

## Relationship between Prevalence of Iodine Deficiency and COVID.19

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### Abstract

Iodine is an essential element which is important for synthesis of thyroid hormones to make their biological tasks, insufficiency of this element lead to serious complications that when combined to global crisis, COVID.19 may lead to death. This review focused on relation between prevalence of goiter in connection with COVID.19 and there is no significant linkage between prevalence of goiter and that global health disorder (COVID.19), further studies required to check the role of iodine supplements in treatment or even protection from the complications of COVID.19.

**Keywords:** *Goiter; COVID.19 Prevalence; Global; Sudan*

### Introduction

Iodine is a necessary constituent of the hormones formed by the thyroid gland. Thyroid hormones, and consequently iodine, are critical for mammalian life. In 1811, Courtois revealed iodine as a violet vapor arising from seaweed ash while developed gunpowder for Napoleon's army. Gay-Lussac recognized it as a new element, and called it iodine, from the Greek for "violet". Iodine was originated in the thyroid gland by Baumann in 1895. In 1917, Marine and Kimball confirmed that goiter was attributed to iodine deficiency and could be prohibited by iodine supplementation. Thyroid enlargement prophylaxis through salt iodization was primary introduced in Switzerland and the United States in the near the beginning 1920s.

In 1980, the initial universal estimate from the World Health Organization (WHO) on the commonness of goiter was documented; it estimated that 20 - 60% of the world's inhabitants were iodine deficient and/or goitrous, with most of the load in developing countries [1]. Iodine is a vital constituent for ordinary growth and progress in animals and man. The fit human contains 15 - 20 mg of iodine of which 70 - 80% is in the thyroid gland. The standard daily need for nutritional intake is 100 - 150  $\mu$ g of iodine, but this need is raised in pregnancy to 200  $\mu$ g/day or more. Next to dietary intake, iodine is absorbed mostly in the jejunum and circulates in the plasma as inorganic iodine. The thyroid gland may be considered as an industrial unit utilizing iodine in the production of thyroid hormones.

Iodide is vigorously concentrated by the thyroid to 20 - 40 times contrasted to the plasma concentration. The method of the concentrating procedure is through an iodide symporter located on the basolateral membrane of the follicular cell. The symporter gene was cloned in 1996, but more lately other iodide transporters have been recognized in the apical follicular membrane which transport the anion into the follicular lumen thus make it accessible for incorporation into tetraiodothyronine. This procedure occurs on thyroglobulin, a 660 kD protein located in the thyroid follicular lumen whose arrangement may be unfavorably exaggerated by changes in iodine status [2].

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In the Sudan, the era from the early 1980s to the middle 1990s observed considerable action in association with iodine deficiency disorders (IDDs) in the form of epidemiological and etiological researches and assessments of the influences of diverse interventions. The entire prevalence of goitre documented in those researches ranged from 13% in the eastern city of Port Sudan and 17% in Khartoum state, to 78% in the central district and 87% in Darfur, in the west. According to a national study carried out in 1997, the total prevalence of all kinds of goitre was 22%. It has been predictable that each year more than 200 000 kids born in the Sudan are at jeopardy of iodine insufficiency [3].

COVID-19 is a worldwide tragedy that influences the global health, economy, and limits people travels. The disease which is presently named COVID19 is attributed to a novel Coronavirus, labeled as SARSCoV-2, which was exposed through whole-genome sequencing, polymerase chain reaction and culture of bronchoalveolar lavage fluid collected from infected persons [4]. At an international scale, approximately 2 billion people undergo of iodine insufficiency (ID) of which approximately 50 million present with clinical signs [5].

On 19<sup>th</sup> June 8,316 persons were exposed to COVID.19 in Sudan, with 6.1% mortality percentage and the recovery percent was 37.1% [6] and 8,525,042 confirmed cases of COVID-19, including 456,973 deaths, reported to WHO, with 5.4% mortality percentage [7].

There is no published study links between iodine deficiency and susceptibility to COVID.19 globally or in Sudan, then we try to offer data about the connection between those health problems.

### Discussion

Current world Population is 7,792,701,320 [8] and the percentage of iodine deficiency is 25.7% worldwide which is more than percentage of in Sudan 22%, the percentage of confirmed cases according to global population is 0.12%, the total population in Sudan is

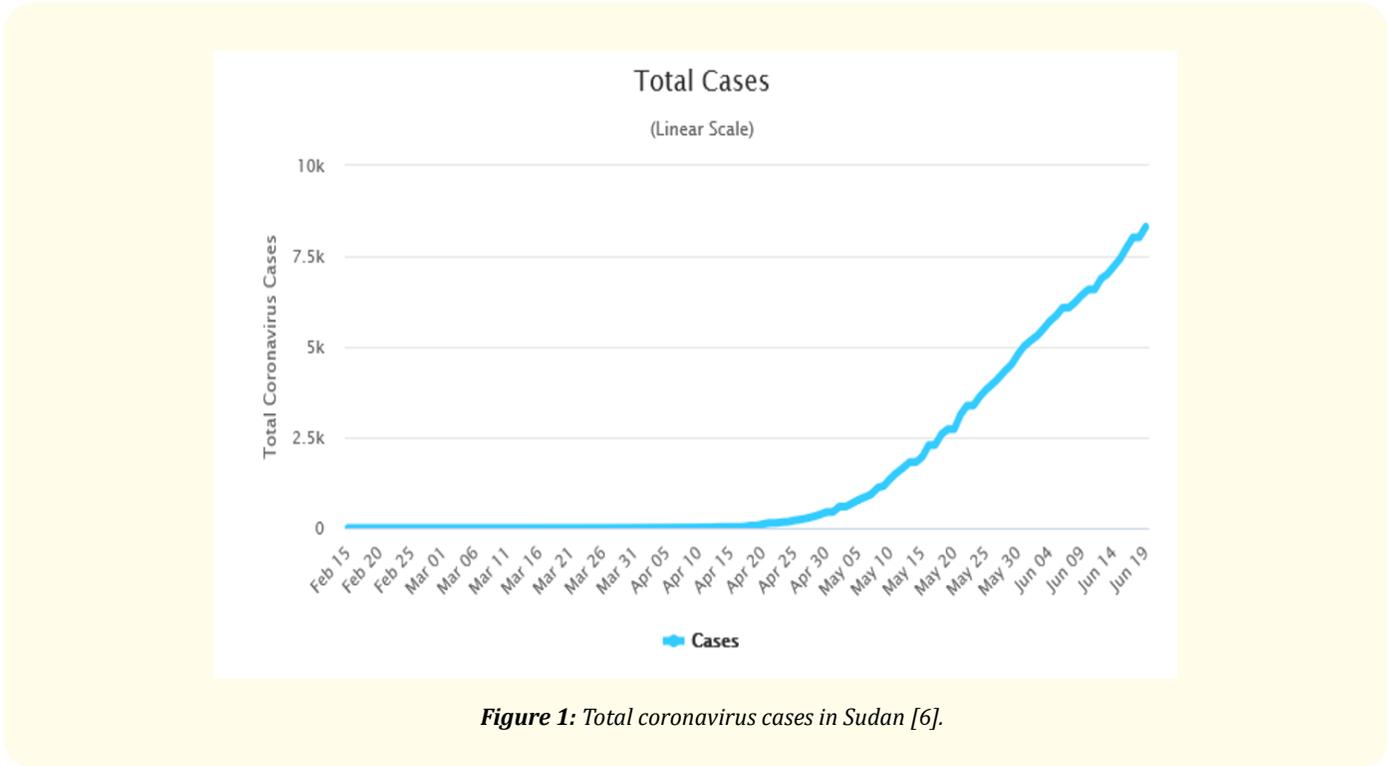
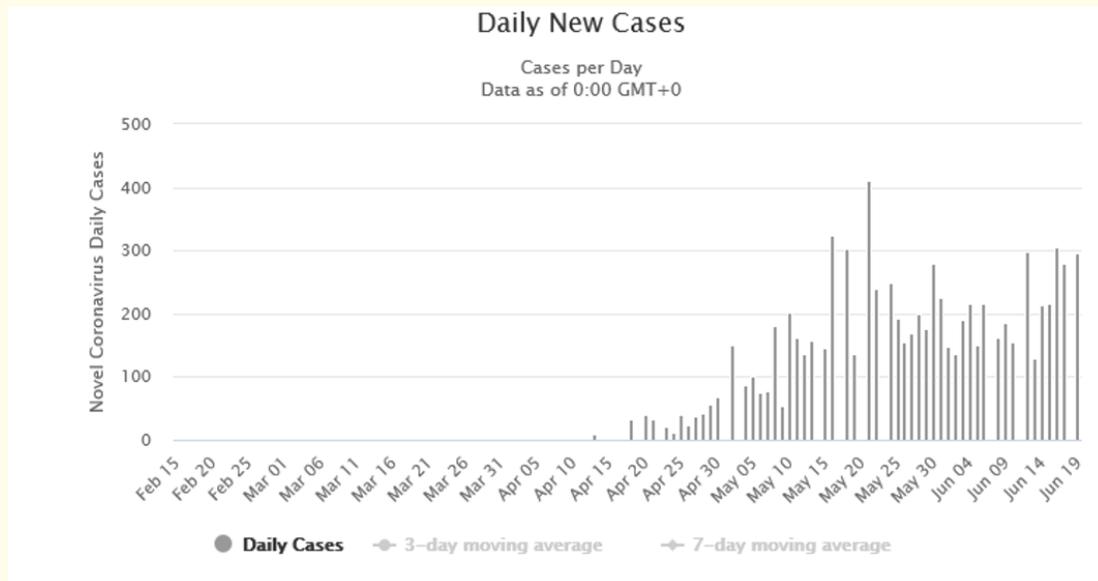


Figure 1: Total coronavirus cases in Sudan [6].



**Figure 2:** Daily new cases in Sudan [6].

43,820,950 [9], the percentage of confirmed cases according to total population is 0.018%. According to report of Sudanese Ministry of health on 17<sup>th</sup> June the percentage of confirmed cases from the national cases in Khartoum state was 75.9%, Central States 12.7%, Red Sea State 1.2% and 0.02% in Darfur states, in comparison to the prevalence of iodine shortage in Sudanese states which was 13% in the eastern city of Port Sudan and 17% in Khartoum state, to 78% in the central district and 87% in Darfur, in the west, we observe that there is no intimate relation between iodine insufficiency and commencement of COVID.19 infection.

## Conclusion

No significant relation between goiter and frequency of COVID.19, despite that goiter may lead to severe complications in COVID.19 patients, further studies must be conducted in local and global levels to know if iodine supplements are necessary for treatment or even prevention of this global crisis.

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