

# Thyroid Dysfunction in Women with Primary Subfertility

Thyroid  
Dysfunction in  
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## ABSTRACT

**Objective:** Calculate and determine the frequency and thyroid dysfunction pattern in women having primary subfertility.

**Study Design:** Descriptive / Cross sectional study.

**Place and Duration of Study:** This study was conducted at the outdoor of Gynaecology and Obstetrics department, DG Khan Medical College and Nishtar Hospital, Multan from May 2015 to November 2015.

**Materials and Methods:** Final approval of investigation was taken by the ethical board of the hospitals. Sampling was done by non-probability consecutive sampling. A 5 cc sample of venous blood was drawn and sent to laboratory evaluation of serum T3, T4 and TSH levels. Version 22 of SPSS was used to analyze the data. Quantitative variables such as age (in years), duration of marriage, BMI, serum T3, T4 and TSH value analyzed in means and standard deviations. Qualitative variables i.e. thyroid dysfunction pattern (hypothyroidism, hyperthyroidism) was calculated in percentage. The effect modifiers like age, BMI and time span of marriage were controlled through stratification. To see the outcome, chi square test was applied after stratification. P value of less or equal to 0.05 was significant for this study.

**Results:** Total 250 patients were taken in this project. The mean age, duration of marriage, BMI, serum T3, serum T4 and TSH of the patients was  $30.38 \pm 3.54$  years,  $4.53 \pm 2.22$  years,  $27.72 \pm 3.25$  Kg/m<sup>2</sup>,  $1.82 \pm 1.13$  ng/ml,  $6.39 \pm 2.49$  ug/dl and  $3.90 \pm 2.03$  uIU/ml, respectively. The outcome variables of our study was hypothyroidism and hyperthyroidism. It was seen in n=73 (29.2%) and n=23 (7.6%) patients, respectively. (Table. 2). No association was found between age, duration of marriage and BMI with hypothyroidism and hyperthyroidism.

**Conclusion:** Conclusion of this project was that hypothyroidism is one of the main and emerging reasons of primary infertility. Proper management of hypothyroidism can result in regain of fertility. Assessment and screening of thyroid status should be part of criteria in infertile patients.

**Key Words:** Primary subfertility, Hyperthyroidism, Hypothyroidism

**Citation of article:** Saeed S, Khan W, Rasheed A, Nazir S, Shaheen U, Fayaz A. Thyroid Dysfunction in Women with Primary Subfertility. Med Forum 2021;32(3):77-81.

## INTRODUCTION

Infertility is a global matter in the health issues of reproduction. After a time of one year of unprotected intercourse done regularly, couple is incapable to conceive baby. Its occurrence is about 10-15% in any population.<sup>1</sup>

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Received: September, 2020

Accepted: November, 2020

Printed: March, 2021

It is obvious to humans and other species to reproduce. However, factors are different for different individuals. The term fertility explains the ability of producing offspring, fecundity characterizes the possibility for reproduction, prejudiced by age, the aptitude of carrying a pregnancy and then deliver feasible offspring. While, the term infertility is lacking fecundity, and subfertility any form of reduced fertility with stretched time of acquiring conception.<sup>7</sup>

A wide range of cases of decreasing of human fertility has been noticed in the last century. In the developed countries, a major involvement of involuntary childlessness is increasing and as a result female's fertility is decreasing. This tendency will certainly affect the population size as the Total Fertility Rate (TFR) falls below the population substitute level of 2.1 births per couple, but is also the reason of not acquiring the desired no of babies by the couple.

Number of babies or the family size is depended on the age where women start trying to conceive. For, last 40 years it has been seen that many devices and medicines are used to late the pregnancy and this is mostly done by educated females. Whilst in the European Union, a rise in the mean age of maternity started in the late

1970s, in Canada from 1970 to 1999. The average age of a female delivering her first baby has been increased from 24.6 to 29.1 years.

A usual age-dependent decrease in fertility exists in both genders, however the lack in fecundity commence is earlier in women and demonstrate a significant variability in which age it actually starts. The increase of maternity is due to an increasing rates of aneuploidy in oocytes<sup>10</sup>concurring with decreasing numbers of elemental follicles and quality of oocytes. This coincides with a significant enhance in the number of couples seeking medical help for involuntary childlessness. Actually, infertility affects approximately 15% of all couples trying to envisage.

Thyroid hormones are vital for normal growth, sexual development and reproductive function. Both hypothyroidism and hyperthyroidism are linked with a variety of changes in reproductive functions together with reproductive depletion, delayed onset of puberty, anovulatory cycles, menstrual disorders, infertility when pregnancy is achieved. Thus thyroid dysfunctions may have a great impact on fertility in females .<sup>2,3</sup> Infertility as well as sub-fertility are due to the Undiagnosed and untreated thyroid disease.

Rijal B, et al, <sup>5</sup> did a study and exhibit 735 primary infertile women. For estimation of thyroid hormones, blood samples were gathered and subjected. Thyroid dysfunction was observed in 25.6% patients and 74.4% were euthyroid. Among those, 7.6% had primary hypothyroidism, 4.2% had primary hyperthyroidism, 12.9% had subclinical thyroid dysfunctions. In the research of Nemade, et al, 52% patients were in euthyroid state, 30% hyperthyroid and 18% hypothyroid patients with infertility.

An epidemiologic study in Pakistan exposed that about 79.8% of the pregnant mothers are having iodine deficiency which predisposes the mothers and their neonates to develop iodine deficiency thyroid disorders.<sup>6</sup> The treatment of thyroid dysfunction may repeal the process of infertility. Although, low or high T3, T4 levels may recognize the patients with hypothyroidism or hyperthyroidism, the identification of subclinical hypo or hyperthyroidism is also significant. Till now there is not any good material published in Pakistan. The earlier studies from different parts of world have shown a great changeability of results. This also provoked me to determine the true frequency of subclinical hypothyroidism among infertile women in our population because thyroid dysfunction is a avoidable disease and is easily reversible by cure. By detection and treatment of thyroid dysfunction, we may be able to improve the results of infertility. Moreover, by knowing the frequency of thyroid dysfunction, we will also be able to determine whether a screening of T3, T4 and TSH could be considered in all the females with infertility or not.

## MATERIALS AND METHODS

Descriptive Cross sectional investigation conducted in outdoor of Gynaecology and Obstetrics department, DG Khan Medical College and Nishtar Hospital, Multan. This study was carried out from May 2015 to November 2015. Final approval of investigation was taken by the ethical board of the hospital. Sampling was done by non-probability consecutive sampling. Females with age ranging from 18 years to 40 years having primary subfertility were included in this project. Primary subfertility was defined as the women who failed to conceive a single time during the last two years after unprotected sex. While females with abnormal pelvic ultrasonographic findings (i.e. with adnexal masses, uterine masses or with absence of any of reproductive organs), patients with previous thyroid surgery, history of antithyroid drugs (i.e. propylthiouracil or carbimazol) or lithium and patients who already had received treatment for infertility were excluded from this research. The calculated sample was 250 cases with 2.5 % margin of error, 95 % confidence level taking expected percentage of primary hyperthyroidism i.e. 4.2%.<sup>5</sup>

Total 250 cases fulfilling criteria were registered through Gynaecology OPD of Nishtar Hospital, Multan. Demographic history [including age (in years) was taken. Informed consent was taken through patients. Detailed medical history and clinical examination were carried out. A 5 cc sample of venous blood was drawn and sent to laboratory evaluation of serum T3, T4 and TSH levels. All the laboratory investigations were done by Pathologist who have at least 5 years of experience of performing laboratory investigation. Presence of any condition hypothyroidism or hyperthyroidism will be considered thyroid dysfunction. The normal range of thyroid function tests were taken as T3 = 0.52-1.90 ng/ml, T4 = 4.5-12.0 µg/dl and TSH = 0.4 - 5.4 µIU/ml. All the information was collected on a specially designed proforma.

Version 22 of SPSS was used to analyze the data. Quantitative variables such as age (in years), duration of marriage, BMI, serum T3, T4 and TSH value analyzed in means and standard deviations. Qualitative variables i.e. thyroid dysfunction pattern (hypothyroidism, hyperthyroidism) was calculated in percentage. The effect modifiers like age, BMI and time span of marriage were controlled through stratification. To see the outcome, chi square test was applied after stratification. P value of less or equal to 0.05 was significant for this study.

## RESULTS

Total 250 patients were taken in this project. The mean age, duration of marriage, BMI, serum T3, serum T4 and TSH of the patients was 30.38±3.54 years, 4.53±2.22 years, 27.72±3.25 Kg/m<sup>2</sup>, 1.82±1.13 ng/ml,

6.39±2.49 ug/dl and 3.90±2.03 uIU/ml, respectively. (Table. I).

The outcome variables of our study was hypothyroidism and hyperthyroidism. It was seen in n=73 (29.2%) and n=23 (7.6%) patients, respectively. (Table. 2). No association was found between age, duration of marriage and BMI with hypothyroidism and hyperthyroidism (Table. 3& 4).

**Table No. I: Demographics characteristics of the patients**

Demographics	Mean±S.D
Age(years)	30.38±3.54
Duration of marriage (years)	4.53±2.22
BMI (Kg/m <sup>2</sup> )	27.72±3.25
Serum T3 (ng/ml)	1.82±1.13
Serum T4 (ug/dl)	6.39±2.49
TSH (uIU/ml)	3.90±2.03

**Table No.2: Variables**

Variable	Presence
<b>Hypothyroidism</b>	
Yes	n=73 (29.2%)
No	n=177 (70.8%)
<b>Hyperthyroidism</b>	
Yes	n=19 (7.6%)
No	n=231 (92.4%)

**Table No.3: Association of hypothyroidism with study variables**

Variable	Strati- fication	Hypothyroidism		P- value
		Yes n=73	No n=177	
Age (years)	18-30	n=46 (63%)	n=121 (68.4%)	0.414
	31-40	n=27 (37%)	n=56 (31.6%)	
	<19	n=10 (13.7%)	n=32 (18.1%)	
BMI (Kg/m <sup>2</sup> )	19-25	n=18 (24.7%)	n=42 (23.7%)	0.818
	26-30	n=25 (34.2%)	n=53 (29.9%)	
	>30	n=20 (27.4%)	n=50 (28.2%)	
	2-4	n=40 (54.8%)	n=96 (54.2%)	
>4	n=33 (45.2%)	n=81 (45.8%)		

**Table No.4: Association of hyperthyroidism with study variables**

Variable	Strati- fication	Hyperthyroidism		P- value
		Yes n=19	No n=231	
Age (years)	18-30	n=6 (31.6%)	n=154 (66.7%)	0.876
	31-40	n=13 (68.4%)	n=77 (33.3%)	
	<19	n=3 (15.8%)	n=39 (16.9%)	
19-25	n=4 (21.1%)	n=56 (24.2%)		
26-30	n=3 (15.8%)	n=75 (32.5%)		
>30	n=9 (47.4%)	n=61 (26.4%)		
Duration of Marriage (years)	2-4	n=8 (42.1%)	n=128 (55.4%)	0.263
	>4	n=11 (57.9%)	n=103 (44.6%)	

## DISCUSSION

Hypothyroidism, hyperprolactinemia, hyperthyroidism, polycystic ovary syndrome, diabetes mellitus, cushings syndrome and inadequate corpus luteum are ordinary endocrine disorders which cause infertility. But thyroid disorders are very essential because of subclinical hypothyroidism incidence in ovulatory dysfunction females is 11.3%. These hormones play vital role in pregnancy and reproduction. Dysfunction of thyroid is problem in many disorders of reproduction that ranges from infertility, menstrual irregularity to abnormal sexual development.<sup>11,12</sup>

In present investigation serum level of T3 and T4 in infertile women were low while TSH level in serum were significantly raised. Results have similarity with Sharma et al,<sup>13</sup> Lakshmi et al,<sup>14</sup> Rijal et al,<sup>5</sup> Munghate et al.<sup>15</sup> In our study we also experienced that out of 250 primary sub infertile females, Hypothyroidism was seen in 29.2% patients and Hyperthyroidism was seen in 7.6% patients. Close similarity to study done by Sharma et al.<sup>13</sup>

The occurrence of hypothyroidism was initiate to be 26% by Sharma et al,<sup>13</sup> 23.9% by verma et al,<sup>16</sup> 18% by Nemade et al,<sup>17</sup> ,20% by Rijal et al,<sup>5</sup> while in our study this frequency is found to be 29.2%. Hypothyroidism is usually linked with dysfunction of ovulation because of thyroid hormones various interactions with system of reproduction.

It causes more concentration of TRH which in turn results in more release of PRL and TSH by stimulation of pituitary. Hyperprolactinemia has adverse effect on fertility and the reason is disturbed pulsatility of GnRH and therefore function of ovaries.<sup>18</sup> Altering the estrogen metabolism in periphery and lowering the SHBG release peripheral metabolism of estrogen and by decreasing SHBG production is different pathway through which hypothyroidism may contact on fertility. Overall incidence of hyperthyroidism in our study was found to be 7.6%. This popularity was found to be 8% by Goswami et al,<sup>19</sup> 5.4% by Rijal et al<sup>5</sup>3.1%, by 5.8% by Joshi et al<sup>20</sup> by Sharma et al,<sup>13</sup>. Hyperthyroidism causes alteration in serum sex hormone binding globulin, that results change in concentration of sex hormone. Changes in concentration of sex hormone including LH and FSH results in menstrual disturbances such as oligomenorrhea, hypomenorrhea and anovulation.<sup>21</sup>. Dysfunction of thyroid is an ordinary reason of infertility that can be handled by treating the suitable levels of thyroid hormones. This type of infertility can be diagnosed and treatment can assist a lot rather than going for unnecessary battery of hormone assays and costly invasive procedures.

## CONCLUSION

Conclusion of this project was that hypothyroidism is one of the main and emerging reason of primary infertility. Proper management of hypothyroidism can result in regain of fertility. Assessment and screening of thyroid status should be part of criteria in infertile patients.

### Author's Contribution:

Concept & Design of Study:	Sadia Saeed
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

## REFERENCES

- Biradar SM, Poornima RT, Sonagra AD, Murthy J. Thyroid dysfunction in infertile women. *Int J Pharm Biol Sci* 2012;2:53-8.
- Negro R, Mestman JH. Thyroid disease in pregnancy. *Best Pract Res Clin Endocrinol Metab* 2011;25:927- 43.
- Verma I, Sood R, Juneja S, Kaur S. Prevalence of hypothyroidism in infertile women and evaluation of response of treatment for hypothyroidism on infertility. *Int J App Basic Med Res* 2012;2:17-9.
- Mascarenhas JV, Anoop HS, Patil M, Kulkarni S, George B, Ananthraman et al.. Improvement in fertility outcome follows initiation of thyroxine for women with subclinical hypothyroidism. *Thyroid Res Pract* 2011;8:3-6.
- Rijal B, Shrestha R, Jha B. Association of thyroid dysfunction among infertile women visiting infertility center of Om Hospital, Kathmandu, Nepal. *Nepal Med Coll J* 2011;13:247-9.
- Elahi S, Rizvi NB, Nagra SA. Iodine deficiency in pregnant women of Lahore. *J Pak Med Assoc* 2009;59:741-3.
- Kassa EM, Kebede E. Time-to-pregnancy and associated factors among couples with natural planned conception in Addis Ababa, Ethiopia. *Afr J Reprod Health* 2018;22(3):33-42.
- Bokaie M, Simbar M, Yassini-Ardekani SM. Social factors affecting the sexual experiences of women faced with infertility: a qualitative study. *Koomesh* 2018;20(2):228-39.
- Stoop D, editor. *Preventing Age Related Fertility Loss*. Springer International Publishing; 2018. DOI 10.1007/978-3-319-14857-1
- La Marca A, Minasi MG, Sighinolfi G, Greco P, Argento C, Grisendi V, et al. Female age, serum antimüllerian hormone level, and number of oocytes affect the rate and number of euploid blastocysts in in vitro fertilization/intracytoplasmic sperm injection cycles. *Fertil Steril* 2017;108(5): 777-83.
- Bercovici JP. Menstrual irregularities and thyroid diseases. *Feuillets de biologie* 2000;74:1063-70.
- Vaquero E, Lazzarin CD, Valensise H, Moretti C, Ramanini C. Mild thyroid abnormalities and recurrent spontaneous abortion: Diagnostic and therapeutic approach. *Am J Reprod Immunol* 2000;43:204-8.
- Sharma B, Kumar A, Singh CM, Kansal R. Significance of thyroid profile (serum T3, T4 and TSH) in infertile women. *Ind J Clin Health* 2012;24(2):148-152.
- Lakshmi S, Agrawal CG, Chowdhary SR, Mehra P, Ranjana K. Thyroid profile in infertile women. *J Obstet Gynec Ind* 1990;40(2).
- Munghate S, Belsare V, Mahajan B, Lambe S. A study of thyroid profile in primary infertility. *Int J Rec Trends Sci Technol* 2014;13(1):70-2.
- Verma I, Sood R, Juneja S, Kaur S. Prevalence of hypothyroidism in infertile women and evaluation of response of treatment for hypothyroidism on infertility. *Int J App Basic Med* 2012;2:17-9.
- Nemade S, Momin A, Naik P, Patil Y, Nemade T. The Association of Thyroid Profile with Primary Infertility in Females. *Int J Health Sci Res* 2012;1(2):90-4.

18. Davis LB, Lathi RB, Dahan MH. The effect of infertility medication on thyroid function in hypothyroid women who conceive. *Thyroid* 2007;17:773-7.
19. Goswami B, Patel S, Chatterjee M, Koner BC, Saxena A. Correlation of prolactin and thyroid hormone concentration with menstrual patterns in infertile women. *J Reprod Infertil* 2009;10(3): 207-12.
20. Joshi JV, Bhandarkar SD, Chadha M, Balaih D, Shah R. Menstrual irregularities and lactation failure may precede thyroid dysfunction or goiter. *J Postgrad Med* 1993;39(3):137-41.
21. Benson RC, Dailey ME. The menstrual pattern in hyperthyroidism and subsequent post therapy hypothyroidism. *Surg Gynecol Obstet* 1955;100: 19-26.