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**ORIGINAL RESEARCH ARTICLE**

# A CROSS SECTIONAL STUDY ON NUTRITIONAL STATUS AND MORBIDITY PROFILE AMONG SCHOOL GOING ADOLESCENTS IN RURAL FIELD PRACTICING AREA OF OSMANIA MEDICAL COLLEGE

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## ABSTRACT

**Background:** Adolescence means "to grow to maturity". Adolescence includes the period from 10-19 years of age (WHO). It is defined as the period of transition between childhood and adulthood and is characterized by an exceptionally rapid rate of growth and maturation in human development. Adolescent constitutes over 23% of the population in India than any country. There were about 1.3 million adolescents died from preventable or treatable causes. There has been a worldwide significant change in nutritional status of adolescents during the past 2 decades because of global economic development and urbanization. Malnutrition and poor health in school children are common causes of low school enrollment, high absenteeism, early dropout and poor classroom performance. This study aimed to Assess the Nutritional Status and Morbidity Pattern among School Going Adolescents in Rural Field Practicing Area of Osmania Medical College.

**Methods**: This cross sectional study was conducted at a tertiary care institution in Hyderabad, Telangana between June 2018 and October 2018 in both boys and girls of adolescents aged between 10-19 years by simple random sampling. A Pre designed, pre tested, semi structured questionnaire was used as study tool. Data was entered using Microsoft Excel 2010 version and analyzed using Epi-Info version 7.1.2.0 and WHO Anthro Plus version 1.0.4.

**Results:** Among the study population, majority were girls 76% (344)and majority of the study population were Hindus 69.1% (313) and most of the adolescents belong to the nuclear family

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.Around 51% belongs to early adolescence age group and nearly 27% adolescents are studying in 10th Standard. Overcrowding was present in 61.4% (278) of study population. Overall stunting was 26.1%, 30.7% of study population were thin, 2.8% of the boys were overweight. Clinical Anemia found among 33.8% (153) study population, Refractive errors present among 20.5% (93).

**Conclusion**: Study conclude that majority of adolescents belong to early adolescent age group with nuclear family and nearly 1/3rd are with poor nutritional status and with different morbidity patterns.

**Keywords: Adolescence, Nutrition, Morbidity, Rural**

## INTRODUCTION

Adolescence means "to grow to maturity"[1].Adolescence includes the period from 10-19 years of age (WHO)[2]. It is defined as the period of transition between childhood and adulthood and is characterized by an exceptionally rapid rate of growth and maturation in human development[3,4]. Adolescence is a very crucial and stressful period in an individual's life with rapid changes occurring in physical, cognitive, psychological, emotional and social domains of life[1].

Worldwide there are more than 1.2 billion adolescents forming 18% of world's population[5,6]. Today, 84% of the world's adolescents live in the developing world[7]. More than half of all adolescents live in Asia and India has the highest adolescent population[5]. Adolescent constitutes over 23% of the population in India than any country[7,8,9].

Adolescence is the time when nutritional requirements of the body are high. Nutrition and health needs of the adolescents are more because of more requirements for growth spurt and increase in physical activity[8].The common morbidities found in adolescents are preventable or avoidable and curable[9]. There were about 1.3 million adolescents died from preventable or treatable causes[10].

There has been a worldwide significant change in the nutritional status of adolescents during the past 2 decades because of global economic development and urbanization[12]. Malnutrition and poor health in school children are among the common causes of low school enrollment, high absenteeism, early dropout and poor classroom performance[11]. Future of a society depends on adolescents and they form a great human resource for the society[6]. Early detection of the morbidities through regular survey helps in prompt treatment and prevention of serious complications[4]. Hence it is important to assess the nutritional status and morbidity profile among school going adolescents.

### Aim

To Assess the Nutritional Status and Morbidity Pattern among School Going Adolescents in Rural Field Practicing Area of Osmania Medical College

### Objectives

1. To study the socio demographic &environmental factors of study population.
2. To assess the Nutritional Status of the study population through Anthropometry
3. To assess Morbidity pattern of the study population.
4. To determine the association of socio demographic factors and environmental factors with Nutritional status and Morbidity status of the study population.

## MATERIALS & METHOD

The details of various methods followed and materials used while conducting the study are described here under.

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**Description of study Area:**

Present study was carried out in Patancheru, which is the rural field practice area of Community Medicine Department, Osmania Medical College, Hyderabad.

**Study design:** Cross Sectional Study.

**Study period:** June 2018- October 2018

**Study population:** All the adolescents both boys and girls aged between 10-19 years

**Sample size:**

Taking into account, the least prevalence of thinness as 4.8%, absolute error as 2%, with Confidence interval of 95%, sample size was calculated using the following formula

$$N = \frac{(1.96)^2 (p \times q)}{l^2}$$

- Hence, the sample size is

$$N = \frac{(1.96)^2 (4.8 \times 95.2)}{(2)^2}$$

$$= 439$$

=439 rounded off to 450

Total sample of 453 adolescents from the age group of 10-19 years

{**DerejeYohannesTeferi Et al (2018)**[13]Prevalence of thinness was 4.8%}

**Sampling Technique:** Simple Random Sampling.

There are 3 sub centers namely Ghanpur, Chitkul and IK pet under rural field practice area of Osmania Medical College. All three sub centers were included in the study. There were four government schools which had adolescents under three sub centers. There was one high school and one upper primary high school under Ghanpur sub center, one high school under Ismailkhanpet sub center and one high school present under Chitkul sub center. All these schools were included in the study. Total number of students was 938, out of which 453 students were taken into the study.

The students to be included in the study were selected after generating the random numbers using EPI INFO software.

**Selection Criteria**

The subjects for the study were selected based on the following criteria, after a written informed consent was obtained following national guidelines.

**Inclusion criteria for study subjects**

1. Adolescents aged 10 – 19 years.
2. Adolescents present on the date of examination.

**Exclusion criteria for study Subjects**

1. Adolescents who were not cooperative to participate in study.
2. Adolescents who were absent on the particular day of study.
3. Adolescents were not willing to participate in the study survey.

**Study Tools**

A Pre designed, pre tested, semi structured questionnaire was used as study tool. Other tools used in the study were:

1. Stethoscope,
2. Weighing machine to record weight.
3. Stadiometer to measure height
4. Snellen's chart to test for distant vision and near vision (visual acuity).
5. Ishihara chart to test for color vision.
6. Torch.

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**Data Collection**

Before starting the study, permission was obtained from the respective school principals.

**Structured Interview Schedule**

All the study participants were personally interviewed by investigator with help of questionnaire, so as to elicit the information regarding identification, sociodemographic, environment details, type of diet and salt, anthropometric measurements, morbidity, and utilization of health services. Every adolescent was examined physically from head to toe and any deviations from normal were recorded.

Anemia was diagnosed by clinical signs such as pallor of the conjunctiva, mucosa, nails and palmar creases. Height and weight were measured using standard protocol.

Snellen's chart was used to assess the visual acuity. Ischihara chart for color vision.

The total time taken for the interview was approximately 20 minutes for each study subject.

**Data Analysis**

Data was entered using Microsoft Excel and analyzed manually in the initial stages and later by using Epi-Info version 7.1.2.0 and WHO AnthroPlus version 1.0.4. Data was summarized in percentages and proportions.

Univariate analysis using Chi-square test with significance level at 5% was used to determine the association of various independent factors.

**RESULTS**

**Socio demographic details:**

**Table no.1. Distribution of study subjects according to Age, Sex, Religion, Type of Family, Mothers Educational status (n=453)**

| Variables | Category | Number | Percentages (%) |
|---|---|---|---|
| **Age Group(years)** | 10 to 13 yrs | 233 | 51,4% |
| | 14 to 16 yrs | 213 | 47.0% |
| | 17 to 19 yrs | 7 | 1.5% |
| **Sex** | Male | 109 | 24% |
| | Female | 344 | 76% |
| **Religion** | Hindu | 313 | 69.1% |
| | Muslim | 35 | 7.7% |
| | Christian | 105 | 23.2% |
| **Type of Family** | Nuclear | 364 | 80.4% |
| | Joint | 30 | 6.6% |
| | Three Generation | 59 | 13% |
| **Class Standard** | $6^{th}$ | 72 | 15.9% |
| | $7^{th}$ | 102 | 22.5% |
| | $8^{th}$ | 45 | 10% |
| | 9th | 112 | 24.7% |
| | 10th | 122 | 26.9% |
| **Educational Status of mother** | Illiterate | 222 | 49% |
| | Primary | 72 | 15.9% |
| | Secondary | 141 | 31.1% |

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| | | | |
|---|---|---|---|
| | Inter | 13 | 2.9% |
| | Graduate | 5 | 1.1% |

- Total 4 or less than 4 family members present in 46.4% (210) and more than 4 members' family members present in 53.6% (243) study population. Family with Children 2 or less than 2 was 49.7% (225), more than 2 children was 50.3% (228).Majority of the study participants were birth order of first and second order.
- Mean age of the study participants was 13.3 years with Standard Deviation 1.55. Out of 453 study 4%(18) were 10yrs of age, 11% (50) were 11yrs age, 16.1% (73) were 12yrs age, 20.3%(92) were 13yrs age, 14 years 28.3% (128) were 14yrs age, 14.6% (66) were 15yrs age, 4.2% (19) were 16yrs age, 1.5%(7) were 17yrs age.
- Most of the mothers of study population were Illiterate 49%(222) followed by secondary schooling 31.1%(141) , primary 15.9%(72), intermediate 2.9%(13) and graduate mothers were 1.1%(5).

**Environment**

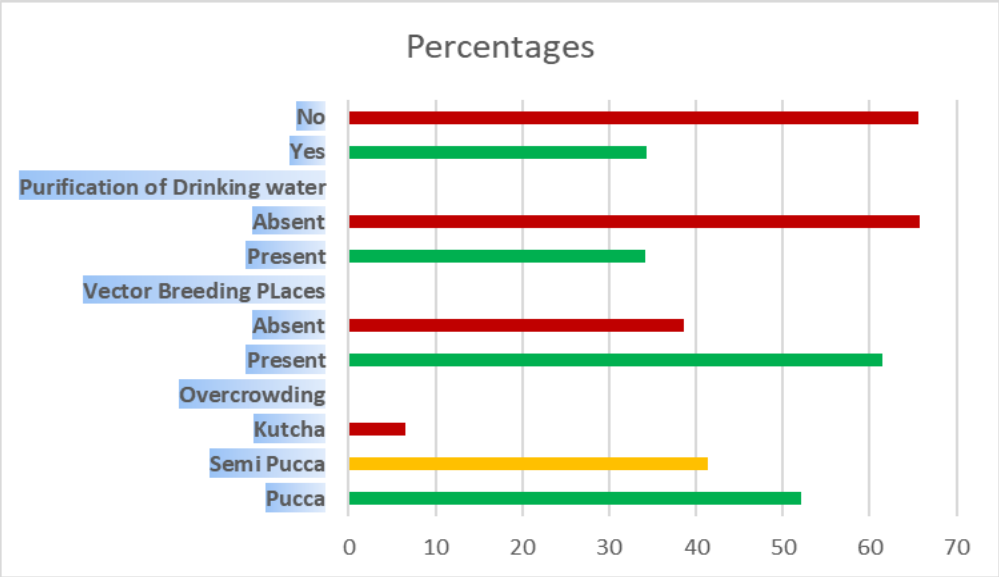


**Figure no.1: Distribution of Environmental factors in the study Subjects**

52.1% (236) study population were living in have Pacca house followed by 41.3% (187) living in Semi Pacca house and 6.6% (30) study population living in Kutcha house. Separate kitchen was present in 63.1% (286) study population. Among 286 study population who had separate kitchen 86% (246) respondents had Exhaust ventilation for kitchen.

**Overcrowding** was present in 61.4% (278) of study population.

**Nutritional status**

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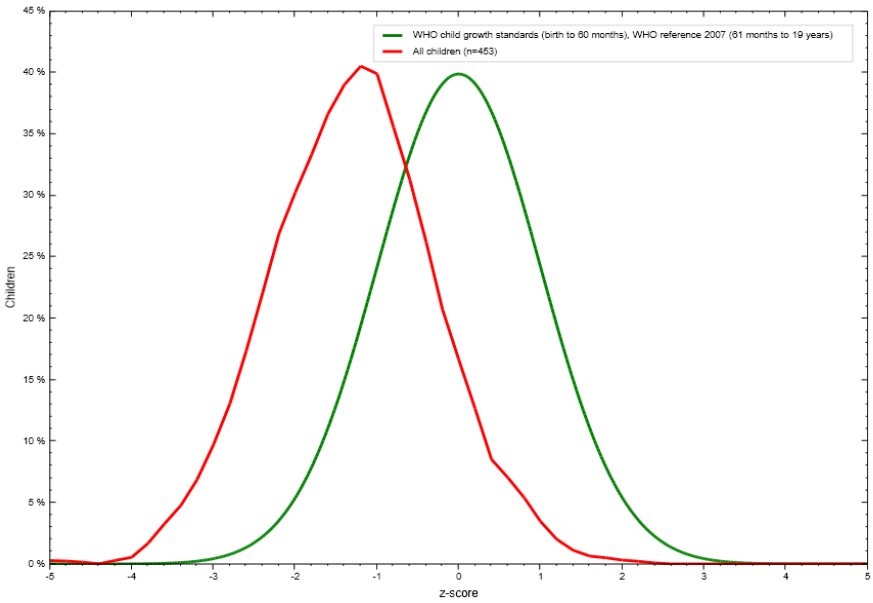
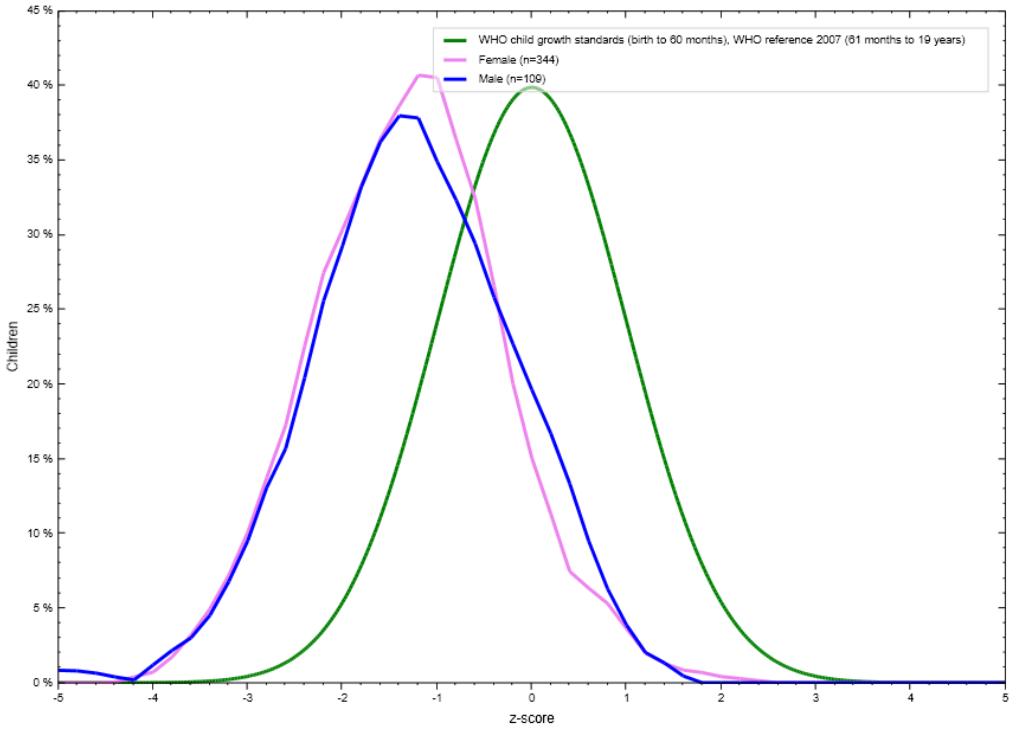



**Graph number: 1 Height for age graph**

Stunting among girls was 25.6% among them 22.1% girls were moderately stunted and 3.5% girls were severely stunted.




**Graph number.2: Height for age (Sex wise)**

Overall stunting was 26.1%, among them moderate stunting seen in 22.3% study population and severe stunting was seen in 3.8% study population.
27.5% boys were stunted among them 22.9% moderately stunted and4.6% were severely stunted.

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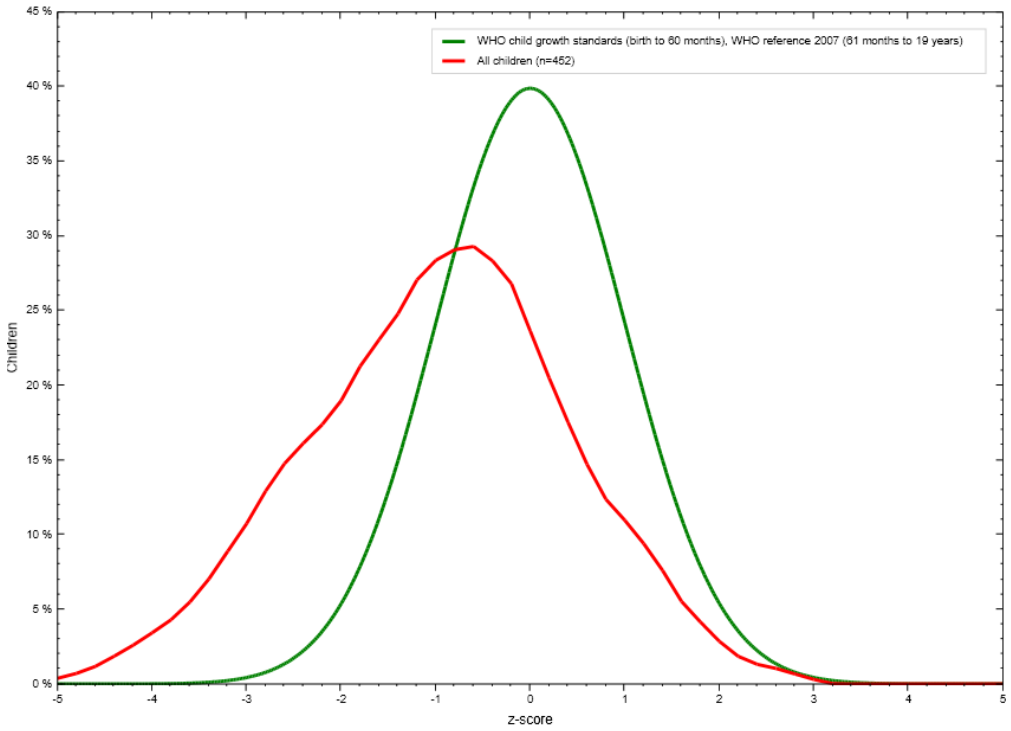
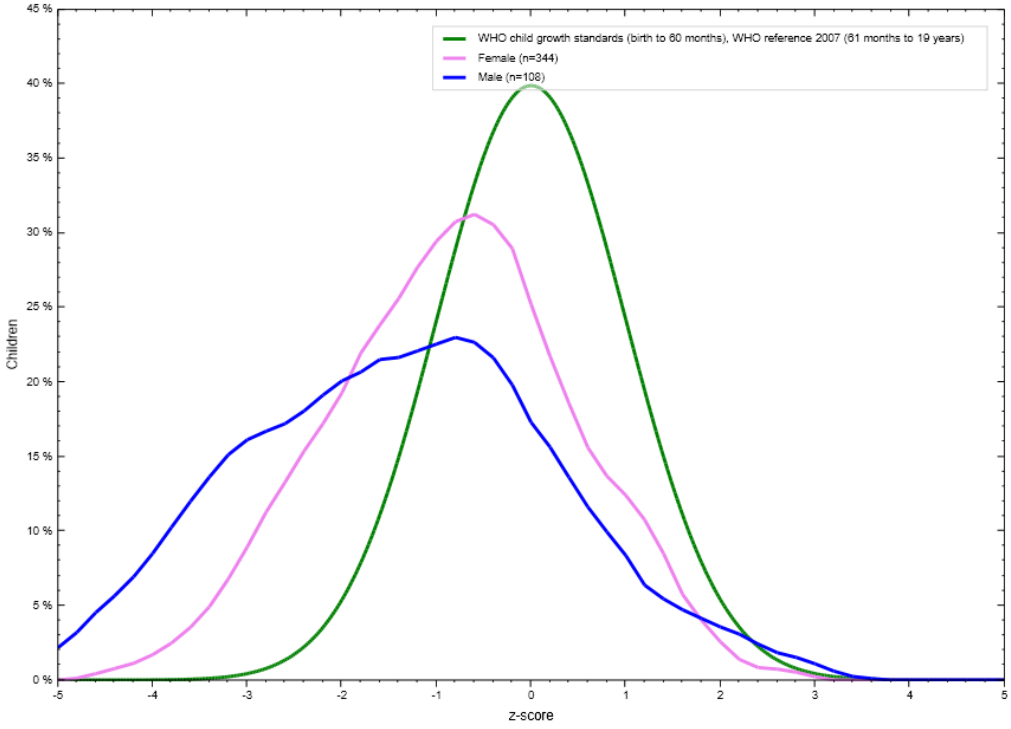



**Graph number: 3** BMI for age graph

30.7% of study population were thin among them moderate thinness was present in 23% and severe thinness was seen in 7.7% study population
1.3% of the study population was overweight.




**Graph number: 4** BMI for age (Sex wise)

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Total thinness was present in 54.6% of boys among them 37% were moderately thin and 17.6% were severely thin.
2.8% of the boys were overweight.
23.3% of girls were thin among them 18.6% were moderately thin and 4.7% were severely thin.
0.9% of the girls were overweight.
**Note:** One student (boy) was not considered for the analysis as the BMI for age Z score was <-3SD (All Z- score values <-3 SD and > +3 SD were not considered because percentiles beyond +/- 3SD were invariant to changes in respective Z- scores).

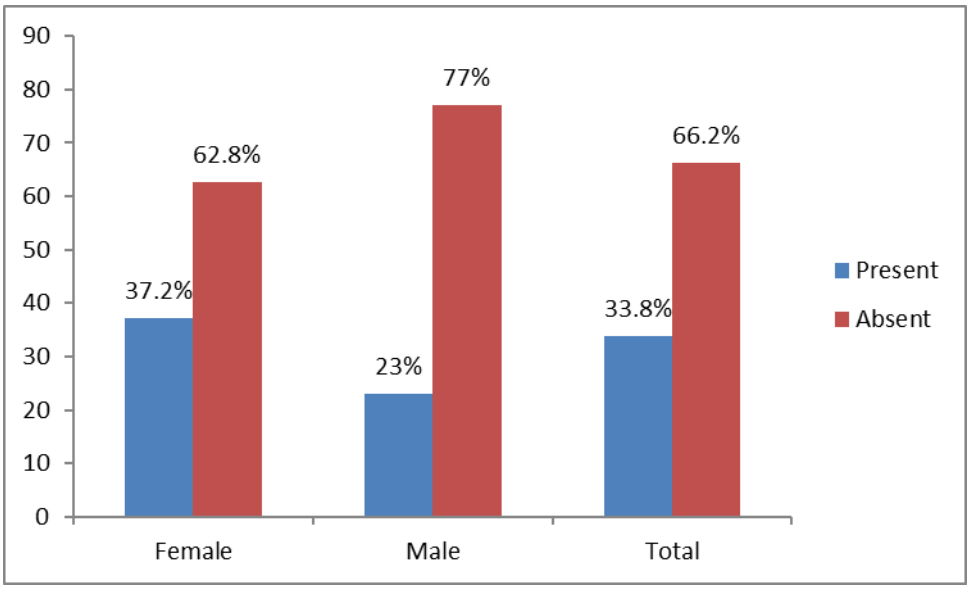


**Figure number: 2Anemia**

- Clinical Anemia found among 33.8% (153) study population. 28.2% (128) were girls and 5.6% (25) were boys.Among total girls, 37.2% (128) girls were anemic and among total boys, 23% (25) were anemic.

**Morbidity**

Table no.2. Morbidity Patterns in the study Population(n=453)

| Morbidity Patterns | Category | Percentages(%) |
|---|---|---|
| **Vitamin deficiency** | Vitamin A | 8.2% |
| | Vitamin B | 0.9% |
| | Vitamin C | 1.8% |
| **Anemia** | Present | 33.8% |
| | Absent | 66.2% |
| **Refractive Errors** | Present | 20.5% |
| | Absent | 79.5% |
| **ENT Morbidity** | Nose discharge&bleeding | 9.9% |
| | Ear discharge &bleeding | 2.2% |
| **Dental Morbidity** | Caries | 21.1% |
| | Mottled | 0.2% |
| | Fluorosis | 3.75% |

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| | | |
|---|---|---|
| **Upper Respiratory Tract Infections** | Present | 34.4% |
| | Absent | 65.6% |
| **GI** | Pain Abdomen | 21% |
| | Diarrhea | 2.2% |
| | Constipation | 0.4% |
| **Musculoskeletal** | Present | 11.1% |
| | Absent | 88.3% |

By clinical examination, Vitamin A deficiency found among 8.2%(37), Vitamin B deficiency found among 0.9%(4), Vitamin C deficiency found among 1.8%(8),

- Personal hygiene problems related to hair i.e hair fall, lice, dandruff were present in 33.7% (153), 26.7% (121), 18.8% (85) study population respectively. Nutritional related problems of hair i.e gray hair, half bald were present in 0.88% (4), 0.44% (2) respectively among study population.
- Hypopigmentation on face was present in 0.7% (3) and hyperpigmentation on face was present in 2.7% (12).
- Acne present among 9% (41) study population. 12.4% (56) study population has skin problems. Scabies was present among 4.2% (19) study population.

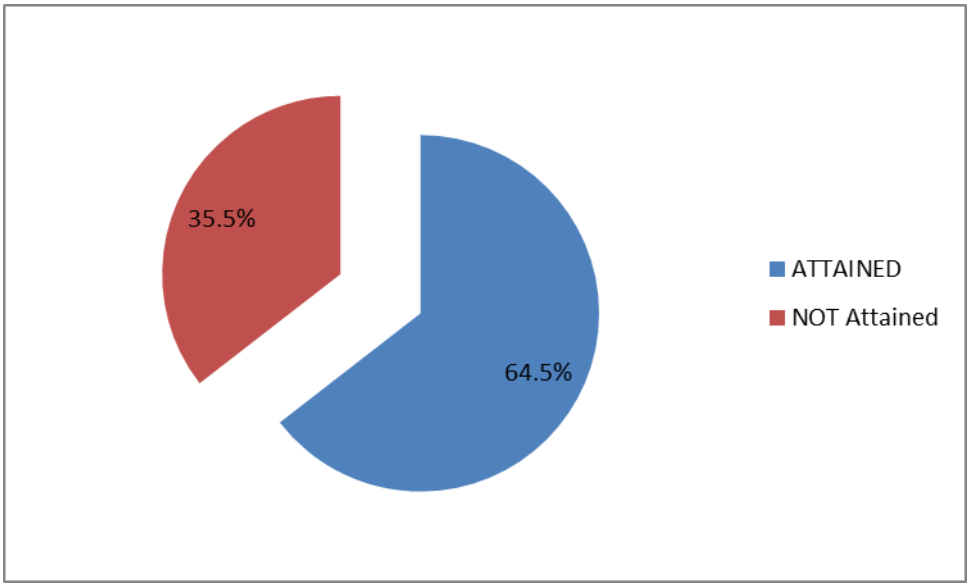


**Figure number 3: Menarche**

Among 344 girls, 64.5% (222) girls attained menarche and 35.5% (122) didn't attained menarche.

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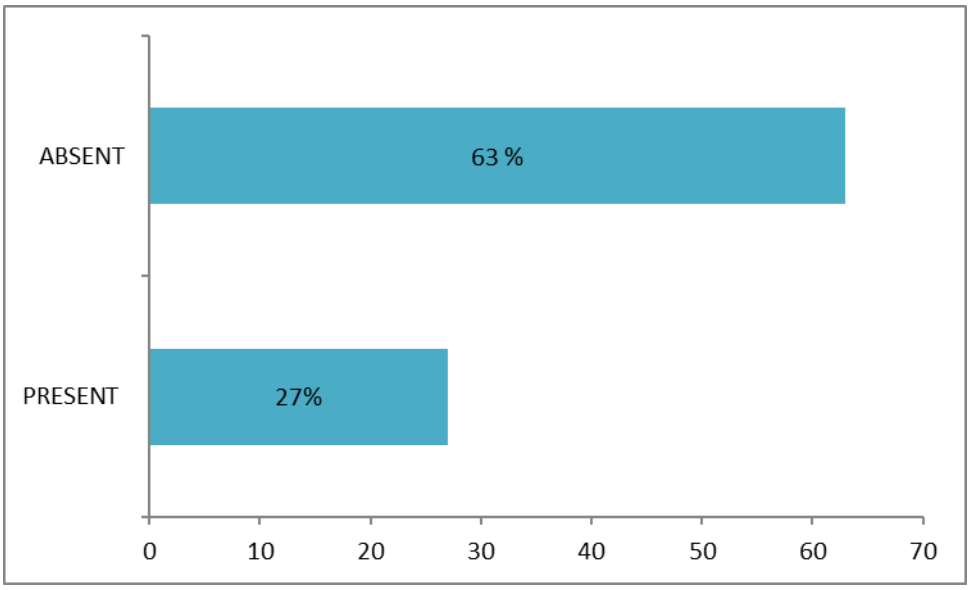


**Figure number: 4Dysmenorrhea**

Dysmenorrhea was present in 27% (60) menstruating girls. 6.8% (15) menstruating girls complained about vaginal discharge. Urinary tract infection was present in 1.4% (3) of menstruating girls.

**Table number: 3Personal hygiene (n=453)**

| | With soap | Without soap |
|---|---|---|
| Hand Washing | 72% (326) | 28% (127) |
| | Daily | Once in 2 days |
| Bathing | 97.6% (442) | 2.4% (11) |
| | Regular | Irregular |
| Nail Cutting | 81.2% (368) | 18.8% (85) |
| Washing of clothes | 96.5% (437) | 3.5% (16) |

72% (326) study population washing their hands with soap and 28% (127) without soap.
97.6% (442) study population bathing daily and 2.4% (11) once in 2 days.
81.2% (368) study participants cutting their nails regularly and 18.8% (85) irregularly.
All the study population brushing their teeth daily 100% (453).
96.5% (437) study participants wearing daily washed clothes.
Table number.4:Association between morbidity and variable factors

| **Study variable** | **Disease (+)** | **Disease (-)** | |
|---|---|---|---|
| **Kitchen** | **URTI+** | **URTI-** | P value=0.000031 |
| Separate kitchen | 118 | 165 | $X^2$=15.99(significant) |
| No separate kitchen | 38 | 129 | |
| **Overcrowding** | **URTI+** | **URTI-** | P value=0.00000115 |
| Present | 119 | 159 | $X^2$=22.32(significant) |

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| | | | |
|---|---|---|---|
| Absent | 37 | 138 | |
| **Gender** | **ANAEMIA+** | **ANEMIA-** | P value=0.003 $X^2$=7.53(significant) |
| Girls | 128 | 216 | |
| Boys | 25 | 84 | |
| **Literacy of mother** | **ANAEMIA+** | **ANEMIA-** | P value=<0.00000113 $X^2$=98.8(significant) |
| Illiterate | 125 | 97 | |
| Literate | 28 | 203 | |
| **Menarche** | **ANAEMIA+** | **ANEMIA-** | P value=<0.000001 $X^2$=32.25(significant) |
| Attained | 107 | 115 | |
| Not attained | 21 | 101 | |
| **Nail cutting** | **ANAEMIA+** | **ANEMIA-** | P value=<0.000001 $X^2$=111.2(significant) |
| Present | 114 | 69 | |
| Absent | 39 | 231 | |

## DISCUSSION

Stunting in the present study was 25.6% which was comparable to the study conducted by **Yamuna BN and Anantha Narayana Gowda B. L. (2016)[14]**(25.8%)and much higher than the study conducted by **Teferi DY Et al (2018)[13]**(5.2%)

Thinness in the present was 23.3%, which was less than the studies conducted by **Yamuna BN and Anantha Narayana Gowda B. L. (2016)[34]**(32.3%) and **Trivedi PK Et al (2016)[5]** (30.8%)

Overweight in the present study was 1.3% which was comparable to the study conducted by **Trivedi PK Et al (2016)[5]**(1.2%) and differs with the studies conducted by **Yamuna BN and Anantha Narayana Gowda B. L. (2016)[14]**(4.8%)

Vitamin A deficiency in the present study was 8.2%. Present study results were comparable with studies conducted by **Ramavat MR Et al (2015)[9](**7%), **Kashyap R and Kaur S (2012)[15]**(6.2%) and **Shinde M Et al (2014)[16](**6.25%).

In my study Vitamin C deficiency was present in 1.8% study population. Present study results differ with studies conducted by **Kashyap R and Kaur S (2012)[15]** (10.0%) and**Ramavat MR Et al (2015)[9]**(10.5%) which were higher than present study.

Anemia in the present study was 33.8%. Present study result was more than the studies conducted by **Singh JP and Singh AK (2017)[4]** 26.8%) and **Kashyap R and Kaur S (2012)[15] (**28.2%) and less than studies conducted by **Jain K Et al (2016)[7](**62.2%) **Trivedi PK Et al (2016)[5]**(95%).

Skin and hair diseases among total study population was12.3%. The present study result was lesser than studies conducted by **Udayar SE Et al (2015)[6](**21.5%) **&Sharada R Et al (2013)[17]**(42.5% ) and higher than studies conducted by **Singh JP and Singh AK (2017)[4](**4.5%)

In the present study Refractive errors was 20.5%. The present study results were similar to the studies conducted by **Joice S Et al (2009)[18]**(20.9%) and differ with study conducted by **Singh JP and Singh AK (2017)[4]** (12.47%).

Squint in the present study was 2.9% which was less when compared with study conducted by **Dey AK and Nath AB (2016)[19]**(4.76%).

In the present study Ear morbidity was 2.87%.Present study results were similar to studies conducted by **Jain K Et al (2016)[7](**2.7%) &**Kochkorova FA Et al (2014)[20]**(3.39%).

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According to my study Dental caries present in 21.2% study population.Present study results were comparable to the studies conducted by **Udayar SE Et al (2015)[8](**19.2%) and **Tondare D Et al (2011)[21]**(20.1%).

Fluorosis in my study was 3.75% which differs with the study conducted by **Sharada R Et al (2013)[17] (**45.5%).

Upper respiratory tract infection (URTI) in my study was 34.4% which was similar to the study conducted by **Singh JP and Singh AK (2017)[4]**(35.7%).

Gastro intestinal morbidity in the present study was 23.6%. The present study results differ with study conducted by **Kochkorova FA Et al (2014)[20]**(11.32%)

Pain abdomen was present in 21% study population, this differ with the studies conducted by**Sehgal RK Et al (2014)[22] (**2.38%), **Alam N (2010)[23]**(4%), **Singh JP Et al (2013)[4]**(4.36%) adolescents had abdominal pain.

In the study conducted by **Rakesh PS etal.(2018)[24]**47.7% of girls (214/440) and 39.6% (173/440) of boys had anemia which is in accordance with our study (37.2% of girls) signifying the association between Gender and Anemia.

## CONCLUSION

Study conclude that majority of adolescents belong to early adolescent age group with nuclear family and nearly 1/3rd are with poor nutritional status and with different morbidity patterns.

**Funding**: No funding sources

**Conflict of interest:** None declared

**Ethical approval**: The study was approved by the Institutional Ethics Committee.

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