

**A CASE CONTROL STUDY ON FACTORS
CONTRIBUTING TO OBESITY/OVERWEIGHT
AMONG SCHOOL CHILDREN AT SELECTED
SCHOOLS, KUMBAKONAM, THANJAVUR
DISTRICT.**



BY

301317101

**A DISSERTATION SUBMITTED TO THE TAMILNADU
Dr.M.G.R. MEDICAL UNIVERSITY, CHENNAI,
IN PARTIAL FULFILMENT OF THE REQUIREMENT
FOR THE AWARD OF THE DEGREE OF
MASTER OF SCIENCE IN NURSING**

OCTOBER – 2015

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OCTOBER – 2015

DECLARATION

This is to certify that the dissertation entitled “A CASE CONTROL STUDY ON FACTORS CONTRIBUTING TO OBESITY/OVERWEIGHT AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS, KUMBAKONAM, THANJAVUR DISTRICT” is a bonafide work done by Mrs.ANITHA.S, Shivparvathi Mandradiar Institute of Health Sciences, College of Nursing in partial fulfillment of the university rules and regulations for award of Master of Science in Nursing under my guidance and supervision during the year of October 2015.

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DECLARATION

I hereby declare that the present dissertation titled, “A CASE CONTROL STUDY ON FACTORS CONTRIBUTING TO OBESITY/OVERWEIGHT AMONG SCHOOL CHILDREN AT SELECTED SCHOOLS, KUMBAKONAM, THANJAVUR DISTRICT” outcome of the original research work undertaken and carried out by me, under the guidance of Research guide Prof. Mrs. KAVIMANI, R.N, R.M, M.N, Principal, Shivparvathi Mandradiar Institute of Health Sciences, College of Nursing.

I hereby declare that the material of this has not found in anyway, the basis for the award of any degree/ diploma in this University or any other University.

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CERTIFIED THAT THIS IS THE BONAFIDE WORK OF

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LIST OF ABBREVIATIONS

SHORT FORMS	ABBREVIATION
SPMIHS	Shivparvathi Mandradiar Institute of Health Sciences
BMI	Body mass index
QI	Qutelet index
Fig	Figure
H ₁	Research hypothesis
MSC (N)	Master of science in nursing
N	Total number of samples
No	Number
P	Probability
Freq	Frequency
%	Percentage
χ^2	Chi-square test
SD	Standard deviation
SPSS	Statistical package for social studies

ABSTRACT

A Case Control study on factors contributing to obesity / overweight among school children at selected schools, Kumbakonam was done by 301317101 as a partial fulfillment of the requirement of the degree of Master of Science in Nursing at Shivparvathi Mandradiar Institute of Health Science, under the Tamil Nadu Dr. MGR Medical University, Chennai, - 2015.

OBJECTIVES

1. To determine the selected factors contributing to obesity among obese school children.
2. To find out the association between the selected factors contributing to obesity among cases and control groups.
3. To find out the association between the selected factors contributing obesity and demographic variables among cases and controls.

HYPOTHESIS

H₁: There is a significant association between the selected factors contributing to obesity among school children in cases and controls.

H₂: There is a significant association between the selected factors contributing to obesity and their demographic variables among school children in cases and controls.

The present study was aimed at determining the factors contributing to obesity among obese and non obese school children aged between 10-14 years.. The conceptual frame work was developed based upon three main issues, school age, background data of obese and normal school children. The conceptual frame work of the present study was based on web causation theory .

The data collection tool was validated by a pediatrician and four nursing experts. Reliability was established by test-retest method ($r=0.84$). Pilot study was done at Sri Madha Matriculation Higher secondary school. The main study was conducted in selected 2 schools in kumbakonam namely St. Antony's Matriculation Hr. Sec. School and Sri Kumaraguruparar Matriculation Hr. Sec. School. The data collected were edited, tabulated, analyzed and interpreted by SPSS version .16. The findings revealed that The overall level of factors contributing to obesity among school children revealed that majority 30(60%) children had moderate level of contribution, 17(34%) children had high level of contribution and only 3(6%) children had low level of contribution to obesity in the cases group. It was inferred that majority 47(94%) of school children in cases and 3(6%) in the control group had high risk of contributing to obesity and there was significant association with the cases group at the level of $p<0.001$ and about 245 times the factors contribute

to obesity (OR = 245.4). The risk for developing obesity in cases is 15.6 times that of the controls. In the demographic variable educational status of father had shown statistically significant association with level of factors contributing to obesity among school children at $p < 0.001$ level. The limitations and the recommendations were clearly spelt in the study.

CHAPTER – I

INTRODUCTION

"Children are the wealth of tomorrow,

Take care of them if you wish to

Have a strong India,

Ever ready to meet various challenges"

- Jawaharlal Nehru.

BACKGROUND OF THE STUDY

Good health is a prerequisite of human productivity and the developmental process. Health is essential to all round development of the country. Health is a state of well being of individual and community. school children face a determine in a society that values youthfulness and thinness but encourages a lifestyle of sedentary convenience such a lifestyle includes a decrease is physical activity, therefore energy expenditure, as well a fast foods

high in calories, making adolescents escapes obesity and ill health. Eating well, exercising regularly, encourage families to make healthful food choices is very important for school children.

Especially during the last few decades the prevalence rate of childhood over weight and obesity has reached epidemic proportions worldwide. Obese children face difficulties in their social life and run a substantially increased risk of becoming our future generation of obese, chronically diseased adolescents and adults.

Childhood obesity is a serious medical condition that affects the children and adolescents. It occurs when a child is well above the normal weight for his or her age and height. Childhood obesity is particularly troubling because the extra pounds often start children on the path to health problems that were once confined to adults such as diabetes, high blood pressure and high cholesterol. Childhood obesity can also leads to poor self esteem and depression.

If current trends continue without attention, today's children will become the first generation to live shorter life spans than their parents. Between 1980 and 2000, there was twofold increase in overweight / obese children (i. e 6-11 years old) and a threefold increase in overweight / obese adolescents. Being overweight in adolescence has been associated with increased risk of death among adult males and a variety of disease such as diabetes and cardio vascular disease in both adult male and female.

Children learn a lot from school, environment and more from experience. Whether a child is a member of our family or not, it is our responsibility help the child to grow in a healthy way. Today's children are tomorrow's citizen. Good health is everyone's right. As parents, teachers and much more as care givers, we have great privilege and responsibility in bringing up children with adequate knowledge and understanding. Understanding about obesity causes, treatment and prevention is one of the best things that you can do for yourself. Over the course of last several decades, America has suffered from an increase in obesity due to variety of factor. With more people eating fast food regularly and not getting enough exercise, it's no wonder that obesity has become a real epidemic.

A bad diet is not only thing that cause obesity. If you eat food that contains things like fructose corny syrup regularly you are putting your body at risk for obesity. In addition if you don't get enough exercise on regular basis, obesity may be in your future. There are some diseases like hypothyroidism that can impact your weight.

One of the best strategies to reduce childhood obesity is to improve the diet and exercise habits of entire family. Treating and prevent childhood obesity helps to protect the health of your child now and in the future.

Obesity in general is defined as the presence of excess adipose tissue in the body to such a degree that it may lead to health hazard (Prentice et al. 2001; Rossner 2002). Obesity is not a single disorder but a heterogeneous group of conditions with multiple causes. Body weight is determined by an interaction between genetic, environmental, psychological factors acting through the physiological mediators of energy intake and expenditure. Even in India, malnutrition has attracted the focus of health workers, as childhood obesity was rarely observed. But over the fast few years, childhood obesity is increasingly being observed with the changing lifestyle of the family with increased purchasing power, increasing hours of inactivity, due to addiction television, videogames and computer which have replaced outdoor games and other social activities (singh and sharma 2010).

The World Health Organization has acknowledged that obesity is sweeping the world and is a major public health problem of particular concern is the increasing incidence of child obesity. Obesity can be seen as the first wave of a defined cluster of non-communicable disease called "New world syndrome" creating an enormous socio-economic and public health burden in poor countries. The World Health Organization has described obesity as one of today's most neglected public health problems following the increase in adult obesity, the proportion of children and adolescents who are overweight and obese have also been increasing. Being overweight or obese during childhood is a health concern in itself, but can also lead to physical and mental health in later life such as heart disease, diabetes, osteoarthritis, back pain, low self esteem and depression.

Many people today, especially young people, are now living a hectic and stressful lifestyle. Because they live this kind of life, they tend to eat comfort food to get rid of stress. Stress can make the person feel hungry even though just ate. Because of this, they will tend to eat more portions over the past two decades. Stress has increased in an alarming rate studies also found that along with increase of stress, obesity also followed closely.

The term obesity is derived from the Latin word "Obesus" which means having "eaten until fat". It is usually defined as an excess of body fat and is often seen as an imbalance between energy intake and expenditure. Obesity is a state in which there is generalized accumulation of excess fat in the body leading to the body weight more than 20% of the required weight where as overweight is a state in which there is generalized accumulation of excess fat in the body leading to the body weight of more than 10% of required weight.

Obesity is the consequence of a long term imbalance between energy intake and energy expenditure determined by food intake, physical activity and influenced by biological, societal and environmental factors. Obesity may have several short term consequences like social discrimination, lower Quality of life, Increase cardiovascular risk factors and disease, like asthma and the long term consequences are persistent of obesity, increased morbidity, and higher prevalence of cardiovascular risk factors in adulthood and also cause important economic burden. Obesity should therefore be prevented as early as

possible. For establishing effective intervention, it is important to identify major determinants in the early stage of life.

Childhood obesity is a global phenomena affecting all socio-economic groups, irrespective of age, sex or ethnicity. Aetiopathogenesis of childhood obesity is multifactorial and includes genetic, neuroendocrine, metabolic, psychological, environmental and socio-cultural factors. The treatment of overweight and obesity requires a multidisciplinary, multi phase approach, which include dietary management, physical activity enhancement, restriction of sedentary behaviour, pharmacotherapy and bariatric surgery.

Schools should facilitate changes increase physical activity and parent teacher association can help to educate parents as to the dangers of childhood obesity. Introduction of nutrition and physical education in the school curriculum with there activities should become compulsory subject with marks to be added to later grades. Parents are the role model. If parents will do exercise and eat healthy, there child will follow them. Government should regulate fast food advertisements aimed at children and insists on food labeling. Department can influence the food industry to reduce the level of fat and sugar in foods targeted at children.

NEED FOR THE STUDY

Obesity is among the easiest medical condition to recognize, but most difficult to treat. The health consequences of obesity will have considerable effect on future burden on health cost and services.

The prevalence of childhood obesity is increasing rapidly worldwide. It is associated with several risk factors for later heart disease and other chronic illness including hyper lipidaemia, hyper insulinaemia, hypertension and early atherosclerosis. These risk factors may operate through the association between child and adult obesity, but they may also act independently.

Worldwide it is estimated that more than 22 million children under five year old are obese or overweight, and more than 17 million of them are in developing countries. Each of the children are at increased risk of developing type 2 diabetes, say the World Health Organization and International Diabetes Federation.

Childhood obesity is one of the serious public health challenges of the 21 century. The problem is global and steadily sweeping the developing

nations. The prevalence has increased at an alarming rate. Globally in 2020 the number of overweight, under the age of five is estimated to be over 42 million. Close to 35 million of these are living in developing nations. Overweight as well as obesity are largely preventable .Therefore Prevention of childhood obesity needs high priority.

According to **WHO**, it is estimated that 300 million obese people worldwide and the data from 79 developing countries and a number of industrialized countries suggest that about 22 million under five children are overweight. There is also evidence that this problem is increasing in the USA, the percentage of overweight children aged 5-14 years has doubled in the last 20 years from 15 % to 32%.

In India studies shown that there is 50% of the increase in prevalence of childhood obesity in two years with the highest incidence in boys.

A study done with school children in urban Chennai found that the number of overweight boys to be 17.8% and girls 15.8% .In affluent cities of India, the prevalence of obesity reaches the levels of industrialized countries, with values increasing with socioeconomic class.

Obesity rates are generally highest in communities with high levels of poverty and low levels of income. Low income communities are often underserved to grocery stores and frequently have fewer places that are safe to play. A higher prevalence of obesity seen in urban areas in developing countries is associated with the change from rural to urban life style causing decreased levels of physical activity and increased intake of energy dense diet.

Many countries in South East Asia including India are going through an economic and nutrition transition. The nutrition transition is associated with a change in dietary habits, decreasing physical activity and rising prevalence of obesity. Obesity in children and adolescents is gradually becoming a major health problem in many developing countries, including India.

Edna sweenie,et.al (2013), Conducted a cross sectional study to assess the prevalence of overweight and obese in Cuenca, Ecuador. Representative sample of n=74 school children aged 6-9 years with overweight and obesity were detected by using the International obesity task force cutoffs according to body mass index, poverty, physical activity and eating habits were assessed with validated questionnaire. The prevalence of obesity and overweight was 1.5 to 2 fold higher in 9 year old than in 6 year old children. Multivariate models demonstrated that higher BMI were significantly related to low physical activity and non poverty. Eating breakfast and eating more than 3 meals/day were not related to prevalence of overweight and obesity. The high prevalence of overweight and obesity in school children was associated with insufficient physical activity and non poverty. promoting physical activity and fruit

consumption in school snacks should be explored as interventional measure to prevent overweight and obesity in Cuenca school children.

Baby (2010), study results showed that there was a significant association between prevalence of obesity(overweight and educational status of mother $X^2 = 7.28$ (2), family income $X^2 = 14.35$ (2), family history of obesity $X^2 = 26.1$ (2), area of residence $X^2 = 8.2$ (2) and age of onset of weaning $X^2 = 11.78$ (2) at 0.05 level of significance.

Bhatia et. al (2007), study shows that over all incidence of obesity in the study group was 3.4% with no significant difference between boys and girls. A significantly greater number of boys (15%) as compared to girls(10.2%)were overweight more than half of the adolescents in the study group, 57.2% of boys and 52.8% of girls, spent 4 hours / day viewing TV or sitting at the computer out of the total obese children significant percentage 82.3% were non vegetarian where as only 8.8% of vegetarians and non vegetarians were obese. The prevalence of obesity and overweight was 3.4% and 12.7% respectively in affluent adolescent from Ludhiana.

In 2007 An interventional study was conducted among 6000 Indian school children at Hyderabad, Andhra Pradesh. This study finding revealed the degree of obesity (>30% body fat) in all subjects (30.19%), in affluent schools it was 50.4% and non-affluent schools it was 92%.

Mozaffari et al.(2007), studies about the factors contributing to obesity in comparison of obese and non-obese school children and conducted that factors associated with obesity and age, more hours of TV watching, low physical activity and low level maternal education. The tendency towards a sedentary life style such as lack of physical activity and TV watching was evident in the study. The importance of education, especially maternal education, as a risk factor for childhood obesity.

In worldwide controversy is going on regarding childhood obesity. Obesity is reportedly increasing in India. The investigator had been seen many overweight and obese children among all the income group peoples and wonder about the causes of obesity among them.so the investigator impressed on the topic and interested to do this research in Kumbakonam as it was my native place.

STATEMENT OF THE PROBLEM

A Case control study on selected factors contributing to obesity/overweight among school children at selected schools, Kumbakonam, Thanjavur District.

OBJECTIVES

- To determine the selected factors contributing to overweight/obesity among school children.
- To find out the association between the selected factors contributing to overweight/obesity among cases and control groups.
- To find out the association between the selected factors contributing to overweight/obesity and demographic variables among cases and controls.

HYPOTHESIS

H₁: There is a significant association between the selected factors contributing to overweight /obesity among school children in cases and controls.

H₂: There is a significant association between the selected factors contributing to overweight/ obesity and their demographic variables among school children in cases and controls.

OPERATIONAL DEFINITIONS

OVERWEIGHT/OBESITY

The term overweight/obesity refers to when the BMI exceeds 25 and BMI between 18 to 24 was considered as normal. Body Mass Index was calculated by using Quetelet's index.

QUETELET'S INDEX

$$\text{QI} = \frac{\text{Weight in kg}}{\text{Height (m}^2\text{)}}$$

INTERPRETATION:

BMI	RESULTS
less than 18.5	Underweight
18.5-24.9	Healthy
25-29.9	Overweight
more than 30	Obese

SCHOOL CHILDREN

It refers to the school children at the age group of 10 to 14 years, who were studying in selected schools at Kumbakonam. For the purpose of the study children were classified into Obese and Normal based on BMI.

SELECTED FACTORS CONTRIBUTING TO OBESITY

In the present study factors contributing to obesity refers to the elements which cause the effect of becoming obese in children. In the present study factors contributing to obesity includes Nutritional factors, Genetic predisposition, Medical factors, Physical activity, Leisure activity and Psychological factors.

SELECTED BACKGROUND FACTORS

It refers those issues even which one thought influence the obesity such as age, sex, birth order, type of family, residential area, religion, education of father, education of mother, employment status of father, employment status of mother and economic status of the family.

CASES

In this study cases refers to the school children who were with obese.

CONTROLS

In this study control refers to school children who were without obese.

ASSUMPTION

- i) Children cooperate with the investigator
- ii) Children provide information about their true risk factors of obesity.

DELIMITATIONS

- Children who are present on the day of data collection
- Children studying in V to IX th Std or chosen for the study in the age group of 10 to 14 years only.
- Children selected by non random method only.
- Measures only factors of obesity
- Obese children at a selected schools in kumbakonam

CONCEPTUAL FRAMEWORK

The conceptual frame work is on organized phenomena which deals with the concepts that are assembled by virtue of their relevance to a common theme. Conceptual schemes use concepts as building blocks. Conceptual frame work can serve to guide research which will further support theory development. The conceptual models attempt to represent reality with its minimal use of words.

The conceptual framework is based on **Web of Causation Theory**. The web of causation considers all the predisposing factors of any type and their complex inter relationship with each other. The basic tenet of epidemiology is to study the clusters of causes and combination of effects and how they are related to each other.

Mac Mohan suggested that the web of causation model for disease where the disease agent is often not known but in the outcome of interaction of multiple factors. The web of causation was reviewed and named as multi-factorial causation theory. The community is in search of multi-factor of disease or the web causation.

SCHOOL CHILDREN

In this study school children refers to male and female children between 10-14 years of age studying in selected schools at Kumbakonam and who were available during data collection.

The following characteristics of school children were measured such as Age, Sex, Order of the child, Type of family, Residential area, Religion, Education of father, Education of mother, employment status of mother, employment status of father and Economic status of the family.

SELECTED CONTRIBUTING FACTORS

It referred as causative or influencing issues related to obesity. The presence or absence was measured. The factors considered were,

1. **Genetic predisposition** refers hereditary that the transmission of characters from parent to offspring. It measures someone was obese within the family. In this study it meant history of obesity among parents and siblings

2. **Physical Activity** involving bodily contact or activity. Such as playing indoor games, outdoor games and regular time duration of playing.

3. **Leisure Activity** refers spend more time for relaxation such as viewing television, playing video games for more than 2 hours / day.

4. **Nutritional Factors** refers to the process of taking in and absorbing nutrient .In this study it referred to often taking fast food, milk products like creams, condensed milk, sugary items, deep fried foods and non vegetarian.

5. **Medical factors** refers to any illness of child because of that illness the child took medication which cause overweight in the children.

6. **Psychological factors** refers on stress can make the person to feel hungry even though just ate. Because of this reason, they will tend to eat more portions. In this study it referred to satisfaction level and stress.

OBESITY

When the children were exposed to the determinants they are likely to be obese and vice versa. Obesity is a condition when the body mass index exceeds

25. BMI between 18-24 were considered to be normal. The children were screened for height and weight then they were classified as obese or non obese children based on BMI.

QUETELET INDEX:

$$QI = \frac{\text{Weight (Kg)}}{\text{Height (m}^2\text{)}}$$

INTERPRETATION OF RESULTS

BMI less than 18.5	Underweight
BMI 18.5-24.9	Healthy
BMI 25-29.9	Overweight
BMI more than 30	Obese

**AGE, SEX, RELIGION, BIRTH ORDER, TYPE OF FAMILY RESIDENTIAL AREA,
EDUCATIONAL STATUS OF PARENTS, EMPLOYMENT STATUS OF PARENTS, ECONOMIC STATUS**

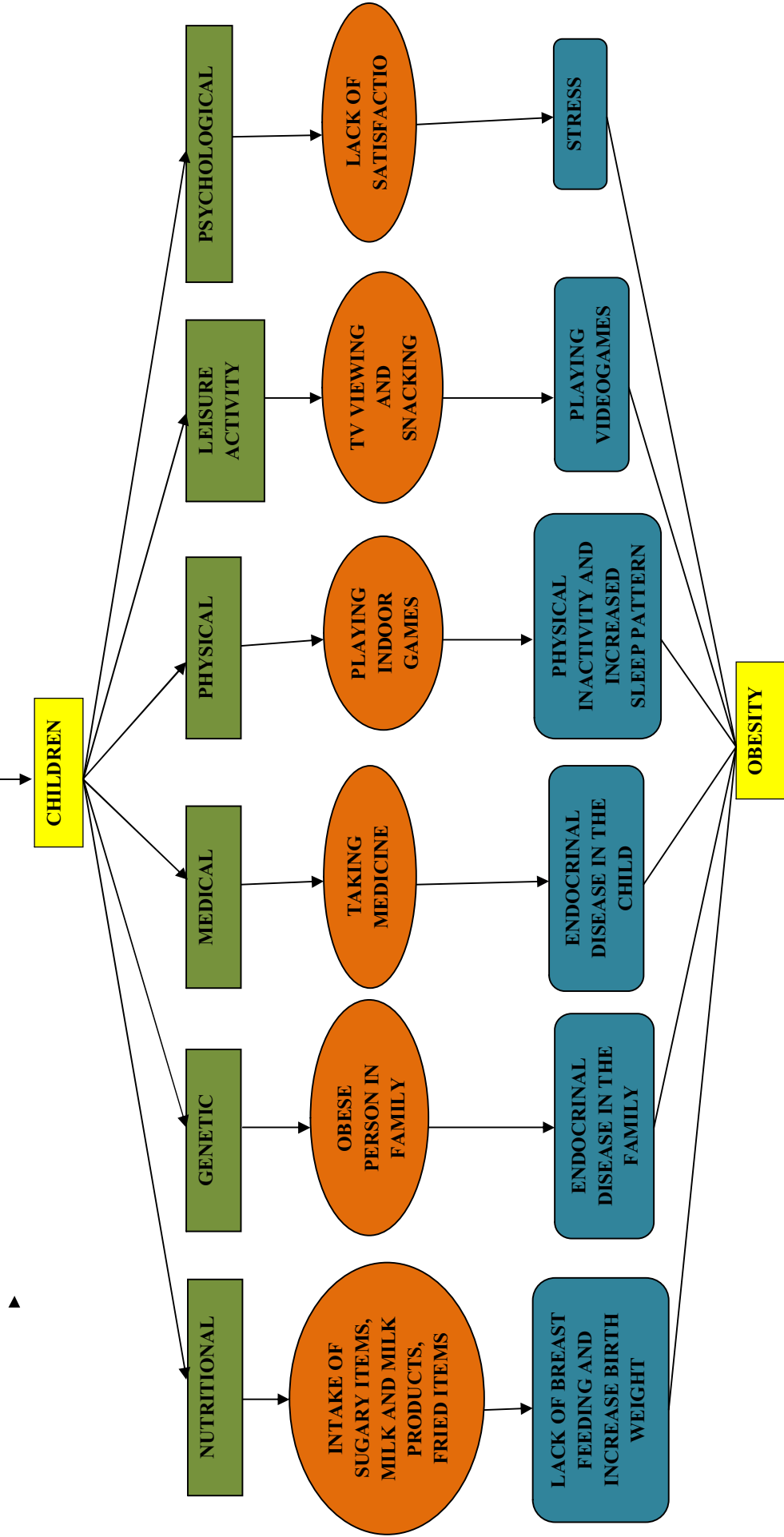


Figure:1 Conceptual Frame Work based on Web of Causation theory

CHAPTER-II

REVIEW OF LITERATURE

Polit (2012) states that literature review is a critical summary of research on a topic of interest, often prepared to put a research problem in context. Review of relevant literature serves as an essential background for any research. Critical examination of previous studies will help researcher to formulate and delimit the problem, to minimize the possibility of research, to suggest theoretical framework for the study, to learn from the reported experience of others about its feasibility to critically evaluate the various methods used by others and choose the most appropriate design for the investigation.

Research and literature were received and organized under the following headings.

- Studies related to prevalence of overweight/ obesity
- Studies related on factors related to overweight/obesity.

1) Studies related to prevalence of overweight/ obesity

Lianping (2014) conducted a cross sectional study to collect the routine health screening data for primary school children in Wannan area, China. Overweight and obesity status were determined using the International Obesity Task Force standard (IOTF) BMI cutoff points. A total of 67956 subjects (36664 male and 31292 female) aged 5-14 years were recruited in this study. Depending on the references used (IOTF), the overall prevalence of overweight, including obesity of the subjects was 17.85% , the prevalence of overweight, including obesity was 22.9% in male subjects and 11.9% in female subjects, respectively. The overall prevalence of obesity was 3.7%, the prevalence of obesity was 5.2 % in male subjects and 1.8% in female subjects, respectively. An interesting observation made was that the prevalence of overweight was high in male subjects.

Ram (2012) conducted a prevalence study was carried out in 2009 in which 4130 children aged 6–12, were selected from eight Arab sector schools representing the Nazareth Municipality. Height, weight and BMI measurements were obtained and presented by age, mean age, size, weight, gender and percentile. Appropriate epidemiological and statistical methods used for comparison. The obesity and overweight prevalence rates in Arab children by age ranges from 0% to 2.6% and 0% to 11.2%, respectively. Comparison with international and Jewish data revealed differences in almost all age groups but higher rates in Arabs, especially boys.

Andrew Rundle (2012) conducted cross-sectional analyses of data from 624,204 public school children (kindergarten through 12th grade) who took part in the 2007–2008 New York City Fitness Program. The overall prevalence of obesity was 20.3%, and the prevalence of overweight was 17.6%. In multivariate models, the odds of being obese as compared with normal weight were higher for boys versus girls (odds ratio (OR) = 1.39, 95% confidence interval (CI): 1.36, 1.42), for black (OR = 1.11, 95% CI: 1.07, 1.15) and Hispanic (OR = 1.48, 95% CI: 1.43, 1.53) children as compared with white children, for children receiving reduced-price (OR = 1.17, 95% CI: 1.13, 1.21) or free (OR = 1.12, 95% CI: 1.09, 1.15) school lunches as compared with those paying full price, and for US-born students (OR = 1.54, 95% CI: 1.50, 1.58) as compared with foreign-born students. After adjustment for individual-level factors, obesity was associated with the percentage of students who were US-born (across interquartile range (75th percentile vs. 25th), OR = 1.10, 95% CI: 1.07, 1.14) and the percentage of students who received free or reduced-price lunches (across interquartile range, OR = 1.13, 95% CI: 1.10, 1.18).

Ancy Paul (2012) conducted a descriptive study to assess the prevalence of obesity among school children in selected schools at Calicut. The design chosen was descriptive research design. Simple random sampling techniques were used. A total number of 294 students studying in 5th to 10th standard were included in the study. A semi structured questionnaire and anthropometric measurement were used to collect data. Obesity in children measured by Body Mass Index(BMI). Descriptive and inferential statistics was used and the result showed that 11.9% of samples were obese and 23.47%. Samples were overweight.

Taheri (2012) conducted a cross sectional study on 1541 elementary school children, i.e. 851 girls and 690 boys, selected from Birjand elementary schools through multiplecluster sampling in 2012. In order to determine overweight and obesity the percentile of CDC was used, so that, 859 5th percentile were taken as overweight and >95th percentile was defined as obese with respect to age and sex. For determination of central obesity, waist circumference and the ≥ 90 th percentile were used regarding age and sex. The obtained data was analyzed by means of SPSS software (V: 15) using t and chisquare statistical tests at the 0.05 significant level. Out of the studied children, 9.6% (11% of boys and 8.3% of girls) were overweight and 9.2% of children (i.e. 10.9% of boys and 7.9% of girls) were obese. About 15.7% of children (i.e. 20.3% of boys and 12% of girls) had central obesity.

Lee PY (2012) conducted a cross-sectional study involving 311 children aged 11-13 years from primary schools in Kuching, Sarawak. Self-esteem and health related quality of life (HRQOL) was measured using the Lawrence Self-esteem Questionnaire (LAWSEQ) questionnaire and the Paediatric Quality of Life Inventory (PedsQL), respectively. Body weight and height were taken and body mass index for age calculated. The prevalence of overweight and obesity among the children were 18.2% and 15.2% respectively. Parent-proxy and child self-reported PedsQL scores were higher for normal weight children compared to thin and obese children, but lower than overweight children. At the subscale level, only parent-proxy PedsQL scores in psychosocial health and emotional component were significantly different between overweight and obese children ($p=0.019$, $p=0.02$). The Self-esteem score was significantly correlated with parent and child PedsQL scores. Although obesity was associated with lower HRQOL among children, both parent and child PedsQL scores among the overweight group were higher than that for the normal weight

group. Overweight and obesity did affect quality of life and self-esteem of children in this study, particularly in the areas of psychosocial and emotional health.

Mahejan PB (2011) childhood obesity among school children in Union Territory conducted a study to assess the prevalence of obesity and overweight among school children in Puducherry with an objective to identify any variation as per age, gender, place of residence and type of school. Secondary data analysis of school based cross sectional study in all the four regions of Puducherry. Children between 6 and 12 were sampled with multistage random sampling with population proportionate to size from 30 clusters. Anthropometric data BMI was analyzed using CDC growth charts. Data was analyzed using SPSS, BMI (CDC) Calculator, CI Calculator and OR calculation. The prevalence of overweight among children was 4.41% and prevalence of obesity was 2.12 % mahe region had the higher prevalence of overweight and obesity female children from private schools and Urban areas were at high risk of being overweight and obese. Childhood obesity is a problem in Puducherry and requires timely intervention for its control.

Xiaoqing Yi (2011) conducted study was to examine the prevalence and the risk factors associated with obesity among school-aged children in Xi'an city. The body mass index of 6,740 children aged 7–18 years was compare with the Working Group on Obesity in China cut-off value to estimate the prevalence of obesity. A case–control study of obese and non-obese children was carried out to study risk factors for obesity. A standardized questionnaire was used to collect information on possible risk factors causing obesity.

Univariate analysis was performed first to compare the distribution of risk factors between cases and controls. Conditional logistic regression analysis was used to assess independent risk factors of obesity. The results showed that the overall prevalence of obesity among school-aged children was 4.11% (4.63% for males and 3.57% for females). A total of 516 subjects (258 pairs of cases and controls) were included in the final analysis. High maternal education and a longer sleeping time were shown to be protective factors against obesity (odds ratio [OR] 0.148, 95% confidence interval [CI] 0.074–0.296 and OR 0.472, 95% CI 0.342–0.652, respectively). Whereas family history of diabetes (OR 5.498, 95% CI 2.606–11.600), parental overweight (OR 3.720, 95% CI 2.068–6.689), and watching television, playing video games, and using computers (OR 1.564, 95% CI 1.133–2.159) were associated with a higher obesity risk.

Geraldinmoreno (2011) conducted a study to assess the Prevalence and Prediction of Overweight and Obesity Among Elementary School Students. Height and weight measurements were collected on 2317 elementary school children in 1 school district. BMI was calculated using the Centers for Disease Control and Prevention's NutStat program. Child characteristics included gender, age, eligibility for free and reduced lunch (proxy for socioeconomic status [SES]), school, grade, and ethnicity/race. Children were grouped into 2 BMI categories, <85th percentile or ≥85th percentile (overweight/obesity). Logistic regression was used to examine potential predictors of overweight/obesity. Prevalence of ≥85th percentile was 30.9%, 34.4%, 35.3%, 36.4%, 37.1%, and 44.5% for K-5, respectively. Prevalence of ≥85th percentile was highest among Hispanic children. Ethnicity was the strongest predictor of inclusion in the ≥85th percentile category followed by grade and free and reduced lunch eligibility.

Amanuel Kidane Andegiorgish (2011) the prevalence and determinants of overweight and obesity among school children and adolescents (7–18 years), a cross-sectional study was conducted in Tianjin City of Northeast China. The prevalence of overweight and obesity was found to be 12.5% and 15.7%, respectively. Logistic regression analysis (overweight compared with normal weight) showed that, overweight in children was significantly associated with male gender, parental obesity, parental educational level, mother's history of gestational diabetes, high birth weight, less hours of physical activity per day, urban residence, motorized transportation, and eating food not prepared at home. After adjusting for parental obesity, the odds ratio of overweight children was increased by urban residence (rural as a reference, 2.68, 2.16–3.32), positive gestational diabetes (2.76, 1.37–4.50), and fast-food/restaurant food service (2.03, 1.34–3.07). Children who walked to school and participated in outdoor activities were 54% and 63% less likely to be overweight respectively.

Tulay Kurzlu ayyilding (2010) conducted a study on factors affecting prevalence of obesity among primary school students in the age group of 6-15 years in Turkey. Cross sectional study on 868 students in Turkey done from march to April in 2010. Data was collected using demographic questionnaire forms and weight length measurements. The median age was 10.3 ± 2.1 ; 47.6% of children were female and 52.4% of them were male. About 70.2% of the students consumed fast food. It was identified that 67.1% of students in age group and 32.9% in 11-15 years age group were obese. The obesity prevalence of children with one or 2 siblings was higher than the one with more than 2 siblings ($p=0.001$)

2. Studies related to factors of overweight/ obesity

Jigna Samir (2014) conducted a study to assess the prevalence of overweight and obesity and to determine their associated factors among school children aged 10-12 years in Mehsana district in India. A single centric epidemiological study was conducted among 200 school children selected at random in Mehsana district school in the period from July 2011 to September 2011. Overweight and obesity were assessed using height, weight, waist circumference and hip circumference of each student in the class. A predesigned and pretested questionnaire was used to interview the students to elicit the information on family characteristics such as number of family members, education and occupation of parents, their usual physical activity, habit of watching TV and time spent with computer and for sleeping as well as the pattern of dietary intake. Significant difference in body mass index for boys ($P < 0.0010$) as well as girls ($P < 0.0123$) was observed in all the three underweight, overweight and obese groups when compared to the normal group. Risk of overweight and obesity was significantly higher in children who spent time in television viewing and/or with computer.

Dorothy Jaganathan (2014) conducted a study on dietary pattern of obese children in Erode district of TamilNadu. A total of 500 children both male and female in the age of 5-10 years from Erode districts were for the study. Height and weight for all children were taken and BMI was calculated. School children were selected by purposive sampling and well framed questionnaire were given to elicit the details. The results exposed that the fat that the percentage of obese children is on rise in TamilNadu, like in other state

of India and globally. The study also showed that the socio-economic factor like income of the family, family system, residential area and birth order of the child are positively associated with prevalence of obesity. In short the study showed that life style pattern like family history, minimum physical activity, snacking during screen time, dining outside very frequently and sleep pattern of child contribute to childhood obesity. Dietary habits like frequent consumption of deep fat fried fleshy foods, fast food consumption and self drink consumption plays a vital role in increasing the number of obese children.

Michiyo Yamekarva (2013) conducted a study to examine the association of breastfeeding with overweight and obesity among school children in Japan. A nationwide longitudinal survey on going from 2001-2009 all over Japan. A total of 43,367 singleton children who were born after 37 gestational weeks and had information on their feeding during infancy. In multinomial logistic regression models with adjustment for children's factors and maternal factors exclusive breast feeding at 6-7 months of age was associated with decreased risk of overweight and obesity compared with formula feeding. The adjusted Odds ratios were 0.85 and 0.55 for overweight and obesity respectively. Breastfeeding is associated with decreased risk of overweight and obesity among school children in Japan.

Edna Sweenie (2013) conducted a cross sectional study in Cuenca, Ecuador in sample n=74 school children aged 6 - 9 years overweight and obesity were detected using the International obesity task force cut off according to Body Mass Index. Poverty, physical activity and eating habits were assessed with validated questionnaires. The prevalence of overweight and

obesity were 26% and 10.6% respectively. There were no difference between sexes but the prevalence of overweight and obesity was 1.5 to 2 fold higher in 9 year old than in 6 year old children. Multivariate models demonstrated that higher BMI were significantly related to low physical activity and non poverty. Eating breakfast and eating more than 3 meal /day were not related to prevalence of overweight and obesity. The high prevalence of overweight and obesity in school children was associated with insufficient physical activity and non poverty promoting physical activity and fruit consumption in school snacks should be explored as intervention measures to prevent overweight and obesity in cuenca school children.

Premalata Prakash (2013) conducted a non experimental study on obesity among children in Punjab to assess the parental role and identify the deficit area among children leading to obesity and to prepare the guidelines for the parents regarding promotion of health of their children. The study population consisted of parents of the children aged 9-17 years studying in the 6 to 10+2 of C.F.C Public school at Ludhiana Punjab .Samples were selected by purposive sampling method. Data were collected by structured questionnaire and checklist. Results showed that mass media exposure was strong prevalent factor leading to obesity among children and there was a correlation between prevalent factors and the parental role. Thus study concluded that it was very essential that school health nurses should conduct periodic awareness programmes in schools for children and parents.

Julice (2012) conducted a comparative study to assess the eating behavior among obese and non obese children in selected schools at Ernakulum, Kerala. 200 school children (100 obese and 100 non obese) were selected by purposive non proportionate quota sampling method. Body Mass index was calculated by quetlet Index. Children in the age group of 11-14 years were included in the study. A semi structured questionnaire was used to assess the eating behavior of the children. The reliability of the tool was $r=0.91$. The study findings showed that the obtained t value was significantly different in eating behavior among obese and non obese school children. Thus it concluded that parents and children should be made aware through health education .Mass media about healthy eating behavior and encouraging in modifying the eating behavior.

Shehab A Alenazi (2012) conducted a cross sectional study to assess the prevalence of overweight and obesity among 523 male adolescent students who were randomly selected from different schools in Arar, a city formed of about 240000 inhabitants and lying in the northern borders region of KSA. This study was conducted over a two month period (March and April 2012). Determine the prevalence of overweight and obesity among male adolescents in Arar city, Saudi Arabia (KSA). They estimated the future risk of developing cardiovascular diseases in this age-group. Questionnaire and anthropometric measurements were used for data collection. A total of 523 male students with a mean age of 16.7 ± 0.9 years participated in the current study in which 30.4% of those students were obese and 17.2% were overweight. A direct relationship was found between body weight and different dietary and lifestyle habits. The risk of CVD based on waist height ratio (WHtR) was found in 33.5% of participants (30.4% obese, 2.1% overweight and 1% normal weight); moreover, the risk of CVD was strongly related to different dietary and lifestyle habits.

Sasikala Javdhi (2012) conducted a study among the 9-14 age group in Kerala at the Achutha Menon centre for health sciences to find out the relationship of child obesity to parental and sibling obesity. It revealed the obesity in children was found to be clearly linked to parental and sibling obesity the father of 10.9% children and the mother of 13% children were obese. Obesity among children in private unaided schools was 7.2% while in Government schools it was 4.9%.

Pavaneh Reza Sottari (2012) conducted case control study to assess the obesity related factors in school children in Rasht, Iran case control study was performed in 8 primary schools of Rasht. A cluster sampling method was used to select 320 students including 80 in case (BMI \geq 85th percentile for age and gender) and 240 in control group (BMI = 5th to 85th percentile for age and gender). Data were collected by a scale, tape meter and a form which consisted of obesity related factors and analyzed by chi-square, Mann-whitney and step wise multivariate regression tests in SPSS 19. Findings showed that the mean and standard deviation of birth weight in case and control groups were 3671 ± 5.64 and 190 ± 5.46 , respectively ($P=0.000$) 82.5% of case and 92.9% of control group had exclusive breast feeding for 4-6 months ($P=0.024$). Also multivariate regression analysis indicated birth weight, age, exclusive breast feeding and frequency of meals have significant effects on body mass index.

Theena Xavier (2011) a cross sectional study was conducted 200 children of age group b/w 10-15 years in Ahmadabad to find out the relationship between TV viewing and obesity. The mean time spent by an obese child watching TV was 3.98 questionnaires were given to collect the data

out of 125 boys 26.4% were found to be obese and the rest 73.6% were within normal limits out of 75 girls 18.6% were found to be obese and the rest 81.3% were found to be within normal limits. There is a definite association between childhood obesity and TV watching habits of children.

Parshin Yousefi (2011) investigated the relationship between breast feeding and obesity in childhood, systematic review and meta-analysis of published epidemiological studies comparing early feeding mode and adjusting for potential confounding factors. Electronic data base were searched and reference lists of relevant articles were checked. Educations of pooled estimates were conducted in fixed and random effects models. Heterogeneity was tested by Q-test. Publication bias was assessed from found plots and by a linear regression method. Odds ratio for obesity in childhood defined as body mass index percentile. Nine studies with more than 69000 participants met with inclusion criteria. The meta-analysis showed that breast feeding reduced the risk of obesity in childhood significantly. The adjusted odds ratio was 0.78,95% CI (0.71, 0.85) in the fixed model. The assumption of homogeneity of results of the included studies could not be refuted, stratified analysis showed no differences regarding difference study types, age group, definition of breast feeding or obesity and number of confounding factors adjusted for. A dose dependent effect of breast feeding duration on the prevalence of obesity was reported in four studies. Funnel plot regression gave no indication of publication bias. Breastfeeding seems to have small but consistent protective effect against obesity in children.

Warden and warden (2011) identified 15 chromosomal loci linked to weight, body fat and other obesity related traits in humans. They state that seven genes have been identified as causing obesity in human and that in most cases, obesity results from interactions between multiple genes, not the action of single gene. In exceptional case, mutations of the leptin gene and its receptors or mutation of melanocortin receptor have been described. These obesity genes encode proteins that are strongly conserved as part of the loop regulating food intake. They all involve the leptin axis and one of its hypothalamic targets. Thus successful leptin protein replacement in a leptin deficient child may have potential reduction of obesity.

Rajaat Vohre (2011) has done a study on overweight and obesity among school going children of Lucknow city. A list of government and private school was procured from sihiksha adtikari 3 public and 3 private schools were selected by simple random sampling students of 5th to 12th grades available at the time of study were included pretested questionnaire was used to elicit information. Height and Weight were measured and BMI was calculated. Children with BMI 25 and above were considered overweight and children with BMI more than 30 were considered obese. As a result overweight and obesity was found to be 4.17% and 0.73% respectively. They together constitute 4.9% for overweight obesity. The study revealed that the importance of father's education and occupation, class, children playing outdoor games for less than 30 minutes and those consuming fast foods.

James (2009) conducted a clustered randomized controlled trial to investigate a education based intervention to discourage the consumption of carbonated beverages and encourage fruit intake and consumption of water in United Kingdom. 6 Years children were randomized by class (N=19; 14 control and 15 intervention) in six schools. Children were aged between 7-11 years and had a mean body mass index BMI of 17.6 in the control classes and 17.4 in the intervention classes. At baseline, the prevalence of obesity was boys: controls (n=155) 10% and intervention (n=169) 11% girls: controls (n=164)12% and intervention (n=156) 10%. The intervention evaluated the effect of reducing carbonated drink consumption in children. The serious promoted drinking water or diluted fruit juice, tasting fruit and the children were encouraged to access the project website. Control program was not described on assessment at 12 months, changes in BMI Z scores were not significantly different between intervention and control classes mean Z score 0.7 versus mean Z score 0.8 respectively. The prevalence of obesity at follow up was boys controls 12% and intervention 9%. There was a reduction is self reported soft drink consumption over 3 days in increase of 0.2 glasses in control group.

Kamatchi(2009) conducted a comparative study on obesity among obese and non obese school children in selected schools, Trichy in march 2009. A sample size was 150 school children. The subjects were 11 to 13 years of age and the total 150 school children 30 obese male, 30 Obese female and 45 non obese male and 45 non obese female by the purposive quota sampling. Semi structured questionnaire were used to collect information regarding determinants of obesity. The result showed that genetic predisposition, physical activity, leisure activity, nutritional factors, psychological factors made a significant difference in obese and non obese

school children ($p < 0.005$). There was no association between determinants of obesity with selected background factors of obese and non obese school children ($p > 0.05$).

M. Shasidhar kotian (2007) conducted a cross sectional study on prevalence and determinates of overweight and obesity among adolescent school children of south Karnataka, India over a period of 4 months from January to April 2007. A sample size was 900. They adopted multistage stratified random sampling procedure. The subjects were 12 to 15 years of age in the city of Mangalore, Karnataka. In the total 900 adolescents in the age group of 12 to 15 years 461 subjects were males. The overall prevalence of overweight among adolescents was 9.9% and obesity was 4.8%. The prevalence of overweight was 9.3% among boys and 10.5% among girls 5.2% and 4.3% were obese. A multivariate logistic regression revealed that the risk of overweight was two times higher among diet adolescents of high SES, 21 times higher among those participating < 2 hours /week in any type of physical activity - 7.3 times higher among those who reported watching TV and playing games on computers for 4 hours/day, and 5.6 times higher among those ate chocolates daily in addition to normal.

CHAPTER -III

METHODOLOGY

Methodology is a significant part of any research which enables the researcher to organize the procedure of collecting reliable data for the problem under study or investigation. This chapter deals with the description of methodology and the various steps adopted to collect and organize data for the study.

According to **Polit and Beck (2004)** research methods are the techniques used by researcher to structure a study to gather and analyze information relevant to research question.

According to **Dempsey (1999)** research methodology defines the way pertinent information is gathered in order to answer the search question to analyze the research problems.

The methodology section includes the research approach, research design, variables, settings, population, sample, sample size, sampling

technique, sampling criteria, development of the tool, description of the tool, validity, reliability, pilot study, data collection procedure, plan for analysis and ethical consideration.

RESEARCH APPROACH

According to **Suresh K. Sharma (2011)** the research approach involves the description of the plan to investigate the phenomenon under study in a quantitative, qualitative or a combination of the two methods. Furthermore, it helps to decide whether the presence or absence as well as manipulation and control over variables. Also, it helps to identify the presence or absence of and comparison between groups.

When the association between two factors is strong and consistent a case control study can be used. If the association is biological in nature and specific in the available time, a retrospective study can be done.

Hence the research approach chosen for the present study was case and control approach. Case control study is a design that moves in a reverse

direction from known outcome to the exposure factors which are thought to be the cause. Two groups were studied: the case group is one who had the selected factors of obese among school children. The control group is one in which the school children were free from selected factors of obesity. The selected factors of obese were assessed retrospectively.

RESEARCH DESIGN

According to **Nancy Burns**, the research design is a blue print for conducting a study that maximizes control over factors that could interfere with the validity of the findings.

According to the **Polit (2012)** stated that an investigators overall plan for obtaining answers to the research designs can be considered as the backbone of study. Research design helps the investigator in the selection of the subject identification of variables, their manipulation and controls, observation to be made and types of statistical analysis to interpret the data.

After considering the factors related to the selected problem which was retrospective in nature, the investigator has selected the “case control design” as suitable for this study. There are four basic steps in conducting a case controls study, selection of cases and controls, matching, measurements of exposure and analysis and interpretation.

In the present study, school children with exposure to selected factors of obesity is considered as a case group and without exposure to factors of obesity as a control group. The investigator is intended to study the level of exposure to the factors of obesity in both groups.

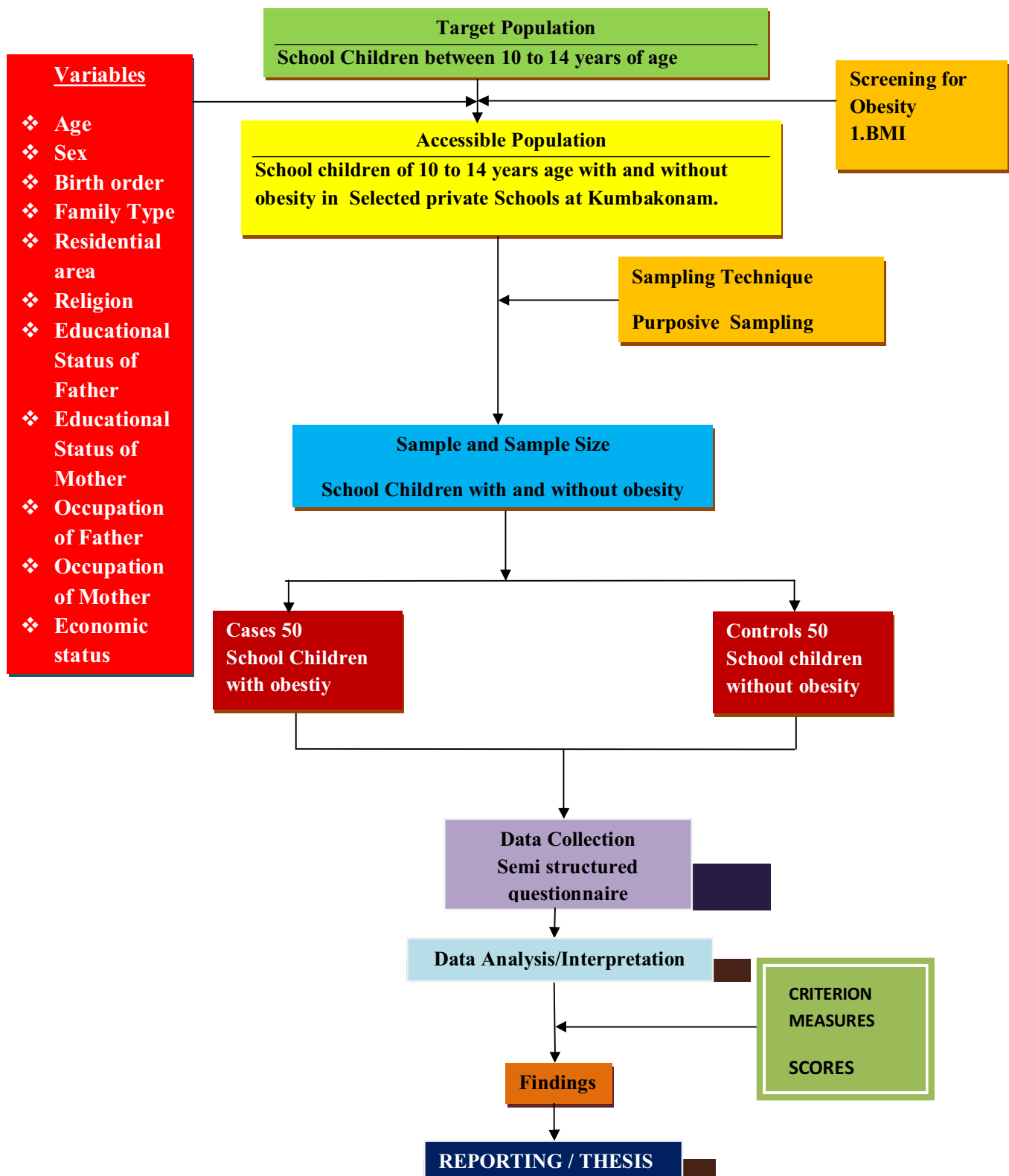


Figure : 2 Schematic Representation of Research Design

VARIABLES

Variables are attributes that vary or differ among the persons or objects being studied. The variables measured in this study were as follows.

Dependent Variable

Dependent variable in a mathematical equation or relationship between two or more variables, a variable whose value depends on those of others; it represents a response, behavior, or outcome that the researcher wishes to predict or explain.

The dependent variables in this study were contributing factors of overweight/Obesity among school children in selected schools, Kumbakonam.

Attribute Variable

Attribute variable is a mathematical process used to analyze the characteristics of a given population of subjects.

The attribute variable in this study were selected factors including demographic as Age, Sex, Order of the child, Type of family, Residential area, religion, Education of father and mother, Employment status of father and mother, Economic status of family. The other selected factors were Nutritional, Genetic predisposition, Medical, Physical, Leisure activity and Psychological.

SETTING

According to **Polit and Beck (2012)** setting is the more specific places where data collection occurs. The selection of setting was done on the basis of feasibility of conducting the study, availability of subject and cooperation of authority.

The setting for the study was selected school at Kumbakonam. Two schools namely St.Antony's Matriculation Higher Secondary School and Sri.Kumaraguruparar Matriculation Higher Secondary School.

POPULATION

According to **Suresh K. Sharma (2011)** population is the entire set of individuals or objects having some common characteristics selected for a research study. There are two types of population target population and accessible population.

TARGET POPULATION

The target populations in the total group of subjects about whom the investigator is interested and on whom study findings are generalized.

ACCESSIBLE POPULATION

The accessible population is the population of subject available for a particular study from whom the study samples are selected. The accessible populations selected for this study were obese and normal school children in selected private schools at Kumbakonam.

SAMPLE SIZE

Polit and Beck (2012) states that a sample consists of the subset of the population selected to participate in the research study. Sample size is the number of people participating in the study. The sample size is determined based on the type of the study, variable being studied, the statistical significance required, and availability of samples and feasibility of conducting the study.

SAMPLE

The sample for the present study includes 100 school children inclusive of 30 obese male and 20 obese female and 23 normal male and 27 normal female. The sample size was arbitrarily decided to 50 cases and 50 controls. Large samples give better results.

Age	Cases		Control	
	Female	Male	Female	Male
10 to 11 yrs	5	6	6	5
11 to 12 yrs	5	8	7	6
12 to 13 yrs	5	8	7	6
13 to14 yrs	5	8	7	6

SAMPLING TECHNIQUE

According to **Talbot (1995)** “sampling” is the process of selection of portion of population to obtain the data about problems which represents entire population.

In present study, purposive sampling technique was used to select cases and controls for study.

After screening the school children, the cases and controls were allotted based on BMI

SAMPLING CRITERIA

Inclusion Criteria

- School children who had body mass index more than 25 (Obese).
- In the age of 10-14 years.
- From both sex.
- Who are available in selected schools at Kumbakonam.
- Children who are willing to participate in the study

Exclusion Criteria

- School children suffering from psychiatric illness.
- Who had suffered from any illness for the past one month.
- Children who had attended any teaching programme on obesity and obesity related factors.

DEVELOPMENT OF THE TOOL

The tool is a written device that a researcher assess to collect the data. The tool was developed by using the information obtained from literature review. The questionnaire was formulated on the basis of selected background factors and also contributing factors of overweight/obesity. Simplicity of language, organization and clarity of items are few factors kept in mind while preparing the tool. The tool was drafted in English.

DESCRIPTION OF THE TOOL

The tool used for the research study was a semi structured questionnaire. Questionnaire was administered to the children and the information was obtained by the investigator.

The tool consisted of two sections:

Section 1: Background data of school children.

Section 2: Selected contributing factors of obesity.

Section 1: Selected Background factors of school children

It consisted of 11 questions seeking information on the selected background data of obese and normal school children. The item included Age, Sex, Order of the child, Type of family, Residential area, Religion, Education of father and mother, Employment status of father and mother and Economic status of family.

Section 2: Selected contributing Factors of obesity.

This section sought information regarding factors of obesity.

It consisted of six factors namely Nutritional, Genetic predisposition, Medical, Physical, Leisure activity and Psychological factors of school children. There were 30 items in this section. The items were distributed as follows,

1. Nutritional factor - 13 (1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13)
2. Genetic Predisposition factor-3(14, 15, 16)
3. Medical factors-2(17, 18)
4. Physical factors-4(19, 20, 21, 22)
5. Leisure activity - 4(23, 24, 25, 26)
6. Psychological Factor-4(27, 28, 29, 30)

VALIDITY OF THE TOOL

Validity of the tool refers to the degree to which the test or other measuring device is truly measuring what it is intended to measure. The important aspect in assessing an instrument is content validity, criteria validity and construction validity.

The Content validity of the data collection tool and intervention tool was ascertained by opinion of experts in the field it is validated by five experts including one medical and four nursing experts for its content. The modifications were made in the tool to identify the contributing factors of obesity among school children as per the suggestion of the experts and the data collection tool was finalized. Validity for the English language was done by experts. Instrumental validity for weighing machine and stadiometer was done.

RELIABILITY OF THE TOOL

Polit and Hungler define reliability as the degree of consistency or accuracy with which an instrument measures the attribute it is designed to measure. The test-retest method was used to establish reliability for Tamil and English questionnaire. Among 10 school children the questionnaire were administered. The coefficient of correlation for Tamil questionnaire was $r=0.84$ and English questionnaire was $r=0.81$ high. Therefore semi structured questionnaire was found to be reliable.

PILOT STUDY

According to **Polit and Beck**, Pilot study is a small scale version or a trial to run done in preparation of a major study. The function of the study is to obtain information; improve the project of its feasibility. Researcher can refine this study by doing it on a small group of people who have similar characteristics of the intended respondents; it helps the researcher to foresee the strength, weaknesses and problems that may be encountered during the actual study.

The pilot study was conducted among 5 obese and 5 normal children who fulfilled the sample criteria of sample selection and after obtained an written consent from each children's parent, the semi structured questionnaire was administered to child and data was collected. Feasibility of conducting the study was ascertained with regard to men, money and material. Data had to be collected in three faces namely, introductory phase, action phase and termination phase.

DATA COLLECTION PROCEDURE

Talbot (1995) defined that data collection is gathering of information from sampling unit. The study was planned for four weeks in the month of June 2015. Prior permission from concerned authority was sought and obtained. The objectives and purpose of the study were explained and confidentiality was assured.

PHASE I: SCREENING PHASE

The study was conducted in 2 private schools in Kumbakonam namely St. Antony's Matriculation Higher Secondary School and Sri Kumarakuruparar Matriculation Higher Secondary School.

Data were collected for four weeks in the month of June 2015 prior permission from authority was obtained.

Screening for obesity was done for school children. Weight was checked by weighing machine and height was checked by Stature measure. Body mass index was calculated based on height and weight. Then children were selected for the study on quota basis. To assess each child, it took 10 to 15 minutes.

PHASE II: DATA COLLECTION PHASE

After identification of children as obese or normal the purpose and procedure of data collection was explained to the children. Self administered questionnaire was distributed to the children the information were collected from the children regarding background data and factors related to obesity. This phase lasted for a period of 15 to 20 minutes per school child.

PHASE III: TERMINATION PHASE

The tool was verified for completion. The children were assured about the confidentiality of the data. This phase lasted for a period of 5 minutes per school age child..

PLAN FOR DATA ANALYSIS

Data analysis is the systematic organization and synthesis of research data and testing of the research hypothesis using the data.

The data collected from the subjects were compiled and analyzed using descriptive and inferential statistics.

The following plan of analysis was developed

- Data on demographic variables among cases and control.
- Data on association between the selected contributing factors among cases and control group.
- Data on association between the selected factors and demographic variables among cases and controls group on the logistic outcome.

ETHICAL CONSIDERATION

For the present study, the investigator took in to consideration the ethical issues. The study of the objectives was approved by research committee. Prior permission was obtained from selected schools principals at Kumbakonam. Explanation about the study was given to the participants. Willingness of the participants was assured. Informed consent was obtained from the parents and children. Participants were assured on confidentiality and anonymity. No physical or psychological have produced during the study. Subject has freedom to leave the study at any point.

CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

This chapter deals with the analysis and interpretation of the data collected from 100 school children (50 Cases and 50 Controls) at selected schools, Kumbakonam, Thanjavur District. The data collected was organized, tabulated and analyzed according to the objectives. The findings based on the descriptive and inferential statistical analysis are presented under the following sections.

ORGANIZATION OF DATA

Section A: Data on demographic variables of the school children in cases and controls.

Section B: Data on level of factors contributing to obesity among school children in cases and controls.

Section C: Data on Comparison of factors contributing to obesity among school children between cases and controls.

Section D: Association of level of factors contributing to obesity among school children with their selected demographic variables in the cases and controls.

SECTION A: DATA ON DEMOGRAPHIC VARIABLES OF THE SCHOOL CHILDREN IN CASES AND CONTROLS.

Table 1: Frequency and percentage distribution of demographic variables of school children in the cases and controls.

N = 100 (50+50)

Demographic Variables	Cases (50)		Controls (50)	
	No.	%	No.	%
Age in years				
10 - 11 yrs	6	12.0	12	24.0
11 - 12 yrs	17	34.0	11	22.0
12 - 13 yrs	9	18.0	12	24.0
13 - 14 yrs	18	36.0	15	30.0
Sex of the child				
Male	30	60.0	23	46.0
Female	20	40.0	27	54.0
Birth order of the child				
First child	25	50.0	19	38.0
Second child	23	46.0	25	50.0
Third child and above	2	4.0	6	12.0
Type of family				
Nuclear	26	52.0	30	60.0
Joint	22	44.0	15	30.0

Demographic Variables	Cases (50)		Controls (50)	
	No.	%	No.	%
Extended	2	4.0	5	10.0
Residential area				
Urban	19	38.0	20	40.0
Rural	31	62.0	30	60.0
Religion				
Hindu	31	62.0	40	80.0
Muslim	8	16.0	7	14.0
Christian	9	18.0	3	6.0
Others	2	4.0	0	0.0
Educational status of father				
Illiterate	10	20.0	3	6.0
Primary schooling	15	30.0	17	34.0
Higher secondary school	21	42.0	20	40.0
Degree and above	4	8.0	10	20.0
Educational status of mother				
Illiterate	7	14.0	3	6.0
Primary schooling	16	32.0	16	32.0
Higher secondary school	20	40.0	25	50.0
Degree and above	7	14.0	6	12.0
Employment status of father				
Employed	16	32.0	24	48.0
Unemployed	8	16.0	6	12.0
Self employed	21	42.0	13	26.0
Coolie	5	10.0	7	14.0
Employment status of mother				
Employed	12	24.0	11	22.0
Unemployed	30	60.0	27	54.0

Demographic Variables	Cases (50)		Controls (50)	
	No.	%	No.	%
Self employed	4	8.0	10	20.0
Coolie	4	8.0	2	4.0
Economic status				
Low income	8	16.0	11	22.0
Middle income	30	60.0	32	64.0
Upper income	12	24.0	7	14.0

Table 1 shows the frequency and percentage distribution of demographic variables of school children in the cases and controls.

Regarding **age**, among cases majority 18(36%) were in 13 to 14 years of age, 17(34%) were in 11 to 12 years of age, 9(18%) were in 12 to 13 years of age and the least 6(12%) were 10 to 11 years of age, and in controls majority 15(30%) were in 13 to 14 years of age, 12(24%) were in 10 to 11 years of age and in 12 to 13 years of age, least 11(22%) were in 11 to 12 years of age.

Regarding **sex**, among cases majority 30(60%) were in males, 20(40%) were females, and in controls majority 27(54%) were in females, 23(46%) were in males.

Regarding **birth order of the child**, among cases majority 25(50%) were first child, 23(46%) were second child and the least 2(4%) were third child, and in control majority 25(50%) were second child, 19(38%) were first child and the least 6(12%) were third child.

Regarding **type of family**, among cases majority 26(52%) were in nuclear family, 22(44%) were in joint family and the least 2(4%) were in extended family, and in controls majority 30(60%) were in nuclear family, 15(30%) were in joint family and the least 5(10%) were in extended family.

Regarding **residential area**, among cases majority 31(62%) were in rural areas and least 19(38%) were in urban areas, and in controls majority 30(60%) were in rural areas and the least 20(40%) were in urban areas.

Regarding **religion**, among cases majority 31(62%) were Hindus, 9(18%) were Christians, 8(16%) were Muslim and the least 2(4%) were others and in controls majority 40(80%) were Hindus, 7(14%) were Muslims and the least 3(6%) were Christians.

Regarding **education status of father**, among cases majority 21(42%) were higher secondary education, 15(30%) were in primary education, 10(20%) were illiterate and least 4(8%) were in degree and above and in controls majority 20(40%) were in higher secondary education, 34(17%) were in primary education, 10 (20%) were in degree and above and least 3 (6%) were illiterate.

Regarding **education status of mother**, among cases majority 20(40%) were in higher secondary education, 16(32%) were in primary education, 7(14%) were illiterate and least 7(14%) were in degree and above and in controls majority 25(50%) were in higher secondary education, 32(16%) were in primary education, 6(12%) were in degree and above and least 6 (12%) were illiterate.

Regarding **employment status of father**, among cases majority 21(42%) were self employed, 16(32%) were employed, 8(16%) were unemployed and least 5(10%) were coolie and in controls majority 24(48%) were employed, 13(26%) were self employed, 7(14%) were coolie and least 6 (12%) were unemployed.

Regarding **employment status of mother**, among cases majority 30(60%) were unemployed, 12(24%) were employed and least 4(8%) were self employed and coolie least 5(10%) were coolie and in controls majority 27(54%) were unemployed, 11(22%) were employed, 20(10%) were self employed and least(4%) were coolie.

Regarding **economic status**, among cases majority, 30(60%) were in middle income, 12(24%) were in upper income and least 8(16%) were in low income divorced or separated, and in control majority 32(64%) were in middle income, 11(22%) were in low income and least 7(14%) were in upper income.

It was inferred that among cases majority 18(36%) were in the age group of 13 – 14 yrs, 30(60%) were male, 25(50%) were first born child, 26(52%) belonged to nuclear family, 31(62%) were from rural area, 31(62%) were Hindus, 21(42%) of fathers were educated up to higher secondary school, 20(40%) of mothers were educated up to higher secondary school, 21(42%) of fathers were self employed, 30(60%) of mothers were unemployed and 30(60%) belonged to middle income group.

Whereas in the controls, majority 15(30%) were in the age group of 13 – 14 yrs, 27(54%) were female, 25(50%) were second born child, 30(60%) belonged to nuclear family, 30(60%) were from rural area, 40(80%) were Hindus, 20(40%) of fathers were educated up to higher secondary school, 25(50%) of mothers were educated up to higher secondary school, 24(48%) of fathers were employed, 27(54%) of mothers were unemployed and 32(64%) belonged to middle income group. Hence both the groups were comparable.

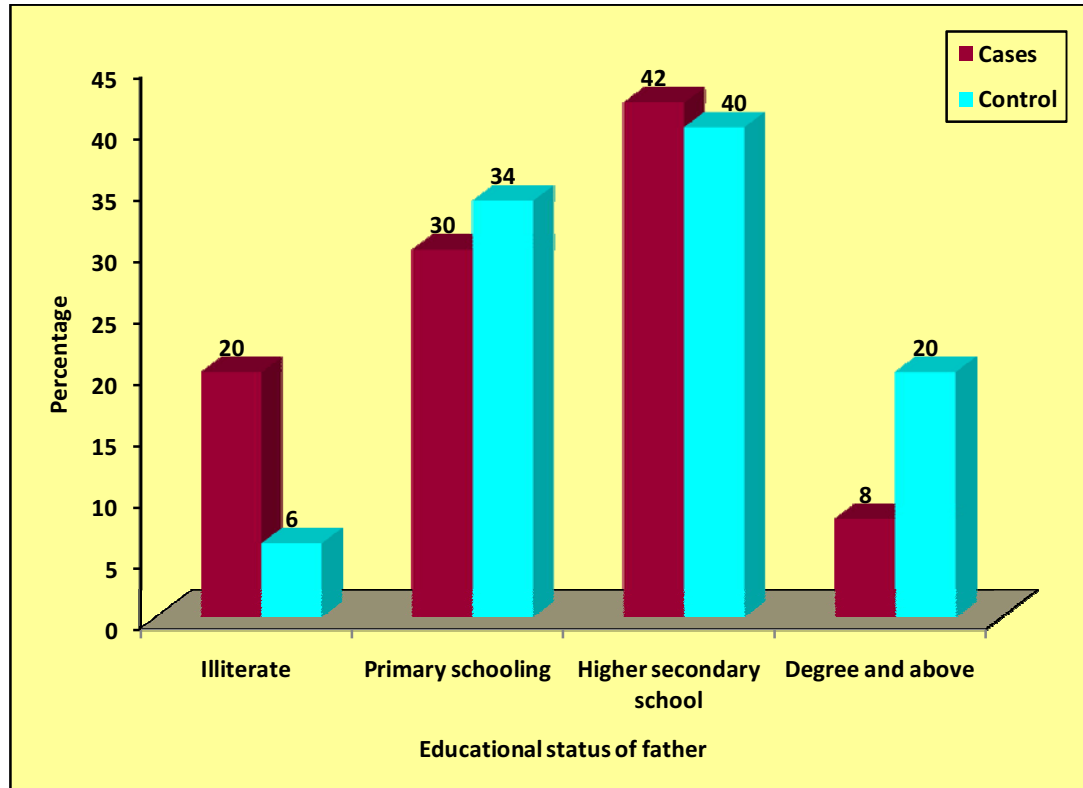


Fig.3 Percentage distribution of educational status of father among school children

It was inferred that education status of father, among cases majority 21(42%) were higher secondary education, 15(30%) were in primary education, 10(20%) were illiterate and least 4(8%) were in degree and above and in controls majority 20(40%) were in higher secondary education, 34(17%) were in primary education, 10 (20%) were in degree and above and least 3 (6%) were illiterate.

SECTION B: DATA ON LEVEL OF FACTORS CONTRIBUTING TO OBESITY AMONG SCHOOL CHILDREN IN CASES AND CONTROLS.

Table 2: Data on level of factors contributing to obesity among school children in the cases.

N = 50

Factors	Low (≤50%)		Moderate (51 – 75%)		High (>75%)	
	No.	%	No.	%	No.	%
Nutritional Factors	1	2.0	31	62.0	18	36.0
Genetic Factors	7	14.0	33	66.0	10	20.0
Medical Factors	6	12.0	0	0	44	88.0
Physical Factors	18	36.0	20	40.0	12	24.0
Leisure Activity	6	12.0	20	40.0	24	48.0
Psychological Factors	32	64.0	7	14.0	11	22.0
Overall	3	6.0	30	60.0	17	34.0

Table 2: Shows the level of factors contributing to obesity among school children in the cases.

Regarding nutritional factors, majority 31(62%) had moderate level of contribution to obesity, 18(36%) had high level of contribution and only one(2%) had low level of contribution to obesity among school children.

Regarding genetic factors, majority 33(66%) had moderate level of contribution to obesity, 10(20%) had high level of contribution and 7(14%) had low level of contribution to obesity among school children.

Regarding medical factors, majority 44(88%) had high level of contribution to obesity and 6(12%) had low level of contribution to obesity among school children.

Regarding physical factors, majority 20(40%) had moderate level of contribution, 18(36%) had low level of contribution to obesity and 12(24%) had high level of contribution to obesity among school children.

Regarding leisure activity revealed that, majority 24(48%) had high level of contribution, 20(40%) had medium level of contribution and 6(12%) had low level of contribution to obesity.

Regarding psychological factor revealed that, majority 32(64%) had low level of contribution, 11(22%) had high level of contribution and 7(14%) had medium level of contribution to obesity among school children.

It was inferred that the factors contributing to obesity among school children revealed that, majority 30(60%) had moderate level of contribution of all the factors, 17(34%) had high level of contribution of all the factors and only 3(6%) had low level of contribution of factors to obesity in the cases.

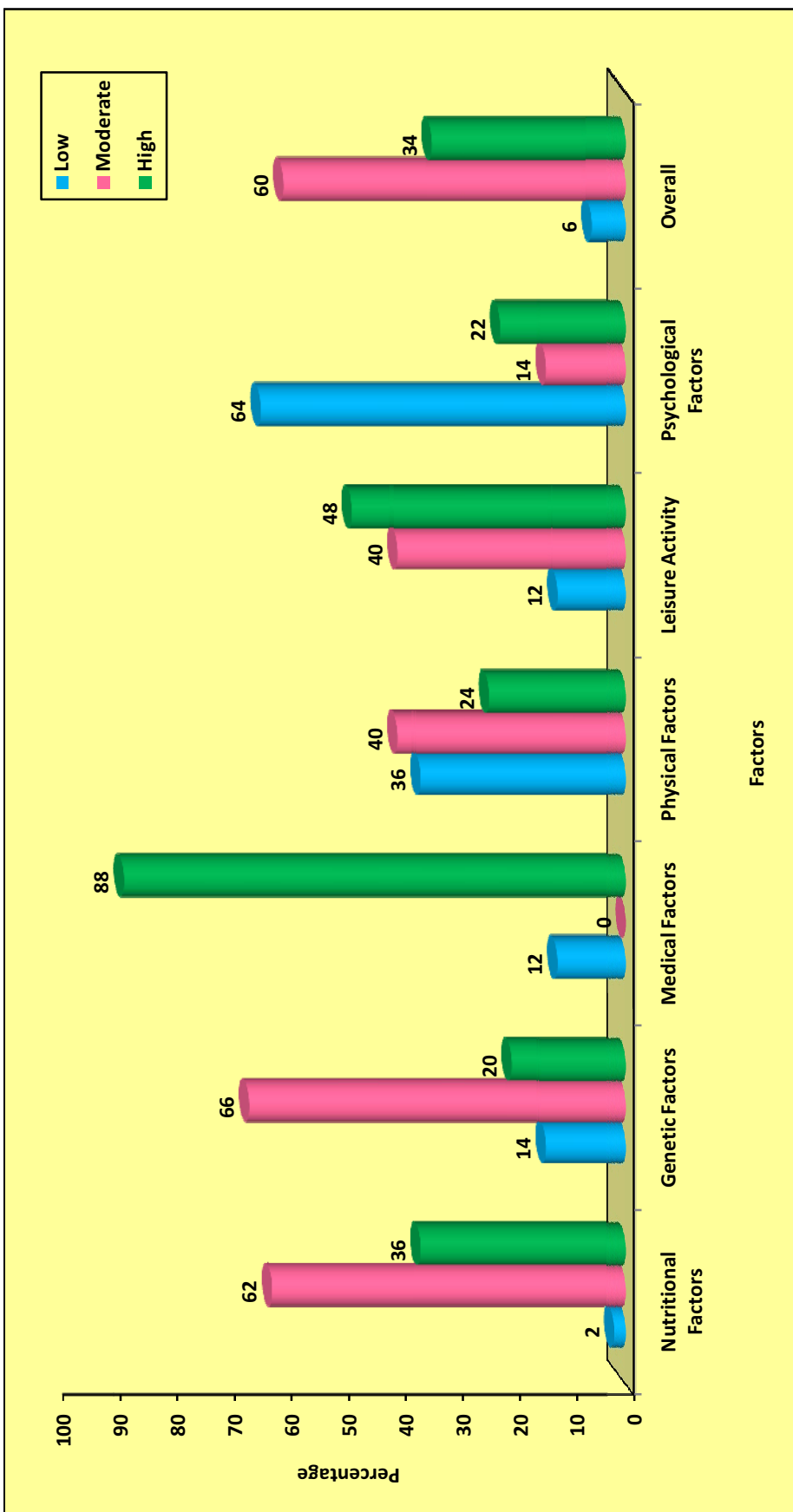


Fig. 4 Percentage distribution of level of factors contributing to obesity among school children in the cases group

Table 3: Data on level of factors contributing to obesity among school children in the controls.

N = 50

Factors	Low (≤50%)		Moderate (51 – 75%)		High (>75%)	
	No.	%	No.	%	No.	%
Nutritional Factors	41	82.0	9	18.0	0	0
Genetic Factors	34	68.0	15	30.0	1	2.0
Medical Factors	39	78.0	0	0	11	22.0
Physical Factors	50	100.0	0	0	0	0
Leisure Activity	35	70.0	14	28.0	2	4.0
Psychological Factors	49	98.0	1	2.0	0	0
Overall	47	94.0	3	6.0	0	0

Table 3 shows the level of factors contributing to obesity among school children in the controls.

Regarding nutritional factors, majority 41(82%) had low level of contribution to obesity and only 9(18%) had moderate level of contribution to obesity among school children.

Regarding genetic factors, majority 34(68%) had low level of contribution to obesity, 15(30%) had moderate level of contribution and only one (2%) had high level of contribution to obesity among school children.

Regarding medical factors, majority 39(78%) had low level of contribution to obesity and 11(22%) had high level of contribution to obesity among school children.

Regarding physical factors, almost all 50(100%) had low level of contribution to obesity among school children.

Regarding leisure activity revealed that, majority 35(70%) had low level of contribution, 14(28%) had moderate level of contribution and only 2(4%) had high level of contribution to obesity.

Regarding psychological factor revealed that, majority 49(98%) had low level of contribution and only one(2%) had high level of contribution to obesity among school children.

It was inferred that the factors contributing to obesity among school children in control group revealed that, majority 47(94%) had low level of contribution and only 3(6%) had moderate level of contribution to obesity.

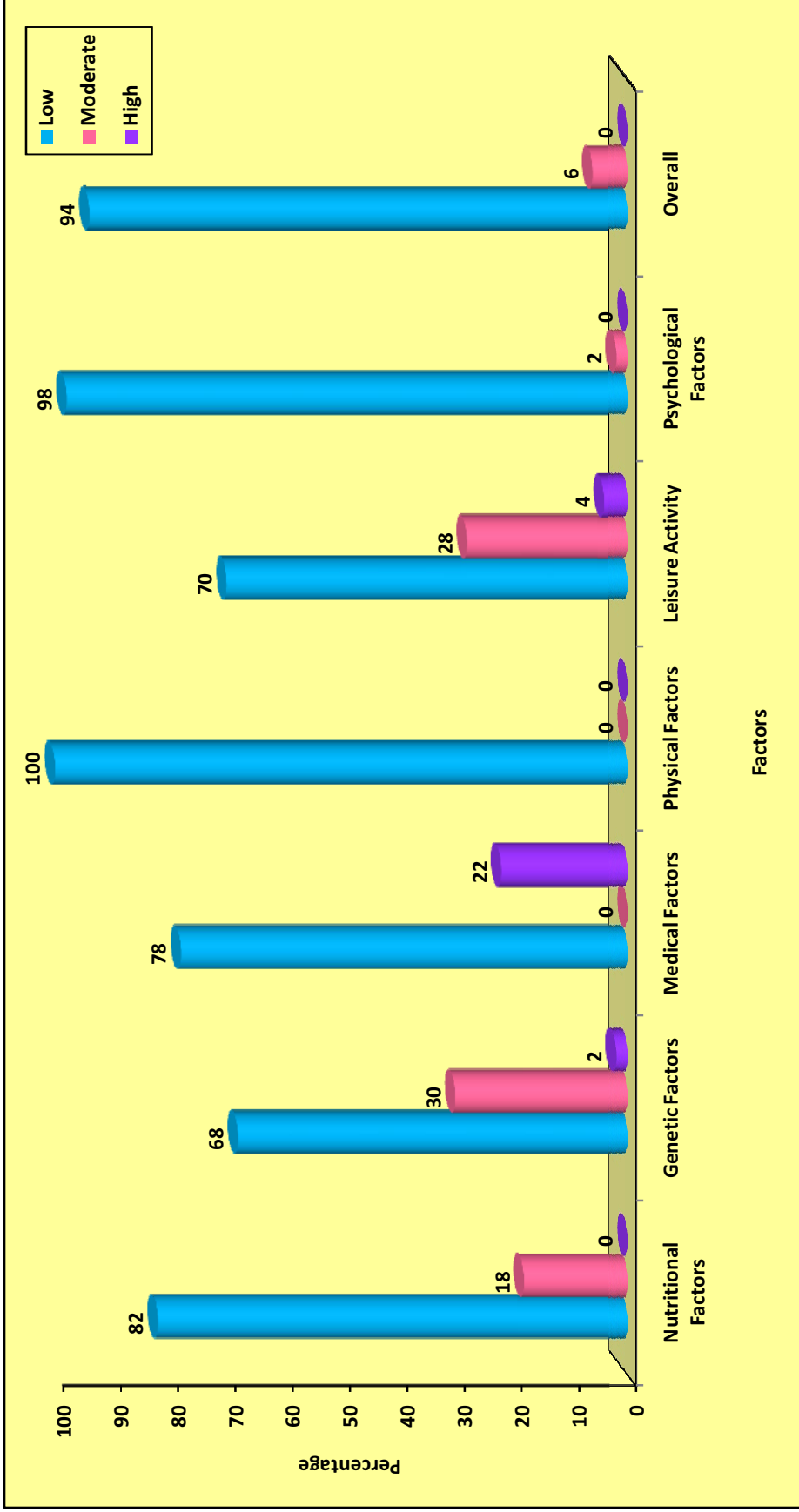


Fig. 5 Percentage distribution of level of factors contributing to obesity among school children in the control group

Table 4: Mean and standard deviation of factors score contributing to obesity among school children in cases and controls.

N = 100 (50+50)

Factors	Cases		Control	
	Mean	S.D	Mean	S.D
Nutritional Factors	23.3	4.86	13.94	3.35
Genetic Factors	2.96	0.80	1.7	1.18
Medical Factors	1.84	0.68	0.56	0.84
Physical Factors	3.98	1.88	0.36	0.78
Leisure Activity	5.16	1.58	2.88	1.36
Psychological Factors	3.26	1.40	1.8	0.95
Overall	40.52	7.53	21.24	4.91

Table 4 shows the Mean and standard deviation of factors score contributing to obesity among school children in cases and controls.

The table 4 shows that in the cases group, the mean score of nutrition factors was 23.3 ± 4.86 and the mean score of genetic factors was 2.96 ± 0.80 . The mean score of medical factors was 1.84 ± 0.68 and physical factors was 3.98 ± 1.88 . The mean score of leisure activity was 5.16 ± 1.58 and the mean score of psychological factors was 3.26 ± 1.40 . The overall mean score was 40.52 ± 7.53 .

Whereas in the controls, the mean score of nutrition factors was 13.94 ± 3.35 and the mean score of genetic factors was 1.7 ± 1.18 . The mean score of

medical factors was 0.56 ± 0.84 and physical factors was 0.36 ± 0.78 . The mean score of leisure activity was 2.88 ± 1.36 and the mean score of psychological factors was 1.8 ± 0.95 . The overall mean score was 21.24 ± 4.91 .

It was inferred that the overall mean score of cases were high 40.52 compared to controls mean score of 21.4

SECTION C: DATA ON COMPARISON OF FACTORS CONTRIBUTING TO OBESITY AMONG SCHOOL CHILDREN BETWEEN CASES AND CONTROLS.

Table 5: Comparison of factors contributing to obesity among school children between the cases and controls.

N = 100 (50+50)

Factors	Group	Level of Factors				Chi square test	Odds Ratio
		High		Low			
		N	%	N	%		
Nutritional Factors	Cases (50)	49	98.0	1	2.0	$\chi^2=65.68$ df=1 p=0.001***	223.2
	Control (50)	9	18.0	41	82.0		
	Relative risk	5.44		0.024			
Genetic Factors	Cases (50)	43	86.0	7	14.0	$\chi^2= 30.136$ df=1 p=0.001***	13.05
	Control (50)	16	32.0	34	68.0		
	Relative risk	2.68		0.206			
Medical Factors	Cases (50)	44	88.0	6	12.0	$\chi^2=44.0$ df=1 p=0.001***	26.0
	Control (50)	11	22.0	39	78.0		
	Relative risk	4.0		0.15			
Physical Factors	Cases (50)	32	64.0	18	36.0	$\chi^2=47.05$ df=1	-
	Control	0	0	50	100.0		

	(50)					p=0.001***	
	Relative risk	-		0.36			
Leisure Activity	Cases (50)	44	88.0	6	12.0	$\chi^2=34.76$ df=1 p=0.001***	17.1
	Control (50)	15	30.0	35	70.0		
	Relative risk	2.93		0.17			
Psychological Factors	Cases (50)	18	36.0	32	64.0	$\chi^2=18.77$ df=1 p=0.001***	27.5
	Control (50)	1	2.0	49	98.0		
	Relative risk	18.0		0.65			
Overall	Cases (50)	47	94.0	3	6.0	$\chi^2=77.4$ df=1 p=0.001***	245.4
	Control (50)	3	6.0	47	94.0		
	Relative risk	15.6		0.064			

The table 5 shows the comparison factors contributing to obesity among school children between the cases and controls .

Regarding nutritional factors, majority 49(98%) of school children in the cases group and only 9(18%) in the control group had high risk of contributing to obesity and there was significant association with the cases group at the level of $p<0.001$ and about 200 times the nutritional factors contribute to obesity (OR = 223.2). The risk for developing obesity in cases group is 5.44 times that of the control.

Regarding genetic factors, majority 43(86%) of school children in the cases and only 16(32%) in the controls had high risk of contributing to obesity and there was significant association with the cases group at the level of $p<0.001$ and about 13 times the genetic factors contribute to obesity (OR = 13.05). The risk for developing obesity in cases is 2.68 times that of the control.

Regarding medical factors, majority 44(88%) of school children in the cases and only 11(22%) in the controls had high risk of contributing to obesity and there was significant association with the cases at the level of $p<0.001$ and about 26 times the medical factors contribute to obesity (OR = 26.0). The risk for developing obesity in cases is 4 times that of the controls.

Regarding physical factors, majority 32(64%) of school children in the cases and none of them in the controls had high risk of contributing to obesity and there was significant association with the cases at the level of $p<0.001$ and since none of them were in the control the OR cannot be calculated and relative risk cannot be predicted.

Regarding leisure activity, majority 44(88%) of school children in the cases group and 15(30%) in the control had high risk of contributing to obesity and there was significant association with the cases group at the level of $p<0.001$ and about 17 times the leisure activity contribute to obesity (OR = 17.1). The risk for developing obesity in cases is 2.93 times that of the control.

Regarding psychological factors, 18(36%) of school children in the cases and one (2%) in the controls had high risk of contributing to obesity and there was significant association with the cases group at the level of $p < 0.001$ and about 27.5 times the psychological factors contribute to obesity (OR = 27.5). The risk for developing obesity in cases group is 18 times that of the control.

It was inferred that the majority 47(94%) of school children in the cases and 3(6%) in the controls had high risk of contributing to obesity and there was significant association with the cases at the level of $p < 0.001$ and about 245 times the factors contribute to obesity (OR = 245.4). The risk for developing obesity in cases is 15.6 times that of the controls.

SECTION D: DATA ON ASSOCIATION OF LEVEL OF FACTORS CONTRIBUTING TO OBESITY AMONG SCHOOL CHILDREN WITH THEIR SELECTED DEMOGRAPHIC VARIABLES IN THE CASES AND CONTROLS.

Table 6: Data on Association of level of factors contributing to obesity among school children with their selected demographic variables in the cases

N = 50

Demographic Variables	Low (≤50%)		High (>50%)		Chi-Square Value
	No.	%	No.	%	
Age in years					$\chi^2 = 5.674$ df = 3 p = 0.129 N.S
10 - 11 yrs	0	0	6	12.0	
11 - 12 yrs	0	0	17	34.0	
12 - 13 yrs	2	4.0	7	14.0	
13 - 14 yrs	1	2.0	17	34.0	
Sex of the child					$\chi^2 = 2.128$ df = 1 p = 0.145 N.S
Male	3	6.0	27	54.0	
Female	0	0	20	40.0	
Birth order of the child					$\chi^2 = 0.601$ df = 2 p = 0.740 N.S
First child	1	2.0	24	48.0	
Second child	2	4.0	21	42.0	
Third child and above	0	0	2	4.0	
Type of family					$\chi^2 = 0.714$

Demographic Variables	Low (≤50%)		High (>50%)		Chi-Square Value
	No.	%	No.	%	
Nuclear	1	2.0	25	50.0	df = 2
Joint	2	4.0	20	40.0	p = 0.700
Extended	0	0	2	4.0	N.S
Residential area					$\chi^2 = 0.030$
Urban	1	2.0	18	36.0	df = 1
Rural	2	4.0	29	58.0	p = 0.864 N.S
Religion					$\chi^2 = 1.066$
Hindu	2	4.0	29	58.0	df = 3
Muslim	0	0	8	16.0	p = 0.785
Christian	1	2.0	8	16.0	N.S
Others	0	0	2	4.0	
Educational status of father					$\chi^2 = 15.383$
Illiterate	0	0	10	20.0	df = 3
Primary schooling	0	0	15	30.0	p = 0.002
Higher secondary school	1	2.0	20	40.0	S***
Degree and above	2	4.0	2	4.0	
Educational status of mother					$\chi^2 = 1.336$
Illiterate	0	0	7	14.0	df = 3
Primary schooling	1	2.0	15	30.0	p = 0.721
Higher secondary school	1	2.0	19	38.0	N.S
Degree and above	1	2.0	6	12.0	
Employment status of father					$\chi^2 = 3.732$
Employed	0	0	16	32.0	df = 3
Unemployed	0	0	8	16.0	p = 0.292
Self employed	2	4.0	19	38.0	N.S

Demographic Variables	Low (≤50%)		High (>50%)		Chi-Square Value
	No.	%	No.	%	
Coolie	1	2.0	4	8.0	
Employment status of mother					$\chi^2 = 0.650$ df = 3 p = 0.885 N.S
Employed	1	2.0	11	22.9	
Unemployed	2	4.0	28	56.0	
Self employed	0	0	4	8.0	
Coolie	0	0	4	8.0	
Economic status					$\chi^2 = 1.093$ df = 2 p = 0.579 N.S
Low income	1	2.0	7	14.0	
Middle income	1	2.0	29	58.0	
Upper income	1	2.0	11	22.0	

***p<0.001, S – Significant, N.S – Not Significant

Table 6: Shows the data on association of level of factors contributing to obesity among school children with their selected demographic variables in the cases

The table 6 depicts that the demographic variable educational status of father had shown statistically significant association with level of factors contributing to obesity among school children at p<0.001 level. The other demographic variables had not shown statistically significant association with level of factors contributing to obesity among school children in the cases.

Table 7: Data on association of level of factors contributing to obesity among school children with their selected demographic variables in the controls

N = 50

Demographic Variables	Low (≤50%)		High (>50%)		Chi-Square Value
	No.	%	No.	%	
Age in years					$\chi^2 = 1.080$ df = 3 p = 0.782 N.S
10 - 11 yrs	12	24.0	0	0	
11 - 12 yrs	10	20.0	1	2.0	
12 - 13 yrs	11	22.0	1	2.0	
13 - 14 yrs	14	28.0	1	2.0	
Sex of the child					$\chi^2 = 2.719$ df = 1 p = 0.099 N.S
Male	23	46.0	0	0	
Female	24	48.0	3	6.0	
Birth order of the child					$\chi^2 = 3.191$ df = 2 p = 0.203 N.S
First child	19	38.0	0	0	
Second child	22	44.0	3	6.0	
Third child and above	6	12.0	0	0	
Type of family					$\chi^2 = 2.128$ df = 2 p = 0.345 N.S
Nuclear	29	58.0	1	2.0	
Joint	13	26.0	2	4.0	
Extended	5	10.0	0	0	
Residential area					$\chi^2 = 0.059$ df = 1 p = 0.808
Urban	19	38.0	1	2.0	
Rural	28	56.0	2	4.0	

Demographic Variables	Low (≤50%)		High (>50%)		Chi-Square Value
	No.	%	No.	%	
					N.S
Religion					$\chi^2 = 1.066$ df = 3 p = 0.785 N.S
Hindu	38	76.0	2	4.0	
Muslim	6	12.0	1	2.0	
Christian	3	6.0	0	0	
Others	-	-	-	-	
Educational status of father					$\chi^2 = 1.867$ df = 3 p = 0.600 N.S
Illiterate	3	6.0	0	0	
Primary schooling	15	30.0	2	4.0	
Higher secondary school	19	38.0	1	2.0	
Degree and above	10	20.0	0	0	
Educational status of mother					$\chi^2 = 1.950$ df = 3 p = 0.583 N.S
Illiterate	3	6.0	0	0	
Primary schooling	14	28.0	2	4.0	
Higher secondary school	24	48.0	1	2.0	
Degree and above	6	12.0	0	0	
Employment status of father					$\chi^2 = 1.127$ df = 3 p = 0.770 N.S
Employed	22	44.0	2	4.0	
Unemployed	6	12.0	0	0	
Self employed	12	24.0	1	2.0	
Coolie	7	14.0	0	0	
Employment status of mother					$\chi^2 = 0.850$ df = 3 p = 0.837 N.S
Employed	10	20.0	1	2.0	
Unemployed	26	52.0	1	2.0	
Self employed	9	18.0	1	2.0	
Coolie	2	4.0	0	0	

Demographic Variables	Low (≤50%)		High (>50%)		Chi-Square Value
	No.	%	No.	%	
Economic status					$\chi^2 = 1.507$
Low income	10	20.0	1	2.0	df = 2
Middle income	31	62.0	1	2.0	p = 0.471
Upper income	6	12.0	1	2.0	N.S

N.S – Not Significant

Table 7: Shows the Data on association of level of factors contributing to obesity among school children with their selected demographic variables in the controls

It was inferred that none of the demographic variables had shown statistically significant association with level of factors contributing to obesity among school children in the controls.

CHAPTER V

SUMMARY, FINDINGS, DISCUSSION, IMPLICATIONS, LIMITATIONS, CONCLUSION AND RECOMMENDATIONS

The essence of any research project lies in reporting the findings. This chapter gives a brief account of the present study including conclusions drawn from the findings, recommendations, limitations of the study, suggestions for further studies, and nursing implications.

SUMMARY

The primary aim of the study was to assess the factors of obesity among cases and controls.

The objectives of the study were

- To determine the selected factors contributing to obesity among school children.

- To find out the association between the selected factors contributing to obesity among cases and control groups.
- To find out the association between the selected factors contributing to obesity and the selected demographic variables among cases and controls.

The study attempted to examine the following hypothesis

H₁: There is a significant association between the selected factors contributing to obesity among school children in cases and controls.

H₂: There is a significant association between the selected factors contributing to obesity and their demographic variables among school children in cases and controls.

The conceptual framework is based on **Web of Causation Theory**. The web of causation considers all the predisposing factors of any type and their complex inter relationship with each other. The basic tenet of epidemiology is to study the clusters of causes and combination of effects and how they are related to each other.

Review of literature was based on studies related to prevalence and factors of Overweight/ Obesity

An evaluative approach was used for this study. It was a non experimental descriptive case control design only. Independent variable was selected factors contributing to obesity and dependent variable was obesity.

The content validity of the tool was established by 5 experts. The reliability of the tool was established by test-retest reliability method. The coefficient of correlation for tamil questionnaire $r=0.84$ and English questionnaire $r=0.81$ high. Therefore semi structured questionnaire was found to be reliable. The pilot study was conducted at Sri Madha Matriculation Hr. Sec. school. Kumbakonam. The study was found to be feasible and effective.

The main study was conducted in St. Antony's Matriculation Higher Secondary School, Sri KumaraguruParar Matriculation Higher Secondary School, Kumbakonam. Prior permission from the authorities was sought and obtained; informed written consent was taken from the parents of the school children. The samples were selected by Purposive sampling technique based on the sample selection criteria. A total of 100 school children were recruited for the study to assess the factors contributing to overweight/ obesity. Gathered data were analyzed based on the objectives using descriptive and inferential statistics using SPSS version 16. The level of probability <0.001 considered to be significant.

FINDINGS

The major findings of the study were presented under the following headings.

FINDING 1:

Findings related to frequency and percentage distribution of demographic variables of school children in the cases and control group:

Among cases, majority 18(36%) were in the age group of 13 – 14 yrs, 30(60%) were male, 25(50%) were first born child, 26(52%) belonged to nuclear family, 31(62%) were from rural area, 31(62%) were Hindus, 21(42%) of fathers were educated upto higher secondary school, 20(40%) of mothers were educated upto higher secondary school, 21(42%) of fathers were self employed, 30(60%) of mothers were unemployed and 30(60%) belonged to middle income group.

Whereas in the controls, majority 15(30%) were in the age group of 13 – 14 yrs, 27(54%) were female, 25(50%) were second born child, 30(60%) belonged to nuclear family, 30(60%) were from rural area, 40(80%) were Hindus, 20(40%) of fathers were educated upto higher secondary school, 25(50%) of mothers were educated upto higher secondary school, 24(48%) of fathers were employed, 27(54%) of mothers were unemployed and 32(64%) belonged to middle income group.

FINDING 2: Findings related to assessment of level of factors contributing to obesity among school children in the cases and controls:

Among cases the overall level of factors contributing to obesity among school children revealed that, majority 30(60%) had moderate level of contribution, 17(34%) had high level of contribution and only 3(6%) had low level of contribution to obesity.

Among controls the overall level of factors contributing to obesity among school children in controls revealed that, majority 47(94%) had low level of contribution and only 3(6%) had moderate level of contribution to obesity.

FINDING 3: Findings related to mean and standard deviation of factors contributing to obesity among school children in cases and controls.

Among cases , the mean score of nutrition factors was 23.3 ± 4.86 and the mean score of genetic factors was 2.96 ± 0.80 . The mean score of medical factors was 1.84 ± 0.68 and physical factors was 3.98 ± 1.88 . The mean score of leisure activity was 5.16 ± 1.58 and the mean score of psychological factors was 3.26 ± 1.40 . The overall mean score was 40.52 ± 7.53 .

Whereas in the controls, the mean score of nutrition factors was 13.94 ± 3.35 and the mean score of genetic factors was 1.7 ± 1.18 . The mean score of medical factors was 0.56 ± 0.84 and physical factors was 0.36 ± 0.78 . The mean score of leisure activity was 2.88 ± 1.36 and the mean score of psychological factors was 1.8 ± 0.95 . The overall mean score was 21.24 ± 4.91 .

FINDING 4: Findings related to comparison of factors contributing to obesity among school children between the cases and control group:

The overall analysis revealed that, majority 47(94%) of school children in the cases group and 3(6%) in the control group had high risk of contributing to obesity and there was significant association with the cases group at the level of $p < 0.001$ and about 245 times the factors contribute to obesity (OR = 245.4). The risk for developing obesity in cases group is 15.6 times that of the control group.

DISCUSSION

This study was conducted to evaluate the factors contributing to obesity school children. The discussion is based on the objectives of the study.

Objective 1: To determine the selected factors contributing to obesity among school children.

The overall level of factors contributing to obesity among school children revealed that majority 30(60%) children had moderate level of contribution, 17(34%) children had high level of contribution and only 3(6%) children had low level of contribution to obesity in the cases group.

The above findings were supported by the following study:

Jigna Samir (2014) conducted a study to assess the prevalence of overweight and obesity and to determine their associated factors among school children aged 10-12 years in Mehsana state in India. A single centric epidemiological study was conducted among 200 school children selected randomly in Mehsana district school in the period from July 2011 to September 2011. Findings revealed that the risk of overweight and obesity was significantly higher in children who spent time in television viewing and/or with computer.

Manuel, Kidane, Andegiorgish (2011) studied the prevalence and determinants of overweight and obesity among school children and adolescents (7–18 years), a cross-sectional study was conducted in Tianjin City of Northeast China. After adjusting for parental obesity, the odds ratio of overweight children was increased by urban residence (rural as a reference,

2.68, 2.16–3.32), positive gestational diabetes (2.76, 1.37–4.50), and fast-food/restaurant food service (2.03, 1.34–3.07). Children who walked to school and participated in outdoor activities were 54% and 63% less likely to be overweight respectively.

Objective 2: To find out the association between the selected factors contributing to obesity among cases and control groups.

In the cases majority 47(94%) of school children and 3(6%) in the control group had high risk of contributing to obesity and there was significant association with the cases group at the level of $p < 0.001$ and about 245 times the factors contribute to obesity (OR = 245.4). The risk for developing obesity in cases is 15.6 times that of the controls.

The above findings were supported by the following study:

Premalata Prakash (2013) conducted a non experimental study on obesity among children in Punjab to assess the parental role and identify the deficit area among children leading to obesity and to prepare the guidelines for the parents regarding promotion of health of their children. Results showed that mass media exposure was strong prevalent factor leading to obesity among

children and there was a correlation between prevalent factors and the parental role. Thus study concluded that it was very essential that school health nurses should conduct periodic awareness programmes in schools for children and parents.

Julice (2012) conducted a comparative study to assess the eating behavior among obese and non obese children in selected schools at Ernakulum, Kerala. The study concluded that parents and children should be made aware through health education .Mass media about healthy eating behavior and encouraging in modifying the eating behavior.

Objective 3: To find out the association between the selected factors contributing obesity and demographic variables among cases and controls.

In the cases the demographic variable educational status of father had shown statistically significant association with level of factors contributing to obesity among school children at $p < 0.001$ level. The other demographic variables had not shown statistically significant association with level of factors contributing to obesity among school children in the cases.

In the controls none of the demographic variables had shown statistically significant association with level of factors contributing to obesity among school children.

The above findings were supported by the following study:

Xiaoqing Yi (2011) study was to examine the prevalence and the risk factors associated with obesity among school-aged children in Xi'an city. High maternal education and a longer sleeping time were shown to be protective factors against obesity (odds ratio [OR] 0.148, 95% confidence interval [CI] 0.074–0.296 and OR 0.472, 95% CI 0.342–0.652, respectively). Whereas family history of diabetes (OR 5.498, 95% CI 2.606–11.600), parental overweight (OR 3.720, 95% CI 2.068–6.689), and watching television, playing video games, and using computers (OR 1.564, 95% CI 1.133–2.159) were associated with a higher obesity risk.

IMPLICATIONS

The investigator had drawn the following implication from the study concern of Nursing Practice, Nursing Education, Nursing Administration and Nursing Research.

IMPLICATIONS IN NURSING PRACTICE

- ❖ The study motivates the nursing personnel about the importance of reducing the factors contributing to obesity among school children for their well-being.
- ❖ The nurses in the clinical area can try out this assessment technique on individual children regarding factors contributing to obesity.
- ❖ This study can be used as an informative illustration for nurses who give care for obese children in the hospital setting.

IMPLICATIONS IN NURSING EDUCATION

- ❖ School health programme should form a part of nursing curriculum to be considered by the experts
- ❖ Nurse educators can discuss the findings of the study while teaching about obesity.
- ❖ Training of child health nurses can be done more appropriately in relation to screening and identification of obesity.

IMPLICATIONS IN NURSING RESEARCH

- ❖ Different methods to assess the factors of obesity can be developed to teach the child health nurse in educational institutions.

- ❖ The tool, technique and review of literature can provide an avenue for further research studies. It certainly the body of knowledge and can be used as reference materials in future.

- ❖ The recommendations can be utilized by other investigator for conducting further studies in the same field.

IMPLICATIONS IN NURSING ADMINISTRATION

- ❖ The findings of the study could be used as basis of in-service education for nurses so as to make them more competent in self-evaluating the effectiveness of cases.

- ❖ The findings of the study can help the nurse administrator to formulate policies for care of obese children and implication in hospital side.

LIMITATIONS

- ❖ The study include school children between 10-14 years of age
- ❖ Who were available in selected schools at Kumbakonam.
- ❖ Who had body mass index more than 25 (Obese).
- ❖ Who were present during the period of data collection
- ❖ Whose parents gave consent to participate in the study

RECOMMENDATIONS

- ❖ The study could be replicated on a larger sample and in different settings.
- ❖ Comparative study can be done on obesity among private and government school children.
- ❖ A cohort study can be done to assess the factors of obesity among school children.
- ❖ Comparative study can be done on obesity among high income and low income groups.

CONCLUSION

The findings of the study showed that the majority 47(94%) of school children in the cases and 3(6%) in the control had high risk of contributing to obesity and there was significant association with the cases group at the level of $p<0.001$ and about 245 times the factors contribute to obesity (OR = 245.4). The risk for developing obesity in cases group was 15.6 times increased than that of the controls.

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TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED

From

Er.R.THANGAVEL,B.E.,
Superintending Engineer,
Erode Elec. Distn. Circle,
Erode - 9.

To

7 M/s.Sakthi Sugars Limited,
Poondurai Semur (Village),
Avalpoondurai
Erode District - 638 115

Lr.No.SE/EEDC/ED/DFC/AO/HT/A4/F.HT SC 299/D.18/15, Dt.10.08.2015.

Sir,

Sub: Elec. - EEDC - M/s. Sakthi Sugars Ltd., HT SC No.299 -
(24.5 MW NCES Based Co-Gen Power Plant) Avalpoondurai
Power supplied to TANGEDCO for 21.5 MW under Tender
No.6 of 2014 - Power purchase bill for the month of
07/2015 - Regarding.

Ref: 1) Tender No.6 of 2014.
2) Your Invoice No.SSL/TNEB/004/2015-16, dt.01.08.2015.

...

Your Invoice under reference cited has been passed for
Rs.5,24,65,981/- (Rupees Five Crores twenty four lakhs sixty five thousand nine
hundred and eighty one only) and sent to our cash section for arranging
payment. You may await cheque for the said amount.

Yours faithfully,



For SUPERINTENDING ENGINEER,
EEDC:ERODE.

TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED

From

Er.R.THANGAVEL,B.E.,
Superintending Engineer,
Erode Eley.Distrn.Circle,
Erode - 9.

To

M/s.Sakthi Sugars Limited,
Sakthi Nagar,
Appakudal Village,
Erode District - 638 315.

Lr.No.SE/EEDC/ED/DFC/AO/HT/A1/F.HT SC 7/D:1^{TA}/15, Dt.10 .8.2015

Sir,

Sub: Eley. - EEDC - M/s.Sakthi Sugars Ltd., HT SC No.7 -
(32 MW NCES Based Co-Gen Power Plant) Appakudal -
Power supplied to TANGEDCO for 27.5 MW under Tender
No.6 of 2014 - Power purchase bill for the month of
07/2015 - Regarding.

Ref: 1) Tender No.6 of 2014.

2) Your Invoice No.SSL/TNEB/139/2015, dt.01.08.2015.

...

Your Invoice under reference cited has been passed for
Rs.6,61,39,542/-(Rupees Six Crores sixty one lakhs thirty nine thousand five hundred
and forty two only) and sent to our cash section for arranging payment. You
may await cheque for the said amount.

Yours faithfully,



For SUPERINTENDING ENGINEER,
EEDC:ERODE.

**AGE, SEX, RELIGION, BIRTH ORDER, TYPE OF FAMILY RESIDENTIAL AREA,
EDUCATIONAL STATUS OF PARENTS, EMPLOYMENT STATUS OF PARENTS, ECONOMIC
STATUS**

