

# Profile of Thyroid Cancer at Dr. Kariadi General Hospital Semarang in 2020

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## ARTICLE INFO

Received : 03 February 2023

Reviewed: 26 February 2023

Accepted : 11 April 2023

Keywords:

profile, statistics, thyroid cancer

## ABSTRACT

**Background:** Thyroid cancer is ranked ninth among the most common type originating from the endocrine glands globally, accounting for approximately 59.7% of cases in Asia. According to 2020 health data, thyroid cancer ranked twelfth in Indonesia, comprising 13,114 cases. Despite the number of cases recorded, there is a lack of comprehensive data regarding the condition of thyroid cancer in the country. Therefore, this research aimed to describe the thyroid cancer profile in Dr. Kariadi General Hospital Semarang.

**Methods:** This descriptive research was carried out using 154 medical records selected through consecutive sampling from Dr. Kariadi General Hospital Semarang from January to December 2020. Categorical scale data were described through frequencies and percentages, while numerical scale data were presented as mean and standard deviation.

**Results:** This research discovered that 57.8% of patients belonged to the 40–59-year-old age group, predominantly consisting of 79.9% females. Additionally, 39.6% of patients had normal thyroid function, with Papillary Thyroid Cancer being the most common type, constituting 92.7% of cases. The results showed that 46.8% of cases were bilateral, 37.7% had a condition of T3, 59.7% had N0, and 89.6% had M0, while 66.2% were classified as stage I.

**Conclusions:** The majority of thyroid cancer patients were 45–64 years old and female. The results showed Papillary Thyroid Cancer as the most prevalent type, with the majority of cases diagnosed at stage I and showing bilaterally presentation. Most of the data correlated with previous research, except thyroid function and histopathology-type percentages.

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## INTRODUCTION

Thyroid cancer is the ninth most widely-found type globally, originating from the endocrine glands [1,2]. Based on the report made by the Global Cancer Observatory in 2020, there are 13,114 new cases of thyroid cancer in Indonesia, with a mortality rate of 0.95% [3]. Prediction also suggests that the majority of cases in Indonesia will increase by 65.6% more in 2040 [4]. In Semarang, there were 347 patients diagnosed with thyroid cancer in Dr. Kariadi General Hospital from January 2006 to June 2010 [5].

Several strategies have been implemented to handle thyroid cancer, including a comprehensive preventive

intervention. However, this intervention can be carried out accurately when there is adequate data on thyroid cancer, which remains a global problem [6]. In Indonesia, available data from Riskesdas 2018 merely covers the prevalence and selected therapy generally [7]. Data included in the Pusdatin publication in 2019 also covers thyroid cancer patients in Dharmas Cancer Hospital [8]. However, data regarding thyroid cancer patients in Semarang are lacking, with the recent publication from 2013 depending on data from one hospital between January 2006 and June 2010 [5].

Indonesia requires comprehensive data describing the epidemiology and general characteristics of thyroid cancer in the country. Therefore, this research aimed

to provide insight into the histopathological features of thyroid cancer and understand the age, sex, thyroid function, location, and cancer stage of patients in Dr. Kariadi General Hospital Semarang.

## METHODS

This descriptive research included thyroid cancer patients in Semarang from January to December 2020. Meanwhile, patients with incomplete data in medical records, residual thyroid cancer, and those diagnosed in previous years, were excluded during the analysis. Consecutive sampling was used to select the subjects, resulting in 154 included from 258 medical records.

Variables in this research included age, sex, thyroid function, location, cancer stage, and histopathology types of thyroid cancer patients. Age was the biological age of the patient when first diagnosed with thyroid cancer, while sex was the biological gender. Thyroid function was the evaluation of thyroid gland competence derived from the Thyroid Stimulating Hormone (TSH) value of patients. This function was divided into three categories, namely hypothyroid (<0.4 mIU/L), euthyroid (0.4–4.0 mIU/L), and hyperthyroid (>4.0 mIU/L). Moreover, the location served as the place where cancer cells were found in the thyroid gland. The thyroid cancer stage was the severity degree of thyroid cancer derived from 3 aspects, namely tumor (T), lymphatic nodes metastasis (N), and metastasis to other organs (M). Histopathology type was obtained from each pathologic anatomy examination results and divided into ICD-10 diagnoses.

The secondary data were obtained from the medical records of Dr. Kariadi General Hospital Semarang. Subsequently, data analysis was carried out using SPSS and Microsoft Excel 2013. The data that were included in the categorical scale were described through frequencies and percentages, while those in the numerical scale were presented as mean and standard deviation.

## RESULTS

**Table 1** shows that thyroid cancer cases in Dr. Kariadi General Hospital Semarang were dominated by patients aged 40–59 years old. Specifically, this age group comprised 57.8% of the cases, with 24% originating from <40 years old and 18.2% from ≥60 years old age group. The majority of the cases in this research comprised female patients, with a percentage of 79.9%.

Based on the medical records that were analyzed, 31.2% of patients had no TSH test result. Remaining laboratory data showed that 39.6% of thyroid cancer patients had normal thyroid function (euthyroid). 22.7% of the patients had hypothyroidism and 6.5% of the patients had hyperthyroidism.

Anatomic pathology examinations showed that the most common diagnosis of thyroid cancer was Papillary

Thyroid Cancer Follicular Variant (ICD 8340/3), with a percentage of 50.6%, followed by Classic Papillary Thyroid Cancer (8260/3), accounting for 34.4% of cases. Meanwhile, the remaining types identified were Papillary Microcarcinoma (ICD 8341/3, 2.6%), Anaplastic Thyroid Cancer (ICD 8020/3, 2.6%), Follicular Thyroid Cancer (ICD 8330/3, 2.6%), Papillary Thyroid Cancer Solid/ Trabecular Variant (ICD N/A, 1.9%), Encapsulated Papillary Thyroid Cancer (ICD 8343/3, 1.3%), Papillary Thyroid Cancer Oncocytic Variant (ICD 8342/3, 1.3%), Squamous Cell Cancer (ICD 8070/3, 1.3%), Poorly Differentiated Thyroid Cancer (ICD 8337/3, 0.6%), and Papillary Thyroid Cancer Tall Cell Variant (ICD N/A, 0.6%). The results showed that 46.8% of cases occurred bilaterally, 29.9% were found on the right side of the thyroid, and 23.4% on the left side.

Based on the assessment written in the medical records, 37.7% of patients were admitted with the condition of T3, 31.8% had T2, while the rest came with T1 and T4 at 18.8% and 11.6%, respectively. For the condition of regional lymphatic nodes, 59.7% were admitted with N0, and 40.3% were presented with N1. Regarding the existence of metastasis, 89.6% were admitted with M0, while the other 10.4% had M1. This assessment showed that in Non-Anaplastic Thyroid Cancer cases, the prevalence of stage I, II, III, IVA, and IVB accounted for 66.2%, 24%, 3.2%, 1.9%, and 1.9%, respectively. For Anaplastic Thyroid Cancer cases, 0.6% had stage IVA, 1.3% had stage IVB, and 0.6% had stage IVC.

## DISCUSSION

The composition of the age group approximately resembled previous research, as the results showed that the majority of cases were from patients aged 40–59 years old. However, this research showed that the second and third positions were from the group of <40 and ≥60 years old respectively [9]. Based on gender composition, female patients in the sample group accounting for 75% had a risk of almost 4 times more than male patients. This result was higher compared to previous research, where female patients were 3–4 times more at risk, with a prevalence of thyroid cancer above 79.9% [10,11].

During the process of data analysis, 31.2% of medical records did not include TSH levels. This showed the importance of healthcare facilities in establishing the standard of data completeness to support patients' diagnoses. Previous research reported that high levels of TSH in blood serum could increase the risk of thyroid cancer, particularly at a worse stage [10]. Although available laboratory results showed normal function in the sample group, medical workers had to be aware that the potential of patients suffering from abnormal thyroid function remained significant, accounting for 29.2% of cases. This result differed from previous

**Table 1.** Thyroid cancer patient characteristics

Characteristics	Frequency	%
Age (years old)		
< 40	37	24
40–59	89	57.8
≥ 60	28	18.2
Sex		
Male	31	20.1
Female	123	79.9
Thyroid Function		
N/A	48	31.2
Euthyroid	61	39.6
Hypothyroid	35	22.7
Hyperthyroid	10	6.5
Histopathology Type		
Papillary Thyroid Cancer Follicular Variant	78	50.6
Classic Papillary Thyroid Cancer	53	34.4
Papillary Microcarcinoma	4	2.6
Anaplastic Thyroid Cancer	4	2.6
Follicular Thyroid Cancer	4	2.6
Papillary Thyroid Cancer Solid/Trabecular Variant	3	1.9
Encapsulated Papillary Thyroid Cancer	2	1.3
Papillary Thyroid Cancer Oncocytic Variant	2	1.3
Squamous Cell Cancer	2	1.3
Poorly Differentiated Thyroid Cancer	1	0.6
Papillary Thyroid Cancer Tall Cell Variant	1	0.6
Location		
Bilateral	72	46.8
Dextra	46	29.9
Sinistra	36	23.4
Primary Tumor (T)		
1	29	18.8
2	49	31.8
3	58	37.7
4A	11	7.1
4B	7	4.5
Lymphatic Nodes Metastasis (N)		
0	92	59.7
1	62	40.3
Metastasis (M)		
0	138	89.6
1	16	10.4
Non-Anaplastic Thyroid Cancer Stage		
I	102	66.2
II	37	24
III	5	3.2
IVA	3	1.9
IVB	3	1.9
Anaplastic Thyroid Cancer Stage		
IVA	1	0.6
IVB	2	1.3
IVC	1	0.6

research, where high TSH serum increased the potential of thyroid cancer. Only 68.8% of medical records analyzed had the required data to determine the thyroid function of patients [10]. Initially, this research would include blood glucose levels to determine the percentage of thyroid cancer patients with diabetes mellitus. The attempt was dismissed due to a lack of data presented in the medical records, leading to the examination of random blood sugar tests. Therefore, fasting blood sugar and HbA1c tests were not included, which made diabetes mellitus diagnosis inadequate [1].

During the research of histology types of samples, patients' diagnosis was taken from anatomic pathology reports included in corresponding medical records. However, some medical records did not include relevant anatomic pathology reports and must be requested directly from the department. The results also showed that several medical records belonging to ICD-10 D44 were incorrectly categorized as ICD-10 C73. Therefore, the corresponding institution was expected to integrate data into an electronic database more accurately to prevent the reoccurring of similar problems.

Papillary Thyroid Cancer comprised most of the cases found in this research with a total percentage of 92.7%. Furthermore, the two most common subtypes found were follicular variant (50.6%) and classic type (34.4%). This result was in line with previous research, where Papillary Thyroid Cancer was categorized as the most common type, with a percentage of 70-80% among all cases [12,13].

In previous research, the prevalence of Papillary Thyroid Microcarcinoma was lower, with a percentage of 7.96% in 2016 [14]. The tall cell variant also had a lower position than solid/trabecular variant, encapsulated, and oncocytic variant [13]. However, another research stated that the tall cell variant had a higher percentage of cases, followed by solid/trabecular, and oncocytic variant [15]. The percentage of patients with Follicular Thyroid Cancer and Anaplastic Thyroid Cancer was found to be 2.6%. According to previous research, Follicular Thyroid Cancer was the second most common type of thyroid cancer, which was higher than Anaplastic Thyroid Carcinoma, with a percentage of < 1% [16,17]. Anaplastic Thyroid Cancer had a higher percentage in this research compared to previous cases [17], requiring intensified treatment due to the categorization as stage IV [18]. Furthermore, 1.3% of patients suffer from Squamous Cell Cancer, which was slightly higher than the global percentage, at < 1% [19]. The composition of Squamous Cell Cancer was lower than Anaplastic Thyroid Cancer [20], while 0.6% of patients had Poorly Differentiated Thyroid Cancer [21].

Based on the general characteristics of thyroid cancer patients, the majority of cases were bilateral, with a percentage of 46.8%. During the analysis of T, N, M, and stage, the research used data that were available

in the medical records. However, data collected during physical inspection, such as density, hardness, evenness, and fixation of bump, were not found on the medical records. Other data that were not found included prognostic risk factors scoring systems, such as Age, Metastases, Extent, and Size (AMES) and Age, Gender, Extent, and Size (AGES). This showed the need for the institution to re-evaluate medical records guidelines in line with current theories to facilitate future research.

In this research, the majority of patients had T3, N0, and M0 with a percentage of 37.7%, 59.7%, and 89.6%, respectively. Thyroid cancer stage that was predominantly found in thyroid cancer patients was stage I with a percentage of 66.2% [18]. However, other conditions such as stage IV should be considered, which could still be found in several cases. This served as a reminder for medical workers to be vigilant regarding the cancer stage of newly admitted thyroid cancer patients due to the potential occurrence of severe cases.

The limitations of this research included the analysis of 31.2% of patients in the case of the data on thyroid function. Therefore, further research is recommended to provide detailed information on thyroid cancer patients.

## CONCLUSIONS

Thyroid cancer patients had a general profile predominantly comprising patients between the age of 40-59 years old and mostly dominated by females with a ratio of approximately 4:1. Laboratory results from 68.8% of patients showed that the majority had normal thyroid function. Papillary Thyroid Cancer was the major type, accounting for 92.7% of cases, which consisted of follicular variant (50.6%) and classic (34.4%) sub-types. Thyroid cancer patients were dominated with bilateral case, T3, N0, and M0 conditions, while stage I was predominantly found in patients. The majority of these results were consistent with previous research, except for thyroid function and histopathology-type percentages.

## DECLARATIONS

### Competing interest

The authors declare no competing interest in this study.

### Ethics Approval

This study was approved ethically by the Health Research Ethics Committee of the Faculty of Medicine of Diponegoro University with certificate number 110/EC/KEPK/FK-UNDIP/IV/2021. This study was also authorized by Dr. Kariadi General Hospital Semarang with the certificate number of No. DP.02.01/I.II/3203/2021.

### Funding

Financial resources used in this research are solely independent of the authors.

## Acknowledgment

The authors wish to thank the Faculty of Medicine of Diponegoro University, including the Department of Surgery and the Department of Anatomic Pathology, and Dr. Kariadi General Hospital Semarang for their support in this research.

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