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# Research Paper

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*The Sciences (ISSN 1608-8689)*  
*is an International Journal*  
*servicing the International*  
*community of Medical*  
*Scientists*

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The Sciences 1 (6): 400-403  
November - December, 2001

## Distribution of Thyroid Patients Between Age Groups, Sex and Seasons in the Thyroid Patients Referred to Inrum Peshawar

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A retrospective study was conducted to know the distribution of thyroid patients in different age, sex and seasons. Twenty five thousand four hundred and thirty seven thyroid patients were referred to the radioimmunoassay (RIA) laboratory of the Institute of Radiotherapy and Nuclear Medicine (INRUM), Peshawar, during the years 1984-1990 (except 1987), 1995 and 1996. These patients were of all age, both sexes and they were referred to the laboratory in different seasons of the year. Out of 25237 thyroid patients, age and sex were categorized into infants (0-2 year), children (>1-13 years), adults (>13-40 years) and old age (>40 years) groups. The patients were also separated into males and females. Based on the date of referral to the laboratory, the patients were also classified into winter (Nov.-Jan.), spring (Feb.-Apr.), summer (May-Jun.) and autumn (Aug.-Oct.). The average distribution of thyroid patients among infants, children, adult and old age groups was 0.8, 8.4, 64.0 and 27%, respectively. Similarly, the average distribution of thyroid patients between males and females was 27 and 73%, respectively. The average referral of thyroid patients to the laboratory in winter, spring, summer and autumn of different years was 28.6, 24.6, 30.9 and 15.9%, respectively. The data revealed that thyroid problems prevailed more in the adult group and females. The referral of thyroid patients was more common in summer than other seasons.

**Key words:** Distribution, thyroid patients, age, sex, seasons

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**Introduction**

Thyroid problems are common, affecting large number of people of different age and sex. Different studies carried out in different countries have shown that the thyroid problems are common in aged people and are more prevalent in females than males (Lavard *et al.*, 1994; Miller and Block, 1970; ICCIDD, 1997; Stephen, 1992). Thyroid problems affect both sexes but women are more prone to develop thyroid diseases (ICCIDD, 1997; Stephen, 1992; Lavard *et al.*, 1994). The two major thyroid problems are hyperthyroidism when the gland is making excessive thyroid hormones and hypothyroidism when the gland is not producing the required quantities of hormones. In Pakistan, about 20 million people live in iodine deficient areas, 8 million of them showed some form of iodine deficiency and at least 1 million have mental disorders (IDD Newsletter, 1996). Hyperthyroidism/thyrotoxicosis is not a common conditions in Pakistan. However, cases of Hyperthyroidism/thyrotoxicosis have been reported in patients with thyroid related problems. Hyperthyroidism/thyrotoxicosis was also observed in Zimbabwe, after salt iodization (IDD Newsletter, 1998). A 10 fold increase in urinary iodine concentration (from 20 in 1983 to 293µg L<sup>-1</sup> in 1994) was observed. The number of patients with toxic nodular goiter increased after iodization and most of them were above 40 years old (IDD Newsletter, 1998). Mengistu (1993) has reported the thyroid problems prevalence in male and female in the ratio of 1:8:1. and also reported that 71.9% of the patients were below 40 years of age. Connolly (1971; 1973), Stewart *et al.* (1971) and Vidor *et al.* (1973) have concluded that autonomous tissues are correlated with aging and hence a population with a significant number of individuals of 40 to 50 years old or above can be at risk of epidemic thyrotoxicosis if iodine intake is increased. Seasonal variations of the disease have not yet been reported. The aim of this investigation was to determine the distribution of thyroid patients in different age, sex and seasons referred to the IRNUM hospital, Peshawar in different years.

**Materials and Methods**

**Source of Data:** The data presented were obtained from the radioimmunoassay (RIA) laboratory of the Institute of Radiotherapy and Nuclear Medicine (IRNUM) Peshawar. Patients from all parts of NWFP, adjacent tribal areas and Afghanistan are referred to the laboratory. The laboratory keeps the record of the patients. The record of 25237 thyroid patients, visited the RIA laboratory of IRNUM during the years 1984-1990 (except 1987), 1995 and 1996 for thyroid and thyroid stimulating hormones test was available in the laboratory. This record was obtained from the laboratory for compilation and statistical analysis.

**Classification of the Data:** The refereed patients were of all age groups and different sex. Out of 25237 patients, age and sex were known of 24522 and 25087 patients, respectively. The data was classified on the basis of age into infants (0-1 years), children (> 1-13 years), adult (> 13-40 years), old age (> 40 years) and into males and females group on the basis of sex. On the basis of date of referral, the data was divided into winter (Nov.-Jan.), spring (Feb.-April), summer (May-Jul.) and autumn (Aug.-Oct.).

**Statistical Analysis:** The data was statistically analyzed with correlation analysis and general linear model procedures by using available SAS statistics package (SAS, 1990). The percent distribution of thyroid patients based on age groups, sex, seasons and years was compiled.

**Results**

All the thyroid patients who were referred to the RIA

laboratory during the years of the study as a whole and during each year and their percent distribution among the various age groups are presented in Table 1. The over all distribution of thyroid patients in different age groups is presented in Table 2. The distribution of thyroid patients among the different age groups was almost constant throughout the study period (Tables 1 and 2). The thyroid patients in the infant group ranged from 0.6 to 1.6% in the different years with an average value of 0.8%. Similarly, the patient in the children group ranged from 7.0 to 12.4 % in different years of the study with an average value of 8.4%. The thyroid patients in the adult group ranged from 59.0 to 66.1% during the study years with an average value of 64.0%. The thyroid patients in the old age group ranged from 25.6 to 31.4% in the different years with an average value of 27.0%.

Table 1: Years wise distribution of thyroid patients in different age groups

Years	Age groups	Total thyroid Patients	Total %
84-90 & 95-96	All age groups	24522	100.00
1984	All age groups	<b>1112</b>	<b>4.5</b>
	Infants	18	1.6
	Children	88	7.9
	Adults	657	59.1
1985	All age groups	<b>629</b>	<b>2.6</b>
	Infants	4	0.6
	Children	44	7.0
	Adults	416	66.1
1986	All age groups	<b>1776</b>	<b>7.2</b>
	Infants	22	1.2
	Children	143	8.1
	Adults	1104	62.2
1988	All age groups	<b>2611</b>	<b>10.6</b>
	Infants	17	0.7
	Children	222	8.5
	Adults	1616	61.9
1989	All age groups	<b>1291</b>	<b>5.3</b>
	Infants	10	0.8
	Children	160	12.4
	Adults	791	61.3
1990	All age groups	<b>4418</b>	<b>18.0</b>
	Infants	25	0.6
	Children	391	8.9
	Adults	2880	65.18
1995	All age groups	<b>5712</b>	<b>23.3</b>
	Infants	36	0.6
	Children	478	8.4
	Adults	3663	64.1
1996	All age groups	<b>6973</b>	<b>28.4</b>
	Infants	54	0.8
	Children	535	7.7
	Adults	4517	64.8
	Old age	1867	26.8

The bold figures in row number 1,2,7,12,17,22,27,32 and 37 in column 3 indicate the total number of thyroid patients in the respective years. The bold figures in the same rows in column 4 indicate percent total of each year. The remaining figures indicate the number and percent of the particular years.

Table 2: Over all distribution of thyroid patients in different age groups

Age groups	Total thyroid patients	Total %
All age groups	24522	100.0
Infants	186	0.8
Children	2061	8.4
Adults	15644	64.0
Old age	6631	27.0

Table 3: Yearwise distribution of thyroid patients in different sex

Year	Total Thyroid	Male		Female	
		thyroid	Total %	thyroid	Total %
1984	1227	355	29	872	71
1985	640	235	37	405	63
1986	1849	597	32	1252	68
1988	2654	710	27	1944	73
1989	1331	394	30	937	70
1990	4550	1215	27	3335	73
1995	5780	1436	25	4344	75
1996	7056	1708	32	5348	68

Table 4: Over all distribution of thyroid patients in different sex

Sex	Total Thyroid Patients	Total %
Both	25087	100
Male	6650	27
Female	18437	73

The yearwise and average distribution of thyroid patients in males and females are shown in Tables 3 and 4. The yearwise distribution of thyroid patients between males and females ranges from 25 to 37% males and 63 to 75% females in different years, with an average value 27 and 73% for male and females, respectively. The yearwise and the average referral of thyroid patients to the RIA laboratory in different seasons are given in Tables 5 and 6. The yearwise referral in winter ranged from 22.1 to 41.4% with an average value of 28.6%. Similarly, the yearwise referral in spring ranged from 23.0 to 40.6 % with an average value of 24.6%. The yearwise referral in summer ranged from 15.6 to 39.7% with an average value of 30.9%. The referral in autumn ranged from 3.1 to 57.9% with an average value of 15.9%.

**Discussion**

The data indicated that the referral of thyroid patients to the RIA laboratory had been increased over the years from 1984 to 1996. The only exception was that the thyroid patients in 1985 and 1989 were less than thyroid patients in the preceding year i.e., 1984 and 1988, respectively. It was also noted that there was some missing data for the years 1985 and 1989 in the record of laboratory and perhaps the decrease

in the referral in those years was due to that missing data. The reason for the general increase in the referral of thyroid patients over the years might be that people had become more educated over the years in terms of health care and they had started consulting their physicians, whenever they had health problems. Also the physicians had become more dependent on laboratory tests over the years. This seemed a possibility that with the passage of time, the sensitivity of the tests performed by the RIA laboratory has been improved and has gained more confidence of doctors who were referring their patients for thyroid hormones test to the laboratory. An additional reason for the increased referral may be the increased frequencies of thyroid problems due to the use of iodized salt or other unknown reasons. More intake of iodine in the form of iodized salt may causes thyroid problems particularly thyrotoxicosis (Kelly, 1960; Connolly 1971; 1973; Stewart *et al.*, 1971; Vidor *et al.*, 1973).

Increased population may also be a reason for the increase. The percent referral in 1996 (28.4%) was 6 times more than the percent referral in 1986 (4.5%). The increase referral of thyroid patients over the years is really a matter of concern for the health professionals. They are required to find the causes of the increase and they would have to develop a strategy for control of this situation.

The distribution of thyroid patients among the different age groups (Table 2) was almost constant throughout the study period. The majority (64%) of patients were in the adult age group followed by old age (27%), children (8.4%) and infants (0.8%). The difference in frequencies of thyroid related problems in different age groups was significant at 0.05 % level. Miller and Block (1970) have reported increased frequencies of thyroid problems with age. They have suggested that gradual increase in autonomous tissues with age, making individuals more susceptible to thyroid problems. Lavard *et al.* (1994) also reported that thyroid problems were less prevalent in infants and children and were increased with age. However, ICCIDD (1997) reported higher frequencies of thyroid problems in old age people above 40 years. This difference may be because of their study design.

The distribution of thyroid patients among males and females was about 1:3. The data (Table 4) indicated a high frequency of thyroid problems in females. The frequency of thyroid problems between males (27 %) and females (73 %) was significantly different at  $p < 0.05$ . The higher frequency of thyroid problems in females patients may be attributed to stress related to multiple pregnancies and lactation. Due to the particular family set up in this country, females are more exposed to nutritional deficiencies that can cause health problems including thyroid disorders. Stephen (1992) reported that Asian women had more economic and domestic responsibilities than men. Poor and illiterate women and their children were more prone to nutritional problems such as goiter, anemia and other disorders. ICCIDD (1997) also reported greater frequency of thyroid problems in females

Table 5: Yearwise distribution of thyroid patients in different seasons

Year	Total thyroid patients	Thyroid patient in winter		Thyroid patient in spring		Thyroid patient in summer		Thyroid patient in autumn	
		patient in winter	Total %	patient in spring	Total %	patient in summer	Total %	patient in autumn	Total %
1984	1290	417	32.3	351	27.2	278	21.6	244	18.9
1985	641	170	26.5	-	-	100	15.6	371	57.9
1986	1873	425	22.7	459	24.5	450	24.0	539	28.8
1988	2687	594	22.1	696	25.9	671	25.0	726	27.0
1989	1342	555	41.4	545	40.6	242	18.0	-	-
1990	4565	1133	24.8	1059	23.0	1169	25.6	1203	26.4
1995	5783	1545	26.7	1448	25.0	2078	35.9	712	12.3
1996	7056	2386	33.8	1655	23.4	2799	39.7	216	3.1

**Khattak *et al.*: Distribution of thyroid patients between age groups, sex and season**

Table 6: Over all distribution of thyroid patients in different season

Season	Total thyroid patients	Total %
All Season	25237	100.0
Winter	7225	28.6
Spring	6213	24.6
Summer	7787	30.9
Autumn	4012	15.9

than males. The various distributions of thyroid patients in different seasons, reported in this study, might be just a chance as there is no indication in literature that seasons have any effect on the frequencies of thyroid problems. In conclusion, thyroid problems have been increased over the years and majority of the thyroid problems occur in adult age and females. The physicians are required to find ways and means to control the problems.

**Acknowledgments**

We are thankful to Dr. Sher Muhammad Khan, Director IRNUM, Peshawar for permission to compile the data.

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MS received 22th September, 2001; accepted 2nd November, 2001