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# Relevance of thyroid dysfunction with age

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**Abstract**
This study was conducted to evaluate the relevance of thyroid dysfunction in male & female subjects of different age groups. Thyroid dysfunction was diagnosed by the chemical analysis of thyroid function tests. A Total of 600 cases during the study period i.e. November 2011 to December 2012 were registered at the Institute of Radioactive Nuclear Medicine (IRNUM) Peshawar, Pakistan**.** The selected cases were analyzed for TSH, $T_4$, and T3 by using Gamma counter. TSH in the sample is estimated by using Immuno Radiometric method (RIA). Primary data ingress was processed on MS Database version 2007. Data were checked in Epidemiological information (EPI-info), for scientific verifications. The data were finally imported in spread sheet statistical software (SPSS) version 20.0 for analysis. Patients of age group between 10-70 years were included. In this study most of the cases (30.8%) presenting with thyroid abnormalities are in the age group of 31-40 years, whereas only 0.3% were found in the age of 70 or more. Very few elderly were found having subclinical thyroid dysfunction (STD) in the age group of 41-60 and there is no evidence of the incidence of subclinical hypothyroidism (SCH-I) as well as subclinical hyperthyroidism (SCH-II) above 60 years of age. We report that on the basis of gender specification 4% of female subjects and 1% of male subjects were declared as SCH-I and SCH-II respectively. According to the results 36.6% of the total population in the age group 34-40 years were found to be having STD, out of which 10% are SCH-I and 26.6% are suffering from SCH-II. The ratio of male vs. female was 0:3(SCH-I) and 1:7 (SCH-II).

**Keywords:** Euthyroidism, Hyperthyroidism, Hypothyroidism, Sub Clinical Hypothyroidism (SCH-I), Sub Clinical Hyperthyroidism (SCH-II).

## 1. Introduction
Endocrine diseases are common, particularly those of the thyroid gland, some endocrine glands respond directly to metabolic glands; most are controlled by hormones released from the pituitary gland [1]. Secretion of the pituitary hormone is controlled in turn by substances produced in the hypothalamus and released into portal blood which drains directly down to the pituitary stalk [2]. Diseases of the thyroid are common, affecting some 5% of the population predominantly females [3]. The thyroid axis is involved in the regulation of cellular differentiation and metabolism in virtually all nucleated cells, so that disorders of thyroid function have diverse manifestations [4]. Entire endocrine system is strongly effected by the process of aging. Symptoms associated with thyroid diseases in the elderly people and normal aging are very similar. Alterations in thyroid function during aging, for thyroid diseases are challenging and some thyroid dysfunctions may contribute to lifespan extension [5].
With age many parts of the body become weak and get damage. Thyroid is not an exception. Mario Skugor, an endocrinologist with the Cleveland Clinic in Ohio says that in older adults as compared to younger ones, multi-nodular goiters, or enlarged thyroid glands with multiple nodules are much more common. In men age 80 and up will develop 60% and of women age 70 and older will develop about 90% thyroid nodules. They usually don't cause any symptoms and are typically benign but rarely may be cancerous [6].
A study in an urban US community over the age of 55 years suggests that in elderly people a significant prevalence of thyroid dysfunction occur, with important sex and racial differences. Thyroid dysfunction was found to be present in 8.9% of the population. The prevalence was greater in whites, women and older than 75 years age people as compared to 55-64 years age group [7]. In old age Subclinical thyroid dysfunction has been implicated as a risk factor for cognitive decline. But no evidence exist that subclinical hyper- or hypothyroidism contribute to cognitive impairment or decline in old age [8]. Appearance of several serum autoantibodies and thyroid autoantibodies are associated with age. But, S. Mariotti et.al suggests that thyroid autoimmune phenomena might be related to age-associated disease and thyroid autoimmune phenomena are not the consequence of the aging process itself [9].

## 2. Material and Methods

This study was conducted in the Institute of Radioactive Nuclear Medicine (IRNUM) Peshawar, Pakistan**.** A Total of 600 cases during the study period i.e. November 2011 to December 2012 were registered in this research. Blood samples and data were collected from patients attending the Institute of Radioactive Nuclear Medicine (IRNUM) Peshawar, Pakistan. A questionnaire, which incorporated information about gender, age, locality and clinical diagnosis etc were collected. Ethical clearance was obtained from Post Graduate Medical Institute, Hayatabad Medical Complex Peshawar. The consent of the patients was obtained.

The selected cases were analyzed for TSH, $T_4$, $T_3$ at IRNUM, Peshawar Pakistan, by using Gamma counter. TSH in the sample is estimated by using Immuno Radiometric method. (RIA).The principal involved in the determination of $fT_4$ is based on the use of labeled antibody. The method for the determination of free triodothyronine $T_3$ is a competition assay just like that of free tetraiodothyronine $T_4$ based on the principle of labeled antibody [10, 12].

### 2.1. Statistical Methods

Primary data ingress was processed on MS Database version 2007. Data were checked in Epidemiological information (EPI-info), for scientific verifications. The data were finally imported in spread sheet statistical software (SPSS) version 20.0 for analysis.

## 3. Results

The prevalence of diagnosis was Euthyroidism (35.7%), Hyperthyroidism (32.5%), and Hypothyroidism (31.8%) respectively. The results also show that thyroid dysfunction is more prevalent in females (sex ratio was male: female = 1.88:5.68). The results are graphically shown in Fig. 1, Fig.2 and Table.1.

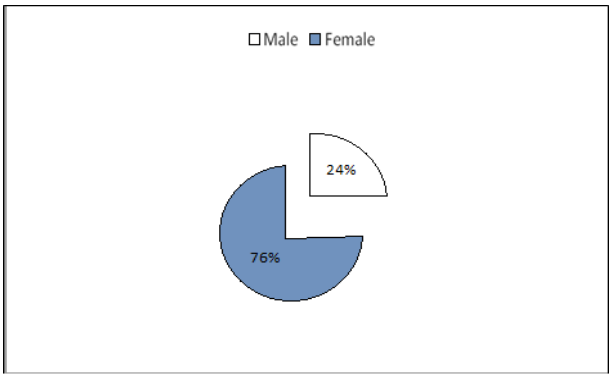


**Fig 1:** Gender wise distribution of subjects Studied (n=600)

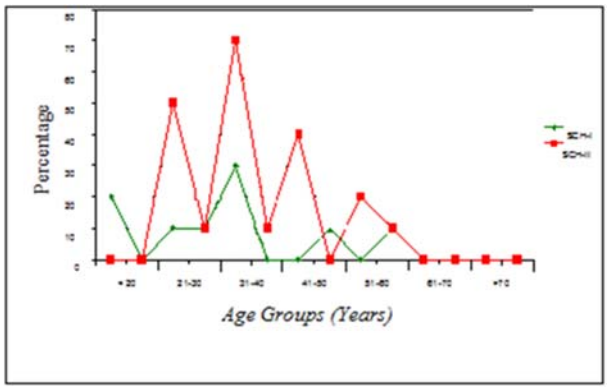


**Fig 2:** Frequency Values of SCH-I and SCH-II.

**Table 1:** Age wise distribution of subjects studied.

| Age in Years | Frequency | Percentage (%) |
|---|---|---|
| ≤20 | 89 | 14.9 |
| 21-30 | 133 | 22.2 |
| 31-40 | 185 | 30.8 |
| 41-50 | 115 | 19.2 |
| 51-60 | 55 | 9.1 |
| >70 | 2 | 0.3 |

The cross tabulation of gender with age groups also gives imperative consequence in the study. In the 1st age group i.e. < 20 years of age 68 females and 21 males were included in the study. Similarly 109 females, 24 males were in 2nd age group which was alienated in between age group of 21-30 years. 144 females and 41 males were in between 31-40 years, 82 females and 33 males belonged to the age group41-50, whereas in the group from 51-60 years there were 36 females and 18 males, while14 females and 08 males were in between 61-70, however 02 females were in the age group >70 years as in Figure 3.

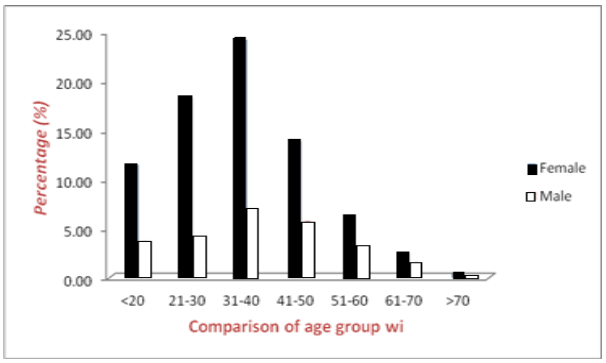


**Fig 3:** Cross match of gender with age group.

The female subjects out class the male individuals, and their ratio in each group was found to be 1:3.24, 1:4.7, 1:3.5, 1:2.7, 1:2, 1:3.5, 0:2 for the different age groups respectively.

The cross tabulation between gender of subjects studied and clinical diagnosis shows that out of total 455 females 162 were Euthyroid and were considered as control healthy individuals. 158 were diagnosed with hyperthyroid and the remaining 135 were suffering from hypothyroidism. Similarly in the male subjects 51, 37, 56 were euthyroid, hyperthyroid and hypothyroid respectively. The same is graphically represented in fig.4. In this study the thyroid disorders i.e hyperthyroid and hypothyroid when compared with Euthyroid group showed greater percentage amongst females for hyperthyroid state (26%) whereas (22%) is hypothyroid. However in male population there is a greater tendency for hypothyroidism (9%) when compared with hyperthyroid male population (6%) given in Figure 4.

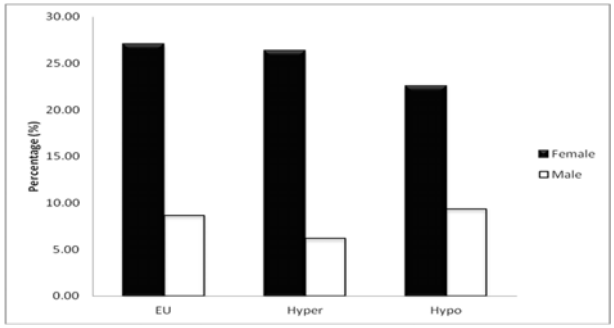


**Fig 4:** Comparison of gender with clinical diagnosis

## 4. Discussion

The aspiration of this research was to compare the frequencies of clinical diagnosis with gender. The determination of prevalence of thyroid dysfunction in a population can produce different results depending on the subject groups, age groups or selection criteria chosen. Thyroid dysfunction was diagnosed by the chemical analysis of thyroid function tests

This study also helps to evaluate the dominancy of thyroid dysfunction either in male or female population of various age groups, may be because of hyperactivity of hormones such as estrogen and progesterone. Furthermore, results regarding age distribution of the included subjects showed that these thyroid disorders mostly exist among age group of 31-40 years, which may be the most effective age limit for productivity and where the above mentioned hormonal changes and associated activity is at peak. In case of young adults, there were quite lesser number of patients presented with such disorders, i-e., frequency of 22 and 2 only for the age range of 60-70 and more than 70 years respectively. This might be because of reduction of sexual hormonal activities and changes in geriatrics. These results were in accordance with the study findings of Pandey *et al.* [13] but interestingly contrasting with the finding of the Tayal *et al.* [14].

The results shown for STD are closely related to a number of studies that show the prevalence of SCH-I ranging from 1.3% to 17.5% on the basis of iodine uptake, age and gender [15, 20]. A large cross-sectional study from Colorado reported a mean prevalence of 9% for SCH-I [21]. In another study it was 0.6% to16% for SCH-II [22]. In this study on the basis of gender specification 4% of female subjects and 1% of male subjects were declared as SCH-I and SCH-II respectively. The ratio of male vs. female was 0:3(SCH-I) and 1:7 (SCH-II),which is in accordance with a number of studies which show that the commonness of SCH-I was twice in women as compared to men [18, 23, 24].

The prevalence and incidence of both SCH-I and SCH-II increases with age [15, 21] but the vulnerability was more in the age of 60 and 80 years respectively [21]. According to the present study very few elderly were found having STD in the age group of 41-60 and there is no evidence of the incidence of SCH-I as well as SCH-II above 60 years of age. According to the results 36.6% of the total population in the age group 34-40 years were found to be having STD, out of which 10% are SCH-I and 26.6% are suffering from SCH-II.

## 5. Conclusions

This study evaluates the incidence and dominancy of thyroid dysfunction in male and female subjects of various age groups**.** There is no evidence of the incidence of subclinical thyroid dysfunction above 60 years of age. It is clearly evident from the results that the different thyroid dysfunctions are more common in the female subjects.

## 6. Acknowledgement

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