PREVALENCE OF THYROID DYSFUNCTION AMONG FIRST YEAR MEDICAL STUDENTS IN A TERTIARY CARE TEACHING HOSPITAL

Vinay A. V[1], Santosh Vastrad[2], Sindhu R[3], Pramila T[4], Vastrad B. C[5], Kavita R[6], Chandana G[7], Janakiraman P[8]

[1]Associate Professor, Department of Physiology, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.
[2]Assistant Professor, Department of General Medicine, Karnataka Institute of Medical Sciences, Hubli, Karnataka.
[3]Associate Professor, Department of Physiology, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.
[4]Assistant Professor, Department of Physiology, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.
[5]Professor and HOD, Department of Physiology, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.
[6]Associate Professor, Department of Biochemistry, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.
[7]Assistant Professor, Department of Biochemistry, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.
[8]Biostatistitian, PES Institute of Medical Sciences and Research, Kuppam, Andhra Pradesh.

ABSTRACT

BACKGROUND

Thyroid dysfunction is very common in India. Among the thyroid disorders, it has been found that there is an increase in prevalence of Subclinical Hypothyroidism rather than Hypothyroidism in India. Although it has been three decades since universal salt iodization program was introduced in our country and a transition from iodine deficient to iodine sufficient state was considered to be attained in our country, the prevalence of thyroid disorders is still found to be increasing. Therefore, we aim to find the prevalence of various thyroid dysfunctions among the young adults so that early intervention can prevent the complications associated with thyroid disorders.

MATERIALS AND METHODS

This study was done on 100 first year medical students of PES institute of medical Sciences and research who were willing to participate in the study. Ethical clearance was taken from the institutional ethical committee. Written consent from the subjects was taken and 5 ml venous blood sample was collected from each subject after an overnight fasting. Free T_4 (FT4) and Thyroid stimulating hormone (TSH) levels were estimated by Enzyme linked immuno-fluorescent assay (ELFA) using Biomeriex VIDAS instrument. Based on the levels of TSH and FT_4 the students were categorized as Euthyroid, Hypothyroid, Subclinical Hypothyroid, Hyperthyroid or Subclinical Hyperthyroid.

RESULTS

Among 100 students involved in our study, 22 were males and 78 were females. 89% of the participants were found to be euthyroid. Prevalence of Subclinical Hypothyroidism was 8% and Prevalence of Subclinical Hyperthyroidism was 3%. It was found that all the cases of Subclinical Hypothyroidism and Subclinical Hyperthyroidism were females.

CONCLUSION

Early detection of thyroid disorders especially Subclinical Hypothyroidism and Subclinical Hyperthyroidism can prevent the complications associated with it.

KEYWORDS

Euthyroid, Hypothyroid, Subclinical Hypothyroid, Hyperthyroid and Subclinical Hyperthyroid.

HOW TO CITE THIS ARTICLE: Vinay AV, Vastrad S, Sindhu R, et al. Prevalence of thyroid dysfunction among first year medical students in a tertiary care teaching hospital. J. Evid. Based Med. Healthc. 2018; 5(52), 3597-3600. DOI: 10.18410/jebmh/2018/733

BACKGROUND

Thyroid disorders are common worldwide, and our country is not an exception for it. Many of the recent studies have reported high prevalence of Hypothyroidism, especially Subclinical Hypothyroidism which was also found to be more common among females.[1] Regardless of universal salt iodization programme, the prevalence of thyroid disorders is high in our country.[2,3]

Thyroid gland secretes the hormones Triiodothyronine (T_3) and Thyroxine (T_4). 0.05% and 0.5% of T_3 and T_4 respectively are in free form in the circulation and the rest are bound to plasma proteins. Thyroid stimulating hormone (TSH) produced from anterior pituitary regulates the production of T_3 and T_4 by the thyroid gland. Secretion of T_3 and T_4 from thyroid gland is regulated by negative feedback mechanism.

Financial or Other, Competing Interest: None.
Submission 30-11-2018, Peer Review 03-12-2018,
Acceptance 11-12-2018, Published 24-12-2018.
Corresponding Author:
Dr. Santosh Vastrad,
House No. 001, Ground Floor,
Roston VEnezia Apartment,
Old Income Tax Office Road,
Vidyanagar, Hubli, Karnataka.
E-mail: drsantoshvastrad@gmail.com
DOI: 10.18410/jebmh/2018/733

Individuals with Subclinical Hypothyroidism or Subclinical Hyperthyroidism do not present with any signs and symptoms. It can be detected by screening the normal population for their TSH and FT_4 levels. Individuals with symptoms of Hypothyroidism like easy fatigability, excessive weight gain, hair loss, cold intolerance, constipation, irregular menstrual cycles, depression, anxiety, hoarse voice and the laboratory tests, i.e., TSH above normal range and FT_4 below normal range are considered to be Hypothyroid.[4] Individuals with symptoms of Hyperthyroidism like weight loss despite increase intake of food, heat intolerance, nervousness, irritability, diarrhea, perspiration, impotence in males, oligomenorrhoea or amenorrhea in females and the laboratory tests, i.e., TSH below normal range and FT_4 above the normal range are considered to be Hyperthyroid.[5]

Several studies have reported the importance of early diagnosis and treatment of Hypothyroidism among pregnant women.[6-10] Hypothyroidism in young women is also associated with menstrual irregularities, polycystic ovaries and infertility.[11-19]

Thyroid dysfunction has been associated with complications like Hypertension, ischemic heart disease, psychiatric disorder. Recent studies show that Subclinical Hypothyroidism is associated with an increased risk of Coronary Heart Disease (CHD) events and CHD mortality in those with higher TSH levels.[20]

Although an easy-to-detect and inexpensive-to-treat disease, patients with Subclinical Hypothyroidism and Subclinical Hyperthyroidism in India often remain undetected and untreated, and thus the disease impairs the work performance and economic productivity of Indian people. Therefore, we intend to screen the young adults for Hypothyroidism, Subclinical Hypothyroidism, Hyperthyroidism and Subclinical Hyperthyroidism. Early detection of Subclinical Hypothyroidism and Subclinical Hyperthyroidism can prevent the individual from developing the overt disease and complications associated with it.

Aim of the Study

To determine the prevalence of thyroid dysfunction among first year medical students of PESIMSR.

MATERIALS AND METHODS

This study was done on 100 first year medical students (within the age group 18-20 years) of PES institute of medical Sciences and Research, Kuppam who were willing to participate in the study. Ethical clearance was taken from the institutional ethical committee. Written consent from the subjects was taken and 5 ml venous blood sample was collected from each subject after an overnight fasting. Method used for determining the levels of FT_4 and TSH is by Enzyme linked immuno-fluorescent assay (ELFA) using Biomeriex VIDAS instrument. FT_4 and TSH levels were estimated using FT_4 and TSH kit. The normal ranges of TSH and FT_4 were 0.25-5.5 µIU/ml and 9-24 pmol/L respectively. Students with symptoms of Hypothyroidism like easy fatigability, excessive weight gain, hair loss, cold intolerance, constipation, irregular menstrual cycles, depression, anxiety, hoarse voice with TSH more than 5.5 µIU/ml and FT_4 less than 9pmol/L were diagnosed to have Hypothyroidism.[4] Asymptomatic Students with TSH more than 5.5µIU/ml and FT_4 within the normal range was considered to be Subclinical Hypothyroid. Students with symptoms of Hyperthyroidism like weight loss despite increase intake of food, heat intolerance, nervousness, irritability, diarrhoea, perspiration, impotence in males, Oligomenorrhoea or amenorrhea in females with TSH less than 0.25 µIU/ml and FT_4 more than 24 pmol/L were diagnosed to have Hyperthyroidism.[5] Asymptomatic students with, TSH less than 0.25 µIU/ml and FT_4 within the normal range was considered to be Subclinical Hyperthyroid.

Inclusion Criteria

- Students willing to participate in the study within the age group 18-20 years.

Exclusion Criteria

- Students with previous history of thyroid disease or previous Thyroxine therapy were excluded.

The data was entered into MS Excel 2007 version and the values of the FT_4, TSH was expressed as Mean ± SD and prevalence of Euthyroid, Subclinical Hypothyroid and Subclinical Hyperthyroid was expressed in percentage.

RESULTS

A total of 100 students were screened for TSH and FT_4 of which 78 were females and 22 were males.

Gender	Number	Age (Mean ± SD)
Female	78	18.86 ± 0.63
Male	22	18.50 ± 0.74
Total	100	18.78 ± 0.67

Table 1. Demographic Distribution of the Participants

Gender	TSH (µIU/ml) Mean ± SD	FT_4 (pmol/L) Mean ± SD
Female	2.78 ± 2.49	15.73 ± 2.51
Male	1.61 ± 0.71	18.48 ± 2.81

Table 2. TSH and FT_4 Levels of the Female and Male Participants

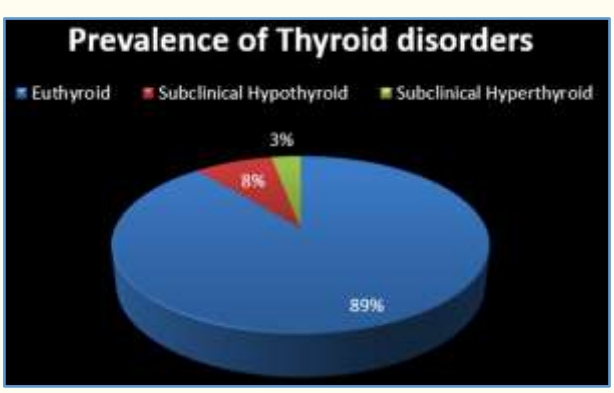

Figure 1. Prevalence of Thyroid Disorders

	TSH (μIU/ml) Mean ± SD	FT_4 (pmol/L) Mean ± SD
Euthyroid	2.08 ± 1.15	16.40 ± 2.70
Subclinical Hypothyroid	8.29 ± 3.67	13.91 ± 1.61
Subclinical Hyperthyroid	0.08 ± 0.05	20.86 ± 2.46

Table 3. TSH and FT_4 Levels of Euthyroid, Subclinical Hypothyroid & Subclinical Hyperthyroid Participants

DISCUSSION

The thyroid gland becomes underactive and produces very little thyroid hormones in case of Hypothyroidism and it becomes Hyperactive and produces excessive thyroid hormones in case of Hyperthyroidism. Risk factors for thyroid failure are family history of thyroid disease, presence of antithyroid antibodies, radiation treatment to head, neck or chest, other autoimmune disease.[21]

Various factors like age, sex, geographical factors and iodine intake affects the prevalence of thyroid disorders.[22] Thyroid disorders needs to be addressed among all the age groups, but its early detection in paediatric age group and young adults would help prevent the complications associated with it. In the present study we assessed the prevalence of thyroid disorders on first year medical students. 89% of the students who volunteered for our study were found to be Euthyroid, 8% of them were found to be Subclinical Hypothyroid and 3% of them were found to be Subclinical Hyperthyroid. All the Subclinical Hypothyroid and Subclinical Hyperthyroid students were found to be females in our study. There are several studies reporting variable prevalence of Hypothyroidism, Subclinical Hypothyroidism, Hyperthyroidism and Subclinical Hyperthyroidism. In a study done in Cochin on 971 adult subjects, the prevalence of Hypothyroidism and Subclinical Hypothyroidism was found to be 3.9% and 9.4% respectively.[1] It was also found that the prevalence in women was higher, being 11.4% in comparison with men with a prevalence of 6.2%. The study also reports that the prevalence of Subclinical Hypothyroidism increased with age.[1] One of the large-scale studies in Madurai district on 1292 subjects reported the overall prevalence of abnormal TSH as 12.5% and prevalence of mild TSH elevation among the 1292 subjects was 9.7%. The overall prevalence of suppressed TSH was 1.5% in the study population.[22] Prevalence of Subclinical Hypothyroidism (9.44%) as well as Subclinical Hyperthyroidism (5.97%) was much higher than overt Hypothyroidism (4.24%) or overt Hyperthyroidism (2.5%) in a study done by Deokar PG et al. The same study also reported that Hypothyroidism is more common than Hyperthyroidism.[23]

Rebecca et al reported 1.8% had hyperthyroidism (1.2% clinical and 0.6% subclinical) while 2.6% had mildly suppressed TSH with normal FT_4 among the women of Puducherry.[24]

We have observed in our study that the prevalence of Subclinical Hypothyroidism is higher than Subclinical Hyperthyroidism, all of them being females. Early screening of female population would help us prevent the development of overt Hypothyroidism or Hyperthyroidism and the complications associated with it like Myxoedema, Coronary heart diseases, cardiac arrhythmias. It has been noted in several studies that the females with thyroid dysfunction are associated with menstrual irregularities, polycystic ovaries and infertility.

CONCLUSION

Thyroid dysfunction was observed to be common among young women of our study. 8% of our study population was found to have Subclinical Hypothyroidism, 3% were found to be Subclinically Hyperthyroid which calls for its early detection and intervention. The most common difficulty faced by the young females of reproductive age group is infertility which is associated with thyroid dysfunction. Hence, early intervention of the females found to have thyroid dysfunction would greatly reduce the incidence of infertility as well as the other complications associated with thyroid dysfunction.

REFERENCES

[1] Usha Menon V, Sundaram KR, Unnikrishnan AG, et al. High prevalence of undetected thyroid disorders in an iodine sufficient adult south Indian population. J Indian Med Assoc 2009;107(2):72-77.
[2] Pandav CS, Yadav K, Srivastava R, et al. Iodine deficiency disorders (IDD) control in India. Indian J Med Res 2013;138(3):418-433.
[3] Unnikrishnan AG, Kalra S, Sahay RK, et al. Prevalence of hypothyroidism in adults: an epidemiological study in eight cities of India. Indian J Endocrinol Metab 2013;17(4):647-652.
[4] Chakera AJ, Pearce SH, Vaidya B. Treatment for primary hypothyroidism: current approaches and future possibilities. Drug Des Devel Ther 2012;6:1-11.
[5] Simone DL, Sun YL, Lewis EB. Hyperthyroidism. Lancet 2016;388(10047):906-918.
[6] Davis LE, Leveno KJ, Cunningham FG. Hypothyroidism complicating pregnancy. Obstet Gynecol 1988;72(1):108-112.
[7] Leung AS, Millar LK, Koonings PP, et al. Perinatal outcome in Hypothyroid pregnancies. Obstet Gynecol 1993;81(3):349-353.
[8] Wasserstrum N, Anania CA. Perinatal consequences of maternal hypothyroidism in early pregnancy and inadequate replacement. Clin Endocrinol (Oxf) 1995;42(4):353-358.
[9] Haddow JE, Palomaki GE, Allan WC, et al. Maternal thyroid deficiency during pregnancy and subsequent neuropsychological development of the child. N Engl J Med 1999;341(26):549-555.
[10] Abalovich M, Gutierrez S, Alcaraz G, et al. Overt and subclinical hypothyroidism complicating pregnancy. Thyroid 2002;12(1):63-68.
[11] Sinha U, Sinharay K, Saha S, et al. Thyroid disorders in polycystic ovarian syndrome subjects: a tertiary

hospital based cross-sectional study from Eastern India. Indian J Endocrinol Metab 2013;17(2):304-309.
[12] Poppe K, Velkeniers B. Female infertility and the thyroid. Best Pract Res Clin Endocrinol Metab 2004;18(2):153-165.
[13] Mansourian AR. Female reproduction physiology adversely manipulated by thyroid disorders: a review of literature. Pak J Biol Sci 2013;16(3):112-120.
[14] Sharma Y, Bajpai A, Mittal S, et al. Ovarian cysts in young girls with hypothyroidism: follow-up and effect of treatment. J Pediatr Endocrinol Metab 2006;19(7):895-900.
[15] Singla R, Gupta Y, Khemani M, et al. Thyroid disorders and polycystic ovary syndrome: an emerging relationship. Indian J Endocrinol Metab 2015;19(1):25-29.
[16] Koutras DA. Disturbances of menstruation in thyroid disease. Ann N Y Acad Sci 1997;816:280-284.
[17] Kakuno Y, Amino N, Kanoh M, et al. Menstrual disturbances in various thyroid diseases. Endocr J 2010;57(12):1017-1022.
[18] Verma I, Sood R, Juneja S, et al. Prevalence of hypothyroidism in infertile women and evaluation of response of treatment for hypothyroidism on infertility. Int J Appl Basic Med Res 2012;2(1):17-19.
[19] Arojoki M, Jokimaa V, Juuti A, et al. Hypothyroidism among infertile women in Finland. Gynecol Endocrinol 2000;14(2):127-131.
[20] Rodondi N, Den Elzen WP, Bauer DC, et al. Subclinical hypothyroidism and the risk of coronary heart disease and mortality. JAMA 2010;304(12):1365-1374.
[21] Victor A. Subclinical hypothyroidism: deciding when to treat. Am Fam Physician 1998;57(4):776-780.
[22] Velayutham K, Selvan SS, Unnikrishnan AG. Prevalence of thyroid dysfunction among young females in a South Indian population. Indian J Endocrinol Metab 2015;19(6):781-784.
[23] Deokar PG, Nagdeote AN, Lanje MJ, et al. Prevalence of thyroid disorders in a tertiary care center. Int J Cur Res Rev 2016;8(9):26-30.
[24] Abraham R, Murugan VS, Pukazhvanthen P, et al. Thyroid disorders in women of Puducherry. Indian J Clin Biochem 2009;24(1):52-59.