

JAN 2024 / BIL. 10 / 2024

# EON

*Epitome of Nature*

K E S I H A T A N   D A N   K E S E J A H T E R A A N



MAJALAH PP BIOLOGI  
UITMCNS

ISSN 2773-5869



## FREQUENTLY EXPOSED TO RADIATION CAUSES THYROID DISORDER

Nur Farhan Natasha Fadzil<sup>1</sup>, Nurul Annisa Ramli<sup>1</sup>, Nursuhaila Muhamad Fauzi<sup>1</sup>, Nur Azlin Atikah Mohd Nasir<sup>1</sup>, Aimie Rifhan Hashim<sup>1</sup>, Sharir Aizat Kamaruddin<sup>1</sup>, Eliy Nazira Mat Nazir<sup>2</sup>, Muhammad Nashiruddin Azizan<sup>3</sup>

<sup>1</sup>Faculty of Applied Science, UiTM Cawangan Perlis, Kampus Arau, Arau, 02600 Arau, Perlis, Malaysia

<sup>2</sup>Faculty of Management and Business, UiTM Cawangan Perlis, Kampus Arau, Arau, 02600 Arau, Perlis, Malaysia

<sup>3</sup>College of Government Law and International Studies, Universiti Utara Malaysia, 06010, UUM Sintok, Kedah Darul Aman, Malaysia

*shariraizat@uitm.edu.my*

EDITOR: NURHAMIMAH ZAINAL ABIDIN

Radiation exposure is a global health issue that receives serious attention from the scientific and medical community. In a time of rapid advancement in technology and increased radiation exposure from multiple sources, worries about possible health hazards have become more prevalent. One important area of focus is the effects of frequent radiation exposure on the thyroid gland, an important component of the endocrine system. In general, humans will always be exposed to natural or man-made radiation. Radiation naturally comes from elements from within the earth or cosmic rays from outer space. While medical imaging, food irradiation, and even airport security scanners are man-made radiations that are widely used today. Humans undergoing radiotherapy without proper control or those exposed to radiation at work are the only contributors to thyroid disorders.

The thyroid gland is one of the main organs affected by radiation exposure. Thyroid disorders are increasingly a concern among public health researchers because of their implications for human health. Hypothyroidism, hyperthyroidism, and thyroid cancer are thyroid disorders associated with radiation exposure.

Figure 2 shows swelling of the thyroid gland. The thyroid is a butterfly-shaped gland located in the front of the neck that is responsible for the production of thyroid hormones. The thyroid gland uses iodine (a source obtained from dietary sources such as salt and seafood) in producing thyroid hormones. Among the two types of hormones produced by the thyroid gland are triiodothyronine (T<sub>3</sub>) and thyroxin (T<sub>4</sub>) where T<sub>3</sub> is a highly biologically active hormone that affects metabolism of the human body cells directly. Thyroid hormones play an important role in controlling the metabolism and functions of the human body such as growth and controlling the metabolism of proteins and fats in the body.

Radiation from industrial or nuclear sources interacts with thyroid cells upon exposure. This interaction can possibly cause genetic multiplication and mutations that in turn alter the function of normal thyroid



**Image 1: Individuals often exposed to radiation undergo consultation with medical experts (Author's own collection)**



**Image 2: Swelling of the thyroid gland  
(Source: Dottie, 2016)**

Hormonal imbalances brought on by these changes may lead to diseases like hypothyroidism or, in more severe circumstances, thyroid cancer. Radiation exposure increases the risk of thyroid cancer, which is one of the most significant effects. It is crucial to understand that a person's age, the kind, and quantity of radiation they have been exposed to, the length of their exposure, and other factors all affect their chance of developing thyroid diseases. According to longitudinal research, people who are exposed to particular levels of radiation have an increased risk of thyroid nodules and, eventually, thyroid cancer. It gives a profound emphasis on the need to control and monitor radiation sources, especially in occupational and industrial environments. Radiation exposure not only poses individual risks but also poses a threat to public health as a

whole. Uncontrolled exposure can have an impact on offspring via genetic inheritance or prenatal exposure. Apart from the direct effects on the thyroid, radiation exposure also has social and psychological implications for exposed individuals. Concerns about the risk of thyroid cancer and other thyroid disorders can exert significant psychological stress on individuals and society. Figure 3 shows psychological stress on individuals due to health issues.

In conclusion, radiation has serious effects on thyroid health. Exposure to ionizing radiation, particularly from sources such as X-rays or nuclear radiation can increase the risk of thyroid disorders. Studies show that the thyroid is very sensitive to radiation, especially in children. Radiation exposure can cause structural and functional

changes in the thyroid glands that contribute to an increased risk of thyroid cancer. In addition, radiation can trigger autoimmune thyroid disease that causes disorders like Hashimoto's Thyroiditis or Graves' disease. It is important to understand that the risk depends on the amount of radiation received and also the duration of receiving radiation exposure. Prevention and routine monitoring are very important especially among individuals who work in the nuclear sector or who are often exposed to radiation in medical treatment. The ability to protect against radiation and awareness of the risk of exposure to radiation needs to be increased. Radiation safety policies and a holistic approach to thyroid health are mandatory to reduce the negative implications of radiation on this important organ.



**Image 3: Psychological stress on individuals due to health issues (Author's own collection)**