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A Cross-Sectional Study to Access the Puberty Changes in Adolescence Girls of 15 & 16 Years of Age Using Tanners Sexual Maturity Scale

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Abstract: ***Background: Puberty is the state of becoming functionally capable of procreation. This is usually accepted as occurring at the age of 12 years in girls and 14 years in boys, but full reproductive capacity is not usually attained until later. Puberty is characterized by physical sexual differentiation and by the onset of activity of the sex organs. puberty is the first part of adolescence; the remainder being concerned with the mental and emotional adaptations to sexual function and with the development of full maturity.4 Aim & Objectives: 1) To understand puberty changes are normal in the age group of 15-& 16-year-old adolescent girls according to Tanner's Sexual Maturity Scale. 2) To estimate the relation between Menarche, breast & pubic hair development and BMI. Methods: A cross-sectional study was conducted from 22-10-2021 to 24-10-2021 as a part of an awareness talk on puberty changes in adolescent girls especially 10th-standard students in a high school, at Moodbidri, Karnataka. Purposive sampling was selected by taking 200 students forms the study group. Study participants filled structured questionnaire on which sexual maturity was accessed using Tanner's Sexual Maturity Score. Results: The mean age of menarche was found 12.86 (SD=0.87) (graph. C). Among 200 girls, most of the students were in stage2 (58) & 3 (96) breast development whereas pubic hair development was in stage3 (99) & 4 (90). Normally breast development must be more than pubic hair development. There was a correlation found between menarche & pubic hair development (r=-.302, p= <.001). There was a correlation found between breast development & BMI (r=.370, p=<.001), as the BMI of 50.5% of girls shows underweight (graph B) and hence most of the breast development was in stages 2 &3 whereas pubic hair development was in stages 3&4 so underweight was found one of the causes for delaying Brest development stage. Discussion: Most of the students showed underweight and delayed breast development stage compared to pubic hair development. The hallmark of the adolescence period is growth, nutrition is an important factor. The impact of inadequate nutrition at this phase of life is also visible later in adult life. Conclusion: This study was conducted on students studying in a high school, at Moodbidri. So further studies at other schools are needed to investigate nutrition deficiencies, followed by nutritional* **correction** *as well as Homoeopathic intervention will be required in the future.***

Keywords: Tanners Sexual Maturity Scale, Adolescence, Puberty

1. Introduction

Puberty in girls is the period, which links childhood to adulthood. It is the period of gradual development of secondary sexual characteristics. It is essential for the activation of H-P-O-A that induces & enhances progressive ovarian secretion, there are profound biological, morphological &physiological changes that lead to full sexual maturity and eventually fertility. As described by Tanner & Marshall, five important physical changes are evident during puberty. These are breast, pubic & axillary hair growth, growth in height, and menstruation.[2] The WHO defines adolescents as individuals in the age group of 10-19 years.[1]

Puberty is the milestone of female reproductive life; it links childhood to adulthood. Problems in puberty can cause a significant impact on their reproductive life, for example, PCOS originates in puberty. Clinical observation teaches that PCOS often develops during adolescence. excessive hair growth usually originates before the onset of menstrual cycles. menarche tends to be delayed. irregular cycles, although considered a normal phenomenon during the first gynaecological years, frequently continue into adulthood.[4]

Tanner's sexual maturity score-Sexual Maturation Rating (SMR), also known as Tanner Staging, is based upon a scale of secondary sexual characteristics that permits health professionals to gauge the degree of pubertal maturation that has occurred among adolescents, regardless of chronological age. SMR is based on the appearance of pubic hair, the development of breasts, and the occurrence of menarche among females; and on the degree of testicular and penile development and the appearance of pubic hair among males. SMR stage 1 corresponds with prepubertal growth and development, while stages 2-5 indicate the progression of puberty. By SMR stage 5, Sexual maturation has been completed. sexual maturation correlates remarkably well with linear growth, changes in weight and body composition, and hormonal changes.[3]

The first sign of ovarian estradiol secretion is breast development "thelarche" (breast budding, B2, or sexual maturity rating 2) with "growth in height" estradiol being a good stimulator of "GH" doubles the growth velocity. Puberty is associated with changes in body shape, such as hip growth, an increase in body fat from 16% to 28%, and a reduction in lean body mass from 80% to 72%. The age of menarche is around 12-13 years. Estradiol is the main hormone in females influencing puberty development, i.e., breast and genitals, and promotes uterine maturation and fat deposition in typical female contours, while androgens from adrenals and ovaries are responsible for pubic and axillary hair and the typical body odour and acne.[1]

Aim

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To understand puberty changes are normal in the age group of 15-& 16-year-old adolescent girls according to Tanner's Sexual Maturity Scale

Objectives

To estimate the relation between Menarche, breast & pubic hair development and BMI

Hypothesis

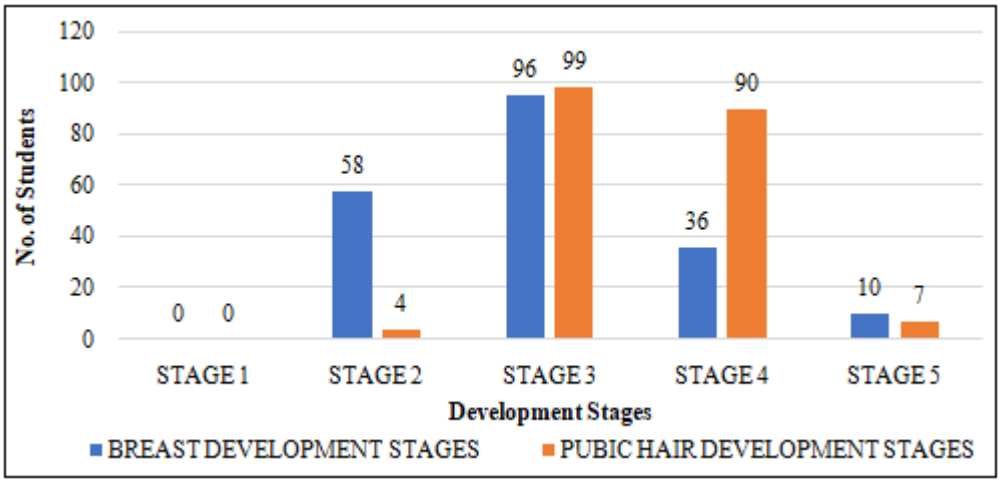
1) Null hypothesis: There is no significant relation between Menarche, breast & pubic hair development and BMI.
2) Alternative hypothesis: There is a significant relation between Menarche, breast & pubic hair development and BMI.

2. Methodology

A cross-sectional study was conducted from 22-10-2021 to 24-10-2021 as a part of an awareness talk on puberty changes in adolescent girls especially 10th-standard students in a High School, at Moodbidri. Purposive sampling was selected by taking 200 students forms the study group. Study participants filled structured questionnaire on which sexual maturity was accessed using Tanner's Sexual Maturity Score. The statistical method used was a linear correlation for analysing the data. Analysis was done using SPSS 28 version software. To assess BMI, a weighing machine and measuring tape were used to measure the weight & height of the students

3. Results and Discussion

A total of 200 adolescent girls, from a high school, at Moodbidri, Karnataka were studied. The study was conducted as a part of an awareness program about puberty changes in adolescence age. The age group selected was 15-& 16-year-old girls who have attained menarche already.



Graph 1: Distribution of Adolescents according to their Breast and Pubic Hair Development

Among 200 girls, most of the students (96) are in stage 3 breast development and 58 students are in stage 2 breast developments. Very few are in stage 5 (10 girls). According to tanner sexual maturity scale students of this age group are in stage 4 & 5.99 students are in stage 3 pubic hair development and 90 students are in Stage 4 pubic hair development. Pubic hair development is normal as per Tanner's Sexual Maturity Scale.

Ghosh et al[6] studied secondary sexual characters in menstruating girls, on that breast bud has appeared between the ages of 8-15 years, pubic hair between 9-16 years.

Lata R Kolluret al [7] A community based cross sectional study: a puberty changes in adolescent girls were studies, it is observed that time period required for full breast development i. e from Breast development stage 1 to Breast development stage V, was 7.3 years and for full pubic hair development i. e., from stage I to stage V, was 7.9 years. On this study, non-menstruating adolescent girls belonged to Brest stage 1 and II and to pubic stage I and II and menstruating adolescent girls belonged to Brest stage III, IV and V and to pubic stage III and IV.

From this, it is clear that the students are in delayed breast development stage (II and III) when compared to pubic hair stage (III and IV). Normally breast development must be more than pubic hair development.

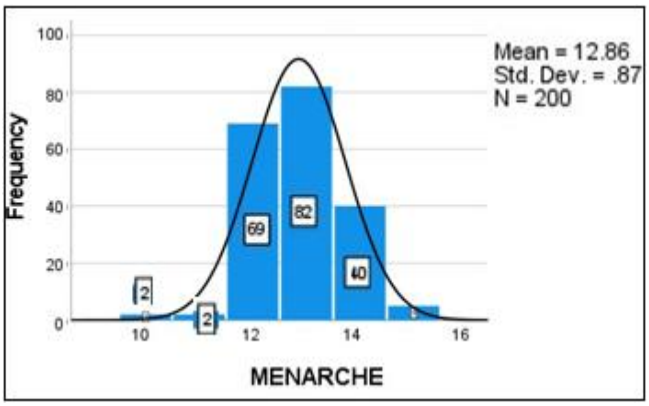


Figure 2: Distribution of Adolesecnt Girls According to Mean Age of Menarche

Among 200 girls, the mean age of menarche was found 12.86 (SD=0.87). menarche was normal on this age group.

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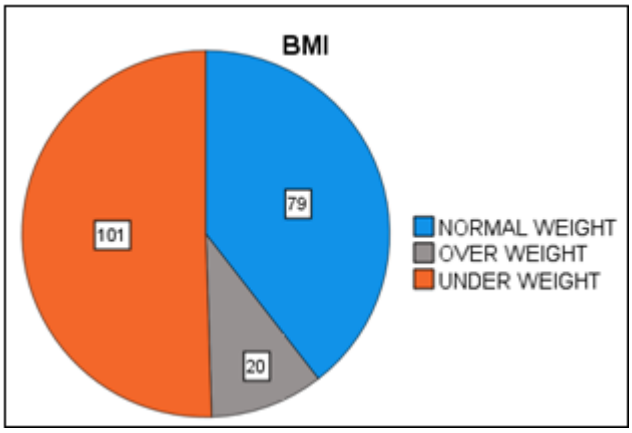

Figure 3: Distribution of Adolesecnt Girls according to BMI

Among 200 girls, 101 students are in underweight stage.20 students are overweight.79 students have normal body weight.

Figure/ Table 3: Correlation of Menarche, Breast Development and Pubic Hair Development

Correlations Table					
		MENARCHE	BD	PHD	BMI
MENARCHE	Pearson Correlation	1	- .065	- .302**	- .218**
	Sig. (2-tailed)		.358	<.001	.002
	N	200	200	200	200
BD	Pearson Correlation	- .065	1	.326**	.370**
	Sig. (2-tailed)	.358		<.001	<.001
	N	200	200	200	200
PHD	Pearson Correlation	- .302**	.326**	1	.171*
	Sig. (2-tailed)	<.001	<.001		.015
	N	200	200	200	200
BMI	Pearson Correlation	- .218**	.370**	.171*	1
	Sig. (2-tailed)	.002	<.001	.015	
	N	200	200	200	200
**. Correlation is significant at the 0.01 level (2-tailed).					
*. Correlation is significant at the 0.05 level (2-tailed).					

- There was a correlation found between Menarche & Pubic hair development (r=-.302) (P= <.001) and There was a correlation found between Breast development & Pubic hair development (r=-.326) (P= <.001)
- There was a correlation found between Breast development & BMI (r=.370, P= <.001), as BMI of 50.5% of girls shows underweight and hence most of the breast development were in stage 2 &3 whereas pubic hair development was in stage 3&4 so underweight was found one of the causes for delaying Breast development stage.

4. Conclusion

Most of the students showed underweight and delayed breast development stage compared to pubic hair development. The hallmark of the adolescence period is growth, nutrition is an important factor. The impact of inadequate nutrition at this phase of life is also visible later in adult life. In addition, in females, there is increased obstetric risk with poor pregnancy outcome & increases maternal mortality and morbidity.

Underweight students are more in high school of Moodbidri. So further studies are required to study nutrition deficiencies followed by nutritional correction as well as Homoeopathic intervention is required in the future.

It is being increasingly recognized as a fact that gynecologic disorders can have their origin in childhood disorders.5 All these can cast their shadow on future reproductive health of the individual during adult life. The understanding of the roe of the gynecologist in the timely detection of these problems, instituting preventive and timely therapeutic interventions to correct the same if possible and counselling the parents about the likely sequalae as well as measures to mitigate their consequential ill effects can all contribute towards improving the future quality of life.

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