

## Risk Factors for Hyperthyroidism in the Work Area of the Meureubo Health Center, West Aceh Regency

<sup>1</sup>Zakiyuddin, <sup>2</sup>Fitriani, <sup>3</sup>Yarmaliza, <sup>4</sup>Teungku Nih Farisni, <sup>5</sup>Fitrah Reynaldi, <sup>6</sup>Ambia Nurdin, <sup>7</sup>Hasrah Junaidi, <sup>8</sup>Fakrurradhi Luthfi, <sup>9</sup>Firzan

<sup>1</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>2</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>3</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>4</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>5</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>6</sup> Faculty of Public Health, Universitas Abulyatama, Indonesia

<sup>7</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>8</sup> Faculty of Public Health, Universitas Teuku Umar, Indonesia

<sup>9</sup> Faculty of Engineering, Universitas Teuku Umar, Indonesia

Corresponding author: zakiyuddin@utu.ac.id

Co-author : ,fitriani@utu.ac.id, yarmaliza@utu.ac.id, teungkunihfarisni@utu.ac.id, Fitrahreynaldi@utu.ac.id, luthfi@utu.ac.id, firzan @utu.ac.id

**Submitted:** 19/7/2021 **Conference:** 17/10/2021 **Accepted:** 14/2/2022 **Published online:** 8/3/2022

**Abstract:** Hipertiroidism is a thyrotoxicosis caused by a hyperactive thyroid gland. Thyrotoxicosis is a clinical manifestation of excess thyroid hormone that circulates in the circulation. The prevalence of hyperthyroidism in the Meureubo Community Health Center in 2016 was 36 cases, in 2017 there were 59 cases and in 2018 there were 86 cases. The purpose of this study was to determine the relationship of risk factors namely gender, stress level and exposure to cigarette smoke with the incidence of hyperthyroidism. Quantitative research methods with a case-control design. The number of samples in the study were 24 cases and 24 controls. The case in this study was all hyperthyroid sufferers and the controls study were at risk. The results of the study based on bivariate analysis with Chi-square test obtained gender (Pvalue = 0.019 and OR = 4.200), stress level (Pvalue = 0.001) and exposure to cigarette smoke (Pvalue = 0.006 and OR = 11.500). Conclusion there is a relationship between sex, stress level and exposure to cigarette smoke with the incidence of hyperthyroidism. Suggestion that you immediately consult a health center if you start experiencing symptoms, manage stress well, consume food with balanced nutrition exercise regularly and and to avoid exposure to cigarette smoke to reduce the risk of hyperthyroidism.

**Keywords:** Hypertiroidism, Gender, Stress, Cigarette Smoke

### Introduction

The American Association of Clinical Endocrinology estimates that there are 27 million Americans suffering from hyperthyroidism/hypothyroidism, of which more than half of sufferers are undiagnosed. In Indonesia, the incidence of hyperthyroidism ranges from 44% - 48% of all thyroid gland disorders encountered and it is estimated that there were 12 million cases of hyperthyroidism in 1960. These data show a fairly high number of cases of hyperthyroidism occurring in the population of both developed and developing countries. Thyroid hormone is one of the hormones needed by almost all body processes including metabolism, so that the hypo/hyperthyroid state affects various events in the human body tissue. Hypothyroidism is considered a condition in which the effect of thyroid hormone in body tissues decreases, while hyperthyroidism is an excess of thyroid hormone circulating in the circulation due to a hyperactive (hyperfunction) thyroid gland (aga, 2014).

The thyroid is the largest pure endocrine gland in the human body which is located in the front of the neck, consisting of two parts (right lobe and left lobe). The two lobes are 5 cm

each and merge at the midline, shaped like a butterfly. Thyroid disease or disorder is a condition of abnormality in a person due to a thyroid gland disorder, either in the form of changes in the shape of the gland or changes in function (excessive, reduced or normal) (Infodatin, 2015).

The prevalence of hyperthyroidism in the UK affects 2% of women (10 times that of men), in America it is found in 1.9% of women and 0.9% of men. Data from several hospitals in Indonesia show a similar comparison where women are more likely to develop hyperthyroidism between the ages of 21-30 years (41.73%). Based on other studies, it is stated that the highest risk is in the young age group (average age 30-50 years), where age above 40 years is the most at risk. Hyperthyroidism is more common in Europe and other countries around the world, prone to iodine deficiency areas. Several studies have shown that there is a significant relationship between stress levels and the incidence of hyperthyroidism and also the relationship between exposure to cigarette smoke and the incidence of hyperthyroidism, enlargement of the thyroid gland increases the risk of the severity of clinical manifestations and an increase in FT4 followed by FT3 (Erent, 2015).

Based on research comparing anxiety problems and mood disorders in women with hyperthyroidism and gynecological diseases, it was found that hyperthyroid patients had higher levels of anxiety when compared to the group with gynecological disorders. Other research also states that people with hyperthyroidism who have long and relapsed feel more stressed (Diah, 2014).

Epidemiological surveys for endemic goiter are often found in mountainous areas such as the Alps, Himalayas, Bukit Barisan and so on and are also seen in lowlands such as Finland, the Netherlands and so on. For toxic goiter the prevalence is 10 times more common in women than men. The prevalence of hyperthyroidism in the UK in general practice is 25-35 cases in 10,000 women, whereas in hospitals it is found to be 3 cases in 10,000 patients. In women found 20-27 cases in 1,000 women, while men 1-5 per 1,000 men. Data from the Whickham Survey on health screening using the Free Thyroxine Index (FT4) shows the prevalence of hyperthyroidism in the community is 2% (Masriadi, 2016).

Based on Indonesia's health profile, non-communicable diseases (NCDs) are the cause of death for almost 70% in the world. NCD is a chronic disease that is not passed from person to person. PTM include heart disease, stroke, cancer, diabetes, hyperthyroidism and Chronic Obstructive Pulmonary Disease (COPD). PTM shows a tendency to increase from time to time. According to the results of the Basic Health Research (Riskesdas) in 2007, 2013 and 2018 there is a tendency to increase the prevalence of PTM such as diabetes, hypertension, hyperthyroidism, stroke and joint disease/rheumatism/gout. This phenomenon is predicted to continue. The 2018 Basic Health Research (Riskesdas) data shows that the national smoking prevalence is 24.3%. Smoking prevalence by gender, where the prevalence in males is 47.3% and females is 1.2%. According to age group, the highest prevalence was at the age of 30-34 years at 32.2%, while at the young age/novice smokers ( $\leq 19$  years) it was 13.4%. According to place of residence, the prevalence of smoking in rural and urban areas is not much different, however, in rural areas it is slightly higher (25.8%) compared to urban areas (23.0%).

Non-communicable diseases have now become a health problem in Indonesia. One type of non-communicable disease is hyperthyroidism. According to Riskesdas, more than 700,000 people in Indonesia are diagnosed with hyperthyroidism with the most patients being in Java (Infodatin, 2015). Meanwhile, based on the results of a survey conducted by IMS Health

---

(2015), 1.7 million Indonesians suffer from thyroid disorders and are the largest sufferers of thyroid disorders in Southeast Asia (David, 2018).

The results of the TSH examination at Riskesdas 2007 found that 12.8% of men and 14.7% of women had low TSH levels indicating a suspicion of hyperthyroidism. However, according to the results of the 2013 Riskesdas, there were only 0.4% of the Indonesian population aged 15 years or older who, based on interviews, admitted that they had been diagnosed with hyperthyroidism. Although the percentage is small, the quantity is quite large. If in 2013 the population aged 15 years was 176,689,336 people, then there were more than 700,000 people diagnosed with hyperthyroidism (Infodatin 2015).

Nowadays, sometimes we are too busy with our own interests to ignore important things to pay attention to, such as health, especially the health of the thyroid gland. Its main function is to control the body's metabolism. From data obtained from the Bengkulu Provincial Health Office, the number of people with thyroid disease reached 2,498 out of 1,249,238 Bengkulu province residents aged over 15 years as of July 2015 (Aprizum, 2017).

Based on data from the West Aceh District Health Office, in 2018 the highest cases of hyperthyroidism were found in the working area of the Meureubo Health Center. Compared to hyperthyroidism cases in other Puskesmas working areas, which only ranged from 1-8 cases of hyperthyroidism, the details of Drien Rpak Health Center were 1 case, Cot Seumeureung Public Health Center 8 cases, Samatiga Community Health Center 1 case and Meureubo Public Health Center 86 cases. And this is a special concern to look at the risk factors for the incidence of hyperthyroidism in the working area of the Meureubo Health Center, West Aceh Regency.

Based on data from the Meureubo Health Center, Aceh Barat Regency in 2018, cases of hyperthyroidism have continued to increase every year since 2016-2018. Data in 2016 there were 36 cases of hyperthyroidism, in 2017 it increased to 59 cases and in 2018 it increased again to 86 cases of hyperthyroidism, both new and relapsed. And based on gender, sufferers are higher than the female sex with 18 people and 6 people for men.

Based on the initial survey that I conducted on 8 people who experienced hyperthyroidism consisting of 3 men and 5 women, from the results of interviews conducted, it was found that they admitted that they experienced both mild and moderate pressure, this is due to because of work, economic and family factors and others they also admitted that 2 out of 3 men interviewed were heavy smokers, one of whom had quit smoking but was still frequently exposed because his family smoked, while 1 in 5 women claimed to be exposed to cigarette smoke and 4 of them admitted that they were often exposed to cigarette smoke.

Based on the data above, the research variables that will be taken related to "Risk Factors for Hyperthyroidism in the Work Area of the Meureubo Health Center, Aceh Barat Regency" are gender, stress levels and exposure to cigarette smoke.

## **Methods**

This type of research is a case control or case control analytic survey, which is related to risk factors using a retrospective study approach (Notoadmodjo, 2012). This study was conducted aiming to identify the effect (disease or health status) at this time, as well as the risk factors identified in past events regarding the Risk of Hyperthyroidism in the Work Area of the Meureubo Health Center, West Aceh Regency. This research was conducted in the Meureubo

Health Center Work Area, West Aceh Regency, and was carried out on 19 November – 4 December 2019.

The research population is the entire object of research or the object under study, namely all people who suffer and are at risk of experiencing hyperthyroidism in the Meurebo Health Center Work Area, West Aceh Regency. The population in this study consisted of the case population and the control population. The case population in this study were all people who experienced cases of hyperthyroidism as many as 24 people and received treatment at the Meurebo Health Center, Aceh Barat Regency from 2016 to January 2019. The control population in this study were all people who were at risk of suffering from hyperthyroidism who also received treatment in the Work Area of the Puskesmas. Meurebo, West Aceh Regency.

The sampling of cases using the total sampling method, namely 24 respondents, while the control sample using the purposive sampling method, namely 24 respondents. This study used a comparison of cases and controls of 1:1, so that the sample of this study was 48 respondents.

## Result

### Research result

**Table 1.** Factors of the influence of knowledge, stress, and diet on the incidence of gastritis in students of the Faculty of Public Health, University of Teuku Umar

Variabel	Pvalue	OR	Keterangan
Gender	0,019	4,200	Relationship
Stress	0,001		Relationship
Cigarette Exposure	Smoke 0,006	11,500	Relationship

*Source: Primary Data 2019*

Based on table 1, it can be seen that of the three variables, namely gender, stress and exposure to cigarette smoke, the P value is smaller than  $= 0.005$ , which means that the independent variable and the dependent variable have a significant relationship.

## Discussion.

### The Relationship between Gender and the Incidence of Hyperthyroidism

Based on the results of the chi square statistical test, the P value = 0.019 and this value is smaller than  $= 0.05$  (P-value =  $0.019 < = 0.05$ ) with OR = 4.200 so that  $H_a$  is accepted. The results of this statistical test indicate that there is a significant relationship between gender and the incidence of hyperthyroidism in the Meurebo Health Center Work Area, West Aceh Regency.

The results of this study are in line with research conducted by Rasipin (2012) concerning Factors Associated with the Incidence of Goiter in Elementary School Students in Agricultural Areas also showed similar results to the results of research that women have a greater risk than men with the number of cases in women as many as 32 people (60.4%) and in men as many as 21 people (39.6%).

### **Relationship between stress and hyperthyroidism**

Based on the results of the chi square statistical test, the P value = 0.001 and this value is smaller than = 0.05 (P-value = 0.001 < = 0.05) so Ha is accepted. The results of this statistical test indicate that there is a significant relationship between stress and the incidence of hyperthyroidism in the Meureubo Health Center Work Area, West Aceh Regency.

The results of this study are in line with research conducted by Fajri (2014) regarding the Analysis of Risk Factors for Hyperthyroidism in Women of Childbearing Age in Endemic Areas of Disorders Due to Iodine Deficiency, Magelang Regency also shows similar results to research that there is a significant relationship between stress and the incidence of hyperthyroidism. with P value = 0.005 and this value is smaller than = 0.05 (P-value = 0.005 < = 0.05) this means that Ha is accepted.

### **The Relationship of Cigarette Smoke Exposure With Hyperthyroidism**

Based on the results of the chi square statistical test, the P value = 0.006 and this value is smaller than = 0.05 (P-value = 0.006 < = 0.05) with OR = 11.500 so that Ha is accepted. The results of this statistical test indicate that there is a significant relationship between exposure to cigarette smoke and the incidence of hyperthyroidism in the Meureubo Health Center Work Area, West Aceh Regency.

The results of this study are in line with research conducted by Rasipin (2012) on Factors Associated with Goiter Incidence in Elementary School Students in Agricultural Areas also showed similar results to the results of research that there is a significant relationship between exposure to cigarette smoke and the incidence of hyperthyroidism. evidenced by the value (P value = 0.015 < = 0.05) with a value of OR = 3.9 and this means that Ha is accepted.

### **References**

- Aga. 2014. *Hubungan Kadar FT4 dan TSH Serum dengan Profil Lipid Darah pada Pasien Hipertiroid yang Dirawat Inap di RSUP Dr. M. Djamil Padang Tahun 2009-2013*. Jurnal Kesehatan Andalas. Universitas Andalas.
- Aprizum. 2017. *Sistem Pakar Diagnosa Penyakit Tiroid Menggunakan Metode Naïve Bayes Berbasis Android*. Jurnal Rekursif. Volume 5. Nomor 3. November 2017. Universitas Bngkulu.
- David. 2018. *Perancangan Film Pendek Tentang "Pejuang Hipertiroid"*. Institut Seni Indonesia Yogyakarta. 2018.
- Diah. 2014. *Konseling Psikologi Dan Kecemasan Pada Penderita Hipertiroid Di Klinik Litbang GAKI Magelang*. MGMI. Volume 6. Nomor 1. Desember 2014.
- Dinas Kesehatan . 2018. *Profil Kesehatan Aceh Barat: Dinkes Aceh Barat 2018*.
- Erent. 2015. *Beberapa Faktor Risiko Kejadian Hipertiroid Pada Wanita Usia Subur Di Kabupaten Magelang*. Jurnal Kesehatan Masyarakat (e-Journal). Volume 3 .Nomor 3 . April 2015. Universitas Diponegoro.
- Fajri. 2014. *Analisis Faktor Risiko Kejadian Hipertiroid Pada Wanita Usia Subur Di Wilayah Endemis Gangguan Akibat Iodium Kabupaten Magelang*. Tesis. Universitas Diponegoro. 2014.
- Kementerian Kesehatan RI. 2015. *INFODATIN Pusat Data dan Informasi Kementerian Kesehatan RI Situasi dan Analisis Penyakit Tiroid*.
- Masriadi. 2016. *Epidemiologi Penyakit Tidak Menular*. Jakarta: Penerbit Buku Kesehatan.
- Notoatmodjo, Soekidjo. 2012 . *Metode Penelitian Kesehatan*, Jakarta: Rineka Cipta, 2012.

*Profil Kesehatan Puskesmas Kecamatan Meureubo Kabupaten Aceh Barat Tahun 2016, 2017, 2018, 2019.*

Rasipin. 2012. *Faktor-faktor Yang Berhubungan Dengan Kejadian Goiter Pada Siswa-siswa SD Di Wilayah Pertanian.* Tesis. Universitas Diponegoro