World Journal of Advanced Research and Reviews
eISSN: 2581-9615 CODEN (USA): WJARAI
Cross Ref DOI: 10.30574/wjarr
Journal homepage: https://wjarr.com/

(RESEARCH ARTICLE)

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Current status of thyroid disease in the population of Saharanpur

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World Journal of Advanced Research and Reviews, 2026, 30(02), 2124–2132

Publication history: Received on 13 April 2026; revised on 20 May 2026; accepted on 23 May 2026

Article DOI: https://doi.org/10.30574/wjarr.2026.30.2.1437

Abstract

The thyroid gland has one of the most important endocrine organs. The neoplasm of the thyroid gland is one of the serious public health issues confronting the modern world. The aim of present study was to assess the life time prevalence, sex analysis, agewise analysis, information available and associated morbidity profile of thyroid disease in adults of Saharanpur district of U.P. For the 250 clinic individuals aged 18-65 years, clinical examination and structured interview. Out of the 250 screened subjects 113 (45.2%) were found to be thyroid positive. Female sex was predominant 59.3%. The 31-45 age range was the hardest hit (30.1%) followed by 18-30 years (23.9%). The most common disorder was hypothyroidism and commonly associated co-morbitities were high cholesterols (30.1%), T2 DM (23.9%), dislypidimia (18.6%) and CVD (12.4%). The most disturbing facts were that 57.5% thyroid positives were unaware of their condition and the prevalence of the thyroid was slowly increasing from 18% in 2021 to 27% in 2025. The conclusions emphasize the essence of mass screening and health education programs plus giving importance on management of affiliated metabolisms.

Keywords: Thyroid disease; Hypothyroidism; Hyperthyroidism; Saharanpur; TSH; Prevalence; Comorbidities; Awareness; Iodine deficiency

1. Introduction

The thyroid gland is an endocrine and is classified based on (a) a bilateral butterfly form, which is situated in the anterior compartment of the neck. This gland is involved in producing and disposing of tri-iodothyronine (T 3) and the tri-iodothyronine (T 4) hormones, which influence a large amount of bioregulatory processes, e.g. of cardiac activity, brain growth, basal metabolic rate, thermo regulation and chemical homeostasis. (1,17).

Thyroid Disease is one of the most common endocrine diseases in the world, the second most common disease worldwide (19,30).There are three major hormones in the thyroid T3, T4 and calcitonin all of which monitor many functions and T3 and T4 are the key monitoring hormones. T3, it is the most potent thyronine, is the three-iodine active isomer of :. It is only secreted directly from the thyroid gland in, and is mainly a peripheral de-iodinating product of : in the liver, renal system and skeletal muscle where it is Mainly involved as a regulator of metabolism temperature cardiac function and brain development. T 4 is by far the predominant deiodinated hormone secreted from the thyroid (~80%) and is a prohormone of T 3, for peripheral conversion in tissues and for maintenance of tissue growth, cardiovascular and metabolic function. Thyroid Stimulating Hormone (TSH), produced in the anterior pituitary, regulates thyroid hormone synthesis via a classical negative feedback loop - rising when T3 / T4 fall and suppressing when they are elevated - and is the most sensitive clinical indicator of thyroid function (9,2,3).

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Hypothyroidsim: the abnormally low secretion of T3 and T4 the most prevalent diseases of the thyroid.Hashimoto's thyroiditis, deficiency of iodine intake, congenital defects of thyroid gland and post thyroid, are the commonest primary causes of hypothyroidism. Common signs and symptoms are fatigue, weight gain, cold insensitivity bradychardia dry skin, thin hair, irregular menses, depression and slow cognitive function if not treated it can cause cardiovascular disease or myorderscoma (7,27).

Hyperthyroidism (overproduction of thyroid hormones, may result from Graves' disease, toxic multinodular goitre, solitary toxic adenoma): weight loss palpitation tachycardia, tremor nervousness anxiety, heat intolerance; Long term Hyperthyroidism can cause atrial fibrillation osteoporosis thyrotoxicosis (8,22)

Subclinical Disorders: Hyper- and hypothyroidism that have normal or near-normal serum levels of T3/T4 but elevated or suppressed TSH levels respectively. TSH rise can mean subtle symptoms; generally these will be asymptomatic. Though they are tied to increased risks of adverse cardiometabolic events if left untreated.

Thyroid hormones influence all systems. The resulting pathology is multi-systemic, either as hyperfunction or hypofunction (4). Hypothryoidism produces a reduced basal metabolic rate which accounts for the obesity lethargy cold intolerance and hyperlipidaemia. An increased risk of atheroma formation and a decrease in heart rate are also associated (7). In hyperthyroidism the higher basal metabolic rate accounts for the anorexia and heat intolerance (7). Psychopathology results in depressed mood with physiological cognitive dysfunction in hypothyroid state, hyperactivity affecting mood, hand tremors and attention span deficits. Also hyperhidrosis and diahorrea occurs. On top of that, in pregnancy, irregular menstrual patterns, anovulation and subsequent neurodevelopmental anomalies are seen (4). Occurring in hypothyroidism they include dry skin constipation generalised alopecia and in hyperthyroidism diarhoea and hyperhidrosis.

It is estimated that 5-10% of the population worldwide has some form of thyroid disease, one of the most common of all endocrine diseases; 45% and ~12% of the global population suffer from hypothyroidism and hyperthyroidism respectively with a number of cases of subclinical state. Hormonally and autoimmunely it affects 35 times the woman vs the amount of men. Iodine deficiency is still the most common preventable cause in developing countries (Most of all South Asia), whereas autoimmune thyroid disease pre-dominates in iodine-replete (1,19,2) populations.

The occurrence of thyroid disorder in India has been reported to be approximately 10-12% of the population i.e. more than 40 million people:(13,24) 70-80%of total cases are hypothyroidism and 8-10% adults presents with subclinical hypothyroidism (13,24); Autoimmune pathology, changes in life style and nutritional deficiencies have been found to be accountable for continued thyroid dysfuntion even after the implementation of universal salt iodisationprogrammes (23). In the rural population of Saharanpur district, 8 -10% people suffer from thyroid disorder, with females mostly affected (65-70%); hypothyroidism predominantly affects both the genders and the underdiagnosis is a major concern owing to the inadequate diagnostic infrastructure and lower public knowledge (14,15).

Thyroid dysfunction has intracouple cause-effect relationships with numerous systemic diseases, with hypothyroidism causing increased LDL-cholesterol and peripheral vascular resistance, Because of this hyperlipidaemia leading to atherosclerosis and ischaemic heart disease plus hyperlipidaemia, while hyperthyroidism causes atrial fibrillation and cardiomyopathy. Hypothyroidism impairs lipid clearance So leading to dyslipidaemia, while Also decreased insulin sensitivity Same thing causes worsened glycaemc control and hyperthyroidism causes an increase in hepatic glucose output and hyperglycaemia in the diabetic population. The autoimmune overlap causes thyroid disease to be associated Also with both Type I and Type II diabetes mellitus, necessitating a common comprehensive approach to endocrine management in high burden settings such as Saharanpur (4,18,21).

Aim of the study

To assess the Magnitude, genderwise and age wise distribution, knowledge about disease, other associated disease(s) among adult population of the district Saharanpur Uttar Pradesh; to find out the main risk factors and trend over a period of time; and to suggest evidence-based intervention for early detection, mass screening and integrated metabolic management in the district.

2. Materials and Methods

2.1. Materials

This was an observational study conducted "To study the current status of thyroid disease among the population of Saharanpur" in the Department of Medicine/Endocrinology at a tertiary care Hospital in Saharanpur district of Uttar Pradesh. The study was conducted for 6 months after permission from Institutional Ethics Committee. All the subjects gave written informed consent.

2.1.1. Study Population:

18-65 years adult male and female out patient department (OPD) patients attending the hospital were included in the study.

2.1.2. Inclusion criteria

- Patients who are adults (18-65 years).
- Patients reporting with symptoms of acquired or congenital dysfunction of the thyroid.
- Patients ready to give informed consent.

2.1.3. Exclusion criteria

- Pregnant women.
- Pediatric Patients.
- Patients with documented chronic systemic disease that influences thyroid function
- Patients using thyroid medication long-term.
- Patients who have significant renal or hepatic disease.

2.2. Methods

- ·The evaluation of subjects was done as follows:
- ·Detailed Clinical History
- ·Fatigue and weakness
- ·Weight changes
- ·Cold or heat intolerance
- ·Menstrual irregularities
- ·Palpitations
- ·Depression or anxiety
- ·Family history of thyroid disease
- ·Drug history and dietary habits

2.2.1. Physical Examination:

- •Body mass index (BMI)
- •Examination of the thyroid gland- size tenderness nodules.
- •Signs of hypothyroidism or hyperthyroidism

2.2.2. Criteria for Diagnosis

Diagnosis of thyroid disease was based on:

- Clinical presentation
- Thyroid function tests (T3 T4 TSH)
- Appropriately relevant supportive investigation.

3. Results and discussion

3.1. Data of thyroid-positive individuals

A total of 250 subjects attending a multi-specialty clinic and diagnostic centre in Saharanpur were screened for thyroid diseases. Out of these 113 were found to be thyroid-positive by the test done. It was observed that 45.2 % of the group tested was found to suffer from a thyroid dysfunction, this is the conclusion drawn using this data (Fig.1)

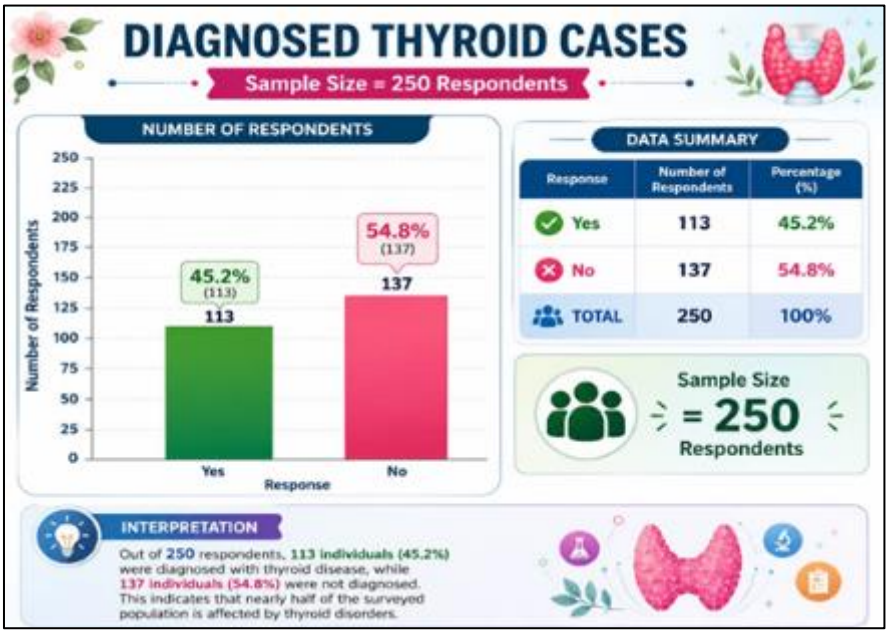

Figure 1 Thyroid diseases based on 250 interviewed in Saharanpur. Majority of People(i.e.45.2%=113) out of 250 shown in the table are affected with Thyroid disease and this may suggest the high prevalence rate of thyroid disease. It indicates the need for higher screening program and preventive health care

3.2. Prevalence of thyroid disease by gender

Within the 113 people who were thyroid-positive,67(59.3%) were females and 46 (40.7%) were males. The results show that the percentage of thyroid disease in females is higher than males,56.3%. This could be attributed to In reality thyroid disease is more common in women than men, as there are various reasons that could have led to this. Females are more affected by hormonal changes as the hormone levels alters due to pubertal changes menstruation pregnancy and menopause, further worsens the problem. Females are also more susceptible to autoimmune disorders like Grave's disease and Hashimoto"s thyroiditis, and may also be due to stress, deficiencies and other contributory lifestyle factors. The results of the survey are in accordance to the medical facts that females are more effected by thyroid disorders than males.

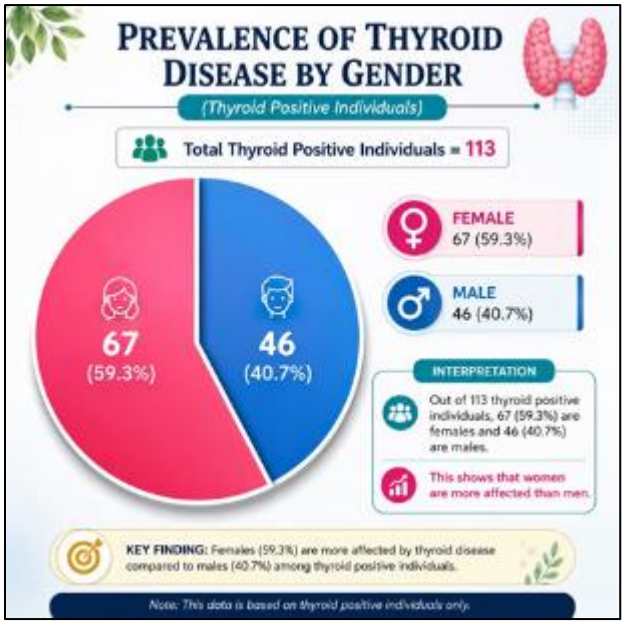

Figure 2 Among the 113 thyroid-positive individuals, females (59.3%) were more affected than males (40.7%), suggesting a higher prevalence of thyroid disease among women in the population

3.3. Age-wise Distribution

The age distribution showed that the maximum number of cases in the age group of 31- 45 years was 34(30.1%). Second maximum was in the age group of 18- 30 years with number of cases 27(23.9%). The number of cases in the age group of 46- 60 years was 21(18.6%) The cases in this 60 years age group were 14(12.4%) & in below 18 years age group was 11(9.7%). From this data Clearly the disease is more seen among youth &middle aged persons.

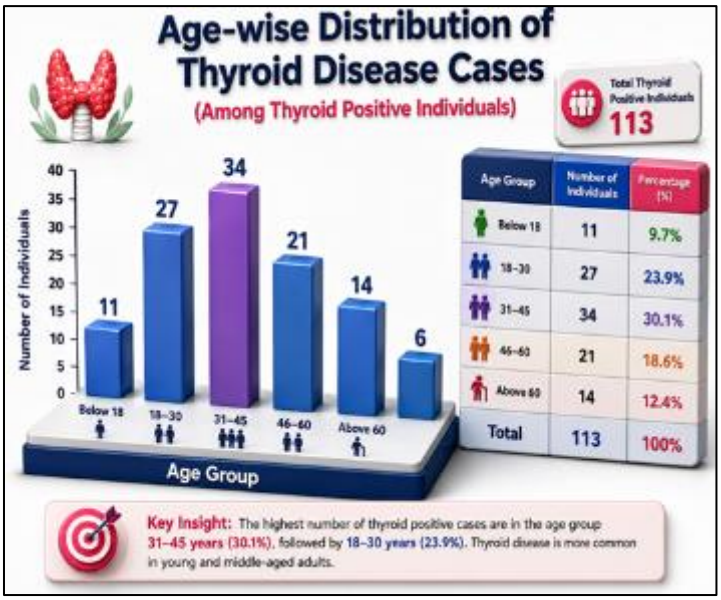

Figure 3 The highest prevalence of thyroid disease was observed in the 31–45 years age group (30.1%), followed by 18–30 years (23.9%), indicating that young and middle-aged adults are more commonly affected

3.4. Awareness About Thyroid Disease

In the 113 thyroid - positive individuals, 48 (42.5%) knew about thyroid disease while 65 (57.5%) were not aware. This way, more than half of the affected individuals lack awareness about thyroid disease, its symptoms and treatment. This lack of awareness can cause delay in diagnosis and health problems. That's why awareness programme should be

increased by conducting health checkup camps and providing proper health education to help people identify and treat thyroid disease early.

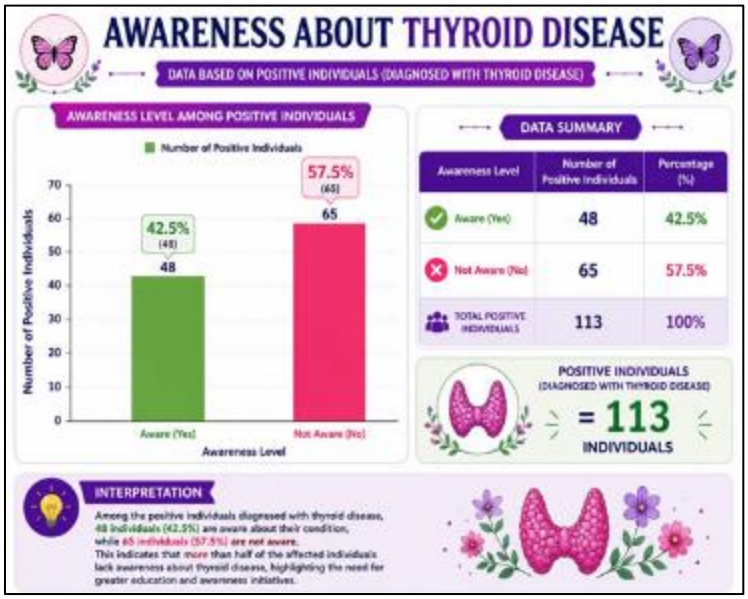

Figure 4 Out of the thyroid positive people, 57.5% didn't know they had any problems which means that the awareness was poor and that there should be more education/ awareness among people for thyroid disease.

3.5. Lifestyle and Risk Factors

And identified a number of factors that could explain the rising trend towards thyroid disease include:

- Stress and unhealthy lifestyle
- Irregular and unhealthy diet
- Hormone disorder,
- A sedentary lifestyle,
- No regular health screenings
- Genetic and environmental.

These established risk factors could really help in the development or natural history of thyroid disease.

3.6. Distribution of Thyroid Disorder with Associated Conditions

Distribution of associated disorders among 113 thyroid positive patients, with 34 individuals (30.1%) having hyper cholesterol as the most common disorder, followed by type 2 diabetes in 27 (23.9%) patients and 21 (18.6%) patients with dyslipidaemia. Cardiovascular disease was present in 14 (12.4%) patients while no associated condition was reported by 17 (15.0%) patients. The study concludes that often met or tied to thyroid disorder are its metabolic and cardiovascular complications. Regular screening, early diagnosis and management of all associated condition should be done to improve the health status of the patient..

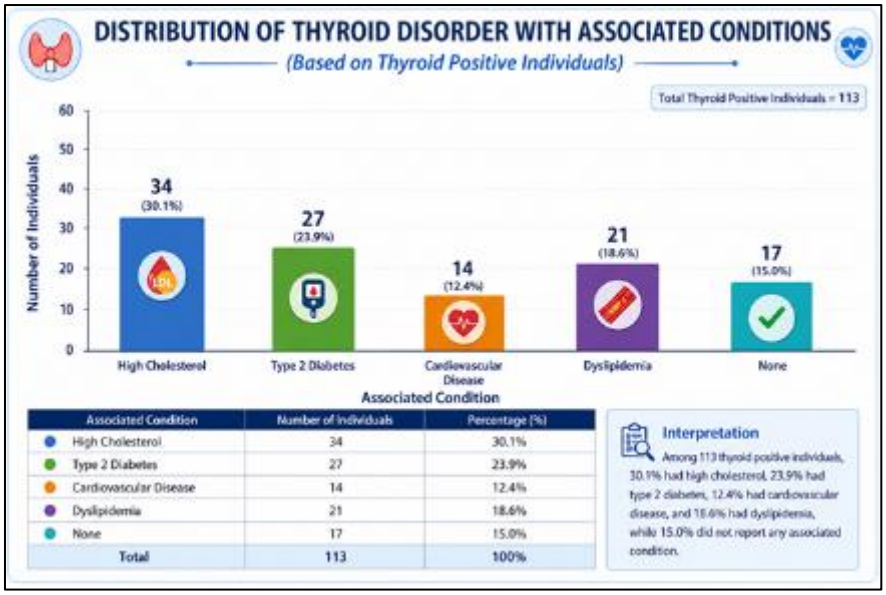

Figure 5 Among the thyroid-positive people (11.6%), the most prevalent accompanying conditions were high cholesterol (30.1%), type 2 diabetes (23.9%), and dyslipidaemia (18.6%), demonstrating a high prevalence of concurrent troubles with other metabolic health problems

3.7. Number of People with Thyroid and Cholesterol Conditions in Saharanpur (2021–2025)

The data in this study depicted that there is rise in the number of cases of Thyroid and Cholesterol in Saharanpur from 2021 to 2025; I.e in 2021, there were 18 patients (18%) with thyroid and 36 (36%)patients with cholesterol and in 2025, there were 27 (27%) patients with thyroid and 44 (44%) patients with cholesterol. The number of cases of Cholesterol is more than the number of cases of Thyroid, during study. This is a clear indication of increasing trend in lifestyle-related health disorders in population. This may be related to, increasing tendency for disturbed dietary pattern, increasing stress, physical inactivity, lack of awareness about preventive health care measure.

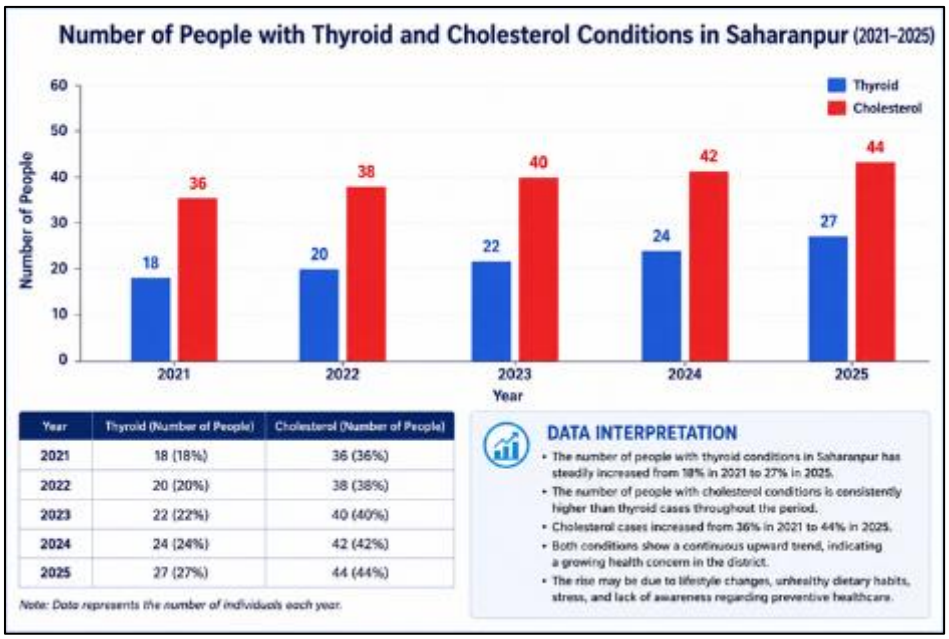

Figure 6 The graph displays an unbroken rise in the number of thyroid and Cholesterol cases over a period of 5 years (2021 to 2025) in Saharanpur. Cholesterol cases were constantly higher than thyroid, signifying an increase in metabolic health conditions in the community

3.8. Distribution of Associated Health Conditions Among Thyroid Positive and Thyroid Negative Individuals

When comparing thyroid-positive to thyroid-negative, the presence of related disorders was more prevalent among thyroid-positive individuals. The highest distribution of disorders among thyroid-positive individuals was high cholesterol (42%), healthy/other (28%), diabetes (16%) and cardiovascular disease (14%). On the contrary, in the thyroid-negative population, the highest distribution was healthy/other (54%), high cholesterol (28%), diabetes (10%) and cardiovascular disease (8%). These observations support that thyroid abnormalities are strongly linked to diseases related to metabolism and hearts. So, screening and management of thyroid diseases early would may have lesser the risk of the associated disorders.

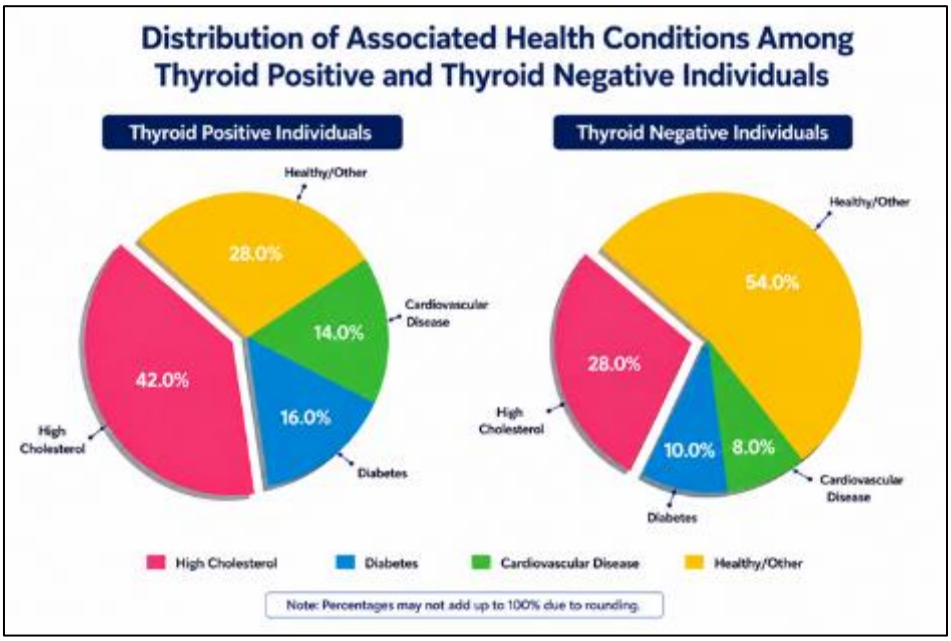

Figure 7 More co-morbidities like hypercholesterolaemia, diabetes and cardio-vascular disease in Thyroid-positive. More individuals were represented in thehealthy/othergroup for Thyroid-negative, indicating a lesser load of metabolic disease

4. Conclusion

The findings derived from the data accumulated from 250 respondents of Saharanpur demonstrated that thyroid disease could be a major health problem in general population. Data says that more than 50 % of the population are suffering from thyroid disease, and the trend seems to be in favor of females and range of young to middle aged people. The knowledge status of respondents for thyroid disease seems to be only moderate, as significant proportion of respondents are still unaware about it.It also exposes a strong link between thyroid Disorders, and the other disease like, including High Cholesterol. Overall, the results point towards need for more awareness, regular health screening and healthy lifestyle habits to combat and control thyroid diseases.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of informed consent

Informed consent was obtained from all individual participants included in the study.

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