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RESEARCH ARTICLE

AWARENESS AND CORRELATION BETWEEN SOME FACTORS SUCH AS IRON DEFICIENCY ANEMIA, OBESITY & HYPERLIPIDEMIA, IN HYPOTHYROIDISM PATIENTS IN HAIL, KINGDOM OF SAUDI ARABIA.

Mona Madbouly Shahin[1], Noura Saleh Dagafag Algrwan[2] and Muradi Hisham Abdulaziz Algriys[2].
1. Department of Pediatrics, College of Medicine, Hail University, KSA.
2. College of Medicine, Hail University, KSA.

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Abstract

Background: Hypothyroidism is a common endocrinal disorder in which thyroid gland does not produce enough thyroid hormones. A lot of diseases may be the underlying cause of Hypothyroidism. In this research we will see the awareness and correlation between some factors such as Iron deficiency anemia, obesity & hyperlipidemia, in Hypothyroidism patients in Hail, Kingdom of Saudi Arabia.

Aims and Objectives: We aimed to describe the changing incidence and prevalence of thyroid disease in Hail, Kingdom of Saudi Arabia and to evaluate if there is any significant correlation between some factors such as Iron deficiency anemia, hyperlipidemia, and Hypothyroidism.

Methodology: The data was carried out on 800 Saudi participant from Hail, Kingdom of Saudi Arabia by handling out questionnaires.

Results: The data showed 168 (21%) are thyroid gland patients out of 800 people. Among the 168 patients there were 142 (17.75%) hypothyroidism patients. These patient were either overweight or obese, others with iron deficiency were 52 (36.62%) and with hyperlipidemia were 49 (34.51%).

Conclusion: The current study have a significant role for the future incidence of hypothyroidism in Hail, Kingdom of Saudi Arabia, and for the health providers they should start increasing the awareness about the thyroid and it's diseases. We also showed that the prevalence of anemia is high in hypothyroidism, also the TSH measurement should be routinely recommended in the initial work-up of anemia.

Introduction:-

Thyroid gland is one of the important organs in human body, thyroid dysfunctions have increased recently and are considered the commonest endocrine diseases [1]. The burden of thyroid diseases in the general population is enormous especially in females. Diseases of the thyroid gland are common in adults and the prevalence is increasing in all parts of the world. Ethnicity and geographical locations also affect the prevalence of thyroid disorders along with the age and sex by the different populations. The prevalence of thyroid disorders depends on many factors, such as age, sex, geographical factors, and iodine intake. Thyroid disorders create many problems so patients may

Corresponding Author:- Mona Madbouly Shahin.
Address:- Department of Pediatrics, College of Medicine, Hail University, KSA.

undergo medical or surgical management. Thyroid diseases are generally grouped and manifested into two main categories which are either due to reduced activity of the gland (hypothyroidism) or due to over activity (hyperthyroidism) [2]. Hypothyroidism is a condition in which the body lacks sufficient thyroid hormone. Since the main purpose of thyroid hormone is to "run the body's metabolism," it is understandable that people with this condition will have symptoms associated with a slow metabolism .The signs and symptoms of hypothyroidism vary, depending on the severity of the hormone deficiency. But in general, any problems tend to develop slowly often over a number of years [3]. The incidence and pattern of thyroid diseases were studied in Saudi Arabia by some investigators (Al-Tameem, 1987; Koriesh et al., 1988: Abu-Eshy et al., 1994; Al-Zahrani et al., 2005) [4]. However we specifically studied on hypothyroidism patients in Hail area, so the present study was undertaken study the pattern and correlation of hypothyroidism with some diseases.

Methodology:-

Our study design is an observational, quantitative, cross-sectional study. The inclusion criteria in the study were female and males from different age groups and the sample size was 800 participants. The study was performed in Hail, Kingdom Saudi Arabia. The questionnaire was divided into parts. The first part was general and demographic questions which included sex, age, height and weight. The second part was about the thyroid gland itself and awareness about it. The third part was about past and present illnesses. In this section we asked if they had ever been diagnosed with thyroid disease including hyperthyroidism, hypothyroidism and tumors. And if they were on thyroid medication. We also asked if they were previously diagnosed with Iron deficiency anemia or hyperlipidemia. [5][6]The fourth part of the questionnaire was a lifestyle section. We asked them about their food intake, exercise, and if they ever had any supplementation.

Results:-

The total number of participants was 800.The patients complaining of different thyroid disorders were 168 (21%). Among these patient there were 142(85.1%) patient diagnosed with hypothyroidism .We start to analyze the results of the hypothyroidism patients specifically and we found the age distribution of these patients, we noticed that most of them were in their second decade (54.3%).

(Figure1). The prevalence of hypothyroidism was (17.75%). The iron deficiency anaemia patients were 260. The prevalence of anaemia was (32.5%) among participants. About (36.36%) of these anaemic participants had thyroid dysfunction (table1) (Figure2). Additionally we asked about hyperlipidemia in hypothyroidism patients and it was approximately (34.50%) (Figure3).

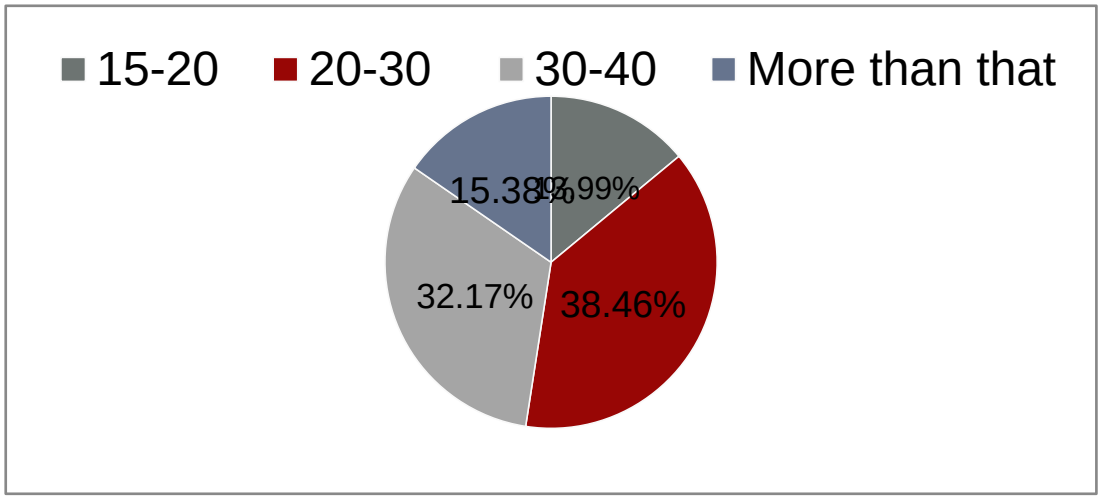

Figure 1:- Age distribution in relation to thyroid dysfunction among patients with thyroid disorders in Hail region, Saudi Arabia during the year of 2018

Table1:-Prevalence of anaemia within the different thyroid function groups in Hail region, Saudi Arabia during the year of 2018

Thyroid function group	Total n = 800	Anaemia n = 260(32.5%)
Euthyroidism (reference)	658	208 (26%)
Hypothyroidism	142	52((36.6%)

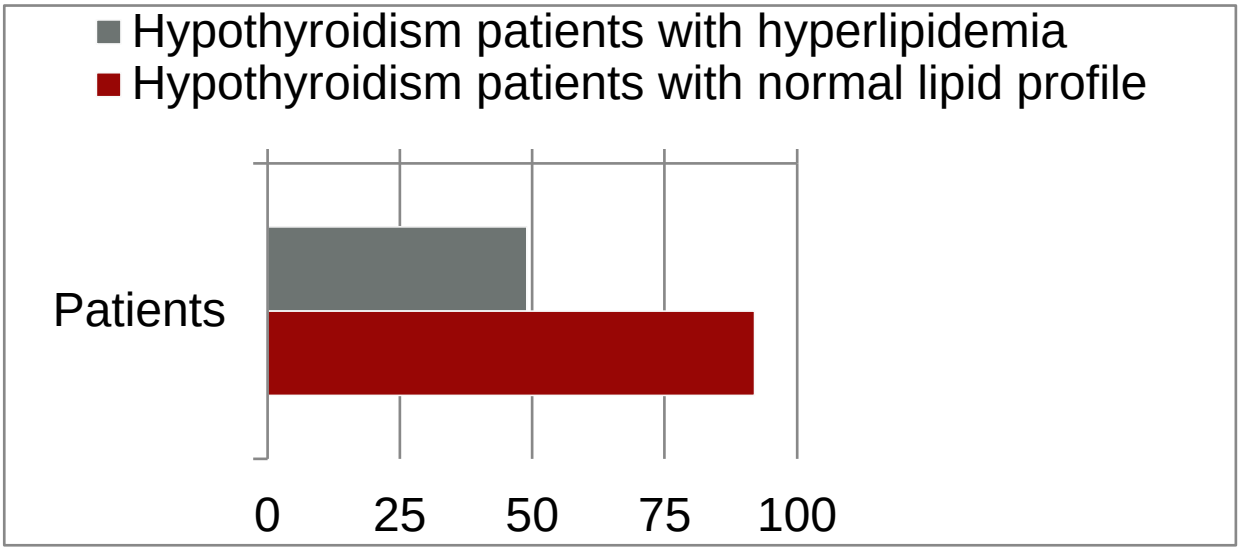

FIGURE 2:- Prevalence of anaemia within the different thyroid function groups in Hail region, Saudi Arabia during the year of 2018

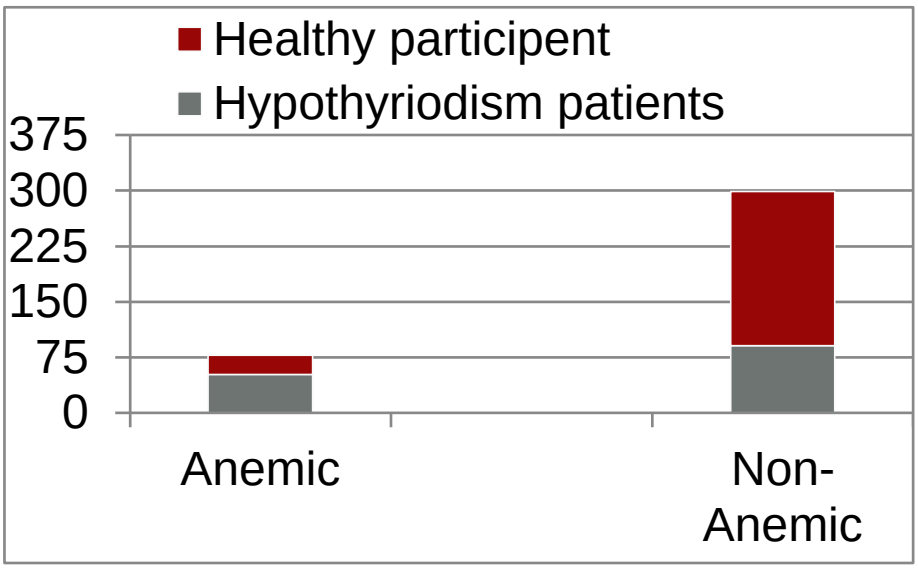

FIGURE 3:-Prevalence of hyperlipidemia within the different thyroid functiongroups in Hail region, Saudi Arabia during the year of 2018

Discussion:-

In this cross sectional study, the prevalence of anaemia was higher among adults with hypothyroidism, compared to the euthyroid state. Although most guidelines recommend a systematic TSH measurement among patients with anaemia [7] [8] [9], screening for anaemia in thyroid dysfunction patient leads to the identification of only 36.36% of adults with thyroid dysfunction (table 1). Hypothyroidism, itself, may lead to low iron levels due to poor gut absorption as a result of decreased levels of digestive acids/ enzymes or due to associated autoimmune conditions

like celiac disease [10]. Iron is a component of many enzymes including thyroid peroxidase (TPO) which takes part in the initial two steps in thyroid hormone biosynthesis [11]. Low ferritin levels have also been observed in hypothyroid patients [12]. Several studies in animals and humans have shown that nutritional iron deficiency may significantly lower the circulating levels of both thyroxine and triiodothyronine and may also reduce conversion of T4 to T3 [13,14]. Iron deficiency has also been reported to decrease plasma concentrations of T3 and T4 and increase in vitro hepatic rT3 deiodination, suggesting the thyroid hormone metabolism via a deactivating pathway in iron deficiency. Thus, hypothyroidism and iron deficiency states are strongly interrelated. Estimation of iron profile may be of help in patients diagnosed with hypothyroidism as the underlying cause may be the associated iron deficiency. Sympathetic system symptoms like anxiety, palpitations, irregular heartbeats etc. may worsen on treatment with thyroxine if patient is iron deficient [15].

A previous study found that the patients with hypothyroidism have developed a macrocytic anaemia with thyroid dysfunction [5] [16] when our results suggest a higher prevalence of iron deficiency anaemia compared with healthy controls .This partial discrepancy could be explained by the low prevalence of thyroid dysfunctyion (10% compared to ours17%) possibly due to different population characteristics and study design; Further studies should confirm this finding [5] [16].

Thyroid function regulates also a wide array of metabolic parameters. Thyroid function significantly affects lipoprotein metabolism as well as some cardiovascular disease (CVD) risk factors, thus influencing overall CDV risk [17-19]. Indeed, even within the normal range of thyroid-stimulating hormone (TSH) values, a linear increase in total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C) and triglycerides (TGs) and a linear decrease in high-density lipoprotein cholesterol (HDL-C) levels has been observed with increasing TSH [20].

Hypothyroidism was associated with hyperlipidemia in 49 patients (34.50%). The prevalence of hyperlipidemia in our study is consistent with previous study [6]. That found Hypothyroidism is associated with an increased risk of coronary artery disease and that might be due to hyperlipidemia. Their study showed the lipid profiles of 268 patients with primary hypothyroidism and 27 with secondary hypothyroidism. Their observation accompanied with our study further supports the fact that hypothyroidism might be a cause of hyperlipidemia due to abnormalities of the lipid and low metabolic rate in these patients. However, it might be hard to find this association when we correct the cause which is the replacement of thyroid hormone with medication. This is accomplished when a previous study found that administration of substitution therapy with L-thyroxine significantly improves lipid metabolism abnormalities [21].

Our study has some limitations. The diagnosis of the thyroid dysfunction was based only at the participant answers which they were a small group, which is a limitation of most previous studies [4], and we might have found a stronger relationship between thyroid dysfunction and anaemia if we had studied on a larger participants with persistent thyroid dysfunction.

Metabolism of thyroid hormones and iron is quite inter-dependent. Deficiency of iron can produce hypothyroidism and vice versa. This fact is important, especially during administration of treatment of hypothyroidism. In conclusion, our data suggest that the prevalence of anaemia is higher in hypothyroidism. TSH measurement should be routinely recommended in the initial work-up of anaemia.

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Référencés:-

1. **Madariaga AG, Palacios SS, Guillén-Grima F, Galofré J (2014).** The incidence and prevalence of thyroid dysfunction in Europe: a meta-analysis. *J Clin Endocrinol Metab* 99: 923-931.
2. **Kumar V, Abbas AK, Mitchell RN, Fausto N (2007).** *Robbins basic pathology* (8th edn.) United States.
3. **Velayutham K, Selvan S, Unnikrishnan A (2015)**. Prevalence of thyroid dysfunction among young females in a South Indian population. *Indian J Endocrinol Metab* 19: 781-784.
4. **Moussa D, Alshammari A, Alshammari G, Alshammari K, Alanzi M, Alanzi N, and Alshammari Z (2016).** Pattern of Thyroid Disease in Hail Region, Saudi Arabia. *Int. J. Adv. Res.*, 4 (9), 1235–1246.
5. **Rabet-Bensalah K M, Aubert CE, Coslovsky M, Collet TH, Baumgartner C, Den Elzen WPJ, R. Luben, Angelillo-Scherrer A, Aujesky D, Khaw KT, and Rodondi N(2016)**. Thyroid dysfunction and anaemia in a large population-based study. *Clin. Endocrinol*. (Oxf), 84 (4), 627–631.
6. **BRIEN O, DINNEEN SF, BRIEN PCO, and PALUMBO PJ (1993).** Hyperlipidemia in Patients with Primary and Secondary Hypothyroidism. *Mayo Clin. Proc*., vol. 68(9), 860–866.
7. **Lee GR, Foerster J, Lukens J, et al. (1999).** Anemia: a diagnostic Strategy. **In: Greer JP, Forester J, Rogers GM, et al.** *Wintrobe's Clinical Hematology*, 10th edn. Williams & Wilkins, Baltimore, Philadelphia, 908–940.
8. **Colon-Otero G, Menke D & Hook CC (1992).** A practical approach to the differential diagnosis and evaluation of the adult patient with macrocytic anemia. *Medical Clinics of North America*,76, 581–597.
9. **Kaferle J & Strzoda CE (2009)**. Evaluation of macrocytosis. *American Family Physician*, 79, 203–208.
10. **Jason WH, Stephen FH, Rajasehkar R, Govind B, Peter HRG (2007).** Anemia in celiac disease is multifactorial in etiology. *Am J Hematol*; 82: 996–1000.
11. **Sonja YH, Michael BZ, Myrtha A, Wolfgang L, Richard FH (2002).** Iron deficiency anemia reduces thyroid peroxidase activity in rats. *J Nutrition*; 132: 1951-1955.
12. **Shakir KM, Turton D, Aprill BS, Drake AJ, Eisold JF (2000).** Anemia: a cause of intolerance to thyroxine sodium. *Mayo Clinic Proceedings*; 75: 189-192.
13. **Chen SCH, Shirazi MRS, Orr RA (1983).** Triiodothyronine and thyroxine levels in iron deficient, hyper triglyceridemic rats. *Nutr Res*; 3: 91-106.
14. **Beard JL, Borel MJ, Deer J (1990).** Impaired thermoregulation and thyroid function in iron deficiency anemia. *Am J Clin Nutr*; 52: 813-819.
15. **Jonathan SM, Rubaraj J, Petros P (2001).** Deterioration of symptoms after start of thyroid hormone replacement. *Br Med J*; 323: 332.
16. **Erdogan M, Ɛosenli K A, Ganidagli S, et al. (2012).** Characteristics of anemia in subclinical and overt hypothyroid patients. *Endocrine Journal*, 59, 213–220.
17. **Duntas LH. (2002).** Thyroid disease and lipids. *Thyroid*; 12: 287-93.
18. **Friis T, Pedersen LR (1987).** Serum lipids in hyper- and hypothyroidism before and after treatment. *Clin Chim Acta*; 162: 155-63.
19. **Canaris GJ, Manowitz NR, Mayor G, Ridgway EC (2000).** The Colorado thyroid disease prevalence study. *Arch Intern Med*; 160: 52634.
20. **Asvold BO, Vatten LJ, Nilsen TI, Bjoro T(2007).** The association between TSH within the reference range and serum lipid concentrations in a population-based study. The HUNT Study. *Eur J Endocrinol*; 156: 181-6.
21. **Rizos CV, Elisaf MS and Liberopoulos EN (2014)**, "Effects of thyroid dysfunction on lipid profile," *Open Cardiovasc. Med. J.*, vol. 5, pp. 76–84, 201.