CHAPTER – V

SUMMARY AND CONCLUSION

5.1 Summary

5.2 Conclusion

5.3 Limitations

5.4 Suggestions
CHAPTER - V

SUMMARY AND CONCLUSION

For any research to be conducted scientifically, certain procedural steps are followed. First of all is the introductory part. Then come problems and hypotheses of the research followed by methodology and analysis and interpretation in that order. In the present research endeavor the above steps have already been discussed. Now this is time to sum up and conclude.

5.1 Summary:

Obesity is an emerging major problem throughout the world and its prevalence has largely increased over the last decade in both developed and developing countries. The 21st century epidemiological transition is manifesting in the form of shift towards increase in prevalence of non-communicable diseases (NCD’s) and decline in communicable diseases. There is established evidence that all NCD are associated with overweight and obesity. Obesity, or over nutrition, is a generalized and excessive accumulation of fat in subcutaneous tissue; it is relatively common during pubescence and adolescence in both sexes. The problem of
overweight and obesity is confined not only to adults but also being reported among the children and adolescents of developed as well as developing countries. Since, adolescence is a period of transition from childhood to adulthood; it assumes critical position in the life cycle of human being, characterized by an exceptionally rapid rate of growth.

At a time when various public health policies were targeted and implemented to prevent malnutrition and shunted growth among the pediatric population of developing countries, today, overweight and obesity has also become a major public health concern especially in the urban areas.

The overall proportion of overweight population in Indian towns and cities is large and increasing, ranging from 33 to 51%. The incidence of obesity in India is about 9% and is mainly concentrated in urban areas. Assuming that the upper middle class in India number around 100 million (half the number of middle class) it may be said that there are roughly 50 million overweight subjects belonging to the upper middle class in the country today according to a report by world health organization.
The present study describes the introduction, review of literature, methodology, results, discussion and conclusion which includes anthropometric status, socioeconomic status, dietary habits and physical activity of children of Bhilai township area of Chhattisgarh.

First chapter describes the meaning, classification, causes, symptoms, review of literature as well as rational of the study. Obesity and relationship to their determinants is mentioned.

Review of literature also incorporated in this chapter. There are number of investigation on obesity among school children. However the studies pertaining to the influence of dietary habits, physical activity and sedentary life activity upon children are not available in Bhilai township area. Therefore, an attempt has been made in the present investigation to assess the overweight and obesity of school children (13-17year) in the light of certain identifiable variables like, socioeconomic status, food habits and physical activity.

This chapter being the introductory one outlines the need and importance of the study with the following objectives:-

1. **General objective :-**
The general objective of the study was to assess the prevalence of overweight and obesity among school children in the age group of 13-17 years in Bhilai city.

2. *Specific objectives:*-

a) To assess the prevalence of obesity/overweight among children of different socioeconomic status groups.

b) To assess the relationship between BMI of students and physical activity and eating habits.

In other words an attempt has been made in the present Endeavour to see how far present determinants do play this role of influencing the obesity in children under the caption “To study the problem of obesity among school children (13-17 years) in relation to their socioeconomic status, eating habits and physical activity.”

Chapter 2 deals with problem and hypotheses of the present study keeping in view the purpose of the present study, the following problems have been set forth in an interrogative form, to seek their scientific solutions.
a) Is socioeconomic status responsible for the problem of obesity among school going children?

b) Is food habit capable of generalizing the obesity among school children?

c) Can physical activity be held responsible for obesity among school going children?

d) Is obesity among school going children susceptible to the joint action influence of socioeconomic status, eating habits and physical activity?

In above proposed problems, “obesity” is the only dependent variable and socioeconomic status, eating habits and physical activities are three independent variables. In this chapter keeping in view the specification of the dependent and independent variables the following hypotheses is introduced to test in the present study.

(a) DIFFERENTIAL HYPOTHESES:

(1) Using premises a₁ and a₂ as the base it has been hypothesized that the group of children who belong to high socioeconomic status (a₁) would have significantly higher
percentage of obesity than the group of children who belong to low socioeconomic status (a2).

(2) Using premises b1 and b2 it has been hypothesized that the group of children who consume excess food (b1) would have significantly higher percentage of obesity than the group of children who consume less food (b2).

(3) Taking premises c1 and c2 it has been hypothesized that the group of children who belongs to physically inactive (c1) would have significantly higher percentage of obesity than the group of children who belongs to physically active (c2).

**INTERACTIONAL HYPOTHESES:-**

**I) TWO FACTOR INTERACTION:-**

(1.) Using premises a1 a2 and b1 b2 it has been hypothesized that the group of children who belongs to high socio-economic status and who consume excess food (a1b1) would have significantly higher percentage of obesity than the group of children who belongs to low socioeconomic status and who consume less food (a2b2).

(2.) Using premises a1a2 and c1c2 it has been hypothesized that the group of children who belong to high socioeconomic status and physically inactive (a1c1) would have significantly higher
percentage of obesity than the group of children who belong to
low socioeconomic status and physically active (a_2c_2).

(3.) Using premises b_1b_2 and c_1c_2 it has been hypothesized that
the group of children who belong to excess food consumption
and physical inactive (b_1c_1) would have significantly higher
percentage of obesity than the group of children who belong to
less food consumption and physically active (b_2c_2).

(b)(II) THREE FACTOR INTERACTION:-

(1.) Using premises a_1a_2, b_1b_2 and c_1c_2 it has been hypothesized
that the group of children who belong to high socioeconomic
status, excess food consumption as well as physical inactive
(a_1b_1c_1) would be significantly higher percentage of obesity
than the group of those children who belong to low
socioeconomic status, less food consumption as well as
physically active (a_2b_2c_2).

Chapter 3 material and methods deal with selection of subjects
for collection of data. 500 school children between age group
of 13-17 years from Bhilai city were selected. The stratified
random sampling method was applied for collecting the data.
In anthropometry; height, weight, mid arm circumference and
triceps skin fold thickness was measured. Based on age and
sex specific BMI percentiles, the children were classified as obese (≥95\textsuperscript{th} percentile), overweight (≥85\textsuperscript{th} percentile), normal (>5\textsuperscript{th} to 85\textsuperscript{th} percentile) and underweight (≤5\textsuperscript{th} percentile). Two types of pre-tested and validated questionnaires were used; one to collect socioeconomic & demographic particulars and the other to cover information on dietary behaviors and lifestyle patterns including physical activity level, frequency of consumption of various foods was collected.

For the analysis of data of socioeconomic status, food habits and physical activity, eight groups were formed (2x2x2 factorial design). Since in a 2x2x2 factorial design each factor is to be varied at two levels, the Ss (sample selection) possessing these levels of low and high were selected. Percentage, mean, median, standard deviation, T test, ANOVA treatment and Newman-Kuels post ANOVA treatment were employed to analyze the data to obtain the relevant findings.

Chapter 4 deals with the results of the study and their presentation in the form of graph and tables. In addition elaborate discussion of the results on the basis of studies from
review of literature was done and comparison was studied. The findings of the present study are summarized below.

Among the 500 subjects, 23.44% of the male were overweight, and 8.02% were obese, 55.67% normal and 12.82% were underweight. While 24.22% of the female were overweight and 8.81% were obese, 59.91% normal and 7.04% were underweight. Waist hip ratio (WHR) provides index of relative accumulation of abdominal fat. Among 500 subjects 9.1% boys are overweight and nil obese where as in girls 41.04% are overweight and 21.04% obese. The prevalence rate of central obesity is higher in girls in comparison to boys.

Socio-economic data revealed different standard of living for the two socio economic groups: High socio-economic status houses were good and educational level of the parents in this group was good, economically these families were very sound. Housing condition of low income group was also good but not as much bigger as high socio economic group. 3.60% mothers were illiterate and most of the others were graduates or only high school level of education, which resulted in ignorance and superstitions, leading to poor
nutrition which affected the growth and development of children in the family. Due to sedentary activity a clear socioeconomic gradient in the prevalence of overweight and obesity was seen. Prevalence of overweight and obesity was significantly higher among high socioeconomic status group. The mean value of BMI of HSES is 24.71 similarly the mean value of BMI of LSES is 20.86. Hence it infers that obesity is more in HSES. These results show consistency with results from other Indian studies.

Physical activity constitutes one of the major components of a healthy lifestyle and general health promotion and protection. Physical activity encompasses a number of different types of activities in a variety of environments. Such activity is generally believed to hold a number of physiological and psychological benefits for the individuals. Activities were categorized into the type of sport or physical activity, mode of transport, watching TV, playing computer, time spent on each activity as well as intensity level of each activity was assessed. The results clearly indicate that regular physical activity was one of the important factors for lower prevalence of overweight and obesity. The prevalence
was also significantly lower among the children, who participated regularly in the outdoor activity and performing physical exercises. Result shows that the prevalence of obesity is 9.17% who participate in physical education (0-1 days/week); 7.18% who participate in physical education (2-3 days/week); while 8.47% obese who participate in physical education more than 4 days/week. In addition, the prevalence of obesity was higher among the children who were involved in sedentary activities such as spending >3hrs/day watching television.

The modern food environments provide a wide range of opportunity to consume food. This study showed significantly positive correlation between BMI and excessive food consumption. Food habits reveal that there is high prevalence of overweight/obesity (24.79%/9.34%) amongst subjects those who consume non vegetarian diet while 21.89% and 7.46% prevalence of overweight/obesity amongst those consume Vegetarian diet. In addition, the prevalence of obesity was higher among those children who consume fast food daily in comparison to those who consume rarely.
At last an attempt has been made to check the nature of the distribution of scores by computing the indices of skewness (SK) and Kurtosis (Ku) before giving any specific statistical treatment to the data. Since, in the 2x2x2 factorial design, each of the pqr treatment cells constitute ‘n’ dependent random sample drawn from the basic population, so homogeneity of the each independent cell is tested over obesity index i.e. BMI to find out the homogeneity of the distribution of scores in the present study. After a perusal of Skewness and Kurtosis of body mass index in school children from high and low socio economic status, high and low physical activity as well as excessive and non excesses food consumption, it can be said that by and large, the distribution of these variables is close to normal distribution. Therefore, the data are amenable to that of parametric test for verification of the hypotheses.

The total variation in a three-dimensional design is partitioned into 8 components namely, three main effects, three first order interactions, and one second order interaction (three factor interaction) and within treatment effect (error).
In the present study that all the differential hypotheses of the present study have been empirically verified and turned out to be significant at acceptable level of confidence.

All the two factor interactions, namely, socioeconomic status and food habits (AxB); socioeconomic status and physical activity (AxB) and food habits and physical activity (BxC) could not turn out to be significant at any acceptable level of confidence since all the three factors are potentially enough in generating significant variance upon obesity. When the two independent variables were put to interact with each other, because of their own potentially they nullified the interactional effects were found to be almost equal. Since, the interactional difference of each first order interaction was found to be equal; it indicates the failure of two factors interactional effect upon obesity.

Three way interactions, namely socioeconomic status, food habits and physical activity (AxBxC) has been found significant at acceptable level of confidence.
5.2 **CONCLUSION:**

The prevalence of overweight/obesity is a problem of affluent children going to various schools in Bhilai city. In the present study it is found that the magnitude of overweight (23.8%) and obesity (8.4%) is very high and alarming for both the sex. Central obesity is predominantly higher among girls (21.14%) as compared to boys. The prevalence is comparable to other national studies; again there is paucity of data. The study also suggested that under nutrition rates remain high in children. Therefore Special attention has to given for their overall nutrition.

The major correlates for the overweight/obesity among children were physical inactivity such as duration of watching television, playing video or computers games, high socioeconomic status of parents, consumption of junk foods such as burger, pizzas, cakes, pastries etc. the involvement in physical activity such as participation in outdoor
games/sports, regular physical education were associated with low prevalence of overweight and obesity.

5.3 **LIMITATIONS:-**

- The sample of the present study was drawn from the urban students of Chhattisgarh region.
- In the present investigation, fixed model was used in the manipulation of independent variables. Therefore, the results of this study can be generalized only for these specific levels of the independent variables.
5.4 SUGGESTIONS:
Healthy society is a wealthy society and children are the important components of the society. The government, health planner, administrator and individual parents are the equal partners in delivering this message and fulfilling the agenda for the society. They not only should promote good health but also make due provision to penalize the individuals/company who violate certain health norms. Based on our study it recommends few points for better health of the children as well as their parents of Bhilai city.

Two categories of suggestions are given on the strength of this piece of research. These are:-

• Suggestions for further research.
• Suggestion for social significance.

Suggestion for further research:-
• Conduct further studies on same age group in different areas of Chhattisgarh by selecting a large sample and making it more stratified.
A study to investigate whether the gap is due to the differences in children’s social and economical factors, such as diet and physical activity or sexual maturation is related to being fat.

In the present investigation, obesity in school going children has been studied in the light of only three variables namely, socioeconomic status, eating habits and physical activity. Further studies should be conducted to verify the effect of other important variables like genetic factors, gender etc.

Rural and urban children can also be compared with respect to their over nutritional status.

**Suggestion for social significance:-**

- Increase awareness about overweight and obesity through publications and symposia, for parents.
- Parents should be advised about obesity problems not only for their children but also for themselves.
- The governments should take proactive initiative to promote good health awareness program across the civil society.
- Official authority should arrange common clubs for different sport activities.
• Facilities at the schools and colleges should be made available to promote and regular monitoring weights of the school children, encourage aerobic physical exercises, participation in sports and games made mandatory in the school curriculum.

• Distribution of pamphlets by the health office at schools to children and advice them on their eating habits as much as possible.

• Give attention to what school canteen offers for children.