

Study on impact of localities, sex ratio, age group, religion and food habits on the Prevalence of Thyroid Diseases in Dakshina Kannada and Kasaragod districts

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Abstract- The objectives of the present investigation were to find out the association of thyroid abnormalities with food habits, sex, religion and also habitats of region under study. Two study groups were surveyed for the study on the prevalence of thyroid diseases. One study group is from Dakshina Kannada and the other from the Kasargod District. A total of 398 subjects were surveyed. Questionnaires were prepared and responses were collected from the subjects. The analysis revealed that in D.K district normal subjects comprise of 39.1% followed by Hypothyroidism with 36.2% and Hyperthyroidism of 24.7%. In Kasaragod district, hypothyroidism is observed in 54.6% subjects followed by normal with 27.6% and Hyperthyroidism only 17.8%. With respect to the residential location, 47% of the village subjects are suffering from Hypothyroidism followed by 36.8% of normal subjects and only 16.2% suffering from hyperthyroidism. In respect of town residents 42.2% are found to be suffering from hypothyroidism followed by 30.2% normal subjects with 27.6% suffering from hyperthyroidism. In respect of city residents 41.2% are found to be suffering from hypothyroidism followed by 37% normal subjects with 21.8% suffering from hyperthyroidism. It is found that there is significant association between thyroidal abnormalities and sex, while no significant association was found between thyroidal abnormalities and age groups. Significant association is found between food habits and religion

Index Terms- Thyroid abnormalities, Dakshina Kannada, Kasargod, Localities, Food habits, Hypothyroidism and Hyperthyroidism.

I. INTRODUCTION

Thyroid disorder is a general term representing several different diseases involving thyroid hormones and the thyroid gland. Thyroid disorders are commonly separated into two major categories, hyperthyroidism and hypothyroidism, depending on whether serum thyroid hormone levels are increased or decreased, respectively. Thyroid diseases are, arguably, among the commonest endocrine disorders worldwide. India too, is no exception. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid diseases. Among the

various varieties, hypothyroidism and congenital hypothyroidism is probably the most important, as it requires an early diagnosis, which is usually followed by appropriate therapy that can prevent the onset of brain damage (1).

The link between endemic goiter and iodine deficiency has been studied in India by several eminent researchers, and this has led to the publication of several important reports. Study from New Delhi had shown that it was linked to iodine deficiency and resulted in decompensated hypothyroidism in many cases. Subsequent to this program, it was shown that in selected regions of Uttar Pradesh, the prevalence of congenital hypothyroidism had come down from 100 to 18/1000 (2).

Several landmark studies have been carried out in the area of iodine deficiency disorders in the country. About 14,762 children from all over India were studied for the following characteristics: goiter prevalence, urinary iodine and thiocyanate excretion, functional status of thyroid, as well as serological and cytopathological markers for thyroid autoimmunity. The authors found that despite iodization, the prevalence of goiter has not dramatically declined. The researchers noted that thyroid autoimmunity could only partly explain the goiter and concluded that the role of goitrogens is an area that deserves further study (3).

In a landmark study of Hashimoto's thyroiditis in India, 6283 schoolgirls from all over the country were screened. Among them, 1810 schoolgirls had a goiter and of these 764 underwent a fine needle aspiration cytology, and 58 had evidence of juvenile autoimmune thyroiditis. Among fine needle aspiration cytology-confirmed cases of juvenile autoimmune thyroiditis, subclinical and overt hypothyroidism was seen in 15% and 6.5%, respectively (4).

Over the last 30 years many publications have revealed an association between Down syndrome and thyroid disorders by showing altered levels of abnormal thyroxine (T4), triiodothyronine (T3) and/or thyroid stimulating hormone (TSH) level. Such changes may be present along with other hormonal and biochemical disturbances (5).

Remya James and Vineeth Kumar., 2012(6) Studied on the Prevalence of Thyroid Diseases in Ernakulam City and Cherthala Town of Kerala State, India. Wrushali and Raut.,2012 (7) reported on Thyroid Disease Diagnosis using Image Processing.

A prospective epidemiological study was conducted to assess the incidence, diagnosis, of thyroid gland abnormality

in northern Finland by Klein and Ojamaa, 1992(8). Veeresh, et al., 2015(9) reported on Serum FSH, LH and Prolactin Levels in women with Thyroid disorders. The studies include 36 women patients between the age group 18-35 years out of which 10 are control, 26 are with thyroid disorders. In this 26 thyroid disorder patients 16 are hypothyroid and 10 are hyperthyroid cases. Aliyu et al., 2015(10) reported on Simple multinodular goiter in about 248 patients, 216 were females and 32 males with a female to male ratio of 6.75:1. A cross sectional study of prevalence of hypothyroidism in adult population of Udayapur district was reported by Rakesh et al., 2015(11).

II. STUDY AREA

Dakshina Kannada is an important district of Karnataka state situated on the western coast of India. The district has an area of 4866 square kilometer which stretch from 12° 57' and 13° 50' north latitude and 74° & 75° 50' east longitude. The Arabian Sea bounds it on the west. Mangalore is the head quarters and chief city of the district. The climate of the district shares the wider climatic pattern of the other West Coast districts of India. It is characterized by excessive humidity (78%) during the greater part of the year.

Kasargod district is sandwiched between the Lakshdweep and the Western Ghats. Lying between north latitudes 8°18' and 12°48' east longitudes 74°52' and 77°22'. Kasargod District is one of the 14 districts in the state of Kerala and the district covers an area of around 1992 km².

III. MATERIALS AND METHODS

A standard set of Questions were grouped together and a Questionnaire was prepared. Data were collected using the questionnaire from 398 subjects. This study is conducted to analyze the factors associated with incidence of Thyroid abnormalities in persons residing in Dakshina Kannada and Kasaragod district. Statistical analyses were carried out using SPSS software.

IV. RESULT AND DISCUSSION

A total of 398 subjects were interviewed from Dakshina Kannada and Kasargod district from January 2012 to December 2014. 235 subjects are included from Karnataka while 163 from Kasargod district. Table I reveals that in D.K district normal subjects comprise of 39.1% followed by Hypothyroidism with 36.2% and Hyperthyroidism of 24.7%. In Kasaragod district, hypothyroidism is observed in 54.6% subjects followed by normal with 27.6% and Hyperthyroidism only 17.8%. The data is depicted in figure 1.

Chi square test is carried out to assess the association between the levels of thyroidism and the districts and found that there is significant association between levels of thyroidism with the districts ($p=0.001$).

Table II reveals with respect to the residential location, 47% of the village subjects are suffering from Hypothyroidism followed by 36.8% of normal subjects and only 16.2% suffering from hyperthyroidism. In respect of town residents 42.2% are

found to be suffering from hypothyroidism followed by 30.2% normal subjects with 27.6% suffering from hyperthyroidism. In respect of city residents 41.2% are found to be suffering from hypothyroidism followed by 37% normal subjects with 21.8% suffering from hyperthyroidism. The data is depicted in figure 2. The Chi square test carried out reveals that there is no significant association between levels of thyroidism with the types of residence.

Table III reveals that a majority of (258) subjects are Hindus followed by Muslims (94) and Christians(46). Among Hindus 39.9% are normals followed by 38% hypothyroidism with 22.1% suffering from hyperthyroidism. In Muslims 59.6% are suffering from hypothyroidism followed by 23.4% normals with 17% suffering from hyper thyroidism. In Christians 39.1% are found to be suffering from hypothyroidism followed by 30.4% with normals and hyperthyroidism. The data is depicted in figure 3. To find any association between the levels of thyroidism with the religions Chi square test is carried out and found that there is significant association between levels of thyroidism with the religions ($p=0.003$).

Table IV reveals that a majority of 169 are from the age group 21-40 followed by 144 in age group 41-60. In the age group <21 there were 49 followed by 36 in the age group >60. In the age group >21 majority (44.9%) are found to be normals followed by 28.6% hypothyroidism and hyperthyroidism (26.5%). In the age group 21-40 normals comprise of 32.5%, hypothyroidism (46.2%) and hyperthyroidism (21.3 %). In the age group 41-60 normals comprise of 34.7%, hypothyroidism (45.8%) and hyperthyroidism (19.4 %). In the age group of >60 normals were 33.3%, hypothyroidism (38.9%) and hyperthyroidism (27.8 %).

Hypothyroidism is more common in older women and 10 times more common in women than men (12). The prevalence of hyperthyroidism is also reported as more common in women than men (13). Females were also more likely to be detected with hypothyroidism than males (11). Thyroid diseases are more prevalent in women particularly between puberty and menopause and women are more susceptible to the goitrogenic effect of iodine deficiency. Carcinomas of the thyroid are three-times more frequent in women than in men, and the peak rates occur earlier in women. These epidemiological data suggest a role of estrogen in the pathogenesis of thyroid diseases (14).

The Table V reveals the association of thyroid abnormalities in terms of sex of the subjects and as per the Chi square test there is a significant association between levels of thyroidism and the sex of subjects

The Table VI and figure 6 reveals a vast majority of 229 non vegetarians of which 45% are the 169 vegetarians 40.8% suffered from hypothyroidism, 13.8% from hyperthyroidism and 40.2% are normal. The Chi square test carried out showed a significant association between levels of thyroidism with the food habits of subjects

The Table VII and figure 7 shows the comparison between users and non users of fast food

Hypothyroidism is seen in 45% of non users of fast food compared to 42.6% of fast food users, while hyperthyroidism is seen in 35% of non users of fast food and 34.9% of users of fast food. The Chi square test carried out showed no significant association between levels of thyroidism with the fast food users

The Table VIII, figure 8 reveals that in a total of 287 subjects not preferred fried foods, 122 (42.5%) are found to be suffering from hypothyroidism followed by 106 (36.9%) normal's and 59 (20.6%) are hyperthyroids. In the case of 111 fried food preferred, 50 (45%) are found to be suffering from hypothyroidism followed by 33 (30%) normal's and 28 (25%) are hyperthyroids. Chi square test is carried out which showed no significant association ($p=0.348$) between levels of thyroidism and the fried food preference of subjects.

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TABLES

Table I District * Thyroidism Cross tabulation

	Count	Normal	Hyperthyroidism	Hypothyroidism	Total
	D K	92	58	85	235
	Percentage	39.1%	24.7%	36.2%	100%
	Kasaragod	45	29	89	163
	percentage	27.6%	17.8%	54.6%	100%

Total	count	137	87	174	398
	percentage	34.4%	21.9%	43.7%	100%

Table II Residential location * Thyroidal level Cross tabulation

Residential location	count	Normal	Hyperthyroidism	Hypothyroidism	Total
Village	43	19	55	117	
Percentage	36.8%	16.2%	47.0%	100%	
Town	35	32	49	116	
percentage	30.2%	27.6%	42.2%	100%	
City	61	36	68	165	
percentage	37.0%	21.8%	41.2%	100%	
Total	Count	139	87	172	398
	percentage	35.0%	21.8%	43.2%	100%

Table 3 Religion * Thyroidal level Cross tabulation

	count	Normal	Hyperthyroidism	Hypothyroidism	Total
Hindu	103	57	98	258	
Percentage	39.9%	22.1%	38.0%	100%	
Muslim	22	16	56	94	
percentage	23.4%	17.0%	59.6%	100%	
Christian	14	14	18	46	
percentage	30.4%	30.4%	39.1%	100%	
Total	Count	139	87	172	398
	percentage	34.9%	21.9%	43.2%	100%

Table 4 Age Group * Thyroidal Level Cross tabulation

	count	Normal	Hyperthyroidism	Hypothyroidism	Total
<21	22	13	14	49	

	Percentage	44.9%	26.5%	28.6%	100%
	21-40	55	36	78	169
	percentage	32.5%	21.3%	46.2%	100%
	41-60	50	28	66	144
	percentage	34.7%	19.4%	45.8%	100%
	>60	12	10	14	36
	percentage	33.3%	27.8%	38.9%	100%
Total	Count	139	87	172	398
	percentage	34.9%	21.9%	43.2%	100%

Table 5 Sex * Thyroidal Level Cross tabulation

Sex	Count	Normal	Hyperthyroidism	Hypothyroidism	Total
	Male	66	18	46	130
	Percentage	50.8%	13.8%	35.4%	100%
	Female	73	69	126	268
	Percentage	27.2%	25.7%	47.0%	100%
	count	139	87	172	398
	Percentage	34.9%	21.9%	43.2%	100%

Table 6 Food habits * Thyroidal Level Cross tabulation

Food habits	Count	Normal	Hyperthyroidism	Hypothyroidism	Total
	Vegetarian	68	32	69	169
	Percentage	40.2%	18.9%	40.8%	100%
	Non vegetarian	71	55	103	229
	Percentage	31.0%	24.0%	45.0%	100%
	count	139	87	172	398
	Percentage	34.9%	21.9%	43.2%	100%

Table 7 Fast Food Usage * Thyroidal Level Cross tabulation

Fast Food Usage	count	Normal	Hyperthyroidism	Hypothyroidism	Total
	yes	104	67	127	298
	Percentage	34.9%	22.5%	42.6%	100%
	No	35	20	45	100
	percentage	35.0%	20.0%	45.0%	100%
Total	count	139	87	172	398
	percentage	34.9%	21.9%	43.2%	100%

Table 8 Fried Food preference * Thyroidal Level Crosstabulation

	count	Normal	Hyperthyroidism	Hypothyroidism	Total
No	106	59	122	287	
Percentage	36.9%	20.6%	42.5%	100%	
Yes	33	28	50	111	
percentage	30%	25%	45.0%	100%	
Total	count	139	87	172	398
	percentage	34.9%	21.9%	43.2%	100%

FIGURES:

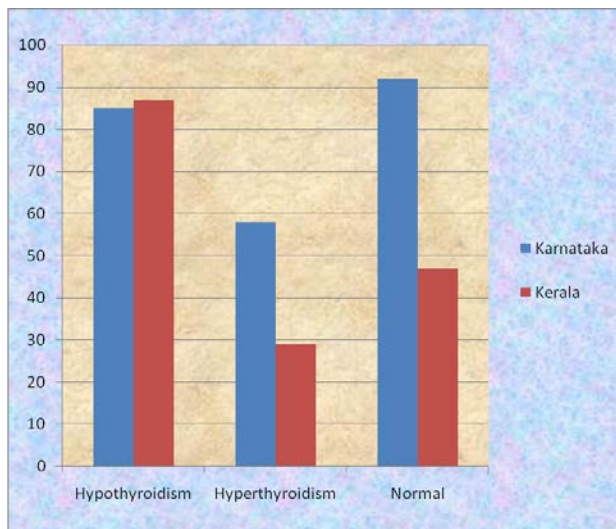


Fig.1 State * Thyroidism Cross tabulation

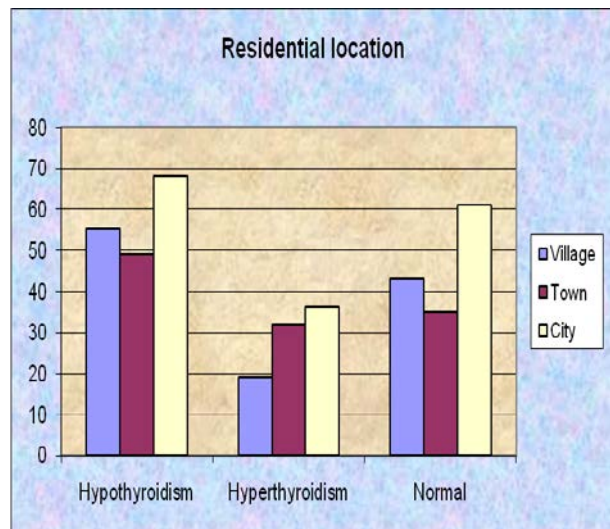


Fig.2 Residential location * Thyroidal level

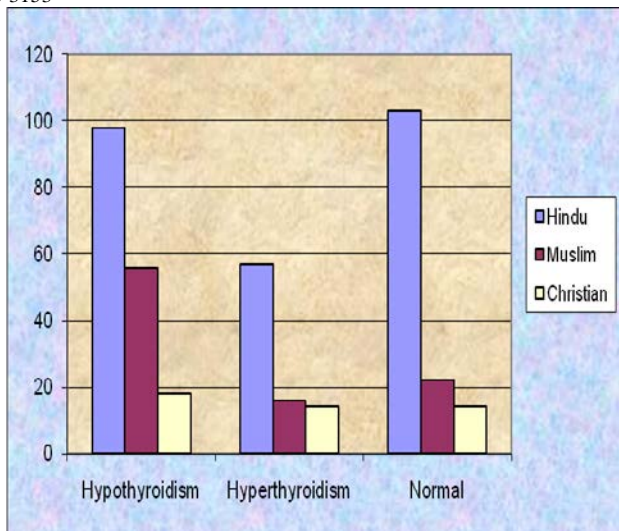


Fig.3 Religion * Thyroidal level

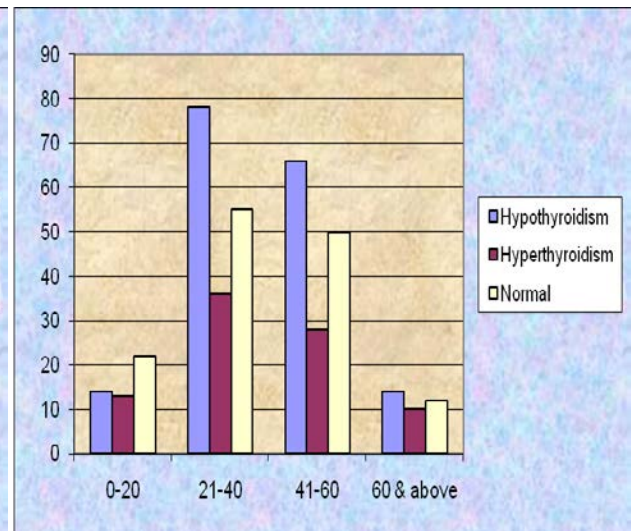


Fig. 4 Age Group * Thyroidal Level

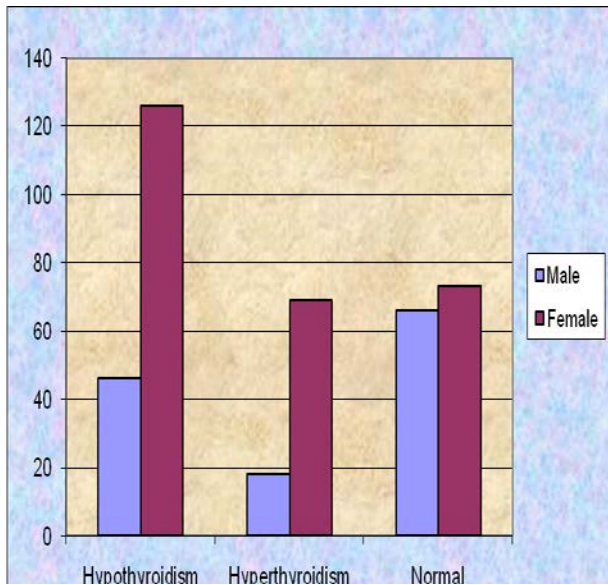


Fig. 5 Sex * Thyroidal Level

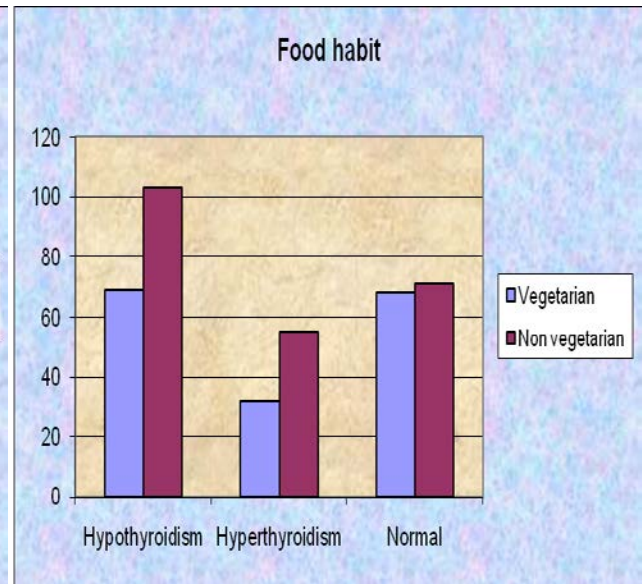


Fig. 6 Food habits * Thyroidal Level

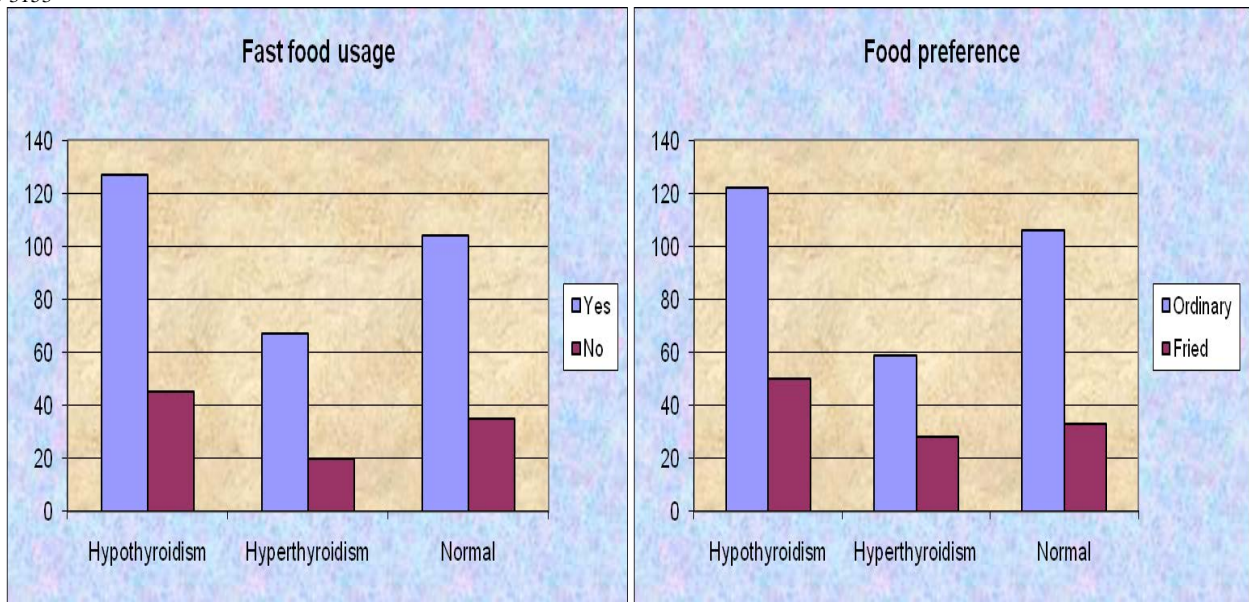


Fig. 7 Fast Food Usage * Thyroidal Level

Fig. 8 Fried Food preference * Thyroidal Level