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Cutaneous symptoms in hypothyroidism

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Abstract:

Introduction: Thyroid disorders are known to cause a wide range of skin manifestations. Hypothyroidism causes changes in the skin, hair and nails.

Aim: To detect the prevalence of cutaneous symptoms in hypothyroid patients.

Methods: This study was a cross-sectional study, conducted on 300 patients recently diagnosed with hypothyroidism done at Family medicine / Endocrine Outpatient Clinics at Cairo University Hospitals screened for evidence of cutaneous manifestations of thyroid disorders. **Results:** the predominant cutaneous symptom in patients was dry skin (38.7%), followed by Pruritis (28.7%), pigmentary changes (27.3%) and diffuse hair loss (22%). puffy face was complained by 18.7% patients, whereas rough skin by 13.3% of patients. slow nail growth was reported as a cutaneous complaint by 10.7% of patients, thin brittle hair was found in 8.7% cases, and (6.7%) of cases had either decreased sweating or brittle nails. **Conclusion:** skin, hair and nail disorders are common finding in thyroid gland dysfunction. Hence both dermatologist and physician should be aware of the interrelationship of both skin and thyroid gland, so that the patients are investigated promptly to rule out thyroid dysfunctions if any such signs and symptoms are present.

Keywords: Thyroid disorders, cutaneous symptoms, hypothyroid patients.

1. Introduction

It's a well-known fact skin is referred to as window to the body. Many internal ailments are detected by looking for the various cutaneous signs and symptoms. Dermatologists often see skin lesions that suggest an underlying endocrine disorder. Identifying the endocrine disorder is very important, so that patients can be treated appropriately rather than giving symptomatic treatment. The endocrine system consists of hormone producing glands, including the pituitary, pancreas, thyroid, parathyroids, adrenals, testes and ovaries. **(Raj et al.,2021).**

A failure in any of these glands may clinically present as an endocrine disorder. Hormones are essential in regulating physiologic processes in each system of the body, including the skin. Endocrine hormones when in excess or deficient result in changes in cutaneous morphology and function. They act as chemical messengers that serve to regulate growth, metabolism, reproduction, behavior and development. **(Campbell et al.,2021).**

Underlying endocrine disorders which may present as skin diseases are, diabetes mellitus; thyrotoxicosis; hypothyroidism; Cushing syndrome; Addison disease; acromegaly; hyperandrogenism; hypopituitarism; primary hyperparathyroidism; hypoparathyroidism¹. Like most systemic pathologies, hypothyroidism is expressed in multiple ways through the skin and its adnexa. In some patients, the initial and most prominent complaints are related to alterations in the skin, and hence the dermatologist will at times be the first physician to be consulted. To make a diagnosis of the underlying endocrinopathy is essential, so that patients can receive corrective treatment and prevent morbidity **(Lavanya et al.,2015).**

Thyroid hormones are key endocrine regulators of tissue development and homeostasis. Beyond the central axis. Skin, muscle, liver, bone and heart are finely regulated by TH. In particular, skin is among the target organs most influenced by TH **(Mancino et al.,2021).**

Thyroid diseases include benign functional, inflammatory, autoimmune and neoplastic diseases characterized by a wide range of physical and mental symptoms primarily, but not exclusively, related to the excess or to the deficiency of circulating thyroid hormones. Such alterations may not only affect the biological and functional aspects of the organism, but may also have an impact on emotional, relational, social, and working life of affected individuals **(Leso et al., 2020).**

Thyroid dysfunction is the second most common endocrine disorder following diabetes mellitus, affecting women in the childbearing age, and thyroid autoimmunity (TAI) is the most frequent autoimmune disorder in such women **(Wali et al., 2020).**

Thyroid dysfunction is common and occurs two to three times more often in women than men. In iodine-sufficient regions, subclinical and overt hypothyroidism occurs in up to 7% of the general population **(Leung et al., 2024).**

Hypothyroidism prevalence in general population in Europe ranged between 0.2 and 5.3% and usually this represents thyroid hormone deficiency. It is more common in older age (≥ 65 years) and its prevalence in them is estimated to be 2%-4%, (Wali et al., 2020)

Material and methods :

This study was a cross-sectional study, conducted on 300 patients recently diagnosed with hypothyroidism done at Family medicine / Endocrine Outpatient Clinics at Cairo University Hospitals and they were chosen due to their high flow rate of patients as well as the cooperation of the health care workers in them. aiming to estimate the prevalence of dermatological complains among hypothyroid patients were screened for evidence of cutaneous manifestations of thyroid disorders. Institutional ethical clearance was obtained before the start of the study.

Adult patients above age 18 years diagnosed with hypothyroidism attending Family medicine/ Endocrine clinics at Cairo University Hospitals were enrolled in this study.

Inclusion criteria:

- Newly diagnosed untreated hypothyroid patients with TSH level above normal range.

Exclusion criteria:

- Menopausal female.

Iatrogenic hypothyroidism

- Pregnancy.

The following steps were done for all cases:

❖ Taking approval consents from patients and detailed history taking including:

- Personal history: including name, age, address, consanguinity, and special habits as smoking ...etc.
- Menstrual history
- Medical history of diabetes, hypertension, autoimmune diseases, drugs, surgical history of thyroidectomy or other surgeries..
- Past history:

endocrine or systemic diseases as hypertension, DM, renal diseases, hyperthyroidism, etc.

- Family history of clinical importance like hypertension, DM, hypothyroidism, hyperthyroidism etc..

❖ Examination

Including general examination: vital signs ,body weight and chest, abdomen and heart examination, lower limb edema.

❖ Dermatological examination

Detailed dermatological examination were carried out

Blood sample taken from each patient to assess thyroid function .

Results

This is a cross sectional study conducted on 300 patients recently diagnosed with hypothyroidism or aiming to estimate their skin manifestation..

Table (1): Basic characteristic of the studied group (n=300):

Characteristic	Study group (n=150)		
Category		No.	%
Age	Mean $\pm$ SD	38.37 $\pm$ 8.61	
	Range	(20-60)	
Sex	Male	56	18.7
	Female	244	81.3
Marital Status	Single	78	25.3
	Married	224	74.7
Residence	Rural	100	33.3
	Urban	200	66.7
Occupation	No	210	70.0
	Yes	90	30.0
Smoking	No	258	86.0
	Yes	42	14.0
Medical history	Hypertension	30	10.0
	DM	46	15.3
	Cerebrovascular disorders	6	2.0
	Cardiovascular disorders	10	3.3
	hepatic disorders	18	6.0

Table (1) shows a total of 300hypothyroid patients were included in this study. Out of 300 patients, the majority were females with mean age 38.37 $\pm$ 8.61 years.

More than half of cases (74.7%) were married,. urban was the residence of (66.7%) of cases. Regarding occupation, (70%) were non-worker and about (14%) were smoker.

Regarding medical history, (10%) of cases were hypertensive, about (15.3%) were diabetic, (6%) had hepatic disorders, cardiovascular disorders were found in (3.3%) of cases and only (2%) of cases had cerebrovascular disorders.

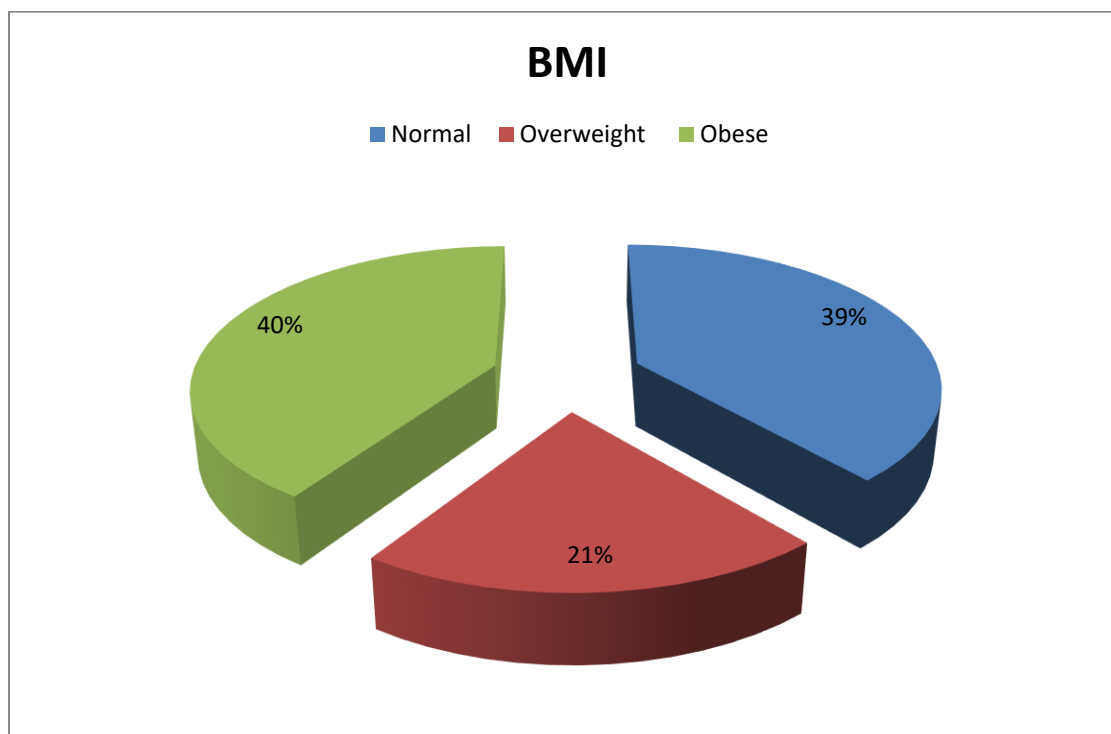


Figure (1): BMI of the studied group.

This figure shows that only 40% of patients were obese, 21% were overweight and rest were of average weight.

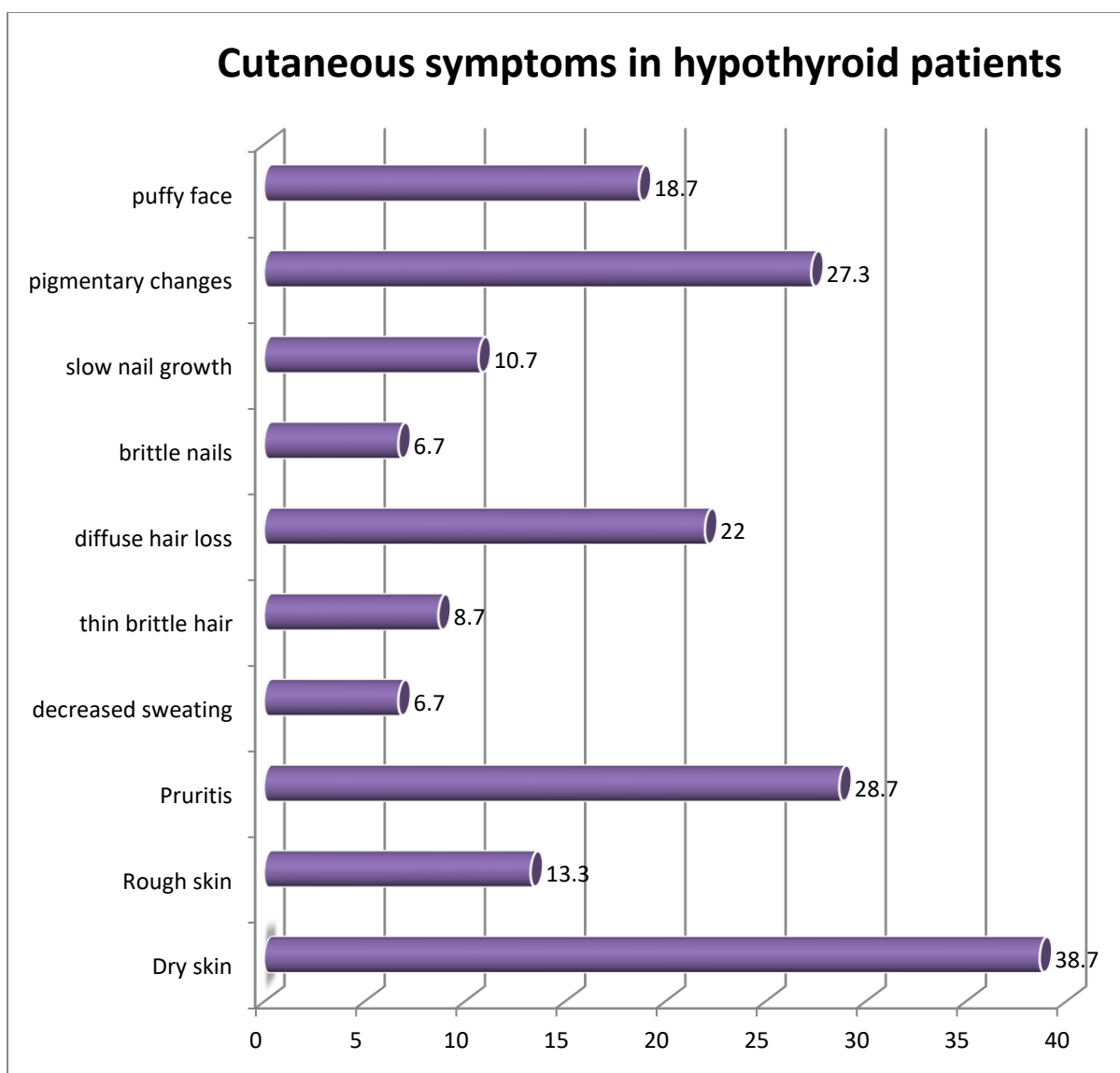


Figure (2): Cutaneous symptoms in hypothyroid patients.

This figure shows that the predominant cutaneous symptom in patients was dry skin (38.7%), followed by Pruritis (28.7%), pigmentary changes (27.3%) and diffuse hair loss (22%). puffy face was complained by 18.7% patients, whereas rough skin by 13.3% of patients. slow nail growth was reported as a cutaneous complaint by 10.7% of patients, thin brittle hair was found in 8.7% cases, and (6.7%) of cases had either decreased sweating or brittle nails.

Discussion:

The present study showed that mean age was 38.37 years, which corresponded with **Jamwal et al. (2013)** who reported that mean age of patients was 37.8 years and the maximum number of patients were in the age group of 41-50 years (30%), clearly showed an increasing trend of hypothyroidism with growing age.

The current study stated that there was a female predominance with males were 18.7 % and females 81.3% which corresponds to the study conducted by **Kambil et al. (2018)** who reported that hypothyroidism was more common in females with a male to female ratio of 1:4.6. These results were compatible with **Srujana et al. (2016)** findings. **Tirkey et al. (2020)** revealed that a female predominance was seen in their study with males were 8.62% and females 91.38 %. This finding corresponded with that obtained by **Keen et al. (2013)** who demonstrated that there were 416 (90.43%) females and just 44 (9.57%) males, which corresponds to the study conducted by **Indra et al. (2004)** who observed 87% female patients in their study. This observation of female preponderance may be due to an increased association of autoimmune disorders in females, autoimmunity being an important cause of hypothyroidism.

Our current findings clearly revealed that the predominant cutaneous symptom in patients was dry skin (38.7%), followed by Pruritis (28.7%), pigmentary changes (27.3%) and diffuse hair loss (22%). puffy face was complained by 18.7% of patients, whereas rough skin by 13.3% of patients. Slow nail growth was reported as a cutaneous complaint by 10.7% of patients, thin brittle hair was found in 8.7% cases, and (6.7%) of cases had either decreased sweating or brittle nails. This was in accordance with **Keen et al. (2013)** who illustrated that the predominant cutaneous symptom in our patients was dry skin (65.22%), followed by hair loss (42.6%) and puffy edema (38.48%). Pruritus was complained by 17.17% patients, whereas decreased sweating by 8.48% of patients. Similar observations were made by **Jabbour et al. (2000)** and **Hueston, et al. (2001)** in their studies. Urticaria was reported as a cutaneous complaint by 13.04% of patients, quite comparable to the study conducted in by **Dogra et al. (2006)** who found urticaria as a cutaneous complaint in 15% of their patients. Ivory yellow skin was a cutaneous complaint in 6.52% cases, which is in concordance with the result of the study by **Rai et al. (2000)** who reported it to be present in 5.12% of their cases. Purpura was reported by 4.13% of our patients.

In agreement with our findings, **Jamwal et al. (2013)** stated that the most common cutaneous complaints were dry skin (65%), followed by hair loss (48%), puffy oedema of face, hands and feet (37%), pruritus (18%), decreased sweating (11%), delayed wound healing (11%), yellow discoloration of skin (9%) and urticaria (4%). Dryness of skin is due to diminished eccrine and sebaceous gland activity and also because of decreased sweating due to cytological changes in the sweat glands in hypothyroidism. Hypothyroidism causes an increase in number of telogen hair, explaining increased hair loss. Facial puffiness and non-pitting oedema of hands and feet is related to tissue infiltration with muco-polysaccharides predominantly in the papillary dermis around the vessels and appendages, and also increase in tissue sodium concentration with associated water retention. Pruritus can be explained by decreased activity of sweat glands, sebaceous glands and low epidermal sterol synthesis. Yellowish discoloration is caused by elevated serum and tissue carotene concentration due to block in the metabolic pathway from carotene to vitamin A. Urticaria can be explained on the basis of autoimmunity.

Conclusion:

We conclude from our study that skin , hair and nail disorders are common affected in thyroid gland dysfunction. Hence both dermatologist and physician should be aware of the interrelationship of both skin and thyroid gland, so that the patients are investigated promptly to rule out thyroid dysfunctions if any such signs and symptoms are present

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