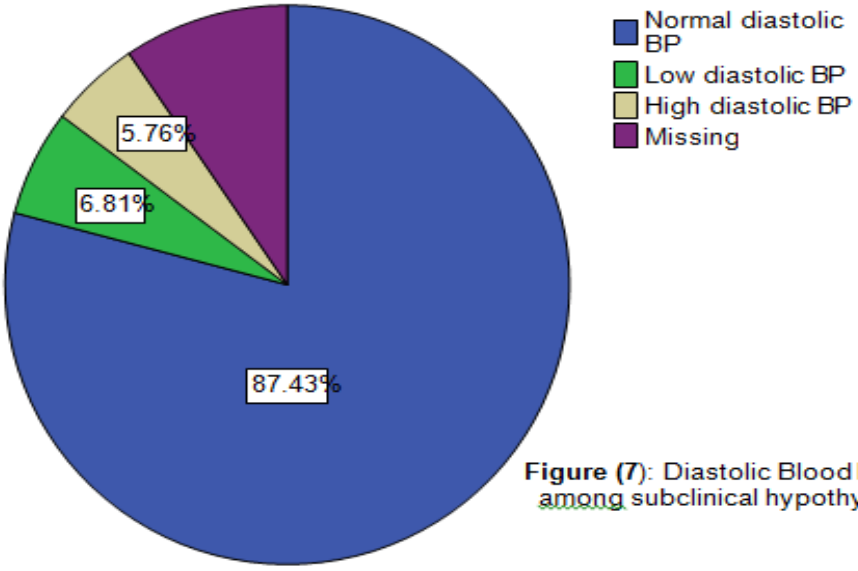


Figure (7): Diastolic Blood Pressure among subclinical hypothyroidism

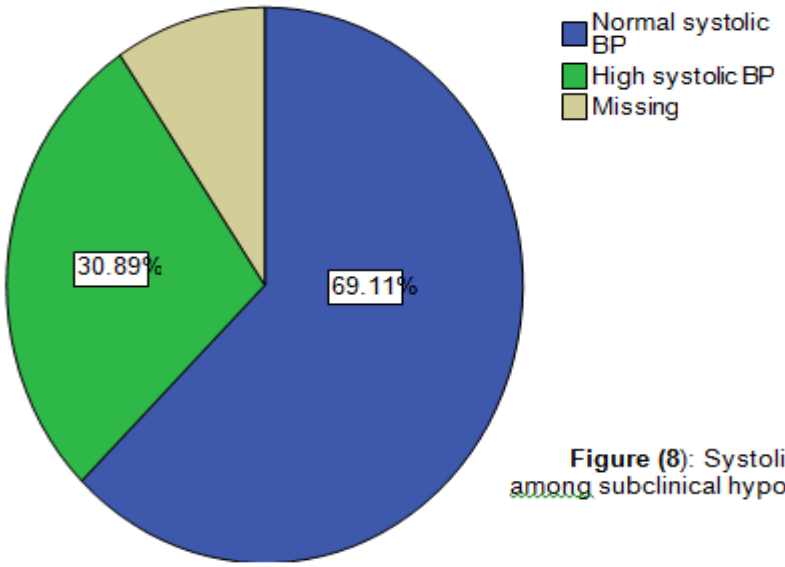


Figure (8): Systolic Blood Pressure among subclinical hypothyroidism cases

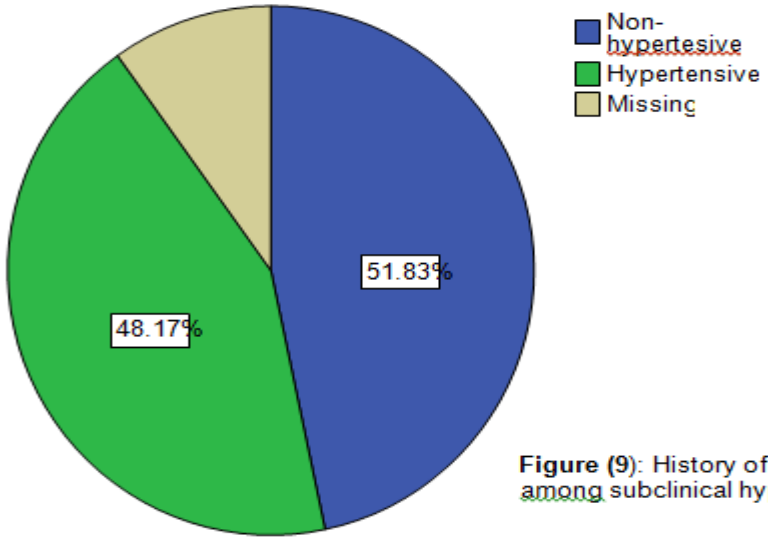


Figure (9): History of Hypertension among subclinical hypothyroidism

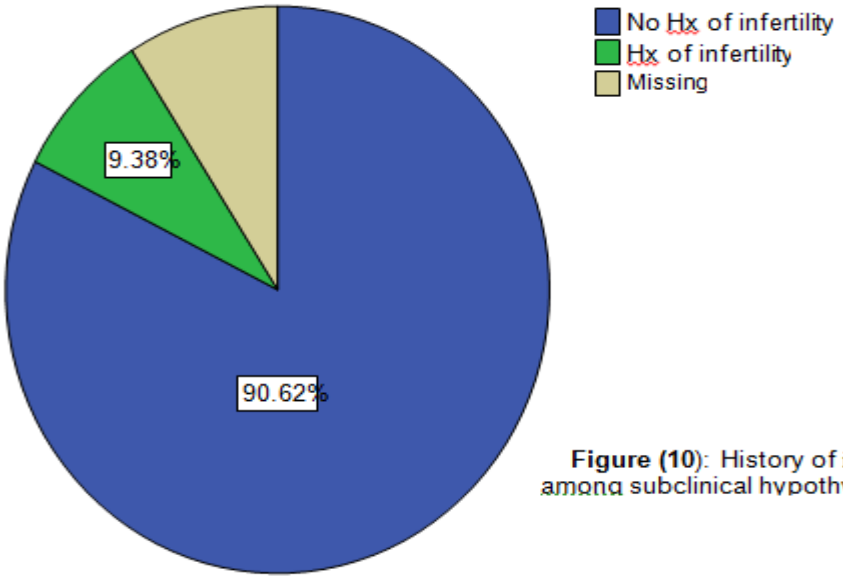
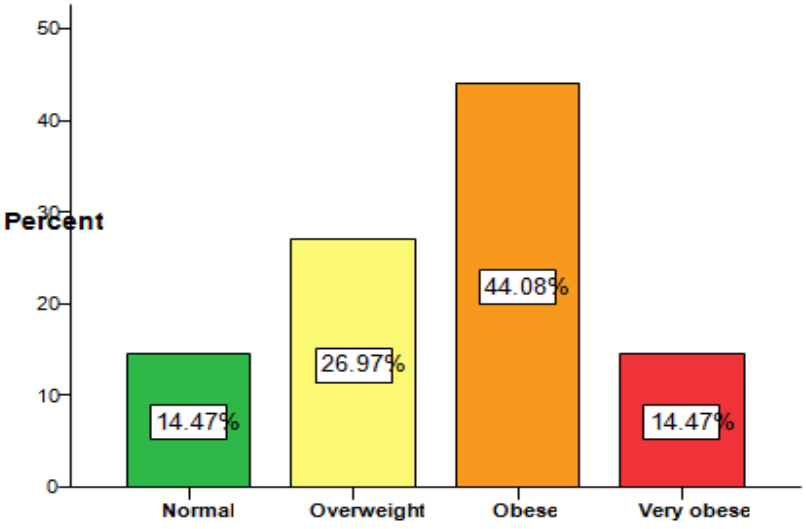


Figure (10): History of infertility among subclinical hypothyroidism

Figure (11): Body Mass Index (BMI) among subclinical hypothyroidism cases



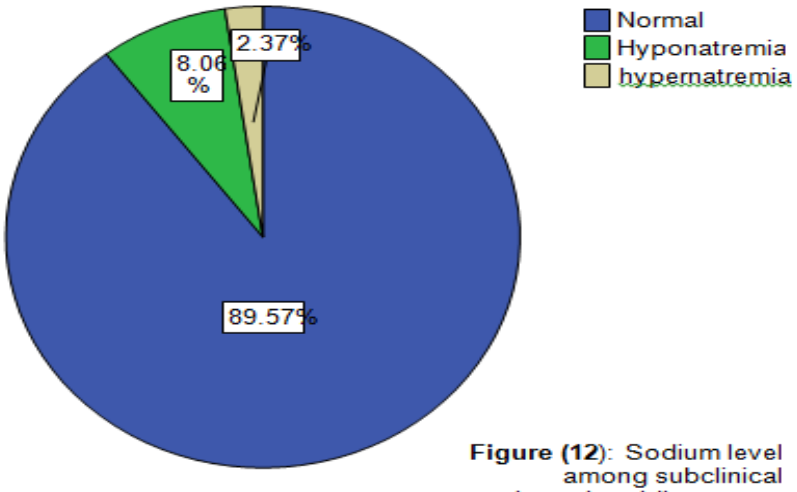


Figure (12): Sodium level among subclinical hypothyroidism cases

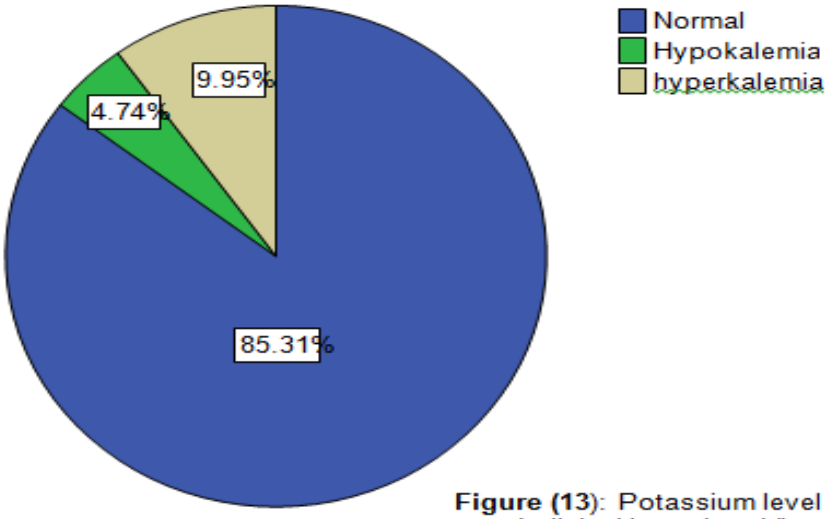


Figure (13): Potassium level among subclinical hypothyroidism cases

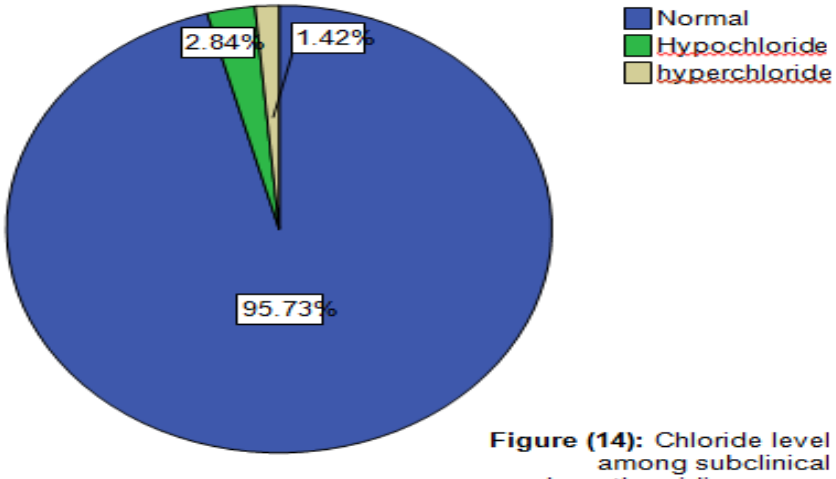
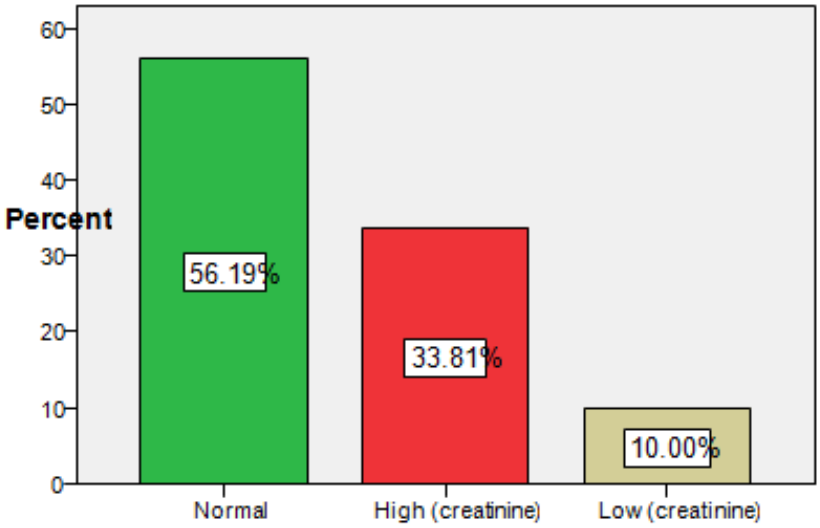


Figure (14): Chloride level among subclinical hypothyroidism cases

Figure (15): Creatinine level among subclinical hypothyroidism cases



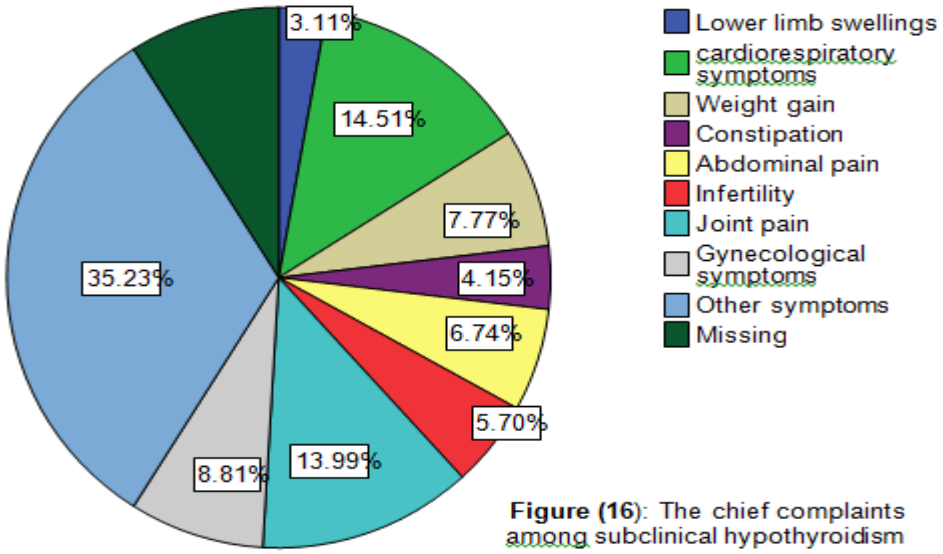


Figure (16): The chief complaints among subclinical hypothyroidism

4. DISCUSSION

Subclinical Hypothyroidism represents a condition of mild to moderate thyroid failure characterized by normal serum levels of thyroid hormones with mildly elevated serum TSH concentrations (14,15). A panel of experts recently divided patients with Subclinical hypothyroidism to two categories: patients with mildly increased serum TSH levels (4.5–10 mIU/liter), and patients with more severely increased serum TSH levels (more 10 mIU/liter) (16).

We shall examine the progression of the disease, the adverse effects, and treatment using these definitions of thyroid hormone deficiency**.**

The etiology of subclinical hypothyroidism is the same as the etiology of overt hypothyroidism (14,15) (Table 1). It is most often caused by chronic lymphocytic thyroiditis (goitrous Hashimoto's thyroiditis and atrophic thyroiditis). An autoimmune disorder of the thyroid gland that is the most common cause of decreased thyroid hormone production in patients with acquired mild subclinical, or overt hypothyroidism. (45,17,7). Other causes of hypothyroidism from therapies that destroyed thyroid tissues such as radioactive iodine or external radiation therapy (18). Transient or persistent increases in serum TSH may occur after subacute, postpartum, or painless thyroiditis and after partial thyroidectomy.

TABLE 1. Causes of subclinical hypothyroidism
Chronic autoimmune thyroiditis (risk factors: family history of autoimmune thyroid disease, personal or family history of associated autoimmune disorders, down syndrome, Turner's sy**ndrome)**
Persistent TSH increase in subacute thyroiditis, postpartum thyroiditis, painless thyroiditis
Thyroid injury: partial thyroidectomy or other neck surgery, radioactive iodine therapy, external radiotherapy of the head and neck
Drugs impairing thyroid function: iodine and iodine-containing medications (amiodarone, radiographic contrast agents), lithium carbonate, cytokines (especially interferon), aminoglutetimide, ethionamide, sulfonamides, and sulfonylurea
Inadequate replacement therapy for overt hypothyroidism: (inadequate dosage, noncompliance, drug interactions (iron, calcium carbonate, cholestyramine, dietary soy, fiber, etc.), increased T4 clearance (phenytoin, carbamazepine, phenobarbital, etc.), malabsorption).
Thyroid infiltration (amyloidosis, sarcoidosis, hemochromatosis, Riedel's thyroiditis, cystinosis, AIDS, primary thyroid lymphoma)
Central hypothyroidism with impaired TSH bioactivity
Toxic substances, industrial and environmental agents
TSH receptor gene mutations; G& gene mutations

Several drugs may induce subclinical or overt hypothyroidism particularly in patients with underlying autoimmune thyroiditis (iodine-containing compounds, lithium carbonate, cytokines, and interferon) (15,18). Amiodarone, a benzo uranic-derivative, iodine-rich drug used to treat tachyarrhythmia's, can inhibit thyroid hormone production. (19). Excess dietary iodine, medication, topical antiseptics, and iodine contrast agents used for diagnostic procedures may induce mild or transient hypothyroidism. Lithium carbonate, which is prescribed for the treatment of manic-depressive disorders, may impair thyroid hormone synthesis and released and may be associated with the development of goiter (40–60% of cases) and mild or moderate hypothyroidism (20-22). Patients who develop persistent hypothyroidism during lithium treatment are more likely to have underlying chronic Hashimoto thyroiditis.

Subclinical hypothyroidism is frequently observed in patients with overt hypothyroidism receiving inadequate replacement therapy due to poor compliance, drug interactions, or inadequate monitoring of therapy. In fact, between 17.6 and 30% of patients with overt thyroid failure were reported to have SHypo due to inadequate thyroid hormone supplementation (8,23).

Only persistent or progressive Subclinical hypothyroidism should be considered an early stage of thyroid disease. It may be difficult to distinguish between transient disturbances of thyroid gland function and mild thyroid failure. Transient hypothyroidism, followed by a euthyroid state, may be due to thyroiditis caused by viral infection (subacute thyroiditis) or autoimmunity (postpartum, painless, or silent thyroiditis). In the early phase of the disease, a mild TSH increase with absent or mild symptoms of hypothyroidism may make it difficult to distinguish who will recover from those destined to be permanently hypothyroid. Moreover, evidence from a long-term follow-up of patients with subacute thyroiditis suggests that viral infection can precipitate an autoimmune thyroid disease in susceptible individuals, thereby resulting in the development of permanent hypothyroidism (18). Diagnosis of persistent Subclinical hypothyroidism can be verified by reevaluating TSH concentration after 6-12 months. This will ensure that only persistent or progressive disease is treated, and will also rule out the possibility that abnormal values were due to a laboratory error. A high thyroid autoantibody titer associated with an increased persistent serum TSH concentration may be useful to identify individuals with autoimmune thyroid disease who are at increased risk of developing permanent hypothyroidism. A transient increase in TSH is common in hospitalized patients during the recovery phase of euthyroid sick syndrome (24). TSH concentrations may be falsely increased in some assays because of the presence of heterophilic antibodies against mouse proteins (25). Patients with untreated adrenal insufficiency may have high serum TSH concentrations. (26). Rare causes of slightly high TSH concentrations TSH secreting pituitary adenomas or isolated pituitary resistance to thyroid hormone (27), however in this case the increase TSH is associated with elevated T3 and T4. Central hypothyroidism can present with mild TSH elevation (5–10 mIU/liter) in approximately 25% of cases that may represent bioinactive TSH (4). The association of low serum thyroid hormone levels with normal or slightly high serum TSH has often been observed in patients with pituitary or hypothalamic disorder.

The prevalence of SHypo has been reported to be between 4 and 10% of adult population samples (3,8,23,28-32). In our study we found 7% fulfill the criteria of subclinical hypothyroidism and more common in female which similar what have been reported). Our study showed subclinical hypothyroidism more common in middle age and most of them has hypothyroid symptoms and more than 50% obese.

We conclude from our study that subclinical hypothyroid is not rare up to 7% and should be treated in those with symptoms of hypothyroid, obese, hyperlipidemia, or those who has positive ant thyroid antibodies.

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