

ORIGINAL RESEARCH

Prevalence of subclinical hypothyroidism in patients visiting OPD at a tertiary health care centre in Gaya, Bihar

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ABSTRACT

Background and objectives: Subclinical hypothyroidism is an asymptomatic condition with normal thyroxin and raised thyroid stimulating hormone (TSH) level. It affects 3-15% of adult population. Large scale population based studies on the prevalence of subclinical hypothyroidism in India are scarce. So this study was done to estimate the prevalence of subclinical hypothyroidism in patients attending OPD in ANMMCH, GAYA and find out the relationship of TSH level with age, sex, family history, body mass index, and other co-morbid conditions.

Subjects and methods: An observational study was carried out on adult persons visiting OPD at ANMMCH GAYA. TSH, T3, and T4 levels were measured. Data about demography and other parameters and co-morbid conditions were collected during routine visits. Analysis was carried out on all variables in the study, and relationships were explored. Serum TSH above 5 μ IU/ml (with normal T3 and T4) was considered as a case of subclinical hypothyroidism

Results: A total of 1457 participants (1042 females and 415 males) in the study gave consent for study and blood samples. subclinical hypothyroidism was seen in 113 (10.84%) females and 27 (6.5% males). No significant relationship were noted in TSH levels with dyslipidemia and increasing blood pressure. 5 cases of overt hypothyroidism (all females) was found in our study sample. There was a trend of raised TSH among perimenopausal women in our study. No patient presented with thyroid enlargement.

Conclusion: Subclinical hypothyroidism has a prevalence of 9.6% of adults visiting OPD. TSH levels tends to be higher in the perimenopausal women, which warrants particular attention to the females aged 40 years and above.

INTRODUCTION

Subclinical hypothyroidism is defined as biochemical evidence of raised TSH in patients with little or no apparent clinical features of hypothyroidism[1]. It is a biochemical diagnosis based on elevated thyroid stimulating hormone (TSH) level concentration and normal free T4. Patients sometimes can have symptoms of lethargy, easy fatiguability and weight gain; however, in most of the cases, patients have no symptoms and are diagnosed incidentally on routine lab tests[2,3]. It is reported to be a common thyroid abnormality affecting 3-15% of adult population[4]. Its incidence increases with age[5,6], more in females[7,8] and persons with higher dietary iodine intake [9-12]. It is found in different studies that Subclinical hypothyroidism may be associated with hyperlipidemia [5,11-15] and there are chances of

progression to overt hypothyroidism[11,13,15]. The rate of progression to overt hypothyroidism is around 2-3% per year and more in persons with higher TSH levels and positive TPO antibodies. This study aims to determine the prevalence of subclinical hypothyroidism in general population attending medicine OPD at ANMMCH Gaya

METHOD

An observational analytical study was conducted in the Medicine department of ANMMCH Gaya. One thousand four hundred fifty seven subjects from patients attending OPD were selected for the same. Volunteers were selected for study after taking prior written consent. Patients were separated based on gender (1042 females and 415 males) as Subclinical hypothyroidism is reported to be more prevalent in females. Subjects ≥ 18 years of age of both sexes and those who gave consent to participate and willing for screening tests and follow up in the protocol were included in the study. Subjects who already have thyroid disorders and taking medications, pregnant females and persons with any chronic disease or on chronic medications for any medical ailments were not included in the study. The volunteers were evaluated for symptoms of hypothyroidism by a detailed history and clinical examination for evaluation of based on proforma designed for the same. Symptom questionnaire involved queries regarding different clinical features of thyroid dysfunction. The questionnaire also included variables such as age, sex, problem for which the visit has been done, past medical history and symptoms of thyroid disease such as cold or heat intolerance, weight loss or gain, lethargy, menstrual irregularities, infertility, and diarrhea or constipation. Patients were also examined for the presence or absence of thyroid gland enlargement. Additionally, medication history including use of drugs currently and of past 12 months was obtained. Female patients were also asked about pregnancy, breast feeding and use of OCPs. Questions asked about the presence of thyroid disease in family members. Physical examination was carried out including blood pressure (BP) measurement, weight, height etc. Lab evaluation for thyroid function tests (serum levels of T3, T4, and TSH) and serum lipid profile was measured in these subjects using standard laboratory methods. Normal range of TSH was taken as 0.34 -4.5 mIU/ml and Subclinical hypothyroids as TSH 4.51-10.0 mIU/l with no or mild clinical sign and symptoms of hypothyroidism. T4 reference range was kept between 4.6-12 microgram/dl. T3 reference range was taken between 80-180 ng/dl. Analysis was carried out for variables such as age, TSH level, T4, T3 level, body mass index (BMI), weight, height, systolic & diastolic BP.

RESULTS

Clinical and biochemical profile are shown in tables. The population has a mean age of 37.6 years. Minimum age was 19 years and maximum was 72 years (Table 1). Serum TSH was above normal ($>5\mu\text{IU/ml}$) in 27 out of the 415 male subjects and in 113 out of the 1042 female subjects. Thus, the prevalence of subclinical hypothyroidism was found to be 6.5 % in men and 10.84% in women (Table 2) in this study.

Table 1 Age group

| Age | Males | Females |
|-------|-------|---------|
| 18-40 | 219 | 607 |
| 40-60 | 132 | 283 |
| >60 | 64 | 152 |

Table 2 TSH profile

| TSH | Males | Females |
|------------|-------|---------|
| Normal | 388 | 929 |
| Raised | 27 | 113 |
| prevalence | 6.5 % | 10.84 % |

Table 3 Thyroid profile range and result mean values

| Hormone | Study range | Result mean |
|-------------|-------------|-------------|
| TSH(mIU/L) | 0.35-5.0 | 3.37 |
| T3(ng/dl) | 80-180 | 147.8 |
| T4(Mcgm/dl) | 4.6-12 | 9.9 |

5 females and no males were found to be overt hypothyroid with TSH >10 and decreased T4 and T3. When subjects of both the sexes were taken together, serum TSH was found to be above normal in 9.6% (140 out of 1457) of the subjects. This finding was consistent with most other studies. Mean TSH was found to be 3.37 mIU/L, mean T4 was 9.9 Mcg/dl and mean T3 was 147.8 ng/dl (Table 3). Regarding symptom profile among subclinically hypothyroids, 17 females and 5 males had lethargy, 12 females and 2 males had weight gain, 8 females and 2 males had chronic constipation, 4 females and 1 male had cold intolerance and 2 females had menstrual irregularities. None of them had goitre. 17 females were obese and 8 were overweight. 9 females and 4 males had dyslipidemia. 13 females and 3 males had stage 1 hypertension and 2 females had stage 2 hypertension on regular follow up (Table 5).

Table 4 Clinical and biochemical profile

| Mean | Males | Females |
|---------------|-------|---------|
| Weight(KG) | 68.7 | 62.6 |
| Height(CM) | 167.8 | 163.7 |
| BMI | 28.3 | 24.7 |
| SBP(mmHg) | 119.7 | 113.8 |
| DBP(mmHg) | 78.5 | 72.8 |
| TG(mg/dl) | 148.7 | 143.9 |
| TC(mg/dl) | 188.9 | 182.5 |
| HDL- C(mg/dl) | 55.8 | 51.2 |
| LDL-C(mg/dl) | 96.5 | 88.7 |

Table 5 Symptom profile

| Symptom | Females | Males |
|------------------|---------|-------|
| Lethargy | 17 | 5 |
| Weight gain | 12 | 2 |
| Constipation | 8 | 2 |
| Cold intolerance | 4 | 1 |
| Amenorrhea | 2 | - |
| Goitre | 0 | 0 |
| Over weight | 8 | 2 |
| Obese | 17 | 6 |
| Dyslipidemia | 9 | 4 |
| Stage 1 HTN | 13 | 3 |
| Stage 2 HTN | 2 | 0 |

DISCUSSION

This observational study gives a rough idea on the prevalence of subclinical hypothyroidism in local population and the relationship of TSH levels with age, sex, BP, BMI, comorbid conditions, family history and some other factors. The prevalence of subclinical hypothyroidism was found to be 9.6% in this study. This prevalence is comparable to those reported in some other studies viz: Framingham[6], Rotterdam[15], Colorado[16] and Wikham[5] studies (Table 6). Prevalence of subclinical hypothyroidism are different in different studies and depends upon many factors like the type of population accessed, i.e.,

sample taken from community, hospital or primary care, other comorbid conditions, the methods of TSH assay and cut-off values of laboratory measurements used. BMI had been found to be not associated with high TSH in this study. 68% subjects in this study with subclinical hypothyroidism were in the age group 35–55 years. Prevalence had a tendency to increase with increasing age. This age related increasing tendency in prevalence may be due to thyroid autoimmunity, which has also a tendency to increase with age as reported in Wickham study[5]. It was also found in this study that prevalence of subclinical hypothyroidism was more in females and had a tendency to increase with increasing age, which is comparable to what was observed by Parle et al[17]. Prevalence was also found to be more in postmenopausal women. High S.TSH was found to be associated with a higher symptom profile and in all these mild weight gain, physical fatigue and constipation being the commonest of symptom. Different epidemiological studies conducted in India (Unnikrishnan AG et al. at cochin[18], Sahu et al. at delhi[19], Brahmabhatt et al. at Baroda[20] and Dang, Abraham et al. at Puducherry[21]) have shown a prevalence rate varying between 9 and 11.4%, which is consistent to that found in this study. Screening for subclinical hypothyroidism may be considered in females of peri-menopausal age group in view of slightly high prevalence of raised S.TSH as found in this study population after the age of 40 years. In this study, subclinical hypothyroidism presented without any thyroid enlargement and was associated with mild and vague symptoms such as lethargy, fatigue, and weight gain which remains mostly undiagnosed or neglected in peri-menopausal females. So, any person particularly female of middle age groups presenting with vague symptoms of fatigue and weight gain needs particular attention for presence of subclinical hypothyroidism.

Table 6 Different studies over subclinical hypothyroidism

| Place of study | Reference | Age group | No. of patient | Prevalence (%) | TSH cutoff |
|----------------|-----------------|-----------|----------------|----------------|------------|
| Wickham | Tunbridge et al | 18+ | 2779 | 8.9 | >6.0 |
| Framingham | Sawin et al | 60+ | 2159 | 10.3 | >5.0 |
| Rotterdam | A.E. Hak et al | 55+ | 1149 | 10.8 | >4.0 |
| Colorado | Kanaya et al | 18+ | 2336 | 9.5 | >5.0 |

CONCLUSION

This study highlights the need for thyroid screening in primary care settings among adults, particularly middle age females when presented with vague symptoms like lethargy, decreased appetite or chronic constipation. Any S.TSH value above 4.5 microIU/mL needs to be taken cautiously in reference to the diagnosis of subclinical hypothyroidism and particular attention should be given regarding symptom profile. They should be evaluated further for thyroid antibody particularly if they are middle aged female. Also these patients should be followed up regularly as conversion rate to overt hypothyroidism is higher in these groups. A large scale study with large sample size, from local population which include both urban and rural groups, is needed to determine prevalence of subclinical hypothyroidism in this area. Separate data for thyroid functions needs to be established for different individual population. This study had some limitations also as prevalence of antithyroid antibody were not evaluated in the study, results can not be generalized to whole local population, and TSH levels couldn't be repeated due to lack of follow up visits.

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