



CODEN [USA]: IAJ PBB

ISSN: 2349-7750

**INDO AMERICAN JOURNAL OF  
PHARMACEUTICAL SCIENCES**<http://doi.org/10.5281/zenodo.1439048>Available online at: <http://www.iajps.com>

Research Article

**A TRANSVERSE RESEARCH TO COMPARE MEAN LEVELS  
OF TSH AND FERRITIN SERUM IN MAJOR B-THALASSEMIA  
PATIENTS**<sup>1</sup>Muhammad Hamid Chand, <sup>2</sup>Dr Hafiza Faiza Umbreen Rana, <sup>3</sup>Dr. Shehryar Aamer<sup>1</sup>Akhtar Saeed Trust Hospital EME Lahore<sup>2</sup>Demonstrator. Aziz Fatima Medical and Dental College, Faisalabad<sup>3</sup>Medical Officer BHU Mundayki**Abstract:**

**Objective:** The main aim of this research work is to compare the mean serum iron-containing protein known as ferritin amounts with the thyroid stimulating hormone (TSH) amounts in the patients suffering from diminishing synthesis of the beta chain of haemoglobin which occur in beta-thalassemia major (BTM).

**Material and methods:** This transverse study was carried out in Allied Hospital, Faisalabad (January 2017 to September 2017). Sixty-six patients of the major beta  $\beta$  thalassemia were the participants of this research work.

**Results:** The average age of the participants was about 8 to 11 years. The blood transfusion average period was  $(7.88 \pm 2.622)$  in years; average plasma thyroid stimulating hormone was  $(3.8085 \pm 2.281)$  micro international units per millilitres. The average iron-containing protein was  $(3087.64 \pm 1.625)$  nanograms per decilitres. The negative association of thyroid stimulating hormone with the level of serum iron containing protein was also documented which was not worthy to be noticed.

**Conclusion:** The outcomes of this study work prove that there is a negative connection available between thyroid stimulating hormone and serum iron-containing protein which is not worthy to be effective. There was also a difference in the amounts of serum thyroid stimulating hormone and serum iron-containing protein in male and female patients which were also not important.

**Keywords:** Thyroid Stimulating Hormone, Serum, Iron-Containing Protein, Ferritin, Beta Thalassemia Major, TSH and Plasma.

**Corresponding author:**

**Muhammad Hamid Chand,**  
Akhtar Saeed Trust Hospital EME,  
Lahore

QR code



Please cite this article in press Muhammad Hamid Chand *et al.*, A Transverse Research to Compare Mean Levels of TSH and Ferritin Serum in Major B-Thalassemia Patients., *Indo Am. J. P. Sci.*, 2018; 05(09).

**INTRODUCTION:**

Thalassaemias are mixed gathering of the abnormalities in which the production of the polypeptide chain or chains is reduced to cause this disease. In beta thalassaemia major, the b chain reduction occurs in the haemoglobin [1, 2]. Regular blood transfers are required by the patients of this disease. This transfusion of the blood can cause the large amount of the iron which may outcome with malfunctioning [3 – 5]. This abundant iron can take a place in the important organs of the human body as the heart.

One of the most important therapies of the endocrine system is hypothyroidism in which an underactive thyroid gland produces low endocrine hormones that thyroid stimulating hormones amounts are raised on average levels and T4 amount are on ordinary levels. The most important underactive thyroid gland is regarded as high TSH amounts and low values of T4. The less important or middle hypothyroidism is regarded by low amounts of TSH and T4 [5, 6]. In the research work of Garadah TS proved that high plasma amounts of TSH in the sufferers of BTM are linked positively with the amounts of serum iron-containing proteins [7]. Different research works carried out in the southern areas of Asia describes that the occurrence of the hypothyroidism in the patients of BTM is different with respect to the areas of the sufferers, worthiness of the administration and the curing procedures [8].

The very objective of this research work is to find the connection between the amounts of the serum ferritin and the amounts of serum thyroid stimulating hormones. The consequences of this study work will help us in the early management of this disease for further investigations.

Few operational definitions are described as; BTM: The sufferer was identified with the BTM disease when his Hb was greater than seven grams per decilitres, the microcytic hypochromic anaemia on tangential less than seventy HbF on the blood haemoglobin on medical grounds. Mean serum ferritin level: Its unit in SI system for the measurement is ng/dl. Mean TSH level: Its unit for measurement in the medical field is  $\mu$ IU/ml.

**METHODS AND MATERIALS:**

This transverse study was carried out in Allied Hospital, Faisalabad (January 2017 to September 2017). Sixty-six sufferers of the BTM disease were selected for this particular study. We included sufferers who fulfil the criteria of definition for BTM, who were relying on transfusion of the blood from last five years, six to fifteen years of age, both genders and who were getting from one to three transfusion of the blood monthly.

We did not include sufferers who were undergone with the transplant of bone marrow, patients who had the history of radiotherapy, goitre history patients were also excluded, who had taken thyroxine, addicted of any drug, who have the hepatic malfunction and producing resistance in the curing of the disease.

The samples of the blood were taken from all the patients before transfusion of the blood. MSF and average plasma TSH amounts were checked by the procedure of chemiluminescence on an analyzer of hormone in a medical laboratory. All the patients were facilitated with the same curing procedures. A particular form was used for the documentation of the medical information.

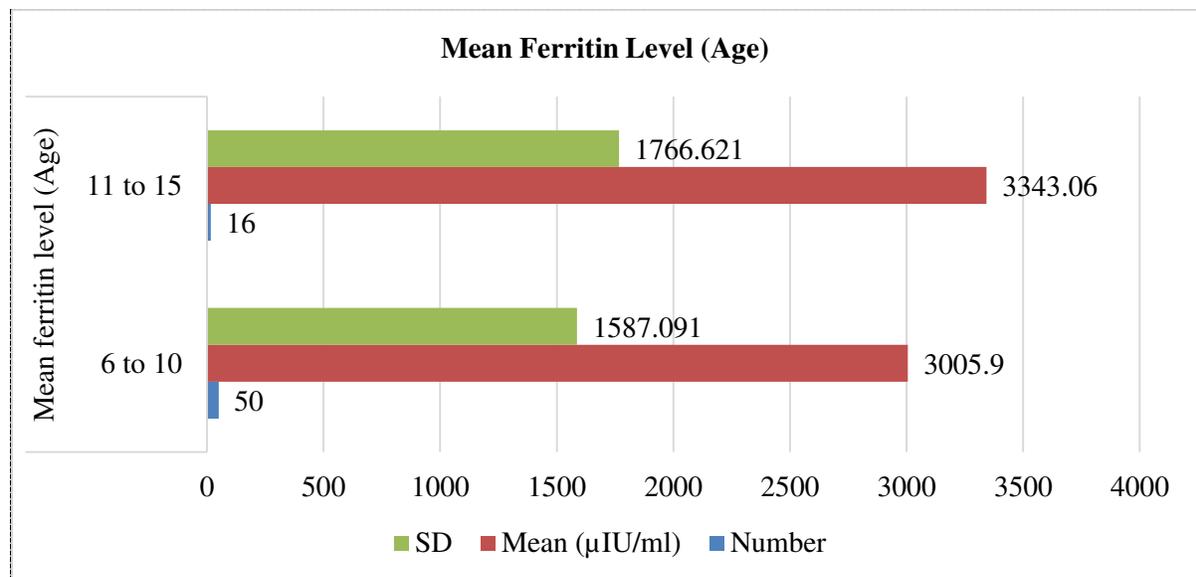
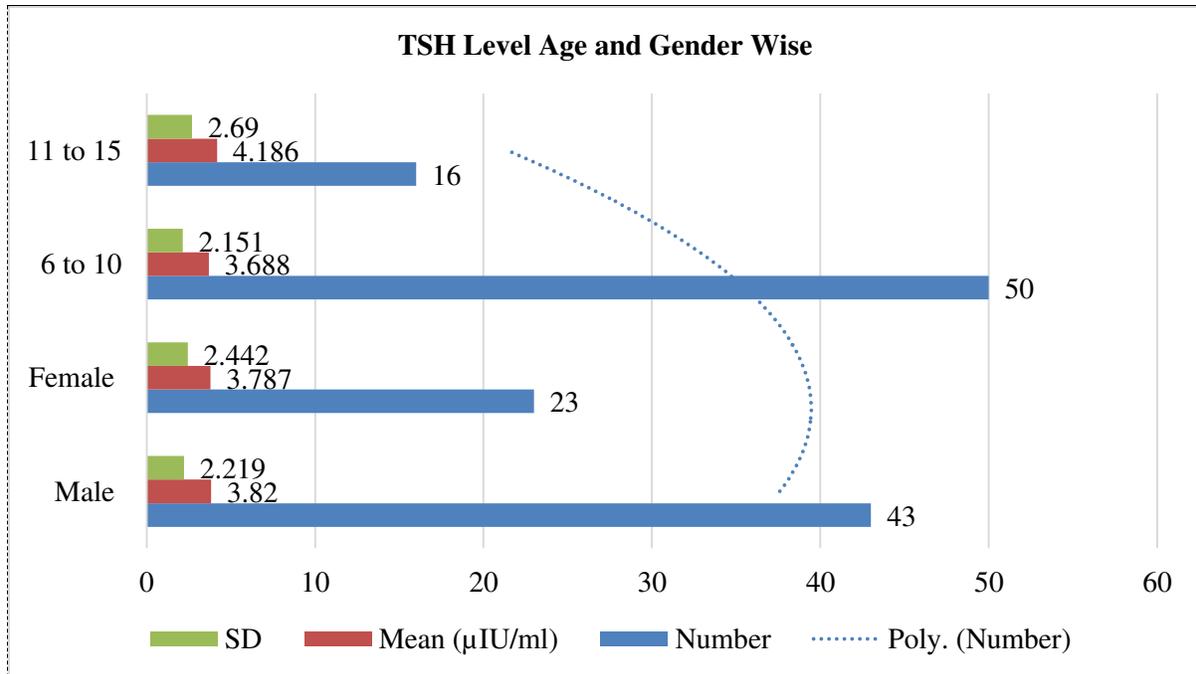
A special form of software SPSS was used for the analysis of the data. Information like the age of the patient, the time of the transfusion of blood, level of thyroid stimulating hormones, amounts of iron-containing protein and the data about the sex of the patient was assessed with the help of this software. The average and model divergence were also calculated for the evaluation of the data. PCC (Pearson correlation coefficient) was used for the average plasma TSH amounts and average plasma iron-containing protein amounts.

**RESULTS:**

The average age of the sufferers was  $(8.73 \pm 2.569)$  and the average length of time for the transfusion of the blood was  $(2.91 \pm 1.389)$  years. The average plasma thyroid stimulating hormone level was  $(3.8085 \pm 2.281)$  micro international units per millilitres and average plasma iron-containing protein was  $(3087.64 \pm 1.625)$  nano-grams per decilitre. The connection between the plasma TSH amounts and plasma iron-containing protein is also mentioned in the tabular data.

Table – I: Mean Levels

Mean Levels		Number	Mean ( $\mu$ IU/ml)	SD	P-Value
Mean TSH level (Gender)	Male	43	3.82	2.219	0.956
	Female	23	3.787	2.442	
Mean TSH level (Age)	6 to 10	50	3.688	2.151	0.451
	11 to 15	16	4.186	2.69	
Mean ferritin level (Age)	6 to 10	50	3005.9	1587.091	0.474
	11 to 15	16	3343.06	1766.621	



The PCC test confirmed that lower the amounts of the TSH will increase the level of plasma ferritin. The negative connection between them was not of much importance. The amount of average plasma TSH in the men was  $(3.820 \pm 2.219)$   $\mu\text{IU/ml}$  and it was found in women as  $(3.787 \pm 2.442)$   $\mu\text{IU/ml}$ . The competition of the amounts of average plasma TSH was carried among the males and females' participants of the study but there was not much difference.

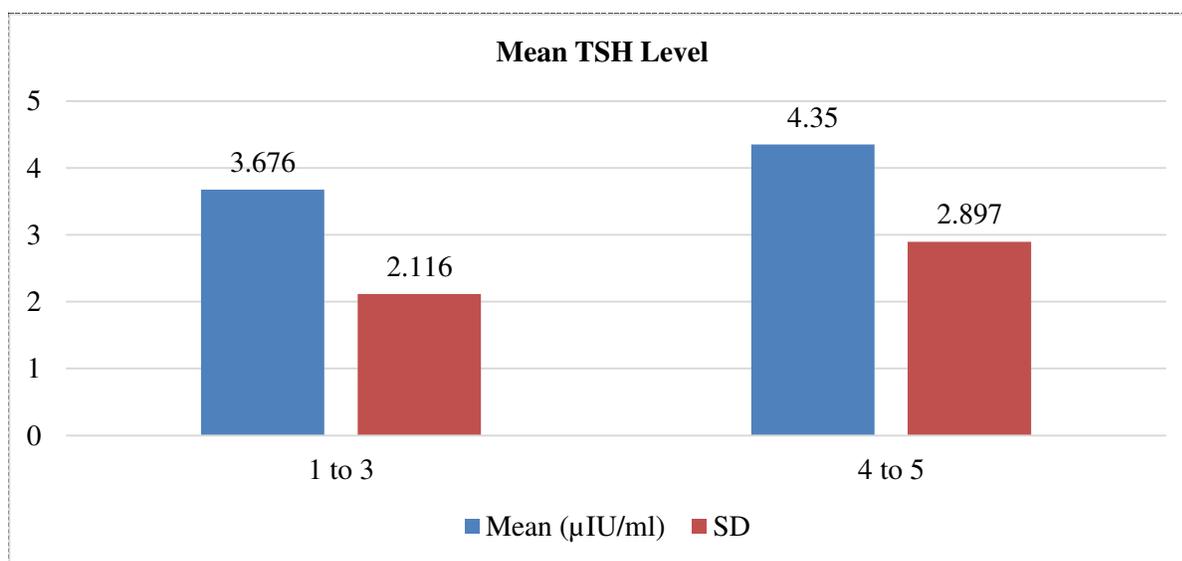
All the participants in the research were divided into two groups based on the age of the patients. First age group was from six to ten years of age and the second

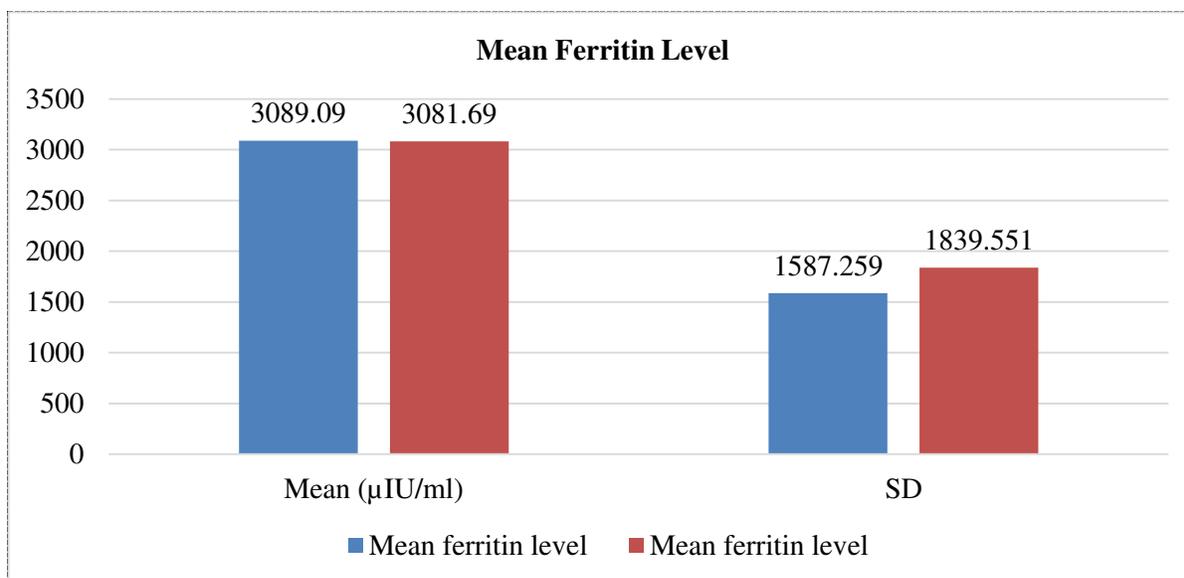
age group was from eleven to fifteen year of age. The average TSH in the first age group was  $(3.688 \pm 2.151)$   $\mu\text{IU/ml}$  and in the second age group, it was  $(4.186 \pm 2.690)$   $\mu\text{IU/ml}$ . There was not too much difference in these values in both age groups.

The separation of the sufferers on the basis of the transfusion of the blood was carried out and participants were divided into two age groups of one to three years of age and four to five years of age. Average TSH in the first age group was  $(3.676 \pm 2.116)$   $\mu\text{IU/ml}$  and in the second age group, it was  $(4.350 \pm 2.897)$   $\mu\text{IU/ml}$ . This unimportant disparity is also mentioned in the tabular data.

**Table – II:** Comparison of mean TSH and serum ferritin level for the duration of blood transfusion

Blood Transfusion Duration	Number	Mean ( $\mu\text{IU/ml}$ )	SD	P-Value
Mean TSH level	1 to 3	53	3.676	0.343
	4 to 5	13	4.35	
Mean ferritin level	1 to 3	53	3089.09	0.988
	4 to 5	13	3081.69	





### DISCUSSION:

Hormones which are most vital for the development of the cells are thyroid hormones. The malfunction of these hormones is very important in the patients of thalassemia. A large number of diseases spreading procedures can be its part. The high amount of iron can be placing a poisonous effect on these glands [9]. High amounts of the plasma labile iron and cell labile iron are the reasons to create radicals and oxygen which result in the damage of cell and other organs [10].

Patients who have an excessive quantity of iron, pituitary may also deteriorate and the secretion of the hormones is also affected by this very reason [11]. In this research work, the average age of the participant was  $(8.73 \pm 2.569)$  years. The average plasma TSH level was  $(3.8085 \pm 2.281)$   $\mu$ IU/ml and average plasma iron-containing protein amount was  $(3087.64 \pm 1.625)$  ng/dl.

In another research work, Malik reported the average age of thalassemic sufferers was a  $(7.6 \pm 2.5)$  year which was close to the patients of our study [12]. Same average age of the sufferers was also reported by Karim [13]. In this study work, male participants were sixty-five percent and female participants were thirty-five percent. Same outcomes were also concluded by Karim in another study [13]. Solanki concluded the average plasma TSH as  $(7.14 \pm 9.04)$  and average plasma iron-containing protein  $(2927.40 \pm 783.39)$  which are very similar to the outcomes of our study [14].

Solanki concluded that there was no connection between the plasma TSH and iron-containing protein

amounts [14]. Farooq MS also concluded a negative connection between the amounts off TSH and ferritin which was not significant [15].

### CONCLUSION:

The outcome of this study proved that there is an unconstructive connection between the amounts of serum TSH & serum ferritin which is not of much importance. The outcomes also proved the insignificance disparity among the average serum iron-containing protein and average serum TSH levels of women and men sufferers.

### REFERENCES:

1. Karim AR, Islam MR, Deeba F, Fakir MHJ, Matin A. Correlation of Thyroid Hormone Derangement with Serum Ferritin Level in Children with Beta Thalassemia Major at a Tertiary Care Hospital of Bangladesh. J Shaheed Suhrawardy Med Coll, 2013;5(2):87-90.
2. Solanki US, Bhargava AK, Adole PS. assessment of thyroid function in multi-transfused children off thalassemia major with iron overload. 2014 [cited 2016 Jul 24]; Available from: <http://www.wjpps.com/download/article/1407235747.pdf>.
3. Farooq MS, Asif M, Shaheen B, Manzoor Z. Serum Ferritin Level in Thalassemic Patients of 10-15 Years and its Relationship with Thyroid Function Tests. Med. Forum. 2014;25(11):40-44.
4. Garadah TS, Mahdi NA, Jaradat AM, Hasan ZA, Nagalla DS. Thyroid function status and echocardiographic abnormalities in patients with Beta-thalassemia major in Bahrain. Clin Med Insights Cardiol. 2013; 7:21-7.

5. Irshaid F, Mansi K. Status of thyroid function and iron overload in adolescents and young adults with beta-thalassemia major treated with deferoxamine in Jordan. In: Proceedings of World Academy of Science, Engineering and Technology [Internet]. 2009 [cited 2016Jul 27]. p. 658–663.
6. Available from: [http://www.academia.edu/download/43409668/Status\\_of\\_thyroid\\_function\\_and\\_iron\\_over\\_20160305-1192-10909yq.pdf](http://www.academia.edu/download/43409668/Status_of_thyroid_function_and_iron_over_20160305-1192-10909yq.pdf)
7. Garadah TS, Mahdi NA, Jaradat AM, Hasan ZA, Nagalla DS. Thyroid function status and echocardiographic abnormalities in patients with Beta thalassemia major in Bahrain. *Clin Med Insights Cardiol.* 2013; 7:21-7.
8. Pirinccioglu AG, Deniz T, Gokalp D, Beyazit N, Haspolat K, Soker M. Assessment of thyroid function in children aged 1-13 years with Beta-thalassemia major. *Iran J Pediatr.* 2011;21(1):77-82.
9. Wahab S, Khan RA, Ahmad K, Wahab A, Ahmad I. Extramedullary Hematopoiesis Causing Spinal Cord Compression in a Thalassemia Intermedia Patient. *Nepalese Journal of Radiology.* 2013 Mar 3;2(2):81–5.
10. Magro S, Puzzon P, Consarino C, Galati MC, Morgione S, Porcelli D, Grimaldi S, Tancrè D, Arcuri V, De Santis V (1990). Hypothyroidism in patients with thalassemia syndromes. *Acta Haematol.* 1990; 84:72-76.
11. Esposito BP, Breuer W, Sirankapracha P, Pootrakul P, Hershko C, Cabantchik ZI. Labile plasma iron in iron overload: redox activity and susceptibility to chelation. *Blood.* 2003; 102(7):2670-7.
12. Cavallo L, Licci D, Acquafredda A, Marranzini M, Beccasio R, Scardino ML, Altomare M, Mastro F, Sisto L, Schettini F. Endocrine involvement in children with beta thalassemia major. Transverse and longitudinal studies. I. Pituitary-thyroidal axis function and its correlation with serum ferritin levels, *Acta Endocrinol (Copenh).* 1984; 107(1):49-53.
13. Malik SA, Syed S, Ahmed N. Frequency of hypothyroidism in patients of beta thalassemia. *J Pak Med Assoc.* 2010;60(1):17–20.
14. Malik SA, Syed S, Ahmed N. Frequency of hypothyroidism in patients of beta thalassemia. *J Pak Med Assoc.* 2010;60(1):17-20.
15. Merchant RH, Shirodkar A, Ahmed J. Evaluation of growth, puberty and endocrine dysfunctions in relation to iron overload in multi transfused Indian thalassemia patients. *Indian J Pediatr.* 2011;78(6):679-83.
16. Kurtoglu AU, Kurtoglu E, Temizkan AK. Effect of iron overload on endocrinopathies in patients with beta-thalassemia major and intermedia. *Endokrynol Pol.* 2012;63(4):260-3.
17. Eshragi P, Tamaddoni A, Zarifi K, Mohammad Hasani A, Aminzadeh M. Thyroid function in major thalassemia patients: Is it related to height and chelation therapy? *Caspian J Intern Med.* 2011;2(1):189-93.
18. Abdel-Razek AR, Abdel-Salam A, El-Sonbaty MM, Youness ER. Study of thyroid function in Egyptian children with beta thalassemia major and beta-thalassemia intermedia. *J Egypt Public Health Assoc.* 2013;88(3):148-52.