Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Assessment of relation of thyroid function with body mass index in girls

[1]Dr Mayank Chugh, [2]Dr Mohammad Anay Tulla

[1]Assistant Professor, Dept of Medicine, KM Medical College and Hospital, Mathura, U.P., India;
[2]Assistant Professor, Dept of Biochemistry, KM Medical College and Hospital, Mathura, U.P., India

ABSTRACT:
Background: Hypothyroidism induces a decreased basal metabolism and thermogenesis, an accumulation of hyaluronic acid and a decreased renal flow. The present study was conducted to assess relation of thyroid function with body mass index in girls. **Materials & Methods:** 90 girls of age ranged 12-18 years were classified into group I and II based on normal and abnormal BMI level, respectively. Thyroid-stimulating hormone and total T4 were recorded by Cobas e411 based on electrochemiluminescence assay (ECLIA). **Results:** Age group 12-13 years had 35, 14-15 years had 28 and 16-18 years had 27 girls. The difference was non- significant (P> 0.05). The mean age in group I was 15.4 years and in group II was 19.0 years, height was 156.8 cm in group I and 158.2 cm in group II, weight was 46.2 kg in group I and 50.1 kg in group II, BMI was 20.5 Kg/m^2 in group I and 25.1 Kg/m^2 in group II, TSH level was 2.7 µIU/mL in group I and 3.9 µIU/mL in group II and total T4 in group I was 10.3 ng/dL in group I and 9.8 ng/dL in group II. The difference was significant (P< 0.05). **Conclusion:** Subjected with higher BMI had higher level of TSH. Thus there is association between high BMI and thyroid level.
Key words: BMI, Thyroid, Girls

Received: 10 March, 2020 Accepted: 12 April, 2020

Corresponding Author: Dr Mohammad Anay Tulla, Assistant Professor, Dept of Biochemistry, KM Medical College and Hospital, Mathura, U.P., India

This article may be cited as: Chugh M, Tulla MA. Assessment of relation of thyroid function with body mass index in girls**.** J Adv Med Dent Scie Res 2020;8(5):174-176.

INTRODUCTION

Overt thyroid dysfunction affects body weight. The adolescent period is an important stage of development. Thyroid hormones have a major role during this stage. During puberty, changes in thyroid functions and an increase in thyroid volume occur as an adaptation to physical development and reproductive maturation.

The increasing prevalence of obesity in the population particularly in younger individuals can affect the metabolism and may lead to many conditions like diabetes, cardiovascular risk, etc. Although the effects of hypothyroidism and hyperthyroidism on body weight has been seen in various studies. The adolescent period is an important stage of development. Thyroid hormones have a major role during this stage. Thyroid hormones are essential for normal growth, sexual development, and reproductive function. Any small derangement in thyroid hormone profile during this period will affect the individual's overall growth, especially BMI.

Hypothyroidism induces a decreased basal metabolism and thermogenesis, an accumulation of hyaluronic acid and a decreased renal flow, all factors leading to water retention. Severe hypothyroidism states lead to a clinical picture known as myxoedema in which hyperkeratosis of the skin and facial edema could give the patient a false appearance of overweight. Patients with hypothyroidism have also slow peristalsis causing chronic constipation that may result in weight gain. This weight gain is mainly due to water retention and is not related to an increase in fat mass. In addition, some studies have found a higher prevalence of subclinical hypothyroidism among obese patients. The present

study was conducted to assess relation of thyroid function with body mass index in girls.

MATERIALS & METHODS

The present study was conducted among 90 girls of age ranged 12-18 years. All were verbally informed and their written consent was obtained.

Demographic data such as name, age, etc. was recorded. History and clinical examination was done. Height, Weight and BMI was recorded. Subjects were classified into group I and II based on normal and abnormal BMI level, respectively. Thyroid-stimulating hormone and total T4 were recorded by Cobas e411 based on electrochemiluminescence assay (ECLIA). The biological reference range for serum TSH was 0.51–4.3 (µIU/mL) and for and T4 was 0.76–1.7 (ng/dL). Results thus obtained were statistically analyzed. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of subjects

Age group (Years)	Number	P value
12-13	35	0.61
14-15	28	
16-18	27	

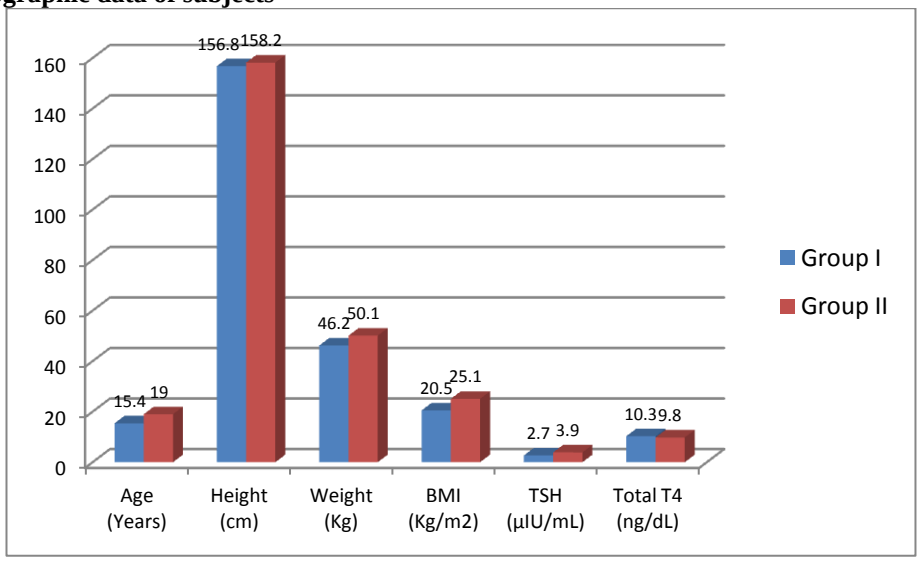
Table I shows that age group 12-13 years had 35, 14-15 years had 28 and 16-18 years had 27 girls. The difference was non- significant (P> 0.05).

Table II Demographic data of subjects

Variables	Group I	Group II	P value
Age (Years)	15.4	19.0	0.05
Height (cm)	156.8	158.2	0.30
Weight (Kg)	46.2	50.1	0.02
BMI (Kg/m^2)	20.5	25.1	0.05
TSH (µIU/mL)	2.7	3.9	0.01
Total T4 (ng/dL)	10.3	9.8	0.12

Table II, graph I shows that mean age in group I was 15.4 years and in group II was 19.0 years, height was 156.8 cm in group I and 158.2 cm in group II, weight was 46.2 kg in group I and 50.1 kg in group II, BMI was 20.5 Kg/m^2 in group I and 25.1 Kg/m^2 in group II, TSH level was 2.7 µIU/mL in group I and 3.9 µIU/mL in group II and total T4 in group I was 10.3 ng/dL in group I and 9.8 ng/dL in group II. The difference was significant (P< 0.05).

Graph I Demographic data of subjects



DISCUSSION

Thyroid hormones are involved in multiple physiological processes and regulating basal metabolic rate, promote the adrenergic nervous system to generate heat in response to cold exposure, stimulate gluconeogenesis and both lipolysis and lipogenesis. Patients with thyroid dysfunction may experience changes in body weight and body composition. Thyroid Association in the 2012 guidelines on the management of hypothyroidism makes reference to the absence of evidence in this field. These guidelines mention that hypothyroidism and obesity are often linked. Hyperthyroidism has traditionally been associated with weight loss and underweight. Subjects with hyperthyroidism have an adrenergic hyperstimulation with increased basal metabolism and thermogenesis, and a greater overall energy expenditure resulting in a tendency toward weight loss. Hyperthyroidism can also induce an increased gastrointestinal transit and occasionally anorexia due to the anorexigenic effect of triiodothyronine. The present study was conducted to assess relation of thyroid function with body mass index in girls.

In present study, age group 12-13 years had 35, 14-15 years had 28 and 16-18 years had 27 girls.

Priya et al analyzed the association between BMI and thyroid function in adolescent girls. Seventy-five girls of 12–18 years of age group were included in this study. Participants with BMI within 25–75 percentiles were categorized as group I and those below 25 and above 75 percentile were categorized as group II. The median values of age, weight, and TSH levels were significantly higher in group II participants when compared with group I. In group II, serum TSH and BMI depicted a highly significant positive correlation (p value = 0.001) while in group I this correlation was 0.044. Serum TSH was found elevated in participants with BMI derangement. The stronger correlation between TSH and BMI suggested regarding the inter-relationship between thyroid hormone and BMI and impact of each other's metabolism.

We found that mean age in group I was 15.4 years and in group II was 19.0 years, height was 156.8 cm in group I and 158.2 cm in group II, weight was 46.2 kg in group I and 50.1 kg in group II, BMI was 20.5 Kg/m^2 in group I and 25.1 Kg/m^2 in group II, TSH level was 2.7 µIU/mL in group I and 3.9 µIU/mL in group II and total T4 in group I was 10.3 ng/dL in group I and 9.8 ng/dL in group II.

Eftekhari et al examined the relationship between thyroid function and body mass index in 227 high school participants. (aged 12-21) were selected. Subgroup analysis was done according to body mass index. TSH, T4 and rT3 were correlated with BMI (r = 0.66, p = 0.001 and r = 0.12, p = 0.05 and r = 0.65, p = 0.001, respectively). Adolescent girls with BMI > or = 25 kg m(-2) showed higher serum TSH, T4 and rT 3 than subjects with BMI < 25 kg m(-2) (p = 0.001, p = 0.05 and p = 0.001, respectively). Present results showed that, although thyroid function was normal in the studied participants TSH and rT3 were positively correlated to BMI. TSH and rT3 could present a marker of altered energy balance in overweight and obese adolescent girls.

Ríos-Prego et al evaluated the association between thyroid dysfunction and body mass index (BMI) at baseline and after normalization of the hormone levels. A total of 330 patients were initially selected for the study. In order to exclude variables that for any reason could influence on BMI, 235 were excluded for further studies. Another 61 patients were also excluded because incomplete data on their medical records, failure to achieve euthyroidism, or lost to follow-up. Therefore, the eligible final study group consisted of 34 patients (17 with hypothyroidism and 17 with hyperthyroidism). No differences were observed in mean baseline BMI between hypo and hyperthyroid patients. Overweight or obesity was observed in 76.5% and 58.8% of hypothyroid and hyperthyroid patients, respectively (p=0.23). After normalization of thyroid function, the weight of hypothyroid patients decreased from 70.93±10.06 kg to 68.68±10.14 (p=0.000), while the weight of hyperthyroid patients increased from 65.45±11.64 kg to 68.37±12.80 (p=0.000). Their mean BMI was 26.22±3.36 and 27.57±4.98 (p=0.361) for hypo- and hyperthyroid patients, respectively. 58.8% and 64.7% patients remained in the overweight/obesity range in each group (p=0.72).

CONCLUSION

Authors found that subjected with higher BMI had higher level of TSH. Thus there is association between high BMI and thyroid level.

REFERENCES

1. Priya R, Patel S, Dubey SS, et al. Association of Thyroid Function with Body Mass Index in Adolescent Girls. Indian J Med Biochem 2020;24(2):55–58.
2. Eftekhari MH, Khosravi HM, Mazloom Z, Ahmadi A. Body mass index and thyroid function in adolescent girls. Pakistan journal of biological sciences: PJBS. 2007 Mar 1;10(6):905-9.
3. Ríos-Prego M, Anibarro L, Sánchez-Sobrino P. Relationship between thyroid dysfunction and body weight: a not so evident paradigm. International journal of general medicine. 2019;12:299.