

# Prevalence of benign and malignant tumors in thyroidectomy specimens



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## Abstract

**Introduction:** The most common type of endocrine malignancy is thyroid cancer (TC). TC is the 7th, 14th, and 11th most common cancer in women, men, and both sexes, respectively.

**Objectives:** The aim of this research was to establish the frequency of benign and malignant tumors in thyroid surgery specimens performed in Al-Zahra hospital in Isfahan from 2011 to 2017.

**Patients and Methods:** This is a retrospective descriptive cross-sectional study. 1345 patients who underwent thyroid surgery were enrolled using census sampling. Data were analyzed using SPSS software (IBM statistics for windows, version 16) using descriptive statistics, mean, standard deviation, frequency, chi-square, and ANOVA. A significance level of less than 0.05 was analyzed.

**Results:** Of 1345 participants, 237 (17.6%) were males, and 1108 (82.4%) were females. The mean age of benign patients was 46.48, malignant 39.31, and healthy patients for 37.50 years. Since the level of significance is less than 0.05, there is a significant relationship between the mean age of patients and the frequency of thyroid surgery specimens. The most prevalent benign and malignant thyroid tumors were goiter (76.8%) and papillary carcinoma (92.6%), respectively.

**Conclusion:** The results showed that there was a significant relationship between age, gender, and benign and malignant type. Also, the most prevalent benign and malignant thyroid tumors were goiter and papillary, respectively.

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## Introduction

The most common type of endocrine malignancy is thyroid cancer (TC) (1). TC accounts for 2.1% of all cancers, according to GLOBOCAN 2012. Its global mortality is also estimated at 0.5 (0.3 in males, 0.6 in females) per 100 000 (2). TC is the 7<sup>th</sup>, 14<sup>th</sup>, and 11<sup>th</sup> most common cancer in women, men, and both sexes, respectively (3). Thyroid follicular cells cause two significant groups of TCs; differentiated (papillary and follicular) and undifferentiated (anaplastic, poorly differentiated) carcinomas (4). The etiology of TC is mostly unknown, and so far, only limited risk factors are recognized. Exposure to ionizing radiation, family records, and records of goiter or benign thyroid disorder are among the most straightforward setup risk factors (5,6). Other possible risk factors consist of the use of oral contraceptive pills, extra weight, records of miscarriage, use of fertility drugs, advanced age at pregnancy, and excessive intake of seafood and dietary iodine (7-10).

## Key point

In a retrospective descriptive cross-sectional study on 1345 patients who underwent thyroid surgery, we found the most prevalent benign and malignant thyroid tumors were goiter and papillary carcinoma, respectively.

Radiation, genetic factors, underlying thyroid disease, hormonal factors (more prevalent in women), and nutritional factors, especially iodine, play essential roles in the pathogenesis of TC (11). There are also significant racial and geographic differences in the incidence of TC (12).

The most significant prognostic variables for TC are age and stage (13). TC is twice as conventional in females as in males (14). The 5-year survival rate for a sample in Tehran was 82.2% (15).

There is extensive research in Iran on the prevalence and incidence of TC. A study by Kojidi et al, which estimated the prevalence of TC from 1990 to 2010, showed that the

prevalence of TC has increased in all provinces, especially since 2002, as the year progresses. However, information on subtypes of TC and survival rates has not been provided in this study (16).

#### Objectives

Currently, there are limited data on the prevalence of TC in Isfahan. The aim of this research was to establish the frequency of benign and malignant tumors in thyroid surgery specimens performed in Al-Zahra hospital in Isfahan from 2011 to 2017.

## Patients and Methods

### Study patients

A retrospective descriptive cross-sectional study was conducted at Isfahan Al-Zahra hospital In November of 2019. The study recruited 1345 users between 2011 and 2017. Sampling is a census sampling method used in this study. Inclusion criteria in this study are all patients admitted to Al-Zahra hospital due to any thyroid mass and underwent surgery. Exclusion criteria included all incomplete pathology reports without a definitive diagnosis. Data were collected from all demographic information, including age, sex, and types of thyroid tumors using patient records.

### Ethical issues

This study was approved by the Isfahan University of Medical Sciences Research Ethics Committee (#IR.MUI.MED.REC.1398.144), which is in accordance with the principles of the Helsinki Declaration (1964). This study was extracted from M.D thesis of Faranak Kamrad at Isfahan University of Medical Sciences.

### Data analysis

All data were analyzed using SPSS statistical software (IBM Corp. Released in 2013. IBM SPSS Windows Statistics, Version 22.0. Armonk, NY). Descriptive statistics used included mean, standard deviation (SD), and percentage. Also, the chi-square and ANOVA analyses were employed. The level of significance was set to  $P < 0.05$ .

## Results

Of 1345 participants, 237 (17.6%) were males, and 1108 (82.4%) were females. The mean age was  $42.91 \pm 13.73$  years. Of the 1345 samples studied, 677 were benign, 662 were malignant, and 6 were normal.

According to [Table 1](#), in 662 cases, 548 (82.8%) were males, and 114 (17.2%) were males. In 677 benign reports, 556 (82.1%) were women, and 121 (17.9%) were men. There were 556 benign and 548 malignancies in females.

According to [Table 2](#), the mean age of benign patients was 46.48, malignant 39.31, and healthy patients 37.50 years. The mean age of the three groups was compared using ANOVA. Since the significance level is less than 0.05, there is a significant relationship between the mean age of patients and the frequency of thyroid surgery specimens.

**Table 1.** Trends in the occurrence of thyroid cancer according to age and gender

Gender	Age	Benign	Malignant
Male	0-44	51 (42.1%)	70 (64.1%)
	45-54	26 (21.5%)	18 (15.8%)
	55-64	26 (21.5%)	18 (15.8%)
	65-74	12 (9.9%)	7 (6.1%)
	+75	6 (5%)	1 (0.9%)
	Total	121	114
Female	0-44	301 (54.1%)	399 (72.8%)
	45-54	105 (18.9%)	78 (14.2%)
	55-64	107 (19.2%)	41 (7.5%)
	65-74	40 (7.2%)	17 (3.1%)
	+75	3 (0.5%)	13 (2.4%)
	Total	556	548

**Table 2.** Descriptive indicators of patients' age by cancer type

	Number	Mean	P value*
Benign	677	46.48 ± 12.72	<0.001
Malignant	662	39.31 ± 13.79	
Normal	6	37.50 ± 11.86	
Total	1345	42.91 ± 13.73	

\* $P < 0.05$ .

Benign TC incidence is the highest in men between 0-44 years old; this age group includes 42.1% of cases. The highest prevalence for women is in the 0-44 age group and 55-64, which comprises 54.1% and 19.2% of cases ([Table 1](#)).

Malignant TC incidence is the highest in men between 0-44 years old; this age group includes 42.1% of cases. The highest rate for women is in the 0-44 age group and 55-64, which comprises 54.1% and 19.2% of cases ([Table 1](#)).

Chi-square test showed that there was a significant relationship between age, gender, and benign and malignant type ( $P < 0.001$ ).

The most common benign types of TC were goiter (76.8%), follicular adenoma (9.5%), and Hashimoto's disease (8.9%) ([Figure 1](#)).

The most common type of malignant thyroid carcinoma was papillary (92.6%), and the least prevalent was metastatic (0.3%) ([Figure 2](#)).

## Discussion

The aim of this research was to establish the frequency of benign and malignant tumors in thyroid surgery specimens performed in Al-Zahra hospital in Isfahan from 2011 to 2017.

The findings showed that the most prevalent in benign goiter specimens and papillary malignant specimens were the most frequent. It was also revealed that the age of patients in the three groups of benign, malignant, and healthy was significantly different.

In 2014, a study was conducted by Huan et al. In this

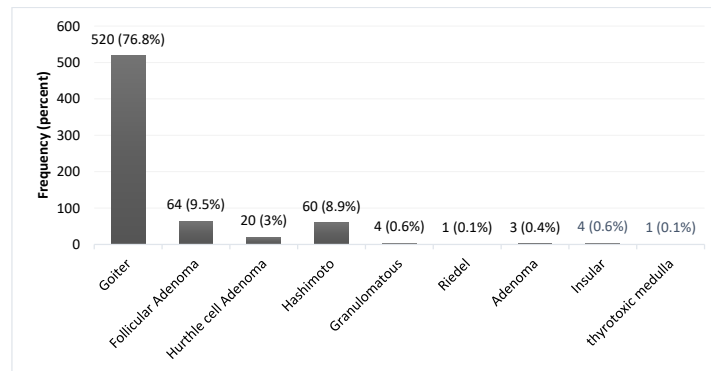


Figure 1. Frequency distribution of benign thyroid cancer types.

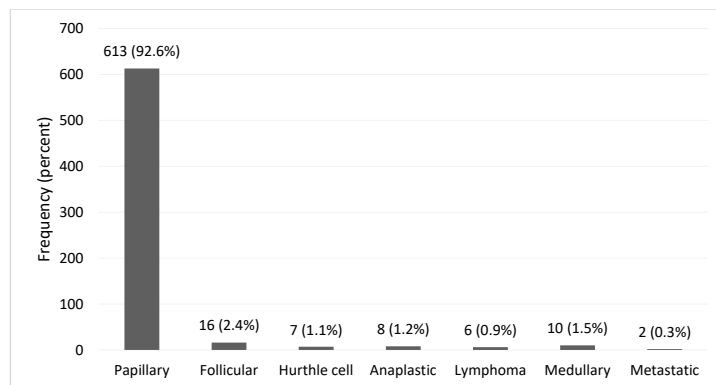


Figure 2. Frequency distribution of malignant types of thyroid cancer.

study, the researchers analyzed the epidemiological and clinical features of thyroid nodules in patients undergoing surgery and identified the risk factors for malignant nodules in order to know more about the differential diagnosis of thyroid nodules. In this study, 65.8% of the samples were benign (17). However, in the present study, 50.33% of the samples were benign. Additionally, in the benign nodule group, there were 3227 cases (51.19%) with nodular goiter, 330 cases (5.23%) with Hashimoto's thyroiditis (17). In our study, the most frequent group of benign tumors was goiter and Hashimoto's disease.

A study by Salamanca-Fernández et al, aimed to identify and analyze trends in TC prevalence and mortality in Granada between 1985 and 2013. The results of this study, as in the present study, were the most prevalent among the types of thyroid tumors, papillary type (62.5% in males and 79.26% in females) (18).

Additionally, in the study of Sipos et al, papillary was the most prevalent (79%) among malignant tumors (n = 53 856) in the United States (19).

In 2014, a study was conducted by Huan et al. The average ages of the patients in the malignant nodules group were younger than those in the benign nodules group ( $44.59 \pm 12.22$  versus  $49.31 \pm 12.41$  years) (17). The results of this study were consistent with our research.

In our study, the mean age in the benign and malignant

groups was 46.48 and 39.31 years, respectively. In the review by Kajidi et al, TC was less prevalent under 14 years of age, with the highest TC incidence in women over 70 years of age, and among men older than 70, the prevalence of TC was higher (16). In most previous limited studies in Iran, the mean age of both sexes in the age group of 40-50 has been reported (20-22). In a survey by Larijani et al (1998-2001), in all provinces of Iran, the highest incidence was in the age group of 45-55 years for women and 55-65 years for men, and the impact after age 65 years has increased in both sexes (23). A study by Marjani et al in Golestan province reported the highest incidence of TC in both genders in the age group of 70-79 years (24). In Saudi Arabia, the highest rate of TC is reported in women between the ages of 30 and 39, which is significantly different from the results of the study (25).

## Conclusion

The findings showed a significant relationship of age, gender, and benign with malignant type. Also, the most prevalent benign and malignant thyroid tumors were goiter and papillary carcinoma, respectively.

Determine the risk factors of benign and malignant tumors in thyroid surgery specimens and prevent them from exposure. Conducting research aimed at detecting and determining the provincial distribution of this disease

should be a top priority in the national health arena.

### Limitations of the study

This study was conducted as a single center study, requires further expansion by multi-centric investigations on this subject.

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### Authors' contribution

MD, Supervision of study, the designing protocol of the study, data collection, manuscript writing; FK, Designing protocol of the study, data collection, manuscript writing; ARJ, Designing protocol of the study, data analysis, manuscript writing; AB, Designing protocol of the study and data collection, manuscript writing. All authors read and signed the final draft of the manuscript before submission.

### Conflicts of interest

The authors declare no conflicts of interest.

### Ethical considerations

Ethical issues (including plagiarism, data accuracy, duplicate publication) have been ultimately obeyed by the authors.

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