

# Evaluation Profile of Thyroid Nodule by Fnac in the Rural Population of Khanpur Kalan, Sonapat, Haryana

HEMLATA T KAMRA<sup>1</sup>, RUCHI AGARWAL<sup>2</sup>, PARVEEN RANA<sup>3</sup>, RAJNISH KALRA<sup>4</sup>, SWARN KAUR<sup>5</sup>, AMRITA DUHAN<sup>6</sup>, SANJAY VERMA<sup>7</sup>, DEEPTI AGARWAL<sup>8</sup>

## ABSTRACT

**Background:** Thyroid disease is most common endocrine disorder and is different from other endocrine diseases because of its visible swelling and ease of diagnosis. If left untreated, thyroid disease makes a person more prone for heart disease, infertility and osteoporosis. In India, significant burden of thyroid diseases exist with an estimation of around 42 million cases. The thyroid status and autoimmune status of adult Indian population in the post iodination phase is largely unknown.

**Aim:** The main objective of this study was to generate valuable epidemiological data regarding the prevalence of thyroid disorders in rural population of Khanpur Kalan, Sonapat in the post-iodinisation era in India. To assess whether thyroid autoimmunity or goitrogens along with environmental factors play role in the development of thyroid. This paper is being presented in view that no such study has been carried out in the rural population of this region in Haryana.

**Materials and Methods:** The present study was conducted in Department of Pathology, Bhagat Phool Singh Medical College for Women, Khanpur Kalan, Sonapat between August 2011 to July 2013. It included retrospective analysis of cytomorphology of fine needle aspiration cytology material of 206 patients presenting with thyroid nodule in the Department of Pathology.

**Results:** The commonest age group affected was 31-40 yrs. The female patients (93.4%) outnumbered the male patients (6.6%). The cytomorphological analysis of 206 patients revealed 190 cases (92.2%) of neoplastic lesions, 10 cases (4.8%) were neoplastic and 6 cases (2.9%) had indeterminate cytomorphology. Maximum number (65.5%) of patients was suffering with goiter followed by lymphocytic thyroiditis (26.2%). Amongst the malignant cases three cases were of papillary carcinoma and one case of medullary carcinoma. Two out of the six cases of follicular neoplasm proved to be follicular adenoma on histopathology. Four patients with high T3 levels were under treatment with neomercazole. They showed change in cytomorphology from hyperplasia to colloid goiter. Only one case of acute suppurative thyroiditis was reported which shows rarity of its type.

**Conclusion:** The increased prevalence of goiter in this post iodination era can be attributed to goitrogens, autoimmune thyroid disease and micronutrient deficiency of iron and selenium. Higher prevalence of autoimmune thyroiditis in females is linked with both genetic and environmental factors such as infection, stress.

**Keywords:** Autoimmune thyroiditis, Goiter, Post iodinisation, Thyroid

## INTRODUCTION

Thyroid disorders are the most common among all the endocrine diseases in India [1]. Various studies have estimated that 42 million people in India suffer from thyroid diseases [2]. 8.5% population have thyroid nodule [3]. Thyroid nodule refers to a distinct lesion within the thyroid gland that is palpably or radiologically distinct from surrounding thyroid parenchyma. The reported prevalence of nodular thyroid disease depends on the population studied and the methods used to detect nodules. Numerous studies suggest a prevalence of 2-6% with palpation, 19-35% with ultrasound and 8-65% in autopsy data [4]. Aim of the study is to generate data on the epidemiology of goiter, lymphocytic thyroiditis and thyroid malignancies on the basis of FNAC of thyroid nodules.

## MATERIALS AND METHODS

The present study was conducted retrospectively in the Department of Pathology, Bhagat Phool Singh Medical College for Women, Khanpur Kalan, Sonapat from August 2011 to July 2013. The study comprised of 206 cases of thyroid swelling irrespective of their age and sex. Patients had presented with enlargement of thyroid in various outpatient departments of our college mainly Surgical, Medicine and Gynaecology OPD. In each case FNAC was done using 23 gauge needles. Smears prepared were stained both by Leishman and Hematoxylin and Eosin stain. The cases were classified into non neoplastic and neoplastic lesions. Non

neoplastic lesions included goiter, lymphocytic thyroiditis and acute suppurative thyroiditis. A broad term lymphocytic thyroiditis was used which included both Graves disease and Hashimoto's thyroiditis. On cytomorphology lymphocytic thyroiditis was reported when the lymphocytes were seen infiltrating the thyroid follicles and destroying them. Background also showed major population of lymphocytes and almost no colloid. The purpose of this study was to generate valuable epidemiological data regarding the prevalence of thyroid disorders in rural population of Khanpur Kalan, Sonapat as thyroid status and autoimmune status of adult Indian population in the post iodination phase is largely unknown.

## RESULTS

A total of 206 thyroid FNA were studied retrospectively from August 2011 to July 2013 covering the rural population of Khanpur Kalan and neighbouring areas. The commonest affected age group was 31-40 yrs followed by 21-30 yrs. Thirteen were males (6.31%) and 193 (93.68%) females. The female patients presented with history of menstrual irregularities, weight gain, infertility, dyspnoea and also cosmetic reasons because of swelling in neck. The age and sex distribution of patients with thyroid disease was as follows [Table/Fig-1].

And the distribution of cases was as follows [Table/Fig-2]. Two out of six cases of follicular neoplasm of thyroid were reported follicular adenoma on histopathology. In the category of indeterminate

Age Group	Male	Female	Total	Percentage
0-10	-	2	2	0.97%
11-20	-	14	14	6.79%
21-30	1	51	52	25.24%
31-40	1	55	56	27.18%
41-50	5	42	47	22.81%
51-60	4	21	25	12.13%
61-70	2	5	7	3.39%
>71yrs	-	3	3	1.45%

[Table/Fig-1]: Age and sex distribution of patients with thyroid disease

	Diagnosis	No. of Cases	Percentage
1	Colloid Goitre	103	50%
2	Hyperplastic nodule of colloid goiter	22	10.6%
3	Colloid goiter with focal lymphocytic thyroiditis	10	4.8%
4	Lymphocytic thyroiditis	54	26.2%
5	Follicular neoplasm	06	2.9%
6	Acute suppurative thyroiditis	01	0.4%
7	Papillary Carcinoma	03	1.4%
8	Medullary ca of thyroid	01	0.4%
9	Follicular neoplasm+ Hyperplastic nodule of colloid goiter	06	2.9%

[Table/Fig-2]: Cases reported were as follows

morphology we could get histopathological correlation only in one case and it was reported as hyperplastic nodule of thyroid. The goiter patients were further divided according to age and sex [Table/Fig-3].

Out of 54 cases of lymphocytic thyroiditis maximum no. of cases (15) were in the age group 21-30 y. All the patients were female. The youngest patient was 8-year-old [Table/Fig-4].

Though all the patients were advised hormonal study and antithyroid antibodies we could get T3, T4 and TSH level in 83 patients only. Most of the cases of goiter were euthyroid, only seven cases were hypothyroid. Twenty one cases of lymphocytic thyroiditis also showed hypothyroidism, four cases had high T3 levels. Patients with high T3 levels were on treatment with neomercazole and were advised FNA because their swelling did not regress with treatment. There was change in cytomorphology of these four cases from hyperplasia to colloid goiter.

## DISCUSSION

Thyroid disease affects women more than the male population. Maximum no. of patients in this study are also females. The ratio of male to female is 1:14.3. Other studies have also shown prevalence of thyroid nodules more in females than in males [5]. In the Framingham Study, 6.4% of women and 1.5% of men had palpable thyroid nodules [6]. This gender predisposition must be genetically mediated because it cannot be hormonal effect of estrogen as thyroid disease can occur before puberty and long after menopause [7].

Maximum number of patients were in the age group 31 to 40 yrs followed by the age group 21-30 yrs. Rana, et al., [5], in their study also found maximum number of patients in the age group 30-40 yrs. In India, thyroid disorders are in a transition zone from a predominant iodine deficient nation to now an iodine sufficient population still the prevalence of goiter has not declined. Iodine

	Age Group	Male	Female	Total	Percentage
1	0-10	-	2	2	1.48%
2	11-20	-	6	6	4.44%
3	21-30	1	30	31	22.96%
4	31-40	1	32	33	24.44%
5	41-50	4	38	42	31.11%
6	51-60	3	12	15	11.11%
7	61-70	1	4	05	3.70%
8	>71yrs	-	1	01	0.74%

[Table/Fig-3]: Age and sex distribution in patients with goitre

	Age Group	Males	Females	Percentage
1	0-10	-	01	1.8%
2	11-20	-	04	7.4%
3	21-30	-	18	33.3%
4	31-40	-	14	25.9%
5	41-50	-	07	12.9%
6	51-60	-	07	12.9%
7	>60yrs	-	03	5.5%

[Table/Fig-4]: Age and sex distribution in lymphocytic thyroiditis

is an essential micronutrient with an average daily requirement at 100-150 micrograms for normal human growth and development. In this study, 135 patients out of 206 were suffering from goiter which included 22 cases of hyperplastic nodule of colloid goiter and 10 cases were associated with focal thyroiditis. Shah et al., [8] have reported global goiter prevalence more than 2 billion with more than 40 million in India. Recent population studies by Menon et al., [9] have shown that about 12% of adults have a palpable goiter. Critical research has concluded that endemic goiter is being reported from all over the country and not just from the Himalayan and Sub-Himalayan regions [10]. A study conducted by Marwah et al., [11] included about 14,762 children from all over India and found that about 23% of subjects had goiter. A significantly higher level of median urinary thiocyanate (USCN) excretion was noted in goitrous subjects (0.75 mg/dl) when compared with controls (0.64 mg/dl;  $p < 0.001$ ). The authors suggested that despite iodization, the prevalence of goiter has not dramatically declined. The thyroid autoimmunity could only partly explain the goiter and concluded that the role of goitrogens is an area that deserves further study. Das et al., [12] assessed the prevalence of goitre and the relationship of goitre with micronutrient status and thyroid autoimmunity in school children of the Union Territory of Chandigarh. They found that though autoimmune thyroid disorders is one of the cause of goitre in the post-iodization phase, several micronutrient deficiencies most notable iron and selenium have also been incriminated as the cause of goitre other than iodine. Thiocyanate has also been implicated as a goitrogen.

Along with goiter we had higher prevalence of autoimmune thyroiditis also as compared to previous epidemiological studies. Thyroiditis is a common endocrine disorder affecting about 300 million people worldwide [13]. Prevalences of up to 10% are quoted, with a higher prevalence in women than men [14]. It mostly affects women between 30-50 yrs of age [14].

In western countries a comprehensive systematic review was carried out on autoimmune thyroiditis between 1980 to 2008. They found that the incidence of hypothyroidism is 350/100 000/year in women and 80/100 000/year in men; the incidence of hyperthyroidism

is 80/100 000/year in women and 8/100 000/year in men [15]. The true prevalence and incidence in India of thyroid disorders is unknown. Fine needle aspiration biopsy among female goitrous students has revealed a prevalence of 7.5% [16]. Various studies have suggested that about 16.7% of adult subjects have anti-thyroid peroxidase (TPO) antibodies and about 12.1% have anti-thyroglobulin (TG) antibodies [9]. Thyroid autoimmunity is familial and is influenced by a combination of genetic, environmental and constitutional factors. Studies have shown an association between HLA class 2 molecules DR3, DR4 and DR5 and the incidence of Hashimoto's thyroiditis. However, the data are as yet inconclusive [14]. Environmental factors include iodine intake, infection and stress. Recent studies have shown that the incidence of AITD is proportional to dietary iodine content. In Europe the prevalence of Graves Disease has increased with national iodine intake programs. Iodine increases the antigenicity of Thyroglobulin with exacerbation of experimental thyroiditis in animals [17]. Recent in vitro studies in NOD. H2h4 mouse have shown that high iodine doses alone may damage thyrocytes and enhances the disease progression in a dose-dependent manner [18]. It seems counter intuitive that more iodine would lead to more thyroid hormone production. Recently, Teng W et al., have found that too much iodine leads to an influx of lymphocytes, for some reason, and an increased incidence of self attack on the thyroid [19].

The female preponderance of thyroid autoimmunity is most likely due to the influence of sex steroids. Estrogen use is associated with a lower risk, and pregnancy with a higher risk for developing hyperthyroidism [18]. In our study, we found that 54 (26.2%) cases were suffering from autoimmune thyroiditis but the cause of increased prevalence is not known whether it is due to iodine, environmental or stress.

Neoplasm was less common in this area. We had a total 10 cases. Only one case of papillary carcinoma was reported in 22-year-old female patient. Out of six cases of follicular neoplasm only two cases were operated in our hospital. On histopathological correlation both the cases were of follicular adenoma. The nationwide relative frequency of thyroid cancer among all the cancer cases was 0.1%-0.2% [20]. Different studies from India have shown a predominance of papillary malignancy followed by follicular malignancies. We had very few neoplastic lesions in our study. This may be because such cases are generally referred to tertiary centers and our college has been recently opened.

To summarise, in this study there is high prevalence of goiter among all thyroid disorders despite adequate levels of iodine provided through salt iodination programs. Various previous surveys show that iodine intake in this rural population is adequate. It is therefore necessary to assess whether this is the effect of goitrogens in this

region or it is the role of thyroid autoimmunity because of increased salt intake.

## CONCLUSION

There is need for larger studies with adult population from across the nation to get a clearer profile of thyroid disorders in India. Other thyroid dysfunction especially autoimmune thyroid disease should be given equal importance because of its increasing prevalence.

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### PARTICULARS OF CONTRIBUTORS:

1. Associate Professor, Department of Pathology, BPS GMC, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.
2. Assistant Professor, Department of Pathology, BPSGMC, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.
3. Assistant Professor, Department of Pathology, BPSGMC, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.
4. Professor, Department of Pathology, Post graduate, Institute of Medical Sciences, Rohtak, Haryana, India.
5. Professor, Department of Pathology, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.
6. Assistant Professor, Department of Pathology, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.
7. Demonstrator, Department of Pathology, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.
8. Associate Professor, Department of Pathology, Bhagat Phool Singh Medical College for women, Khanpur Kalan, Sonapat, Haryana, India.

### NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Hemlata T Kamra,  
B-15, BPSGMC Campus, Khanpur Kalan, Sonapat, Haryana, India.  
Phone : 08221883255, E-mail : hemlatamunde@rediffmail.com

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