Original Research Article

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Prevalence of hypothyroidism amongst college girls of Bhopal, Madhya Pradesh, India: a cross sectional study

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ABSTRACT

Background: Endocrine disorders are common amongst Indian population, out of which thyroid disorders represent an important subset of these endocrine disorders. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid disease. Hypothyroidism in young women is linked to menstrual irregularities, polycystic ovaries and infertility. Also, several studies have highlighted the importance of diagnosing and treating hypothyroidism in pregnancy. So, this study was done to assess the prevalence of hypothyroidism in young women attending college who are going to become pregnant in future.

Methods: This was a cross-sectional study done in government PG girls college of Bhopal, Madhya Pradesh, from October 2015 to December 2015 (3 months). The study population was the college girls in the age group 17-25 years. After taking permission from principal of the college, a survey was conducted on 249 students of M.L.B Girls College, Bhopal using a semi - structured questionnaire. It was followed by clinical examination of 249 girls and recognizing the high risk group by Zulewski's Scoring Criteria for thyroid dysfunction. Those who were having score of >5 points were taken for TSH estimation to confirm the diagnosis. Girls with history of hypothyroidism and receiving treatment were also included to calculate the prevalence. The data thus obtained was tabulated and analysis was done using MS Excel 2013.

Results: Out of 249 girls, 32 girls have score >5. Thus, prevalence by clinical score came out to be 11%. Prevalence by TSH estimation came out to be 7.63%.

Conclusions: Since prevalence of hypothyroidism in the college going age group came out to be 7.6% in our study, which is quite prominent and who are destined to conceive in the years to come, hence thyroid screening should be included in medical check-up in all colleges.

Keywords: Bhopal, College girls, Hypothyroidism, Prevalence

INTRODUCTION

Endocrine disorders are common amongst Indian population, out of which thyroid disorders represent an important subset of these endocrine disorders. According to western literature, around 50% of people in the community have microscopic nodules, 5% women have overt hypothyroidism or hyperthyroidism, 15% have palpable goitre, 3.5% have occult papillary carcinoma &

10% demonstrate an abnormal TSH level. The prevalence of these thyroid disorders varies widely according to geographical distribution, diet and nutrition, and patient population. According to a projection from various studies on thyroid disease, it has been estimated that about 42 million people in India suffer from thyroid disease.² Thyroid diseases are different from other diseases in terms of their ease of diagnosis, accessibility of medical treatment and relative visibility that even a

small swelling of thyroid offers to the treating physician. Early diagnosis and treatment remains the cornerstone of management. The prevalence of Hypothyroidism in developed world is 4-5% and prevalence of sub-clinical hypothyroidism in the developed world is 4-15%.³⁻⁵ Thyroid disorders are 10 times more common in women than in men. Hypothyroidism in young women is linked to menstrual irregularities, polycystic ovaries and infertility. 6-11 Also, several studies have highlighted the importance of diagnosing and treating hypothyroidism in pregnancy. 12-14 Studies on prevalence of thyroid disorders in the post iodisation era are very few. Similarly, studies on hypothyroidism in young women are fewer. So, this study was done to assess the prevalence of hypothyroidism in young women attending college who are going to become pregnant in future.

METHODS

This was a cross-sectional study done in government PG girls college of Bhopal, Madhya Pradesh, India from October 2015 to December 2015 (3 months). The study population was the college girls in the age group 17-25 years.

Sample size

Sample size for the study was determined using the formula for calculating single proportions by Abramson and Gahlinger . The total number of college students in Bhopal was above 10,000. Therefore the sample size formula was used.

$$n = p (1-p) z_{\alpha}^{2}/d^{2}$$

where n is minimum sample size, z_{α} is standard normal deviate, corresponding to 95% confidence level at which for a two tailed test, p is proportion in the target population estimated to have a particular characteristic (prevalence of hypothyroidism in young girls from a previous study was 12.5% and d is degree of accuracy desired or maximum allowable difference from true proportion which was set at 5% (0.05). The sample size came out to be 168. In order to make up for anticipated loss due to incompletely filled questionnaire, the number was increased to 200 but 249 respondents were included because of their personal interest.

Inclusion criteria

Girls present at the time of the survey and who give consent; including known cases of hypothyroidism who were on treatment.

Exclusion criteria

Girls absent at the time of survey; girls not consenting.

Ethical consideration

Ethical clearance was obtained from institutional ethical committee and informed consent obtained from principal of the college. Written consent was taken from the participants for blood investigation.

After taking permission, a survey was conducted on 249 students of M.L.B Girls College, Bhopal using a semi structured questionnaire which had questions regarding demographic variables, medical history family history ,symptoms, menstrual history, radiation history, etc. We then conducted an audio visual orientation program on hypothyroidism and its ill effects. It was followed by clinical examination of 249 girls and recognizing the high risk group by Zulewski's Scoring Criteria for thyroid dysfunction.¹⁵ This score includes 7 symptoms and 5 signs. Each symptom and sign is given score of 1 thus a total score of 12 (maximum score 12). A score of >5 points defines hypothyroidism. A score of 0-2 points defines euthyroid. This score has a sensitivity of 62% (62% of all overt hypothyroid were detected by the new score). Those who were having score of >5 points were taken for TSH estimation to confirm the diagnosis. TSH estimation was done by Chemi-luminescence on Automated Immuno Assay System. The laboratory reference value for TSH was 0.34 - 5.60. TSH level more than 5.60 was termed as elevated TSH and the subject labelled as hypothyroid. Girls with history of hypothyroidism and receiving treatment were also included to calculate the prevalence. Statistical Analysis: The data thus obtained was tabulated and analysis was done using MS Excel 2013.

RESULTS

Out of 249 girls, 32 girls have score >5. Thus, prevalence by clinical score came out to be 11 %. Due to Financial constraints, TSH estimation was done only for these 32 girls with score >5, excluding those who were already diagnosed as hypothyroid & were on treatment. Out of them, 6 had elevated TSH levels, i.e. Values >5.60 And, 13 girls already diagnosed as hypothyroid & were on treatment. So, prevalence was calculated as 19 (6+13) as numerator & 249 as denominator. Prevalence by TSH estimation came out to be 7.63%.

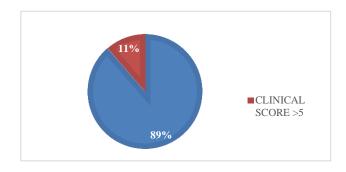


Figure 1: Prevalence of hypothyroidism by clinical score.

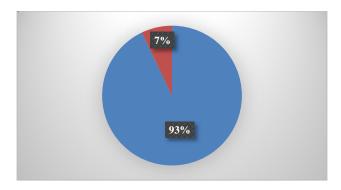


Figure 2: Prevalence of hypothyroidism by TSH estimation.

Table 1: Socio demographic profile of the participants.

Age-group (years)	N=249	Percentage
<18	45	18.07
18-20	125	50.20
20-22	59	23.69
22-24	9	3.61
>24	10	4.02
Religion		
Hindu	199	81.22
Muslim	46	18.47
Christian	4	1.61
Sikh	0	0
Others	0	0
Education		
Graduate	225	90.36
Post Graduate	24	9.64
SES (Modified Prasad)		
1	14	5.62
2	32	12.85
3	24	9.64
4	45	18.07
5	94	37.75

DISCUSSION

Thyroid dysfunction was seen in 7.6% of study subjects. Majority of them could have sub-clinical hypothyroidism. A small number in this group could also have overt hypothyroidism (with low free T4) and rarely may have central hypothyroidism. Our study results are consistent with reports from other studies. In a similar study conducted in Madurai district by Velayutham K et al the overall prevalence of abnormal TSH among female college students was 12.5%. The prevalence of hypothyroidism was 13.3% and 11.5% in the study from Kerala and Pondicherry respectively. In another nationwide study in India, the prevalence of overt undiagnosed hypothyroidism was 3.5% and the prevalence of subclinical hypothyroidism was 8.5%. In a study from Delhi in 2012 by Marwaha et al, subclinical

hypothyroidism was present in 19.3% of subjects and 4.2% had overt hypothyroidism.²⁰

Since prevalence of hypothyroidism in the college going age group came out to be 7.6 % in our study, which is quite prominent and who are destined to conceive in the years to come, hence thyroid screening should be included in medical checkup in all colleges. This young population is at risk of infertility, reproductive dysfunction and possibly fetal abnormalities — all important enough to deserve further study and research in future.

CONCLUSION

This study focuses on young college girls and this is a female population likely to become pregnant in future. High Prevalence of hypothyroidism was seen and it was 7.6%. Any association between Hypothyroidism & other variables such as Family history of thyroid disorder or menstrual history could not be commented as TSH estimation was not done for all 249 girls. Similarly, sensitivity & specificity of Zulewski's score could not be assessed for similar reasons.

Strengths of the study: It is one of a few studies to assess the thyroid dysfunction in young college girls.

Limitation of the study: The required sample was taken from a single college, randomization was not done. FT4 and thyroid antibodies could not be tested due to financial constraints and for similar reasons, Zulewski score was used to screen the subjects, which has a sensitivity of 62%.

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Ethical approval: The study was approved by the

Institutional Ethics Committee

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