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# Early Thyroid Awareness: Health Education to Raise Public Awareness in Lamongan

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*ABSTRACT*

*Thyroid disorders are a health problem that often goes undetected early due to nonspecific symptoms and a lack of public awareness. This condition can impact quality of life and productivity, and increase the risk of health complications if not properly managed. Lamongan Regency, as a region with diverse community characteristics, requires promotive and preventive efforts to raise early awareness regarding thyroid health. This health education activity aims to increase public knowledge and awareness about thyroid gland function, signs and symptoms of thyroid disorders, risk factors, and the importance of early detection and treatment. The methods used included health education, interactive discussions, and the provision of educational media in the form of leaflets and visual presentations to the community. Evaluation was carried out by measuring knowledge before and after the education activity. The results of the activity showed an increase in public knowledge and understanding of thyroid disorders and awareness of the importance of regular health check-ups. Health education about thyroid has proven effective in increasing early public awareness and is expected to contribute to the prevention and control of thyroid disorders in Lamongan Regency.*

## 1. INTRODUCTION

The thyroid gland produces hormones known as thyroid hormones. Thyroid hormones regulate the rate of the body's metabolism. In addition to stimulating protein synthesis, thyroid hormones also increase oxygen utilization by the body's cells. When these hormones are present in excess, cells work harder and the body's metabolism becomes faster. The thyroid gland is also known as the goiter gland (thyroid gland). It is located at the front of the neck, specifically just below the Adam's apple [1]. The thyroid gland is small in size and often not visible, so it is frequently overlooked. People often focus only on the appearance of the neck and Adam's apple without realizing the important role of the thyroid gland. It is only when a lump appears, hormonal disturbances occur, or complications arise that the thyroid becomes a concern [2].

Most people are not interested in thyroid-related issues. They prefer to talk about diabetes mellitus or attend seminars on heart disease and stroke.[3] However, upon closer observation, one in ten people is found to have a lump in the neck. Moreover, with ultrasonography (USG) examination, the likelihood of thyroid enlargement doubles to one in five [4].

Approximately 29% of the world's population living in 130 countries reside in iodine-deficient areas, particularly



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mountainous regions such as the Himalayas, the Alps, and the Andes, where iodine has been eroded by glaciers or floods. In the United States, with a population of more than 275 million, it is estimated that 27 million people suffer from various thyroid disorders [5]. More than half of them are unaware of the thyroid disease they have. Statistical data in Indonesia are unavailable, and it is likely that there are even more thyroid patients who are unaware of their condition and allow the disease to progress untreated [6].

Thyroid-stimulating hormone (TSH), also known as thyrotropin, is a glycoprotein secreted by the anterior part of the pituitary gland. Thyroid-stimulating hormone has not been widely discussed, even though it plays a role in the hypothalamic–pituitary–thyroid axis. TSH plays an important physiological role in regulating this axis by controlling the release of thyroid hormones from the thyroid gland [7].

The synthesis and secretion of TSH are regulated by hypothalamic factors, predominantly thyrotropin-releasing hormone (TRH), and by peripheral factors, mainly thyroid hormone levels. The stages of TSH synthesis include transcription, glycosylation, and the combination of two TSH subunits that are formed independently. After synthesis, TSH is secreted and binds to its receptor, known as the thyroid-stimulating hormone receptor (TSHR). Normal blood TSH levels in adults range from 2–10 mU/L, while in neonates they range from 3–18 mU/L [8].

The thyroid-stimulating hormone receptor is a G-protein-coupled receptor (GPCR) and has a structure similar to the serpentine receptor family, consisting of seven transmembrane segments, three extracellular loops, three intracellular loops, an amino-terminal ectodomain, and an intracellular carboxyl terminal. The intracellular loops of this receptor bind to the three (trimeric) G-protein subunits, namely α, β, and γ [9].

Hormone binding to TSHR generates second messengers that exert effects on the cells where the binding occurs. In addition to TSH, thyroid-stimulating antibodies (TSAb) and a newly identified glycoprotein hormone called thyrostimulin can also activate TSHR. Thyrostimulin is produced in several tissues and can activate TSHR, suggesting a paracrine regulatory mechanism in those tissues [10].

The TSH–TSHR interaction produces clinical effects on the tissues and organs where the binding occurs. This interaction can take place in the thyroid gland as well as in extrathyroidal tissues. In the thyroid gland, TSHR enables thyrocytes to recognize and respond to TSH secreted by thyrotropic cells of the pituitary gland [11]. This process regulates thyrocyte proliferation and the production and secretion of thyroid hormones. Disruption of TSH signal transduction leads to thyroid disorders such as goiter, hypothyroidism, and hyperthyroidism, which have complex clinical manifestations. Currently, functional TSHR expression has also been found outside the thyroid gland, and this remains an interesting area for further research regarding the role of TSHR in extrathyroidal tissues. Tissues known to express TSHR include adipose tissue, the hypothalamus, the anterior pituitary, bone, liver, and the immune system [12].

Although the thyroid gland is the only organ that produces the hormones T3 and T4, the regulation of their production is controlled by the hypothalamus and pituitary gland. The hypothalamus secretes TSH-releasing hormone to stimulate the pituitary gland to produce thyrotropin or TSH (Thyroid-Stimulating Hormone). TSH then influences the thyroid gland to produce the hormones T3 and T4 [13]. The level of thyrotropin released by the pituitary gland indicates the amount of hormone that needs to be produced by the thyroid gland. There are also certain periods in a woman's life that make her more vulnerable to thyroid problems.



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## 2. METHODE

This counseling activity was carried out by providing education through the delivery of material, question-and-answer sessions, and games with the students. The reason for choosing this method was that students prefer direct, participatory learning. Participatory learning allows counseling participants to be actively involved throughout the activity and makes it possible to assess whether participants understand the material being explained.

The implementation method involved collaboration between students of IIK NU Tuban and Grade X and XI students at SMK Asy-Syafi'iyah Lohgung by providing educational material on the "Thyroid Gland" and conducting health checks for the students. The material presented included the definition of the thyroid gland, signs and symptoms, prevention methods, examinations, care management, and the role of nutrition. This counseling activity was conducted through the delivery of material, question-and-answer sessions, and games with the students. The reason for selecting this method was that students prefer direct participatory learning, which enables participants to be actively involved during the activity and allows facilitators to evaluate participants' understanding of the material. The work procedures included creating health promotion content through social media, encouraging students to consistently maintain their health and personal hygiene, and providing education on how to perform health checks, particularly the measurement of vital signs (TTV).

## 3. RESULTS AND DISCUSSION

3.1. The counseling provided to students of SMK Asy-Syafi'iyah Lohgung was an effort to deliver knowledge, particularly regarding thyroid gland diseases. This Community Service activity was conducted on May 16, 2024, for the preparation process, which included situation analysis, coordination with the campus, coordination with the school, and coordination with local community and religious leaders. Subsequently, on May 17, our representatives visited the school to deliver an official letter from the campus and to obtain approval from the school authorities.

3.2. The next stage was the implementation of the Community Service activity at SMK Asy-Syafi'iyah Lohgung, which took place on May 19, 2024. A total of 50 participants attended the counseling session, consisting of Grade X and XI Multimedia students. During the counseling activity, we were accompanied by teachers from SMK Asy-Syafi'iyah Lohgung. We provided education on the topic of the "Thyroid Gland." The activity was carried out through the delivery of educational material. During the presentation, students appeared active in responding to the material and were able to clearly restate the content that had been explained.

For the students, the thyroid gland was an unfamiliar term, and initially they did not fully understand what the thyroid gland was. Prior to delivering the material, we provided free health checks for teachers and students. They were very enthusiastic because such activities had never been conducted there before. Their enthusiasm brought great happiness to our team. The thyroid gland material was highly appropriate to be delivered in this setting, covering the definition of the thyroid gland, signs and symptoms, prevention methods, examinations, care management, and the role of nutrition. Explanations regarding genetic and environmental risk factors were also provided to give a more comprehensive understanding. The counseling used an interactive lecture method to help students better understand the concepts.

3.3. The final stage was the evaluation phase, which aimed to assess the implementation of the Community Service activity on the thyroid gland, with support



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from the school principal, teachers, and students of SMK Asy-Syafi'iyah Lohgung. At this stage, monitoring and evaluation of the activities that had been carried out were conducted. The Community Service activity involved Grade X and XI Multimedia students, who were able to understand the material presented. Overall, the participants' attention and responses were good, as seen from their enthusiasm during case discussions and when we asked for responses by posing questions during the presentation. The students actively asked and answered questions. During the games session, students were very active in correctly answering the questions provided.

The participants showed considerable enthusiasm, and several students attempted to share their personal experiences. The feedback and impressions given at the end of the counseling session were positive and supportive of the activity. Although there were still a few students who did not fully understand the material, improvements from the school side are needed, such as routine health screenings, which could be an effective step in increasing awareness and preventing thyroid disorders from an early stage. We also gave prizes to participants who answered questions correctly during the games session as a form of appreciation for their attentiveness to the material. This activity served as a benchmark for participants' knowledge regarding thyroid hormones. Further counseling on other health topics is recommended to continue improving health awareness among students. The involvement of teachers and parents in school health programs is also recommended to support health education efforts in schools.

Documentation 3







Figure 4.1 Documentation of the Community Service Activity on the Thyroid Gland at SMK Asy-Syafi'iyah Lohgung.

## 4. CONCLUSION

Thyroid-stimulating hormone (TSH), also known as thyrotropin, is a glycoprotein secreted by the anterior part of the pituitary gland. Thyroid-stimulating hormone has not been widely discussed, even though TSH plays a role in the hypothalamic–pituitary–thyroid axis. TSH plays an important physiological role in regulating this axis by controlling the release of thyroid hormones from the thyroid gland.

Thyroid hormones have the effect of increasing the basal metabolic rate through various mechanisms. In addition, increased thyroid gland activity accompanied by increased food intake will enhance ATP production as well as the amount of energy released as heat, which in turn raises body temperature.

Based on the results of the Community Service activity, students of SMK Asy-Syafi'iyah were able to understand the thyroid gland and are expected to be more cautious in carrying out activities related to health. The counseling activity conducted at SMK Asy-Syafi'iyah for Grade X and XI Multimedia students, involving 50 students, was quite successful in increasing students' knowledge and understanding of the thyroid gland.

The results of this counseling provide hope that in the future, Grade X and XI Multimedia students at SMK Asy-Syafi'iyah Lohgung will be able to apply their knowledge regarding the prevention of thyroid gland diseases, with the aim of preventing the occurrence of such diseases



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among students of SMK Asy-Syafi'iyah Lohgung.

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