

Incidence of Thyroid Diseases in Local Population

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ABSTRACT

Background: Thyroid diseases are considered most significant public health dilemma worldwide with global prevalence of 5%-10%. In Pakistan, the hypothyroidism and hyperthyroidism prevalence is 4.1% and 5.1%, respectively. Thyroid disorder is a common, identifiable and simply curable, but if not diagnosed or left untreated can have intense adverse effects.

Aim: To evaluate the incidence of thyroid diseases in local population of Lahore.

Study design: Cross-sectional study.

Methods: It is carried out among patients visiting Arif Memorial Teaching Hospital, Lahore. A total of 257 patients aged between 18 to 65 years with clinical features suggestive of thyroid disorders from October 2021 to November 2022 were included. Patients data were collected through questionnaire and analyzed using SPSS version 25.0.

Results: Among 257 respondents, 64.2% were females and the mean age was 41.93 ± 11.522 years. 33.9% respondents had family history of thyroid, 23.8% diagnosed with hypothyroidism, 12.8% with hyperthyroidism and 35.4% with subclinical hypothyroidism while 28% respondents were euthyroid. The association between thyroid disease and age was found statistically significant ($P=0.000$) but insignificant ($P=0.351$) between thyroid disease and gender.

Conclusion: Study concluded that incidence of thyroid diseases was 72% in study population.

Keywords: Incidence, thyroid disease, hypothyroidism, hyperthyroidism, euthyroidism.

INTRODUCTION

Thyroid diseases are considered most significant public health dilemma worldwide and ranked as 2nd most prevalent endocrine disorder¹⁻³. Global incidence of thyroid diseases is from 5% to 10%⁴. In America, 4.6% of population was identified with hypothyroidism while 1.3% with hyperthyroidism. However, these figures in the European countries were 3.05% and 0.75%, respectively⁵. In Pakistan, the hypothyroidism and hyperthyroidism prevalence is 4.1% and 5.1%, while that of subclinical hypothyroidism and subclinical hypothyroidism is 5.8% and 5.4%, respectively^{6,7}. High prevalence of hypothyroidism and hyperthyroidism is found among females compared to males and in old age group compared with the younger population^{8,9}.

The incidence of thyroid disorders differs by gender, age, race and geographically through modification in iodine intake in diet¹⁰. Almost one-third populace of world dwells in area with iodine deficiency and it is described that iodine deficiency is a leading cause of thyroid dysfunction, worldwide¹¹.

Iodine is an important inherent constituent thyroid hormones i.e. T3 & T4. According to WHO (World Health Organization) recommendation, daily 150µm iodine intake is required for men, non-pregnant females and non-lactating females; 250µm for both pregnant & lactating females; 90µm for 0-59 months old (pre-school) children and 120µm for 6-12 years old (school going) children¹².

The iodine fortification policy with iodine-fortified salt adoption, which presently covers almost 71% populace of world could force an alteration in TSH (thyroid stimulating hormone) reference ranges¹³.

Thyroid gland is considered the largest endocrinal gland in the human body.^[14] It is located opposite the neck, having 2 lobes that extend upward over the lower half of thyroid cartilage that controls carbohydrates metabolism, lipids and proteins. Thyroid glands exudes thyroid hormones such as T3 & T4, that are controlled by HPT (hypothalamic-pituitary-thyroid) axis. For thyroid hormones biosynthesis iodine plays an important role. The single source of thyroxine is thyroid gland, however, triiodothyronine is mostly produced from thyroxine peripheral conversion to triiodothyronine⁴.

As per gland function, thyroid diseases are classified in to hyperthyroidism & hypothyroidism that can be further categorized in primary & secondary as well. In the primary thyroid disease,

defect is found in thyroid gland itself and hyperactivity/hypoactivity of gland, whereas secondary disease is caused by defect in posterior pituitary gland that exudes TSH¹⁵.

Subclinical thyroid disease was described biochemically: the subclinical hyperthyroidism takes place when concentrations of serum TSH are low/undetectable, but the concentrations of triiodothyronine (T3) and free thyroxine (T4) are found normal while subclinical hypothyroidism takes place when concentrations of serum TSH are elevated and the concentrations of serum thyroid hormone are found normal¹⁵.

Thyroid dysfunction significantly impacts health outcomes¹⁶. The thyroid dysfunction spectrum can extend from the subclinical to the overt disease which shows a condition of further acute thyroid derangements. Mostly the thyroid dysfunction has an important impact on general health and is related to severe morbidity if untreated or ignored. The hypothyroidism is linked with hypertension, dementia, cardiovascular & cerebral events and dyslipidemia, and if not treated can cause myxedema coma. The subclinical hypothyroidism is linked with cardiovascular morbidity as well as mortality while the risk is TSH dependent. The subclinical hyperthyroidism and hyperthyroidism are related to enhanced risk of heart failure, atrial fibrillation, bone loss, fractures and dementia¹⁷.

Thyroid disorder is a common, identifiable and simply curable, but if not diagnosed or left untreated can have intense adverse effects. Therefore, timely investigation, discriminating the types and management is obligatory as the eventual goal of establishing the routine screening programs is to offer correct timely treatment, prevent the complications and to reduce the morbidity as well as mortality associated with disease¹⁸. Thus, present study aimed to evaluate the incidence of thyroid diseases in local population of Lahore.

MATERIAL AND METHODS

It was a cross-sectional study carried out among patients visiting Arif Memorial Teaching Hospital, Lahore during October 2021 to November 2022. A total of 257 patients aged between 18 to 65 years with clinical features suggestive of thyroid disorders were included. The patients with ischemic heart disease, chronic kidney disease, chronic liver disease, pregnant and lactating mothers were excluded. To determine the serum levels of TSH, free T3 and free T4, blood sample were taken from all patients.

The concentration of serum free T3 and T4 were determined utilizing radio-immunoassay. A normal range for free T4 and T3 were 11-23µg/dl and 2.80-5.80µg/dl respectively. The concentration of serum TSH were measured with the

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immunoradiometric assay. Normal range for TSH level was between 0.4 to 4.0mU/l. TSH decided hypothyroidism versus hyperthyroidism as it was found elevated in hypothyroid and repressed in the hyperthyroid. While subclinical hypothyroidism was labelled as high TSH and normal free T4 and subclinical hyperthyroidism as suppressed TSH and normal free T4.

Patients data including age, gender, family history, medical condition and diagnosis of thyroid disease were collected through questionnaire. The collected data was analyzed using SPSS version 25.0. For quantitative variable mean and standard deviation were calculated and for qualitative variables frequency and percentages were calculated. Data was presented in tables and graphs for both quantitative and qualitative variables. Chi-square test was used to estimate the association of thyroid disease with age and gender. P-value ≤ 0.05 was considered significant.

The ethical approval was obtained from Institutional Review Committee of Lahore General Hospital, Lahore.

RESULTS

Table-1 describes that among 257 respondents, 47(18.3%) were 18-30 years old, 61(23.7%) were 31-30 years old and 96(37.4%) were 41-50 years old while 53(20.6%) respondents were 51-65 years old. The mean age of the respondents was 41.93 ± 11.522 years. Table-2 indicates that among 257 respondents, 92 (35.8%) were males and 165 (64.2%) were females. Table-3 exhibits that 87(33.9%) respondents had family history of thyroid while majority 170 (66.1%) had no such history. Table-4 highlights that among 257 respondents, 31 (12.1%) were pregnant, 46 (17.9%) had diabetes, 37 (14.4%) had hypertension and 143 (55.6%) had no medical condition. Table-5 depicts that among 257 respondents, 61 (23.8%) were diagnosed with hypothyroidism, 33 (12.8%) with hyperthyroidism and 91 (35.4%) with subclinical hypothyroidism while 72 (28.0%) respondents were found with normal thyroid function (euthyroidism).

Table-6 demonstrates that among 108 respondents who were 18-40 years old, 94 (36.6%) had thyroid disease while 14 (5.4%) had no thyroid disease. Among 149 respondents, who were 41-65 years old, 91 (35.4%) had thyroid disease while 58 (5.4%) had no thyroid disease. The result was found statistically significant (P=0.000).

Table-7 asserts that among 92 respondents who were male, 61 (23.7%) had thyroid disease while 31 (12.1%) had no thyroid disease. Among 165 respondents who were female, 124 (48.2%) had thyroid disease while 41 (16.0%) had no thyroid disease. The result was found statistically insignificant (P=0.351).

Table-1: Frequency distribution of respondents according to age

Age	Frequency	%age
18-30 years	47	18.3
31-40 years	61	23.7
41-50 years	96	37.4
51-65 years	53	20.6
Total	257	100.0
Mean \pm SD	41.93 ± 11.522	

Table-2: Frequency distribution of respondents according to gender

Gender	Frequency	%age
Male	92	35.8
Female	165	64.2
Total	257	100.0

Table-3: Frequency distribution of respondents according to family history

Family history	Frequency	%age
Yes	87	33.9
No	170	66.1
Total	257	100.0

Table-4: Frequency distribution of respondents according to medical conditions

Medical conditions	Frequency	%age
Pregnancy	31	12.1
Diabetes	46	17.9
HTN	37	14.4
No medical condition	143	55.6
Total	257	100.0

Table-5: Frequency distribution of respondents according to diagnosis of thyroid disease

Diagnosis	Frequency	%age
Hypothyroidism	61	23.8
Hyperthyroidism	33	12.8
Subclinical hypothyroidism	91	35.4
Euthyroidism	72	28.0
Total	257	100.0

Table-6: Association between age and thyroid diseases

Age	Thyroid Disease				Total
	Yes		No		
	Freq.	%age	Freq.	%age	
18-40 yrs	94	36.6	14	5.4	108
41-65 yrs	91	35.4	58	22.6	149
Total	185	72.0	72	27.0	257

P-value = 0.000

Table-7: Association between gender and thyroid diseases

Gender	Thyroid Disease				Total
	Yes		No		
	Freq.	%age	Freq.	%age	
Male	61	23.7	31	12.1	92
Females	124	48.2	41	16.0	165
Total	185	71.9	72	28.1	257

P-value = 0.351

DISCUSSION

Thyroid diseases are considered most significant public health dilemma worldwide. Present study was carried out to assess the incidence of thyroid diseases among local population of Lahore. To acquire appropriate outcomes, total 257 patients were included in the study and found that most of the patients were more than 30 years old and the mean age was 41.93 ± 11.522 years indicating that disease was prevalent among elderly population. The findings of our study are comparable with a study undertaken by Ullah and teammates (2022) who reported that mean age of the patients was 40.82 ± 13.77 years.^[4] However, a study done by Naz and fellows (2017) confirmed that mean age of the patients was 33.67 ± 13.03 years.⁹

An elevated prevalence of thyroid diseases is observed among females than males. It was found during study that mainstream of patients (64.2%) were of females while 35.8% were males. Almost comparable results were reported by a study performed by Toyib and comrades (2019) who stated that majority of the patients (88.7%) were females^{18]} A similar scenario was also reported by a study carried out by Ullah and teammates (2022) who asserted that most of the patients were females (87.9%)⁴.

As far as family history is concerned, study disclosed that only 33.9% patients had family history of thyroid while majority (66.1%) had no such history. The results of our study exhibited better situation than the study conducted by Bukhari and companions (20222) who elucidated that significant majority (95.3%) of patients had family history of thyroid³.

During study comorbidities were also assessed among patients. Study indicated that 17.9% had diabetes followed by hypertension (14.4%) and pregnancy (12.1%) while remaining proportion (55.6%) had no medical condition. A study carried out by Hassan-Kadle and coworkers (2021) indicated that 13.4% patients had diabetes mellitus, followed by, HIV (10.4%), malaria (4.9%) and HIV & malaria (4.5%)².

The findings of our study highlighted that 28.0% patients were euthyroid while 23.8%, 12.8% and 35.4% had hypothyroidism, hyperthyroidism and subclinical hypothyroidism, respectively. But the results of a Pakistani study conducted by Nafisa and associates (2021) are better than our study results who confirmed that 68.3% patients were euthyroid while 12%, 7%, 6.7% and 5.9% patients had had subclinical hyperthyroidism, subclinical hypothyroidism, overt hyperthyroidism and overt hypothyroidism, respectively¹. In an Indian study, Lakshminarayana and collaborators (2016) reported that 84.31% patients were euthyroid while 1.6%, 7.15%, 2.77% and 4.17% patients had subclinical hyperthyroidism, subclinical hypothyroidism, hyperthyroidism and hypothyroidism, respectively¹⁹. A study performed in Bangladesh by Kamrul-Hasan and partners (2020) highlighted that thyroid dysfunction prevalence was 17% (11% subclinical and 5.2% overt hypothyroidism while 0.4% subclinical and 0.4% overt hyperthyroidism)²⁰. Another study performed in China by Huang and colleagues (2020) confirmed that overall thyroid diseases prevalence among population was only 8.81% (overt hyperthyroidism 0.38%, subclinical hyperthyroidism 1.86%, overt hypothyroidism 0.70% and subclinical hypothyroidism 5.87%)²¹.

When the association of thyroid diseases with age and gender the evaluated, significant result ($P=0.000$) was found regarding age but insignificant result ($P=0.351$) regarding gender. A study carried Nafisa and associates (2021) also showed significant association ($P=0.001$) between age and thyroid diseases.^[1] In our study an insignificant association was seen between gender and thyroid diseases but study done by Alqahtani (2021) showed significant association between gender and thyroid diseases ($P<0.05$)¹⁶. Findings of a study done by Nafisa and associates (2021) also confirmed significant association between gender and thyroid diseases ($P=0.027$)¹.

CONCLUSION

Study concluded that incidence of thyroid diseases in study population was 72%. Further studies are required to be conducted on large scale to know the incidence of thyroid disease in population.

Conflict of interest: Nil

REFERENCES

- Nafisa A, Ikram N, Khursheed S, Anjum R, Akhtar N. Epidemiologic profile of thyroid disorders in a tertiary care hospital, a five years analysis. *J Rawal Med Coll.* 2021; 25(4): 466-71.
- Hassan-Kadle MA, Adani AA, Eker HH, Keles E, Osman MM, Ahmed HM, et al. Spectrum and prevalence of thyroid diseases at a tertiary referral hospital in Mogadishu, Somalia: a retrospective study of 976 cases. *Int J Endocrinol.* 2021; 2021: 7.
- Bukhari SI, Ali G, Memom MY, Sandeelo N, Alvi H, Talib A, et al. Prevalence and predictors of thyroid dysfunction amongst patients with type 2 diabetes mellitus in Pakistan. *J Family Med Prim Care.* 2022; 11: 2739-43.
- Ullah F, Ali SS, Tahir H. Clinical spectrum of thyroid disorders; an experience at a tertiary care hospital in Peshawar. *Pak J Med Res.* 2022; 61(2): 56-62.
- Bukhari SI, Ali G, Memom MY, Sandeelo N, Alvi H, Talib A, et al. Prevalence and predictors of thyroid dysfunction amongst patients with type 2 diabetes mellitus in Pakistan. *J Family Med Prim Care.* 2022; 11: 2739-43.
- Qureshi IS, Khalid S, Jabeen S, Waseem H, Tariq M, Khan R. Frequency of different thyroid disorders among females attending Sir Ganga Ram Hospital, Lahore. *AJAHS.* 2019; 4(4): 20-8.
- Iqbal MA, Naseem Z, Qureshy A, Shahid A, Roohi N. Prevalence and manifestations of thyroidal dysfunction in Central Punjab Pakistan (a case study). *Sci Int (Lahore).* 2016; 28(4): 3959-63.
- Shah N, Ursani TJ, Shah NA, Raza HMZ. Prevalence and manifestations of hypothyroidism among population of Hyderabad, Sindh, Pakistan. *Pure Appl Biol.* 2021; 10(3): 668-75.
- Naz N, Rizvi SK, Sadiq S. Assessment of thyroid hormone levels and thyroid disorders: A case study from Gujranwala, Pakistan. *Pak J Pharm Sci.* 2017; 30(4): 1245-9.
- Diab N, Daya NR, Juraschek SP, Martin SS, McEvoy JW, Schulthei UT, et al. Prevalence and risk factors of thyroid dysfunction in older adults in the community. *Sci Rep.* 2019; 9: 13156.
- Sharma P, Magar NT, Mahesh BK. Prevalence of thyroid disorder in residents of western region of Nepal. *Int J Appl Sci Biotechnol.* 2021; 9(3): 169-75.
- Ahmad M, Iqbal S, Ahmad N, Khan IM. Thyroid dysfunction in the patients visiting tertiary health care hospital. *Int J Med Sci Public Health.* 2016; 5: 2143-5.
- Kocelak P, Mossakowska M, Puzianowska-Kuźnicka M, Sworczak K, Wyszomirski A, Handzlik G, et al. Prevalence and risk factors of untreated thyroid dysfunctions in the older Caucasian adults: results of PolSenior 2 survey. *PLoS ONE.* 2022; 17(8): e0272045.
- Alyahya A, Alnaim A, Albahr AW, Almansour F, Elshebiny A. Knowledge of thyroid disease manifestations and risk factors among residents of the eastern province, Saudi Arabia. *Cureus.* 2021; 13(1): e13035.
- Hasanato R, Mirah JA, Al-Shahrani N, Alfalayyih N, Almutairi A, Ogailan B, et al. Incidence of thyroid diseases in female Saudi adults visiting a tertiary care hospital in Riyadh. *Epidemiology (Sunnyvale).* 2017; 7: 1.
- Alqahtani SAM. Prevalence and characteristics of thyroid abnormalities and its association with anemia in ASIR Region of Saudi Arabia: a cross-sectional study. *Clin Pract.* 2021; 11: 494-504.
- Ajlouni KM, Khawaja N, EL-Khateeb M, Batiha A, Farahid O. The prevalence of thyroid dysfunction in Jordan: a national population-based survey. *BMC Endocr Disord.* 2022; 22: 253
- Toyib S, Kabeta T, Dendir G, Bariso M, Reta W. Prevalence, clinical presentation and patterns of thyroid disorders among anterior neck mass patients visiting Jimma Medical Center, Southwest Ethiopia. *Biomed J Sci Tech Res.* 2019; 18(2): 13431-5.
- Lakshminarayana Gopaliah R, Sheetal Lakshminarayana G, Nidhish P, Sadanandan, Pramod M. Prevalence of thyroid dysfunction: experience of a tertiary care centre in Kerala. *Int J Med Res Rev.* 2016; 4(1): 12-8.
- Kamrul-Hasan AB, Aalpona FT, Mustari M, Akter F, Chanda PK, Rahman MM, et al. Prevalence of thyroid dysfunction and thyroid autoimmunity in polycystic ovary syndrome: a multicenter study from Bangladesh. *Thyroid Res Pract.* 2020; 17: 76-81.
- Huang X, Zhang X, Zhou X, Han X, Fu Z, Li Y, et al. Prevalence of thyroid dysfunction in a Chinese population with different glucose intolerance status: a community-based cross-sectional study. *Diabetes Metab Syndr Obes Targets Ther.* 2020; 13: 4361-8.