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Prevalence of Undetected Hypothyroidism and Associated Risk Factors among Adults in a Tertiary Care Hospital in Central Kerala

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Abstract

Introduction: *WHO in 2004 has classified India as having optimal iodine nutrition. Despite this India has large burden of thyroid disease, Hypothyroidism is the commonest endocrine disease Autoimmune thyroiditis is an emerging cause for increasing prevalence of hypothyroidism in the population. This study was done to find out the current trend in the prevalence of undetected hypothyroidism in central Kerala, study the risk factors associated with prevalence of hypothyroidism and to determine the Anti TPO antibody titres among those found to have undetected hypothyroidism.*

Methods: *This was adescriptive (cross sectional) study: Total of 935 subjects including patients, relatives, students, staff and other volunteers of the age group 20-70 years, ina Govt. Medical College, meeting the inclusion criteria (resident of Ernakulam for 5 years) excluding pregnant and post-partum women, history of thyroid surgery/disease/radiation exposure, severe illness, intake of drugs affecting thyroid, and malignancies, were tested for TSH values. In 44 subjects of 157 with raised TSH, Anti TPO antibody titres were assessed.*

Results: *Total of935 adults were screened, between the ages of 18-70 years. Out of 935 subjects, 157 had raised TSH (16.7%). Only 44 of them could be followed up for further antibody (Anti TPO)testing. Of the 44 (out of 157) hypothyroid study subjects who were tested, 42(95.5%)had raised antibody titres suggestive of autoimmune thyroiditis which is highly significant.*

Interpretation and Conclusion: *The prevalence of hypothyroidism was found to be higher than studies done in similar population, previously. The study showed an increased prevalence of undetected hypothyroidism in midlife(41-50 yrs. of age) with higher prevalence in females (19.2%).Most of the subjects who were tested for Anti TPO antibodies were found to be having raised Anti TPO antibody titre suggestive of autoimmune thyroiditis .It has been reported as one of the leading causes for hypothyroidism.*

There is a large and increasing number of undetected hypothyroidism in the population, affecting the wellbeing, work efficiency and productivity of the community, despite iodine sufficiency. Hypothyroidism being an easily tested and treated condition, larger population based screening studies need to be undertaken.

Introduction

Thyroid diseases are common in India, as it is in the rest of the world. It has been estimated that about 42 million people in India suffer from thyroid disease and hypothyroidismis the most common endocrine disorder[(1)]

The prevalence and pattern of thyroid disorders depends on sex, age, ethnic and geographical factors and especially food habits and iodine intake. Iodine deficiency and excessive iodine intake can cause thyroid dysfunction like goitre, hypothyroidism and autoimmune thyroiditis

Advancing age, female gender, family history of thyroid disease, other autoimmune conditions, intake of drugs affecting thyroid function, radiation exposure, thyroid surgery and increased iodine consumption are risk factors for developing hypothyroidism.,

Subclinical and clinical forms of hypothyroidism and hyperthyroidism can contribute to morbidity from osteoporosis, hypercholesterolemia, homo cysteinemia, cardiovascular and neuropsychiatric disease, especially in the older population.[(2, 3, 4)]

Subclinical hypothyroidism is most widely spread thyroid dysfunction with prevalence in general population reaching to 10 -20%. In a cross sectional, multicentre, epidemiological study in eight cities of India prevalence of subclinical hypothyroidism (normal FT4 with TSH >5.5mIU/l) was found 8.02%, the elevated thyroid peroxidase antibodies (TPOAb) levels being registered in 21.85 %.[(5)]

In 2009, study done by Usha et al in the population of Ernakulam (Aluva) showed high prevalence of thyroid disorders[**(6)**]

This study was done to find out the prevalence of undetected hypothyroidism (subclinical +clinical) among adults attending OPD, relatives of inpatients, employees and students of Govt. Medical College, Ernakulam; to study the risk factors associated with prevalence of hypothyroidism and also to determine the prevalence of autoimmune thyroiditis, among subjects with undetected hypothyroidism.

Materials and Methods

After due clearance from IEC, this descriptive study (Cross sectional study) was done at Govt. Medical College, Ernakulam. in the year 2016 over a period of one year. After getting informed consent, subjects were recruited from patients, relatives, employees and students conforming to inclusion and exclusion criteria in the age group 20-70 years.

Inclusion criteria: subjects residing in Ernakulam since past 5 years. Exclusion criteria: Pregnant and post-partumwomen, presence of severe illness, subjects with history of thyroid disease/surgery/ radiation exposure, those taking drugs known to affect thyroid function, and known cases of malignancies

Demographic and clinical profile data was collected and entered in excel sheet. TSH was tested for all subjects included. in the study.. Patients were divided into hypothyroid and euthyroid groups based on TSH values. In subjects who had elevated TSH, TPO antibodies were then tested in 44 of the 157subjects only. All data including risk factors and lab values was entered in excel sheet and analysis was done using SPSS software with appropriate statistical tests.

Results

In one year of study period, a total of 935 adults aged 18-65years, meeting inclusion criteria were recruited and TSH was done for all. The mean age was found to be 38.7 +/- 12.2 years. Maximum subjects were from the age group 31-40 years (figure-1)

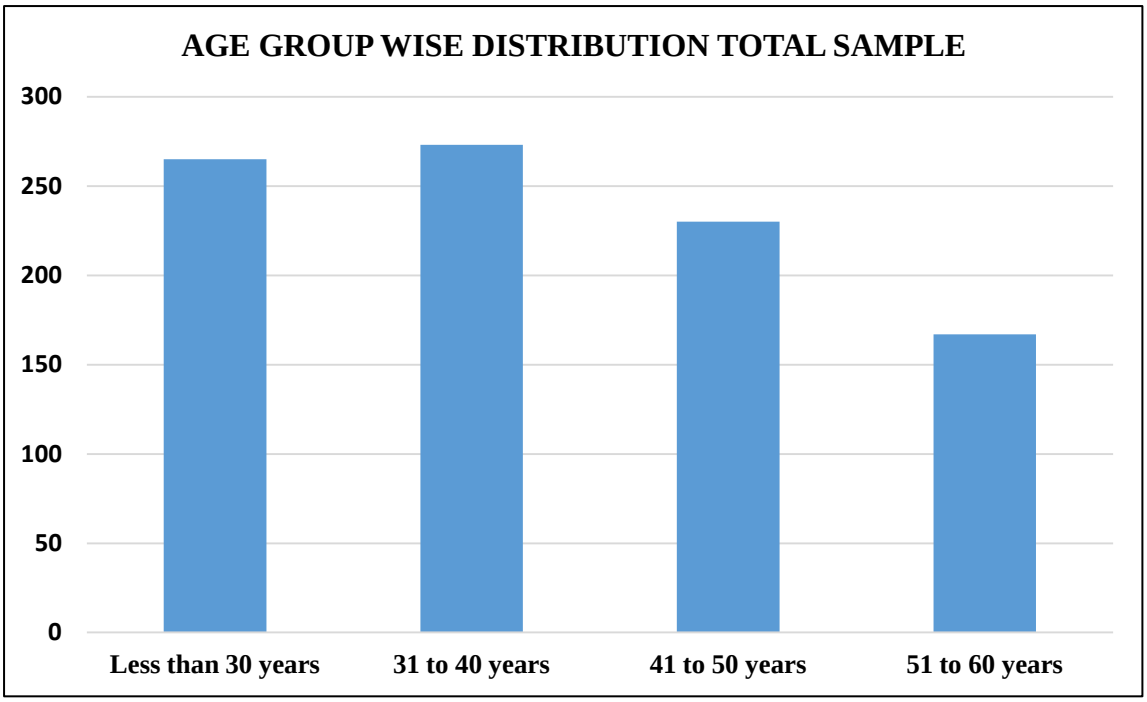

Figure 1- Age Group Wise Distribution Total Sample

157subjects had raised TSH – Undetected hypothyroidism (16.7%) while 778 had normal values (83.2%) –figure- 2

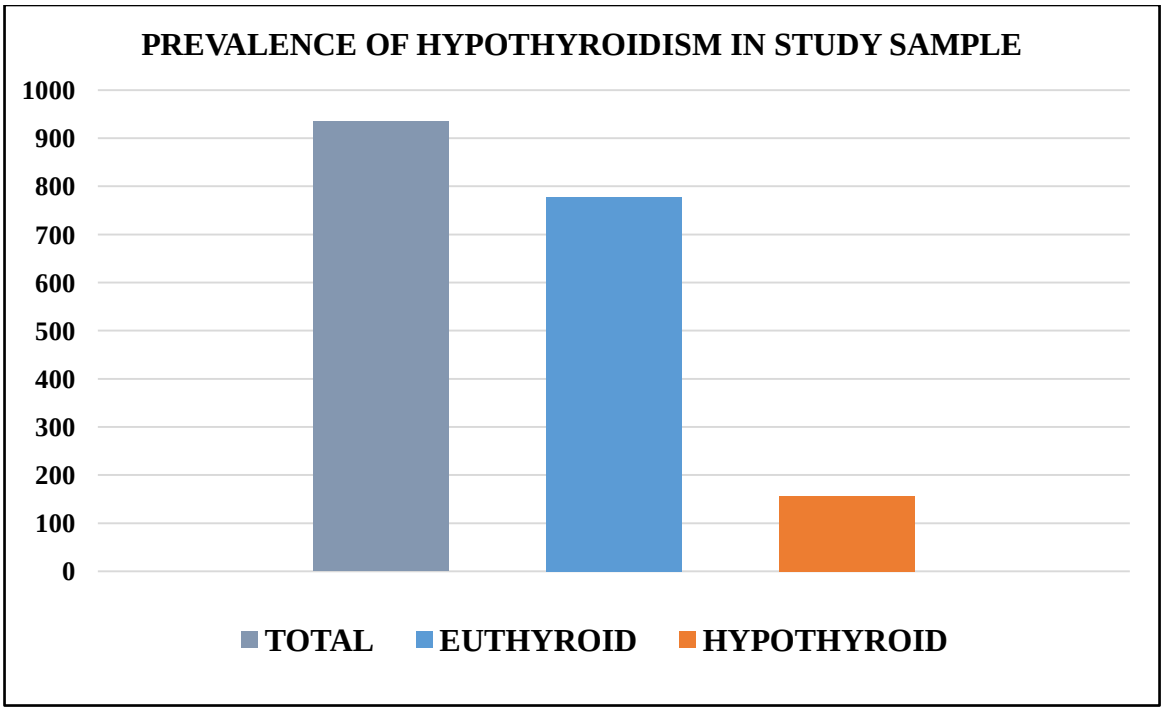

Figure 2- Prevalence of Hypothyroidism in Study Sample

Prevalence of hypothyroidism was found to be more among 41-50 year group Figure-3

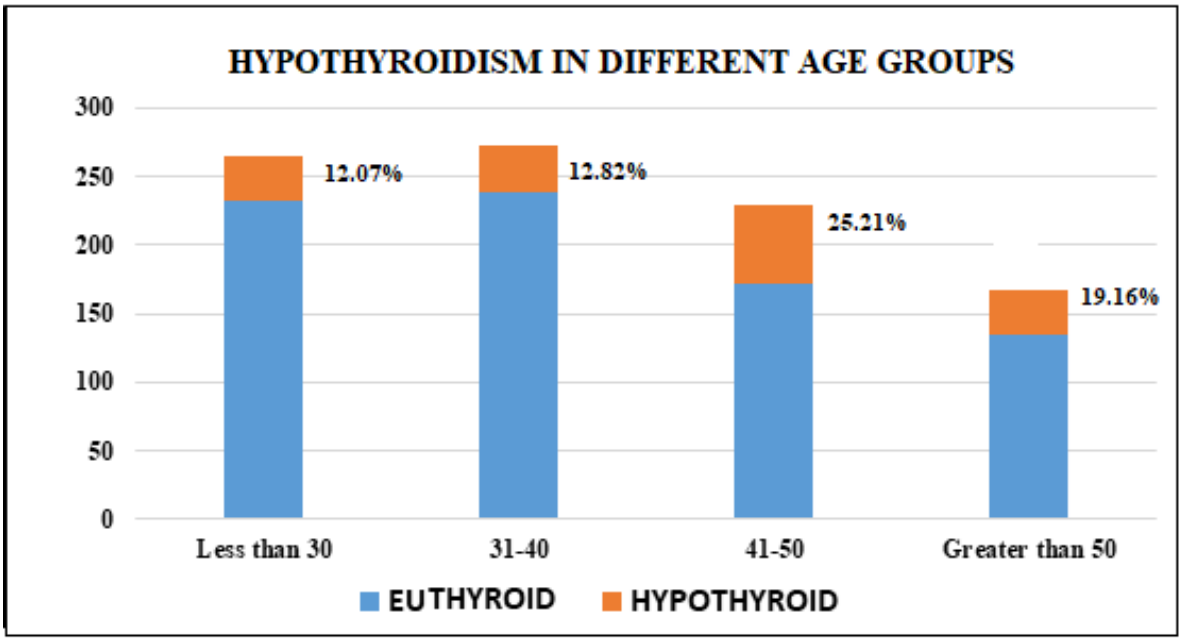

Figure 3 Hypothyroidism in Different Age Groups

Out of 935 subjects, 259(27.7%) were males and 676(72.3%) were females. Hypothyroidism was more in females, 130 out of 676 (19.2%) than in males 27 out of 259 (10.4%) (Figure-4)

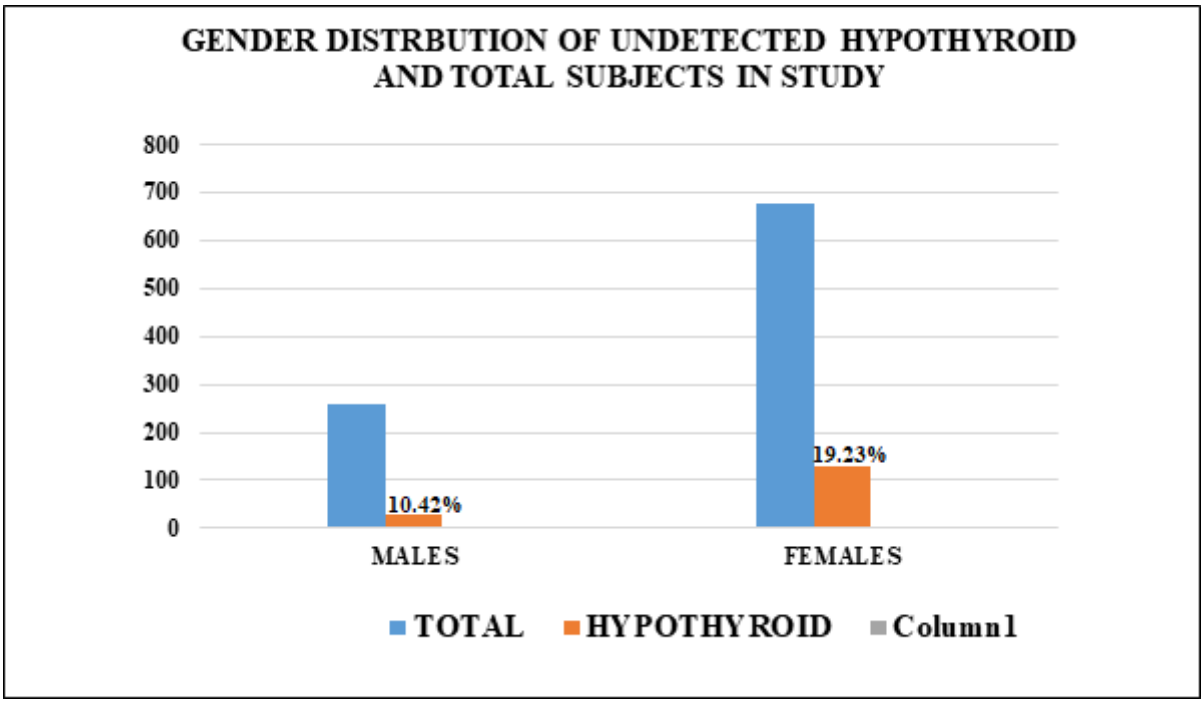

Figure 4 Gender Distribution of Undetected Hypothyroid and Total Subjects in Study

Regression analysis of risk factors showed statistical significant correlation only for gender and presence of symptoms as shown in table 1 while presence of Diabetes, Hypertension, Dyslipidemia and heart disease, family history did not show any significant correlation with raised TSH levels

Variables in the Equation

Table 1 Associated Risk Factors in Study Sample and Their Correlation with TSH Values

		B	SE	Wald	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
								Lower	Upper
Step 1[a]	Symptoms	1.668	0.294	32.084	1	0.000	5.301	2.977	9.442
	Diabetes	-0.146	0.297	0.240	1	0.624	0.864	0.483	1.547
	Hypertension	0.165	0.280	0.349	1	0.555	1.180	0.682	2.042
	Dyslipidaemia	-0.070	0.268	0.068	1	0.794	0.932	0.552	1.576
	Family History	0.203	0.217	0.875	1	0.350	1.225	0.801	1.872
	Fish Consumption	0.267	0.200	1.790	1	0.181	1.306	0.883	1.932
	Gender	-0.474	0.234	4.117	1	0.042	0.622	0.394	0.984
	Constant	-3.047	0.324	88.300	1	0.000	0.047		

Discussion

The prevalence of hypothyroidism in the developed world is 4-15%.[6, 8] The prevalence of hypothyroidism among Indian adults was found to be around 10.9%. [5]In a population based study from Kochi in 2009 the population was found to be Iodine sufficient and the prevalence of subclinical hypothyroidism was 9.4%.[7]The prevalence of undetected hypothyroidism (including clinical and subclinical) in our study was 16.7%. This study shows an increase in number of undetected cases, compared to9.4% subclinical hypothyroidism in an earlier study from Kochi by Usha V et al[7] A large proportion of undetected hypothyroidism in the population will affect the quality of life, performance at work, and economic productivity More wide population studies are needed to confirm these findings and to find the cause for the increasing prevalence.

In another epidemiological study conducted in different cities in India the overall prevalence was 10.95%, but undetected hypothyroidism was only 3.4% which is lower than our study. Highest prevalence noted was from Kolkata with 21.67 %[5] which included both self-reported and undetected cases

The prevalence of undetected hypothyroidism in different age shows the highest prevalence of 25.2% in the age group of 41-50 years. Other studies have also reported increased prevalence in midlife and lesser in younger age groups.[5]

The prevalence of undetected hypothyroidism was found to be 19.2% among females and that in males was 10.4% which is higher than previous studies. In a study from Kochi in 2009 the prevalence of subclinical hypothyroidism was 11.4% in females as compared to male 6.2 %[7] .Another study of young women from Chennai in 2015 reported a prevalence of 12.5%.[11] Hypothyroidism is a cause for increasing infertility, recurrent miscarriages menstrual irregularities and unexplained weight gain/loss in females. Hence a burden of undetected hypothyroidism in the population may affect the reproductive health of the population,

Earlier studies have reported hypothyroidism being a risk factor for hypertension but not for Diabetes.[12,13] This study found no significant increase in prevalence of hypothyroidism in Diabetics or Hypertensives.

AntiTPO antibodies is an established marker for autoimmune thyroid disease.[14] There has been a steady increase in Anti TPO positivity in India. In a study from Delhi done over 3 years the TPO positivity was 13.3%[16]and in another study 22.20 %.[5]In an earlier population study from Kochi in 2009, the prevalence of TPO positivity in the group having normal thyroid function was 9.5%, while in those with thyroid dysfunction it was 46.3%.[7] In the study done in eight cities Anti TPO positivity was 21.85 %.[5] In persons who are positive for AntiTPO antibodies and elderly the progression to overt hypothyroidism is 20%. The greater the TSH level, the longer the duration of hypothyroidism and Anti TPO positivity the more the probability of progressing to overt hypothyroidism

In this study Anti TPO was done in only 44 subjects out of 137 who had above normal TSH

values, but Anti TPO positivity was found in 42 subjects making a prevalence of 95.5% which is very high, though the sample size is too low This needs to be further studied in a larger study group and in different parts of Kerala to find whether it is regional. Auto immune thyroiditis may be one cause for increasing prevalence, the aetiology of which also merits further study. Increasing exposure to thyroid disruptors like industrial and agricultural contamination has been reported as a heath concern all over India in a study in 2011.[10] The subjects of our study are from the industrial belt of Kerala. The water from the river Periyar is the source of drinking water for Ernakulam. Studies have reported that the water in Periyar River is contaminated with industrial effluents.[15] Reasons for increasing autoimmunity causing thyroid disease are unclear. Underlying pathogenesis may involve complex interplay of genetic, environmental and endogenous factors.[16, 17, 18]

Conclusion

Patients with hypothyroidism often are undetected and untreated in India. There is a large proportion of undetected hypothyroidism among the population in central Kerala, despite Kerala being iodine sufficient. Autoimmunity is a cause in a large number of these undetected cases, and have an increased probability of progression to overt hypothyroidism This can impact the quality of life, work efficiency and productivity of the population, though it is a condition that is easily detected and inexpensive to treat The reason for the increased Anti TPO positivity needs to be studied in larger epidemiological studies and may involve interplay of multiple factors like-genetic, environmental and endogenous.

Limitations

FT4 levels and Anti TPO levels could be done only in small number of cases, due to logistic reasons hence the proportion of subclinical and clinical hypothyroidism could not be done.

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