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ORIGINAL RESEARCH

A Study on Thyroid Status In Relation to Puberty Menorrhagia at a Tertiary Care Centre

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ABSTRACT

Background:Menstrual problems account for 20% of gynaecology OPD visits. Thyroid hormones affect ovaries directly and interact with sex hormone-binding globulin indirectly to regulate normal reproductive function. To assess thyroid dysfunction in AUB-presenting teenage girls. AUB and thyroid issues in adolescent girls.

Materials and Methods: The study involved adolescent girls at Hyderabad's Modern Government Maternity Hospital. Cross-sectional study, November 2019 to October 2021. Girls with menorrhagia in Modern Government Maternity Hospital, Hyderabad.

Results: Adolescent girls experience physical and psychological changes, including menstruation. Heavy menstrual bleeding is a common childhood-to-adulthood medical problem. Puberty menorrhagia is a serious health problem in adolescents and may require a blood transfusion.

Conclusion: This cross-sectional study was conducted in Hyderabad's contemporary government maternity hospital. The study aimed to determine the prevalence of thyroid problems and their connection with menorrhagia in adolescents. Study participants numbered 100. After receiving consent from all subjects, a questionnaire and clinical exam were done.

Keywords: Thyroid status, relation, puberty menorrhagia, tertiary care centre.

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INTRODUCTION

Menstrual problems account for 20% of gynaecology OPD visits.[1] Thyroid hormones affect ovaries directly and interact with sex hormone-binding globulin indirectly to regulate normal reproductive function. Menstrual abnormalities and infertility can result from thyroid disease.[2] Thyroid problems are widespread in India.[3] Normal thyroid hormone levels are necessary for normal thyroid function.[4] Thyroid hormone affects ovaries and proteins that bind sex hormone during reproductive system development.[5]

Women's thyroid status affects menarche, pubertal growth and development, menstrual physiology, fertility and foetal development, postpartum period, reproductive physiology, and postmenopausal status. Every doctor has seen abnormal menstruation patterns in women with hypothyroidism and hyperthyroidism. Menorrhagia was the most prevalent menstruation complaint.[6]Thyroid dysfunction causes menstrual irregularities and infertility. Thyroid

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diseases are the second most frequent endocrine condition. In India, 17.9% of reproductive-age women had abnormal uterine bleeding. Hypothyroidism causes 4% of adolescent AUB. Irregular Uterine Bleeding is abnormal menstruation duration, volume, regularity, or frequency (AUB). Young and perimenopausal women are particularly impacted. 10 times more women than men have thyroid disorders. Thyroid deficient women suffer menstruation irregularities, miscarriage, and pregnancy morbidity.[7]

Inflammatory thyroid diseases obscure the high occurrence of thyroid problems in children.[8] TSH, T3 and T4 levels must be examined in patients with abnormal uterine bleeding to assess thyroid function. Heavy periods are normal. Hypothyroidism-triggered. Hyperthyroidism is linked to oligomenorrhoea and insufficient flow.[9]

Thyroid problems occur in 26% of premenopausal and menopausal women.[10] Thyroid diseases are more common in women and older persons.[11]

Hypothyroidism causes aberrant sexual development, menstruation abnormalities, and infertility.[12] Hypothyroidism affects menstrual cycle length and blood flow since the 1950s. 12 Subclinical hypothyroidism is connected with undetected menorrhagia before symptoms appear.[13] 9.5% of women have subclinical hypothyroidism.[14] Despite a few research, there are still gaps that need more analysis, hence this study examined the association between thyroid function and menorrhagia in teenagers.

MATERIALS & METHODS

Study Area

Adolescent girls who were undergoing treatment at Hyderabad's Modern Government Maternity Hospital's obstetrics and gynaecology department participated in the study. Using data from the study periods of November 2019 and October 2021, a cross-sectional study was conducted. Teenage girls presenting to the obstetrics and gynaecology division of the Modern Government Maternity Hospital in Hyderabad with menorrhagia.

Ethical approval

Institutional ethical committee approval was obtained prior to the initiation of the study.

Inclusion Criteria

1. Between the ages of 11 and 19.
2. Females who had reached menarche at least a year prior to the study's start

Exclusion Criteria

1. Participants who are over 19 and under 11 years old.
2. People who have taken medication in the past for thyroid dysfunction.
3. Females with coagulopathy or a bleeding disorder.
4. Teenage girls who are taking any type of anticoagulant or hormonal therapy.
1. Pregnancy

Sample Size and Study Tools

The study consisted of a total of one hundred individuals, all of whom had menorrhagia at some point over the course of the research. Pre-designed pre-tested questionnaire.

Data collection methodology

- The subjects were included in the study after their consent and sociodemographic details were noted.
- History was taken from patients and attenders.
- Personal history including history related to addictive habits was also taken.

Examination was done according to proforma.

- All patients were subjected to complete physical examination including recording vitals and calculating the BMI along with gynecologic examination.
- Particular attention was given to presence of clinical signs such as pallor, petechiae, acanthosisnigricans or baldness.

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- Presence of goiter/thyromegalywasnoted.
- All the routine investigations including complete blood picture, bleeding time and clotting time were done.
- Forthyroid profile (which includes Serum TSH, Thyroxine (T4) and Tri iodothyronine (T3) levels), sample of venous blood was taken and analysis done using Chemi-Luminescence-Immuno Assay (CLIA) system.

Table 1: Diagnostic criteria

Thyroid profile	**Normal range**
T3	80- 180 ng/dl
T4	4.6- 12 µg/dl
TSH	0.4- 5 µIU/ml
Hemoglobin	
Normal	12- 16 g/dl
Anaemia	<12 g/dl

Data analysis

The information was gathered, organised, and coded before being imported into Microsoft Excel and then sent to SPSS. SPSS version 21 was used to perform the analysis on the data. The data is first displayed in the form of percentages organised into categories, and then it is presented in the form of tables and graphs. The Chi-square test, the analysis of variance (ANOVA), and an independent t-test were employed to examine the significance of the data.

RESULTS

Table2:Distributionaccordingtoage

Age	**Frequency**	**Percent**
11- 15years	52	52%
16- 19years	48	48%
Total	100	100%
Meanage:15.2±2.71years		

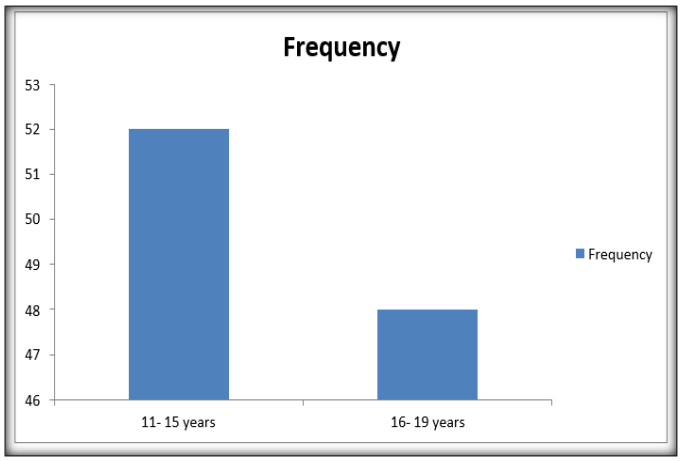

Figure 1: Column chart showing age distribution

[Table2]showstheagedistribution,where52%werebetween11-15 yearsand48%werebetween16-19years.Themeanagewas15.2±2.71years.

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Table3:DistributionofBMIaccordingtoWHOclassification

BMI(kg/m2)	Frequency	Percent
<18.5[Underweight]	-	-
18.6-24.9[Normal]	57	57%
25-29.9[Overweight]	36	36%
>30[Obese]	7	7%
Total	100	100%
Mean BMI:24.82±3.51kg/m2		

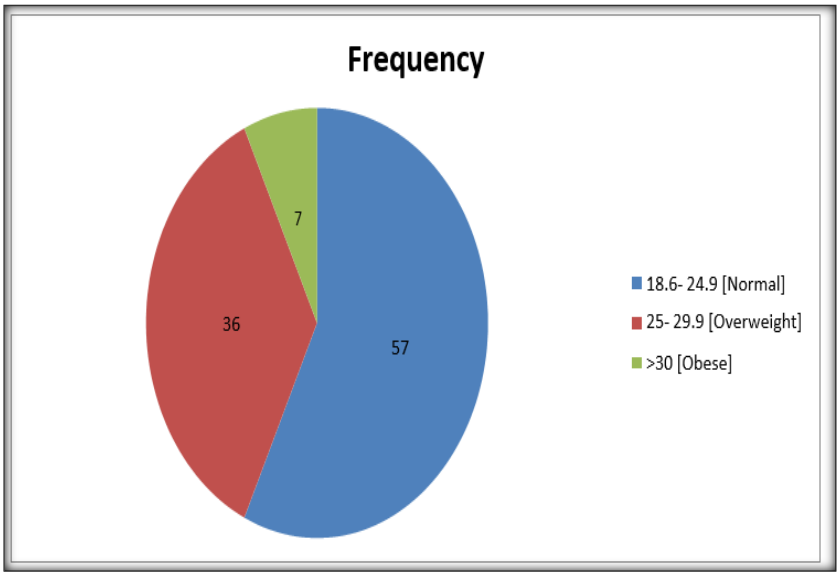

Figure2:PiechartshowingBMIclassification

[Table 3] shows the distribution of BMI of patients as per WHOclassification.57% of the patientshadnormal BMI,36% were over weight and 7% were obese.Non eofthemwereunder weight.Them ean BMI was24.82±3.51kg/m2.

Table4:Durationofmenorrhagia

Menorrhagia	Duration(Months)
Mean	6.66-7.89months
Minimum	1month
Maximum	30months

[Table4]showsthemeandurationofmenorrhagiaamongthepatientswas 6.66-7.89months.

Table5:Distributionaccordingtoexamination

Examination	Frequency	Percent
Normal	85	85%
Anaemia	12	12%
Anaemia&thyromegaly	2	2%
Thyromegaly	1	1%
Total	100	100%

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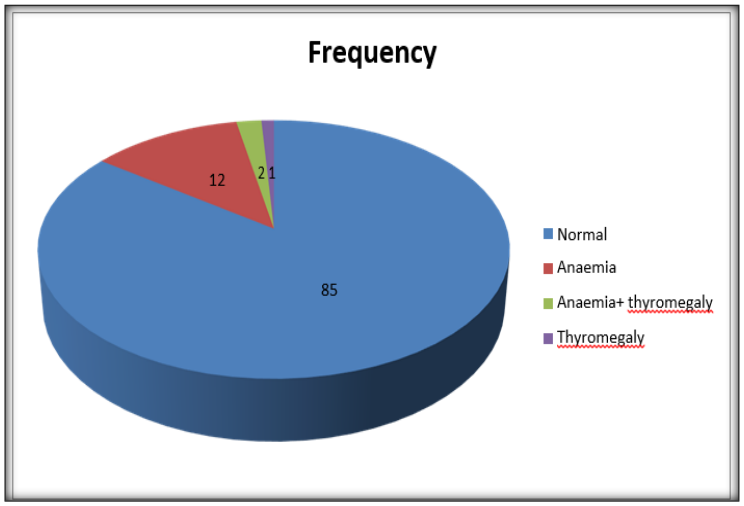

Figure3:Piechartshowingexamination

[Table5]shows85%had no significantabnormalityonphysical examination, 12 were found to beanaemic, 1 had thyromegaly and 2 had both anaemiaand thyromegaly together.

Table6:Distributionaccordingtothyroiddiagnosis

Diagnosis	Frequency	Percent
Hypothyroid	33	33%
Euthyroid	63	63%
Hyperthyroid	4	4%
Total	100%	100%

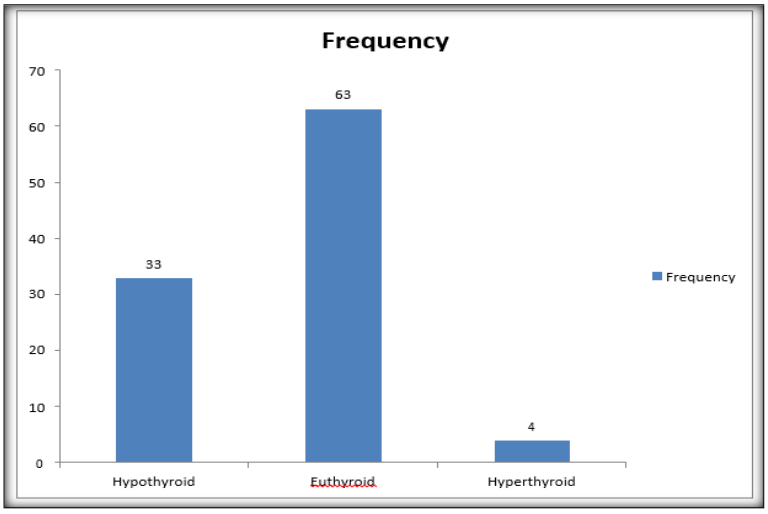

Figure4:Columnchartshowingthyroiddiagnosis

[Table 6] shows among the 100 patients who were included in the study,33 were diagnosed with hypothyroidism, 4 had hyperthyroidism and 63hadnormalthyroidstatus.

Table7:SymptomsofhypothyroidpatientS(n=33)

Symptoms	Frequency	Percent
Weightgain	13	39.4%
Lethargy	8	24.2%
Hairloss	4	12.1%

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Constipation	5	15.1%
Dryskin	2	6.1%
Voicechange	1	3.1
Total	33	100

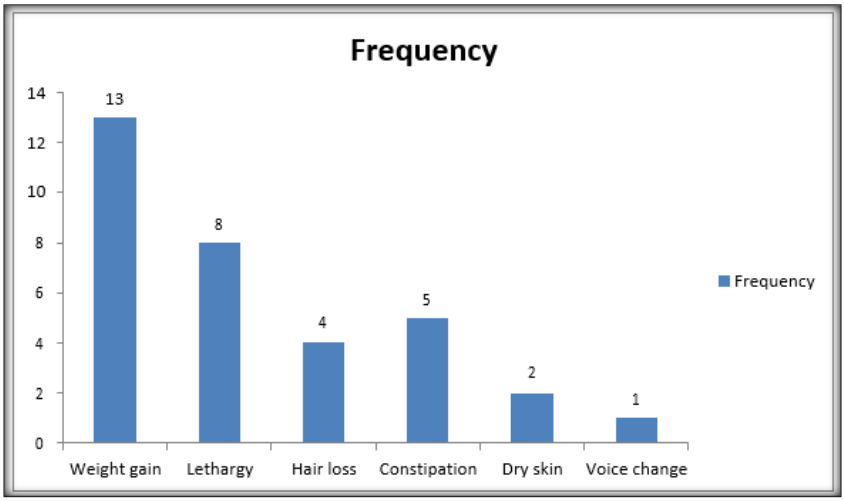

Figure5:Columnchartshowingsymptoms

Among hypothyroid cases, the history revealed 13 had weight gain, 8were lethargic, 4 had hair loss, 5 had constipation, 2 had dry skin and 1hadchangeofvoiceasshownin [Table7].

Table8:Hyperthyroidsymptoms(n=4)

Symptom	Frequency	Percent
Fatigue	2	50%
Sweating	2	50%
Total	4	100%

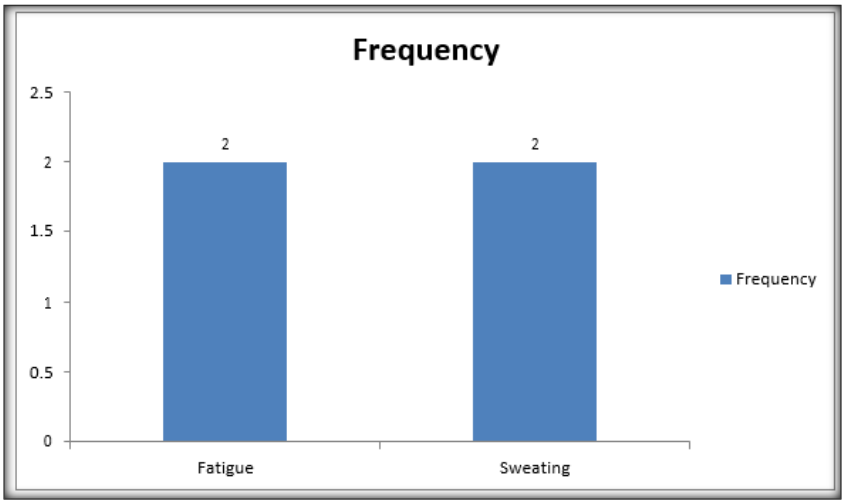

Figure6:Hyperthyroidsymptoms

The study consisted of 4 hyperthyroidpatients; the symptomsexperiencedbythemwerefatigue andsweatingasseenin [Table 8].

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Table9:Thyroidprofiledistribution

Thyroidprofile	Frequency	Percent
T3		
<80 ng/dl	33	33%
80- 180ng/dl	63	63%
>180ng/dl	4	4%
Total	100	100%
Mean T3:120.13±45.69 ng/dl		
T4		
<4.6µg/dl	33	33%
4.6-12µg/dl	63	63%
>12µg/dl	4	4%
Total	100	100%
Mean T4:6.85±3.59µg/dl		
TSH		
>5µIU/ml	33	33%
0.4-5 µIU/ml	63	63%
<0.4µIU/ml	4	4%
Total	100	100%
Mean TSH:4.14±2.32µIU/ml		

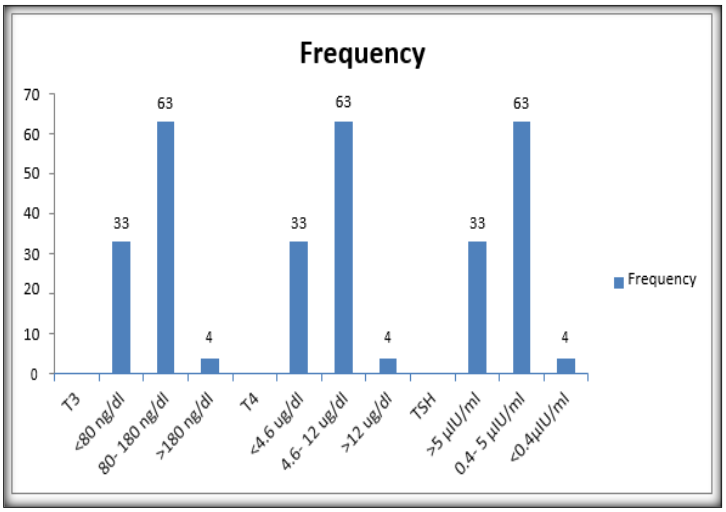

Figure7:Columnchartshowingthyroidprofile

[Table 9] shows, 63% cases had T3, T4 and TSH within normal range; 33%had low T3 & T4 levels and elevated TSH levels; and 4% had high T3 & T4levels andlowTSHlevels.

Table10:AssociationbetweenT3andmenorrhagia

T3	Diagnosis	n	Mean	SD	95%CI		p-value
					Lower	Upper	
	Hypo	33	79.67	41.94	64.82	94.57	
	Euthyroid	63	136.58	30.34	128.94	144.22	**<0.001***
	Hyper	4	194.5	7.04	183.28	205.71	
***Levelofsignificance:p<0.05**							

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[Table10]showstheassociationbetweenT3andmenorrhagia.Asignificant (p<0.001)associationwasobtainedinhypothyroidcasesmeaning among significant number of menorrhagia patients, T3levelswerefoundtobelow.

Table11:AssociationbetweenT4andmenorrhagia

T4	Diagnosis	n	Mean	SD	95%CI		p-value
					Lower	Upper	
	Hypo	33	4	3.80	2.65	5.35	**<0.001***
	Euthyroid	63	7.98	2.18	7.43	8.53	
	Hyper	4	12.65	3.52	7.04	18.25	
***Levelofsignificance:p<0.05**							

[Table11]showstheassociationbetweenT4andmenorrhagia.Asignificant(p<0.001)associationw asobtainedinhypothyroidcasesmeaning among significant number of menorrhagia patients, T4levelswerefoundtobelow.

Table12:AssociationbetweenTSHand menorrhagia

TSH	Diagnosis	n	Mean	SD	95%CI		p-value
					Lower	Upper	
	Hypo	33	6.8	1.10	6.40	7.19	
	Euthyroid	63	3.01	1.36	2.67	3.35	**<0.001***
	Hyper	4	0.07	0.03	0.02	0.12	
***Levelofsignificance:p<0.05**							

[Table12]showstheassociationbetweenTSHandmenorrhagia.Asignificant(p<0.001)association wasobtainedinhypothyroidcasesmeaning among significant number of menorrhagia patients, TSH wasfoundtobeelevated.

Table13:AssociationbetweenBMIandmenorrhagia

BMI	n	Mean	SD	95%CI		p-value
				Lower	Upper	
BMI(kg/m2)	100	24.82	3.51	23.12	24.52	0.001
***Levelofsignificance:p<0.05**						

[Table 13] shows the association between BMI and menorrhagia where asignificant association was found meaning higher BMI is associated withmenorrhagia.

DISCUSSION

Girls go through a variety of changes, both physically and mentally, during adolescence, including those that are related with the onset of menstruation. The transition from childhood to adulthood is accompanied by a variety of frequent medical issues, one of the most prevalent of which is heavy menstrual flow. Menorrhagia connected with puberty is a significant health issue that primarily affects adolescents. This condition can be linked to severe problems, some of which may need receiving a blood transfusion.The beginning of puberty typically occurs between the ages of 10 and 16 and is influenced by a number of hormones. These hormones have an effect on the cellular and glandular components of the

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reproductive system, which in turn causes the anatomical and physiological changes that characterise puberty. It is not uncommon for a woman to experience irregular or no ovulatory cycles during the first few years after menarche. While these symptoms may be caused by a normal, transient step of ovarian hyperandrogenism, they may also be the result of hormonal abnormalities brought on by dysfunction in the adrenals, ovaries, thyroid, or pituitary glands.The female reproductive system is profoundly impacted when there is a malfunction in the thyroid. Menstrual abnormalities are typically brought on by issues relating to a woman's thyroid, most frequently hypothyroidism but sometimes other thyroid conditions. According to the findings of a survey that was carried out in Tamil Nadu in the year 2015. In South India, young women frequently presented symptoms of thyroid insufficiency. TSH levels were abnormal in young women at a rate of one in every eight. The participants in this study ranged in age from 11 to 19 years old and there were a total of 100 of them. In this particular study, the mean age was 15.2 years, with a standard deviation of 2.71 years.

Table14:Comparison ofmeanagewithrespecttootherstudies

Study	**Age (years)**
PresentStudy	15.2±2.71
SiddheshR,HarithaSetal.	17.36±1.85
ChungPW,ChanSS,YiuKW,etal.	15.4±1.8
ZegeyeDTetal.	16.9±1

[Table14]showscomparisonofmeanagewithrespecttootherstudies.

A study by Siddhesh R, Haritha S et al. reported the mean age among the case swas 17.36±1.85 years.[15] The study by Chung PW, Chan SS, Yiu KW, et al,[16] the mean age was15.4± 1.8 years and in the study by Zegeye DT, Megabiaw B, Mulu A,[17]themeanagewas16.9±1year/s. The mean BMI was 24.82±3.51kg/m 2 in this study.The study by SiddheshR,HarithaSetal. Reported the BMI tobe 21.82±5.36kg/m2.[15]

Table15:Comparisonofprevalenceofhypothyroidismwithrespecttootherstudies

Study	**Hypothyroidcases**
PresentStudy	33%
AbrahamR etal.	11.5%
NangiaS,VinitaSetal.	34%
KaurTet al.	14%
SharmaN, SharmaA	22%
PahwaSetal.	22%
PadmaleelaKetal.	26.5%

In the present study among the 100 patients with menorrhagia, 33 had hypothyroidism.Table 15 shows comparison of percentageofhy pothyroid case swithre specttoo the rstudies. Study by AbrahamR,Srinivasa MuruganV,PukazhvanthenP,etal which had evaluated thyroid dys function in women in the age group of11- 20 years found that 84.2% women were euthyroid, 11.5% women hypothyroid and 1.8% women hyperthyroid. This shows a comparable prevalen ceofthyroid dys function in the a dolescent population.[18]

Kakuno Y, Amino N, Kanoh M, et alreported menstrual disturb an ceswere found to be more common in patients with severe hypothyroidism (34.8%) compared tomildtomoderatehy pothyroidism (10.2%).[19] The study by Nangia S, Vinita S et al. reported hypothyroidism was

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the common estabnormalityas 34% cases in the study group hadhypothyroidismand 10 % of women were hyperthyroid which is comparable othepresent study.[20]In the study by Kaur T, Aseeja V, Sharma S among 100 patients 14 hadreportedhy pothyroidism.[21] Another study by SharmaN,SharmaA shows the prevalenceofhy pothyroidism was 22%.58

In the study by Pahwa S, Shailja G, Jasmine K among 150 patients ,the prevalenceofhy pothyroidism was 22%.[22] Another study by Padmaleela K, Thomas V, Lavanya KM, et al. 26.5%werehypothyroidamong125patients.[23]In the present study among the 33 hypothyroid patients, 13 had weight gain, 8 were lethargic, 5 were constipatedand 4 hadhairloss. The study by SiddheshR,HarithaSetal.suggested many of the patientshad weight gain followed by myalgiaand dryskin.[15]

The study by Siddhesh R, Haritha S et al. among 139 cases 10% had menorrhagia and among them 6.7% had thyroiddys function.[15] Another study by Moulika S and Ptange R reported the hyperthyroidism was 23% in sample of 520 subjects.[23]The study by Siddhesh R,Haritha S etal .found decreased T3 and T4 and increased TSH was associated with men orrhagia which was asimilar finding with the present study.[15] Nangia S, Vinita S et al. also reported a significant association and concludedhy pothyroi dismisassociated with men orrhagia.The study by Moulika S and Patange R also found positive correlationan dassociationofhy pothyroidism with menorrhagia.[23]

The study by Banarjee B, C. Manisha et al. reported the incidence ofGynecological OPD attendance due to abnormal uterine bleeding was 3% and the in cide nceofthyroiddys function was 10.6% with hypothyroidism being the commonest (9.3%). The commonest men strualpattern reported among them was men orrhagia/polymenorrhoea (8%cases). This study report edincreasing BMI is associated with men orrhagia which was statistically significant. A similar finding was seen in the study by SiddheshR.HarithaSetal.[15]

CONCLUSION

This cross-sectional study was conducted in Hyderabad's contemporary government maternity hospital. The study aimed to determine the prevalence of thyroid problems and their connection with menorrhagia in adolescents. Study participants numbered 100. After gaining consent from all individuals, a complete history and clinical exam were done. The study's mean age was 15.22.71 years. 100 participants had normal BMI, 36 were overweight, and 7 were obese, with a mean BMI of 24.823.51kg/m2. 85% had no abnormalities, 12 had anaemia, 1 had thyromegaly, and 2 had both. 33% of participants had hypothyroidism. Weight gain, lethargy, hair loss, diarrhoea, dry skin, and voice alteration were reported.

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