



## Original Research Article

## Thyroid dysfunctions in down's syndrome

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## ABSTRACT

**Background:** Down's syndrome is one of the common chromosomal abnormalities seen. Also means yes having thyroid dysfunctions would be better than neonatal having thyroid dysfunction. The patients having Down's syndrome are having thyroid dysfunction and the children having down's syndrome are at higher risk to have thyroid dysfunction and these children are having both the hypothyroidism and hyperthyroidism.

**Aim:** The present study aims at identifying the thyroid dysfunctions among the patients having Down's syndrome.

**Material and Methods:** The present study is an observational study which is being conducted in tertiary care hospital from March 2018 to June 2019. In this study 80 neonatal having Down's syndrome were being examined and the thyroid function tests are being performed on the patients for identifying the prevalence of thyroid dysfunction in patients with Down's syndrome. The patients are being selected on the basis of inclusion and exclusion criteria.

**Results:** In the present study it is being found that 56% of the patients were having normal thyroid function and 44% were having abnormal thyroid function. TSH value of the patients having abnormal thyroid function is significantly higher as compared to the patients having normal thyroid function. The mean of FT3 (pg/ml) among the patients having normal and abnormal thyroid function was found to be  $2.9 \pm 0.4$  and  $2.5 \pm 0.9$  respectively and the mean of FT4 (pg/ml) among the patients having normal and abnormal thyroid function was found to be  $14.9 \pm 8.4$  and  $2.5 \pm 0.9$  respectively  $13.5 \pm 7.9$ .

**Conclusion:** The study concluded that there is a significant impact of down syndrome on the thyroid function and the patients having down syndrome are at higher risk of thyroid diseases as it is found that the patients having down syndrome are having abnormal thyroid function and higher TSH value.

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## 1. Background

Down's syndrome is one of the common chromosomal abnormalities seen. Also means yes having thyroid dysfunctions would be better than neonatal having thyroid dysfunction.<sup>1</sup> This disease is considered to be a genetic disorder which affects wide population across the globe. Down's syndrome is a major cause of the intellectual

disabilities and this disease is also associated with the other diseases such as weak neuromuscular tone, mental retardation, gastrointestinal anomalies, visual impairment, congenital heart defects, hematopoietic disorders and other diseases as well.<sup>2</sup> Down's syndrome also increases the risk of several other clinical disorders which affects the overall quality of the life and life expectancy as well.

Down's syndrome is caused due to the irregularity in the chromosome or it is occurred due to the trisomy of whole chromosome or a part of chromosome 21.<sup>3</sup> Majority of the

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patients having Down's syndrome are also having an extra copy of chromosome 21. This genetic disorder may lead to the delay in physical growth, intellectual disability

The present study aims at identifying the thyroid dysfunctions among the patients having Down's syndrome.

Materials and Methods which can vary from mild to moderate and characteristic facial features. The incidence of Down's syndrome is affected by the maternal age or it can be said that child having increased maternal age are at higher risk of Down's syndrome.<sup>4</sup>

The patients having Down's syndrome are having thyroid dysfunction and the children having down's syndrome are at higher risk to have thyroid dysfunction and these children are having both the hypothyroidism and hyperthyroidism.<sup>5</sup> This disease is having a significant impact on the thyroid hormone which is one of the important hormone from the proper development of the human brain and because of this reason it is necessary to understand that how the down's syndrome is associated with the thyroid dysfunction.<sup>6</sup> This study is being conducted for studying the relation between Down's syndrome and increased risk of thyroid dysfunction.

## 2. Aim

The present study is an observational study which is being conducted in tertiary care hospital from March 2018 to June 2019. In this study 80 neonatal having Down's syndrome were being examined and the thyroid function tests are being performed on the patients for identifying the prevalence of thyroid dysfunction in patients with Down's syndrome. The patients are being selected on the basis of inclusion and exclusion criteria.

### 2.1. Inclusion criteria

1. Patients having Down's syndrome were included in the study.
2. The neonatal whose parents have given the consent are included in the present study.

### 2.2. Exclusion criteria

1. Neonatal not having Down's syndrome were excluded from the above study.
2. The neonatal whose parents are not given the consent willingly are excluded from the current study.

## 3. Results

In the present study the thyroid functioning tests were being conducted on the neonatal having own syndrome in which the TSH (thyroid stimulating hormone), FT3 (free triiodothyronine) and FT4 (free thyroxine) are being conducted.

In the present study it is being found that 56% of the patients were having normal thyroid function and 44% were

**Table 1:** Thyroid Function

Thyroid function	Parameter	Frequency	Percentage
	Normal	45	56%
	Abnormal	35	44%

having abnormal thyroid function.

**Table 2:** TSH (mU/L)

Parameter		Mean	P-value
TSH (mU/L)	Normal	7.5±5.9	Significant
	Abnormal	45.5±25.9	

In the present study it is being found that the TSH value of the patients having abnormal thyroid function is significantly higher as compared to the patients having normal thyroid function.

Further, the mean of FT3 (pg/ml) among the patients having normal thyroid function was found to be 2.9±0.4 and mean of FT3 among the patients having abnormal thyroid function was found to be 2.5±0.9. This shows that there is no significant difference between the FT3 among the patients having normal and abnormal thyroid function.

Finally, the mean of FT4 (pg/ml) among the patients having normal thyroid function was found to be 14.9±8.4 and mean of FT4 among the patients having abnormal thyroid function was found to be 13.5±7.9. This shows that there is no significant difference between the FT4 among the patients having normal and abnormal thyroid function.

## 4. Discussion

In the present study it is found that the thyroid function was found to be 44% abnormal among the patients having down syndrome. On comparing this with the study of Beker and Tuysuz, (2001)<sup>7</sup> it was being found that in their study it is being identified that among the total number of patients 71.9% were having normal thyroid function and 28.1% were having abnormal thyroid function.

In the current study it was identified that the TSH value is higher among the patients which are having abnormal thyroid functioning and are having down syndrome. On comparing this with the study of Pueschel and Pezzullo, (1985)<sup>8</sup> similar results were obtained. In the study of Pueschel and Pezzullo, (1985)<sup>2</sup> they have performed a study on two groups one which is having down syndrome and the another one which is not having down syndrome and it is being found that the TSH value is significantly higher for the patients belonging to the group which is having down syndrome. In support to this the study of Cutler, et al., (1986)<sup>9</sup> also it was found that the TSH value is higher among the patients having down syndrome. Van Trosutsenburg, et al., (2006)<sup>10</sup> had also conducted a study on the infants having down syndrome and had identified that the TSH value is higher among the patients having down

syndrome.

In the present study the mean of FT3 (pg/ml) among the patients having normal thyroid function was found to be  $2.9 \pm 0.4$  and mean of FT3 among the patients having abnormal thyroid function was found to be  $2.5 \pm 0.9$ . Similar to this the study of Sarici, et al., (2012)<sup>11</sup> it was found that the mean of FT3 (pg/ml) among the patients having normal thyroid function was found to be  $2.6 \pm 0.9$  and mean of FT3 among the patients having abnormal thyroid function was found to be  $2.6 \pm 1.1$ . On the basis of this comparison, it can be said that the value of FT3 is slightly lower among the patients having abnormal thyroid function.

The current study reveals that the mean of FT4 (pg/ml) among the patients having normal thyroid function was found to be  $14.9 \pm 8.4$  and mean of FT4 among the patients having abnormal thyroid function was found to be  $13.5 \pm 7.9$ . On comparing this with the study of Sarici, et. al., (2012)<sup>5</sup> similar results were obtained.

From the analysis of the above parameters, it can be said that the thyroid dysfunction is common among the patients having down syndrome. Similar results were also found in the study of Murphy, et. al., (2008)<sup>12</sup> and Pascanu, et al., (2009).<sup>13</sup>

## 5. Conclusion

The study concluded that there is a significant impact of down syndrome on the thyroid function and the patients having down syndrome are at higher risk of thyroid diseases as it is found that the patients having down syndrome are having abnormal thyroid function and higher TSH value.

## 6. Conflict of Interest

No conflict of interest.

## 7. Source of Funding

None.

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