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## THE RISK FACTORS FOR HYPERTHYROIDISM IN THE WORK AREA OF MEUREBO HEALTH CENTER, WEST ACEH REGENCY

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### Abstrak

Hipertiroidisme adalah tirotoksikosis yang diakibatkan oleh kelenjar tiroid yang hiperaktif. Tirotoksikosis ialah manifestasi klinis kelebihan hormon tiroid yang beredar dalam sirkulasi. Prevalensi hipertiroid di Puskesmas Meureubo pada tahun 2016 sebanyak 36 kasus, pada tahun 2017 sebanyak 59 kasus dan pada tahun 2018 sebanyak 86 kasus. Tujuan penelitian untuk mengetahui hubungan faktor risiko yakni jenis kelamin, tingkat stres dan paparan asap rokok dengan kejadian hipertiroid. Metode penelitian kuantitatif dengan desain *case-control* digunakan dalam penelitian ini. Jumlah sampel sebanyak 24 kasus dan 24 kontrol. Kasus dalam penelitian ini adalah seluruh penderita hipertiroid dan kontrol dalam penelitian ini adalah kelompok yang berisiko. Hasil penelitian berdasarkan analisis bivariat dengan uji *Chi-square* diperoleh jenis kelamin (*Pvalue* = 0,019 dan OR = 4,200), tingkat stres (*Pvalue* = 0,001) dan paparan asap rokok (*Pvalue* = 0,006 dan OR = 11,500). Kesimpulan ada hubungan antara jenis kelamin, tingkat stres dan paparan asap rokok dengan kejadian hipertiroid. Saran agar segera memeriksakan diri ke pusat kesehatan jika mulai mengalami gejala, mengelola stress dengan baik, mengonsumsi makanan dengan gizi yang seimbang, melakukan olah raga secara teratur dan agar menghindari dari paparan asap rokok untuk mengurangi risiko kejadian hipertiroid.

### Kata Kunci:

Hipertiroid, Jenis Kelamin, Stres, Asap Rokok

### ABSTRACT

Hyperthyroidism 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 Health Center in 2016 were 36 cases, in 2017 were 59 cases and in 2018 were 86 cases. The purpose of this study was to determine the relationship of the risk factors of gender, stress level and cigarette smoke exposure with the incidence of hyperthyroidism. The research used quantitative method with a case-control design. The number of samples were 24 cases and 24 controls. The case in this study was all hyperthyroid sufferers and the controls were groups at risk. The results of the study based on bivariate analysis with Chi-square test were gender (*Pvalue* = 0.019 and OR = 4.200), stress level (*Pvalue* = 0.001) and cigarette smoke exposure (*Pvalue* = 0.006 and OR = 11.500). The conclusion is there is a relationship between gender, stress level and cigarette smoke exposure with the incidence of hyperthyroidism. It is suggested to consult to health center if you have the symptoms, manage stress well, consume food with balanced nutrition, do exercise regularly and avoid cigarette smoke exposure to reduce the risk of hyperthyroidism.

### Keywords:

Hypertiroidism, Gender, Stress, Cigarette Smoke Exposure.

### 1. Introduction

The American Association of Clinical Endocrinology estimates that 27 million Americans have hyperthyroidism/hypothyroidism, in which a half of the sufferers are undiagnosed. In Indonesia, the incidence of hyperthyroidism ranges from 44% - 48% of all thyroid gland disorders found, and it is estimated that 12 million cases of hyperthyroidism were occurred in 1960. This data shows a high number of hyperthyroid cases occur both in developed and developing countries. Thyroid hormone is one of the hormones needed by almost all the body systems including metabolism, so that the hypo / hyperthyroid state affects various events in the human body. Hypothyroidism is considered as a condition in which the effects of thyroid hormones in the body's tissues are decrease, whereas hyperthyroidism is an excess of thyroid hormone that circulates in the circulation due to a hyperactive (hyperfunctioning) thyroid gland (Aga, 2014).

The thyroid is the largest pure endocrine gland in the human body, located in the front of the neck, consisting of two parts (right lobe and left lobe). The two lobes are 5 cm long and are joined at the bottom center line, shaped like a butterfly. Thyroid disease is a condition of abnormalities in a

person due to a thyroid gland disorder, either in the form of shape or its function (excessive, reduced, or normal) (Infodatin, 2015).

The prevalence of hyperthyroidism in England affects 2% of women (10 times than men), while in America it is found in 1.9% of women and 0.9% of men. Data from several hospitals in Indonesia shows a similar comparison, in which more women suffer from hyperthyroidism with age 21-30 years (41.73%). The other research stated that the highest risk is in the younger age group (average age 30-50 years), where the age above 40 years is the groups at risk. Hyperthyroidism is commonly found in Europe and other countries around the world, susceptible to iodine deficiency areas. From several research conducted, it was found that there was a significant relationship between stress levels and the incidence of hyperthyroidism, and also the relationship between cigarette smoke exposure and hyperthyroid events, enlarged adenoids increased the risk of severity of clinical manifestations and increased FT4 followed by FT3 (Erent, 2015).

Based on a study comparing anxiety problems and mood disorders in women with hyperthyroidism and gynecological diseases, it was found that people with hyperthyroidism had higher levels of anxiety when compared to the group with gynecological disorders. Other studies also stated that people with hyperthyroidism who have long 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. It is also seen in lowlands area such as Finland, the Netherlands and so on. For toxic goitre, the prevalence is 10 times more in women than men. The prevalence of hyperthyroidism in UK in general practice are 25-35 cases in 10,000 women, whereas in hospital there were 3 cases in 10,000 patients. In women, there are 20-27 cases out of 1,000, while in men 1-5 per 1,000 men. Data from the Whickham Survey on health screening using the Free Thyroxine Index (FT4) shows that the prevalence of Hyperthyroidism in the community is 2% (Masriadi, 2016).

Based on Indonesia's health profile, non-communicable diseases (PTM) are the cause of death for nearly 70% of the world. PTM is a chronic disease that is not transmitted from person to person. PTM includes heart disease, stroke, cancer, diabetes, hyperthyroidism, and Chronic Obstructive Pulmonary Disease (COPD). PTM shows a tendency to increase time by time.

According to the results of the Basic Health Research (Riskesdas) in 2007, 2013 and 2018, there is an increasing trend in the prevalence of PTM such as diabetes, hypertension, hyperthyroidism, stroke, and joint disease (rheumatism/gout). This phenomenon is predicted to continue. Basic Health Research Data (Riskesdas) in 2018 shows that the national smoking prevalence is 24.3%. The prevalence of smoking according to sex, where the prevalence in men are 47.3% and women are 1.2%. According to the age group, the highest prevalence was at the age of 30-34 years at 32.2%, while at young age / novice smokers ( $\leq 19$  years) was 13.4%. According to the place of residence, the prevalence of smoking in rural and urban areas are quite similar, however in rural areas it is slightly higher (25.8%) than in urban areas (23.0%).

Non-communicable diseases have 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 most patients located in Java (Infodatin, 2015). Meanwhile, based on the results of a survey conducted by IMS Health (2015), 1.7 million Indonesian suffers from thyroid disorders, and it is the largest sufferers in Southeast Asia (David, 2018).

The results of TSH examination in Riskesdas 2007 found that 12.8% of men and 14.7% of women had low TSH levels which indicated a suspicion of hyperthyroidism. However, according to Riskesdas in 2013, only 0.4% of Indonesia's population aged 15 years or over who based on interviews admitted to being diagnosed with hyperthyroidism. Even though it is a small percentage, it is quite large in quantity. If the population aged  $\geq 15$  years were 176,689,336 people in 2013, then there were more than 700,000 people diagnosed with hyperthyroidism (Infodatin 2015).

Nowadays, we are busy with our own bussiness so that we ignore things that are important to pay attention to, for example health, especially health of the thyroid gland. Its main function is to control the body's metabolism. Data from Bengkulu Health Office, the number of thyroid disease sufferers reached 2,498 out of 1,249,238 people who were over 15 years old as of July 2015 (Aprizum, 2017).

Based on data from the West Aceh Health Office in 2018, the highest cases of hyperthyroidism were found in the Meureubo Health Center. Compared to cases of hyperthyroidism in other health center work areas, which only ranged from 1-8 cases of hyperthyroidism, with details of 1 case of Rampak health center, Cot Seumeureung Health Center as many as 8 cases, Samatiga health center 1 case and Meureubo health center 86 cases. Its becomes a concern to see the risk factors for hyperthyroidism in the working area of the Meureubo Community Health Center, Aceh Barat District.

Based on data from the Meureubo Health Center, West Aceh Regency, in 2018, hyperthyroid cases continued to increase every year from 2016-2018. Data in 2016 there were 36 cases of hyperthyroidism, in 2017 it increased to 59 cases and in 2018 it increased to 86 cases of hyperthyroidism, both those who had recently experienced events and those who had relapsed. In

addition, based on gender, the number of sufferers is higher on female with 18 people and 6 people for men.

Based on the initial survey that conducted by the researcher on 8 people with hyperthyroidism consisting of 3 men and 5 women, it was found that they experience mild or moderate pressure, this is due to work, economic and family factors. They also admitted that 2 out of 3 men were heavy smokers, one of them had quit smoking, but he was still frequently exposed because his family was a smoker, while 1 in 5 of these women admitted to being 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 of this study are formulated as follows "Risk Factors for Hyperthyroidism in the Work Area of the Meureubo Health Center, West Aceh Regency".

## 2. Research Methodology

This research is a case control or case control analytic survey which concerns on risk factors using a retrospective study approach (Notoadmodjo, 2012). This research was conducted to identify the effect (disease or health status) at this time, as well as the risk factors identified in the past incident regarding the Risk of Hyperthyroid Incidence in the Work Area of the Meureubo Health Center, Aceh Barat regency. This research was conducted on 19 November - 4 December 2019

The population is the whole research object or object under study. In this case, they are including people who suffer from and are at risk of experiencing hyperthyroidism in the Work Area of the Meureubo Health Center, West Aceh Regency. The population in this study are consisted of the case population and the control population. The case population were all people who have experienced Hyperthyroidism as many as 24 people and were treated at the Meureubo Community Health Center in West Aceh Regency from 2016 to January 2019. The control population in this study were all people at risk of suffering from hyperthyroidism who also sought treatment in the health working area of Meureubo Health Center, West Aceh Regency.

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

## 3. Result and Discussion

### Result

**Table 1 Risk Factor for Hyperthyroidism in the Work Area of Meurebo Health Center**

| Variable           | Pvalue | OR     | Note                  |
|--------------------|--------|--------|-----------------------|
| Gender             | 0,019  | 4,200  | There is relationship |
| Stress             | 0,001  |        | There is relationship |
| Cigarette Exposure | 0,006  | 11,500 | There is relationship |

*Source: Primary Data (processed) 2019*

Based on the data above, all variables have Pvalue small than  $\alpha = 0.05$ . It is indicated that dependent and independent variable have significant relationship.

## 4. Discussions

### a. Relationship between Gender and Hyperthyroidism

Based on the results of the chi square statistical test, it was found that the Pvalue = 0.019 and it was smaller than  $\alpha = 0.05$  (Pvalue = 0.019 <  $\alpha = 0.05$ ) with OR = 4.200, so that  $H_a$  was accepted. The results of this statistical test indicate that there is a significant relationship between gender and the incidence of hyperthyroidism in the Meureubo Community Health Center, West Aceh Regency.

The results of this study are in line with research conducted by Rasipin (2012) on the factors associated with the incidence of Goiter in elementary school students in agricultural areas which also showed similar results that women have a greater risk than men. The number of cases in women were 32 people (60.4%) and in men as many as 21 people (39.6%).

### b. Relationship between Stress and Hyperthyroidism

Based on the results of the chi square statistical test, it was found that the value of P= 0.001 and this value was less than  $\alpha = 0.05$  (Pvalue = 0.001 <  $\alpha = 0.05$ ), it means that  $H_a$  was 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, West Aceh Regency.

The results of this study are in line with research conducted by Fajri (2014) concerning Risk Factor Analysis for Hyperthyroidism in Women of Fertile Age in Endemic Areas Disorders due to Iodine Deficiency in Magelang Regency. It is also show similar results that there is a significant relationship between stress and hyperthyroidism. with a value of Pvalue = 0.005 and this value is less than  $\alpha = 0.05$  (Pvalue = 0.005 <  $\alpha = 0.05$ ). It means that  $H_a$  is accepted.

### C. Relationship between Cigarette Smoke Exposure and Hyperthyroid Incidence

Based on the results of the chi square statistical test, it was found that the value of Pvalue = 0.006 and this value was smaller than  $\alpha = 0.05$  (Pvalue = 0.006 <  $\alpha = 0.05$ ) with OR = 11.500, so that  $H_a$  was accepted. The results of this statistical test indicate that there is a significant relationship between cigarette smoke exposure and the incidence of hyperthyroidism in the Meureubo Community Health Center, West Aceh Regency.

The results of this study are in line with research conducted by Rasipin (2012) on the factors associated with the incidence of Goiter in elementary school students in agricultural areas which also showed similar results with the results of this study that there was a significant relationship between cigarette smoke exposure and the incidence of hyperthyroidism with the value (Pvalue = 0.015 <  $\alpha = 0.05$ ) with OR = 3.9.

## 5. Conclusions

1. There is a significant relationship between gender factors and hyperthyroidism in the Work Area of Meureubo Health Center, West Aceh Regency (Pvalue = 0.019 <  $\alpha = 0.05$ ) with an OR = 4.200 (1.228 - 14.365).
2. There is a significant relationship between stress factors and the incidence of hyperthyroidism in the work area of Meureubo Health Center, West Aceh Regency (Pvalue = 0.001 <  $\alpha = 0.05$ ).
3. There is a significant relationship between cigarette smoke exposure factors and the incidence of hyperthyroidism in the work area of Meureubo Health Center, West Aceh Regency (Pvalue = 0.006 <  $\alpha = 0.05$ ) with an OR = 11,500 (1.307 - 101.182).

## 6. Suggestions

1. It is hoped that the community in the work area of Meureubo Health Center, West Aceh Regency, especially for women to always check their health if they got hyperthyroid symptoms, manage stress properly, consume food with balanced nutrition, do exercise regularly and avoid cigarette smoke exposure and quitting smoking for smokers to reduce the incidence of hyperthyroidism both in themselves, their families and communities.
2. It is hoped that Meureubo Health Center in West Aceh Regency could improve the delivery of information related to health, especially those related to hyperthyroidism and its trigger factors, especially for women and also people who have stress symptoms and who are exposed to cigarette smoke, both active and passive along with an understanding of the hazards concerned.
3. It is hoped that the next researcher will examine the risk factors for hyperthyroidism with different or more variables with a larger number of respondents and different research designs to provide stronger research results.

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Susy Sriwahyuni, SKM., M.Si was born in Meulaboh, West Aceh Regency, Province of Aceh on May 16, 1984. She is the first child of 4 siblings from the couple of Mr. Sukiswo Sugiman and Mrs. Rosmadewi. Her education background were SDN 9 Meulaboh graduated in 1996, SMPN 1 Meulaboh graduated in 1999, SMAN 2 Meulaboh in 2002, Bachelor (S1) in Public Health Sciences at Muhammadiyah University of Aceh graduated in 2009 and continued the Masters (S2) in Veterinary Public Health at Syiah Kuala University graduated in 2015.



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