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**ISSN: 0974-8369**

## **Biology and Medicine**

**International, Open Access**

**Available online at: [www.biolmedonline.com](http://www.biolmedonline.com)**

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## Evaluation of the Functional State of the Thyroid Gland in Men of the Ecologically Unfavorable Aral Sea Region

Berikbay Kultanov\*, Alik Kubayev, Aigul Serikbaeva, Zauresh Tauesheva, Anar Turmukhambetova, Raushan Dosmagambetova

Karaganda State Medical University, Karaganda, Kazakhstan

### Abstract

In this paper we study the functional state of the men living in environmentally disadvantaged areas of South Kazakhstan, Arys town, the area of the Aral Sea. To achieve these aims were examined 225 men of reproductive age from 18 to 49 years. According to a study, high rates of thyroid dysfunction in the form of subclinical hypothyroidism in the youngest age group of 18-29 years and in the age group 40-49 years were found—18.67% of men studied.

### Keywords

Aral Sea region; Thyroid hormones; Subclinical hypothyroidism

### Introduction

Establishing causal relationships between environmental-risk factors and health status of the population makes it possible to control the risk factors for disease-control purposes. The problem of measuring and assessing risks today has a special role both because of worsening ecological trouble in recent decades and because of the complex handling of the process [1]. The human body in the process of life is exposed to complex environmental factors, polytropic actions that contribute to the formation of altered reactivity of the organism, increasing the risk of diseases [2-4]. The Aral Sea crisis is the biggest environmental disaster of the planet, acquired acute. Intensive desertification, sustained irreversible degradation of the environment, and worsening living conditions have caused an increased incidence of new socioeconomic and environmental situations that require legislative solutions and legal regulation of social protection of the population living in environmentally disadvantaged areas [5].

In recent years, the incidence of thyroid problems have acquired special urgency. The large number of organs and systems that respond to thyroid hormones (TH) includes thyroid problems in the sphere of interests of representatives of a variety of medical disciplines, and an increasing incidence of thyroid disease in the population [6-8] brings these issues to the forefront of modern endocrinology.

The objective of this study was to assess the functional status of the thyroid gland in men of reproductive age in ecologically unfavorable regions of the Republic of Kazakhstan, mainly the Aral Sea region—the South Kazakhstan area of Arys town.

### Materials and Methods

Research conducted as part of the scientific and technical project, “An integrated approach to managing the health of the population of the Aral Sea region” examined male population aged 18-49 years in a village of the Arys town in the South Kazakhstan region. During the study 225 men of reproductive age (seventy-five men in the age group 18-29 years, seventy-five males aged 30-39 years, and seventy-five men aged 40-49) were examined. Inclusion criteria were time of human habitation in the Aral Sea area was not less than five years and employment in occupations with the hazard of no more than two class. All men of the study area underwent clinical examination to detect the symptoms of thyroid disease, and laboratory tests were performed: determination of serum TSH and free T4 in serum. Statistical analysis

was performed using the package STATISTICA 6.0 (Stat-Soft, 2001) and the program BIostatistica 4.03.

### Results and Discussion

Disorders of the thyroid gland in the male population of Arys, South Kazakhstan region, in the majority of cases have been presented in the form of subclinical and overt hypothyroidism. According to the literature, it is known that the prevalence of subclinical hypothyroidism in men is up to 3% of the population [9]. The prevalence of overt hypothyroidism in populations of men reaches 2% of the population. Among men aged 18-29 years in Arys by clinical and laboratory examination were registered fourteen cases of subclinical hypothyroidism, which is 18.67% of the surveyed men and two cases (2.66%) of overt hypothyroidism where the average value of ( $M \pm m$ ) TTH was  $3.11 \pm 0.33$ ; the mean value ( $M \pm m$ ) T4 was  $10.62 \pm 0.41$ . In men of the age group 30-39 years were registered eleven cases (14.67%) of subclinical hypothyroidism and three cases (4%) of overt hypothyroidism, where the average value of ( $M \pm m$ ) TTH was  $3.64 \pm 0.39$ ; the mean value ( $M \pm m$ ) T4 was  $10.09 \pm 0.55$ . As for the men in the age group of 40-49 years were registered fourteen cases (18.67%) with laboratory-confirmed subclinical hypothyroidism and two cases (2.67%) of overt hypothyroidism, where the average value of ( $M \pm m$ ) TTH was  $3.59 \pm 0.57$ ; the average value of ( $M \pm m$ ) T4 was  $11.02 \pm 0.54$ .

### Conclusions

The study of thyroid function among the male population aged 18-49 years in the ecologically unfavorable Aral Sea town of Arys revealed:

1. In all groups, the prevalence of subclinical hypothyroidism was determined to be in excess of the average prevalence of these pathologies in the population.

\*Corresponding author: Kultanov B, Karaganda State Medical University, Karaganda, Kazakhstan; E-mail: [kultanov.berik@mail.ru](mailto:kultanov.berik@mail.ru)

Received: Nov 6, 2015; Accepted: Nov 27, 2015; Published: Dec 30, 2015

Citation: Kultanov B, Kubayev A, Serikbaeva A, Tauesheva Z, Turmukhambetova A, *et al.* (2015) Evaluation of the Functional State of the Thyroid Gland in Men of the Ecologically Unfavorable Aral Sea Region. Biol Med (Aligarh) 7(5): BM-138-15, 2 pages.

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2. Particularly high rates of thyroid dysfunction in the form of subclinical hypothyroidism have been reported in the youngest age group of 18-29 years and 40-49 years—18.67% of men studied.
3. The maximum rates of overt hypothyroidism (4%) were recorded in the age group 30-39 years.

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**Citation:** Kultanov B, Kubayev A, Serikbaeva A, Tauesheva Z, Turmukhambetova A, *et al.* (2015) Evaluation of the Functional State of the Thyroid Gland in Men of the Ecologically Unfavorable Aral Sea Region. *Biol Med (Aligarh)* 7(5): BM-138-15, 2 pages.

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