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PREVALENCE OF THYROID DYSFUNCTION IN DIFFERENT AGE AND GENDER GROUPS.

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Abstract

Introduction: Thyroid disorders are increasing day-by-day throughout the world, especially in sub-continent of Asia. There seem to be 20 million individuals in Pakistan who live in iodine-deficient regions. At a minimum, 1 million individuals have psychological illnesses, whereas 8 million people have had some type of iodine deficiency. This study was designed to determine thyroxine (T4) and Thyroid Stimulating Hormones (TSH) level in suspected patients of different age groups and gender. **Methodology:** This cross-sectional survey lasted three (03) months, from September to December 2020. The work was authorised by the ethics committee of Abdul Wali Khan University's Department of Biotechnology in Mardan. The research included a total of 177 suspected patients. All individuals referred by medical doctors after recognizing signs and symptoms of thyroid dysfunction, regardless of age or gender, were recruited. A statistical programme for social version (SPSS) 22 was utilized to analyze data. **Results:** overall 177 potential candidates got examined. An average age of the individuals that were enlisted were 33.8 17.3, including a minimum seven years as well as a maximum age of 80. Among total, 26% male and 74% were female patients. Majority patients were found in age group 30-70 years. Total thyroid dysfunction in females was 43.8% and 6.4% in male patients. Sub clinical hypothyroidism in females were found very high (16.0%), followed by hypothyroidism and hyperthyroidism (9.2%) and euthyroid sick syndrome (4.6%). In males only hypothyroidism were observed in 6.4% patients. **Conclusion:** Thyroid dysfunction is common among patients, especially among females and the elderly. Iodine-rich foods should be consumed. People's awareness in Pakistan, particularly in KPK, is nil. People's health awareness should be raised, and basic health care facilities should be made available.

Keywords: Thyroid Dysfunction, Hypothyroidism, Hyperthyroidism, T4, TSH, Age, Gender.

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INTRODUCTION

The thyroid gland is an endocrine gland in the human body that is positioned in the neck area above the trachea. It is a bi-lobed gland joined by a short strip known as the isthmus. The thyroid gland is a tiny gland that weighs 20-25 grams[1]. The thyroid gland is the master gland in charge of the body's metabolism, growth, development, and internal environment maintenance[2]. Thyroid hormones are classified into two types: triiodothyronines (T3) and tetraiodothyronine (thyroxin) (T4). Thyroid gland absorbs iodine from the diet (seafood or table salt) and mixes it with an amino acid (tyrosine) to produce T4 and T3. T3 has three iodine atoms, whereas thyroxin has four[3]. The typical thyroid gland generates around 7% triiodothronine and approximately 93% thyroxin. Thyroxin loses one iodine molecule during the deiodination process, resulting in triiodothyronine. TRH is produced by the hypothalamus and induces the synthesis of Thyroid stimulating hormone (TSH) (TSH). TSH, commonly known as Thyrotropin, is an internal pituitary hormone that controls T3 and T4 release and synthesis[4]. TSH is also known as thyrotropin and is produced by pituitary gland. It works as a master of hormones and it plays a vital role in production of thyroid hormones. TSH is supposed to stimulate thyroid gland. If TSH is not responding there will be high production of thyroid hormones and if there is much TSH then there will be low production of thyroid hormones. Thyroid disorders are increasing day-by-day throughout the world.Endocrine illnesses are becoming more common worldwide, although they are spreading faster in Asia[5]. Endocrine problems account for around 0.2% of all fatalities in Nepal, with iodine deficiency being the leading cause[6]. In Pakistan, about 20 millions of people reside in iodine-deficient regions, 8 million of these suffer from some form of iodine deficiency, and with at least 1 million of these struggle with psychiatric conditions. Thyroid illnesses are classified into two kinds[7].

The most prevalent thyroid condition is hypothyroidism, which is frequently overlooked[8]. Females are 5-10 times more likely than males to develop it[9]. Hypothyroidism's clinical appearance can range from asymptomatic to multi-system organ failure culminating to myxedema coma[10]. In the general population, hypothyroidism is a frequent metabolic disease. This may be identified by such a slower metabolism, retarded development & growth, diminished brain power, & enlargement of some skin regions. This is a condition brought on by a lack of iodine in the liquid we consume.[11]. Hypothyroidism is a clinical disease caused by a lack of thyroid hormone and an excess in TSH[12].

Subclinical hypothyroidism is characterised by increased TSH and normal T4 levels[10]. Depending on the demographic investigated, several studies have indicated a 3-15% rate of subclinical hypothyroidism[13]. The overproduction of thyroid hormones is known as hyperthyroidism. In the general population of Pakistan, the incidence of hyperthyroidism is lower, at 2%, than that of hypothyroidism[13]. Hyperthyroidism occurs when the body creates too much thyroid hormone. Subclinical hyperthyroidism is defined by low circulating thyrotropin (thyroid-stimulating hormone; TSH) levels and normal blood thyroid hormone levels[14]. By taking into account these facts, current study was formulated in order to analyze the current status of thyroid disease in different age groups and gender of suspected patients of KPK (Pakistan).

MATERIALS AND METHODS

From September to December 2020, a descriptive cross-sectional research was undertaken. The Real-Time PCR Laboratories in Dabgeri Garden at Peshawar, Pakistan, provided support for the study, that was carried out in the biotechnology department in Abdul Wali Khan University in Mardan.

Samples were collected from 177 suspected patients, both male and female, ranging in age from 7 to 85 years. Following this examination by both the doctor & specialist, 5ml blood was drawn from participants during the laboratory visit. The thyroid profile was tested by fully automated machine Mindray i900 by CLIA method to find out the value of T4 and TSH. Normal range of T4 is 5-13.0 µg/dl and TSH is 0.35-5.30 milliunits/L. The collected samples were centrifuged for 2 minutes on 8000rpm to collect the serums. Approximately 500µl serums were added to eppendorf tube and tubes were placed in Mindray – CL-900i Chemi luminescence Immunoassay fully automated System at specific positions. The Chemi Luminescence Immunoassay technology is extremely sensitive and that it can identify biomolecules in really minute quantities. After 45 minutes Mindray – CL-900i test result was displayed on screen. Demographic, laboratory test data, and proportions were noted in obtained data using descriptive statistics. A statistical programme for social version (SPSS) 22 was utilized to analyze data. The means and standard deviations were calculated.

RESULTS

One hundred seventy-seven volunteers in all (n=177) were involved. Patients ranged in age from seven years old to eighty years old, with a mean age of 33.8 +/17.3. Male patients made up 26.55% of the total (n=47), with a mean age of 35.3+10.1. Patients who were female had a 73.44% (n=130) prevalence and an average age of 28.7+9.91. Six categories were created by classifying all cases. The age group 31-45 years had the largest percentage of participation (35.59%), followed by the age groups 46-60 years (23.72%), 16-30 years (23.72%), 1-15 years (6.81%), 61-75 years (5.08), and 75 years and older (5.08%). (Table 1).

All patients' blood was analyzed for thyroid Dysfunction. Thyroid Dysfunctions were categorized into five groups including EUS (euthyroid sick syndrome), S/C Hypothyroidism & hyperthyroidism. The results of thyroid Dysfunctions were 8.47% ,3.39%, 12%, 6.8% and 3.39% respectively. Thyroid Dysfunction was determined high in female (43.78%) suspected subjects as connected to males (6.38%) (Table 2).

Moreover, thyroid dysfunction in various age groups was identified. The age range of 46 to 60 years had the highest frequency of thyroid dysfunction, followed by the age ranges of 16 to 30, 31 to 45, 61 to 75, and 75 and beyond. Thyroid dysfunction was more prevalent in people having age of 46- 60 years (as shown in Table no 03).

Table 1: Participants distributed according to their age & sex.

Age (Years)	Male % (n)	Female % (n)	Total % (n)
Below 15	25%(03)	75%(09)	6.81%(12)
16-30	14.28%(06)	85.72%(36)	23.72%(42)
31-45	41.26%(26)	58.73%(37)	35.59%(63)
46-60	28.57%(12)	71.43%(30)	23.72%(42)
61-75	0.00%(0)	100%(09)	5.08%(09)
75 & above	0.00%(0)	100%(09)	5.08%(09)
Grand Total	**26.55(47)**	**73.44(130)**	**100%(177)**

Table 2: The Thyroid Dysfunction distribution in males & females

Thyroid Dysfunctions	Male % (n)	Female % (n)	Total % (n)
Hypothyroidism	3(6.38%)	12(9.23%)	15(8.47%)
Hyperthyroidism	0.00%(0)	6(4.61%)	6(3.39%)
Sub clinical hypothyroidism	0.00%(0)	21(16.1%)	21(12%)
Sub clinical hyperthyroidism	0.00%(0)	12(9.23%)	12(6.8%)
Euthyroid Sick syndrome	0.00%(0)	6(4.61%)	6(3.39%)
Grand Total	**3(6.38%)**	**57(43.78%)**	**60(34%)**

Table 03: The Distribution of Thyroid Dysfunction in different age groups

Thyroid Dysfunctions	Below 15	16-30	31-45	46-60	61-75	75 & above
Hypothyroidism	1(0.56%)	3(1.7%)	6(3.39%)	2(1.13%)	3(1.7%)	0.00(0)
Hyperthyroidism	0.00%(0)	0.00(0)	0.00(0)	3(1.7%)	3(1.7%)	0.00(0)
Sub clinical hypothyroidism	0.00%(0)	6(3.39%)	0.00(0)	12(6.8%)	0.00(0)	3(1.7%)
Sub clinical hyperthyroidism	0.00%(0)	3(1.7%)	6(3.39%)	0.00(0)	3(1.7%)	0.00(0)
Euthyroid Sick syndrome	0.00%(0)	0.00(0)	0.00(0)	0.00(0)	0.00(0)	6(3.39%)

DISCUSSION

According to the results, level of T4 varies little bit but TSH level was found high in most of the cases and was found high in females than males which means females are at high risk with age greater than 50 years. Many previous studies also showed TSH level increases with age[15]. According to this study we are also agreed with the previous studies. Some previous studies also disagree with the statement but it may be the difference in population, genetic factor or iodine intake etc[16]. According to our report we clarified that the rate of subclinical hypothyroidism was 12% and hypothyroidism was 8.47% in suspected patients of KPK, Pakistan. Subclinical hypothyroidism is the condition in which TSH level rises with normal T4 level, which was observed more in females (6.8%) in 46-65 years of age followed by the age group 16-30 years which was 3.39%. Nevertheless, serum cholesterol returns to its normal level if a hypothyroidism is managed with just a thyroid hormone[17]. Cardiovascular disease is brought on by high serum cholesterol, which

may be caused by hypothyroidism. On the other hand we also reported that the rate of subclinical hypothyroidism in female was 16.1 %, which was the surprising fact of the study. As we reported the rate of hypothyroidism (8.47%) in all suspected patients including females (9.23%) and males (6.38%), which was recorded slightly low according to previous studies[16]. It may be due to awareness programs arranged by researcher. We also observed that hypothyroidism rate was high than hyperthyroidism which means that insufficient amount of iodine intake, it may cause some serious abnormalities. Thyroxin medication for hypothyroidism should begin right once in the interests of avoiding cardiac illness myxodema coma, & thyroid function should have been regularly checked while being on medication. [15]. We also observed some cases of Euthyroid sick syndrome in older age females which is also surprising. Elderly patients who have just undergone surgery are more likely to develop ESS, which is linked to nutritional deficiencies as well as a stronger autonomic activity. It may be due to renal or cardiac diseases. To reduce the rate of ESS, one must avoid poor nutrition. According to this study females were at high risk of thyroidism. It may be due to problems of the menstrual periods because thyroid helps in control of menstrual cycles, it may be increases or decreased. It may be due to pregnancy or lactation because during pregnancy basal metabolic rate increases than normal This causes this same thyroid gland is being stimulated & release extra hormone. Thyroid dysfunction may also increases due to radioactive surgeries and auto immune responses, and women are more prone to auto immune condition still no clear statement tells about that what causes these responses. Some studies said that it may be due to sex (2X) chromosomes.

Conclusion

This study has demonstrated that age and gender have a substantial impact on thyroid hormone levels. Our research indicates that women are more impacted than men, which may be because there are greater home obligations and a rise in the illiteracy rate. Aging has an impact on thyroid hormones as well. Thyroid disorders are more prevalent in women than in men in KPK, Pakistan. The most probable cause could be lactation, menstrual abnormalities and pregnancy. TSH levels rise with age and are more common in women, but T4 levels change depending on age and gender. Iodine deficiency may be the primary factor causing thyroid dysfunction. Early diagnosis and treatment should be done. The present study reflected that subclinical hypothyroidism and hypothyroidism rate was very high in suspected patients. Proper iodine sufficient food should be used. The population of Pakistan, particularly inside the region of Khyber Pakhtunkhwa, are almost conscious of this problem. Individuals ought to be fully conscious of their wellbeing, as well as having access to basic medical services

Ethics Approval: The ERC gave ethical review approval

Consent To Participate: written and verbal consent was taken from subjects and next of kin

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