



Thyroid Dysfunction and Prevalence of both clinical and subclinical form of Hyperthyroidism and Hypothyroidism in District Mardan, KPK, Pakistan

Zia Alam¹, Mubassir Shah¹, Mudassir Khan², Waqar Ali¹, Amir Shehzad¹, Jawad Ali Shah³, Hajra Shahana⁴, Aziz Ahmad⁵, Fazal Jalil¹

¹Department of Biotechnology Abdul Wali Khan University Mardan, KPK, Pakistan

²Atta Ur Rahman School of Applied Biosciences, NUST Islamabad, Pakistan

³Department of Plant Breeding and Genetics, University of Agriculture Peshawar, Pakistan

⁴Women University of Swabi Pakistan

⁵Medical Lab Technology Faculty of Peshawar, KPK, Pakistan

*Corresponding Author: fazaljalil@awkum.edu.pk

ABSTRACT

Thyroid issue has been accounted for more than 110 nations around world. This study was aimed to determine the ratio of clinical and subclinical forms of hyperthyroidism and hypothyroidism in district Mardan KPK, Pakistan. The study was conducted in Mardan from June 2018 to May 2019. Blood Samples (5ml) from 686 individuals were collected in vacutainer tubes and were shifted to Aziz biotech medical laboratory. Blood was centrifuged at 3000rpm to isolate serum for biochemical analysis. The qualitative measurement of TSH, T3, and T4 was done through chemiluminescence Immunoassay (CLIA) using Acculite CLIA Micro-wells using standard protocol of TSH, T3 and T4 kits (CLIA kit, AutoBio Diagnostics LTD, China). Out of the total 686 subjects [Females 494 (72.02%) and Males 192 (27.98%)], 142 individuals [109 (22.06%) females and 33 (17.18%) males] were found to be positive for both clinical and subclinical form of hyperthyroidism and hypothyroidism. The subclinical form of Hyperthyroidism and hypothyroidism was found to have higher ratio that is 36 (5.24%) and 40 (5.83%), respectively. Furthermore, both the clinical and subclinical form of hyperthyroidism and hypothyroidism were found to have almost similar ratio in the affected individuals of current study. In Mardan thyroid dysfunction are more typical in females when contrasted with males. The most reasonable justification could be iodine insufficiency. To take-over this disease early diagnosis and treatment should be done as ahead of schedule as possible.

Key words: Hyperthyroidism, Subclinical Hyperthyroidism, Hypothyroidism, Subclinical Hypothyroidism, Thyroid dysfunction, Mardan KPK.

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INTRODUCTION

Thyroid issues have been accounted for in more than 110 nations of the world with 1.6 billion individuals in risk because of lack of some iodine supplements. A large portion of these are developing nations, Africa, Asia and Latin America. In Pakistan around 20 million individuals lives in iodine lacking territories, in which 8 million individuals demonstrates some type of iodine inadequacy and somewhere around 1 million have mental disability [1]. Imbalance functions of Thyroid or thyroid gland enlargement can influence thyroid disorders, in which majors are under or over secretion of its hormones, mainly in both cases individuals suffer with thyroid disorders which is differentiated by different signs and symptoms [2]. Thyroid glands have common diseases like endocrine diseases in which some endocrine glands respond to metabolic glands directly while rest are respondent pituitary gland hormones [3]. The Pathophysiology of numerous thyroid ailments identified with TSH, T3 and T4. TSH is the prime chemical marker of thyroid function while many thyroid diseases are related to T3, T4 and TSH. Hyperthyroidism is the aftereffect of low TSH profile while high esteem prompts hypothyroidism[4]. Serum TSH is brought up in primary hypothyroidism in which T3 and T4 are low yet in mild hypothyroidism T4 might be

ordinary however TSH will be raised[5]. TSH is suppressed in hyperthyroidism while T3 and T4 are raised because of negative feedback mechanism[6].

In Pakistan the incidence of hypothyroidism leads over hyperthyroidism[7]. The hoisted level of flowing thyroid hormones in body is because of two reasons one is endogenous and the other is exogenous. The endogenous reasons of hyperthyroidism are the variations from the norm created inside the thyroid organ like autoimmunity against the thyroid cells that animates the over emission of thyroid hormones grave's diseases and certain sort of adenoma in the thyroid organs are the case of endogenous reasons. The exogenous explanation behind hyperthyroidism incorporates ingestion of unreasonable measure of thyroid hormones and intake of extreme measure of iodine [2]. Usually hyperthyroidism is term as thyrotoxicosis, however all hyperthyroidism may not speak to thyrotoxicosis. It is the most widely recognized endocrine disease of middle age. In hyperthyroidism whole, thyroid organ is hyper-plastic and is increment 2-3 time then ordinary size, every cell increments its rate of emission of hormones by 5-15 times more than the typical discharge low or right around zero serum TSH fixation has been watched [8], [9]. In 50 to 80% cases hyperthyroidism is caused by Graves's disease, harmful multi-nodular goiter and lethal adenoma. At times sub intense Thyroiditis is likewise in charge of hyperthyroidism[10]. After grave's disease the real reason for hyperthyroidism is harmful multi-nodular goiter, which has for the most part been analyzed in develop and matured patients. Around 5% of patients with hyperthyroidism have harmful thyroid adenoma caused by inordinate release of thyroid hormones [11]. Subclinical hyperthyroidism is a milder type of hyperthyroidism described by low or imperceptible serum TSH level, but with a typical serum free thyroxin level[12]. Hypothyroidism is atypical metabolic issue in the all-inclusive community. Like hyperthyroidism, the low level of thyroid hormones in hypothyroidism is additionally because of endogenous and exogenous reasons. The endogenous reason is again autoimmunity created against the thyroid organ, yet for this situation decimation of organ happens as opposed to incitement. Hashimoto sickness is the case of hypothyroidism because of endogenous reasons. The exogenous reason of hypothyroidism is the low intake of iodine. The endemic goiter is a case of hypothyroidism because of exogenous reasons [9]. It is portrayed by lessened digestion, impended development and improvement, disability mental action and swelling of specific parts of the skin. It is an ailment caused by absence of iodine in drinking water [13], [26]. Hypothyroidism is a clinical condition because of inadequacy of thyroid hormones and increment level of TSH[14].

There is very limited knowledge about thyroid abnormalities and its burden raises day by day in the studied area, we aimed to highlight the predominance ratio and its risk factors of both clinical and subclinical form of hyperthyroidism and hypothyroidism in district Mardan, KP Pakistan.

MATERIAL AND METHODS

A total of 686 blood samples were collected in District Mardan (hospitals and clinical laboratories) from June 2018 to May 2019. 5cc of blood was taken in Vacutainer tube and serum was isolated by centrifugation at 3000 rpm for 3 minutes to get serum from each blood sample. Further analysis at Aziz biotech medical laboratory and Research Center Mardan Pakistan. A questionnaire was filled to collect medical/clinical information from all the individuals. All hormones (TSH, T3 and T4) were qualitatively estimated by chemiluminescence immunoassay (CLIA) using acculite CLIA Micro Wells Using standard protocol of TSH, T4 and T3 kits (CLIA kit, AutoBio Diagnostics Co LTD, China). Serum was incubated for one hour with enzyme and conjugate and was washed 5 times using solutions of TSH, T3 and T4 respectively. Mixture of substrates A and B were added after washing and run on machine, and the result was noted. An informed consent was signed from each participant and the study was approved by ASRB Abdul Wali Khan University Mardan Pakistan.

RESULTS

Out of the total 686 subjects 192 (27.98%) were males and 494 (72.02%) were females. The overall ratio of affected individuals was 142 (20.69%) including 109 (22.06%) females and 33 (17.18%) males. The ratio of hyperthyroidism was found 32 (4.67%) in total sample set having 26 (5.26%) females and 6 (3.12%) males. Whereas 34 (4.94%) individuals had hypothyroidism including 25 (5.06%) females and 9 (4.68%) males. On the other hand, subclinical form of both hyperthyroidism and hypothyroidism was found higher in ratio that is 36 (5.24%) and 40 (5.83%) respectively. The prevalence rate of subclinical form of both hyperthyroidism and hypothyroidism among female individuals was 28 (5.66%) and 30 (6.07%) respectively. Similarly, the prevalence rate of subclinical form of both hyperthyroidism and hypothyroidism among male individuals was 8 (4.16%) and 10 (5.20%) (Table 1, Figure 1).

Both the clinical and subclinical form of Hyperthyroidism and Hypothyroidism were found to have almost similar ratio in the infected individuals of current study as shown in the figure 2.

Table 1. gender wise distribution of clinical and subclinical form of hyperthyroidism and hypothyroidism.

Gender	Total= n (%)	Hyperthyroidism = n (%)	Subclinical hyperthyroidism = n (%)	Hypothyroidism = n (%)	Subclinical hypothyroidism = n (%)	Total abnormal = n (%)
Females	494 (72.02%)	26 (5.26%)	28 (5.66%)	25(5.06%)	30 (6.07%)	109 (22.06%)
Males	192 (27.98%)	6 (3.12%)	8 (4.16%)	9 (4.68%)	10 (5.20%)	33 (17.18%)
Total individuals	686 (100%)	32 (4.67%)	36 (5.24%)	34 (4.94%)	40 (5.83%)	142 (20.69%)

Figure 1. Gender wise distribution of clinical and subclinical form of hyperthyroidism and hypothyroidism.

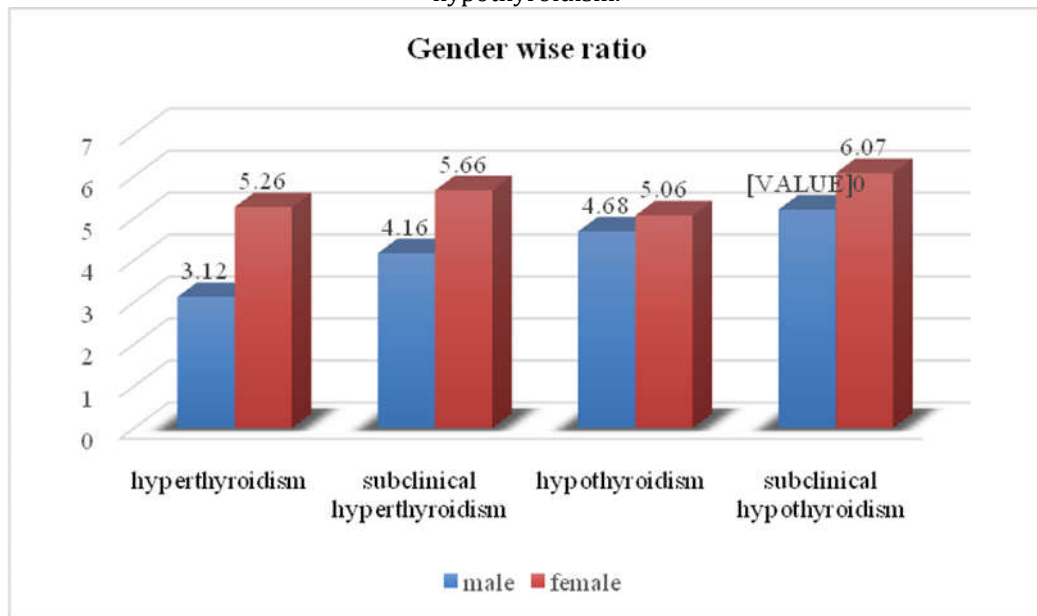


Figure 2. Comparison of both clinical and subclinical form of hyperthyroidism and hypothyroidism.

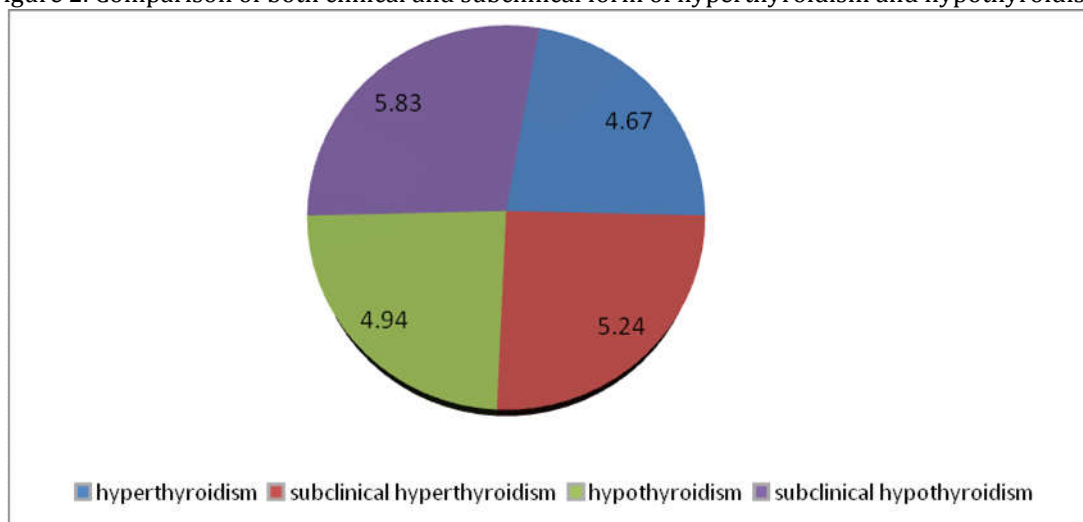


Table 2. Age wise distribution of clinical and subclinical form of hyperthyroidism and hypothyroidism.

Age limit (Years)	Clinical hyperthyroidism	Subclinical hyperthyroidism	Clinical hypothyroidism	Subclinical hypothyroidism
Below 15	0 (0%)	2 (0.29%)	2 (0.29%)	4 (0.58%)
16 to 30	14 (2.04%)	12 (1.75%)	12 (1.75%)	12 (1.75%)
31 to 45	10 (1.46%)	8 (1.16%)	10 (1.46%)	12 (1.75%)
46 to 60	6 (0.87%)	10 (1.46%)	6 (0.87%)	6 (0.87%)
Above 60	2 (0.29%)	4 (0.58%)	4 (0.58%)	6 (0.87%)

Table 2 shows the age wise distribution of both clinical and subclinical form of hyperthyroidism and hypothyroidism. The highest number of subjects found between the age limit 15 to 45 years among different age groups. the highest number of hyperthyroidism were found between age limit 16-30 years (2.04%) followed by age limit 31-45 (1.46%) and there were no cases found below 15 years while the numbers of subclinical hyperthyroidism were greater between the age limit 16-30 (1.75%) followed by age limit 46-60 (1.46%).The number of hypothyroidism observed in age limit 15-30 (1.75%) were greater followed by age limit 31-45 (1.46%) and age limit 46-60 (0.8%) respectively. the subclinical hypothyroidism was found greater between age limit 16-45 years (1.75%) followed by age limit 46-60 and above 60 years (0.87%) respectively. in all age groups high prevalence of hypothyroidism and subclinical hypothyroidism were observed.

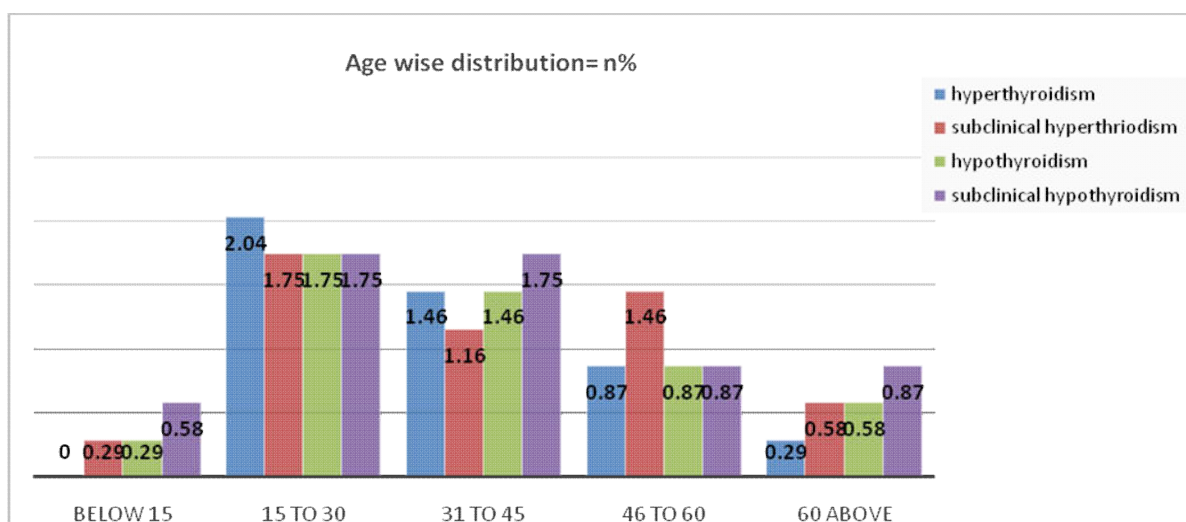


Figure 3. Age wise distribution of both clinical and subclinical form of hyperthyroidism and hypothyroidism in the studied populace.

Table 3. Representation of various dysfunction levels by Comparing thyroid hormones levels.

Thyroid hormones	Normal Mean ±SD	Hyperthyroidism Mean±SD	Subclinical Hyperthyroidism Mean ±SD	Hypothyroidism Mean ±SD	Subclinical hypothyroidism Mean ±SD
fT3 (ng/ml)	1.35 ±0.6	6.5±4.5	1.5±0.5	0.4 ±0.3	1.3 ±0.5
fT4 (µg/dl)	7.5 ±3.5	16.0 ±5.0	8.0 ±3.0	3.0 ±1.0	6.0 ±1.5
TSH (µIU/ml)	2.3 ±2.0	0.14±0.15	0.14±0.15	6.5 ±1.5	7.0 ±1.5

STATISTICAL ANALYSIS

The data were analyzed and tabulated by using statistical package SPSS version 10.0 (SPSS Inc. Armonk, New York, USA) and Microsoft Excel Version 2016. Than the calculation was done for ratio results and percentages.

DISCUSSION

Hyperthyroidism is that condition in which the thyroid glands produce excessive amount of thyroid hormones. In the literature view we found that hyperthyroidism influences around 1.2% of the peoples in the United States[15].In Pakistan the ubiquity of hyperthyroidism isn't be common condition. But still

mostly cases of hyperthyroidism have been previously reported in patients having thyroid problems. According to Akhter et al study the prevalence rate of hyperthyroidism was reported 5.1% and sub-clinical hyperthyroidism was 5.8% in Pakistan[16]. According to our report we clarified that the prevalence rate of hyperthyroidism was 4.67% and subclinical hyperthyroidism was 5.24% at Mardan region. On the other hand, we also reported that in female individuals the prevalence rate of hyperthyroidism was 5.26% and subclinical hyperthyroidism was 5.66% while in males were 3.12% and 4.16%. This result shows that the prevalence of hyperthyroidism and subclinical hyperthyroidism in female were relatively higher than males. According to this study the prevalence rate of hyperthyroidism and subclinical hyperthyroidism were little bit reduced from previously reported study. This shows that most of peoples is aware from this disease as compare to past. Most of research works bring little awareness in peoples of Pakistan about risk factors of thyroid dysfunction. But most of peoples are still not aware. The high number of subjects were found between age limit 15-45 years among different age groups. The prevalence of hyperthyroidism was found in Nepal were reported in the age limit 15 to 30 years were (1.45%) and age limit 31-45 were (0.8%)[17]. We reported that Hyperthyroidism were observed greater between the age limit 16-30 years (2.04%) followed by age limit 31-45 years (1.46%) and age limit below 15 years there were no cases observed. while higher numbers of subclinical hyperthyroidism were found in age limit 16-30 years were (1.75%) followed by age limit 46-60 years (1.46%). the highest prevalence of hypothyroidism was observed in the age limit 15-30 (1.75%) followed by age limit 31-45 (1.46%) while the prevalence of subclinical hypothyroidism was greater between age limit 16-45 years which were (1.75%). In all the age groups the higher prevalence of hypothyroidism and subclinical hypothyroidism were observed. In comparison with study reported in Nepal the prevalence is relatively high in the age group 15-45 years compared with other age groups.

Hypothyroidism is that condition in which thyroid hormones is produce in very less amount by the thyroid glands[2]. The prevalence rate of hypothyroidism and hyperthyroidism vary in different countries. The prevalence rate of hypothyroidism in India was previously reported 11%. Another study showed the prevalence rate of hypothyroidism in UK was only 2% compared with 4.6% in USA[18]. The investigation led in Libya detailed that predominance of hypothyroidism was 6.18% and subclinical hypothyroidism was 2.3% [19], [20]. One of the other study demonstrated that the prevalence rate of hypothyroidism in Saudi Arabia were reported 47.34%[21], showing that the commonness in Saudi Arabia is substantially higher compared with the prevalence rate of hypothyroidism reported in Scotland of 0.13% respectively[22]. As in Pakistan the prevalence rate of hypothyroidism was 4.1% and subclinical hypothyroidism was 5.4% previously reported by Akhter[16]. Our data reveals that the prevalence rate of hypothyroidism and subclinical hypothyroidism in females are 5.06% and 6.07% at Mardan region while the prevalence rate of hypothyroidism and subclinical hypothyroidism in males are 4.68% and 5.20%. So here we find that the prevalence rate of hypothyroidism and subclinical hypothyroidism is frequently higher in female individuals as compared with male individuals. Similarly, the prevalence rate of hyperthyroidism and subclinical hyperthyroidism is higher in female individuals as compared with male individuals.

The prevalence rate of hypothyroidism is slightly higher than that of hyperthyroidism. Our data reveals higher prevalence of hyperthyroidism and hypothyroidism as compared to previously reported by Shahnaz and BIBI Safia about 2.33% and 3% in Mardan[23]. As per the above outcomes the incidence of hyperthyroidism and hypothyroidism in Mardan is clear. The main reason is being more prominent populace in Mardan and accessibility of medical and research laboratory facilities. This investigation demonstrates the recurrence of patients having issues of thyroid problems in correlation with their territory. The only way to prevent iodine deficiency disorder is iodine supplementation. The iodine must be supplied in diet regularly because it cannot be stored for long period of time in the body. The iodization of salts is the most widely recognized, long haul technique for iodine supplementation [24]. Due to hazardous impacts of iodine inadequacy the legislature of Pakistan is endeavoring to take out IDD through general salt iodization. Amid pregnancy the thyroid organ must deliver half more thyroid hormones to give enough thyroid hormones to the improvement of fetus and the eager of mother[25]. So, when sufficient amount of thyroid hormones is not produced the case is led to hypothyroidism which may cause miscarriage or pregnancy loss. Still now most of peoples are unaware about thyroid abnormalities in studied area thus the knowledge and awareness are needed to the populace of Mardan to minimize the disease.

CONCLUSION

Mardan is the second big city of KPK, Pakistan. In Mardan thyroid dysfunction are more typical in females when contrasted with males. The most reasonable justification could be iodine insufficiency. Another

significant conclusion is that the most common thyroid problems are the menstrual abnormalities, lactation and pregnancy in the females of reproductive age. As we found that the prevalence of hyperthyroidism and hypothyroidism is high in females of reproductive age. So, we concluded that menstrual abnormality is also one of the main Reasons of hypothyroidism and hyperthyroidism. In pregnant and breastfeeding women, the basal metabolic rate is raised in the light of fact that the body necessity increments than the typical, prompting incitement of thyroid organ to create more hormones. Early diagnosis and treatment ought to be done as ahead of schedule as could be allowed.

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CONFLICT OF INTERESTS

The Authors claims that there's no conflict of interest related to the publication of this paper.

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