

# A Comparison Between The Effect Of Shisha And Cigarette Smoking On Thyroid Function Of Males

Sundus Kareem Hamzah

Department of Chemistry, College of Education, University of Al-Qadisiyah, Diwaniya, Iraq

Corresponding author: Sundus Kareem Hamzah E- mail : [sundus.hamzah@qu.edu.iq](mailto:sundus.hamzah@qu.edu.iq)

## ABSTRACT

Studies show, that smoke may effect physiological of the thyroid gland functions, this study aim was to decide the effects of cigarette smoke or hookah smoke on thyroid function in males. Thyroid is a consider endocrine gland located under the larynx, thyroid hormones of the major are thyroxinT4, Tri-iodothyroxine T3 , and thyroid inspiring hormone TSH. Male divided into cigarette smokeG1, hookah smoking G2,and control group G3, The results indicated that serum TSH levels were significant change low a in the G1 group than with the control group(G3), and we found the levels of TSH hormone were significant change lower  $P<0.05$  in the cigarette smokers compared with the control group, TSH levels were no significant  $P\geq 0.05$  between the hookah smokingG2  $3.6\pm 0.004$  and control group, and highly significant mean differences among two groups in the TSH levels between the G1 and G2, Our findings also indicated a significant increase in T3 or T4 serum levels in smoking, also the levels of triiodothyronine hormone (T3) were  $P<0.05$  (significantly higher) in the cigarette smokers  $3.50\pm 1.1$  nmol/l compare with the control group G3,  $0.98\pm 0.002$ nmol/l,, We found also the levels of thyroxine T4 significant higher  $p<0.05$  than control G3 and cigarette smokers. Also the significant differences in T3 levels  $P<0.05$  betweenG2 $4.01\pm 0.4$  than G3  $0.98\pm 0.002$ ,also we found significant differences in the T4 levels  $P<0.05$  between G2  $140\pm 30$  compared G3  $120\pm 22$ , . Also we found no significant change in T3 levels  $P>0.05$  between G1  $3.50\pm 1.1$ than G2  $4.01\pm 0.4$ , also we found no significant changes in T4 levels  $P>0.05$  in G1  $135\pm 24$ compared G2

**Keywords:** Cigarette Smoke, Hookah Smoke, Thyroid

## Correspondence:

Sundus Kareem Hamzah

Department of Chemistry, College of Education, University of Al-Qadisiyah, Diwaniya, Iraq

\*Corresponding author: Sundus Kareem Hamzah email-address: [sundus.hamzah@qu.edu.iq](mailto:sundus.hamzah@qu.edu.iq)

## INTRODUCTION

Smoke is the important main cause of needless death [1]. Pipe and Cigarettes, hookas and other modes of smoking are very shared amid every adults[2]. Cigarette smoking is a severe health problem and greatest important preventable cause of death in the world. Smoking causes atherosclerosis and lack of platelets and mainly increases risk of cancer producing mutations which may seem until many years after man's first cigarette. Its assessed that tobacco-connected deaths will quantity to 6.4 million in the 2015, 8.3 million in 2030 and one billion deaths through the 21st century.[3,4] Cigarette of smoke comprises more 4,800 compounds, as of them; at smallest amount sixty-nine of chemicals reason the cancer disease. causes of cigarette smoking, about 90% of deaths by the lung cancer and the around 85% of by the chronic obstructive pulmonary diseases such as emphysema disease and deaths chronic bronchitis disease. The smoking is related by extensive range of the diseases similar to the cancers, diseases of cardiovascular, and strokes, pulmonary diseases [5,6]. The people smokers is die at an earlier age than people non smokers perform. The reported an characteristic of about 10 years death of early in the smokers [7].

Tobacco smoking is the another communal health risk factor leaving hazardous effects on the endocrine system and the counting pituitary role, adrenal secretions and thyroid function [8]. smoking effect on body is mostly mediated through pharmacological action of the nicotine and the toxins. Hookah smoking is an unhealthy custom rising worldwide annually and is going to put the world health in more danger [9]. Also the thiocyanate present in the smoke [10] , [10]Tobacco smoking is commonly consumed in changed ways counting, pipe, cigarette, and hookah smoking [11,12].

Shisha custom has a history which dates back to around 400 years and with changed terms such as narghile, hookah, water-pipe, and argils,[13] it originates

in dissimilar flavors, such as mint, chocolate, cherry, apple, and coconut which are frequently related with social activity where more people may share the same pipe. Most People use Shisha smoke (SH-S) during the humanity, and used daily by more than 100 million women and men in world had been burned for at least 400 years.[14] Shisha use is extensively apparent to be a harmless alternative to cigarettes because the smoke is filtered finished water but growing evidence which indicates that actively smoking shisha may be more harmful than the smoking cigarettes.[3]

Thyroid usual function is energetic aimed at metabolism for cell, normal growth and increase [15]. Change in levels of serum thyroid hormones be able to main to a variety of disorders representative the biomedical of significance , features of the hormones [12,16].

Thyroid is the one of the main endocrine glands, existing directly under the larynx[17]. Hormones of thyroid gland include Tri-iodothyronine (T3), (T4) and thyroxin they are main hormones of the gland and they are essential for establishing development, metabolism, normal growth, differentiation and reservation of normal functions3. The thyroid function is measured by TSH hormon, whose secretion is measured by hypothalamus. Most of the T3 hormone is derived from partial de-iodination of T4 inside of the thyroid gland, and the T3 hormon considered more biologically and more active than T4. In animals, thyroid hormone is very important for usual growth and growth therefore the best concentrations of thyroid hormones act similar growth stimulators5. [18] Cigarette tobacco effects of the smoke on the thyroid hormones can be causes of concern. Smoke of cigarette comprises above (4800) mixes, counting at smallest amount 200 of the toxicants or endocrine disruptors and about 80 known or supposed the carcinogens [19]. Further Agency research of the Global on Cancer organizes on smoke cigarette by tobacco as a known person carcinogen. A cigarette burner produces together

## A Comparison Between The Effect Of Shisha And Cigarette Smoking On Thyroid Function Of Males

the typical smoke, which creates from the lips piece of the cigarette , exhaled gasped by the smoker, and lateral stream smoke. Which originates as of the lean of a flaming cigarette. [20]

The aim main of this study was to show levels the of TSH, T3 or T4 hormones and effects of hookah smoke and cigarette smoke on in hormones

### MATERIALS AND METHODS

Collected 150 Blood samples from male smokers, aged (18-60) years during 3 months the samples were divided in three groups G1(cigarette smokers), n=50 G2(hookah smokers) , n=50,G3 (nonsmokers(control group )n=50. Total male had attended the hospital for thyroid hormone test were included in the study, which were selected from January to Jun 2019. The search was permitted by the Ethics Committee of Clinic Hospital, and informed agreement was obtained from all subjects involved in the study. All patients engaged in study were clinically diagnosed in Al-Diwanyah teaching hospital. Data organized according to gender, TSH, T3 and T4 level, were analyzed. These sample were collected by a syringe with a little of heparin to prevent blood coagulation ,the

samples were centrifuged at 2000 rpm for 5 minutes. Using VIDAS by (biomerieus A) by Hospital. VIDAS, T3, TSH and T4 an automated quantitative, test for use on the (VIDAS) family instruments, for the immune enzymatic determination of, T3, TSH and T4 in human serum (lithium heparin using the (ELFA) Technique (enzyme linked fluorescent Assay).

### Statistical Analysis

The student test (t-test) was used for the quantitative data by using SPSS 23. The levels of significance different was when the possibility (p<0.05).

### RESULT AND DISCUSSION

Table (1) shows the activity of thyroid-stimulating hormone (TSH) in the G1(cigarette smokers) and in controlsG3 .The levels of TSH were observed to be  $0.09 \pm 0.002$   $\mu$ UI/ml in the cigarette smokers and  $4 \pm 0.2$   $\mu$ UI/ml in the controls group . There was low a significant different in TSH levels in the (G1) group than with the control group(G3) shown , figure1.

Table 1:- Concentrations of thyroid hormones in the cigarette smokers (G1) and control group (G3).

	NO	TSH $\mu$ UI/ml	T test
G1	50	$0.09 \pm 0.002$	P<0.05
G3	50	$4 \pm 0.2$	

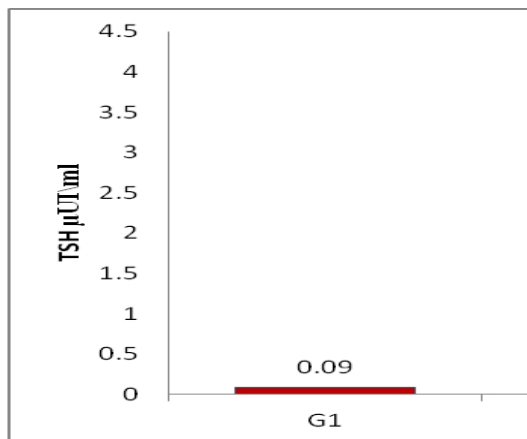
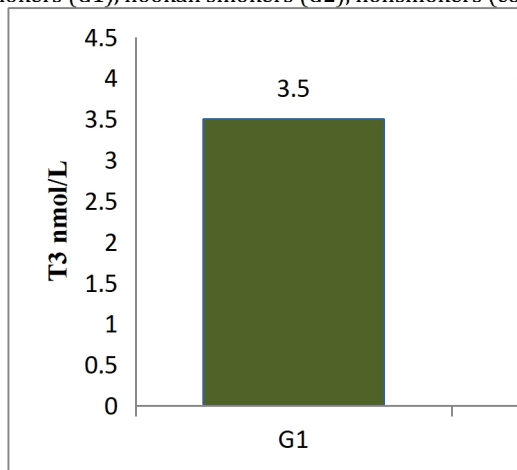


Fig.1.Serum TSH hormone levels  
Cigarette smokers (G1), hookah smokers (G2), nonsmokers (co



## A Comparison Between The Effect Of Shisha And Cigarette Smoking On Thyroid Function Of Males

Fig.2.Serum T3 hormone levels

Cigarette smokers (G1), hookah smokers (G2), non smokers(control group) (G3). Data are expressed as means  $\pm$  SD In this study ,we found the levels of serum thyroid-stimulating hormone (TSH) were significantly lower( $P<0.05$ ) in the cigarette smokers  $0.09\pm 0.002$   $\mu$ UI/ml than with the control group (G3)  $4\pm 0.2$   $\mu$ UI/ml table1 figure.1 Our findings also indicated a significant increase in T3 or T4 serum levels in smoking, the levels triiodothyronine of serum (T3) were significantly different higher( $P<0.05$ ) in the cigarette smokers  $3.50\pm 1.1$  nmol/l than control group  $0.98\pm 0.002$ nmol/l, table1,figure2. Significant different higher  $p<0.05$  in the levels of thyroxine T4 than control and cigarette smokers ,we show the level  $135\pm 24$ nmol/l in the cigarette smokers than control group  $120\pm 22$  n mol/l, shown table1,figure3. Because the level of TSH hormone was reduced in smokers, [21], and the functions of

thyroid hormon can raise in the thyroid hormones during particularly serum thyroglobulin and concentrations of tri-iodothyronine. We found the levels of Thyroid hormone that's affected by the smoking and by some mechanisms. Toxin of the tobacco smoke as thiocyanate, is a possible goitrogen [18]. A half-life 6 days for the thiocyanate, inhibits organification and iodide transport , as well as increases the release of iodide as of the (thyroid thiocyanate ), can reason goiter in the iodine absence, although a tobacco smoke toxin as 2,3-hydroxypyridine, by reducing iodothyronine deiodinase that's inhibits the thyroxine deiodination activity [22]. This provisional reason gently elevates serum (thyroxine levels) owing to its deiodinase changing action before plummeting levels [23].

Table 2:- Concentrations of thyroid hormones in the hookah smokers (G2) and control group (G3).

	NO	TSH $\mu$ UI/ml	T test	T3nmol/l	T test	T4nmol/l	T test
G2	50	$3.6\pm 0.004$	$P>0.05$	$4.01\pm 0.4$	$P<0.05$	$140\pm 30$	$P<0.05$
G3	50	$4\pm 0.2$		$0.98\pm 0.002$		$120\pm 22$	

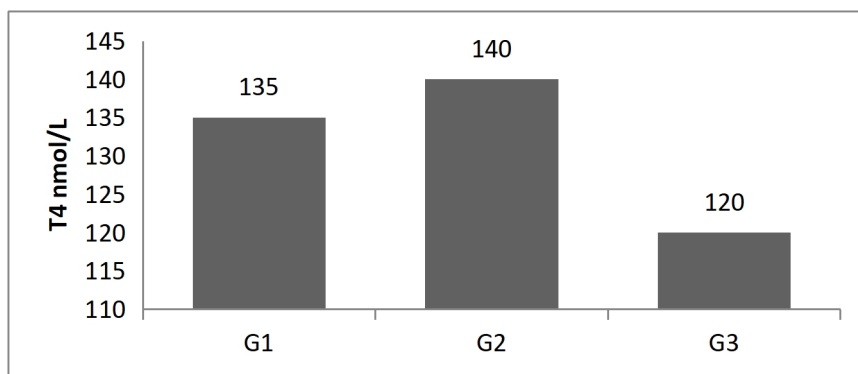


Fig.3.Serum T4hormone levels

Cigarette smokers (G1), hookah smokers (G2), nonsmokers(control group) (G3). Data are expressed as means  $\pm$  SD

As shown in table (2) fig.1, TSH levels were no significant  $P>0.05$  between the hookah smoking G2  $3.6\pm 0.004$  and control group G3  $4\pm 0.2$ . we found the significant differences in the T3 levels  $P<0.05$  between G2  $4.01\pm 0.4$  than G3  $0.98\pm 0.002$ , also we found significant differences in the T4 levels  $P<0.05$  between G2  $140\pm 30$  compared G3  $120\pm 22$  fig.3. This result is consistent, through results of previous studies during which it has been shown that cigarette smoking has no effect on TSH level in some cases. In contrast to our finding there are other studies indicating a decrease in TSH levels in smokers compared

to non-smokers [24]. Our findings also indicated a significant increase in T3 or T4 serum levels there are studies showing that thiocyanate, a main toxic component existing in tobacco, influences thyroid gland function [16]. In contrast to these findings, some researches indicate that injection of nicotine does not affect the level of thyroid hormones. The mechanism by which smoking leaves its effects on thyroid function is unknown, but it seems that thiocyanate affect iodine uptake by the thyroid [16] and also there is correlation between concentrations of thiocyanate and thyroglobulin (TG) [25]

Table 3:- Concentrations of thyroid hormones in the cigarette smokers (G1) and hookah smokers (G2)

	NO	TSH $\mu$ UI/ml	T test	T3nmol/l	T test	T4nmol/l	T test
G1	50	$0.09\pm 0.002$	$P<0.05$	$3.50\pm 1.1$	$P>0.05$	$135\pm 24$	$P>0.05$
G2	50	$3.6\pm 0.004$		$4.01\pm 0.4$		$140\pm 30$	

Table 3 shows highly significant mean differences among two groups in the TSH levels between the G1  $0.09\pm 0.002$  and G2  $3.6\pm 0.004$ . We found that's no considerable differences in the T3 levels  $P>0.05$  between G1  $3.50\pm 1.1$  than G2  $4.01\pm 0.4$ , also we found no significant changes in the T4 levels  $P>0.05$  among G1  $135\pm 24$  compared G2  $140\pm 30$ . shown Fig.3. Cigarette smoking generates substantial quantities of oxidative stress, explained by that smoke inhaled by the smoking modes (shisha and cigarette) leads to increasing effects of nicotine and similar risks of alteration and inflammation by these two types of smoking methods. [26].

### CONCLUSION

found significant differences in the T4 levels  $P<0.05$  between G2  $140\pm 30$  compared G3  $120\pm 22$ , . Also we found no significant change in T3 levels  $P>0.05$  between G1  $3.50\pm 1.1$  than G2  $4.01\pm 0.4$ , also we found no significant changes in T4 levels  $P>0.05$  in G1  $135\pm 24$  compared G2

### REFERENCE

- Centers for Disease Control and avoidance. Annual Smoking- Attributable Mortality, Years of Potential

## A Comparison Between The Effect Of Shisha And Cigarette Smoking On Thyroid Function Of Males

- Life Lost, and Economic Costs-United States., Morbidity and Mortality Weekly Report; 2002 , 51 (14): 300-3..
- Fady S. Yasso' , Saba S. Yaso , Petra S. Yasso, Isam V. Dafdony, Prevalence of Cigarette Smoking among Medical Iraqi Students American Journal of Public Health Research, 2014, Vol. 2, No. 1, 10-15
  - Shatha Hamed Chwyeed. A Comparison between the Effect of Shisha and Cigarette Smoking on Serum Lipid Profile of Males in Nasiriyah City, medjbabylon.org on Monday, March 19, 2018, IP: 10.232.74.23]
  - World Health Organization. Report on the Global Tobacco Epidemic. World Health Organization; 2009. p. 136.
  - Davidson S., Haslet C., Chilvers E. & Colledge N. Principle and practice of medicine. 19th Edition.
  - U.S. Department of Health and Human Services. How Tobacco
  - Smoke Causes Disease: The Biology and Behavioral Basis for Smoking-Attributable Disease. Atlanta: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health, 2010.
  - Jha P, Ramasundarahettige C, Landsman V, Rostron B, Thun M, Anderson RN, McAfee T, Peto R 21st Century Hazards of Smoking and Benefits of Cessation in the United States. *New England Journal of Medicine*. 368: 341-50, 2013.
  - Tziomalos K, Charsoulis F. Endocrine effects of tobacco smoking. *Clin Endocrinol (Oxf)*. 2004;61(6):664-74.
  - Eissenberg T, Shihadeh A. Waterpipe Tobacco and Cigarette Smoking
  - Direct Comparison of Toxicant Exposure. *Am J Prev Med*. 2009
  - ;37(6):518-23.
  - Steinmaus C, Miller MD, Howd R. Impact of smoking and thiocyanate on perchlorate and thyroid hormone associations in the 2001-2002 national health and nutrition examination survey. *Environ Health Perspect*. 2007;115(9):1333-8
  - Martinasek, M.P., R.J. Mc Dermott and L. Martinim. Waterpipe (hookah) tobacco smoking among youth. *Curr. Probl. Pediatr Adolesc. Health Care*, 2011, 41: 34-57.
  - Ahmadi R, Abedi Gh, and Asgari V. A Comparison between Restraint Stress and Hookah Smoke on Thyroid Function in Rats; 4th International Conference on Medical, Biological and Pharmaceutical Sciences (ICMBPS'2013) Oct. 6-7, 2013 Dubai (UAE)
  - Kinne A, Schülein R, Krause G. Primary and secondary thyroid hormone transporters. *Thyroid Res*. 2011;4 Suppl 1:S7
  - Wolfram RM, Chehne F, Oguogho A, Sinzinger H. Narghile (water pipe) smoking influences platelet function and (iso-) eicosanoids. *Life Sci* 2003;74:47-53.
  - Moeller MC, Broecker-Preuss M. Transcriptional regulation by nonclassical action of thyroid hormone. *Thyroid Res*, 2011;4 Suppl 1:S6.
  - Kinne A, Schülein R, Krause G. Primary and secondary thyroid hormone transporters. *Thyroid Res*. 2011;4 Suppl 1:S7
  - Taylor, P.M. and Ritchie, J.W. (2007). Tissue uptake of thyroid hormone by amino acid transporters. *Best. Pract. Res. Clin. Endocrinol. Meta.* 21 (2): 237250.
  - Seeham Ali Qasim\* , Abeer Salih Ali, Alia Essam Alubadi, Hadeel Hadeel Radawi Hussein Al-Newani . The Effect of Seasonal Variation on Thyroid
  - Hormones in Iraqi Patients *International Journal of Pharmaceutical Quality Assurance* 2018; 9(4); 405-409
  - Pieraccini G, Furlanetto S, Orlandini S, Bartolucci G, Giannini I, Pinzauti S, Moneti G. Identification and determination of mainstream and sidestream smoke components in different brands and types of cigarettes by means of solid-phase microextraction-gas chromatography-mass spectrometry. *J Chromatogr A*. 2008;1180:138-150
  - Bethany E. Goughenour, Sappho Z. Gilbert, Helain J. Landy, and Steven J. Soldin. Thyroid Hormone Levels Associated with Active and Passive Cigarette Smoking. 2009 Aug; 19(8): 817-823.
  - Fisher C.L., Mannino D.M., Herman W.H. et al.: Cigarette smoking and thyroid hormone levels in males. *Inter. J. Epidemiol*. 1997, 26, 972
  - Eckstein A, Quadbeck B, Mueller G. et al.: Impact of smoking on the response to treatment of thyroid associated ophthalmopathy. *Br. J. Ophthalmol*. 2004, 87, 773.
  - Abbreviations: GD, Graves' disease; GH, Graves' hyperthyroidism; HH, et al: Smoking and thyroid disease – review of literature
  - 2009, 878.
  - Mehran L, Amouzgar A, Delshad H, Azizi F. The association of cigarette smoking with serum TSH concentration and thyroperoxidase antibody. *Exp Clin Endocrinol Diabetes*. 2012;120(2):80-3.
  - Ahmadi R, Abedi Gh, and Asgari V, A Comparison between Restraint
  - Stress and Hookah Smoke on Thyroid Function in Rats, 2013; Oct. 6-7
  - Shatha Hamed Chwyeed, A Comparison between the Effect of Shisha and Cigarette Smoking on Serum Lipid Profile of Males in Nasiriyah City
  - March 19, 2018, IP: 10.232.74.23]