

## Chapter – 5

### Summary and Conclusion

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#### 5.1 Introductory Statement

When a farmer plants a field of corn, he must provide several environmental conditions to ensure it grows. There must be ample sunlight, water, and fertilizer. The temperature should neither be too hot nor too cold, and the soil can neither be too acidic nor too alkaline. Given time, with these influences set at optimum levels, the seed will mature into a successful plant. It is not a far stretch to apply this same cultivation process to understanding how a child develops into an adolescent, then into full maturity as an adult. An individual will go through a series of cognitive developmental steps over her/his life, and at each step there is numerous sources of influence that can impact the step's progress, either helping or hindering the outcome. Keeping in mind the above fact the research has been done on adolescents. The period of transition from childhood to adulthood is called adolescence with accelerated physical, biochemical and emotional development. It is during this period that the final growth spurt occurs. There are many body changes which result due to the influence of hormones. The growth spurt of boys is slower than that of girls. The growth spurt signals the onset of critical body composition of 10 per cent body fat. However 22 percent of body fat is required to maintain regular ovulation. Growth velocity is maximum for boys between 12-15 years and for girls 10-13 years. They attain their adult stature between 18-20 but bone mass continues to increase up to age of 25. With the profound growth of adolescence there are increased demands for energy, protein, minerals and vitamins.

The dimensional changes and changes in maturational timings over the generations are called secular changes, the term secular referring to successive periods of time. Magnitude of secular trend in stature which may approximate 1 cm/decade and then inverse secular trend in menarcheal timings, which may approximately 0.2 yr/decade. Adolescent anorexia may lead diminution of the secular trend. Keeping the fact in mind it is very necessary to study the major day to day changes observed by adolescence and problems they face during this changes.

So on the basis of it, following objectives are set and research work has been conducted which shows following results, which are summarized as below.

## **5.2 Methodology**

### **5.2.1 Aims and Objectives**

- To assess the anthropometric measurements of adolescent girls and boys.
- To study dietary intake of adolescent girls and boys.
- To study the various health problems of adolescent girls and boys.
- To assess the hemoglobin level of adolescent girls and boys.

### **5.2.2 Hypothesis**

**Following null hypothesis have been set to draw statistical inferences -**

- There shall be no significant difference in anthropometric measurements of adolescent girls and boys.
- There shall be no significant difference in dietary intake of adolescent girls and boys.

- There shall be no significant difference in various health problems of adolescent girls and boys.
- There shall be no significant difference in hemoglobin level of adolescent girls and boys.

### **5.2.3 Material and Methods**

**Sampling Technique :** The present study was carried out on 500 adolescent girls and boys aged 18-21 years. Samples were selected by random sampling method. The study was conducted in Christian Eminent School of Indore District.

**Tools and techniques:** To determine the nutritional status of adolescent girls and boys, anthropometric measurement like age, height, weight and body mass index (BMI) was calculated. Along with that dietary intake of nutrients was also calculated through 24 hours recall method with that food group intake by food frequency questionnaire was calculated. Hemoglobin and serum calcium status was calculated to find out the nutritional status of adolescent girls and boys. Life style pattern of adolescent girls and boys was also observed through physical activity, exercise and meal pattern. Data was collected by questionnaire method.

After explaining the purpose of the study consent was taken. A semi structured questionnaire was provided with proper guidance and assistance to samples. They were asked to answer questionnaire.

### **5.2.4 Statistical Analysis**

The Data was entered into the computer database. The responses of frequencies were calculated and analyzed by using statistical software SPSS version 11.0. Prevalence of an outcome variable along with 95% confidence interval was calculated. The descriptive statistics like mean and standard

deviation for different study variables were calculated. Significance of difference in frequency distribution of studied sample has been found out using Chi square test.

### **5.3 Results and Discussion**

#### **5.3.1 Nutritional status**

##### **3.1(a) Anthropometric assessment**

**Age:** Age of the adolescent girls and boys of MIG and HIG have been recorded and analyzed for significance by applying 'Z' test and 'Chi-square test reveals that the mean age of adolescent girls and boys of MIG and HIG was 20.13 years. Non-significant difference was observed between the two groups in their age group with a 'Z' value of 0.11 ( $P > 0.05$ ). The range of age amongst subjects was 18 yrs to 21 yrs.

**Height:** Height status reveals that the mean height of adolescent girls and boys of both MIG and HIG groups was 154.9 cm and 153.6 cm, respectively. Minimum and maximum height in both the groups have not differed much in their values and non-significant difference ( $Z$  value = 0.21,  $P > 0.05$ ) was observed for the height between both the groups.

**Weight:** Weight status reveals that the mean weight of adolescent girls and boys of both MIG and HIG groups was 55.9 kg and 56.2 kg, respectively. Non-significant difference was observed for the weight between both the groups ( $Z$  value = 0.49,  $P > 0.05$ ), whereas, the minimum weight was (41.0 kg) in MIG compared to HIG (48.0 kg) adolescents.

**BMI:-** BMI status reveals that the mean body mass index of adolescent girls and boys of both MIG and HIG groups was 22.5 and 22.8 respectively. Non-significant difference was observed for the body mass index between both the groups ('Z' value = 1.88,  $P > 0.05$ ).

**Education Level:** Education level reveals that 52.0 % and 48.0 % of adolescent boys and girls studied at, graduate and diploma level of MIG compared to 65.2 % and 34.8 % in HIG respectively. Significant difference was observed between the two groups in their percentages with a Chi- value of 10.84 ( $P < 0.05$ ), which implies that the frequency of education between both the two groups was different.

**Caste :** Caste status reveals that 33.16 %, 31.43%, and 32.87 % of adolescent girls and boys of MIG were Hindus, Muslim and Sikh as compared to 66.83 %, 68.57 % and 67.12 % adolescent girls and boys of HIG respectively. Significant difference was observed between the two groups in their percentages with a chi-value of 41.4 ( $P < 0.05$ ).

**Income:** Income status reveals that 43.6 %, 58.8 % of adolescent boys were of HIG and MIG as compared to 56.4 %, 41.2 % of adolescent girls respectively. Significant difference was observed between the two groups in their percentages with a Chi-value of 10.86 ( $P < 0.05$ ), which implies that frequency of occurrence of the MIG and HIG of both adolescent girls and boys was different.

### **5.3.1(b) Food Group Intake**

**Cereals :** It reveals that 2.0 %, 31.6 %, 37.6 % and 28.4 % of adolescent girls and boys were taking stuffed paratha daily, twice a week, weekly, monthly and occasionally in MIG group as compared to 27.2 %, 33.2 %, 29.2% and 10.4 % were taking stuffed paratha twice a week, weekly, monthly and occasionally in HIG group respectively; whereas 6.0 %, 34.0 %, 25.6 % and 34.4 % of adolescent girls and boys were taking upma twice a week, weekly, monthly and occasionally in MIG group as compared to 36.4 %, 33.6 %, 16.8 % and 13.2 % in HIG group respectively. It was observed that 7.2 %, 24.8 %, 33.2 %, 20.0 % and 14.8 % of adolescent girls and boys were taking

poha daily, twice a week, weekly, monthly and occasionally in MIG group as compared to 36.4 %, 52.0 %, 7.6 % and 3.6 % in HIG group respectively; whereas, 10.8 %, 28.4 % and 60.4 % of adolescent girls and boys were taking missi chapati twice a week, weekly, monthly and occasionally in MIG group as compared to 5.6 %, 42.4 % and 52.0 % in HIG group respectively. It was observed that 9.2 %, 33.6 %, 24.4 % and 32.8 % of adolescent girls and boys were taking bread twice a week, weekly, monthly and occasionally in MIG group as compared to 5.2 %, 34.0 %, 32.4 % and 28.4 % in HIG group respectively, whereas, 14.8 %, 32.0 % and 53.2 % of adolescent girls and boys were taking dosa weekly, monthly and occasionally in MIG group as compared to 6.4 %, 46.0 % and 47.6 % in HIG group respectively.

Cereal intake reveals significant differences for intake of stuffed paratha, upma and poha, and non-significant difference for missi chapatti, bread and dosa in the food items of adolescent girls and boys of MIG and HIG groups. Highly significant difference ( $P < 0.05$ ), was observed between the two groups in their percentages with a Chi- values of 31.6, 33.1 and 26.3 for stuffed paratha, upma and poha respectively, which implies that frequency of cereal intake in both the groups are different.

**Pulses Intake:** It reveals that 7.6 %, 14.0 %, 25.2 %, 21.2 % and 32.0 of adolescent girls and boys were taking moong dal daily, twice a week, weekly, monthly and occasionally in MIG group as compared to 46.0 %, 48.8 %, 4.0 % and 1.2 % in HIG group respectively, whereas, 21.2 %, 21.2 %, 24.4 %, 9.6 % and 23.6 % of adolescent girls and boys were taking tuar dal daily, twice a week, weekly, monthly and occasionally in MIG group as compared to 66.8 %, 33.2 %, in HIG group respectively. It was observed that 0.4 %, 9.2 %, 21.6 % and 68.8 of adolescent girls and boys were taking mosoor dal twice a day, weekly, monthly and occasionally in MIG group as compared to 5.2 %, 26.8 %, 32.4 % and 35.4 % in HIG group respectively, whereas, 13.2

%, 47.2 % and 39.6 of adolescent girls and boys were taking chole weekly, monthly and occasionally in MIG group as compared to 24.8 %, 44.0 % and 30.8 % in HIG group respectively. It was found that 1.6 %, 11.6 %, 33.2 % and 53.6 % of adolescent girls and boys were taking rajmah daily, weekly, monthly and occasionally in MIG group as compared to 19.6 %, 42.4 % and 38.0 % in HIG group respectively.

Pulses intake reveals highly significant difference for intake of moong dal, taur dal and massor dal; and non-significant difference ( $P > 0.05$ ), for intake of chole and Rajmah in pulses intake of adolescent girls and boys in MIG and HIG groups. Highly significant difference ( $P < 0.05$ ), was observed between the two groups in their percentages with a Chi- values of 72.5, 79.4 and 27.1 for moong dal, tur dal and massor dal, respectively, which implies that frequency of consumption of pulses in both the groups is different.

**Vegetable Intake :** It reveals that 10.0 %, 3.6 %, 28.4 %, 24.4 % and 33.6 % of adolescent girls and boys were taking green leafy vegetables daily, weekly, monthly, occasionally and not at all in MIG group as compared to 0.8 %, 2.0 %, 2.4 %, 3.2 %, 11.6 %, 18.8 % and 61.2 % in HIG respectively; whereas, 18.8 %, 3.2 %, 24.0 %, 24.8 % and 29.2 % of adolescent girls and boys were taking root & tubers daily, weekly, monthly, occasionally and not at all in MIG group as compared to 14 %, 3.6 %, 6.0 %, 1.2 %, 11.2 %, 17.2 % and 46.8 % in HIG group respectively. It was observed that 2.4 %, 2.0 %, 21.6 %, 30.8 % and 43.2 % of adolescent girls and boys were taking other vegetables daily, weekly, monthly, occasionally and not at all in MIG group as compared to 2.0 %, 5.6 %, 14.0 %, 24.0 % and 53.6 % in HIG respectively; whereas, 21.6 %, 2.0 %, 16.8 %, 24.8 % and 34.8 % of adolescent girls and boys were taking mixed vegetables daily, weekly, monthly, occasionally and not at all in MIG group as compared to 26.4 %, 6.4 %, 8.0 %, 9.2 % and 49.2 % in HIG group respectively.

Vegetable intake reveal Significant difference ( $P < 0.05$ ), was observed between the two groups in their percentages with a Chi-value of 28.1, 21.3 and 16.3 for green vegetables, root and tubers and mixed vegetables, respectively, which implies that frequency of vegetable consumption in both the groups is different. Non-significant difference ( $P > 0.05$ ), was observed between the two groups in their percentages with a chi-square value of 6.13 for other vegetables, which implies that frequency of consumption of mixed vegetable in both the groups is similar.

**Meat, Fish and Poultry Product Intake :** It reveals that 99.2 % of adolescent girls and boys were taking egg occasionally and not at all in MIG group as compared to 12.0 %, 10.4 %, 26.0 %, 1.6 % and 50.0 % daily, twice a week, weekly, monthly and not at all in HIG group respectively; whereas, 100.0 % of adolescent girls and boys were not taking fish at all in MIG group as compared to 0.8 %, 14.4 % and 84.4 % twice a week, weekly, monthly and not at all in HIG group respectively. It was observed that 0.8 % and 99.2 % of adolescent girls and boys were taking meat occasionally and not at all in MIG group as compared to 1.6 %, 20.4 %, 12.8 % and 65.2 % twice a week, weekly, monthly and not at all in HIG group respectively; whereas, 0.8 % and 99.2 % of adolescents girls and boys were taking chicken occasionally and not at all in MIG group as compared to 63.2 %, 0.8 %, 1.2 %, 24.4 % and 10.4 % daily, twice a day, weekly, monthly and occasionally in HIG group respectively. Table 4.3.8 reveals highly significant difference ( $P < 0.05$ ), for egg, fish, meat and chicken in the food items of adolescent girls and boys in MIG and HIG groups. Significant difference was observed between the two groups in their percentages with a Chi-value of 67.0, 16.9, 42.6 and 197.0 28.1, 21.3 and 16.3 for egg, fish, meat and chicken, respectively, which implies that frequency of consumption of non- vegetarian foods in both the groups is different.



**Milk and Milk Product Intake :** It reveals that 51.2 %, 2.0 %, 1.2 % and 45.6 % of adolescent girls and boys were taking skimmed milk daily, twice a week, weekly and not at all in MIG group as compared to 21.6 %, 8.8 %, 5.6 % and 64.0 % daily, twice a day, weekly and not all in HIG group respectively; whereas, 9.6 %, 4.4 %, 4.0 %, 1.2 % and 80.8 % of adolescent girls and boys were taking skimmed milk curd daily, twice a week, weekly, occasionally and not at all in MIG group as compared to 2.4 %, 12.0 %, 1.2 % and 84.4 % daily, weekly, monthly and not at all in HIG group respectively. It was observed that 6.4 %, 2.4 %, 4.4 %, 4.0 %, 41.2 % and 41.6 % of adolescent girls and boys were taking butter milk daily, twice a week, weekly, monthly, occasionally and not at all in MIG group as compared to 4.0 %, 30.4 %, 30.4 %, 21.6 % and 13.6 % twice a week, weekly, monthly, occasionally and not at all in HIG group respectively; whereas, 6.4 %, 1.2 %, 3.2 % and 89.2 % of adolescent girls and boys were taking whole milk daily, twice a week, occasionally and not at all in MIG group as compared to 30.4 %, 9.2 % and 60.4 % daily, twice a day and not at all in HIG group respectively.

It was found that 3.2 %, 2.4 %, 22.4 % and 71.6 % of adolescent girls and boys were taking whole milk curd daily, twice a week, weekly, occasionally and not at all in MIG group as compared to 9.2 %, 1.2 %, 24.4 % and 64.4 % daily, twice a day, twice a week, weekly, monthly and not at all, in HIG group respectively; whereas, 26.8 %, 51.6 % and 21.6 % of adolescent girls and boys were taking paneer monthly, occasionally and not at all in MIG group as compared to 26.0 %, 43.6 %, 27.6 % and 2.4 % twice a week, weekly, monthly, occasionally and not at all in HIG group respectively. It was observed that 23.2 %, 66.4 % and 10.4 % of adolescent girls and boys were taking khoa monthly, occasionally and not at all in MIG

group as compared to 3.6 %, 48.0 %, 46.4 % and 2.0 % weekly, monthly, occasionally and not at all in HIG group respectively.

Milk and milk product intake reveals highly significant difference ( $P < 0.05$ ), for skimmed milk, skimmed milk curd, butter milk, whole milk, whole milk curd, paneer and khoa in the food items of adolescent girls and boys in MIG and HIG group. Significant difference was observed between the two groups in their percentages with a Chi-value of 28.8, 15.2, 66.8, 34.8, 44.9, 53.0 and 21.5 for skimmed milk, skimmed milk curd, butter milk, whole milk, whole milk curd, paneer and khoa, respectively, which implies that frequency of consumption of milk and milk products in both the groups, is different.

**Nuts and Oil Seeds Intake :** It reveals that 4.8 %, 20.0 %, 56.0 % and 19.2 % of adolescent girls and boys were taking almonds weekly, monthly, occasionally and not at all in MIG group as compared to 25.2 %, 15.6 %, 14.8 %, 12.4 % and 32.0 % daily, weekly, monthly, occasionally and not at all in HIG group respectively; whereas, 4.8 %, 26.8 %, 60.0 % and 6.4 % of adolescent girls and boys were taking cashew nut weekly, monthly, occasionally and not at all in MIG group as compared to 10.4 %, 12.4 %, 17.6 %, 24.8 % and 34.8 % daily, weekly, monthly, occasionally and not at all in HIG group respectively. It was observed that 2.0 %, 7.6 %, 56.0 % and 34.4 % of adolescent girls and boys were taking dry coconut weekly, monthly, occasionally and not at all in MIG group as compared to 12.4 %, 17.6 %, 22.8 %, 26.8 % and 20.4 % twice a week, weekly, monthly, occasionally and not at all in HIG group respectively; whereas, 38.8 % and 61.2 % of adolescent girls and boys were taking sesame seeds occasionally and not at all respectively in MIG group as compared to 10.4 %, 0.8 %, 13.2 %, 20.0 %, 23.2 % and 32.4 % daily, twice a week, weekly, monthly, occasionally and not at all in HIG group respectively.

Result reveals highly significant difference for almonds, cashew nut, dry coconut and sesame seeds in the food items of adolescent girls and boys in MIG and HIG groups. Significant difference ( $P < 0.05$ ) was observed between the two groups in their percentages with a Chi-value of 62.3, 49.8, 46.3 and 57.2 for almonds, cashew nut, dry coconut and sesame seeds respectively which imply that frequency of consumption of nuts and seeds in both the groups is different.

**Beverages Intake :** It reveals that 16.0 %, 37.2 %, 9.2 % and 37.6 % of adolescent girls and boys were taking tea once a day, tea twice a day, coffee once a day and not at all in MIG group as compared to 27.2 %, 25.6 %, 10.4 %, 2.0% and 34.8 % tea once a day, tea twice a day, coffee once a day, coffee twice a day and not at all in HIG group respectively; whereas, 0.4 %, 0.4 %, 10.4 %, 47.6 %, 36.4 % and 4.8 % of adolescent girls and boys were taking fruit juice daily, twice a day, weekly, monthly, occasionally and not at all in MIG group as compared to 17.2 %, 16.8 %, 28.4 % and 37.6 % daily, twice a week, weekly and not at all in HIG group respectively. Table 4.3.11 reveals highly significant difference ( $P < 0.05$ ) for fruit juice and non-significant difference ( $P > 0.05$ ) for coffee or tea in the food habits of adolescent girls and boys in MIG and HIG groups. Significant difference was observed between the two groups in their percentages with a Chi-value of 150.9 ( $P < 0.05$ ) for fruit juice, which implies that frequency of consumption of beverages in both the groups is different.

**Soya product Intake :** It reveals that 100 % of adolescent girls and boys were not taking at all the soya milk in MIG group as compared to 14.4 %, 14.4 % and 71.2 % weekly, monthly and not at all in HIG group respectively; whereas, 7.2 %, 20.8 % and 72.0 % of adolescent girls and boys were taking soybean dal monthly, occasionally and not at all in MIG group as compared to 16.0 %, 26.8 %, 17.6 %, 14.8 % and 24.8 % twice a week, weekly,

monthly, occasionally and not at all in HIG group respectively. It was found that 13.6 % and 86.4 % of adolescent girls and boys were taking soya badi occasionally and not at all in MIG group as compared to 15.6 %, 24.4 %, 12.0 % and 48.0 % weekly, monthly, occasionally and not at all in HIG group respectively. Table 4.3.12 reveals highly significant difference for soya milk, soybean dal and soya badi in the food items of adolescent girls and boys in MIG and HIG groups. Significant difference ( $P < 0.05$ ) was observed between the two groups in their percentages with a Chi-value of 33.6, 71.2 and 51.1 for soya milk, soybean dal and soya badi, respectively, which implies that frequency of consumption of soya products in both the groups, is different.

### **5.3.1(c) Nutrient intake**

It reveals highly significant difference ( $P < 0.05$ ) for intake of energy, carbohydrate, protein, fat, calcium and phosphorus of adolescent girls and boys with 1907.9 kcal, 234.1 g, 40.3 g, 33.4 g, 996.8 mg and 1110.7 mg in MIG group as compared to 2226.4 kcal, 252.2 g, 47.7 g, 44.9 g, 1061.3 mg and 1128.2 mg in HIG group, respectively, with a Z- value of 15.49, 9.15, 11.34, 19.93, 5.73 and 2.32 respectively. Whereas, non-significant difference ( $P > 0.05$ ) for magnesium level was observed between adolescent girls and boys in MIG and HIG.

### **5.3.2 Health status**

It reveals that 38% were having health problems and 62.0% were not having health problems in adolescent girls and boys in MIG whereas 16.8 % were having health problems and 83.2% were not having health problems in adolescent girls and boys in HIG. It was observed that 15.2 %, 2.8 %, 3.6 %, 2.8 % and 12.4 % of MIG adolescent girls and boys were suffering from BP, asthma, diabetes, heart disease and joint pain as compared to 3.2 %, 0.8 %,

1.2 %, 6.8 % in HIG adolescent girls and boys respectively. No one was suffering from kidney disease in both the group.

### **Hemoglobin Status:**

It reveals the descriptive statistic regarding hemoglobin status. The mean value obtained for both group's adolescent girls and boys in initial stage was 12.42 +/- 1.502, 12.56 +/- 1.18gm/dl and 12.29 +/- 1.668, 12.45 +/- 1.527 gm/dl respectively. And in final stage it was 12.41 +/- 1.348, 12.54 +/- 1.36 and 12.40 +/- 1.425, 12.56 +/- 1.36 gm/dl respectively.

**Alimentary tract ailments:** The obtained chi-value for alimentary tract problems in MIG adolescent girls and boys was 60.64, 33.15 at 6 and 4 df which is significant ( $P < 0.001$ , two tailed) and in HIG adolescents was 7.26, 11.07 at 6 df which is not significant ( $p > 0.05$  two tailed). In initial stage of both MIG and HIG it was found that 38.3%, 38.3%, 6.7%, 5%, 10%, 1.7%, adolescent girls and boys in MIG and 38.3%, 38.3%, 8.3%, 5%, 10%, in HIG and 36.7%, 28.3%, 3.3%, 10%, 0%, 21.7% adolescent girls and boys in MIG group and 38.3%, 30%, 8.3%, 1.7%, 13.3%, 8.3% adolescent girls and boys in HIG group had constipation, acidity, fissure, constipation + fissures, acidity + fissures, constipation + acidity and no problem resolved respectively. In final stage of both group was 5%, 26.7%, 3.3%, 1.7%, 3.3%, 60% and 10%, 13.3%, 1.7%, 1.7%, 73.3% and 23.3 %, 58.3%, 8.3%, 3.3%, 6.7%, 50% and 18.3%, 46.7%, 5%, 1.7%, 11.7%, 6.7%, 10% adolescent girls and boys had constipation, acidity, fissure, constipation + fissures, acidity + fissures, constipation + acidity and no problem resolved respectively.

## **Menstrual pattern of the adolescent girls of both groups**

It reveals the menstrual pattern of adolescent girls in MIG and HIG groups. In that 8.3% girls had regular menstrual pattern before observation which was 25% after observation. Similarly 26.7% had irregular menstrual pattern prior observation which was decreased to 10 % after observation in MIG group. Similarly in HIG group 14% girls had regular menstrual pattern in initial stage which was 13% in final observation. Also, 16.7% girls had irregular menstrual pattern in initial phase which was 18.3% in final stage.

### **5.3.3 Life style pattern**

**Physical Activity Pattern :** It reveals that 15.6 % of adolescent girls and boys in MIG were doing exercise and 84.4% were not doing exercise whereas 52.0 % of adolescent girls and boys in HIG were doing exercise and 48.0% were not doing exercise.

Whereas, 9.6 % and 6.0 % of adolescent girls and boys were exercising in the form of walk and yoga in MIG group as compared to 30.0 % and 22.0 % in HIG group respectively. It was observed that 1.2 % of MIG adolescent girls and boys were taking alcohol and 98.8% were not taking alcohol whereas 4.0% HIG adolescent girls and boys and girls were taking alcohol and 96.0% were not taking whereas, 100 % were not having the habit of smoking and tobacco chewing in the both groups. It was also found that 55.6% of MIG adolescent girls and boys were taking aerated drinks and 44.4% were not taking whereas 35.2% of HIG adolescent girls and boys were taking aerated drinks and 64.8% were not taking whereas, 44.0 % of MIG adolescent girls and boys were exposed to sunlight and 56% were not exposed to sunlight whereas 37.6 % of HIG adolescent girls and boys were exposed to sunlight and 62.4% were not exposed. It was also observed that 24.0 %, 16.0 % and 4.0 % of adolescent girls and boys were exposed to

sunlight from 6 a.m. to 9 a.m., 9 a.m. to 12 noon, 12 noon to 3 p.m. in MIG as compared to 25.2%, 12.0% in HIG adolescent girls and boys respectively.

Result reveals significant difference ( $P < 0.05$ ) was observed between the two groups in their percentages with a Chi-value of 29.6, 29.6, and 8.39 for exercise, type of exercise and consumption of aerated drinks respectively, which implies that frequency of occurrence of the adolescent girls and boys in both the groups is different. Non-significant difference ( $P > 0.05$ ) was observed for alcohol, smoking, tobacco chewing, exposure to sunlight and its duration in their life style pattern of adolescent girls and boys in the both groups.

**Food Pattern :** Food pattern reveals that 99.2 % and 0.8 % of adolescent girls and boys were vegetarian and non-vegetarian or ova-vegetarian in MIG groups compared to 45.2 % and 54.8 % HIG group respectively. Highly significant difference was observed between the two groups in their percentages with a Chi-value of 72.64 ( $P < 0.05$ ), which implies that frequency of occurrence of the vegetarian and non vegetarian or ova-vegetarian adolescent girls and boys in both the groups is different.

**Number of Meals :** Number of meals reveals that 28.8 %, 46.4 % and 24.8% of adolescent girls and boys of MIG were taking food in two meal pattern, three meal patterns and four meal pattern per day as compared to 2.4%, 44.4% and 53.2 % adolescent girls and boys in HIG respectively. Highly significant difference was observed between the two groups in their percentages with a Chi-value of 32.72 ( $P < 0.05$ ), which implies that frequency of number of meals in both the groups is different.

**Time Gap Between Meals :** Time gap between meals reveals that 57.6 %, 29.2 % and 13.2 % of adolescent girls and boys were taking food in 4hrs gap, 6hrs gap and 8 hrs gap in a day in MIG group as compared to 65.2 %, 34.8 %

and 0.0 % in HIG group respectively. Highly significant difference was observed between the two groups in their percentages with a chi-value of 14.16 ( $P < 0.05$ ), which implies that frequency of occurrence of the time gap between meals in both the groups is different.

**Food Preferences :** It reveals that 24.4 %, 26.4 % and 49.2 % of adolescent girls and boys were having food preference of spicy foods, fried foods and normal food in MIG groups as compared to 48.4 % preferred fried foods and 51.6 % preferred normal foods in HIG group respectively. Highly significant difference was observed between the two groups in their percentages with a Chi-value of 30.93 ( $P < 0.05$ ), which implies that frequency of occurrence of the food preferences in both the groups is different.

**Meal Eating Time :** It reveals that 47.2 % and 52.8 % of adolescent girls and boys were having certain fixed meal time and uncertain meal time of eating meals in MIG group as compared to 66.8% and 33.2% in HIG group. Highly significant difference was observed between the two groups in their percentages with a Chi-value of 4.84 ( $P < 0.05$ ), which implies that frequency of occurrence of meal time in both the groups is different.

## 5.4 Conclusion

On the basis of obtained results-

All four Hypothesis that "There shall be no significant difference in anthropometric measurements of adolescent girls and boys, in dietary intake of adolescent girls and boys, in various health problems of adolescent girls and boys and in hemoglobin level of adolescent girls and boys" is not accepted because there was a significant difference in nutritional status, health status and life style pattern of adolescent girls and boys of middle income group and high income group.



## **5.5 Limitations**

- The study was restricted to Indore city only.
- Also, only MIG and HIG group was considered.

## **5.6 Suggestion**

LIG group can also be studied and area can also be not restricted to Indore city only. Also, other parameters like impact of stress, media on lifestyle can also be further studied.