Prevalence of Subclinical Hypothyroidism in High-Risk Individuals Attending Medicine Outpatient Department (OPD) in Tertiary Care Hospital

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ABSTRACT

Introduction: Nowadays Hypothyroidism is quite common. It results in many problems which ultimately hampers the quality of life. It is a common endocrine disorder in general practice. A textbook describes the classical hypothyroid state thus, the patients face looks grotesquely swollen and eyelids may be so infiltrated that the skin beneath hangs in sacs. The present study aims to study the magnitude and association of subclinical hypothyroidism in individuals having risk factors. (Females with age more than 50 years old and family history of hypothyroidism).

Method: This is a Cross-sectional, observational hospital-based study design. The study was conducted on patients attending the medicine outpatient department in Krishna Hospital and Medical Research Centre, Karad. The study duration was from October 2018 to March 2020 (18 months). Result: A significant association between smoking and subclinical hypothyroidism was found (p < .05). It was observed that a comparatively larger proportion of subjects who consumed tobacco (smokeless form) developed subclinical hypothyroidism, but the statistical significance could not be established (p > .05). Subclinical hypothyroidism was observed significantly more among the subjects with a body mass index of more than 25 kg/m² (p < .05).

Conclusion: Present study provides valuable information regarding the presence of subclinical hypothyroidism in a significant proportion of subjects in context with the Indian population.

Key Words: Subclinical Hypothyroidism, High-Risk Individuals, Outpatient Department, History of cigarette smoking, Diabetes mellitus and obesity

INTRODUCTION

Hypothyroidism is a common problem; it causes symptoms that reduce the functional status and quality of life. It is a common endocrine disorder in general practice. A textbook describes the classical hypothyroid state thus, the patients face looks grotesquely swollen and eyelids may be so infiltrated that the skin beneath hangs in sacs. Movements and speech are grossly retarded. The tongue may fill the mouth. The voice is hoarse, almost a croak. Skin is thickened, cold, rough and dry. Hair tends to dry and become brittle and sparse. A slow pulse rate may be found. Non-pitting oedema can be recorded in third to half of the patients. The Achilles reflex is prolonged. The disease may progress slowly without the patient being aware that he/she is ill.¹ ² The history about the thyroid is summarized by Rolleston¹ according to which Galen in his De Voce briefly described the gland. Vesalius added to the anatomy of the gland. He suggested that the gland was there to round out and beautify the neck. Hypothyroidism is a clinical syndrome that was described for the first time in London in 1870. In 1873 Sir William Gull was the first to understand that the cause of myxoedema is atrophy of the thyroid gland.³ Ord coined the term Myxedema in 1878 and published the definitive account of myxedema. Later it was accepted widespread that cretinism, myxedema and post-thyroidectomy changes all were a result of the loss of function of the thyroid body. In 1896 Baumann suggested that iodine deficiency caused the malfunctioning of the thyroid. Kendall isolated thyroxin (thyroxyindole) for the first time in 1914. Harrington synthesized it for the first time in 1926. However,
In 1951 T3 was found to be metabolically active in the treatment of hypothyroidism.\(^5\)

Subclinical hypothyroidism was a new clinical entity described in the early 1970s after TSH estimation became routine. It represents a form of mild thyroid failure. Large epidemiological studies indicate that subclinical hypothyroidism is the most prevalent thyroid disease in the community.\(^6\)

**AIM**

To study the magnitude and association of subclinical hypothyroidism in individuals having risk factors. (females with age more than 50 years old and family history of hypothyroidism). At the same time, we will study the magnitude and association of subclinical hypothyroidism in subjects having the following risk factors

- a) Females more than 50 years old
- b) Family history of hypothyroidism
- c) History of cigarette smoking
- d) Diabetes mellitus and obesity

**METHOD**

This is a Cross-sectional, observational hospital-based study design. The study was conducted in patients attending the medicine outpatient department in Krishna Hospital and Medical Research Centre, Karad. The study duration was from October 2018 to March 2020 (18 months). Ethical committee clearance: This study was approved by Institutional Ethics and Protocol Committee (Protocol number 0252/2018-2019). The Sample size was calculated by using the following formula

\[
N = 4 \times p \times q / d^2
\]

Concerning previous studies, we found that the prevalence of subclinical hypothyroidism was 9.4% that constituted \(p\) in the above equation. Hence ‘\(q\)’ which is 100 - \(p\) became 90.6% (100-9.4). The ‘\(d\)’ is absolute allowable error taken as 5% (considering a confidence interval of 95%). Hence from the above equation, the estimated sample size for this study was 136.

**Inclusion criteria**

Subjects with high-risk factors for the development of hypothyroidism were included. We took the following high-risk factors for screening of subclinical hypothyroidism

1. Females more than 50 years old
2. Family history of hypothyroidism
3. History of cigarette smoking
4. Diabetes mellitus and obesity

**Exclusion criteria**

1. Subjects already diagnosed to have hypothyroidism
2. Cases of frank hypothyroidism
3. Critically ill patients

**RESULT**

Subclinical hypothyroidism is defined as an elevated serum thyroid-stimulating hormone (TSH) level associated with normal total tetra-iodothyronine (T4) and tri-iodothyronine (T3) levels. This is a much more common disorder than overt hypothyroidism. After institutional ethical clearance, with informed consent and with inclusion and exclusion criteria 136 cases with known high-risk factors in the medicine outpatient department were included in the study and were evaluated based on thyroid hormone profile. The data was entered in the master sheet and analysed statistically. The salient features of studied criteria in the study population are summarized below: In the present study majority of the study, subjects were females (69.11%) whereas 30.88% of the subjects were males. The majority of the study subjects were in the age group of 46 to 55 years (41.91%)

A family history of hypothyroidism was present among 26.47% of study subjects, and 22% of the subject’s history of diabetes mellitus was seen. It was found that 19.85% of subjects were smokers, whereas 12.5% of the subject of tobacco consumption (smokeless) and 16.91% subjects were having the habit of alcohol consumption. 37.50% of study subjects had body mass index between 17.5 - 25 i.e normal, followed by 33.82% with BMI 25 – 30 and 28.68% subjects were obese with BMI between 30 -40. The presence of subclinical hypothyroidism in this study was 24.26%, whereas overt hypothyroidism was observed among 11.76% of the subjects. Hyperthyroidism was noted among 3.68% of the subjects and 60.29 % of the subjects were having normal thyroid function status. Subclinical hypothyroidism was significantly observed more among subjects with type 2 diabetes mellitus (\(p < .05\))

A significant association between smoking and subclinical hypothyroidism was found (\(p < .05\)). It was observed that a comparatively larger proportion of subjects who consumed tobacco (smokeless form) developed subclinical hypothyroidism, but the statistical significance could not be established (\(p > .05\)). Subclinical hypothyroidism was observed...
They observed 19.80% euthyroid subjects and 14.70% subclinical hypothyroidism among subclinical hypothyroidism and euthyroid subjects. Relative Risk = 3.85. Odds Ratio = 8.76. Thakur V et al. in their study compared the presence of type 2 diabetes mellitus in the present study population were female subjects with age more than 50 years, family history of hypothyroidism as present and subclinical hypothyroidism was significantly more among the cases with a family history of hypothyroidism. The risk factors associated with increased risk of development of subclinical hypothyroidism in the present study population were female subjects with age more than 50 years, family history of hypothyroidism, obesity, smoking, history of diabetes mellitus. The present study provides valuable information regarding the presence of subclinical hypothyroidism in a significant proportion of subjects in context with the Indian population.

**Conflict of Interest:** There is no conflict of Interest

**Authors Contribution:** This is a collaborative work among all authors. Dr. Anand D Bang and Dr. Nitin N Jadhav performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Dr. Virendra C Patil, Dr. Aparna P Patange managed the literature searches. All authors read and approved the final manuscript.

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