



EFFECT OF CIGARETTE SMOKING ON THYROID HORMONES IN SUDANESE SMOKERS

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ABSTRACT

Effect of cigarette smoking on serum thyroid hormones i.e. thyroxin (T3) and triiodothyronine (T4) and their regulatory hormone i.e. thyrotrophin (TSH) was evaluated in healthy smoker individuals and compared with non smoker individuals. Enzyme linked immunosorbant assay (ELISA) was used to estimate level of T3, T4 and TSH. The results of study showed that the (Mean \pm SD) of T3, T4 and TSH were (1.21 \pm 0.26), (6.3 \pm 2.0) and (1.27 \pm 0.7) respectively in smokers which was not significantly differ when compared with non-smokers (Mean \pm SD) of T3, T4 and TSH were (1.31 \pm 0.27), (6.0 \pm 0.7) and (1.33 \pm 0.6) respectively.

The study indicated no significant variations in thyroid hormones and their regulatory hormones in smokers and non smoker individuals.

Key words: smokers, thyroxin, triiodothyronine and thyrotrophin.

INTRODUCTION

Smoking has a significant impact on thyroid function. Thiocyanate, a major component of smoke, derived from hydrogen cyanide leads to increased excretion of iodine, inhibits iodide uptake by the thyroid, competes with iodide in the organification process [1] and inhibits thyroid hormone synthesis [2].

The anxious effect of smoking on the thyroid gland seems to become apparent when thyroid function is slightly compromised, while in euthyroid patients, the pool of circulating thyroid hormones is adequate to compensate for the smoking-induced defect of thyroid hormone action [3]. Thus, in normal adults, smoking has no effect on thyroid function or a weak pro-thyroid effect, causing small,

thyrotrophin-independent increase in thyroid function, most often small increase in serum triiodothyronine concentrations [4].

Epidemiological studies have reported a small inverse association of thyroid cancer with cigarette consumption [5]. Cigarette smoking has been found to be associated with a moderately reduced risk of thyroid cancer. This relationship is more pronounced in current smokers than former smokers. There are significant trends of reduced risk

with greater duration and frequency of smoking [6]. The smoking-related reduction in TSH secretion and the lower body weight among smokers compared to nonsmokers are proposed explanations, as increased body weight is associated with a slightly increased thyroid cancer risk [7].

Both decreased and increased thyroid functions have been described in smokers [8]. Higher thyroxine and lower thyroid stimulating hormone levels have been reported in smokers [9]. Moreover, heavy smokers had a smaller increase in thyroxine levels than did light smokers, when compared to non-smokers. Cigarette smoking is, therefore, associated with a significant increase in the T4, T3 level and a decrease in the TSH level.

The effect of smoking on thyroid hormone levels is related to increased levels of thyroxine-binding globulin [10].

It has further been reported by several workers that current smokers have higher T4 levels and lower TSH levels than never smokers and former smokers [11]. Certain workers, on the other hand, have reported similar or lower thyroid hormone levels in smokers as compared to non-smokers [12].

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This study was conducted to investigate the effect of smoking on thyroid hormones (T3, T4) from the thyroid gland and their regulatory, thyroid-stimulating hormone (TSH), from pituitary gland in our local population.

MATERIAL AND METHODS

A total number of 100 volunteer individuals were introduced into the study, (50 non smokers and 50 smokers), age range for non smokers (21-52) years (Mean \pm SD= 36 \pm 7.6) and for smokers(29-52) years (Mean \pm SD= 40 \pm 6.4) and the duration of smoking (Mean \pm SD= 12.4 \pm 6.2) years and they smoke (11 \pm 3.2) cigarette/day, all volunteer participants were from Khartoum state, any individual complaining from, renal disease, Liver disease, Diabetes mellitus and Hypertension or history of the disease effect thyroid were excluded from the study population from each 5 ml of venous blood were collected using antiseptic for the skin (70%alcohol) in plain container Blood was then centrifuged for 3-5 min and serum was separated then T3, T4 and TSH estimated using human Uno ELISA full automated machine.

Statistical evaluation was performed using SPSS (SPSS for windows version 17) to assess significant difference using T-test and Correlations between hormone and the duration of smoking were assessed using bivariate correlations. P.value < 0.05 was considered statistically significant

RESULTS

The results of study is presented in (Table-1) showed that the (Mean \pm SD) of control T3, T4 and TSH were (1.31 \pm 0.27), (6.0 \pm 0.7) and (1.33 \pm 0.6) respectively and the (Mean \pm SD) of smoker T3, T4 and TSH were (1.21 \pm 0.26), (6.3 \pm 2.0) and (1.27 \pm 0.7) respectively, the P.values were (0.081),(0.337),

Table-1: T3, T4 and TSH in Smoker and non Smoker

Parameter	Group 100		P.value
	control (n=50) Mean \pm SD	Smoker(n=50) Mean \pm SD	
T3	1.31 \pm 0.27	1.21 \pm 0.26	0.081
T4	6.0 \pm 0.7	6.3 \pm 2.0	0.337
TSH	1.33 \pm 0.6	1.27 \pm 0.7	0.655

(0.655) respectively.

DISCUSSION

According to the presented results there is no significant differences in T3, T4 and TSH between the smoker individual and non smoker individuals .

The current study revealed slightly higher T4 concentration in the smoker when compared with non smoker individuals; however, the difference in the mean didn't achieve statistical difference. However according to Nabila et al 2010, smokers were shown no significant differences when compared with non smoker individuals.

Earlier it has been observed that smoker have some or low thyroid hormone level as compared to non smoker individuals (14). Significantly reduced serum thyroxin (T4) and non significantly elevated serum T3 and TSH level in smoker group when compared with non smoker group have earlier been reported (2).

In this study the concentration of T3, T4 and TSH were not agree with most previous study this may be due to firstly the most of the smoker group may be recent smokers and this may be has no obvious effect in the concentration of thyroid hormones and their regulatory hormone so we recommend to classify the smoker according to the period of smoking into groups i.e. chronic smokers, recent smokers passive smokers and non smokers when a new study will conduct.

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