REF ID: STSH180248

THE DETERMINANTS OF EARLY PUBERTY ON PHYSICAL AND PSYCHOSOCIAL DEVELOPMENT AMONG GIRLS

1.INTRODUCTION

Going through the puberty as young girl is so confusing. This monster invades your body changes things and makes things grows and no one tells you what's going on.

-Katherine Isabelle

Precocious (early) puberty is defined as the development of pubertal changes, at an age younger than the accepted lower limits of age, onset of puberty before age 8 years in girls. It is responsible for early progression of secondary sexual characteristics, rapid bone formation, reduced final height, inappropriate body appearance and psychological behavioural abnormalities.[1] The onset of puberty is normally triggered by hypothalamus, the area of brain that stimulates pituitary gland near the base of the brain, to release hormone that stimulate ovaries in girls. [2] Normally pubertal changes begin after 8 years menarche at 12.5 years – 14 years while in early puberty, pubertal changes begin before 8 years and menarche before 12 years.

FIG 1: PUBERTAL CHANGES

Causes: Genetics, nutritional problem followed by obesity, dietary factor which include high diary consumption, soft drink consumption, meat intake have been associated with early menarche .exposure to endocrine disrupting chemicals, phthalates are chemicals used in toys, food packages, nail polish, shampoo, and detergents are associated with early breast development in girls. It also include CNS injuries or problem in ovaries or thyroid gland. [3]

At the beginning of 20th century the first menstruation (menarche) cycle begin at the age 16 and 17. As years passed age of menarche decreased. Over the last several decades girl child start their first menstruation before 12 years.[4] Even though it's quiet common if it occurs when she is still busy in the world of dolls, it can be quiet uncommon .Pubertal timing also may be a harbinger of abnormal metabolic health. In fact, it is found that early puberty was associated with 48 health conditions later in life, including irritable bowel syndrome, Type2diabetes, arthritis and cardio vascular disease & Non-alcoholic fatty liver disease. [5]

Various factors have been postulated to affect the age of menarche with opinions both supporting and rejecting it. While analysing the different predictors of early menarche age , it was discovered that the Body Mass Index (BMI), nutrition, physical activity are some of the major underlying factors.[6,7,]While they aren't necessarily causes they seem to be related to early puberty by modifying these factors the time of puberty can be delayed. Psychosocial maturity is one important source of resilience that is positively associated with young adult adjustment including positive peer relationship, academic achievement and emotional wellbeing. **Studies shows that early puberty affects psychosocial health leading to depression, loss of self-esteem and poor academic achievements**. In a study of 6 to 11 -year-old girls those who mature earlier were some depresses, aggressive and had more sleep problems in children. [8, 9]

Risk factors include behaviour and psychosocial changes, body fat and hormonal changes, physiological and neurological changes, insulin sensitivity in blood glucose regulation, Type 2 diabetes, obesity, Non toxic alcoholic fatty liver disease, stress, anxiety loneliness, lack of self confidence, short stature, cardio vascular disease, acne, stomach pain etc. [10]

2. NEED OF THE STUDY

The purpose of this study is to increase our current understanding of girl children experience of early puberty and provide a more in depth look at their on their views of self.

The female child seem to have difficulty in discussing topics such as menarche and it is often portrayed and experienced as a private issue, something to be keep hidden.

Open discussion on girl's experiences can lead to learning. Each participant would come to know herself better and have more positive feelings and experiences associated with their bodies as young women and throughout their lifetime.

Early puberty has become an alarming trend even in rural area like our locality. It initiated me to do research in this topic and thereby steps to modify the lifestyle pattern can be initiated.

3. AIMS AND OBJECTIVES

- To identify the major determinants of early puberty in female children between the age 8 – 14 years in our locality.
- To understand the effect of early puberty on psychosocial health.
- To identify the mean age of menarche.

4. REVIEW OF LITERATURE

NORMAL PUBERTY

It is characterized by a number of changes culminating the menarche. These changes are a consequence of stimulation of the gonadotrophins and an increase in gonad steroids. Normally there is a negative feedback is removed and there is significant increase in amplitude of pulsatile release of GnRH by the hypothalamus. This usually occurs between ages of 12-13 years in girls and stimulates an increase in the pituitary release of LH and FSH. This period is characterised by growth spurt, thelarche, pubarche and adrenarche and finally the menarche.

Normal pubertal development is caused by the increasing pulsatile activity of the hypothalamic gonadotrophin releasing hormone (GnRH) pulse generator which leads to maturation of pituitary gonadotrophin release (pulsatile LH and FSH secretion) and subsequently to the maturation of gonads and gonadal activity. For the initiation of puberty a functioning GnRH neuronal network and pulsatile GnRH secretion are critical prerequisities.

The central mechanism governing GnRH secretion are located within the neuronal and the glial networks. [11]

To date, it is believed that two mechanisms are responsible for the central control of pulsatile GnRH secretion

i) A tonic inhibitory restraint
ii) Excitatory inputs to GnRH neurons

While amino butyric acid (GABA) and $GABA_A$ receptors are important components of the tonic inhibitory system.

Traditionally precocious puberty has been classified into three types: [12]

- Gonadotropin dependent precocious puberty
  (True precocious puberty\central precocious puberty)
- Gonadotropin independent precocious puberty
  (Pseudo precocious puberty\Peripheral precocious puberty)
- Incomplete precocious puberty(Premature thelarche)

Gonadotropin dependent precocious puberty: [13]

The signs of constitutional sexual precocity are due to premature maturation of the hypothalamic pituitary ovarian axis, resulting in production of gonadotropin and sex steroids .This may run in families. First sign of true precocity is adrenarche or menarche.

The most serious effect of precocity is the resultant adult short stature. Expectations of emotional, social, sexual, and intellectual competence corresponding to their puberty state leave these youngsters and their families with potentially serious difficulties on all levels of social and emotional function. There is no unifying pathophysiologic mechanism linking in diverse spectrum of aetiologies for true precocity.

True precocity occurs in small number of children with long standing hypothyroidism. High levels of thyroid stimulating hormone can stimulate theFSH receptor. CNS lesions or history of cranial irradiation is also responsible for true precocity.

Gonadotropin independent precocious puberty: [14]

Pubertal changes induced by such an independent production of sex steroids are termed pseudo precocious puberty or peripheral precocious puberty. It can be isosexual or heterosexual, depending upon which hormone being secreted. Congenital adrenal hyperplasia, androgen secreting tumour, Mccune- Albright syndrome and Cushing syndrome are responsible for precocity

Incomplete precocious puberty:

It includes premature pubarche, premature thelarche.

FIG 2: Pubertal development among girls

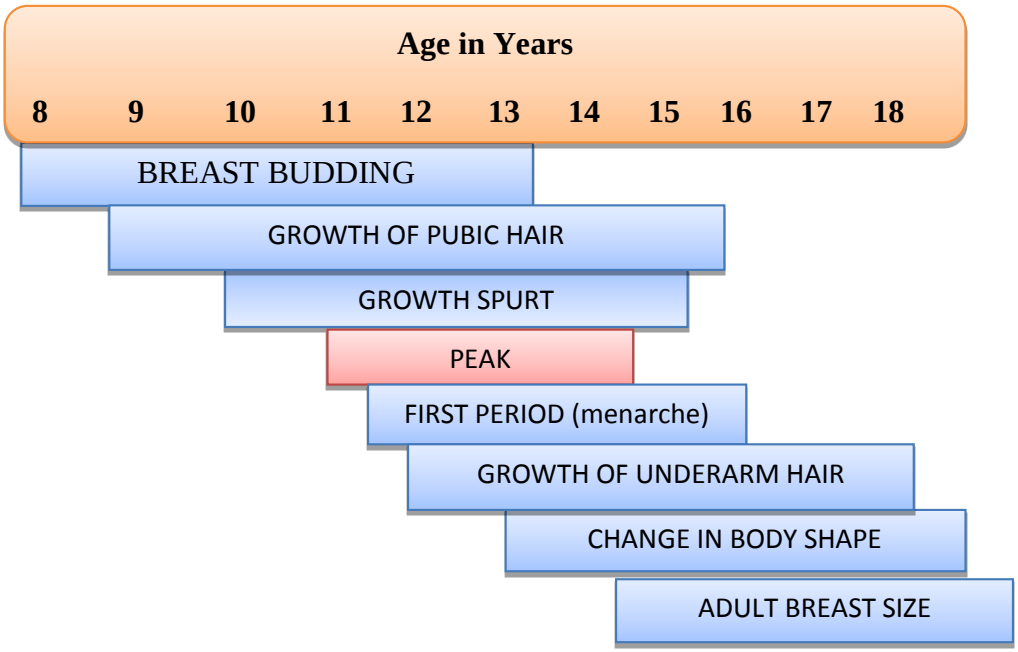


TABLE4.1: Aetiology [16]

Peripheral precocious puberty	• Ovarian causes oestrogen secreting tumours (granulosa cell tumour) androgen secreting tumours (arrhenoblastoma, sertoli-leydig cell tumours) • Adrenal causes- adrenal tumours, Congenital adrenal hyperplasia, Cushing's syndrome • McCune Albright syndrome (MAS) • Longstanding hypothyroidism • Exogenous steroids- OCP's, anabolic steroids, facial creams
Incomplete precocious puberty	• Premature thelarche
Central precocious puberty	• Idiopathic • CNS pathology/lesion • Hypothalamic haematoma • Tumours (astrocytoma, gliomaetc) • Congenital- hydrocephalus, arachnoids cysts, meningo-myelocele. • Acquired-CNS Irradiation, trauma, infection • International adoption • Secondary to peripheral precocious puberty

RELATED STUDIES

1. MENARCHE AND THE ONSET OF DEPRESSION AND ANXIETY IN VICTORIA, AUSTRALIA [17]

According to Patton G.C, Total of 2525 subjects completed the survey - an overall participation rate of 83%. Levels of depression and anxiety increased with the secondary school years and girls had significantly higher rates at each school year level.. For girls menarche status emerged as the strongest predictor. Associations with age and school year level, evident on univariate analysis, did not persist when the recency of menarche was taken into account. After addition of measures of perceived social stress to a multivariate model, a significant association between depression/anxiety and parental divorce disappeared but the association with menarche persisted

2. MAJOR DEPRESSIVE DISORDER [18]

According to Garrison C.Z, An epidemiological study conducted between 1987 and 1989 in a single school district in the south eastern United States investigated the incidence, transition probabilities, and risk factors for major depressive disorder (MDD) and dysthymia in adolescents aged 11 to 16 years. Family cohesion was the only significant predictor of incident MDD. Family support or cohesion may be more important to adolescent mental health than family structure. An extended version of the gender intensification hypothesis was tested as an explanation for the gender difference in depressed mood. Structural equation modelling and regression analyses showed that the gender difference could be explained, in part, by increased developmental challenges for girls--pubertal development, dissatisfaction with weight and attainment of a mature female body, and increased importance of feminine sex role identification. Depressed mood was not associated with masculinity or school change, as had been predicted.

3. DEPRESSED MOOD DURING ADOLESCENCE [19]

According to Wilchstrom .L, the prevalence of depressive mood was examined in a representative and nationwide sample of approximately 12,000 Norwegian adolescents. At the age of 12, no gender difference was found. The gender difference was due to girls becoming more depressed from 13 to 14 years of age.

4. PROTECTING ADOLESCENTS FROM HARM [20]

According to Resnick M.D, A total of 12118 adolescents in grades 7 through 12 drawn from an initial national school survey of 90118 adolescents from 80 high schools plus their feeder middle schools.Working 20 or more hours a week was associated with emotional distress of high school students, cigarette use, alcohol use, and marijuana use. Appearing "older than most" in class was associated with emotional distress and suicidal thoughts and behaviours among high school students. It was also associated with substance use and an earlier age of sexual debut among both junior and senior high students

5. ENTRY INTO EARLY ADOLESCENCE [21]

According to Simmon.R.G, the purpose of the study is to examine the impact of the movement into early adolescence upon the self-esteem of children. Which children are most vulnerable to this role-transition and effect of changes in school environment, pubertal development, and social behaviour, with repeated survey interviews and nurses' measurements, 798 school children were followed from sixth into seventh grade in two different types of school system. Lower self-esteem is seen among the girls who have changed schools and who reached adolescence early.

6. ADOLESCENT DEPRESSION [22]

According to Peterson A.C, longitudinal data on 335 students randomly selected from two school districts were used to test the hypotheses. Results revealed that girls are at risk for developing depressed affect by 12^{th} grade because they experienced more challenges in early adolescence. The sex difference in depressed affect at 12^{th} grade and disappears once early changes are considered.

7. BEHAVIOURS OF EARLY MATURED GIRLS [23]

According to Mussen P.H, The study of 16 adolescent girls with a history of idiopathic precocious puberty compared to closely pair- matched adolescent control subjects of comfortable pubertal status and normal pubertal history. The result shows little difference in body image, self-regard, and definite psychiatric diagnoses but slightly increased psychopathologic symptomatology, especially in the areas of conduct problems, and psychosomatic complaints usually associated with menstruation. We conclude that idiopathic precocious puberty in girls is associated with a long term risk of minor psychopathologic symptomatology.

8. BEHAVIOUR OF YOUNG FEMALE ADOLESCENTS [24]

According to Trembley, physical development is regarded as bizarre by children of the same age, and it causes teasing problems with peer groups in a stage of immature superego.

According to Siegel, Yancey, Anashenel and schuler, the girls cognitions and perceptions about puberty and their own maturation relative to others may play important roles in the link between pubertal timing and adjustment. Early developing girls may be viewed and view themselves as different from their peers, which might have negative consequences for them.

According to Alsaker, When adolescents feel more mature than their same-age peers that pubertal timing plays a meaningful role in their psychosocial adjustment.

9. NEUROPSYCHOLOGICAL PERFORMANCE IN ADOLESCENCE [25]

According to Rovert .J More recent understandings that neurodevelopment continues into early adulthood, particularly in regions linked to regulation of behaviour and emotion, have again heightened interest in an idea that the early adolescent rise in emotional problems may in part be due to such a mismatch in peers.

10. PUBERTY IN THE FEMALE AND ITS DISORDERS [26]

According to Rosen field**,** A range of possible psychosocial risk factors for depression in girls changed markedly across pubertal stage. These changes included worsening of attachments with family and school contexts and greater report of psychological styles (e.g self-blaming) previously linked to depression in young women

11. BEHAVIOUR OF YOUNG FEMALE ADOLESCENTS [27]

According to Abraham**.**S**.** "A study conducted on patients with early onset normal puberty, reported that self-stress due to a different body shape from the peer group, psychological concerns due to discrepancies between physical and chronological age, and long-term behavioural problems in school, sexual activity, and social adaptation could occur".

Psycho social risk factors linked to the social context, family conflict and bullying, increased risks for new and continuing symptoms of depression in females.

As mentioned above, the results about psychosocial problems in precocious puberty were different. In addition, there may be racial and cultural differences regarding perceptions

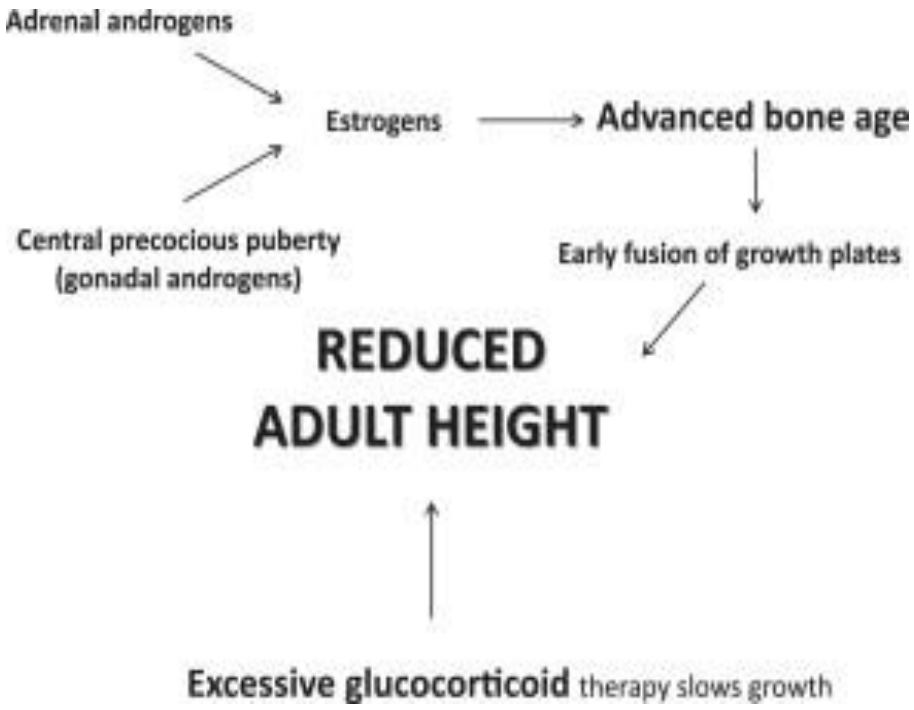
about early physical development. Accordingly, this study was conducted to investigate the characteristics of precocious puberty and to assess the psychosocial impact of precocious puberty in precocious puberty group as compared with age.

12. PROBLEMS FACED BY GIRLS WHO ATTAIN EARLY PUBERTY

12.1. STUNTED GROWTH

Children with precocious puberty may grow quickly at first and be tall, compared with their peers. But, because their bones mature more quickly than normal, they often stop growing earlier than usual. This can cause them to be shorter than average as adults.

FLOW CHART: 1



12.2. DEVIANCE HYPOTHESIS

Feeling different from peers (deviance hypothesis) is a constant challenge for teens. Girls going through puberty compare her to others. It has found that early maturing girls are stressed than on-time maturing girls. The maturational deviance hypothesis points those adolescents who develop earlier relative to peers experience psychological distress and manifest behaviour problems (Petersen & Taylor, 1980). Findings regarding earlier puberty affect psychological development in girls.

12.3. TEASED BY PEERS

Girls attaining early puberty experience the situations which are being teased by peers or bullied by older children at school.

Peer children may not understand what is happening when someone of their same age is developing breasts or getting their period. So without the knowledge of puberty, they teased their peers.

Older children notice if someone in a lower grade is physically developing ahead of them and they also tease these girls who attaining early puberty. Thus girls who attaining early puberty teased by peers and bullied by seniors have experience higher rates of depression.

12.4. STRESS

Puberty can be a confusing time. It can be all the more stressful for younger kids with early puberty. They might feel awkward about looking different from their peers. Early menstruation can be unsettling for girls who are age 9 or younger or who are developmentally delayed.

12.5. HIGH DEPRESSION AND ANXIETY

Puberty brings with it a host of changes that may attribute to feelings of anxiety including bodily changes such as growth in height, weight, body shape as well as hormonal changes. As they move towards puberty, their hormones begin to fluctuate. It causes emotional stability and they are also lack to control their emotions. Children who experience early puberty have higher rates of depression and anxiety compared to their peers. Anxious girls are also lack in emotional development to fully control their moods. A number of recent studies have implicated puberty as a transition point in risk for female depression. Age of menarche, a late pubertal event, defined a transition point in risk in one study.

12.6. DISORDERS IN MOODS

Irritability, emotional outbursts, moodiness can accompany early puberty girls. Mood disorders are crop up during these years.

Types of disorders

- Depressive disorder
- Bipolar disorder

Both disorders involves

- Low mood
- Sleep problem
- Fatigue
- Decreased concentration
- Eating disturbances

In Bipolar disorder, depressed periods alternate with the periods of

- mania or hypo-mania
- elevated or irritable mood
- sleeping less
- talking more
- being hyper active
- slowing poor judgement

12.7. LOWER SELF ESTEEM

Girls who mature early also tend to suffer from lower self esteem and body image than their peers who mature on time. Children with precocious puberty should cope with physical changes earlier than their peers do while their psychological growth doesn't keep up with their fast biological growth. Early maturing girls are more likely to experience body dissatisfaction and low self-esteem during adolescence. Furthermore, early puberty in girls has been reported as a risk factor for depression.

The degree of physical maturity is related to low self-esteem during adolescence, which affects perception about body image and eating behaviour. Eating behaviour, perception about body image, and depression are inter-related and are known to be affected by a number of factors such as biological, social, and psychological environment.

12.8. STAGE TEMINATION HYPOTHESIS

Some psychologists believe the development must occur in certain order in order to be optimal. Children must experience certain social, cognitive and emotional milestones before they are ready to endure the rigors of adolescence.

Puberty can be a confusing time for child. Puberty is all about change , and to a child, change can be a pretty scary. If puberty arrives too early, those girls may overwhelmed by the stressors of adolescence. They also have a negative impact on adolescence. There is some research evidence in support of this explanation is called "**stage termination hypothesis**".

12.9. POOR ACADEMIC PERFORMANCE

Some studies find that girls who experience early puberty do poorer in school compared to their peers. If the puberty arrives too early, then it coincides with transition from elementary to middle school, then their academic performance is poor than their peers. After entering middle school, students tend to get lower grades than they did in elementary school. Their decreased academic achievement may extend through the high school years and possibly beyond. There are probably many developmental reasons for the changes such as shifting interests and the beginning of distracting bodily changes. Decrease in academic result is due to confusion about their body changes.

12.10 MULTIPLE TRANSITION HYPOTHESES

Some psychologists believe that the stress of simultaneous transitions made the negative impact of early puberty in girls. Girls who are attaining early puberty experiences too many transitions at a time and suffer a lot.

- Transition from elementary to middle school;
- Hormonal changes
- Body changes

13. LIFESTYLE AND ENVIRONMENTAL FACTORS IN PUBERTAL TIMING

13.1 Diet

Beyond early life growth and body weight, dietary quality and quantity in the years preceding onset of puberty have been implicated in the timing of pubertal development.

A number of prospective observational studies have investigated the association of mid-childhood diet and pubertal timing. These are summarized below, with focus on studies in girls.

13.2 Nutritional problems followed by obesity

Obesity in young girls has an increased risk of early puberty. Excess body fat alters the level of the hormones insulin, leptin and oestrogens are responsible for the early puberty

Obesity in young girls has an increased risk of early puberty. Excess body fat alters the level of the hormones insulin, leptin and oestrogen are responsible for the early puberty

Dietary factor

- High dairy consumption
- Soft drink consumption
- Higher animal protein
- Meat intake

Have been associated with early menarche

Environmental and chemical cause

- Exposure to Endocrine disrupting chemicals (EDC)
- EDCs are hormonally active synthetic chemicals.
- Phthalates are chemicals used in toys, food packages, vinyl flooring, shower curtains, shampoo, detergents, nail polish are associated with early breast development tin girls.

14. OTHER RELATED RESEARCHES:

A cross sectional study on the precocious puberty among girls in the age group of 11-15 years, in two schools in Kollam. The prevalence of precocious puberty was found to be 10.4%. In urban it was found to be 12.35% and in rural it was 8.43%. Girls whose fathers have primary education are risky to have precocious puberty (P<0.049). Those students who take fish occasionally, that is once or thrice in a week were more prone to have precocious puberty (P<0.000). Prevalence of Precocious puberty is more in rural area when compared to urban area. Parents, especially fathers who were less educated should take of care of their daughter's health by not giving them dried and junk foods. It is better to take fish daily, rather than once or thrice in a week, occasional consumption of fish is found to be a reason for precocious puberty. [28]

Investigating the relationship between precocious puberty and obesity:

A cross-sectional study in Shanghai, China.13.86% and 29.42% of girls with precocious puberty were respectively accompanied by obesity (OR=9.00, 95% CI=5.60 to 14.46) or central obesity (OR=5.40, 95% CI=4.10 to 7.12). The median ages of breast, pubic hair decreased with BMI increase and median ages of thelarche rather than pubarche were earlier in children with central obesity. [29]

Early Puberty and its Effect on Height in Young Saudi Females

A Cross-Sectional Study. Mean of child's final height of 149.4 cm +/- 9.5, in comparison to the mean of their target height of 157.8 +/- 6.4, shows an 8.4 cm difference. Moreover, the correlation coefficient analysis showed a significant association between child's height in cm and age of menarche for child with (p-value = 0.001) and (r) = 0.349. This indicates a positive relation between the two variables. [30]

5. METHODOLOGY

STUDY SETTINGS: Pre-structured questionnaire given to the students of age 8-14 years filled with help of parents or teachers. This study helps to evaluate the determinants of early puberty on physical and psychosocial Development among the school students**.**

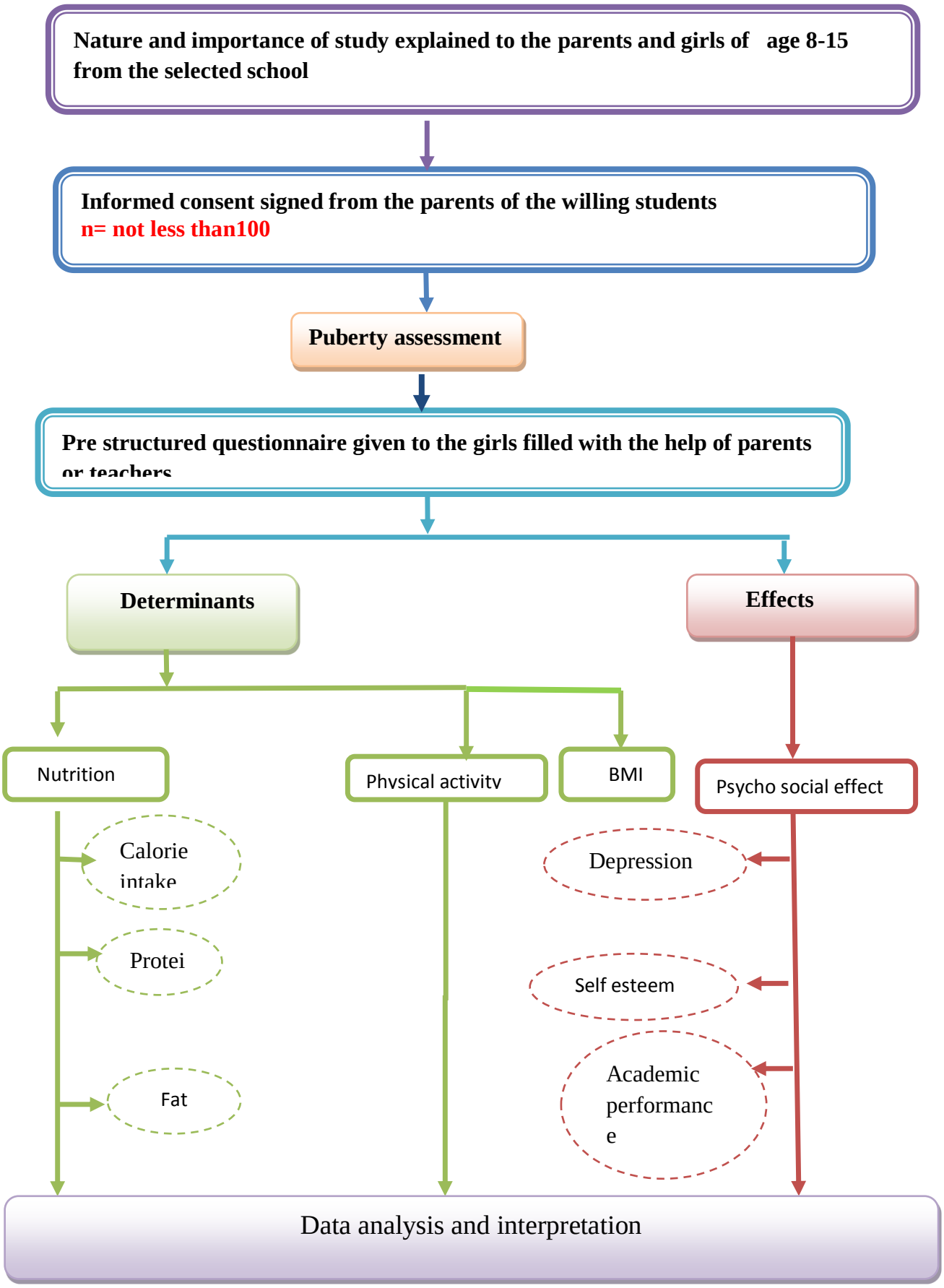
Source of data: Schools of Kulasekharam, Kanyakumari district

Sampling: Cluster sampling

Selection of tool: pre structured questionnaire

Sample size: not less than 100

FLOW CHART


Nature and importance of study explained to the parents and girls of age 8-15 from the selected school
Informed consent signed from the parents of the willing students
n= not less than100
Puberty assessment
Pre structured questionnaire given to the girls filled with the help of parents or teachers
Determinants
Effects
Nutrition
Phvsical activitv
BMI
Psycho social effect
Calorie intake
Protei
Fat
Depression
Self esteem
Academic performanc e
Data analysis and interpretation

Criteria taken for assessment

- Puberty timings
- Nutritional health
- Physical activity
- Depression
- Self esteem
- Academic achievements

Inclusion criteria

- Girls between the age 8-14 years
- Girls who handover the questionnaire duly filled

Exclusion criteria

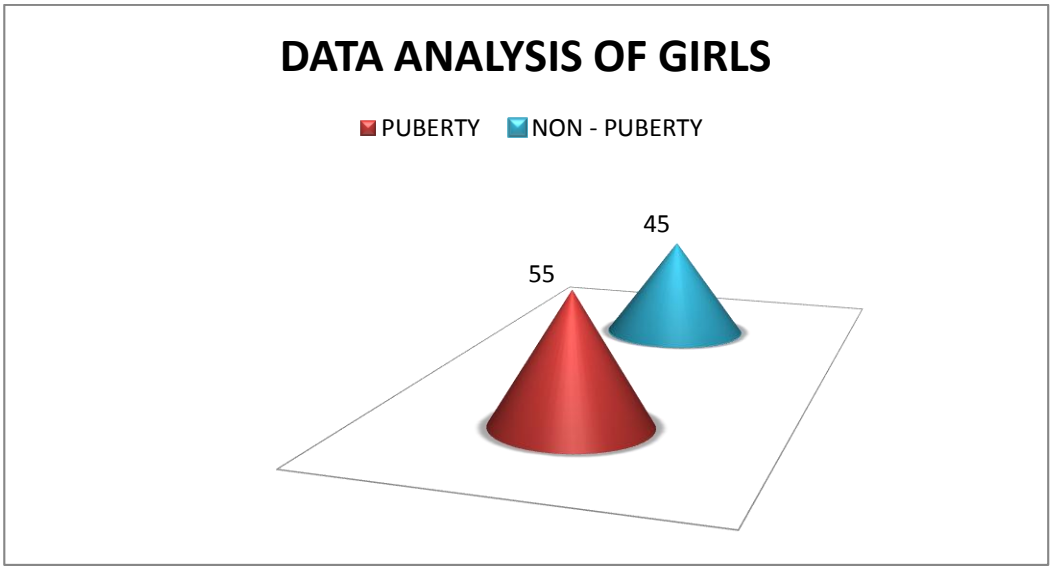
- Girls above 15 years and below
- Girls who suffer from chronic diseases

6. OBSERVATIONS AND RESULTS

TABLE: 6.1 .DATA ANALYSIS OF GIRLS WHO ATTAIN PUBERTY (MENARCHE)

Type	Number of girls
Menarche	55 (55%)
Non-menarche	45 (45%)
Total	100

FIGURE: 6.1 DATA ANALYSIS OF GIRLS WHO ATTAIN PUBERTY (MENARCHE)



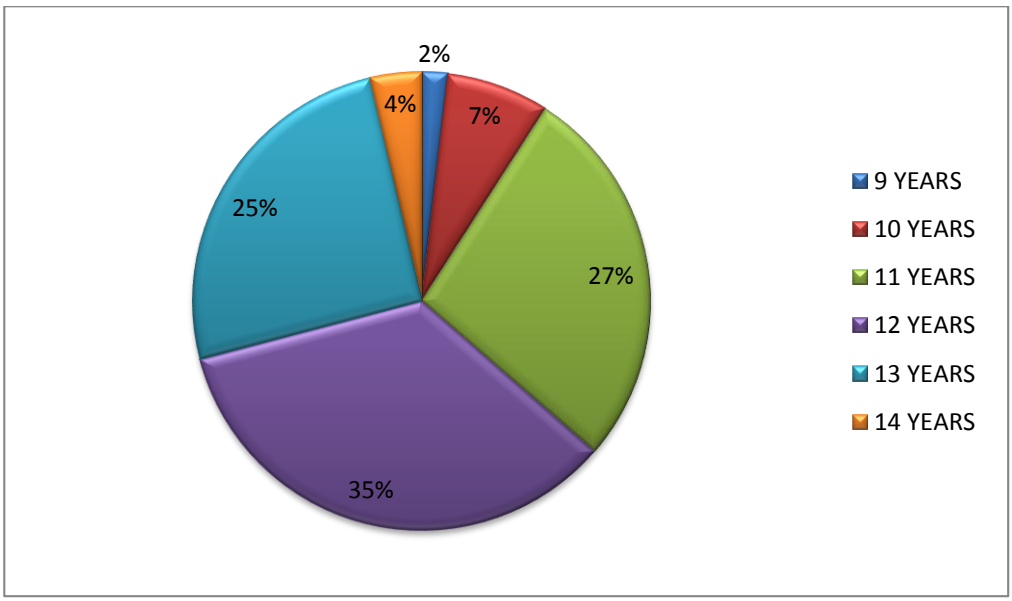
OBSERVATION

Out of 100 students , 55% of them attained puberty and 45% were not attained puberty.

TABLE: 6.2 DATA ANALYSIS OF PUBERTAL TIMING (MENARCHE) OF GIRLS AGE 8-14 YEARS

Age	No. of students	Percentage
9 years	1	2%
10 years	4	7%
11 years	15	27%
12 years	19	35%
13 years	14	25%
14 years	2	4%

FIGURE: 6.2



OBSERVATION

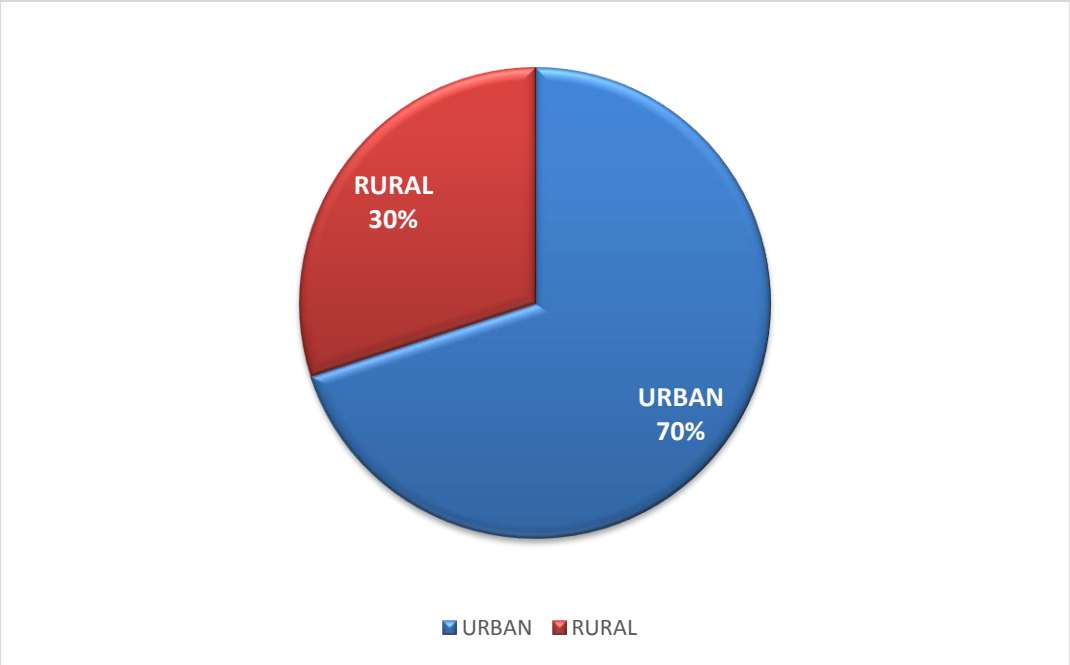
Out of 57 menarche girls, 1 girl(2%) attained menarche in 9 years, 4of them (7%) attained menarche in 10 years, 15 of them (27%) attained menarche in 11 years, 19 of them (35%) attained menarche in 12 years, 14 of them (25%) in 13 years and 2 of them (4%) in 14 years.

The mean range of menarche in and around Kulasekharam, Kanyakumari district girls is 12 years.

TABLE: 6.3 DATA ANALYSIS OF EARLY PUBERTY GIRLS RELATED TO DWELLING

Dwelling	No. of students
Rural	6 (30%)
Urban	14 (70%)

FIGURE NO: 6.3 DATA ANALYSIS OF EARLY PUBERTY GIRLS RELATED TO DWELLING



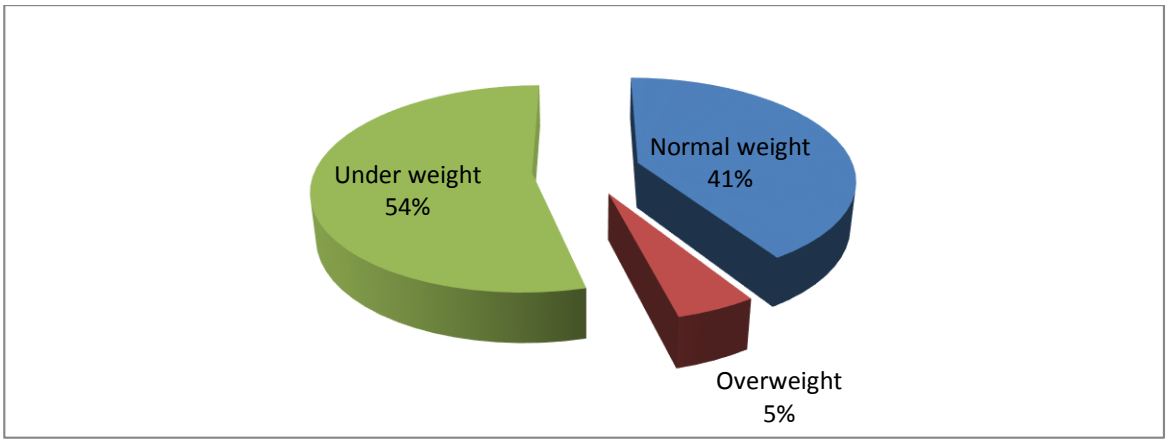
OBSERVATION

Out of 100 students, 40 were taken in rural area and 60 were taken in urban area. From that 20 students attained early puberty. 30% students (6) were from rural area and 70% students (14) were from urban area.

TABLE: 6.4 DATA ANALYSIS OF GIRLS WEIGHT RELATED TO BMI

Scores	BMI	Percentage
Normal	**41**	**41%**
Under weight	**54**	**54%**
Over weight	**5**	**5%**

FIGURE: 6.4 DATA ANALYSIS OF GIRLS WEIGHT RELATED TO BMI



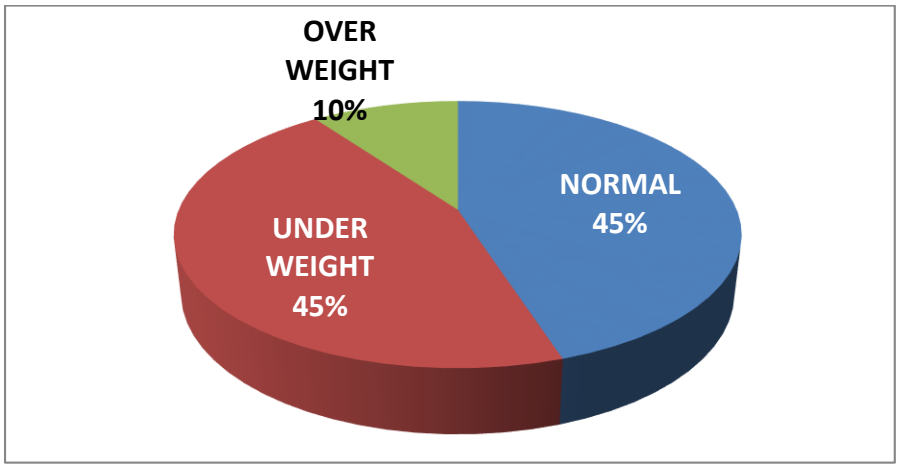
OBSERVATION

Out of 100 students, 5% of them having overweight, 41% of them having normal weight and 54% of them having underweight.

TABLE: 6.5 DATA ANALYSIS OF GIRLS WHO ATTAINED EARLY PUBERTY RELATED TO BMI

BMI	NO OF STUDENTS	PERCENTAGE
Normal	9	45%
Under weight	9	45%
Over weight	2	10%

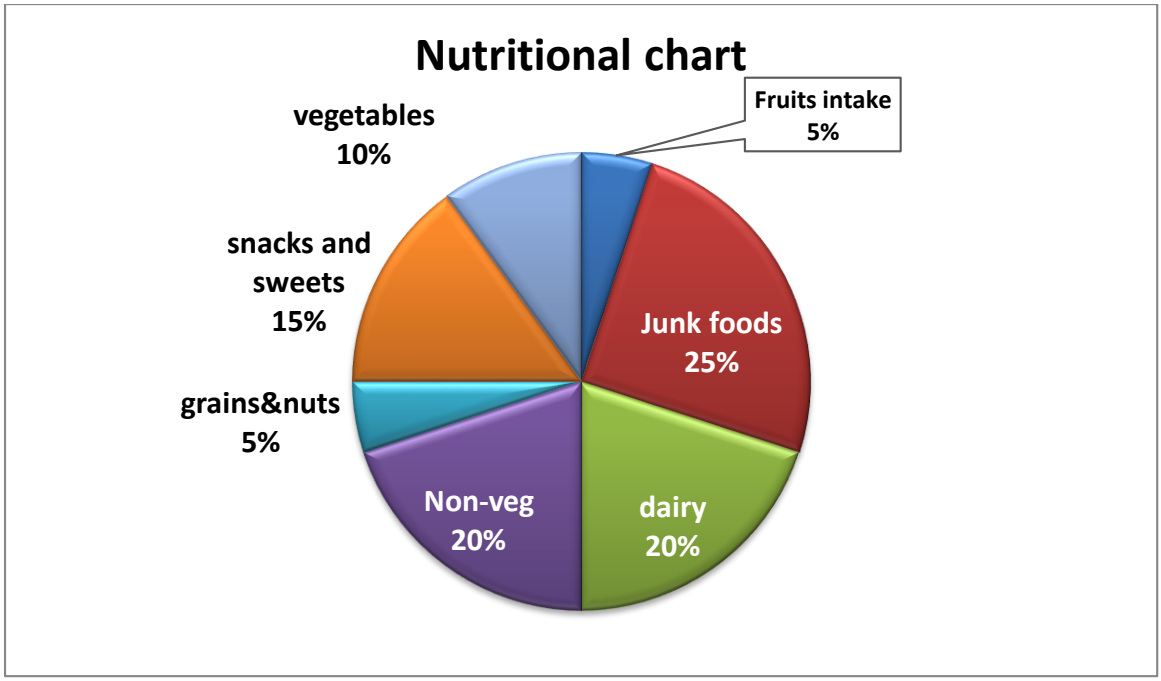
FIGURE: 6.5 DATA ANALYSIS OF GIRLS WHO ATTAINED EARLY PUBERTY RELATED TO BMI



OBSERVATION

Out of 20 early puberty girls, 9(45%) of them having normal BMI, 9(45%) of them having underweight, 10% of them having overweight

FIGURE 6.6 DATA ANALYSIS OF EARLY PUBERTY GIRLS RELATED WITH THEIR FOOD INTAKES



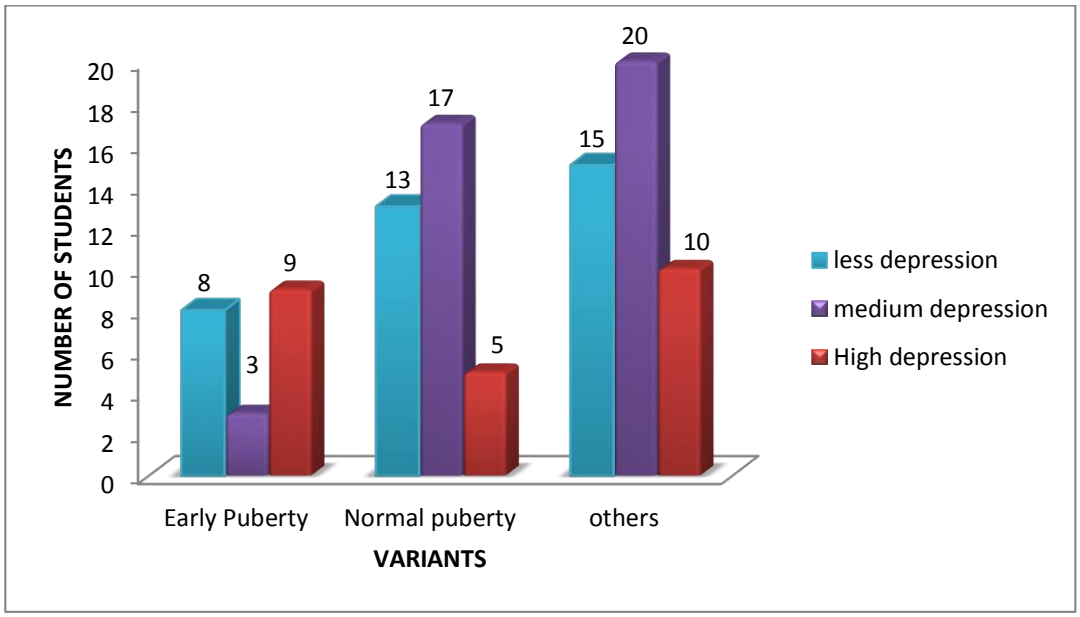
OBSERVATION

Out of 20 early puberty students in kulasekharam area, mostly 25% likes to eat Packed items such as pizza, burgers, sandwiches, cakes, potato chips etc. 20% of them like dairy products such as milk, milk shakes, and chocolates. 5% of them take fruits daily. 20% of them eat nuts and grains regularly. Mostly they like to eat fish foods, non-veg, sea foods. 5% of them take fruits daily. 10% of them take vegetables regularly. 15% of them likes to eat homemade snacks, deep fry oily foods and sweets. Only 5% of them like to eat nuts.

TABLE: 6. 6 DATA ANALYSIS OF GIRLS RELATED TO THER DEPRESSIVE SYMPTOMS

Depression	Early puberty	percentage	Normal puberty	percentage	Non puberty	Percentage
Less	8	40%	13	37%	15	33%
Medium	3	15%	17	49%	20	45%
High	9	45%	5	14%	10	22%
Total	20	100%	35	100%	45	100%

FIGURE: 6.7 DATA ANALYSIS OF GIRLS RELATED TO THER DEPRESSIVE SYMPTOMS



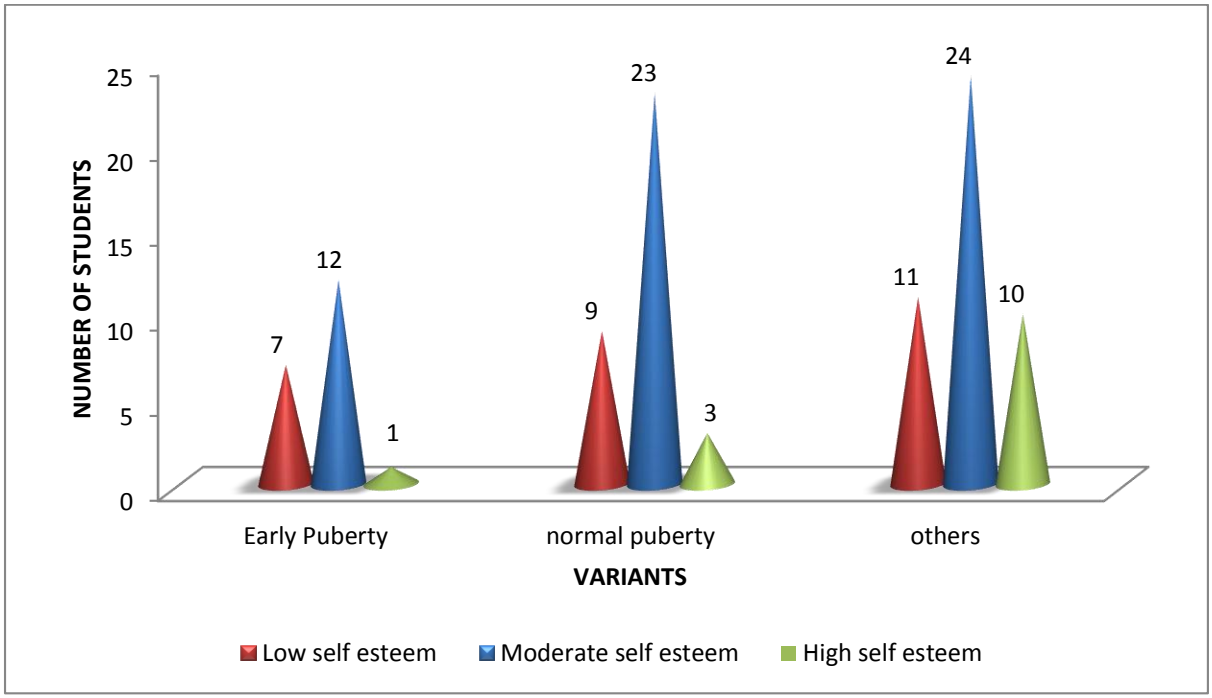
OBSERVATION

Out of 20 early puberty girls, 8 (40%) of them having less depression, 3 (15%) of them having moderate depression and 9 (45%) of them having high depression. Out of 35 normal puberty girls, 13 (37%) of them having less depression, 17(49%) of them having moderate depression and 5(14%) of them having high depression. Out of 45 non puberty girls, 15(33%) of them having less depression, 20(45%) of them having moderate depression and 10(22%) of them having high depression. Comparing to other girls, Girls who attained early puberty have high depressive symptoms. They feel unhappy, tired, and hard to concentrate, not satisfied with oneself, easily disappointed, mood swing problem, unable to control emotions etc

TABLE: 6.7 DATA ANALYSIS OF GIRLS RELATED TO THER SELF ESTEEM

Self-esteem	Early puberty	percentage	Normal puberty	percentage	Non puberty	Percentage
Less	7	35%	9	26%	11	25%
Moderate	12	60%	23	65%	24	53%
High	1	5%	3	9%	10	22%
Total	20	100%	35	100%	45	100%

FIGURE: 6.8 DATA ANALYSIS OF GIRLS RELATED TO THER SELF ESTEEM



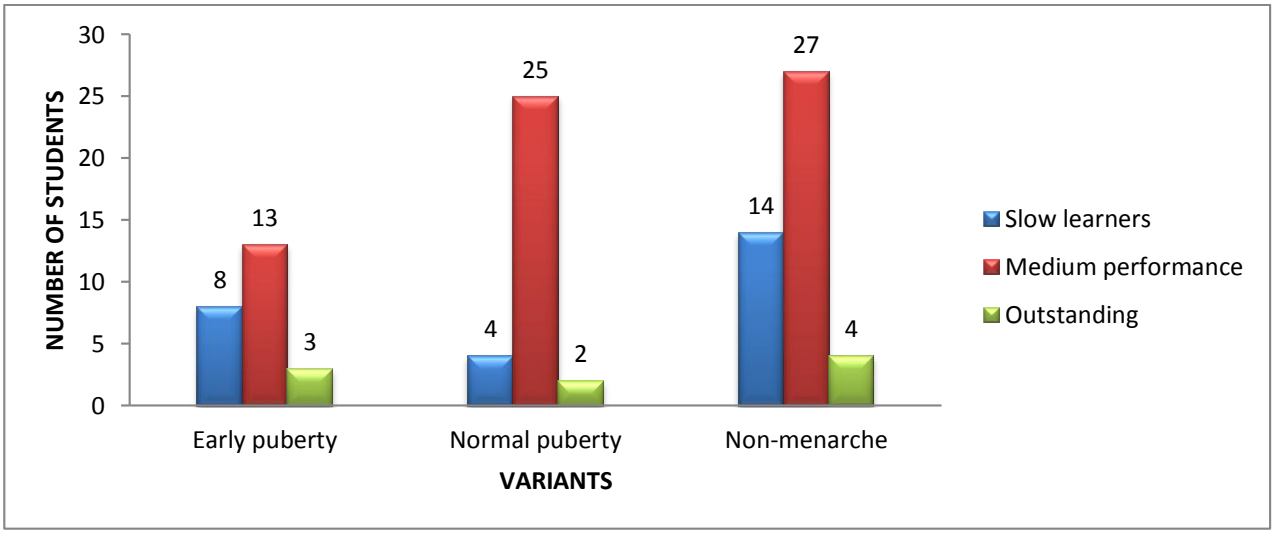
OBSERVATION

Rosenberg self-esteem questionnaire is given to 100 girl student to analyse their self-esteem.Out 0f 20 early puberty girls, 7(35%) of them having low self-esteem, 12(60%) of them having moderate self-esteem and only one (5%) having high self-esteem.Out of 35 normal puberty girls, 9 (26%) of them having low self-esteem, 23(65%) of them having moderate self-esteem and 3 (9%) of them having high self-esteem.Out of 45 non puberty girls, 11(25%) of them having low self-esteem, 24 (53%) of them having moderate self-esteem, 10 (22%) having high self – esteem. Early puberty girls from the age group 9-11 years having very low self-esteem compared to other girls.

TABLE: 6.8 DATA ANALYSIS OF GIRLS RELATED WITH THEIR ACADEMIC PERFORMANCE

Academic performance	Early puberty	percentage	Normal puberty	percentage	Non puberty	Percentage
Slow learners	13	65%	8	23%	14	31%
Medium performers	4	20%	25	71%	27	60%
Outstanding performers	3	15%	2	6%	4	9%
Total	20	100%	35	100%	45	100%

FIGURE: 6.9 DATA ANALYSIS OF GIRLS RELATED WITH THEIR ACADEMIC PERFORMANCE

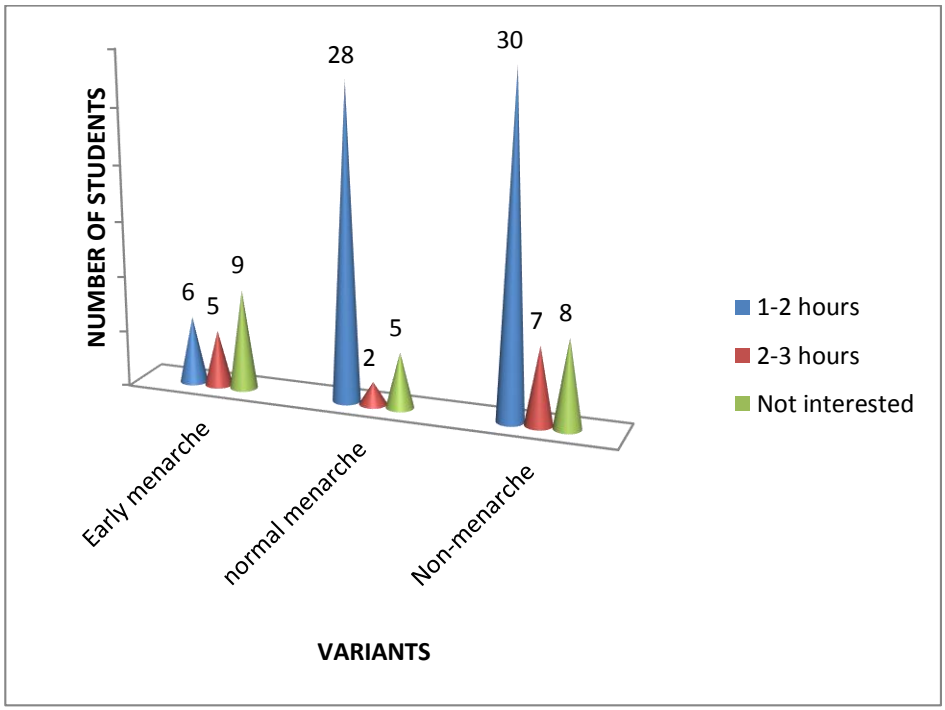


Out of 35 normal puberty girls 8(23%) of them were slow in studies, 25(71%) were medium performers and 2(6%) were outstanding performers. Out of 45 non puberty girls 14(31%) of them were slow learners, 27(60%) of them are medium performers, 4(9%) of them were outstanding performers. Out of 20 early puberty girls 13(65%) were slow learners, 4(20%) were medium performers and 3(15%) were outstanding performers.

TABLE: 6.9 DATA ANALYSIS OF GIRLS SPENT TIME OUTDOOR GAMES

Hours	Early puberty	Percentage	Normal puberty	Percentage	Non-puberty	Percentage
1-2 hours	6	30%	28	80%	30	67%
2-3 hours	5	25%	2	6%	7	15%
Non-participants	9	45%	5	14%	8	17%

FIGURE: 6.10 DATA ANALYSIS OF GIRLS SPENT TIME OUTDOOR GAMES

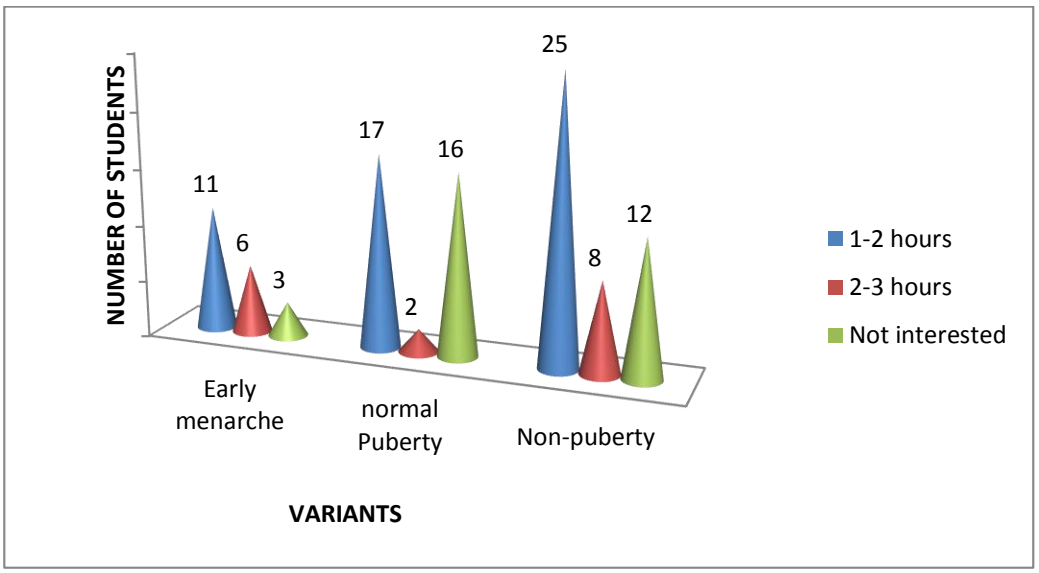


Out of 35 normal puberty girls 28(80%) of them spending 1-2 hours for playing outdoor games, 2(6%) of them spending 2-3 hours for playing outdoor games, 5(14%) were not interested in playing outdoor games. Out of 45 non puberty girls 30(67%) of them spending 1-2 hours for playing outdoor games, 7(15%) of them spending 2-3 hours for playing outdoor games, 8(17%) of them were not interested in playing outdoor games. Out of 20 early puberty girls 6(30%) of them spending 1-2 hours for playing outdoor games, 5(25%) of them spending 2-3 hours for playing out door games. 9(45%) of them were interested playing out door games. Comparing to other girls, early puberty girls were not interested in playing out door games.

TABLE: 6. 10 DATA ANALYSIS OF GIRLS SPENT TIME IN INDOOR GAMES

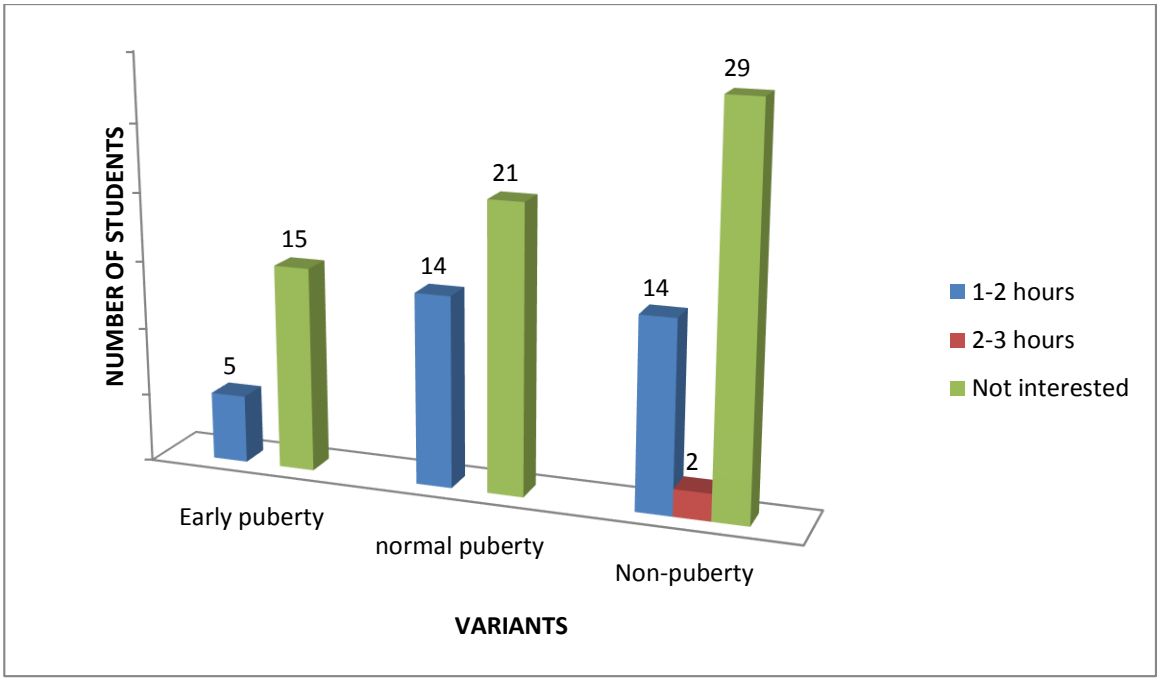
Hours	Early puberty	Percentage	Normal puberty	Percentage	Non puberty	Percentage
1-2 hours	11	55%	17	48%	25	56%
2-3 hours	6	30%	2	6%	8	17%
Non-participants	3	15%	16	46%	12	27%

FIGURE: 6.11 DATA ANALYSIS OF GIRLS SPENT TIME IN INDOOR GAMES



Out of 35 normal puberty girls 17(48%) of them spending 1-2 hours for playing indoor games, 2(6%) of them spending 2-3 hours for playing indoor games, 16(46%) 0f them are not interested in playing indoor games. out of 45 non puberty girls 25(56%) of them spending 1-2 hours for playing indoor games, 8(17%) of them spending 2-3 hours,12(27%) of them were not interested in playing indoor games. out of 20 early puberty girls 11(65%) of them were spending 1-2 hours for playing indoor games 6(30%) of them were spending 2-3 hours for playing indoor games, 3(15%) of them were not interested in playing indoor games. Comparing to other girls early puberty girls were more interested in playing indoor games

FIGURE: 6.12 DATA ANALYSIS OF GIRLS SPENDING TIME IN YOGA AND EXERCISE

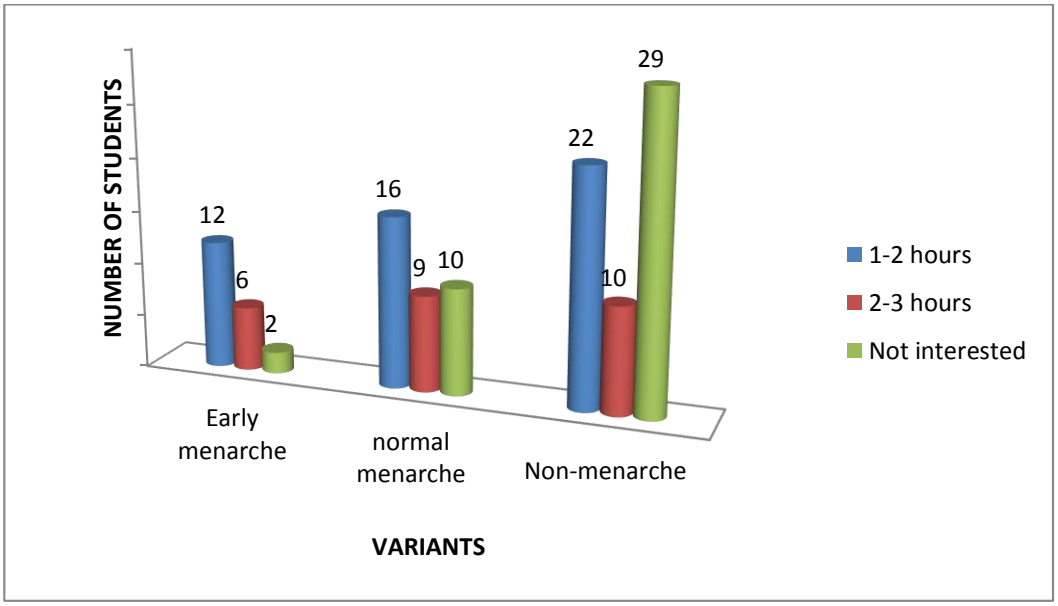


Out of 20 early puberty girls, 2(25%) of them spent 1-2 hours in doing yoga or exercise and 15 (75%) of them are not interested in doing yoga and they are not aware of physical fitness. Out of 35 normal puberty girls, 14(40%)) of them spent 1-2 hours for doing exercise and 21(60%) of them are not interested in doing yoga or exercise. Out of 45 non-puberty girls, 14 (31%)) of them spent 1- 2 hours for doing yoga or exercise, 2 (4%) of them spent 2- 3 hours and 29 (65%) of them are not interested in doing yoga or exercise.

TABLE: 6.11 DATA ANALYSIS OF GIRLS SPENT TIME IN SOCIAL MEDIA

Hours	Early menarche	Percentage	Normal menarche	Percentage	Non-menarche	Percentage
1-2 hours	12	60%	16	46%	22	49%
2-3 hours	6	30%	9	26%	10	22%
Non-participants	2	10%	10	28%	13	29%

FIGURE: 6.13 DATA ANALYSIS OF GIRLS SPENT TIME IN SOCIAL MEDIA



Out of 35 puberty girls 16(46%) of them spending 1-2 hours in social media, 9(26%) of them spending time in social media, 2(10%) were not allowed to spend time in social media .Out of 45 non puberty girls 22(49%) of them spending1 -2 hours in social media, 10(22%) of them spending 2-3 hours in social media and 13(29%) were not allowed to spend time in social media. Out of 20 early puberty girls, 12(60%) of them spending 1-2 hours in social media, 6(30%) of them spending 2-3 hours in social media, 2(10%) were allowed to spend time in early puberty. Comparing to other girls, girls who matured early spend much time in social media.

7.DISCUSSION:

This study shows Out of 100 students 20 attained early puberty from that 6(30%) were from rural area and 14(70%) were from urban area. Likewise the cross sectional study was conducted in 250 students in Kollam, prevalence of early puberty is 10.4%. Also it shows 20 early puberty students in kulasekharam area, mostly 25% likes to eat packed/ fast/junk food items such as pizza, burgers, sandwiches, cakes, potato chips etc. 20% of them like dairy products such as milk, milk shakes, and milk chocolates. Only 5% of them took fruits daily. 20% of them eat nuts and grains regularly. Mostly they like to eat fish foods, non-veg, sea foods. 5% of them take fruits daily. 10% of them take vegetables regularly. 15% of them likes to eat homemade snacks, deep fry oily foods and sweets. [10] Only 5% of them like to eat nuts. In urban 12.35% and rural it was 8.43%. [28]This study shows that girls who attained early puberty (20) members in that (9)45% have high depressive symptoms they unable to concentrate in studies, easily get disappointed etc. Likewise the study conducted in 80 high schools in that girls who attained early puberty have emotional distress and also depressed as they appear older compared to their peer.[20] This study show that girls who attained early puberty 20 members in that (7) 35% have low self-esteem level compared to other girls. Likewise the study was conducted in 798 school children to examine the impact of the movement into early adolescence upon the self-esteem of children in that low self-esteem is seen in girls who reached early adolescence. [21] This study shows that girls who attained early puberty (20) members in that 65 %(13) are slow in studies and poor in their academic performance. Likewise study conducted shows that early puberty affects psychosocial health leading to depression, loss of self esteem and poor academic achievements.[8,9] This study shows that girls who attained normal puberty and girls who not attained puberty comparatively spent more time in outdoor games than the girls who attained puberty. This study shows that girls who attained early puberty are not interested in doing either exercise or yoga. Likewise the study of 62 subject's weekly survey exercise shows that girls who attained early puberty is not interested in doing exercise or yoga. This study shows that girls who attained early puberty (20) in that (6)30% were spending much time in indoor games. They are more interested compared to girls who did not attain menarche and those who attained normal puberty. This study also shows that early puberty girls are also spending more time in social media comparing with others.

8. SUMMARY

Pre structured questionnaire given to 100 students of age 8-14 years. The study was undertaken in the schools of Kulasekharam, Kanyakumari district. This study was also taken in both rural and urban area. Initially the nature and importance of the study explained to the parents. Before giving the questionnaire informed consent was signed by the parents of willing students. Questionnaire distributed according to inclusion and exclusion criteria. The aim of this study is to identify the major determinants of early puberty in female children in our locality and to understand the effect of early puberty on psychosocial health and to identify the mean age of menarche. After the thorough analysis of questionnaire which was filled by the students, the study shows that girls who live in urban area mature early than the girls live in rural area. This study shows the mean age of menarche in this locality is 12 years. This study shows that out of 100 students 41% have normal BMI ,underweight 51%and overweight 5%.0ut of 100 students (20) members were early puberty in that(9)45% have normal BMI, overweight 10% and underweight 45% .Packed food stuff also play a major role in early puberty. In our locality underweight girls mature early. This study also shows out of 35 normal puberty, 13(37%) of them having less depression, 17(49%)of them having moderate depression and 5(14%) of them having high depression. out of 45 non puberty girls,15 (33%) of them having less depression, 20(45%) of having moderate depression and 10 (22%)of them having high depression. out of 20 early puberty girls,8 (40%) of them having less depression,3(15%) of them having moderate depression and 9(45%) of them having high depression. Comparing to other girls, girls who attained early puberty have high depressive symptoms .They feel unhappy tired and hard to concentrate, not satisfied with oneself, easily disappointed, mood swing problem, unable to control emotion etc. This study also shows that out of 35 normal puberty girls, 9 %(26%) of them having low self-esteem, 23(65%) of them having moderate self-esteem, 3 (9%) of them having high self-esteem. Out of 45non puberty girls, 11(25%) of them having low self-esteem, 24(53%) of them having moderate self-esteem, 10(22%) having high self-esteem. Out of 20 early puberty girls, 7(35%) of them having low self-esteem, 12(60%) of them having moderate self-esteem and only one (5%) having high self-esteem. Early puberty girls having very low self-esteem compared to other girls. This study Shows that out of 35 normal puberty girls 8(23%) of them were slow in studies, 25(71%) were medium performers and 2(6%) were outstanding performers. Out of 45 non puberty girls 14(31%) of them were slow learners, 27(60%) of them are medium performers, 4(9%) of them were outstanding performers. Out of 20 early puberty girls 13(65%) were slow learners, 4(20%)

were medium performers and 3(15%) were outstanding performers. Early puberty girls are slow in studies and they unable to achieve good marks in their academics comparing to other girls. This study shows that out of 35 normal puberty girls 28(80%) of them spending 1-2 hours for playing outdoor games, 2(6%) of them spending 2-3 hours for playing outdoor games, 5(14%) were not interested in playing outdoor games. Out of 45 non puberty girls 30(67%) of them spending 1-2 hours for playing outdoor games, 7(15%) of them spending 2-3 hours for playing outdoor games, 8(17%) of them were not interested in playing outdoor games. Out of 20 early puberty girls 6(30%) of them spending 1-2 hours for playing outdoor games, 5(25%) of them spending 2-3 hours for playing out door games. 9(45%) of them were interested playing out door games. Comparing to other girls, early puberty girls were not interested in playing out door games. This study shows that out of 35 normal puberty girls 17(48%) of them spending 1-2 hours for playing indoor games, 2(6%) of them spending 2-3 hours for playing indoor games, 16(46%) 0f them are not interested in playing indoor games. out of 45 non puberty girls 25(56%) of them spending 1-2 hours for playing indoor games, 8(17%) of them spending 2-3 hours,12(27%) of them were not interested in playing indoor games. out of 20 early puberty girls 11(65%) of them were spending 1-2 hours for playing indoor games 6(30%) of them were spending 2-3 hours for playing indoor games, 3(15%) of them were not interested in playing indoor games. Comparing to other girls early puberty girls were more interested in playing indoor games. This study shows that out of 35 normal puberty girls, 14(40%) of them spending 1-2 hours for doing yoga or exercise and 21(60%) of them are not interested in doing yoga or exercise. Out of 45 non puberty girls, 14(31%) of them spending 1-2 hours for doing yoga or exercise, 2(4%) of them spending 2-3 hours for doing yoga and exercise and 29(65%) of them are not interested in doing yoga or exercise.non puberty girls are spending more time in doing yoga and exercise while early puberty girls were not interested in doing yoga or exercise. This study shows that out of 35 puberty girls 16(46%) of them spending 1-2 hours in social media, 9(26%) of them spending time in social media, 2(10%) were not allowed to spend time in social media. Out of 45 non puberty girls 22(49%) of them spending1 -2 hours in social media, 10(22%) of them spending 2-3 hours in social media and 13(29%) were not allowed to spend time in social media. Out of 20 early puberty girls, 12(60%) of them spending 1-2 hours in social media, 6(30%) of them spending 2-3 hours in social media, 2(10%) were allowed to spend time in early puberty. Comparing to other girls, girls who matured early spend much time in social media.

9. CONCLUSION

- The mean age of pubertal timing according to this study is 12 years.
- Girls who live in urban area mature early compare to the girls live in rural area.
- Early puberty girls were not interested in playing outdoor games and also skip their regular exercise.
- Packed food stuffs also play a major role in early puberty.
- Early puberty girls are also poor in academic achievements.
- Comparing to other girls early puberty girls spending more time in indoor games and they are also much active in social media.

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