CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

Available online at: http://www.iajps.com *Research Article*

ASSOCIATION OF THYROID ADAPTATION WITH OBESE POSTMENOPAUSAL DIABETIC WOMEN

Shehwar Nadeem[1], Ambreen Tauseef[2], Munaza Javed[3], Mehwish Qamar[4], Syeda Abeer Fatima[5], Saadia Sajjad[6]

[1] Assistant Principal Medical Officer, Nawaz Sharif Social Security Hospital, Lahore.
[2] Associate Professor, The Department of Physiology, CMH, Lahore Medical College & IOD, Lahore.
[3] Associate Professor, The Department of Medicine, University College of Medicine & Dentistry, University of Lahore.
[4,5] Senior Lecturer , The Department of Physiology, CMH, Lahore Medical College & IOD, Lahore.
[6] Assistant Professor, The Department of Physiology, Continental Medical College, Lahore

Article Received: June 2019 **Accepted:** July 2019 **Published:** August 2019

Abstract:

Background:*Presence of thyroid disorders in general population and in patients with diabetes mellitus is inconsistent in various populations.Thyroid disorder and diabetes in postmenopausal females may have certain specific adaptation. The thyroid profile might have a link between thyroid and diabetic postmenopausal women of different weight categories. Thisparticular study was designed to compare thyroid stimulating Hormone (TSH), Total thyroxine (TT4), totaltriiodothyronine (TT3), free thyroxine (FT4) and Free triiodothyronine (FT3) in diabetic and non-diabetic postmenopausaland non-diabetic premenopausal females.*

Objectives: *To Compare thyroid profile in postmenopausal diabetic and non-diabetic women with premenopausal non-diabetic women.*

Methods:*A total of 78 female subjects were divided into four groups; postmenopausal diabetics and non-diabetics, having weight ≤ 59 kg and below and postmenopausal diabetics and non-diabetics with weight ≥ 60 kg respectively.Blood samples were analyzed by ELISA.*

Results:*The lower level of FT3 was seen in the diabetic females of both the lower and higher weight categoriesbut statisticallymore significantly foundin higher weight group. In diabetic patients, TT3 was found to be statistically low in those who were above and below 60 kg of weight.*

Conclusion*:Thyroid gland functions found to be adaptedin postmenopausal diabetic females of different weight categories.*

Keywords;*Thyroid profile,postmenopausal, diabetics*

Corresponding author:

Dr. Shehwar Nadeem
Assistant Principal Medical Officer,
Nawaz Sharif Social Security Hospital
Lahore, Pakistan
E-mail Address: Dr.shehwar.nadeem@live.com

QR code

Please cite this article in press Shehwar Nadeem et al., ***Association Of Thyroid Adaptation With Obese Postmenopausal Diabetics,*** *Indo Am. J. P. Sci, 2019; 06(08).*

INTRODUCTION:

Thyroid gland activity seems to be affected in postmenopausal age. Similarly, type 2 diabetes mellitus (DM) appears to affect the activity of thyroid gland in an adverse manner.The incidence of thyroid dysfunction in women with type 2 DM is greateras compared to general population.[1] Fremantle Diabetes Study(Australia) emphasized the presence of subclinical hypothyroidism(8.6%) in women with type2DM.The combined effect of diabetes in postmenopausal age may have some specific adaptationsthat are different from normality. The research on thyroid function in postmenopausal females with diabetes have not received much attention.

In female subjects, there is a positive relationship of BMI and increasing age. In men BMI has a negative relationship with increasing age ($p<0.05$). The incidence of obesity and overweight increases with age and acheives a peak between sixteen to seventeen years of age. It is observedthat 17.2% individuals had insulin resistance and increased Adiponectin and these higher adiponectin levels were observed in post-menapausal women as compared to pre-menoupausal subjects.[2,3]

MATERIAL AND METHODS:

Thiscross sectionalstudy was performed over the period of ten months, including seventy postmenopausal females, initially selected one hundred and fifty postmenopausal females with variable age, weight and parity with and without the presence of diabetes. Thirteen middle aged premenopausal female subjects were also chosen for the study.Thyroid function related hormones like TSH,total T4,total T3,free T4, free T3 were estimated. Females of age between 30 and above and postmenopausal women with and without type2diabetes were included. Females with no diabetes were taken as the controls. The exclusion criteria for all groups were patients with history of thyroid disease and below 30 years of age. The postmenopausal women with no children was also excluded.Approximately 5 ml blood was collected from each subject under aseptic measures.The samples were placed immediately in vaccutainers, labeled, aliquoted and kept refrigerated at -20° C till ELISA was done to assess selected biomarkers mentioned earlier. Significance of the difference between the groups was determined with t-test and ANOVA on the statistical program of SPSS version 21. The significance of the difference between the groups was taken at $p =<0.05$.

RESULTS:

Thyroid stimulating hormone (TSH) concentration was however statistically non-significant in subjects with weight above and below 60 kg in diabetics and non-diabetics. In those subjects who were below and above 60 kgweight, the mean concentration of TT4 was 2.19% and 2.53 % high respectively in diabetics but with an insignificant difference statistically.The lower level of FT3 had been observed in the diabetic of both the categories of lower and higher body weight, however in higher weight group the lowering is greater and also significant statistically. ($p=0.05$). (Table: 1)

In the subjects with weight below 60 kg the mean concentration of TT3 was observed to be 34.13% low in diabetics with a significant p-value ($p =0.036$).In subjects with weight above 60 kg the mean concentration ofTT3 was 27.17% low in diabetics ($p =0.05$). In another comparison the hormone concentration was assessed in controls below 60 kg and diabetic subjects above 60 kg. It was found that the concentration of TT_3 was lower 34.7% in diabetics as well ($p=0.016$).(Table: 2)

Table: 1 Mean concentrations of FT_3 (pg/ml) in non-diabetic and diabetic subjects

Weight (Kg)	Disorder State	Mean ± SEM	% Difference in groups	P-value
Below 60	Non –Diabetic	2.22±0.548	25.22%	0.797
	Diabetic	1.66±0.325		
At and above 60	Non-Diabetic	2.56±0.375	44.14%	0.05
	Diabetic	1.43±0.168		

SEM: Standard Error of Mean; p value ≤ 0.05 statistically significantly different.

Table:2 Mean concentrations of TT_3 (ng/ml) in non-diabetic and diabetic subjects

Weight (Kg)	Disorder State	Mean ± SEM	%Difference in groups	P-value
Below 60	Non –Diabetic	5.01 ± 0.343	34.13%	0.036
	Diabetic	3.30 ± 0.334		
Above 60	Non-Diabetic	4.49 ± 0.189	27.17%	0.05
	Diabetic	3.27 ± 0.198		
Below 60	Non-Diabetic	5.01 ± 0.343	34.73%	0.016
Above 60	Diabetic	3.27 ± 0.198		

DISCUSSION:

It is now well understood that the incidence of thyroid dysfunction increases with age and is frequently found in females. It is mostly not picked easily on clinical basis because symptoms are very similar to changes related to menopause. Walfish and Pearce et al showed by his study that thyroid dysfunction is much common in women over 50 years of age.[4,5,6,7]. The lowering of FT3 could be the result of low levels of TT3 as specifically in T4 it is strongly supported by variousinvestigations that free fraction positively depends upon total fraction of this hormone. The other possibility is that the deiodonation of FT4 to FT3 is somehow reduced due to decreased activity of the relevant monodeiodnase. The lower concentration of FT3 may be due to reduced TT3.This seems to be the most likely cause. There are studies showing that FT3 is affected in diabetic postmenopausal subjects rather than the non-diabetics.A study concluded that diabetes and thyroid disorder are interrelated and mostly subclinical hypothyroidism is the most common thyroid disorder in these subjects, showing high TSH levels along with low T3 and T4 concentrations in blood.Vikram et al did notsuggest directly the reducedFT3 levels,however the lowering of thyroid hormones was observed [8,9,10]. .

Analysis of FT3 in relation to age, parity and body weight have shown contrasting results. The fraction of FT3 has also shown that its level was significantly and markedly lowered in 60 kg and above groups compared to lower weight category. The heavier weight category may be associated with obesity trend; therefore it is indirectly stated that in obesity FT3 is lowered in diabetic postmenopausal compared to non-diabetic subjects.[11]A study on the assessment of FT3 in postmenopausal women has not come across specifically in diabetics with central obesity compared to non-diabetics although there are studies related to general thyroid gland function in such situations.[12] In a study it was reported that the most important factor in postmenopausal women with metabolic syndrome is central obesity (58.04%). This problem is associated with thyroid dysfunction in late years of life. Postmenopausal agenot only affects thyroid, diabetes is an additional factor and if diabetes is caused by central obesity in old diabetics, it further increases the chances of abnormality of thyroid gland function[13]. Many studies observed that , following the assessment of thyroids parameters, the incidence of hypothyroidism is quite high in patients with type2 DM specially those who are above 45 years or more.[14,15,16].

CONCLUSION:

In postmenopausal diabetics and non-diabetics of different weight categories functional adaptation occurs in thyroid gland. These results emphasize that clinicians should assess and manage health and dysfuction of thyroid glands in aged women.

REFERENCES:

1. Deuri A, Thakuria J, Kalita D. A prospective study of thyroid dysfunction in patients with type 2 diabetes mellitus in a tertiary care hospital. IOSR J Dent Med Sci. 2016;15:21-5.
2. Zeng J, Wan Q, Bai X, Li X, Liu F, Li C, Liu X, Wang Y. 2014. Prevalence and risk factors of overweight and obesity among individuals over 40 years old in Luzhou city. Genet Mol Res. 16:13-20.
3. Bonneau GA, Pedrozo WR, Berg G. 2014. Adiponectin and waist circumference as predictors of insulin-resistance in women. Diabetes MetabSyndr. 8(1): 3-7.
4. Walfish, PG. 2014. Thyroid disease in late life. www.thyroid.ca/elderly.php.
5. Pearce EN.2007. Thyroid dysfunction in perimenopausal and postmenopausal women. Menopause Int. 13(1): 8-13.
6. Del GhiandaDS ,Tonacchera M, Vitti P. 2014. Thyroid and menopause Climacteric.17(3):225-234.
7. Iglesias P. 2009. Alterations in thyroid function tests in aged hospitalized patients: prevalence, aetiology and clinical outcome. Clin. Endocrinol. 70(6): 961-967.

8. Vikram B Vikhe, Shubhangi A Kanitkar, Krunal k tamakuwala, Anu N Gaikwad, Meenakshi Kalyan and Rajani R Agarwal. 2013. Thyroid dysfuntion in patients with Type 2 Diabetes Mellitus at Tertiary Care Centre. Natl J Med Res. 3(4): 377-380.
9. Mirella MH, Mira S, Zantout and Sami TA. 1995. Thyroid disorders and diabetes. Clinical Endocrinology; 43(1): 55-68.
10. Davina H. 2012. Thyroid dysfunction in type 2 Diabetes Mellitus: A retrospective study. Indian J Endocrinol Metab. 16(Suppl 2): S334-S335.
11. Jeenduang N, Trongsakul R, Inhongsa P, Chaidach P. 2014. The prevalence of metabolic syndrome in premenopausal and postmenopausal women in southern Thailand. Gynecol Endocrinol. 30: 573-576.
12. Rosety-Rodriguez M, Fornieles G, Rosety I, Diaz AJ, RosetyMA,Camacho-Molina A, Rodriguez-Pareja A, Teejerina A, Alvero-Cruz JR, Ordonez FJ. 2013. Central Obesity measurements predict metabolic syndrome in a retrospective cohort study of postmenopausal women. Nutr Hosp. 1; 28 (6):1912-1917.
13. Hou X, Jia W, Bao Y, Lu H, Jiang S, Zuo Y, Gu H, Xiang K. 2008. Risk factors for overweight and obesity, and changes in body mass index of Chinese adults in Shanghai. BMC Public Health; 21(8):389-393
14. Erem C, Arslan C, Hacihasanoglu A, Deger O, Topbas M, Ukinc K, Ersoz HO, Telatar M. 2004. Prevalence of obesity and associated risk factors in a Turkish population (Trabzon City, Turkey). Obes Res. 12(7):1117-1127.
15. Biggs ML. 2010. Obesity after age 50 Raises Diabetes Risk. J Am Med Assoc. 303:25042512.
16. Mattei J, Malik V, Wedick NM, Hu FB, Spiegelman D, Willett WC, Campos H; 2015. Global Nutrition Epidemiologic Transition Initiative. Reducing the global burden of type2 diabetes by improving the quality of staple foods: The Global Nutrition and Epidemiologic Transition Initiative. Global Health; 4 (11): 2.