

A Survey on the Prevalence of Thyroid Disorder Induced by Demography and Food Habits in South Indian Population

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ABSTRACT

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Introduction: Thyroid disorders are among the most common endocrine disorders in India. The prevalence and pattern of the thyroid disorders depends on age, sex, geographical factors, food habits and on iodine intake. **Aim and Objective :** To assess the prevalence and role of geographical factors, family history, medical history, menstrual history and food habits in the incidence of thyroid disorders. **Materials and methods :** 1000 responders from 4 different geographical areas were interviewed using a pre-designed proforma, demographic details, family history, food habits and suspecting symptoms of the responders were collected. **Results:** Food habits plays an important role in the fluctuation of thyroid hormone. The distribution of the thyroid patients were found to be more in Coastal area(%) where as Non coastal , Mid-land, Hilly area have low prevalence of thyroid disorder. **Conclusion:** The factors associated with the prevalence are mainly food habits especially the intake of sea food, coconut, tapioca. It was also found that geographical feature of the area plays an important role in inducing the disorder. It was observed that anything too much can induce fluctuation in thyroid hormones.

Keywords: Hypothyroidism, Thyroxin, Menstrual history, Thyroidism

INTRODUCTION

The reports reveals that the total burden of thyroid disorder in India is 42 million. In India, Iodine deficiency disorders account 27 per 1000 where as Grave's disease accounts 5 per 10,000². One in every eight women during their life time has risk for thyroid disorder. Hypothyroidism is more common in women than in men and is very common in older women.

Survey reveals that in India, thyroid disorders are amongst the most common endocrine disorders. The prevalence and pattern of Thyroid disorders depend on sex, age, ethnic and geographical factors and especially on iodine intake. Iodine deficiency can lead to mental retardation, stillbirths, congenital anomalies and psychomotor defects⁵ Research shows that hypothyroidism can contribute to morbidity from Osteoporosis, Hyperlipidemia, Hypercholesterolemia, Cardiovascular and Neuropsychiatry disease in the population³. The seriousness of thyroid disorders should not be underestimated as thyroid storm and myxedema coma can lead to death in a significant number of cases.

Survey on the disease high lights that through out world the prevalence of thyroid disorder is 25% in females and 0.6% in males. The exact reason is not known. The higher prevalence in females may be associated with oestrogen and progesterone. Hyperthyroidism in coastal area is about 5% where as hypothyroidism in 0.6%. Due to leaching of the soil by annual flooding, hilly region people are found to be iodine deficient.

In South India, 11.5% were estimated to have hypothyroidism where as only 1.8% had hyperthyroidism. So the study was intended to assess the role of food habits and geographical factors in the incidence of Thyroidism.

MATERIAL AND METHODS

Institutional Ethics Committee has accepted and approved the proposed protocol. It was a Community Survey carried out in Coastal, Non coastal, Midland and Hilly region of Kerala. 1000 female responders of above 18 year old were interviewed using a predesigned proforma. Patients who have undergone radio active ablation and thyroectomy were excluded from the study. Four different geographical areas include:

ZONE I – Coastal area (Calicut)

ZONE II – Non coastal (Palakkad)

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ZONE III- Mid-land (Thrissur)

ZONE IV- Hilly Region (Wynad)

Pre-designed proforma includes Demographic details, Family history, Medical history, Food habits, Menstrual history and Suspected symptoms.

RESULTS AND DISCUSSION

The community survey in the present study was aimed to give health related awareness associated with thyroid disorder and role of sea foods in the incidence of the disease. It was performed using a questionnaire as a tool to collect data from the women above 18 years old based on earlier findings. The community survey was carried out at different parts of Kerala based on higher incidence of thyroid disorders (unpublished data) by taking a total of 1000 female responders. Four different geographical areas were selected; Calicut (Coastal area), Palakkad (Non coastal area), Thrissur (Mid-land), Wynad(Hilly region). 250 responders were interviewed from each area using a questionnaire.

Out of 1000 female responders, 117 responders (11.7%) were suspected to have thyroid disorder by their symptoms.

Out of 117, only 90 (76.9%) people went for biochemical evaluation.

27 (23%) people did not go for laboratory evaluations.

Out of 90, only 30 (33.3%) were found to be positive to thyroid disorder(Chart 1).

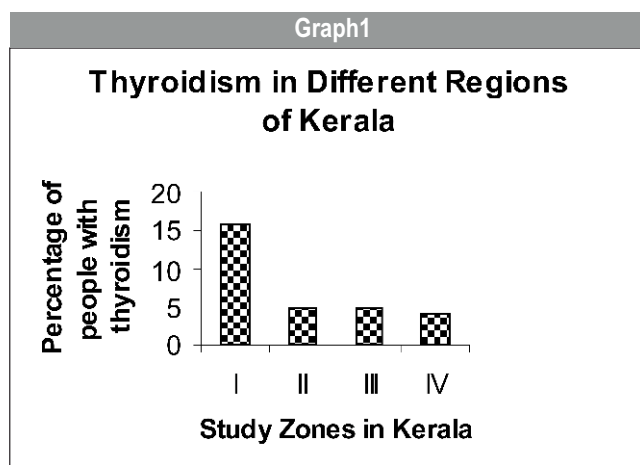
1. Distribution of thyroid patients in different areas:

It is wrongly believed that people residing in coastal area do not suffer from iodine deficiency disorders as they consume sea food which are rich in iodine(5).In our community study we have included a coastal area that is Calicut. 250 responders were interviewed from 4 different parts of Calicut. The availability of sea foods like fish, prawn, crab is same in all the parts. And they are habituated to take it regularly in their meals. Out of 250 surveyed in this area, 28 (11.2%) were suspected to have thyroid disorder by their symptoms who were advised for biochemical investigations. 16 (57.14%) were positive to the thyroid tests. Rebecca (1) in her studies showed that the incidence of thyroidism is more in coastal area which might be due to the increase intake of iodine containing foods. Hypothyroidism also is prevalent in this area which may be associated to higher intake of iodine rich foods causing negative feed back mechanism. Prema (3) in her survey in a coastal area reported the prevalence of hypothyroidism is 5.8%. At Calicut 1.6% of hypothyroidism and 4.8% of hyperthyroidism were found out. Use of coconut in their food stuffs may also be a contributing factor in the

fluctuation of TSH. Zimmermann(5) suspected that it may be a reason for hyperthyroidism.

Among people residing in Coastal area were found to have thyroid disorder, where as people in Non-coastal, Mid land and Hilly area have a low prevalence of thyroid disorder(Graph 1). P Value is 0.0003, which shows that there is a significant linear trend among the categories. It implies that geographical variation is a causative factor for thyroidism.

Palakkad, a non coastal area is also selected for community



survey. People residing there are not prone to take fish regularly even though they are non vegetarians and belong to middle class. The availability of sea fish is comparably good in this area. Out of 250, 38 (15.2%) were suspected to have thyroid disorder by their symptoms. On biochemical investigations, 5 (2%) were positive to thyroid tests. Only hypothyroid patients were found in this area.

Another area we selected for survey was Thrissur. Out of 250, 14 women were with suspected symptoms (5.6%) 5 (2%) were found to be positive to thyroid tests.. All of them were hypothyroid. Their hypothyroidism may be associated with low consumption of sea foods. Though majority of the responders were non vegetarians only few of them were taking sea fish.

Wynad is another area we included in our survey. Out of 250, 14 (5.6%) patients 5 (2%) were found to be responding positively to thyroid tests. All of them were hypothyroid.According to Chaturvedi (4) in mountainous and hilly areas iodine content is lost due to years of washing of the soil by heavy rains and recurrent floodings. As a result, all the living things which are depending on the soil directly or indirectly become iodine deficient. The survey conducted by Prema(5) revealed that frequent consumption of tapioca

which is a common and favourite dish of Keralites may be one of the reasons for the prevalence of goiter in Kerala. Tapioca contains hydrocyanic acid which blocks the uptake of iodine by thyroid causing goiter

2. Age wise distribution of thyroid patients:

In our survey, hyperthyroidism patients are of age above 50 years and hypothyroidism are common among young women . It shows hyperthyroidism is more common in older women (Table 1).

Age	No. of Hyperthyroid Patients	No. of Hypothyroid Patients
≤ 45 years	4(33.3%)	14(77.7%)
>45 years	8(66.6%)	4(22.2%)

3. Food habits:

In our community study, 100% of the hyperthyroidism patients and 94.4% of hypothyroidism patients were non vegetarian. In coastal area 99% were non vegetarians, their main diet is sea foods like fish, crab etc. Research on Thyroidism shows non vegetarian foods and vegetables like cabbage,cauliflower and soya are goitrogens which can fluctuate our thyroid hormone. In non coastal and midland consumption of non vegetarian food stuff is too less. It is due to the non availability of Sea foods. In hilly region only 70% were non vegetarians. P value is 0.8355 and relative risk is infinity. It shows that in non vegetarian people the relative risk for thyroidism is more. Some of the reasons may be the consumption of seafish has a role in the incidence of hyperthyroidism. As sea water contains 0.05 mg / litre of iodine content, the sea fishes will also have some amount of iodine. Regular use of coconut and coconut products in the meals is also a factor associated with hyperthyroidism .Since coconut has stimulating effects on thyroid and there by it may cause hyperthyroidism says Chaturvedi(4). Excess intake of iodine rich food also leads to hypothyroidism by reverse mechanism.

Hitman (3) in his study he explained high fiber diet will also cause fluctuation of thyroid hormones.

4. Menstrual cycle:

Out of 18 hypothyroidism patients, 13 (72%) were found to have irregularity in menstrual periods which includes heavy menstruation and cessation of periods for 2- 3 months. Among hyperthyroid patients, only 3 (25%) were having

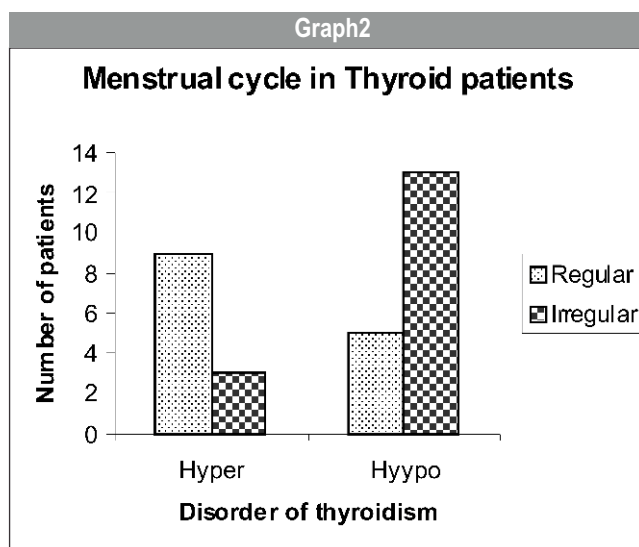
irregular periods. Among the 5, 1 patient (2%) was found to be nulliparous though she belongs to child bearing age. Davies(2) in his article explained that hypofunction of thyroid affects ovulation frequency and occurrence. It increases the prolactin level and prevents the ovulation too. Thyroid hormone is essential for egg fertilization. Hypo function of thyroid gland causes infertility.

5. Symptoms experienced:

Thyroid patients experiences some specific symptoms during the stage of fluctuation of TSH.

Major Symptoms of Hypothyroidism	Major symptoms of Hyperthyroidism
Weight gain(82%)	Weight loss (62%)
Irregularity in periods (78%)	Fatigue (58%)
Heat intolerance(62%)	Heat intolerance (50%)
Dry mouth(6%)	Irregularity in periods (39%)
Fatigue (58%)	Decreased appetite (38%)
Restlessness(52%)	Constipation (35%)
Gasping (51%)	
Swinging of mood (48%)	
Increased appetite (45%)	
Irregular hair growth (17%).	

Disorder	Number of patients with regular periods	Number of patients with irregular periods
Hyperthyroidism	9 (75%)	3 (25%)
Hypothyroidism	5 (27%)	13 (72%)



CONCLUSION

It is found that the prevalence of thyroidism is more in coastal area compared to non coastal, mid-land and hilly area of Kerala. The factors associated with the prevalence are mainly food habits especially the intake of sea food, coconut, tapioca and geographical features of the place.

It was also observed that anything too much can induce fluctuation in thyroid hormones. Educational programme has to be launched. Monitoring of thyroid levels are regularly conducted since a particular diet can cause thyroidism, which may be risk factor for other disease. Early identification and early initiation and early recovery helps to avoid complications.

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