

171829

FOOD HABITS AND NUTRITIONAL PROFILE OF ADOLESCENTS

By
SHIJI PAUL



THESIS

**Submitted in partial fulfilment of the
requirement for the degree of**

Master of Science in Home Science
(FOOD SCIENCE AND NUTRITION)

**Faculty of Agriculture
Kerala Agricultural University**

**Department of Home Science
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR-680 656
KERALA, INDIA**

2001

DECLARATION

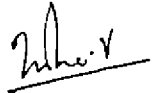
I hereby declare that this thesis entitled “**Food habits and nutritional profile of adolescents**” is a bonafide record of research work done by me during the course of research and that the thesis has not previously formed the basis for the award to me of any degree, diploma, associateship, fellowship or other similar title, of any other University or Society.

Vellanikkara


SHIJI PAUL

CERTIFICATE

Certified that this thesis, entitled “**Food habits and nutritional profile of adolescents**” is a record of research work done independently by **Miss. Shiji Paul**, under my guidance and supervision and that it has not previously formed the basis for the award of any degree, diploma, fellowship or associateship to her.




Dr.V.Usha
(Chairperson, Advisory Committee)
Associate Professor
Department of Home Science
College of Horticulture

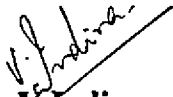
Vellanikkara

CERTIFICATE

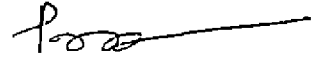
We, the undersigned members of the Advisory Committee of **Miss. Shiji Paul**, a candidate for the degree of **Master of Science in Home Science** with major in **Food Science and Nutrition**, agree that the thesis entitled "**Food habits and nutritional profile of adolescents**" may be submitted by Miss. Shiji Paul, in partial fulfilment of the requirements for the degree.




Dr. V. Usha
Associate Professor
Department of Home Science
College of Horticulture, Vellanikkara




Dr. V. Andira
Associate Professor & Head
Department of Home Science
College of Horticulture,
Vellanikkara



Dr. P. V. Prabhakaran
Associate Dean (i/c)
College of Horticulture
Vellanikkara



Dr. P. S. Geethakutty
Associate Professor
Department of Agricultural Extension
College of Horticulture
Vellanikkara


3/3/0
EXTERNAL EXAMINER
DR. D. MALATHI

ACKNOWLEDGEMENT

At this moment of fulfilment I would like to express my whole hearted gratitude to each and every one those who were ready to give their helping hands and supports in the completion of this work.

*My heart is brim over with gratitude and indebtedness to **Dr.V.Usha**, Associate Professor, Department of Home Science, College of Horticulture and chairperson of my advisory committee for her treasurable guidance, ever willing help, lasting patience, immense encouragement; affection and concern showed to me during the course and research work.*

*I sincerely express my gratitude to **Dr.V.Indira**, Associate Professor and Head, Department of Home Science, College of Horticulture for her timely suggestions and inspiration during the course of the thesis work.*

*I also express my heartfelt thanks to **Dr.P.V.Prabhakaran**, Associate Dean (i/c), College of Horticulture for his valuable suggestions in carrying out statistical analysis.*

*I am also thankful to **Dr.P.S.Geethakutty**, Associate Professor, Department of Agricultural Extension, College of Horticulture for her immense help during the period of study.*

May I express my sincere gratitude to other teaching and non teaching staff of my department.

*Heartfelt thanks are also for principles of institutions which were selected for the study, all the parents as well as children surveyed and **Dr.Alphonsa Thomachan** who had extended full co-operation during the conduct of the study.*

*I also express my special thanks to **Mr.Paul Eluvathingal**, **Mr.Manikandan**, **Mr.Joy**, **Mr.Johnson**, **Sr.Presanna**, **Mrs.Reetha Paul** and **Mrs.Mrudhula** for their constant help during the survey.*

I would like to express my sincere gratitude to my dearest friends Sabeena, Saima, and Vandana for their company, constant encouragement and support.

I feel thankful to my seniors Maya, Suman, Raji, Mini and Sulaja for their valuable helps. I also thank my Juniors Seeja, Sunitha, Rosemol and Shyna for their company.

I thank Joyci chechi for helping me to carry out the statistical analysis.

I also express my sincere thanks to Mr.Joy, J.M.J. Computer Centre, Thottappady for the neat typing of the manuscripts.

I also wish to thank Kerala Agricultural University for awarding the fellowship during the conduct of the study.

*I take this opportunity to express my gratitude to **Appachan, Amma, Chechi, Cheta, Johnu and Polu** for their constant encouragement, prayers, great concern and everlasting love which provided me the strength to complete the thesis work.*

*Above all, I thank **GOD ALMIGHTY** for his blessings throughout the course, which made me to complete it successfully.*

SHIJI PAUL

*Dedicated to
my ever loving parents*

CONTENTS

Chapter	Title	Page No.
1	INTRODUCTION	1
2	REVIEW OF LITERATURE	3
3	MATERIALS AND METHODS	17
4	RESULTS	24
5	DISCUSSION	99
6	SUMMARY	116
	REFERENCES	
	APPENDICES	
	ABSTRACT	

LIST OF TABLES

Table No.	Title	Page No.
1	Distribution of families based on religion, type of family and family size	25
2	Educational status of parents	26
3	Occupational status of parents	26
4	Monthly income of families	27
5(a)	Distribution of families based on monthly expenditure pattern	28
5(b)	Distribution of families based on monthly expenditure pattern	28
6	Housing conditions of families	30
7	Other living facilities of families	31
8	Details of labour saving devices in the family	33
9	Details regarding servants	34
10	Details of selected adolescents	35
11	Morbidity pattern of adolescents	36
12	Utilization of information sources by adolescents	37
13	Details of friends and membership in organizations by adolescents	38
14	Mode of conveyance to college and school	39
15	Frequency of seeing movies and watching T.V	39
16	Leisure time activities of adolescents	40-41
17	Purchasing trend of processed foods by adolescents motivated by T.V advertisements	43

18	Breakfast and lunch pattern of adolescents	44
19	Details of pocket money received by adolescents	45
20	Mode of spending pocket money	46
21	Eating outside habits of adolescents	47
22	Preference of branded soft drinks by adolescents	50
23	Celebration of special occasions by adolescents	52
24	Weight consciousness of adolescents	54
25	Unhealthy personal habits of adolescents	55
26	Food consumption pattern of families	56
27	Frequency of use of food items by the families	57
28 a	Common breakfast preparations by the families	60
28 b	Common side dishes for breakfast by the families	61
28 c	Common preparations for lunch by the families	62
28 d	Common side dishes for lunch by the families	63
28 e	Common preparations for dinner by the families	62
28 f	Common side dishes for dinner by the families	64
28 g	Common preparations for evening tea by the families	65
29 a	Frequency of use of processed foods by the families	67
29 b	Frequency of use of processed beverages, bakery items and fried foods by the families	68
30	Frequency score (percentage) of different food preparations consumed by adolescents	70-71
31	Frequency of use of breakfast, lunch, dinner and evening tea by adolescents	74

32	Foods prepared by the families during special occasions	76
33	Purchase of prepared foods by the families	77
34	Distribution of the adolescents based on their attitude towards their eating habits	79
34 a	Attitude of adolescent boys towards their eating habits	80
34 b	Attitude of adolescent girls towards their eating habits	80
35	Attitude of parents towards the eating habits of adolescents	81
35 a	Attitude of parents of adolescent boys	82
35 b	Attitude of parents of adolescent girls	82
36	Mean height and weight of adolescents in comparison with ICMR standards (1990)	84
37	Distribution of adolescent boys based on ICMR standards for height and weight	85
38	Distribution of adolescent girls based on ICMR standards for height and weight	85
39	Distribution of adolescents (16-18 yrs) based on weight for age (Gomez <i>et al.</i> , 1956)	87
40	Distribution of adolescents (16-18 yrs) based on Body Mass Index (James <i>et al.</i> , 1988)	90
41	Details of clinical examination of adolescents	92
42	Mean food intake of adolescents in comparison with RDA	94
43	Mean nutrient intake of adolescents in comparison with RDA	95
44	Haemoglobin levels of adolescents	98

LIST OF FIGURES

Fig. No.	Title
1	Frequency of eating from outside by adolescents
2	Distribution of adolescents based on ICMR standards for height
3	Distribution of adolescents based on ICMR standards for weight
4	Distribution of adolescents based on weight for age
5	Distribution of adolescent boys based on Body Mass Index
6	Distribution of adolescent girls based on Body Mass Index
7	Intake of food groups by adolescents as percentage of RDA
8	Intake of nutrients by adolescents as percentage of RDA

LIST OF APPENDICES

Page No.	Title
1	Interview schedule to elicit information regarding the socio-economic conditions of the families
2	Interview schedule to elicit information on food consumption and dietary pattern of the families
3	Attitude of adolescents towards their eating habits and attitude of parents towards the eating habits of adolescents
4 a	Family and individual food consumption survey - weighment method
4 b	Family and individual food consumption survey - weighment method
5	Schedule for clinical assessment
6	Estimation of Haemoglobin
7	Formula for calculation of food frequency score
8	Delinious - Hodges cumulative method of classification

Introduction

INTRODUCTION

(Adolescence is a tender, impressionable and transient age. It is a crucial phase in life since atleast some of the nutritional insults of childhood can be erased during this period. It provides a second opportunity for achievement of the full genetic potential for growth, an opportunity to undo, however partial the deleterious effects of early childhood undernutrition (Devadas, 2000).)

(The growth and hormonal changes occurring during adolescence, place greater nutritional demands on the body and their requirements vary according to age, sex, body size and activity. As the growth progresses, the food and nutrient needs of the adolescents increase gradually. Good nutrition is extremely important during adolescence because of the rapid acceleration in growth.)

(Adolescence is a period when a particular life style is acquired and in this process many youngsters adopt health compromising behaviour. Most of the time such health risks are knowingly taken. Cigarette smoking, alcohol consumption, drug addiction, faulty eating habits etc. are a few health hazards usually seen among adolescents.)

(Many of the adolescents exhibit peculiar food habits. Meal skipping and eating irregularly are common during adolescence. Peer influence is found to be the cause of faulty eating habits of most of the adolescents. Ready to eat and fast foods providing calorifically rich foods are usually frequented along with friends. Gradually this becomes a habit resulting in a host of malnutrition related problem.)

(Today's teenagers are growing up receiving mixed messages from television. While watching television and hundreds of commercials promoting soft drinks, fast foods and other products it is also a practice that they consume high calorie foods. This, along with sedentary life styles make them more susceptible to

obesity and paves the way to diseases like high blood pressure, cardio vascular diseases and certain types of cancers at a relatively early period in their life.)

(Information on the eating habits, life style and nutritional status of adolescents of the state is limited. Hence the study was under taken to find out the food consumption pattern and nutritional status of adolescents and to study the attitude towards the eating habits of adolescents and their parents.)

Review of Literature

2. REVIEW OF LITERATURE

This chapter pertaining to the study “Food habits and nutritional profile of adolescents” is discussed under the following headings.

- 2.1 Importance of adolescence
- 2.2 Dietary habits of adolescents
- 2.3 Food consumption pattern
- 2.4 Prevalence of nutritional disorders
- 2.5 Life styles of adolescents

2.1 Importance of adolescence

Adolescence is a period during which the individual rapidly undergoes a series of sequential physical and mental changes that transform a small child into young adult (Myron, 1980). Mahan and Ress (1984) divided adolescence into three stages; early, middle and late. Early adolescence includes the onset of puberty and usually occurs by the age of 10 to 12 years in girls and 11 to 13 years in boys. Middle adolescence continues through the age of 12 to 15 years in girls and 13 to 16 years in boys. Late adolescence complete the process of somatic growth through the age of 16 to 21 years in both sexes.

According to Devadas and Jaya (1984) adolescence is a process of achieving desirable growth, attitude, believes and methods for effective participation in society as an emerging adult. Wright (1984) stated that adolescence is a period of dynamic changes and these changes occur in all spheres of development of the human potential viz., physical, emotional, intellectual and even spiritual. For majority of young persons the years from 12 to 16 are the most eventfull ones of their lives so far as their growth and development is concerned (Tanner, 1986).

Cameron *et al.* (1986) stated that growth spurt during adolescence varies in intensity and duration from individual to individual due to several factors such as heredity, environment, socio-economic status, illness and malnutrition in childhood. According to Marshall and Tanner (1986) in the past, the word 'adolescence' was used synonymously with puberty and recently it has become a common practice to use 'adolescence' to refer to the physiological changes associated with puberty.

Adolescence is the most crucial period in one's life (Sarojini and Vijayalakshmi, 1989). Rao (1996) has the opinion that growth during adolescence contributes significantly to the attainment of final body size of an individual. Adolescence is considered to be a second opportunity for the body to grow as it facilitates catch up in height (Joshi *et al.*, 1998). Adolescence is a period of transition, during which an individual develops from a child to an adult (Akkamahadevi *et al.*, 1998). Bagchi (1999) stated that the period of adolescence is marked by profound physiological, anatomical, endocrinal and emotional changes.

Population of adolescents in India is 22.5 per cent and the significant segment of the population of Kerala is composed of adolescent and pre-adolescent group (Bali, 1990). According to Census of India (1991) adolescent boys constitute 10.8 per cent of the males and adolescent girls constitute 10.0 per cent of the females of the total population of India.

2.2 Dietary habits of adolescence

Food habits are integral part of a person's life and are related to behavioural patterns (Schoff *et al.*, 1972).

Runyan (1976) reported that adolescent boys usually have a tremendous appetite but girls sometimes have a finicky appetite. According to Lacey *et al.* (1978) there is a marked daily variation in dietary intake among adolescent girls. Food preferences and food habits of adolescents are formed as a result of complex

interaction of many factors within the individual and with that of his environment (Mahan and Ress, 1984). Sweeting *et al.* (1994) stated that at 18 there was a clear differentiation in food choices and meal patterns according to sex. They also realised that dietary habits of adolescents are closely associated with life styles.

According to Manoff (1973) mass media had an influence on modifying the adolescent food beliefs, food attitudes and eating pattern. Rao (1985) opined that teenage period is the time when they exercise full authority in matter of what they will or will not eat.

Socio economic status of the families were found to have an influence on the inclusion of high cost foods such as margarine, butter, milk and sweets, in the adolescent diet (Prattala, 1988). Manocha *et al.* (1988) studied an inverse relationship between social mobility and dietary intake and it was found that adolescent girls belonging to low income groups being less literate, eat more dense calorific food than females of high income groups and middle income groups who are more literate. Worsley *et al.* (1993) stated that adolescent food habits are not much influenced by socio economic conditions.

Spillman *et al.* (1994) opined that the dietary habits of adolescents are influenced by reinforcing factors such as peers, parents and teenagers. Cusatis and Shannon (1996) reported that different aspects of adolescent's food consumption behaviour may be influenced by different factors, which may vary between males and females. The adolescents are more likely to be influenced in their eating habits by family members than friends (Doyle and Feldman, 1997).

According to Wardle *et al.* (1992) restrained subjects had a more negative attitude towards food, external eaters had a positive attitude to food and emotional eaters showed signs of situational loss of control and a negative attitude towards over eating. A study conducted by Fisher *et al.* (1994) showed that

abnormal eating attitudes are present among urban and suburban students with differences in their manifestations and implications.

Dorothy *et al.* (1980) stated that for active teenagers three meals a day is not enough to satisfy their appetite. A diet survey conducted by Sarupriya and Mathew (1988) in Rajasthan found that all adolescents took two meals daily. A study conducted by Paul (1993) among adolescents of Kerala found that 80 per cent of adolescent boys and 60 per cent of adolescent girls took four meals daily.

Bundier *et al.* (1991) studied the breakfast habits of adolescents of France and found that breakfast was usually of traditional sort with coffee and milk, bread, butter and jam. Some urban girls of higher socio economic groups took yoghurt, fruit or fruit juices and cereals. Breakfast habits of Italians showed that most ate cereal or bread, less than 10 per cent ate yoghurt, fried eggs, fruit or pizza, 60 per cent had a milk drink, less than 20 per cent had milk, tea or coffee and less than 5 per cent had fruit juices (Lanica *et al.*, 1995).

Eating in between meals is a common practice possessed by adolescents. Musgrave *et al.* (1981) opined that there was no real difference in eating snacks between girls and boys. Pearce *et al.* (1987) reported that 15% of adolescent girls surveyed, viewed snack eating as eating out of control. Driskell and Korslund (1991) conducted a study on adolescent girls of USA and they reported that majority of the subjects having afternoon and evening snacks. Spyckerelle *et al.* (1991) stated that snacks provided as much energy as breakfast. According to them adolescents prefer snacks like bread, biscuits, cakes, pasteries, sweets and meats. Bull (1992) opined that developments in western dietary practices have tended to leave adolescents vulnerable to low intakes of energy and some nutrients, as snacking accounts for an increased proportion of dietary intake. From the study of Anderson *et al.* (1993) on adolescents of U.K. it was revealed that more than 40% of them ate crisps, confectionery or biscuits at least once a day.

Nibbling or eating in between is a common practice observed among adolescents in Kerala (Paul, 1993). Snacks ate in between meals reduced appetite and subsequently affected the food intake of adolescents. She also reported that 70% of adolescent girls and 60% of adolescent boys were found to possess the habit of eating in between meals. Snack consumption is negatively related to the self efficiency of adolescents for making healthful food choices (Cusatis and Shannon, 1996). Worthington (1988) and Philippe *et al.* (1988) observed that female adolescents were found to skip the breakfast, lunch and evening meal more often than males. They also found out that lack of time, dieting and not feeling well are the reasons reported by adolescents for skipping breakfast. Someya *et al.* (1989) reported that adolescents who skipped breakfast took more snacks. According to Wardle and Marsland (1990) dieting was more common in girls. Children attending schools and colleges often skip their breakfast and consume inadequate ill planned lunches (Mathew and Bhatnagar, 1992). According to Devadas (2000) many adolescents exhibit peculiar food habit such as meal skipping and irregular eating habits which are especially prevalent during middle and late adolescence. She also reported that lack of time, fasting, food dislikes and petty quarrels at home often force them to miss meals very often.

Philippe *et al.* (1988) from his study on adolescent girls in France, found that half of them ate fast foods about twice monthly. Erbersdobler (1991) realised that fast foods are more acceptable to adolescents. More than half of French adolescents studied by Bundier *et al.* (1991) went to fast food restaurants. Paul (1993) from her study reported that majority of the adolescents did not have the habit of taking food from outside the home. Devadas (2000) reported that boys easily develop a tendency to eat outside, especially from hotels than girls.

Sarojini and Vijayalakshmi (1989) reported that adolescent girls prefer less amounts of milk, milk products, fruits and green leafy vegetables. A study conducted by Worsley *et al.* (1993) on adolescents found that girls prefer fruits and vegetables and boys prefer foods rich in fat and sugar.

Reid (1993) recommended guidelines for healthy adolescents such as eat many different kinds of food each day, eat enough for growth and physical activity, choose foods low in fat, salt and sugar, choose snacks well, drink plenty of water every day and to avoid alcohol.

2.3 Food consumption pattern

Bozz *et al.* (1980) pointed out that intake of high nutritive value foods such as eggs and fish were found to be low in adolescents while intake of fruits and vegetables were below optimum. Pushpamma *et al.* (1982) conducted a diet survey among adolescents in Andhra Pradesh and found that intake was low for all foods except cereals. Sarupriya and Mathew (1988) conducted a diet survey among adolescents of a tribal village in Rajasthan and revealed that the intake of cereals was higher than that of recommended but that of pulses and roots and tubers was low and no leafy vegetables, fruits, nuts or oilseeds were consumed.

According to Sarojini and Vijayalakshmi (1989) consumption of foods by adolescent girls with moderate activity and heavy activity were very different from each other. They found that intake of milk, milk products and fruits was low in the case of girls with heavy activity and intake of green leafy vegetables was low in girls with moderate activity.

Spyckerelle *et al.* (1990) reported that intake of cheese, yoghurts, vegetables and fruits was greater in the higher socio-economic group. Half of their energy intake is from milk products, bread, sweets and pastries.

A study conducted by Michaud *et al.* (1990) on 481 French adolescents, it was found that 96 per cent consumed bread and biscuits, 90.4% consumed sugar products, 86.3% consumed green legumes, 74.2% consumed fresh fruits and 69.6% consumed cheese. Rajesh (1991) and Pandey (1995) observed that teenagers often eliminated leafy vegetables and thus lack nutrients which are important for their growth and development. Mathew and Bhatnagar (1992) in their study

observed that the daily consumption of cereals was 200-250 g and pulses was 20-30 g by adolescents, which was lower than the Recommended Dietary Allowances (RDA). The amount of protective foods like green leafy vegetables and fruits consumed by them were nil and the amount of milk, fat and sugar was slightly below the recommended amounts.

Paul (1993) reported that intake of cereals and fish was higher than recommended levels in adolescents of Kerala. The intake of pulses, other vegetables, fruits, and milk were lesser than RDA and consumption of green leafy vegetables was far below the recommended levels. Desai (1996) observed a low consumption of leafy vegetables among adolescents which resulted in low haemoglobin level. Lalmas *et al.* (1996) conducted a study on food intake and dietary habits of adolescents in South East Spain and found that they had very low intake of vegetables, milk products and fruits.

Story and Alton (1996) reported that adolescents consume higher than recommended amounts of dietary fat especially saturated fat and sodium and inadequate amounts of fruits, vegetables and fibre. Ahmed *et al.* (1997) collected food frequency data on vitamin A rich foods among female adolescents in Dhaka city and revealed that a large percentage of the subjects did not eat eggs (41%), milk (64%), liver (85%) and sweet pumpkin (85%). However, about 40 per cent of girls did eat dark green leafy vegetables.

A study conducted by Akkamahadevi *et al.* (1998) found out that the intake of green leafy vegetables, other vegetables, fruits, iron rich foods, cereals, pulses, sugar, jaggery and milk and milk products was low in adolescent girls. They also found that personal likes, dislikes, taboos, beliefs, religion, customs and poverty as some of the contributing factors leading to poor intake of foods.

The deficiency observed in the intake of different foods are reflected in the intake of nutrients also (Sarojini and Vijayalakshmi, 1989). A study conducted

by Michaud *et al.* (1989) found that energy intake was less than 30 per cent of RDA, protein and calcium intake was less than 20 per cent of RDA and lipid intake was excessive in French adolescents. Studies conducted by Reggiani *et al.* (1989) also reported that intake of energy by adolescents was lower than recommended for their age. Saini and Verma (1989) observed that the daily mean intake of energy in adolescent girls from high socio economic group was significantly more, compared to those from low socio-economic group.

Witschi *et al.* (1990) conducted a study on 200 adolescents of USA. It was found that 34 per cent of total energy was supplied by fat. Energy intake of boys was greater than girls but contribution of energy from protein, fat and carbohydrate was same for both sexes (Michaud *et al.*, 1991 and Spycykerelle *et al.*, 1991). Andersen *et al.* (1995) reported that among the Norwegian adolescents 31 per cent of energy was supplied by fat and 11.4 per cent by sugar.

The nutrient intake among adolescent girls belonging to poor socio-economic groups of rural area of Rajasthan showed that the diets were 26-36 per cent deficient in energy and 23-32 per cent deficient in protein (Chaturvedi *et al.*, 1996). Rao (1996) reported that calorie intake of adolescents in India was only around 70 per cent of RDA. Mean intake of energy, protein, vitamin B12, folic acid and iron was higher in the urban group compared to rural group of adolescents (Akkamahadevi *et al.*, 1998).

A study conducted by Lyhne (1998) in Danish adolescents revealed that the average daily energy intake was 9.4 MJ for girls and 12.4 MJ for boys. The distribution of energy was 34 per cent from fat, 49 per cent from carbohydrate, 14 per cent from protein, 3 per cent from alcohol and 13 per cent from added sugars.

Thimmayamma *et al.* (1982) have observed a decrease in the intake of energy, protein, and riboflavin with a decrease in socio-economic status among adolescents. Qin and Yu (1990) realised that the lack of protein, calcium, vitamin

A, vitamin B and vitamin B₂ was most serious among Chinese adolescents. According to Gunn *et al.* (1991) adolescents eating the highest amounts of added sugars consumed less protein and vitamin D than those who ate the lowest amounts of added sugars. The findings of Ajayi and Korede (1991) indicated that those who consumed staple diets based on roots and tubers or those who do not meet their needs for protein would have poor vitamin B₆ status.

Nagi *et al.* (1994) assessed the mean nutrient intake of adolescent girls and reported that the mean daily intake of energy, protein, iron and ascorbic acid was inadequate and intake of fiber and copper was sufficient when compared to the Indian Council of Medical Research (ICMR) recommendations. Manjula *et al.* (1995) reported that the mean intake of nutrients except fat, calcium and vitamin C for adolescents were less than the RDA suggested by ICMR. Kochhar *et al.* (1995) found that the diet consumed by adolescent girls of Punjab was deficient in energy, protein and iron but contained higher amounts of calcium, thiamin than ICMR recommendations. They also reported that income significantly influenced energy, protein, iron, beta carotene, riboflavin and ascorbic acid consumption.

Adolescent girls had lower intake of protective foods compared to boys resulting in calcium and vitamin A deficiency. Vitamin A and iron were the most limiting nutrients which were deficient to the extent of 70-85 per cent in all the age groups in both sexes (Premeela *et al.*, 1995). Calcium intake was inadequate among adolescent girls of USA (Matkovic *et al.*, 1990, Niedzwiedz *et al.*, 1992 and Albertson *et al.*, 1997). Calcium consumption during adolescence may influence the risk of osteoporosis in later life (Ryan *et al.*, 1997). According to Devadas (2000) some adolescents have a tendency to reject milk and to respond to peer pressure by consuming soft drinks which will frequently lead to calcium:phosphorus ratio less than 1:1.

Salar *et al.* (1990) assessed iron status among adolescents in Spain and found that most of the subjects studied had total iron intake lower than RDA.

Dietary sources of iron among English adolescents as reported by Moynihan *et al.* (1994) included meat and meat products (18.7%), breakfast cereals (14.8%), bread (11.9%) and potatoes (11.1%). Vegetables contributed only 3.4 per cent and the total intake of Iron was 11.7 mg/day in boys and 11.2 mg/day in girls. Samuelson *et al.* (1996) reported daily mean intake of iron in boys and girls are 18.7 and 14.2 mg respectively.

Adolescent girls who perform sustained physical exercise are highly susceptible to iron deficiency (Tait and Asp, 1996). Macvean *et al.* (1997) found out that 22 per cent of males and 98 per cent of females among Scottish adolescents were below the Recommended Nutrient Intake (RNI) for iron.

Zwiauwer *et al.* (1988) found out that during weight reduction vitamin A and vitamin E values decreases among adolescents. The percentage of calcium, iron, retinol and riboflavin met by adolescent boys and girls of Kerala were lower than RDA (Paul, 1993). Lyhne (1998) reported that the intakes of vitamin D, iodine and iron were low compared to recommended levels among adolescent girls.

2.4 Prevalence of nutritional disorders

Adolescents who were severely malnourished in pre-school age do exhibit longer growth spurt of lesser magnitude during adolescence (Cameron *et al.*, 1986). According to Joshi *et al.* (1998) early childhood malnutrition exerts its influence on adolescent growth.

Sarupriya and Mathew (1988) studied the nutritional status of adolescent boys and girls and reported that only 40 per cent had normal body weight and 60 per cent of the subjects had one or other variable signs of deficiency disease. Kapoor and Aneja (1992) assessed the nutritional status of adolescents in New Delhi belonging to different socio economic background and revealed that 65 per cent of low economic group had weight/height² ratio less than reference

standard. A study conducted by Nagi *et al.* (1995) on the nutritional status of adolescents in Ludhiana city revealed normal body weight and height. Chaturvedi *et al.* (1996) assessed the nutritional status of 941 adolescent girls in Rajasthan and the body mass index revealed that 8.1 per cent, 6.6 per cent and 78.8 per cent had chronic energy deficiency of grade I, II and III respectively.

Female children of poor socio economic status appear to have experienced the greatest disadvantage in terms of nutritional status (Rousham, 1997). Girls are in a most disadvantageous position and remain as unrecognized segment of the population when compared to boys (Devadas, 2000).

Greenwood (1978) has stated that iron deficiency anaemia is undoubtedly one of the most serious problems related to nutrition during adolescence.

Raman *et al.* (1985) reported that the incidence of anaemia was higher in rural girls than urban girls. Gopalan (1986) reported the incidence of anaemia as 60 per cent to 79 per cent in Indian girls. Amstrong (1989) found that 40 per cent of Irish adolescents were anaemic.

Studies by Qin and Yu (1990) among chinese adolescents reported iron deficiency anaemia among 46.8 per cent boys and 61.8 per cent girls. Hamdaoui *et al.* (1991) reported that 67 per cent of girls and 65 per cent of boys were anaemic among adolescents in Tunis, as defined by WHO.

Kapoor and Aneja (1992) reported that anaemia is a major health problem among adolescent boys and girls belonging to different socio economic backgrounds. A study conducted by Paul (1993) found that 30 per cent adolescent girls and 20 per cent of adolescent boys of Kerala are anaemic.

According to Nagi *et al.* (1994) clinical symptoms of anaemia and vitamin B complex deficiency were present in adolescent girls of Punjab. Studies

conducted by Kanani (1995) revealed that 65 to 75 per cent of the under privileged adolescent girls were anaemic. Iron deficiency anaemia is prevalent in many countries including U.K. (Chapman and Hall, 1995). Nagi *et al.* (1995), Chaturvedi *et al.* (1996), Ahmed *et al.* (1997) and Johndhale *et al.* (1999) also reported prevalence of anaemia among adolescents. Ninsing and Shaw (1996) opined that iron deficiency was more prevalent in females than in males and highest rate occurred in teenage girls. The assessment of nutritional status of adolescents in New Delhi belonging to different socio economic background by Kapoor and Aneja (1992) reported goitre grade I in a large proportion of adolescents. According to NNMB (1996) report, the total prevalence of goitre grade I was found to be 6-8 per cent in Kerala and 2 per cent of boys and girls had grade II goitre. The overall prevalence was marginally higher in girls (3.9%) as compared to boys (2.8%).

Stroz and Greene (1983) reported that one third of adolescents studied were obese and remained so as adults. Kapoor and Aneja (1992) reported prevalence of obesity among adolescents belonging to high income groups. Moon *et al.* (1992) realised that there were two peaks in prevalence rate of obesity, from 9 to 11 years and 15 to 17 years old. They also found gradual increase in the prevalence rate of obesity.

According to Giray *et al.* (1992) obesity was more frequent among students who had an obese mother or sibling. They also found out that higher the educational status of parents of adolescent girls had a decreasing effect on the prevalence of obesity. Story and Alton (1996) stated that nutrition related concerns among adolescents include the increasing prevalence of over weight and the use of unhealthy weight loss methods.

Spiegelere *et al.* (1998) concluded that social inequalities in obesity increases during early adolescence. Bagchi (1999) revealed that in many developing countries and in other parts of the world, young and adolescent girls

with more affluent diet, leaving their traditional food habits and adopting westernised practice developed obesity. She also observed that in India, adolescents from middle class families are more prone to develop diabetes, cerebrovascular accidents and heart diseases.

2.5 Life styles of adolescents

Factors such as inattention, impulsivity and hyperactivity consequent to poor behaviour, and self regulation pre-dispose to substance abuse (Swadi and Zeitlin, 1993), (Dawes *et al.*, 1997) (Schwartz, 1998).

Tobacco, inhalants, cannabis products, alcohol and stimulants are most commonly abused drugs by adolescent in the west (Jaffe, 1996).

Indian children did not seem to smoke as frequently as their western counterparts (Krishna, *et al.*, 1980). Mohan and Desai (1993) conducted a survey in India and reported that 0.2 to 0.3 per cent of general population used tobacco or alcohol and from that 2.5 per cent to 3.4 per cent in the age group 15-20 years.

A study conducted in Kerala by Paul (1993) revealed that none of the adolescents had unhealthy habits such as smoking, drinking, drug addiction etc. Smoking has increased among teenage girls of west (Swadi and Zeitlin, 1993).

Crawley (1993) conducted a study on Britain adolescents of 16 and 17 years and it was found that half of them drank alcohol. He also found that 6 per cent of females drank more than 2 units alcohol daily and 6 per cent of males drank more than 3 units alcohol daily.

According to Vidya (1995) approximately 5500 children and adolescents start using tobacco every day adding 2 million a year. A number of factors influence the use of tobacco by children and teenagers including adult use, peer influence, experimentation, easy access, personality factors, underlying

emotional or psychological problems associated other risk taking behaviours and most importantly, aggressive marketing by the cigarette industry. (Vidya, 1995), (Epps *et al.*, 1995), (Meijer *et al.*, 1996), (Epps *et al.*, 1998).

Parental separation, divorce and disturbed family relationship and peer drug use increase the likelihood of the adolescent's drug problem (Andrados, 1995), (Jaffe, 1996), (Miller, 1997). The common drugs of abuse amongst adolescents in India are tobacco and alcohol (Tripathi and Lal, 1999).

Materials and Methods

3. MATERIALS AND METHODS

The study on the “Food habits and nutritional profile of adolescents” was carried out to find out the food consumption pattern and nutritional status of adolescents (16-18 years of age) and to study the attitude of adolescents and their parents towards their eating habits.

3.1 Selection of the study area

The study was conducted in Thrissur Municipal area. From the list of Colleges/schools offering predegree and plus two courses four institutions were randomly selected for the study.

3.2 Selection of the samples

From each selected institution, adolescents in the age group of 16-18 years were selected proportionately at random so as to make a total sample size of 200 adolescents (100 boys and 100 girls). A subsample of 100 adolescents (50 boys and 50 girls) were randomly selected from the above sample for conducting clinical examination and anthropometric survey. Food weighment survey and haemoglobin estimation was carried out in a sub sample of ten adolescents (from a subsample of 100 adolescents). Adolescents belonged to families below poverty line and also adolescents residing in the hostels were excluded from the study.

3.3 Plan of action (Research plan)

Plan of action of the present study included

- 1) A base line survey to collect the socio-economic details of the families of the selected children and also to collect details of the adolescents who are selected for the study.
- 2) A dietary survey to assess the food consumption pattern of the family members especially the dietary habits of the adolescents in the family.

- 3) An attitude study to analyse the attitude towards the eating habits of adolescents among the adolescent respondents and their parents.
- 4) Assessment of nutritional status of selected adolescents by conducting,
 - a) An anthropometric survey to record the height and weight.
 - b) Clinical examination to identify manifestations of symptoms related to malnutrition.
 - c) A food weighing survey in a subsample of 10 adolescents to determine the actual food and nutrient intake.
 - d) Estimating the haemoglobin levels in a subsample of 10 adolescents.
- 5) Analysis of the data using suitable statistical techniques.

3.4 Methods selected for the study

(According to Devadas and Kulandaivel (1975) and Bass *et al.* (1979) interview method is reported to be the most suitable way for data collection since it proceeds systematically and records information quickly. Oral questionnaire and interview methods were used in this study to elicit information regarding socio-economic details as well as food and nutrient consumption pattern of the families. This method is most commonly used in diet surveys (Begum, 1991). The advantages of the interview method is that, it consists of face to face verbal interchange, it is not a time consuming method and therefore large number of families can be covered within a specific time.)

(Diet surveys constitute an essential part of any comprehensive study of nutritional status of individual or groups and provide essential information on nutrient intake levels, source of nutrition, food habits and attitudes (Gopaldas and Sheshadri, 1987). Rao and Rahman (1999) stated that in the upper middle and high income groups it would be appropriate to undertake a consecutive four or five day cumulative household diet survey to ascertain their dietary and nutrient intakes. In this study a three day food weighing survey was conducted among the subsample

of 10 adolescents. The exact amount of food consumed by the sample and the nutritive value of the foods consumed were computed.)

(The attitude of adolescents towards food and the attitude of parents towards the eating habits of adolescents were assessed using Likert's scale (Likerts, 1932). According to Bhatnagar (1981), Likert Technique is simple and easy to apply in the development of an attitude scale. Jha and Singh (1973) opined that Likert Technique is less time consuming.)

(According to Vijayaraghavan (1987) anthropometry has been accepted as an important tool for assessment of nutritional status. Gopaldas and Sheshadri (1987) opined that the extent of height deficit in relation to age as compared to regional standards may be regarded as a measure of the duration of malnutrition. Body weight is sensitive even to small changes in nutritional status due to childhood morbidities and rapid loss of body weight is an indicator of potential malnutrition (Rao and vijayaraghavan, 1996). In the present study anthropometric measurements such as height and weight were recorded by using standard method.)

(Clinical examination is the most important part of nutritional assessment as direct information on signs and symptoms of dietary deficiencies prevalent are obtained (Swaminathan, 1986). In this study also clinical examination of adolescent children were conducted.)

Biochemical estimation of haemoglobin was carried out using cyanmethaemoglobin method.

3.5 Development of tools

(Tools are instruments used in research, for gathering new facts (Sidhu, 1985 and Best, 1989). To elicit informations regarding the socio-economic and dietary pattern of the families oral questionnaire method was used. The interview schedule for obtaining the socio-economic characteristics of the families were

structured to include data on income and expenditure pattern of the family, educational level of the parents, living conditions and also details regarding the adolescents like birth order, morbidity pattern, life style and personal habits. The pretested questionnaire is presented in Appendix-I.)

(A separate questionnaire was prepared to elicit information on food habits and food consumption pattern of the families which included the details regarding the dietary habits of families mainly food expenditure pattern, frequency of use of various foods, use of different processed foods and beverages in the family and also food prepared on special occasions, food preferences, eating habits and daily meal pattern. The pretested schedule is presented in Appendix-II.)

(To test the attitude, forty eight statements were prepared for adolescents and forty five statements were prepared for parents. These statements were selected after discussion with experts and review of literature. Care was taken to include both positive and negative statements. These statements were administered to 30 respondents (non sample). They were asked to respond in terms of agreement or disagreement with statements in a 5 point Likerts scale - strongly agree (SA), agree (A), undecided (UD), disagree (DA) and strongly disagree (SDA).)

(After collecting the responses these statements were subjected to item analysis to examine how well each statement discriminates between respondents with different attitudes.)

(Item analysis was carried out by using the procedure suggested by Edwards (1957). The total score was found out for each respondent by summing up the scores obtained for all the statements. Each response was numerically scored 5, 4, 3, 2 and 1 for positive statements and the order was reversed for negative statements.)

(The respondents were arranged in a descending order of total scores. Twenty five per cent of subjects with highest score and 25 per cent of subjects with the lowest score were selected for item analysis. The following formula was used for evaluating the responses of the high and low group to each statement.

$$t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{SH^2}{n_H} + \frac{SL^2}{n_L}}}$$

where

\bar{X}_H - the mean score on a given statement for the high group

\bar{X}_L - the mean score on a given statement for the low group

SH^2 - the variance of the distribution of responses of the high group to the statement

SL^2 - the variance of the distribution of responses of the low group to the statement

n_H - the number of subjects in the high group

n_L - the number of subjects in the low group

(The value of 't' is a measure of the extent to which a given statement differentiates between the high and low groups. Any value of 't' equal to or greater than 1.75 was considered. The selected statements were arranged in ascending order of magnitude and ten statements having maximum 't' value were selected for the final scale. Six positive and four negative statements were selected from the statements given to adolescents. From the statements given to parents eight positive and 2 negative statements were selected. The statements are presented in Appendix III.)

(Suitably structured questionnaire was also developed for clinical examination and it is presented in Appendix V.)

Separate schedules were structured for food weightment survey and is presented in Appendix-IVa and IVb. Standardized food weighing balance and standard measuring cups and spoons were used for conducting the food weightment.

3.6 Conduct of the study

3.6.1 Survey of socio-economic and dietary pattern of the families and that of adolescents in the family

The information on the socio-economic and dietary pattern of the families were collected with the help of pretested questionnaires by interview method. Here the respondents were adolescents in the age group of 16-18 years and their parents. The accuracy of the answers were checked by supplementary questions, whenever necessary.

3.6.2 Attitude of adolescents and their parents

To test the attitude of adolescents and their parents towards the eating habits of adolescents, separate scales developed for this purpose were administered.

3.6.3 Clinical examination

Clinical examination was conducted in a sample of 100 adolescents (50 girls and 50 boys) with the help of a qualified physician.

3.6.4 Anthropometric survey

In this study height and weight of 100 adolescents (50 girls and 50 boys) were recorded using standardized procedures.

Height of the adolescents were measured using a fiber glass tape. The subject was asked to stand erect without shoes, with the heels, buttocks, shoulder and occipit against the wall.

Weight of adolescents were recorded using a bathroom balance which was checked by calibration with standard weights.

3.6.5 Food weightment survey

To assess the actual food and nutrient intake of adolescents, a three day food weightment survey was conducted in a subsample of 10 adolescents (5 girls and 5 boys). The weights of raw ingredients included in the meal for a day and the weight of cooked foods prepared by the family were recorded. Any other extra foods consumed by the adolescent like snacks, biscuits, toffees etc. outside the house was also recorded. All these weights were taken with standard measuring cups and spoons and also by means of a food weighing balance. The amount of cooked food consumed by the child was then converted to its raw equivalents. This was repeated for 3 consecutive days. The nutritive value of the food consumed was computed using food composition table (ICMR, 1989).

3.6.6 Estimation of haemoglobin

In this study biochemical estimation of blood for haemoglobin was carried out in a subsample of 10 adolescents to identify the prevalence of anaemia. This was carried out using cyanmethaemoglobin method as suggested by National Institute of Nutrition (NIN) (1983). The procedure is given in Appendix-VI.

3.6.7 Interpretation of data collected

To interpret the results the data were analysed using suitable statistical techniques such as analysis of variance, correlation analysis and multiple regression analysis.

Results

4. RESULTS

The results of the study on the "Food habits and nutritional profile of adolescents" are presented under the following headings.

- 4.1. Socio economic background of families, details regarding the adolescents and their personal habits
- 4.2. Food consumption pattern of families and dietary habits of adolescents
- 4.3. Attitude towards the eating habits of adolescents
- 4.4. Nutritional status of adolescents assessed by
 - a) Anthropometric measurements
 - b) Clinical examination
 - c) Food weighment survey
 - d) Haemoglobin levels

4.1(a) Socio economic background of families

Distribution of the families based on religion, type of family and family size are presented in Table 1.

Table 1 reveals that, 51 per cent of the families surveyed were Christians, 44 per cent were Hindus and 5 per cent were Muslims. Among Hindus 19 per cent of the families belonged to Nair community, 15.5 per cent belonged to other backward community and 9.5 per cent belonged to scheduled caste.

As revealed in the table majority of the families (80.5 per cent) followed nuclear family system while 19.5 per cent followed joint family system.

In the case of family size most of the families (80 per cent) had 1-2 adults and 20 per cent of the families had 3-4 adults. Two children were present in 75 per cent of the families. While 14 per cent of the families had three children,

Table 1. Distribution of families based on religion, type of family and family size

Details	Total No. of families (n=200)
Religion	
a) Hindus	88 (44.0)
1. Nair	38 (19.0)
2. OBC	31 (15.5)
3. SC	19 (9.5)
b) Christians	102 (51.0)
c) Muslims	10 (5.0)
Total	200
Type of family	
Joint	39 (19.5)
Nuclear	161 (80.5)
Family size	
Number of adults	
1-2	160 (80.0)
3-4	40 (20.0)
>4	-
Number of children	
1	17 (8.5)
2	150 (75.0)
3	28 (14.0)
>3	5 (2.5)

Figures in parenthesis indicate percentage
n - number of families

one child was observed in 8.5 per cent of the families and more than three children were present in 2.5 per cent of the families.

Educational status of parents are shown in Table 2.

Table 2. Educational status of parents

Educational status	Total No. of families (n = 200)	
	F	M
Illiterate	-	-
Lower Primary	-	2 (1)
Upper Primary	5 (2.5)	2 (1)
High School	37 (18.5)	42 (21)
College & Higher education	158 (79)	154 (77)
Total	200	200

F - Father, M - Mother

Figures in parenthesis indicate percentage

n - Number of families

Seventy nine per cent of fathers had higher education. In 18.5 per cent of the families fathers studied upto high school and 2.5 per cent of fathers had only Upper Primary level education.

Educational status of mothers revealed that, 77 per cent of them had higher education and 21 per cent of them completed high school education. One per cent of mothers studied upto upper primary level while one per cent of them had only lower primary level.

Occupational status of parents are given in Table 3.

Table 3. Occupational status of parents

Occupational status	Total No. of families (n = 200)	
	F	M
Private job	171 (85.5)	82 (41.0)
Government job	18 (9.0)	3 (1.5)
Unemployed	11 (5.5)	115 (57.5)
Total	200	200

F - Father, M - Mother

Figures in parenthesis indicate percentage

n - Number of families

From Table 3, it is clear that 57.5 per cent of mothers and 5.5 per cent of fathers were unemployed. Forty one per cent of mothers and 85.5 per cent of fathers were working in private sectors. Only 1.5 per cent of mothers and 9 per cent of fathers had regular government jobs.

Details regarding monthly income of the families are presented in Table 4.

Table 4. Monthly income of families

Monthly income (Rs.)	Total No. of families (n = 200)
<10000	35 (17.5)
10001-11000	56 (28.0)
11001-12000	11 (5.5)
>12000	98 (49.0)
Total	200

Figure in parenthesis indicate percentage
n - Number of families

Table 4 shows that, 49 per cent of the families had monthly income more than Rs.12000. Twenty eight per cent of the families had monthly income between Rs.10001 and 11000. Monthly income of 5.5 per cent of the families ranged between Rs.11001 to 12000 and 17.5 per cent of the families had monthly income below Rs.10001..

Distribution of the families based on their monthly expenditure pattern are given in Table 5a and 5b.

Table 5a reveals that, 37.5 per cent of the families spent 20-30 per cent of their monthly income on food and 80 per cent families spent less than 10 per cent of their monthly income on clothing.

Majority of the families (82.5%) did not spend anything for their shelter but 10.5 per cent of the families spent less than ten per cent of their monthly income on shelter.

Table 5(a). Distribution of families based on monthly expenditure pattern (n = 200)

Range of monthly expenditure (in percentage)	Food	Clothing	Shelter	Rent	Transportation	Education
<10	28 (14.0)	160 (80)	21 (10.5)	5 (2.5)	167 (83.5)	153 (76.5)
10-20	62 (31.0)	19 (9.5)	11 (5.5)	6 (3.0)	23 (11.5)	34 (17.0)
20-30	75 (37.5)	2 (1.0)	2 (1.0)	2 (1.0)	1 (0.5)	11 (5.5)
30-40	23 (11.5)	-	1 (0.5)	-	-	1 (0.5)
40-50	11 (5.5)	-	-	-	-	1 (0.5)
>50	1 (0.5)	-	-	-	-	-
Nil	-	19 (9.5)	165 (82.5)	177 (88.5)	9 (4.5)	-

Figures in parenthesis indicate percentage, n - Number of families

Table 5(b). Distribution of families based on monthly expenditure pattern

(n=200)

Range of monthly expenditure (in percentage)	Entertainment	Health	Savings	Personal expenses	Repayment of loans	Kuries	Fuel	Others
<10	171 (85.5)	150 (75)	80 (40)	84 (42)	82 (41)	108 (54)	182 (91)	32 (16)
10-20	11 (5.5)	13 (6.5)	63 (31.5)	17 (8.5)	35 (17.5)	39 (19.5)	18 (9)	9 (4.5)
20-30	4 (2)	1 (0.5)	15 (7.5)	5 (2.5)	10 (5)	15 (7.5)	-	6 (3)
30-40	-	-	4 (2)	1 (0.5)	3 (1.5)	-	-	2 (1)
40-50	-	-	2 (1)	-	-	-	-	-
>50	-	-	4 (2)	2 (1)	-	-	-	-
Nil	14 (7)	36 (18)	32 (16)	91 (45.5)	70 (35)	38 (19)	-	151 (75.5)

Figures in parenthesis indicate percentage, n - Number of families

More than half (83.5%) of the families spent less than ten per cent of their monthly income for transportation and 76.5 per cent of the families spent less than 10 per cent for education.

Table 5b reveals that expenditure on entertainment was below 10 per cent of the income for majority of the families (85.5%). Seven per cent of the families were with no expenditure on entertainment. About 5.5 per cent of the families spent 10-20 per cent of their income whereas, 2 per cent of the families spent 20-30 per cent of their income on entertainment.

Regarding expenditure on health, majority of the families (75%) spent below 10 per cent of their income on health aspects. Eighteen per cent of the families reported no monthly expenditure on health. About 40 per cent of the families saved only below 10 per cent of their monthly income. About 31.5 per cent of the families saved 10-20 per cent of their monthly income whereas 7.5 per cent of the families saved 20-30 per cent of their monthly income. About 16 per cent of the families reported no savings on their monthly income.

A higher percentage of the families (45.5%) reported no personal expenses but 42 per cent of the families spent below 10 per cent of their monthly income on personal expenses. About 8.5 per cent of families spent 10-20 per cent and 2.5 per cent families spent 20-30 per cent of their income on personal expenses.

For repayment of loans, 41 per cent of the families utilized below 10 per cent of their income whereas 35 per cent of the families did not have any expenditure on loan repayment. About 54 per cent of the families spent below 10 per cent of their income for payment of kuries. Ninety one per cent of the families spent below 10 per cent of their income on fuels.

Table 6. Housing conditions of families

Details	Total No. of families (n=200)
1. Ownership of house	
Own	187 (93.5)
Rented	13 (6.5)
2. No. of rooms	
1-2	7 (3.5)
3-4	135 (67.5)
6-8	41 (20.5)
8 and more	17 (8.5)
3. Usage of different rooms	
Drawing room & bed room	44 (22)
Drawing room, bed room & store room	35 (17.5)
Drawing room, bed room & study room	16 (8)
Bed room, store room & study room	5 (2.5)
All	100 (50)
4. Type of roof	
Tiled	21 (10.5)
Concrete	179 (89.5)
5. Type of floor	
Mosaic	132 (66)
Marble	39 (19.5)
Tiles	21 (10.5)
Granite	8 (4)
6. Housing loan	
Yes	66 (33)
No	134 (67)
7. Separate rooms for individual members	
Yes	145 (72.5)
No	55 (27.5)

Figures in parenthesis indicate percentage, n - Number of families

Table 7. Other living facilities of families

Details	Total No. of families (n = 200)
1. Source of drinking water	
Own well	172 (86)
Public tap	25 (12.5)
Public well	-
Tank	3 (1.5)
River	-
2. Lavatory facilities	
Own	200 (100)
Public	-
3. Drainage facilities	
Present	188 (94)
Absent	12 (6)
4. Electricity facility	
Present	200 (100)
Absent	-
5. Recreational facilities	
Own radio	-
Radio and T.V.	107 (53.5)
Radio, T.V. & V.C.R.	93 (46.5)
6. Transport facilities	
Public	26 (13)
Private	174 (87)
7. Membership in social organizations	
Yes	56 (28)
No	144 (72)
8. Name of organization	
a) Rotary club	-
b) Lions club	4 (7.1)
c) Mahila samajam	2 (3.6)
d) Co-operative society	39 (69.6)
e) Youth club	11 (19.6)
f) Others	-

Figures in parenthesis indicate percentage, n - Number of families

Housing conditions of the families such as ownership of the house, number of rooms, usage of different rooms, type of roof, type of floor etc. are given in Table 6.

From the above table, it is clear that nearly 94 per cent of the families had their own house and majority of the families (67.5%) had 3-4 rooms while 6-8 rooms were present in 20.5 per cent of the families.

Fifty per cent of the families had separate drawing room, bed room, study room and store room in their house. Twenty two per cent of the families had separate drawing room and bed room. Separate drawing room, bed room and store room was found in 17.5 per cent of the families.

Regarding roofing conditions, nearly 90 per cent of the families had concrete roofs. Mosaic flooring was seen in 66 per cent of the families. Sixty seven per cent of the families built their houses without any housing loans. Separate rooms for individual members were seen in 72.5 per cent of the families.

Other living facilities of the families are presented in Table 7.

From Table 7, it is found that 86 per cent of the families had their own well and 12.5 per cent of the families used public tap as a source of drinking water.

All the families had their own lavatory and electricity facilities. Drainage facility was present in 94 per cent of the families.

More than half of the families (53.5 per cent) used radio and Television (T.V) as their recreational media while 46.5 per cent of the families used radio, Television (T.V) and Video Cassette Recorder (V.C.R) as recreational agents. Most of the families (81 per cent) used own vehicles for transportation.

Only 23 per cent of the families were members in social organizations. Among them about 70 per cent were members in co-operative society.

Table 8. Details of labour saving devices in the family

Details	Total No. of families (n = 200)
1. Oven, mixi, grinder, juicer, electric cooker & washing machine	6 (3)
2. Oven, mixi, grinder and washing machine	4 (2)
3. Oven, mixi, chapathi maker, electric cooker and washing machine	1 (0.5)
4. Oven, mixi, chapathi maker, bread toaster, electric cooker and washing machine	4 (2)
5. Oven, mixi, grinder, bread toaster, washing machine and chapathi maker	5 (2.5)
6. Oven, mixi and heater	4 (2)
7. Oven, mixi, grinder, bread toaster, heater, juicer, electric cooker and washing machine	11 (5.5)
8. Oven, mixi, bread toaster and washing machine	3 (1.5)
9. Oven, mixi, grinder, electric cooker and washing machine	3 (1.5)
10. Mixi, grinder, dish washer and electric cooker	5 (2.5)
11. Mixi, grinder, heater, electric cooker and washing machine	1 (0.5)
12. Mixi, grinder, electric cooker and washing machine	4 (2)
13. Mixi, bread toaster, juicer, kitchen mate and washing machine	6 (3)
14. Mixi	13 (6.5)
15. Mixi bread toaster and washing machine	5 (2.5)
16. Mixi, grinder, heater and washing machine	12 (6)
17. Mixi, grinder and washing machine	12 (6)
18. Mixi, chapathi mixer and juicer	5 (2.5)
19. Mixi and grinder	8 (4)
20. Mixi, grinder, bread toaster, chapathi maker, juicer and washing machine	8 (4)
21. Mixi, grinder, chapathi maker and juicer	6 (3)
22. Mixi, heater, juicer, electric cooker and washing machine	5 (2.5)
23. Mixi, juicer and kitchen mate	4 (2)
24. Mixi, grinder and heater	2 (1)
25. Mixi, grinder, heater, juicer, chapathi maker, electric cooker and washing machine	10 (5)
26. Mixi, juicer and washing machine	8 (4)
27. Mixi, dishwasher, bread toaster, heater, electric cooker and washing machine	12 (6)
28. Mixi and washing machine	20 (10)
29. Mixi, grinder and chapathi maker	2 (1)
30. Mixi, chapathi maker and washing machine	11 (5.5)
Total	200

Figures in parenthesis indicate percentage, n = Number of families

Different labour saving devices used by the families are studied and the results are given in Table 8.

From Table 8, it was observed that all the families had mixi and most of the families used a combination of different labour saving devices such as washing machine, chapathi maker, bread toaster, heater, oven, dish washer etc.

Details of servants such as number of servants and works done by servants are shown in Table 9.

Table 9 shows that, majority of the families (63.5 per cent) had no servants at home while 36.5 per cent of the families had servants. Among these families 95.9 per cent had only one servant at home.

Details of works done by servants indicated that in 43.8 per cent of the families, servants were engaged in washing and cleaning, whereas, in 16.4 per cent of the families servants were engaged only for cleaning.

Table 9. Details regarding servants

Details	Total No. of families (n = 200)
Servants at home	
Yes	73 (36.5)
No	127 (63.5)
No. of servants at home	
1	70 (95.9)
2	3 (4.1)
3	-
>3	-
Works done by servants	
Cleaning	12 (16.4)
Washing	3 (4.1)
Purchasing	4 (5.5)
All	6 (8.2)
Cooking and cleaning	2 (2.7)
Cooking & washing	3 (4.1)
Cooking, washing & cleaning	7 (9.6)
Cleaning & purchasing	4 (5.5)
Washing & cleaning	32 (43.8)

Figures in parenthesis indicate percentage, n - Number of families

4.1(b) Details regarding the selected adolescent in the family

Details regarding the selected adolescents in the families are given in Table 10.

Among the selected adolescents 37 per cent of the boys and 64 per cent of the girls had normal birth weight while 24 per cent of the boys and 18 per cent of the girls had a birth weight above the normal. About 39 per cent boys and 18 per cent girls had low birth weight.

Table 10. Details of selected adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
Gender			
Male	100 (100)	-	100 (50)
Female	-	100 (100)	100 (50)
Birth weight			
<2.5 kg	39 (39)	18 (18)	57 (28.5)
2.5-3 kg	37 (37)	64 (64)	101 (50.5)
>3 kg	24 (24)	18 (18)	42 (21)
Birth order			
1 st	46 (46)	45 (45)	91 (45.5)
2 nd	48 (48)	47 (47)	95 (47.5)
3 rd	5 (5)	7 (7)	12 (6)
4 th	1 (1)	1 (1)	2 (1)
Immunization status			
Complete	85 (85)	95 (95)	180 (90)
Partially complete	12 (12)	4 (4)	16 (8)
Not taken	3 (3)	1 (1)	4 (2)

Figures in parenthesis indicate percentage, n - Number of adolescents

The above table reveals that, 48 per cent of the boys and 47 per cent of the girls belonged to the second birth order. Forty six per cent of the boys and forty five per cent of the girls belonged to first birth order. Only 5 per cent of boys and 7 per cent of girls belonged to the 3rd birth order and the rest (1%) belonged to 4th birth order.

The details of immunization status is also presented in the above table and it shows that, 85 per cent of the boys and 95 per cent of the girls had taken their immunization completely. But 3 per cent of the boys and 1 per cent of the girls had not taken any of the immunizations. Among boys, 12 per cent and among girls, 4 per cent were found to have taken their immunization partially.

Morbidity pattern of the adolescents for the past one year is presented in Table 11.

Table 11. Morbidity pattern of adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
Diarrhoea and vomiting	18 (18)	10 (10)	28 (14)
Measles	11 (11)	6 (6)	17 (8.5)
Chickenpox	5 (5)	6 (6)	11 (5.5)
Mumps	1 (1)	5 (5)	6 (3)
Fever	59 (59)	65 (65)	124 (62)
Jaundice	3 (3)	3 (3)	6 (3)
Respiratory disease	2 (2)	4 (4)	6 (3)
Others (Allergy)	1 (1)	1 (1)	2 (1)
Total	100	100	200

Figures in parenthesis indicate percentage, n - Number of adolescents

The above table shows that 59 per cent of the boys and 65 per cent of the girls had fever and 18 per cent of the boys and 10 per cent of the girls had diarrhoea and vomiting. Communicable diseases like measles was found to occur more in boys (11%) than in girls (6%). Regarding chickenpox, it was more among girls (6%) than boys (5%).

4.1(c) Personal habits of adolescents

Utilization of various information sources by adolescents are given in Table 12.

Table 12. Utilization of information sources by adolescents

Information sources	Frequency of use (n = 200)			
	Daily	Occasionally	Never	Total
1. Reading newspapers				
Boys (n = 100)	88 (88)	11 (11)	1 (1)	100
Girls (n = 100)	88 (88)	12 (12)	-	100
Total (n = 200)	176 (88)	23 (11.5)	1 (0.5)	200
2. Reading weeklies /Magazines and newspapers				
Boys (n = 100)	20 (20)	78 (78)	2 (2)	100
Girls (n = 100)	17 (17)	83 (83)	-	100
Total (n = 200)	37 (16.5)	161 (80.5)	2 (1)	200
3. Watching T.V. news and reading newspapers				
Boys (n = 100)	85 (85)	15 (15)	-	100
Girls (n = 100)	76 (76)	24 (24)	-	100
Total (n = 200)	161 (80.5)	39 (19.5)	-	200

Figures in parenthesis indicate percentage, n = Number of adolescents

From Table 12, it is clear that 88 per cent of both boys and girls read the newspapers daily. Nearly 78 per cent of the boys and 83 per cent of the girls read weeklies and magazines occasionally along with newspapers. Watching T.V. news and reading newspapers were done daily by 85 per cent of the boys and 76 per cent of the girls.

Details regarding number of friends, membership in organizations and the type of participation in organizations by the adolescents are presented in Table 13.

It is observed from the above table that, 51 per cent of the boys and 30 per cent of the girls had more than ten friends. Thirty two per cent of the girls had 1-3 friends whereas it was only 17 per cent among boys. Another 32 per cent of the

girls had 4-7 friends and this was also found to be less among boys (15%). One per cent of the adolescents, both boys and girls were with no friends.

Table 13. Details of friends and membership in organizations by adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
No. of friends			
Nil	1 (1)	1 (1)	2 (1)
1-3	17 (17)	32 (32)	49 (24.5)
4-7	15 (15)	32 (32)	47 (23.5)
8-10	16 (16)	5 (5)	21 (10.5)
>10	51 (51)	30 (30)	81 (40.5)
Total	100	100	200
Membership in organizations			
Yes	19 (19)	12 (12)	31 (15.5)
No	81 (81)	88 (88)	169 (84.5)
Mode of participation			
Active	11 (58)	9 (75)	20 (64.5)
Not active	8 (42)	3 (25)	11 (35.5)

Figures in parenthesis indicate percentage, n - Number of adolescents

Regarding membership in various organizations, majority of the boys (81%) and girls (88%) were not having membership in any of the social organizations. Only 19 per cent of the boys were members and among girls it was 12 per cent. Even among the members only 58 per cent of the boys actively participated in organizational activities whereas, among girls active participation was found to be 75 per cent.

Mode of conveyance to college and school by adolescents is explained in Table 14.

Table 14. Mode of conveyance to college and school

Mode of conveyance	Boys (n = 100)	Girls (n 100)	Total (n = 200)
a) Private	26 (26)	13 (13)	39 (19.5)
Own car	-	8 (8)	8 (4)
Own two wheeler	6 (6)	5 (5)	11 (5.5)
Own bicycle	20 (20)	-	20 (10)
b) Public	71 (71)	63 (63)	136 (68)
Bus	71 (71)	63 (63)	134 (67)
Jeep	-	-	-
Van	-	-	2 (1)
c) By walking	3 (3)	22 (22)	25 (12.5)

Figures in parenthesis indicate percentage, n - No. of adolescents

Table 14 indicates that, 26 per cent of the boys and 13 per cent of the girls were going to college and school in their own vehicle. Twenty per cent of the boys used bicycle while 6 per cent used their own two wheelers. Eight per cent girls used their own car while 5 per cent used their own two wheelers. Majority of the boys (71%) and girls (63%) were dependent public conveyance to reach the college and school. Three per cent of boys and 22 per cent of the girls reached college and school by walking.

Table 15. Frequency of seeing movies and watching T.V.

Frequency	Seeing movies			Watching T.V.		
	Boys (n=100)	Girls (n=100)	Total (n=200)	Boys (n=100)	Girls (n=100)	Total (n=200)
Daily	-	-	-	100 (100)	100 (100)	200 (100)
Once in a week	27 (27)	59 (59)	86 (43)	-	-	-
Once in a month	16 (16)	6 (6)	22 (11)	-	-	-
Several times in a week	12 (12)	3 (3)	15 (7.5)	-	-	-
Occasionally	45(45)	32 (32)	77 (39.5)	-	-	-
Never	-	-	-	-	-	-
Total	100	100	200	100	100	200

Figures in parenthesis indicate percentage, n = Number of adolescents

Table 16. Leisure time activities of adolescents

Activities	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
1. Helping parents	4 (4)	7 (7)	11 (5.5)
2. Watching T.V.	7 (7)	8 (8)	15 (7.5)
3. Gossiping	-	3 (3)	3 (1.5)
4. Seeing film	5 (5)	3 (3)	8 (4)
5. Reading	5 (5)	10 (10)	15 (7.5)
6. Being with friends	7 (7)	-	7 (3.5)
7. Sports and games	12 (12)	-	12 (6)
8. Arts	3 (3)	-	3 (1.5)
9. Helping parents and watching T.V.	2 (2)	6 (6)	8 (4)
10. Helping parents, watching T.V. & reading	3 (3)	10 (10)	13 (6.5)
11. Helping parents, seeing film & being with friends	2 (2)	1 (1)	3 (1.5)
12. Helping parents, watching, T.V., reading & being with friends	-	4 (4)	4 (2)
13. Helping parents, seeing film & reading	-	2 (2)	2 (1)
14. Helping parents, watching T.V., seeing film & reading	-	2 (2)	2 (1)
15. Helping parents, seeing film, watching T.V. & being with friends	1 (1)	1 (1)	2 (1)
16. Helping parents, watching T.V., gossiping & seeing film	-	1 (1)	1 (0.5)
17. Helping parents, watching T.V. & being with friends	1 (1)	3 (3)	4 (2)
18. Helping parents and arts	-	4 (4)	4 (2)
19. Helping parents and being with friends	2 (2)	1 (1)	3 (1.5)
20. Helping parents, watching T.V. & sports and games	1 (1)	-	1 (0.5)
21. Helping parents & sports and games	8 (8)	-	8 (4)
22. Helping parents, being with friends, sports and games and arts	2 (2)	-	2 (1)
23. Watching T.V. & being with friends	3 (3)	2 (2)	5 (2.5)
24. Watching T.V., seeing film & reading	2 (2)	3 (3)	5 (2.5)
25. Watching T.V. & reading	4 (4)	16 (16)	20 (10)
26. Watching T.V., seeing film, reading & being with friends	1 (1)	2 (2)	3 (1.5)
27. Watching T.V., reading & being with friends	2 (2)	1 (1)	3 (1.5)
28. Watching T.V., reading, arts & sports and games	2 (2)	1 (1)	3 (1.5)
29. Watching T.V., seeing film, reading, arts	-	2 (2)	2 (1)

Contd.

Table 16. Continued

Activities	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
30. Watching T.V., Gossiping and being with friends	-	1 (1)	1 (0.5)
31. Watching T.V., being with friends, sports & games	4 (4)	-	4 (2)
32. Watching T.V., seeing film, sports & games	-	1 (1)	1 (0.5)
33. Watching T.V., reading & sports and games	4 (4)	1 (1)	5 (2.5)
34. Reading and being with friends	2 (2)	1 (1)	3 (1.5)
35. Reading and arts	-	1 (1)	1 (0.5)
36. Reading, sports and games	2 (2)	-	2 (1)
37. Reading, being with friends, sports & games	2 (2)	-	2 (1)
38. Being with friends, sports and games	7 (7)	-	7 (3.5)
39. Gossiping and being with friends	-	2 (2)	2 (1)
Total	100	100	200

Figures in parenthesis indicate percentage, n = Number of adolescents

Table 15 deals with the frequency of seeing movies and watching T.V. by adolescents.

This table reveals that, all adolescents watched T.V. daily. Forty five per cent of the boys and 32 per cent of the girls saw movies occasionally. Twenty seven per cent of boys and 59 per cent of girls saw movies once in a week. Among boys 12 per cent reported of seeing movies several times in a week whereas it was only 3 per cent among girls.

Leisure time activities of the adolescents are presented in Table 16.

Table 16 shows that 12 per cent of the boys were interested in sports and games during their free time. Sixteen per cent of the girls were interested in watching T.V. programmes and reading.

Purchasing trend of adolescents motivated by T.V advertisements are shown in Table 17.

The above table reveals that, 93 per cent of the boys and 99 per cent of the girls watched T.V advertisements. Among them 78 per cent of the boys and 91 per cent of the girls were motivated by the advertisements to purchase different processed foods. There is no significant difference between boys and girls in their trend to purchase processed foods motivated by T.V advertisements.

Types of processed foods preferred by adolescents are also given in Table 17. It was observed that, 30.8 per cent of the boys preferred soft drinks, 16.7 per cent preferred chocolates and 12.8 per cent preferred biscuits. Among girls nearly 21 per cent preferred chocolates, 18.7 per cent preferred soft drinks and 19.8 per cent preferred both soft drinks and chocolates.

Table 18 deals with the breakfast and lunch pattern of adolescents.

Table 17. Purchasing trend of processed foods by adolescents motivated by T.V advertisements

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
a. Adolescents purchasing processed foods motivated by T.V advertisements	78 (78)	91 (91)	169 (84.5)
b. Adolescents not motivated by T.V. advertisements	15 (15)	8 (8)	23 (11.5)
Adolescents watching T.V advertisements	93 (93)	99 (99)	192 (96)
Total	100	100	200
	T.V.= 3.84		$\chi^2 = 3.068$ (N.S.)
Processed foods purchased			
1. Soft drinks	24 (30.8)	17 (18.7)	41 (24)
2. Chocolates	13 (16.7)	19 (20.9)	32 (19)
3. Snacks	1 (1.3)	1 (1.1)	2 (1.2)
4. Biscuits	10 (12.8)	5 (5.5)	15 (8.9)
5. Ice cream	4 (5.1)	-	4 (2.4)
6. Soft drinks, chocolates & Ice cream	7 (8.9)	5 (5.5)	12 (7.1)
7. Soft drinks & chocolates	6 (7.7)	18 (19.8)	24 (14.2)
8. Soft drinks, chocolates & snacks	-	1 (1.1)	1 (0.6)
9. Soft drinks, chocolates, snacks, biscuits & ice cream	-	1 (1.1)	1 (0.6)
10. Soft drinks & snacks	1 (1.3)	1 (1.1)	2 (1.2)
11. Soft drinks, snacks, biscuits & chocolates	-	1 (1.1)	1 (0.6)
12. Soft drinks, snacks & biscuits	-	1 (1.1)	1 (0.6)
13. Soft drinks & biscuits	2 (2.6)	2 (2.2)	4 (2.4)
14. Soft drinks, chocolates, ice cream & biscuits	1 (1.3)	2 (2.2)	3 (1.8)
15. Soft drinks & ice cream	1 (1.3)	3 (3.3)	4 (2.4)
16. Soft drinks, chocolates & biscuits	2 (2.56)	-	2 (1.2)
17. Snacks & chocolates	1 (1.3)	2 (2.2)	3 (1.8)
18. Snacks, chocolates & biscuits	1 (1.3)	2 (2.2)	3 (1.8)
19. Chocolates & biscuits	-	5 (5.5)	5 (3)
20. Chocolates & ice cream	2 (2.56)	3 (3.3)	5 (3)
21. Chocolates, biscuits & ice cream	-	-	-
22. Ice cream & biscuits	2 (2.6)	2 (2.2)	4 (2.4)
Total	78 (100)	91 (100)	169 (100)

Figure in parenthesis indicate percentage, N-number of adolescents
 χ^2 - Chi square; T.V. - Table value; N.S. - Not significant

Table 18. Breakfast & lunch pattern of adolescents

Details	Boys (n = 100)	Girls (n =100)	Total (n = 200)
Adolescents taking Breakfast	97 (97)	95 (95)	192 (96)
Adolescents taking Packed lunch	97 (97)	96 (96)	193 (96.5)
Type of packed lunch			
a) Bread	2 (2.1)	2 (2.1)	4 (2.1)
b) Rice	92 (94.8)	84 (87.5)	176 (91.2)
c) Breakfast item	3 (3.1)	10 (10.4)	13 (6.7)
Total	97 (100)	96 (100)	193 (100)

Figures in parenthesis indicate percentage n - number of adolescents

Table 18 reveals that, 97 per cent of the boys and 95 per cent of the girls took their breakfast daily. Ninety seven per cent of the boys and ninety six per cent of the girls were taking packed lunches.

Among the adolescents 94.8 per cent of the boys and 87.5 per cent of the girls preferred rice for lunch. While 10.4 per cent of girls preferred breakfast items for lunch.

Details of pocket money received by adolescents is shown in Table 19.

From the above table, it is clear that 85 per cent of the adolescent boys and 62 per cent of the adolescent girls received pocket money. Among them 43.5 per cent boys and 32.3 per cent girls received more than twenty five rupees per week as their pocket money.

Table 19. Details of pocket money received by adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
Pocket money received			
Yes	85 (85)	62 (62)	147 (73.5)
No	15 (15)	38 (38)	53 (26.5)
Total	100	100	200
Pocket money received / week (Rs.)			
5-10	12 (14.1)	7 (11.3)	19 (12.9)
10-15	13 (15.3)	14 (22.6)	27 (18.4)
15-20	17 (20)	11 (17.7)	28 (19)
20-25	6 (7.1)	10 (16.1)	16 (10.9)
> 25	37 (43.5)	20 (32.3)	57 (38.8)
Total	85 (100)	62 (100)	147 (100)
Percentage of pocket money spent (%)			
Nil	15 (17.6)	18 (29)	33 (22.4)
< 10	8 (9.4)	-	8 (5.4)
10-20	12 (14.1)	14 (22.6)	26 (17.7)
20-30	3 (3.5)	5 (8.1)	8 (5.4)
30-40	8 (9.4)	2 (3.2)	10 (6.8)
40-50	7 (8.2)	10 (16.1)	17 (11.6)
> 50	32 (37.6)	13 (20.9)	45 (30.6)
Total	85 (100)	62 (100)	147 (100)

Figure in parenthesis indicate percentage, n - Number of adolescents

Table 20. Mode of spending pocket money

Mode of spending	Boys (n = 85)	Girls (n = 62)	Total (n = 147)
1. Eating out side	11 (12.9)	6 (9.7)	17 (11.6)
2. Books	4 (4.7)	9 (14.5)	13 (8.8)
3. Dress	2 (2.4)	2 (3.2)	4 (2.7)
4. Film	7 (8.2)	-	7 (4.8)
5. Cassettes	3 (3.5)	-	3 (2)
6. Savings	15 (17.6)	18 (29.0)	33 (22.4)
7. Smoking	1 (1.2)	-	1 (0.7)
8. Eating outside, books, cassettes & savings	1 (1.2)	1 (1.6)	2 (1.4)
9. Eating outside & savings	6 (7.1)	4 (6.4)	10 (6.8)
10. Eating outside, books & dress	-	1 (1.6)	1 (0.7)
11. Eating outside & books	2 (2.4)	3 (4.8)	5 (3.4)
12. Eating outside & dress	1 (1.2)	1 (1.6)	2 (1.4)
13. Eating outside, cassettes & savings	1 (1.2)	1 (1.6)	2 (1.4)
14. Eating outside & film	6 (7.1)	-	6 (4.1)
15. Eating outside & cassettes	1 (1.2)	-	1 (0.7)
16. Eating outside, dress & cassettes	8 (9.4)	1 (1.6)	9 (6.1)
17. Books & savings	4 (4.7)	10 (16.1)	14 (9.5)
18. Books & cassettes	1 (1.2)	4 (6.5)	5 (3.4)
19. Books & film	1 (1.2)	-	1 (0.7)
20. Dress & savings	2 (2.4)	1 (1.6)	3 (2)
21. Dress & film	3 (3.5)	-	3 (2)
22. Film & savings	2 (2.4)	-	2 (1.4)
23. Film & cassettes	3 (3.5)	-	3 (2)

Figures in parenthesis indicate percentage, n - No. of adolescents

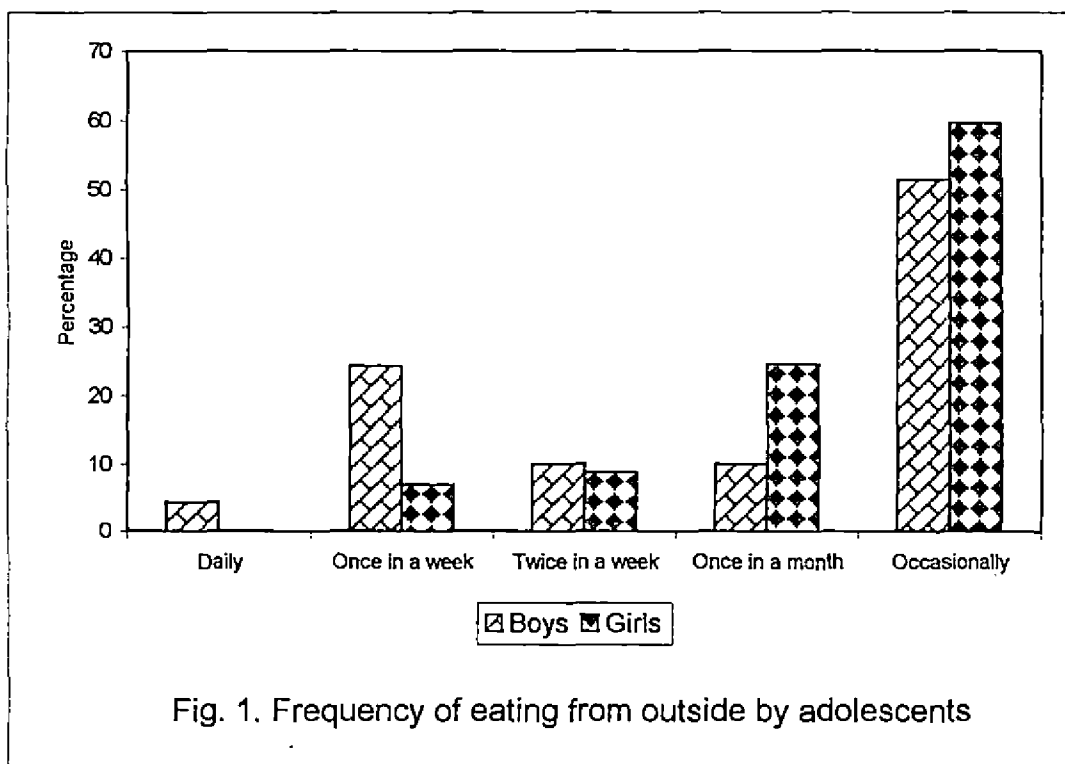
Table 21. Eating outside habits of adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
Adolescents eating from outside	70 (70)	57 (57)	127 (63.5)
Adolescents not eating from outside	30 (30)	43 (43)	73 (36.5)
Total	100	100	200
	T.V.=3.84		$\chi^2=3.77$ (N.S.)
Frequency of eating from outside	n=70	n=57	n=127
Daily	3 (4.3)	-	3 (2.4)
Once in a week	17 (24.3)	4 (7.0)	21 (16.5)
Twice in a week	7 (10)	5 (8.8)	12 (9.4)
Once in a month	7 (10)	14 (24.6)	21 (16.5)
Occasionally	36 (51.4)	34 (59.6)	70 (55.1)
Total	70	57	127
	T.V.=9.44		$\chi^2=61.12^*$
Eating outside with			
Family members	30 (42.9)	52 (91.2)	82 (64.6)
Friends	32 (45.7)	5 (8.8)	37 (29.1)
Both	8 (11.4)	-	8 (6.3)
	T.V.= 3.84		$\chi^2=4.89^*$
Types of food preferred			
Vegetarian	28 (40)	23 (40.4)	51 (40.2)
Non vegetarian	30 (42.9)	25 (43.9)	55 (43.3)
Both	12 (17.1)	9 (15.8)	21 (16.5)
	T.V.=3.84		$\chi^2=0.003$ (N.S.)

Figures in parenthesis indicate percentage, n - Number of adolescent

χ^2 - Chi square; T.V. - Table value

* - Significant at 5% level; N.S. - Not significant



Nearly 38 per cent of the boys and 20.9 per cent of the girls spent more than 50 per cent of their pocket money. Boys (14.1%) and 9.4 per cent spent between 10-20 per cent and 30-40 per cent respectively of their pocket money. Regarding girls 22.6 per cent spent 10-20 per cent of their pocket money and another 16.1 per cent of the girls spent 40-50 per cent of their pocket money. From the above table, it is clear that 17.6 per cent boys and 29 per cent girls saved their pocket money.

Table 20 explains the mode of spending pocket money by adolescents.

Nearly 13 per cent of boys spent their pocket money to eat from outside. Where as 14.5 per cent girls spent their pocket money on books.

Eating outside habits of adolescents were studied and the results are presented in Table 21.

Seventy per cent of the boys and 57 per cent of the girls were having the habit of eating from outside. Results when statistically analysed by Chisquare test, revealed that there was no significant difference between boys and girls in their eating outside behaviour.

Frequency of eating from outside was analysed and it was found that 51.4 per cent of the boys ate occasionally from outside, while 24.3 per cent ate once in a week and 4.3 per cent ate daily from outside. Among girls 59.6 per cent ate occasionally and 24.6 per cent ate once in a month. Eating daily from outside was not observed among girls. Statistically (Chi square test) it was found that there is significant difference between boys and girls in their frequency of eating from outside. Frequency of eating from outside habits of adolescents is depicted in Fig.1.

Boys (57.1%) ate from outside with non family members ie, friends and 42.9 per cent of the boys went outside with family members. Among girls 91.2 per

Table 22: Preference of branded soft drinks by adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
Adolescents preferring branded soft drinks	95 (95)	86 (86)	181 (90.5)
Adolescents not preferring soft drinks	5 (5)	14 (14)	19 (9.5)
Total	100	100	200
	----- T.V.= 3.84		----- $\chi^2=4.02^*$
Type of preference	Boys (n=95)	Girls (n=86)	Total (n=181)
1. Cocacola	22 (23.2)	15 (17.4)	37 (20.4)
2. Thumsup	3 (3.2)	-	3 (1.7)
3. Pepsi	22 (23.2)	16 (18.6)	38 (20.9)
4. Mirinda	10 (10.5)	13 (15.1)	23 (12.7)
5. Limca	3 (3.2)	-	3 (1.7)
6. Cocacola & Mirinda	6 (6.3)	2 (2.3)	8 (4.4)
7. Cocacola & Pepsi	14 (14.7)	10 (11.1)	24 (13.3)
8. Cocacola, Pepsi & Fanta	-	1 (1.2)	1 (0.6)
9. Cocacola, Pepsi & Limca	1 (1.1)	1 (1.2)	2 (1.1)
10. Cocacola, Pepsi & Mirinda	7 (7.4)	8 (9.3)	15 (8.3)
11. Cocacola, Pepsi, Mirinda & Fanta	3 (3.2)	3 (3.5)	6 (3.3)
12. Cocacola, Thumsup & Pepsi	1 (1.1)	1 (1.2)	2 (1.1)
13. Cocacola, Thumsup, Pepsi & Mirinda	2 (2.1)	1 (1.2)	3 (1.7)
14. Cocacola & Fanta	-	1 (1.2)	1 (0.6)
15. Cocacola & Thumsup	-	1 (1.2)	1 (0.6)
16. Pepsi & Mirinda	1 (1.1)	6 (7)	7 (3.9)
17. Mirinda & Fanta	-	3 (3.5)	3 (1.7)
18. Mirinda & Limca	-	2 (2.3)	2 (1.1)
19. Fanta & Limca	-	2 (2.3)	2 (1.1)
Total	95 (100)	86 (100)	181 (100)

Figures in parenthesis indicate percentage, n - Number of adolescents

χ^2 - Chi square; T.V. - Table value

* - Significant at 5% level

cent ate from outside with family members and only 8.8 per cent ate from outside with non family members like friends. Statistical analysis as revealed by Chi square test indicated that there is significant difference between boys and girls with whom they are going out for eating.

Type of food preferred by adolescents were also studied and it was found that most of the boys (42.9%) and girls (43.9%) preferred non vegetarian foods. No significant difference was observed between boys and girls in their food preference.

Preference of branded soft drinks by adolescents are given in Table 22.

From the above table, it is clear that 95 per cent of the boys and 86 per cent of the girls preferred branded soft drinks. Chi square test shows a significant difference between boys and girls in their preference of branded soft drinks.

Type of preference of soft drinks was also studied and it was found that 23.2 per cent of the boys preferred both Cocacola and Pepsi. While 18.6 per cent of the girls preferred Pepsi and 17.4 per cent preferred Cocacola. More girls (15.1%) preferred Mirinda than boys (10.5%). Remaining adolescents preferred a combination of different soft drinks.

Celebration of special occasions and the details of celebrating special occasions were enquired and the results are presented in Table 23.

From Table 23 it was found that 92 per cent of the boys and 95 per cent of the girls celebrated special occasions. Chi square test reveals that there was no significant difference between boys and girls in their celebration of special occasions.

Among adolescent boys 37 per cent celebrated birthday and 22.8 per cent celebrated both birthday and marriage in their family. Fourty two per cent

Table 23. Celebration of special occasions by adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
1. Adolescents celebrating occasions	92 (92)	95 (95)	187 (93.5)
2. Adolescents not celebrating occasions	8 (8)	5 (5)	13 (6.5)
Total	100 <hr/> T.V.=3.84	100	200 <hr/> $\chi^2=0.00$ (N.S.)
3. Types of occasions celebrating			
a. Birthday	34 (37)	24 (25.3)	58 (31)
b. Passing exam	11 (12)	5 (5.3)	16 (8.6)
c. Marriage	5 (5.4)	9 (9.5)	14 (7.5)
d. Birthday and marriage	21 (22.8)	40 (42)	61 (32.6)
e. Birthday & passing exam	7 (7.6)	7 (7.4)	14 (7.5)
f. Birthday, passing exam & marriage	7 (7.6)	3 (3.2)	10 (5.3)
g. Passing exam & marriage	2 (2.2)	1 (1.1)	3 (1.6)
h. Others	5 (5.4)	6 (6.3)	11 (5.9)
Total	92 (100)	95 (100)	187 (100)
4. Occasions celebrating with family members	34 (37)	46 (48)	80 (42.8)
Friends	11 (12)	-	1 (5.9)
Both	47 (51)	49 (51.6)	96 (51.3)
	<hr/> T.V.=3.84		<hr/> $\chi^2=3.98^*$
5. Place of celebration			
Home	53 (57.6)	77 (81.1)	130 (69.5)
Outside	24 (26.1)	11 (11.5)	35 (18.7)
Both	15 (16.3)	7 (7.4)	22 (11.8)
	<hr/> T.V.=3.84		<hr/> $\chi^2=4.18^*$

Figures in parenthesis indicate percentage; n - Number of adolescents; χ^2 - Chi square
T.V. - Table value; * - Significant at 5% level; N.S. - Not significant

girls celebrated birthday and marriage in their family and 25.3 per cent girls celebrated only birthday. Twelve per cent of the boys celebrated passing the exams while only 5.3 per cent of the girls celebrated passing of exams. Statistically there was no significant difference between boys and girls regarding the type of occasions they are celebrating.

The above table also revealed that both boys (51 per cent) and girls (51.6 per cent) celebrated various occasions with their family members and friends. Among boys 37 per cent celebrated occasions with family members alone, whereas, in girls it was 48 per cent. Twelve per cent of the boys celebrated occasions with their friends only. Chi square test revealed that there was significant difference between boys and girls with whom they are celebrating occasions.

Regarding the place of celebration 81.1 per cent of the girls celebrated occasions at home whereas, among boys it was only 57.6 per cent. Among boys, 26.1 per cent celebrated occasions outside and it was only 11.5 per cent among girls. Statistical analysis revealed that there was a significant difference between boys and girls regarding their place of celebrating various occasions.

Table 24 deals with weight consciousness of the adolescents.

Seventy five per cent of adolescent boys and sixty per cent of adolescent girls were weight conscious. There is a significant difference between boys and girls with respect to their body weight consciousness.

From Table 24, it is clear that 28 per cent of the boys preferred exercise to reduce their body weight. But girls were interested in walking (41.7%) as a means of reducing body weight. Fifteen per cent of the girls were doing regular exercise. Only 13.3 per cent boys and 8.7 per cent girls controlled their diet to maintain body weight. Both diet control and exercise was resorted by 10.7 per cent of adolescent boys and 6.7 per cent of adolescent girls. Among boys 10.7 per cent reported walking and cycling as their weight maintaining practices.

Table 24. Weight consciousness of adolescents

Details	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
Weight consciousness among adolescents			
Yes	75 (75)	60 (60)	135 (67.5)
No	25 (25)	40 (40)	65 (32.5)
Total	100	100	200
	T.V. = 3.84		$\chi^2 = 4.03^*$
Practices adopted for maintaining weight	Boys (n=75)	Girls (n=60)	Total (n=135)
1. Diet control	10 (13.3)	13 (21.7)	23 (17)
2. Exercise	21 (28)	9 (15)	30 (22.2)
3. Both	8 (10.7)	4 (6.7)	12 (8.9)
4. Jogging	2 (2.7)	-	2 (1.5)
5. Walking	5 (6.7)	25 (41.7)	30 (22.2)
6. Swimming	4 (5.3)	1 (1.7)	5 (3.7)
7. Cycling	8 (10.7)	3 (5)	11 (8.1)
8. Walking & cycling	8 (10.7)	3 (5)	11 (8.1)
9. Walking & swimming	-	1 (1.7)	1 (0.01)
10. Exercise & walking	9 (12)	1 (1.7)	10 (7.4)
	T.V. = 16.9		$\chi^2 = 5.03$ (N.S.)
Time spent on above activities			
< 1/2h	4 (5.3)	12 (20)	16 (11.9)
1/2h	26 (34.7)	18 (30)	44 (32.6)
1-2h	30 (40)	10 (16.7)	40 (29.6)
2-3h	5 (6.7)	7 (11.7)	12 (8.9)
>3h	-	-	-
	T.V. = 9.44		$\chi^2 = 4.44$ (N.S.)

Figures in parenthesis indicate percentage, n - Number of adolescents

χ^2 - Chi square; T.V. - Table value

* - Significant at 5% level; N.S. - Not significant

Time spent for weight maintaining practices was analysed and it was found that 40 per cent of the boys spent 1-2 hours on weight maintaining activities. But most of the girls (30%) spent only half an hour for such activities. Among boys 34.7 per cent spent half an hour for weight maintaining practices. Twenty per cent of the girls spent only less than half an hour for such practices. Statistically there was no significant difference among boys and girls in their weight maintaining practices and time spent on such activities.

Details of unhealthy personal habits of adolescents were enquired and the results are presented in Table 25.

Table 25. Unhealthy personal habits of adolescents

Details	Boys (n = 100)	Girls (n 100)	Total (n = 200)
Smoking			
Yes	1 (1)	-	1 (0.5)
No	99 (99)	100 (100)	199 (99.5)
Total	100	100	200
Drinking			
Yes	3 (3)	-	3 (1.5)
No	97 (97)	100 (100)	197 (98.5)
Place of drinking			
Home	2 (66.7)	-	2 (66.7)
Outside	1 (33.3)	-	1 (33.3)
Consuming drugs	-	-	-

Figures in parenthesis indicate percentage, n - No. of adolescents

It was observed that, none of the girls had unhealthy personal habits. But one percent boys had smoking habits and 3 per cent had the habit of consuming alcoholic drinks. Consumption of narcotic drugs was not observed among both boys and girls.

4.2 Food consumption pattern of the families

Food habits and meal pattern of the families were studied and the details are presented in Table 26.

It was found that, 82 per cent of the families preferred non vegetarian foods. More than half of the families (61 per cent) followed three major meal pattern and 32.5 per cent families followed two major meal pattern. In most of the families it was the mother who decided the menu of the day.

Table 26. Food consumption pattern of families

Details	Total No. of families (n = 200)
Food habit	
Vegetarian	36 (18)
Non vegetarian	164 (82)
Meal pattern	
One major meal	13 (6.5)
Two major meals	65 (32.5)
Three major meals	122 (61)

Figures in parenthesis indicate percentage, n - No. of families

Frequency of use of various food items by the families are given in Table 27.

All the families used foods such as cereals, milk and milk products, fats and oils and sugar and jaggery daily.

Table 27. Frequency of use of food items by the families

(n = 200)

Food items	Frequency of use						
	Daily	W1	W2	W3	W4	Occ.	Never
Cereals	200 (100)	-	-	-	-	-	-
Pulses	26 (13)	43 (21.5)	63 (31.5)	33 (16.5)	15 (7.5)	20 (10)	-
Green leafy Vegetables	20 (10)	46 (23)	25 (12.5)	21 (10.5)	10 (5)	76 (38)	2 (1)
Roots & tubers	31 (15.5)	58 (29)	40 (20)	22 (11)	14 (7)	34 (17)	1 (0.5)
Other vegetables	92 (46)	25 (12.5)	23 (11.5)	25 (12.5)	20 (10)	15 (7.5)	-
Fruits	55 (27.5)	30 (15)	29 (14.5)	27 (13.5)	31 (15.5)	28 (14)	-
Milk & milk Products	200 (100)	-	-	-	-	-	-
Meat	5 (2.5)	69 (34.5)	40 (20)	15 (7.5)	12 (6)	23 (11.5)	36 (18)
Fish	38 (19)	33 (16.5)	25 (12.5)	36 (18)	12 (6)	20 (10)	36 (18)
Egg	33 (16.5)	38 (19)	31 (15.5)	29 (14.5)	11 (5.5)	22 (11)	36 (18)
Fats & oils	200 (100)	-	-	-	-	-	-
Sugar/Jaggery	200 (100)	-	-	-	-	-	-

W1 - Once in a week, W2 - Twice in a week, W3 - Thrice in a week

W4 - Four times in a week, Occ. - Occasionally

Figures in parenthesis indicate percentage, n - No. of families

Regarding the consumption of pulses 31.5 per cent of the families consumed it twice a week. Pulse consumption was limited to once in a week by 21.5 per cent of the families. Only 13 per cent of the families consumed pulses daily. About 16.5 per cent of the families consumed pulses thrice a week and 7.5 per cent consumed pulses four times a week. Ten per cent of the families reported pulse consumption as occasional.

Thirty eight per cent of the families consumed green leafy vegetables only occasionally. Twenty three per cent of the families consumed green leafy vegetables only once in a week where as 12.5 per cent consumed it twice in a week. About 10.5 per cent of the families reported of consuming green leafy vegetables thrice in a week and 5 per cent, four times a week. Only 10 per cent of the families include green leafy vegetables daily in their diet.

Daily consumption of roots and tubers was restricted to 15.5 per cent of the families. Seven per cent of the families consumed this four times a week where as 11 per cent consumed three times in a week. Above 20 per cent of the families consumed roots and tubers twice in a week while 29 per cent consumed this only once in a week.

Other vegetables were consumed daily by 46 per cent of the families. The pattern of vegetable consumption was found to be weekly four times (10%), weekly thrice (12.5%), weekly twice (11.5%) and weekly once (12.5%) by the families. Occasional consumption of vegetables was reported by 7.5 per cent of the families.

Fruits were consumed daily by 27.5 per cent of the families. Occasional consumption of fruits was found in 14 per cent of the families. Among others 15.5 per cent consumed fruits four times a week and 13.5 per cent consumed it thrice in a week.

Daily consumption of meat was found only in 2.5 per cent of the families. Nearly 35 per cent of the families consumed meat only once in a week where as, 20 per cent consumed meat twice in a week. Six per cent of the families consumed meat four times a week. Occasional consumption of meat was observed in 10.5 per cent of the families.

Fish was consumed daily by 19 per cent of the families. Eighteen per cent of the families consumed fish thrice in a week and 6.5 per cent of the families consumed it four times a week. Occasional consumption of fish was observed in 10 per cent of the families.

Inclusion of egg in the daily diet was observed in 16.5 per cent of the families, whereas in 19 per cent families egg was included only once in a week. Eleven per cent of the families consumed egg only occasionally.

Common breakfast preparations and its side dishes prepared by the families were enquired and is presented in Table 28 (a) and 28 (b).

From Table 28(a), it was observed that majority of the families used a combination of different preparations such as pittu, idli, dosa, chapathi, poori, bread, appam and uppuma for breakfast. Twenty four per cent of the families used rice for their breakfast.

Table 28(b) deals with different side dishes used by the families for breakfast.

Table 28(a). Common breakfast preparations by the families

Food items	Total No. of families (n = 200)
1. Idli	13 (6.5)
2. Bread	4 (2)
3. Pittu	7 (3.5)
4. Dosa	7 (3.5)
5. Appam	5 (2.5)
6. Chapathi	8 (4)
7. Rice	48 (24)
8. Pittu, idli, dosa and appam	2 (1)
9. Pittu and poori	1 (0.5)
10. Pittu, idli and dosa	6 (3)
11. Pittu, idli, poori, dosa and chapathi	6 (3)
12. Pittu, idli, dosa and chapathi	-
13. Pittu, poori and idli	5 (2.5)
14. Pittu, dosa and chapathi	6 (3)
15. Pittu and idli	4 (2)
16. Pittu, idli, appam and chapathi	11 (5.5)
17. Idli, dosa and chapathi	13 (6.5)
18. Idli, dosa and rice	3 (1.5)
19. Idli, uppuma, bread and rice	4 (2)
20. Idli, dosa, chapathi and rice	2 (1)
21. Idli, dosa, uppuma and rice	7 (3.5)
22. Dosa and idli	3 (1.5)
23. Dosa, uppuma, bread, rice and chapathi	5 (2.5)
24. Dosa and poori	5 (2.5)
25. Dosa, chapathi and rice	5 (2.5)
26. Dosa, appam and bread	3 (1.5)
27. Uppuma, bread and rice	2 (1)
28. Uppuma and rice	5 (2.5)
29. Bread and rice	3 (1.5)
30. Appam, poori, chapathi and rice	4 (2)
31. Rice and chapathi	3 (1.5)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Table 28(b). Common side dishes for breakfast by the families

Food items	Total no. of families (n = 200)
1. Dhal	5 (2.5)
2. Vegetables	73 (36.5)
3. Meat	9 (4.5)
4. Chicken	7 (3.5)
5. Vegetable and dhal	24 (12)
6. Vegetable and egg	38 (19)
7. Vegetable, egg and chicken	4 (2)
8. Dhal, vegetable and meat	13 (6.5)
9. Dhal, vegetable and egg	8 (4)
10. Chicken and vegetable	3 (1.5)
11. Egg	6 (3)
12. Egg, vegetable and meat	6 (3)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Most of the families (36.5%) used vegetable preparations while, 19 per cent of the families used vegetable and egg preparations and 12 per cent of the families used vegetable and dhal preparations as side dish for breakfast. Remaining families used a combination of different items such as chicken, meat, egg, dhal and vegetables.

Main items as well as side dishes for lunch is given in Table 28 (c) and 28 (d)

Table 28(c) Common preparations for lunch by the families

Food items	Total no. of families (n = 200)
1. Rice	180 (90)
2. Rice and fried rice	14 (7)
3. Rice and biriyani	4 (2)
4. Rice and pulav	2 (1)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Table 28(c) shows that, 90 per cent of the families used rice as main item for lunch and 7 per cent of the families used rice and fried rice for lunch.

Table 28(d) reveals that, 27 per cent of the families used vegetable and fish preparations and 22 per cent of the families used only vegetable preparations for lunch. A combination of different preparations with dhal, vegetable, fish, meat, chicken and egg was used by remaining families for lunch.

Different preparations and their combinations used by the families for dinner were also studied and the results are presented in Table 28(e) and Table 28(f).

Table 28(e). Common preparations for dinner by the families

Food items	Total No. of families (n = 200)
1. Chapathi	25 (12.5)
2. Rice	100 (50)
3. Chapathi and rice	55 (27.5)
4. Chapathi and battura	5 (2.5)
5. Chapathi and nan	5 (2.5)
6. Paratha and rice	6 (3)
7. Paratha and chapathi	3 (1.5)
8. Paratha and battura	1 (0.5)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Table 28(d). Common side dishes for lunch by the families

Food items	Total No. of families (n = 200)
1. Dhal	3 (1.5)
2. Vegetable	44 (22)
3. Fish	18 (9)
4. Meat	4 (2)
5. Chicken	3 (1.5)
6. Vegetable, fish and egg	14 (7)
7. Vegetable and fish	55 (27.5)
8. Vegetable, fish and meat	2 (1)
9. Vegetable, fish, egg and chicken	5 (2.5)
10. Vegetable, fish and chicken	2 (1)
11. Vegetable and chicken	3 (1.5)
12. Dhal, vegetable and egg	11 (5.5)
13. Dhal, vegetable, fish and egg	3 (1.5)
14. Dhal, vegetable, fish and meat	3 (1.5)
15. Dhal and vegetable	6 (3)
16. Fish and meat	6 (3)
17. Fish and egg	8 (4)
18. Fish and chicken	4 (2)
19. Fish, vegetable and dhal	5 (2.5)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Table 28(f). Common side dishes for dinner by the families

Food items	Total No. of families (n = 200)
1. Vegetables	53 (27.5)
2. Fish	12 (6)
3. Meat	14 (7)
4. Egg	3 (1.5)
5. Dhal and vegetable	15 (7.5)
6. Dhal and fish	4 (2)
7. Dhal, vegetable, fish and egg	8 (4)
8. Dhal, vegetable and chicken	2 (1)
9. Dhal, fish and egg	1 (0.5)
10. Dhal, vegetable and egg	7 (3.5)
11. Dhal, vegetable and fish	3 (1.5)
12. Vegetable and chicken	10 (5)
13. Vegetable, fish, meat and egg	3 (1.5)
14. Vegetable, fish and egg	8 (4)
15. Vegetable and fish	7 (3.5)
16. Vegetable, fish, chicken and egg	5 (2.5)
17. Vegetable, fish and egg	2 (1)
18. Vegetable, dhal, fish and chicken	1 (0.5)
19. Vegetable and egg	6 (3)
20. Fish and egg	5 (2.5)
21. Fish and meat	7 (3.5)
22. Chicken and egg	11 (5.5)
23. Chicken, dhal, vegetable, fish and egg	1 (0.5)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Table 28(g). Common preparations for evening tea by the families

Food items	Total No. of families (n = 200)
1. Samosa	9 (4.5)
2. Vada	20 (10)
3. Puffs	6 (3)
4. Sandwich	13 (6.5)
5. Cuttlet	6 (3)
6. Cake	5 (2.5)
7. Other fried foods	73 (36.5)
8. Vada, cuttlet and sandwich	8 (4)
9. Vada and sandwich	9 (4.5)
10. Vada, samosa and cake	4 (2)
11. Vada, puffs and sandwich	3 (1.5)
12. Vada, cuttlet and samosa	6 (3)
13. Vada, cuttlet and cake	4 (2)
14. Puffs and cake	5 (2.5)
15. Cuttlet and cake	10 (5)
16. Samosa, puffs and cake	6 (3)
17. Nothing	15 (7.5)
Total	200

Figures in parenthesis indicate percentage, n - No. of families

Table 28(e) deals with main items used by the families for dinner. Fifty per cent of the families used rice and 27.5 per cent of the families consumed either chapathi or rice for dinner. About 12.5 per cent of the families consumed chapathi for dinner.

Table 28(f) reveals that, 27.5 per cent families used vegetable preparations for dinner. Meat preparations were used by 7 per cent of the families and dhal and vegetable preparations were used by 7.5 per cent of the families. Six per cent of the families used fish. Remaining families used a combination of different food items such as vegetables, fish, meat, egg and chicken etc. for their dinner.

Common preparations for evening tea was also enquired and the results are given in Table 28(g).

Ten per cent of the families consumed fried item such as vada, 6.5 per cent of the families prepared sand witch and 7.5 per cent of the families prepared nothing for evening tea. Nearly 37 per cent of the families prepared other items such as pazhampori, baji, chips, bread etc.

Frequency of use of different processed foods by the families were enquired and is presented in Table 29(a) and 29(b).

Table 29(a) reveals that majority of the families never used idli mix (34%), dosa mix (37.5%) and sambar mix (32.5%) but these items were used daily by 8.5 per cent, 6 per cent and 4.5 per cent of the families respectively.

Cornflakes was never used by 60 per cent of the families while 30 per cent families used it occasionally. Noodles (50.5%) and vermicelli (57%) were used occasionally by most of the families.

Table 29(a). Frequency of use of processed foods by the families

(n = 200)

Food items	Frequency of use							Total
	Daily	W1	W2	W3	W4	Occ.	Never	
Idli mix	17 (8.5)	33 (16.5)	23 (11.5)	5 (2.5)	2 (1)	52 (26)	68 (34)	200
Dosa mix	12 (6)	27 (13.5)	22 (11)	14 (7)	2 (1)	48 (24)	75 (37.5)	200
Corn flakes	-	11 (5.5)	4 (2)	1 (0.5)	-	60 (30)	124 (62)	200
Sambar mix	9 (4.5)	38 (19)	29 (14.5)	13 (6.5)	3 (1.5)	43 (21.5)	65 (32.5)	200
Noodles	-	24 (12)	7 (3.5)	4 (2)	-	101 (50.5)	64 (32)	200
Vermicelli	-	5 (2.5)	4 (2)	-	-	114 (57)	77 (38.5)	200
Milkmaid	-	6 (3)	3 (1.5)	-	-	96 (48)	95 (47.5)	200
Milk powder	16 (8)	10 (5)	4 (2)	-	-	64 (32)	106 (53)	200
Ice-cream mix	-	5 (2.5)	2 (1)	-	-	90 (45)	103 (51.5)	200
Paneer mix	-	2 (1)	-	-	-	44 (22)	154 (77)	200
Gulabjamun mix	-	1 (0.5)	1 (0.5)	1 (0.5)	-	92 (46)	105 (52.5)	200
Jam	10 (5)	21 (10.5)	14 (7)	6 (3)	4 (2)	111 (55.5)	34 (17)	200
Cheese/Butter	16 (8)	21 (10.5)	15 (7.5)	6 (3)	6 (3)	71 (35.5)	65 (32)	200
Jelly	-	-	2 (1)	-	-	43 (21.5)	155 (77.5)	200

Figures in parenthesis indicate percentage, n - No. of families

W₁ - Once in a week, W₂ - Twice in a week, W₃ - Thrice in a week

W₄ - Four times in a week, Occ - occasionally

Table 29(b). Frequency of use of processed beverages, bakery items and fried foods by the families

(n = 200)

Food items	Frequency of use							
	Daily	W1	W2	W3	W4	Occ.	Never	Total
Squash	-	4 (2)	2 (1)	2 (1)	-	145 (72.5)	47 (23.5)	200
Cocacola/Pepsi/ Others	-	7 (3.5)	2 (1)	-	-	152 (76)	39 (19.5)	200
Bread	31 (15.5)	54 (27)	28 (14)	16 (8)	12 (6)	58 (29)	1 (0.5)	200
Cakes	3 (1.5)	16 (8)	14 (7)	7 (3.5)	2 (1)	154 (77)	4 (2)	200
Pasteries	1 (0.5)	7 (3.5)	3 (1.5)	-	1 (0.5)	111 (55.5)	77 (38.5)	200
Sauces	1 (0.5)	3 (1.5)	5 (2.5)	1 (0.5)	2 (1)	103 (51.5)	85 (42.5)	200
Ketchups	-	-	-	-	-	63 (31.5)	137 (68.5)	200
Pickles	96 (48)	17 (8.5)	8 (4)	9 (4.5)	6 (3)	48 (24)	16 (98)	20
Biscuits	61 (30.5)	33 (16.5)	19 (9.5)	19 (9.5)	9 (4.5)	59 (29.5)	-	200
Chips	40 (20)	30 (15)	26 (13)	14 (7)	13 (6.5)	75 (37.5)	2 (1)	200
Mixture	35 (17.5)	30 (15)	23 (11.5)	8 (4)	11 (5.5)	93 (46.5)	-	200
Samosa/puffs	5 (2.5)	30 (15)	23 (11.5)	6 (3)	1 (0.5)	130 (65)	5 (2.5)	200
Cuttlet	6 (3)	40 (20)	14 (7)	5 (2.5)	3 (1.5)	123 (61.5)	9 (4.5)	200
Pappads	57 (28.5)	39 (19.5)	21 (10.5)	14 (7)	10 (5)	53 (26.5)	6 (3)	200
Vattals	4 (2)	11 (5.5)	8 (4)	4 (2)	2 (1)	92 (46.)	89 (44.5)	200

Figures in parenthesis indicate percentage; n - No. of families; W₁ - Once in a week; W₂ - Twice in a week; W₃ - Thrice in a week; W₄ - Four times in a week; Occ - occasionally

Fourty eight per cent of the families used milk maid occasionally. Milk powder was used daily by 8 per cent of the families and 53 per cent of the families never used it.

Ice cream mix was used occasionally by 45 per cent families. Paneer mix was not used by 77 per cent of the families. Majority of the families (52.5%) never used gulab jamun mix and jelly (77.5%). Jam and cheese /butter were used daily by 5 per cent and 8 per cent of the families respectively.

Table 29(b) reveals the use of different processed beverages, bakery items and fried foods by the families.

Occasional use of processed beverages like squash (72.5%), Cocacola, Pepsi and other soft drinks (76%) were observed in majority of the families.

Pickles were used daily by 48 per cent of the families. Twenty seven per cent of the families used bread once in a week and 15.5 per cent of the families used it daily. Cakes (77%), pasteries (55.5%) and sauces (51.5%) were used occasionally by most of the families and 68.5 per cent families never used ketchups.

Twenty per cent of the families used chips and 30.5 per cent of the families used biscuits daily. Mixture and chips were used occasionally by 46.5 per cent and 37.5 per cent families respectively.

Food preparations consumed by the adolescents were recorded for one week including foods consumed from outside and the consumption of different food preparations for breakfast, lunch, dinner and evening tea by adolescents were recorded. Based on this food frequency scores were calculated as suggested by Reaburn *et al.* (1979). The formula used is given in Appendix VII.

Table 30. Frequency score (%) of different food preparations consumed by adolescents

Food preparations	Frequency score (%)		
	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
a) Breakfast - <u>Main items</u>			
Rice	39	45	84
Rice based preparation	50.1	46.9	97
Wheat based preparation	32.3	38.2	70.5
Bread	16.5	25.8	42.3
Tea	43.2	43.8	87
Coffee	23.0	22.0	45.0
<u>Side dishes</u>			
Dhal	22.8	29.0	51.8
Green leafy vegetables	7.0	6.5	13.5
Vegetables	47	51	98
Egg	47.8	38.8	86.6
Fish	47.8	24.6	50.8
Meat	26.2	32.0	66.8
Chicken	34.8	16.0	31.0
Fruits	23.6	28.2	51.8
b) Lunch - <u>Main items</u>			
Rice	48	52	100
Rice based preparations	6.4	8.8	15.2
Wheat based preparations	13	7	20
<u>Side dishes</u>			
Dhal	18.2	21.7	39.9
Green leafy vegetables	25.0	33.6	58.6
Vegetables	41	50	91
Egg	38.2	44.6	82.8
Fish	48.5	45.8	94.3
Meat	51.4	44.4	95.8
Chicken	43	50	93.0
Fruits	12.5	14.5	27.0
c) Dinner - <u>Main items</u>			
Rice	46	52	98
Wheat based preparations	49	37	86

Contd.

Table 30. Continued

Food preparations	Frequency score (%)		
	Boys (n = 100)	Girls (n = 100)	Total (n = 200)
<u>Side dishes</u>			
Dhal	22.2	28.2	50.4
Green leafy vegetables	21.8	19.4	41.2
Vegetables	43	51	94
Egg	44.2	45.8	90.0
Fish	44.2	33.0	68.0
Meat Fleshy foods	38 47	54 41.1	92 79.3
Chicken	58.8	36.2	77.8
Fruits	18.5	20.5	39.0
d) Evening tea			
Tea	47.6	47.4	95
Coffee	12.0	12.3	24.3
Baked foods	5.0	8.0	13.0
Fried foods	45	43	98
Steamed foods	26.8	26.2	53.0

n = Number of adolescents

Table 30 shows the frequency score in percentage for different food preparations consumed by the adolescents.

As revealed from Table 30 among breakfast preparations maximum frequency score was for rice based preparations (97%). Boys preferred rice based preparations more (50.1%) than girls (46.9%). Rice as such scored 84 per cent and for that also the preference was more for boys (45%) than girls (39%). Frequency score obtained for wheat based preparations was 70.5 percentage and wheat based preparations were preferred more by girls, (38.2%) than boys (32.3%). The least score was obtained for bread (42.3%) and that also more girls preferred bread (25.8%) than boys (16.5%) for their breakfast.

Side dishes consumed along with the breakfast when analysed, maximum frequency score was for vegetables (98%) followed by egg (86.6%). Frequency of consumption of vegetables was found to be more for girls (51%) when compared to boys (47%). But frequency score for egg was more for boys (47.8%) than girls (38.8%). Among flesh foods, as side dish for breakfast meat got the highest frequency score of 66.8 per cent followed by fish (50.8%). Meat preparations were highly preferred by girls (32%) than boys (26.2%) for breakfast. But boys were found to prefer fish preparations (47.8%) and preparations with chicken (36.2%) for breakfast than girls (24.6% and 16% respectively). Only seven per cent boys and 6.5 per cent girls preferred preparation with green leafy vegetables as side dish for breakfast. Frequency score obtained for fruits was 51.8 per cent and was more among girls (28.2%) than boys (23.6%). Most of the adolescents preferred tea (87%) than coffee (45%) during breakfast.

For lunch, rice ranked highest with a frequency score of 100 per cent. More girls preferred rice (52%) than boys (48%) as the main dish for lunch. Wheat based preparations obtained the second highest frequency score (20%). More boys preferred wheat based preparations for lunch (13%) than girls (7%).

Side dishes for lunch revealed a maximum frequency score for vegetable preparations (91%) followed by meat (95.8%), chicken (93%), fish (94.3%) and egg preparations (82.8%). Dhal preparations scored the least (39.9%) among side dishes for lunch. Vegetables was preferred more by girls (50%) than boys (41%). More preference for meat preparations was found among boys (51.4%) compared to girls (47.8%). But preference for chicken for lunch was more for girls (50%) when compared to boys (43%). Frequency score for fish consumption was more for boys (48.5%) as against (45.8%) girls. Egg preparations was also preferred by girls during lunch (44.6%) than boys (38.2%). Adolescents consumed less fruits during lunch which scored 12.5 per cent and 14.5 per cent among boys and girls respectively. Preparations with green leafy vegetables scored 58.6 per cent and girls preferred (33.6%), it more than boys (25%) as side dish for lunch.

For dinner frequency score was high for rice (98%) as against wheat based preparations (86%). For dinner majority of the girls preferred rice (52%) than boys (46%). Wheat based preparations scored second and the score was high for boys (49%) when compared to girls (37%).

Regarding side dishes for dinner, maximum frequency score was for vegetable preparations (94%) and preference for vegetables was found to be more among girls (51%) as against boys (43%). Next highest frequency score was for meat preparations (92%) and that too among girls (54%). Boys also preferred chicken preparations for dinner (58.8%) than girls (36.2%). But girls (45.8%) preferred egg for dinner than boys (44.2%). Preparation with green leafy vegetables was used by 21.8 per cent boys and 19.4 per cent girls for dinner. Frequency score for fruits was 39 per cent. Girls consumed more fruits (20.5%) than boys (18.5%) during dinner.

As snacks for evening tea, fried foods ranked highest frequency score of 98 per cent and there was not much difference in their preference regarding this

Table 31. Frequency of use of breakfast, lunch, dinner and evening tea preparations by adolescents

	Most frequently used preparations (> 75%)	Medium frequently used preparations (50-75%)	Less frequently used preparations (< 50%)
Breakfast	Rice, rice based preparations egg, vegetables and tea	Dhal, fruits and wheat based preparations	Fleshy foods such as meat, fish and chicken, green leafy vegetables and coffee
Lunch	Rice, vegetables, egg and fleshy foods (meat, fish and chicken)	Green leafy vegetables	Rice based preparations, wheat based preparations, dhal and fruits
Dinner	Rice, wheat based preparations vegetables egg, and fleshy foods	Dhal	Green leafy vegetables and fruits
Evening tea	Fried foods and tea	Steamed foods	Baked foods, Coffee

food item (45% for boys and 43% for girls). Steamed foods obtained 53 per cent frequency score where as for baked foods it is only 13 per cent. Frequency score for evening tea was 95 per cent (47.6% among boys and 47.4% among girls). The frequency score for coffee was 24.3 per cent.

On the basis of frequency scores obtained by different food preparations for breakfast, lunch, dinner and evening tea, the foods were categorized into three different groups namely most frequently used foods (having a score of above 75%), medium frequently used foods (percentage score between 50 to 75%) and less frequently used foods (percentage score below 50%) are presented in Table 31.

From Table 31, it is clear that rice, rice based preparations, vegetables, egg and tea were the most frequently used breakfast items by adolescents. Fleshy foods such as meat, fish and chicken, green leafy vegetables and coffee were the less frequently used breakfast items.

Table 31 reveals that rice and preparations with vegetables, egg and fleshy foods are the most frequently used items by most of the adolescents for lunch. Less frequently used foods during lunch included rice based preparations, wheat based preparations and preparations with dhal. Moderate use of green leafy vegetables during lunch was also observed.

Rice, wheat based preparations, vegetables, egg and fleshy foods are the food items most frequently used by adolescents for dinner. Dhal preparations are the medium frequently used items for dinner. Green leafy vegetables and fruits were used less frequently for dinner.

From Table 31, it is evident that the most frequently used snacks among adolescents were fried foods. Steamed foods were medium frequently used and baked foods were less frequently used snacks. Among the beverages, tea is used most frequently and coffee is used less frequently.

Table 32. Foods prepared by the families during special occasions

Details		Total No. of families (n = 200)
Families celebrating special occasions		
Yes		145 (72.5)
No		55 (27.5)
Total		200
Occasions	Preparations	Total No. of families (n = 145)
Birthday	Vegetarian	69 (47.6)
	Non-vegetarian	76 (52.4)
Marriage	Vegetarian	66 (45.5)
	Non-vegetarian	79 (54.5)
Death related functions	Vegetarian	93 (64.1)
	Non-vegetarian	52 (35.9)
Festivals	Vegetarian	56 (38.6)
	Non-vegetarian	89 (61.4)
Feasts	Vegetarian	39 (26.9)
	Non-vegetarian	106 (73.1)
Others	Vegetarian	57 (39.3)
	Non-vegetarian	88 (60.7)

Figures in parenthesis indicate percentage

n = Number of families

Table 33. Purchase of prepared foods by the families

Details	Total No. of families (n = 200)
Families purchasing prepared foods	133 (66.5)
Families not purchasing prepared foods	67 (33.5)
Type of preference	
Vegetarian	40 (30.0)
Non-vegetarian	58 (43.6)
Both	35 (26.3)
Place of purchase	
Hotels	85 (63.9)
Fast food centers	29 (21.8)
Both	19 (14.3)
Frequency of purchase	
Daily	-
Once in a week	11 (8.3)
Twice in a week	1 (0.75)
Thrice in a week	-
Four times in a week	-
Occasionally	121 (91.0)

Figures in parenthesis indicate percentage
n = Number of families

Table 32 deals with the foods prepared during celebration of special occasions by the families.

Nearly 73 per cent of the families celebrated special occasions like birthday, marriage, feasts, festivals etc.

For birthdays 52.4 per cent of the families prepared non vegetarian foods and 47.6 per cent of the families prepared vegetarian foods for marriage.

Most of the families (64.1%) prepared vegetarian foods on the death of any of the family members or relative. About 39 per cent of the families prepared vegetarian foods during festivals and remaining families (61.4%) prepared non vegetarian preparations. During feasts and other occasions, most of the families prepared non vegetarian foods.

Purchase of prepared foods by the families were also studied and the results are presented in Table 33.

Among the families studied 66.5 per cent purchased prepared foods from outside. Among them 43.6 per cent preferred non vegetarian foods and 30.1 per cent preferred vegetarian foods. Most of them (63.9%) bought prepared foods from hotels. It was observed that about 21.8 per cent of the families purchased prepared foods from fast food centers.

Frequency of purchase of prepared foods was also studied and it was found that 91 per cent of the families bought prepared foods occasionally and 8.3 per cent bought items once in a week.

4.3 Attitude towards the eating habits of the adolescents

Attitude of adolescents as well as their parents towards the eating habits of adolescents were studied. Delinious – Hodges Cumulative method of classification as explained by Delinious and Gurney (1951) was used to classify

the respondents and the results are given below. The method is explained in Appendix-VIII.

4.3.1 Attitude of the adolescents

Distribution of the adolescents based on their attitude towards their eating habits are presented in Table 34.

Table 34. Distribution of the adolescents based on their attitude towards their eating habits

(n = 200)		
Category	Frequency	Percentage
< 32 Less favourable attitude	20	10
32-34 Somewhat favourable attitude	45	22.5
35-41 Favourable attitude	123	61.5
42 > 43 Highly favourable attitude	12	6

From Table 34, it is clear that most of the adolescents (61.5%) had favourable attitude towards their eating habits. While 22.5 per cent had some what favourable attitude. Only 6 per cent of the adolescents had highly favourable attitude. Ten per cent of the adolescents were having less favourable attitude towards their eating habits.

The attitude of both boys and girls were analysed separately and is presented in Table 34(a) and 34(b).

Table 34(a) deals with the attitude of the adolescent boys towards their eating habits.

Table 34(a). Attitude of adolescent boys towards their eating habits

(n = 100)

Category	Frequency	Percentage
< 33 Less favourable attitude	9	9
33-35 Somewhat favourable attitude	26	26
36-44 Favourable attitude	64	64
45 > 48 Highly favourable attitude	1	1

Table 34(b). Attitude of the adolescent girls towards their eating habits

(n = 100)

Category	Frequency	Percentage
< 34 Less favourable attitude	12	12
34-36 Somewhat favourable attitude	30	30
37-42 Favourable attitude	56	56
43 > 44 Highly favourable attitude	2	2

The above table reveals that, 64 per cent and 26 per cent of the boys had favourable and some what favourable attitude respectively towards their eating habits. Nine per cent of the boys expressed less favourable attitude towards their eating habits while only one per cent expressed highly favourable attitude.

Attitude of the adolescent girls towards their eating habits are explained in Table 34(b).

From the above table, it is observed that 56 per cent of the girls had favourable attitude and 30 per cent had some what favourable attitude towards their eating habits. While 12 per cent had less favourable attitude towards their eating habits. Two per cent of girls expressed highly favourable attitude towards their eating habits.

Statistical analysis as carried out by students 't' test revealed a significant difference between boys and girls in their attitude towards their eating habits.

4.3.2 Attitude of parents

Distribution of parents based on their attitude towards the eating habits of adolescents are given in Table 35.

Table 35. Attitude of parents towards the eating habits of adolescents

(n = 200)

Category	Frequency	Percentage
< 33 Less favourable attitude	24	12
33-35 Somewhat favourable attitude	68	34
36-41 Favourable attitude	95	47.5
42 > 43 Highly favourable attitude	13	6.5

Table 35(a). Attitude of parents of adolescent boys

Category	Frequency	Percentage
< 33 Less favourable attitude	12	12
33-35 Somewhat favourable attitude	23	23
36-41 Favourable attitude	53	53
42 $\bar{}$ 48 Highly favourable attitude	12	12

Table 35(b). Attitude of parents of adolescent girls

Category	Frequency	Percentage
< 32 Less favourable attitude	11	11
32-34 Somewhat favourable attitude	28	28
35-41 Favourable attitude	58	58
42 $\bar{}$ 44 Highly favourable attitude	3	3

The above table reveals that, 47.5 per cent of the parents had favourable attitude towards the eating habits of adolescents and some what favourable attitude was expressed by 34 per cent of the parents. Twelve per cent of the parents reported less favourable attitude towards the eating habits of their children. Whereas 65 per cent of the parents expressed highly favourable attitudes.

Attitude of parents of both boys and girls were analysed separately and is presented in Table 35(a) and 35(b).

Table 35(a) deals with the attitude of parents towards the eating habits of adolescent boys.

Table 35(a) shows that 53 per cent and 23 per cent of the parents respectively had favourable and some what favourable attitude towards the eating habits of their boys. Less favourable and highly favourable attitude was expressed by 12 per cent of the parents.

The attitude of parents towards the eating habits of adolescent girls are given in Table 35(b).

As revealed from the table, among the parents of girls 58 per cent had favourable attitude and 28 per cent had some what favourable attitude towards the eating habits of their daughters. Eleven per cent of the parents were having less favourable attitude while 3 per cent of them expressed highly favourable attitude.

Student's 't' test revealed a significant difference in the attitude of the parents of boys and girls towards the eating habits of their children.

4.4 Nutritional status of the adolescents assessed by

4.4.1 Anthropometric measurements

Anthropometric measurements such as body height and weight of the adolescent boys and girls were taken and the mean values were compared with ICMR (1990) standards and the details are given in Table 36.

Table 36. Mean height and weight of adolescents in comparison with ICMR standards (1990)

Criteria	Boys (n = 50)			Girls (n = 50)		
	Mean	Standard	't' value	Mean	Standard	't' value
Height (cm)	168.50	171.10	2.05*	160.24	156.00	5.01*
Weight (kg)	51.38	57.28	4.24*	47.48	49.92	2.35*

n = Number of adolescents

ICMR - Indian Council of Medical Research (1990)

*Significant at 5% level

From the above table, it is clear that the mean weight of both boys and girls were significantly low when compared with Indian standard values as suggested by ICMR. But mean height of girls was found to be above the standard value and this was found to be significant.

Distribution of adolescents boys based on the ICMR standard values for height and weight are presented in Table 37.

It was observed that, majority of the boys (52% and 68% respectively) had body height and weight less than the standard. Body height and weight were above the standard values for 46 per cent and 26 per cent respectively for the boys. Normal height and weight was observed in only 2 per cent and 6 per cent respectively among adolescent boys.

Distribution of adolescent girls based on the ICMR standard values for height and weight are presented in Table 38.

Table 38 reveals that, only 6 per cent and 8 per cent of the girls had normal height and weight respectively. Among girls 80 per cent had height above the standard. But majority of the girls (64%) had body weight less than the standard.

Table 37. Distribution of adolescent boys based on ICMR standards for height and weight

Criteria	Standard height (cm)	Boys (n = 50)	Standard weight (kg)	Boys (n = 50)
Less than standard	<171.1	26 (52)	<57.28	34 (68)
Normal	171.1	1 (2)	57.28	3 (6)
More than standard	>171.1	23 (46)	>57.28	13 (26)
Total		50		50

Figure in parenthesis indicate percentage

n = Number of adolescents

ICMR - Indian Council of Medical Research (1990)

Table 38. Distribution of adolescent girls based on ICMR standards for height and weight

Criteria	Standard height (cm)	Girls (n = 50)	Standard weight (kg)	Girls (n = 50)
Less than standard	<156	7 (14)	<49.92	32 (64)
Normal	156	3 (6)	49.92	4 (8)
More than standard	>156	40 (80)	>49.92	14 (28)
Total		50		50

Figure in parenthesis indicate percentage

n = Number of adolescents

ICMR - Indian Council of Medical Research (1990)

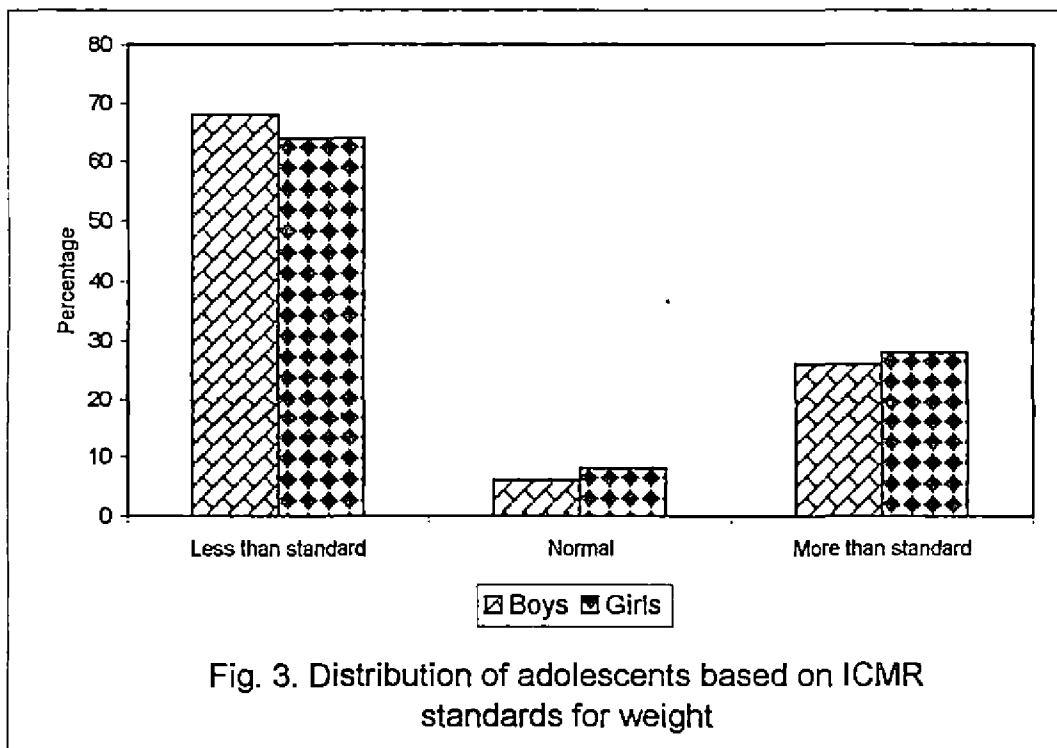
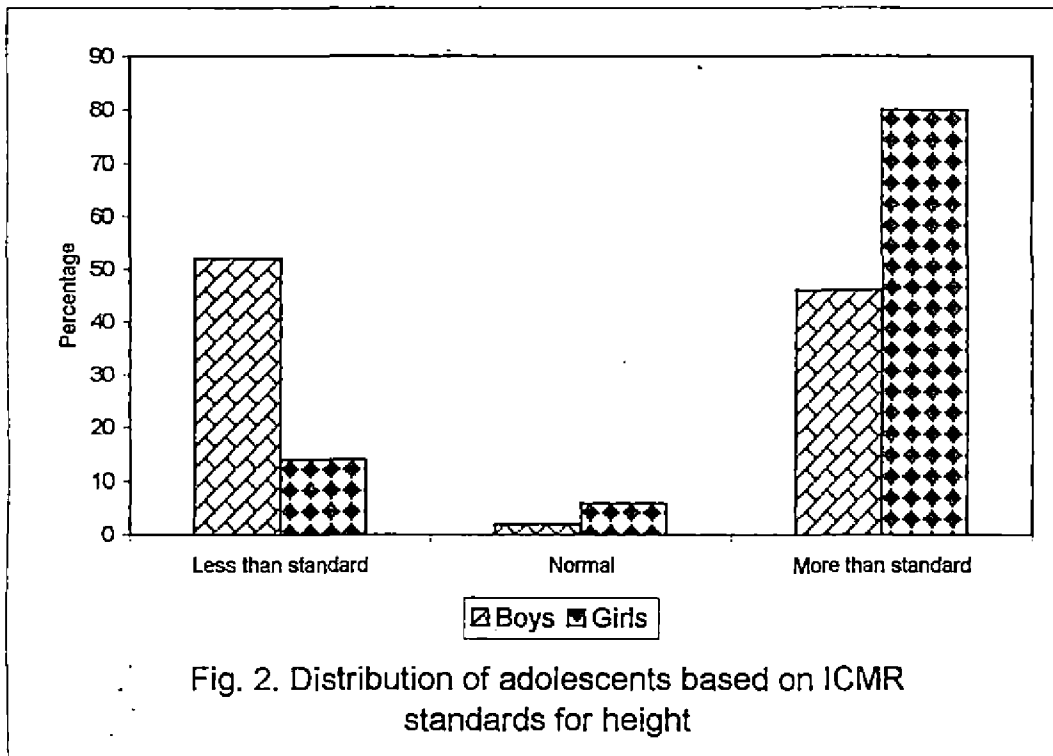
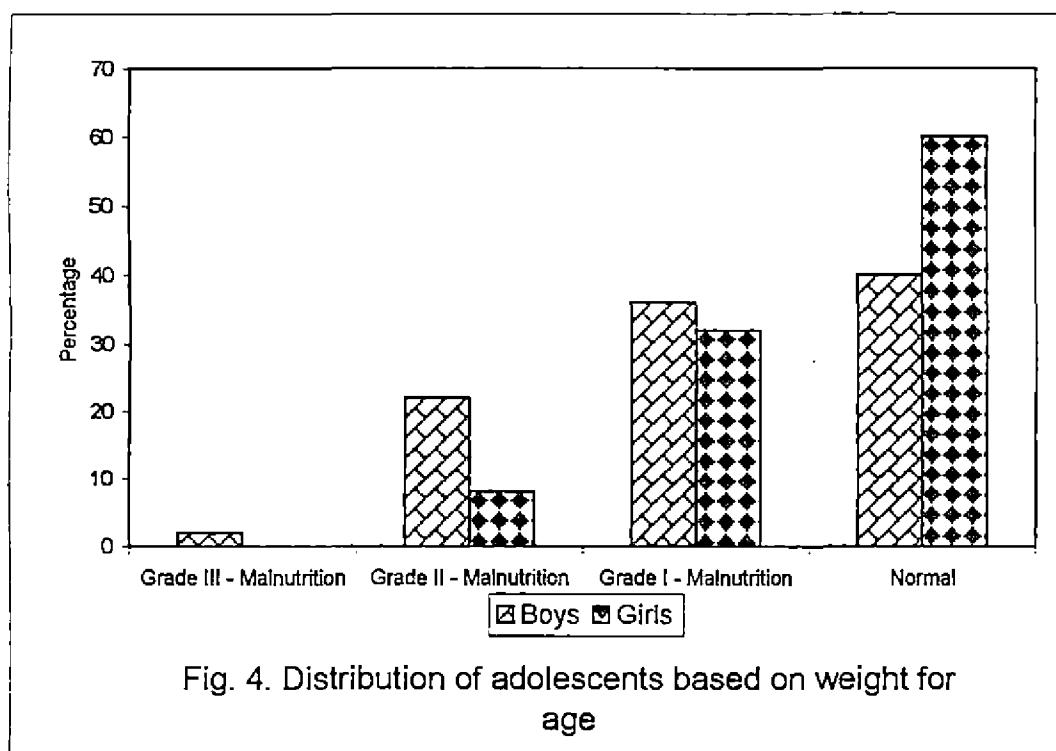


Table 39. Distribution of adolescents (16-18 yrs) based on weight for age
(Gomez *et al.*, 1956)

Nutritional status	Weight for age ratio (%)	Boys (n=50)	Girls (n=50)	Total (n=100)
Grade III - Malnutrition	≤60	1 (2)	-	1 (1)
Grade II - Malnutrition	60-75	11 (22)	4 (8)	15 (15)
Grade I - Malnutrition	75-90	18 (36)	16 (32)	34 (34)
Normal	>90	20 (40)	30 (60)	50 (50)
Total		50	50	100

Figure in parenthesis indicate percentage

n - Number of adolescents



Distribution of adolescents based on ICMR standards for height is presented in Fig.2 and distribution of adolescents based on ICMR standards for weight is presented in Fig.3.

Weight for age

Based on the weight for age classification of Gomez *et al.* (1956) the adolescents were categorized into different grades of malnutrition and is shown in Table 39.

As indicated in Table 39, 50 per cent of the adolescents were having normal weight for age. Normal weight for age was found to be more among girls (60%) than boys (40%). Thirty four per cent of the adolescents were having grade I malnutrition. Grade I malnutrition was prevalent more among adolescent boys (36%) than girls (32%). Prevalence of grade II malnutrition was found to be 15 per cent among adolescents. The prevalence rate is also high among boys (22%) where as it was only 8 per cent among girls. Grade III malnutrition was found to occur among 2 per cent of adolescent boys whereas this was not prevalent among adolescent girls. Distribution of adolescents based on weight for age is depicted in Fig.4.

Body Mass Index (BMI)

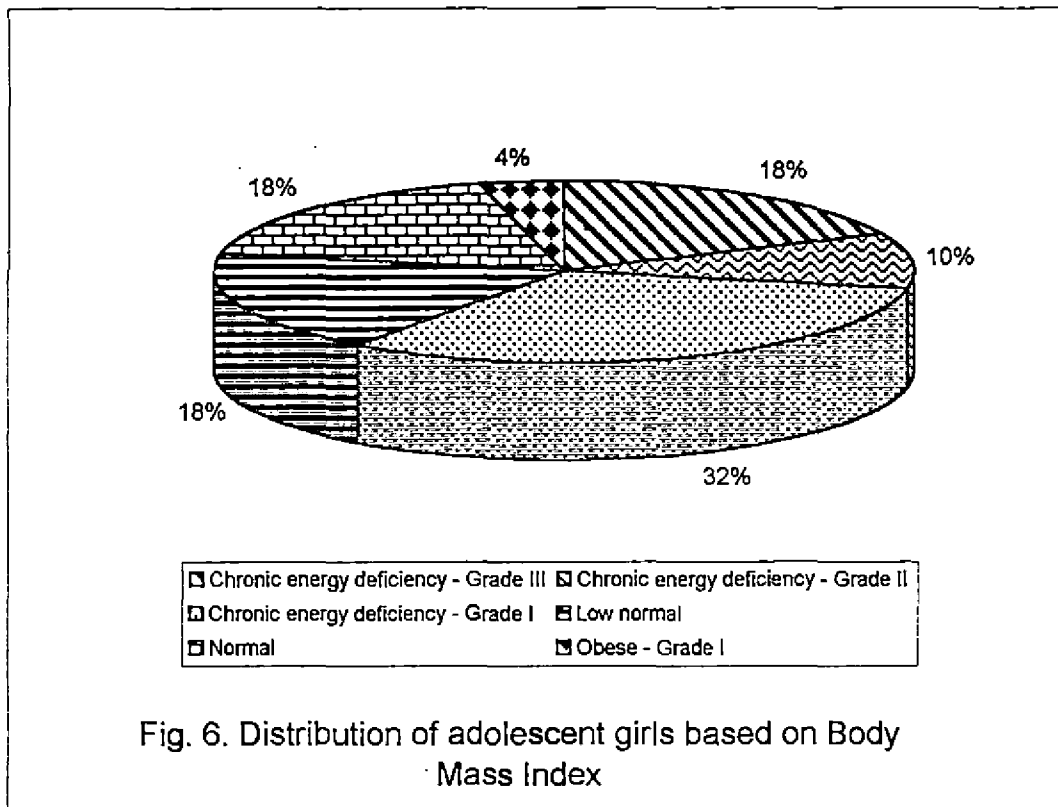
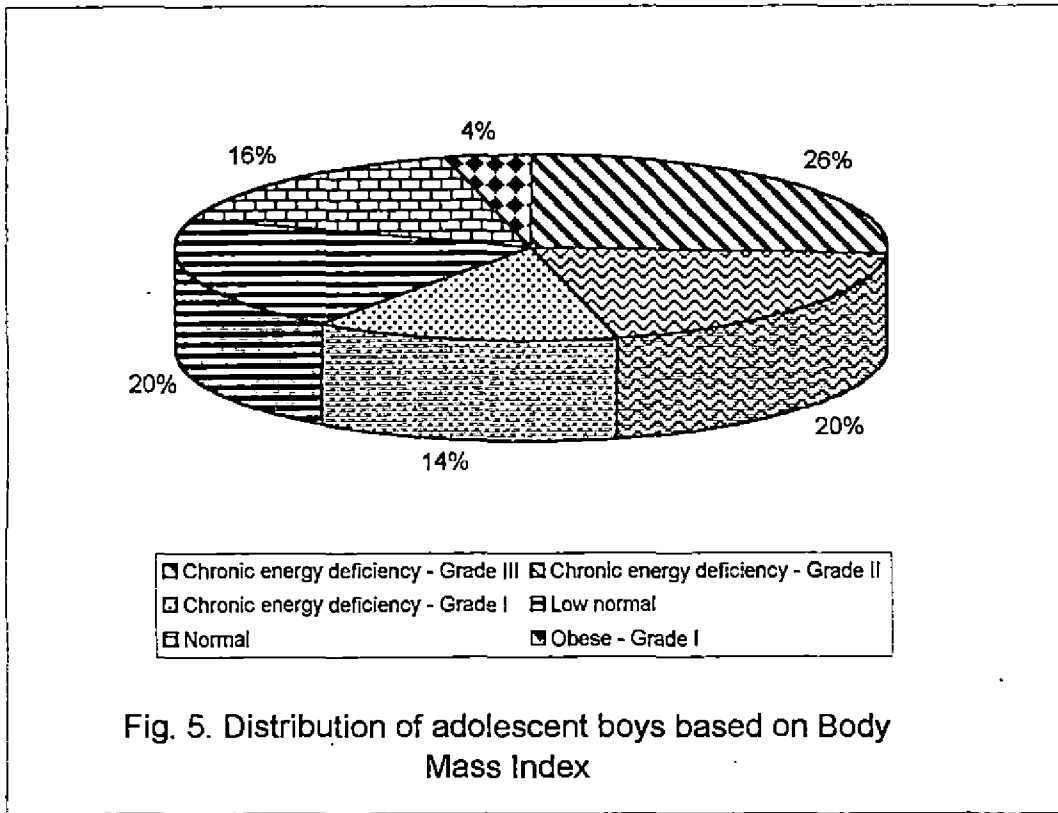
Based on BMI adolescents were grouped into different grades of malnutrition and the details are furnished in Table 40.

As indicated in Table 40, 16 per cent of adolescent boys and 18 per cent of adolescent girls were having normal nutritional status. Low but normal nutritional status was found in 20 per cent of boys and 18 per cent of girls. Thirty two per cent of the girls were having chronic energy deficiency grade I whereas it was 14 per cent among boys. Twenty per cent of the boys were found to have chronic energy deficiency grade II while in girls it was only 10 per cent. Chronic

Table 40. Distribution of adolescents (16-18 yrs) based on Body Mass Index
(James *et al.*, 1988)

BMI	Nutritional status	Boys (n=50)	Girls (n=50)	Total (n=100)
<16.0	Chronic energy deficiency - Grade III	13 (26)	9 (18)	22 (22)
16.0-17.0	Chronic energy deficiency - Grade II	10 (20)	5 (10)	15 (15)
17.0-18.5	Chronic energy deficiency - Grade I	7 (14)	16 (32)	23 (23)
18.5-20.0	Low normal	10 (20)	9 (18)	19 (19)
20.0-25.0	Normal	8 (16)	9 (18)	17 (17)
25.0-30.0	Obese - Grade I	2 (4)	2 (4)	4 (4)
>30.0	Obese - Grade II	-	-	-

Figures in parenthesis indicate percentage
n - Number of adolescents



energy deficiency grade III was also prevalent more among boys (26%) than girls (18%). Among both boys and girls 4 per cent were obese grade I. Grade II obesity was not found among adolescents. Distribution of adolescent boys and girls based on Body Mass Index is depicted in Fig.5 and 6 respectively.

4.4.2 Clinical manifestations of deficiency symptoms

Clinical examinations of adolescents was conducted and the results are presented in Table 41.

Table 41. Details of clinical examination of adolescents

Details	Boys (n=50)	Girls (n=50)	Total n=100)
Clinical symptoms			
Present	3 (6)	1 (2)	4 (4)
Absent	47 (94)	49 (98)	96 (96)
Total	50	50	100
Type of clinical symptoms			
a) Eyes - discharge	1 (2)	-	1 (1)
b) Skin - collar - like pigmentation and dermatitis around the neck	1 (2)	-	1 (1)
c) Skin - Hyperkeratosis and phynoderma	-	1 (2)	1 (1)
d) Nervous system - Paresis	1 (2)	-	1 (1)

Figures in parenthesis indicate percentage
n - Number of adolescents

From the above table, it is evident that manifestations of clinical symptoms were present only in 4 per cent of the adolescents. Clinical symptoms were present more among boys (6%) than girls (2%).

One of the adolescent boys had discharge from his eyes, another boy had collar like pigmentation on skin and dermatitis around the neck and paresis was present in another boy.

Among girls only one girl had hyperkeratosis and phymoderma.

4.4.3 Actual food and nutrient intake

Actual food intake of adolescents was assessed by three days weighment survey and the results are furnished in Table 42.

The intake of cereals was found to be low in boys when compared to RDA (82%) where as in girls the cereal intake was found to be high (106.8%). The same trend was observed regarding the intake of pulses. It was only 58 per cent of RDA in boys and 248 per cent in girls. Consumption of green leafy vegetables was found to be more among boys than girls but for both groups it was below the RDA (60% for boys and 32% for girls). Consumption of other vegetables was 135.7 per cent of RDA for boys but only 60 per cent of RDA for girls. There was not much difference in the consumption of roots and tubers by both groups but was below the RDA (90% for boys and 80% for girls). Among adolescents, consumption of fruits was found to be high in both groups. Eighty eight per cent of the RDA for milk was met by boys where as for girls only 80 per cent of RDA was met regarding this food group. Consumption of food groups like fats and oils (110% for boys and 125% for girls), flesh foods (361% for boys and 333% for girls) and sugar and jaggary (120% for boys and 125% for girls) was found to be high among adolescents compared to RDA.

Among boys the consumption of pulses was significantly lower than the RDA, but the intake of meat, fish and egg was significantly higher than the RDA. Where as among girls only the intake of green leafy vegetables was significantly lower than the recommended levels. Mean nutrient intake by the adolescents were worked out using the food composition table (Table 42) and the results are presented in Table 43.

As indicated in Table 43, among boys 95.3 per cent of the RDA of energy was met where as in girls it was 117 per cent of RDA. When compared to

Table 42. Mean food intake of adolescents in comparison with RDA* (g/day)

Food item	RDA* boys	Boys (n=5)	't' value	RDA* girls	Girls (n=5)	't' value
Cereals	500	410 (82)	2.05 NS	440	470 (106.8)	1.27 NS
Pulses	35	20 (58)	5.88*	25	62 (248)	1.46 NS
Green leafy vegetables	50	30 (60)	1.08 NS	125	40 (32)	4.40*
Other vegetables	70	95 (135.7)	2.18 NS	75	45 (60)	0.98 NS
Roots and tubers	50	45 (90)	0.30 NS	50	40 (80)	1.29 NS
Fruits	30	45 (150)	0.52 NS	30	48 (160)	3.09 NS
Milk and milk products	250	220 (88)	2.71 NS	250	200 (80)	2.70 NS
Fats and oils	50	55 (110)	1.63 NS	40	50 (125)	0.79 NS
Meat, fish and egg	60	217 (361)	3.48*	60	200 (333)	2.43 NS
Sugar/Jaggery	50	60 (120)	1.18 NS	40	50 (125)	2.71 NS

Figures in parenthesis indicate percentage of RDA

RDA* - Recommended Dietary Allowances for Indians (ICMR, 1989)

n - Number of adolescents

*Significant at 5% level, NS - Not significant

Table 43. Mean nutrient intake of adolescents in comparison with RDA*

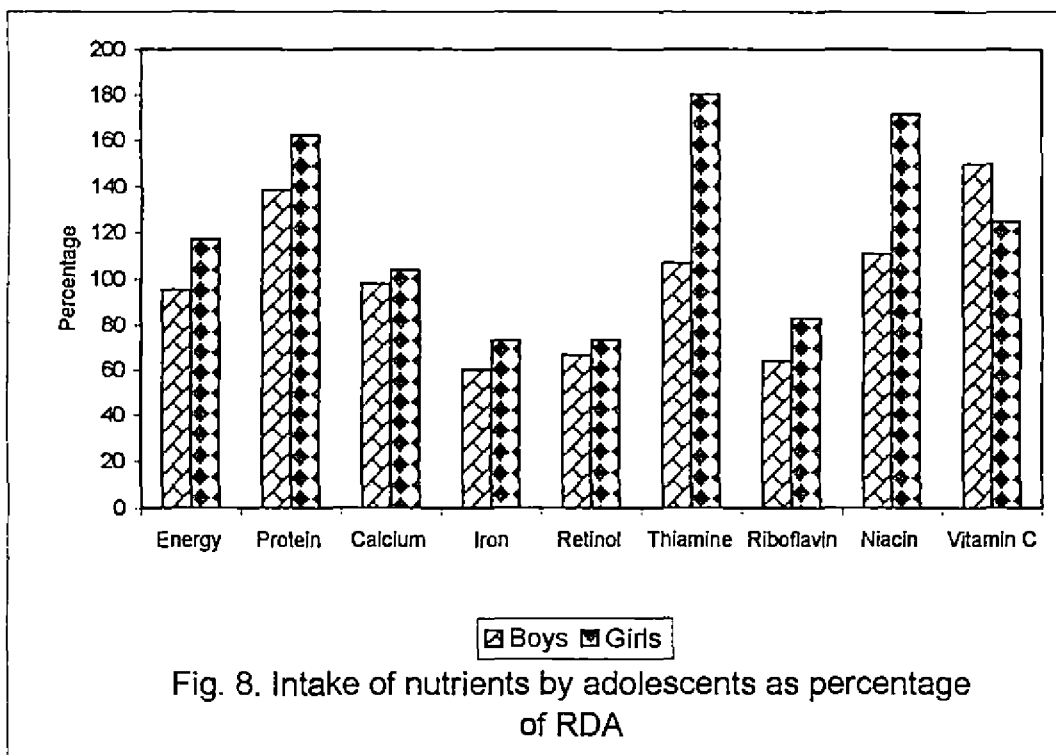
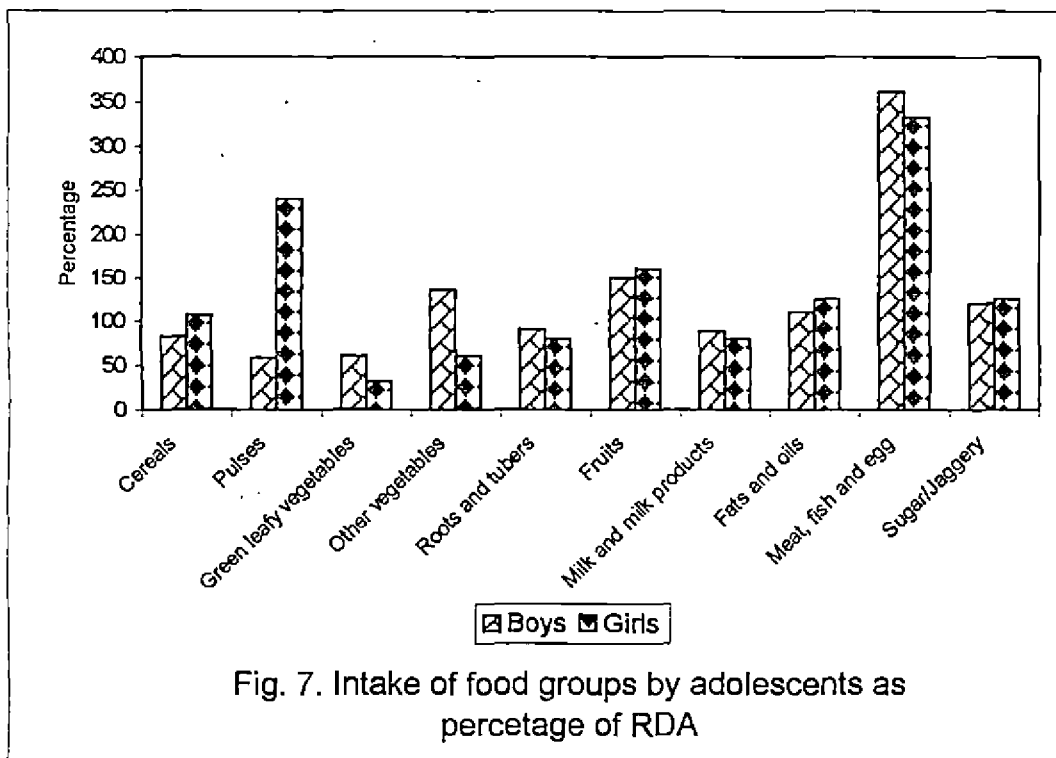
Nutrients	RDA* boys	Boys (n=5)	't' value	RDA* girls	Girls (n=5)	't' value
Energy (Kcal)	2640	2516 (95.3)	0.92 NS	2060	2401 (117)	1.75 NS
Protein (g)	78	108 (138.5)	0.83 NS	63	102 (162)	4.98*
Calcium (mg)	500	490 (98)	0.43 NS	500	524 (104)	0.26 NS
Iron (mg)	50	30 (60)	3.24*	30	22 (73)	13.48*
Retinol (μ g)	600	400 (66.7)	2.58 NS	600	440 (73.3)	2.999 NS
Thiamine (mg)	1.3	1.4 (107)	0.91 NS	1.0	1.8 (180)	5.20*
Riboflavin (mg)	1.6	1.03 (64)	0.57 NS	1.2	1.0 (83)	0.053 NS
Niacin (mg)	17	20.98 (111)	1.77 NS	14	24 (171)	3.248*
Vitamin C (mg)	40	60 (150)	1.01 NS	40	50 (125)	0.920 NS

Figures in parenthesis indicate percentage of RDA

RDA* - Recommended Dietary Allowances for Indians (ICMR, 1989)

n - Number of adolescents

*Significant at 5% level, NS - Not significant



RDA the difference in energy intake was not statistically significant. A high intake of protein was observed in both boys (138.5%) and girls (162%) but the difference was not statistically significant when compared to RDA in the case of boys but it was significant in the case of girls.

Calcium intake was also found to be satisfactory in both groups (98% for boys, 104% for girls) and when compared to RDA the difference was not significant.

The intake of iron was significantly lower in boys (66%) than the RDA and girls (73%).

The retinol intake in both boys (66.7%) and girls (73.3%) were found to be low when compared to RDA but the difference found was not statistically significant. The high intake of thiamine in boys (107%) was not statistically significant when compared to RDA. But in girls, the thiamine intake was significantly high when compared to RDA.

Regarding the intake of riboflavin both boys (64%) and girls (83%) showed a low intake which was statistically not significant when compared with RDA.

The intake of niacin was high in both boys (111%) and girls (171%) but significantly high intake was found only among girls when compared with RDA.

Vitamin C intake was also above the RDA in both boys and girls but statistically the difference was not significant.

4.4.4 Haemoglobin levels

To assess the nutritional status of the adolescents biochemical estimation of haemoglobin was also done. The results are shown in Table 44.

Table 44. Haemoglobin levels of adolescents

(Gopaldas and Seshadri, 1987)

Hb levels (g/dl)	Presumptive diagnosis	Boys (n=5)	Girls (n=5)
< 8	Deficient	-	-
8-10	Low	2 (40)	1 (20)
10-12	Low	2 (40)	4 (80)
>12	Acceptable	1 (20)	-
Total		5 (100)	5 (100)

Figures in parenthesis indicate percentage
n - Number of adolescents

Forty per cent of the boys and 80 per cent of the girls had Hb levels between 10 - 12 g/dl. Forty per cent of boys and 20 per cent of the girls were having Hb values between 8-10 g/dl. Only 20 per cent of the adolescent boys had acceptable Hb level of above 12 g/dl.

Discussion

5. DISCUSSION

5.1 Demographic variables

Two hundred adolescents (100 girls and 100 boys) in the age group of 16-18 years in Thrissur Municipal area were selected at random for the study.

The type and size of the families, religion, income and educational status of the parents etc. are some of the important factors, which indirectly influence the nutritional status of children in the family.

In the present study majority of the families (51%) were Christians followed by Hindus (44%) and Muslims (5%). Among Hindus, most of them belonged to Nair community.

In the pre modern matriarchal Nair societies, the pattern of family life was joint. As the modernization goes on individuals would find it more preferable to establish independent nuclear homes than living in large families. In the present study also most of the families (80.5%) followed nuclear family system. According to Saxena (1986) nuclear families are better than joint families in health and development. Paul (1993) and Devi (2000) in their Kerala studies revealed that most of the families followed nuclear family system. In most of the families (80%), there were only 4 members i.e. 2 adults and two children. This falls below 5.3, the average size of the families in Kerala (Census of India, 1991). Studies conducted by Cherian (1992), Jayanthakumari (1993), Udaya (1996) and Shyna (1996) also revealed the same family pattern in Kerala.

A positive association between parental literacy and nutritional status was reported by Devadas (1994). In this study, both fathers and mothers had high educational status (> 70%).

Occupational status of parents revealed that 57.5 per cent of the mothers were unemployed. Where as, majority of the fathers (85.5%) were working in private sectors. Fourty nine per cent families had monthly income above Rs.12000.

Monthly expenditure pattern showed that 37.5 per cent of the families spent 20-30 per cent of their monthly income on food. An earlier study conducted by Rai and Sarup (1995) in Kerala revealed that urban families spent 58.45 per cent of their monthly income on food. The present study also reported that majority of the families (93.5%) had their own houses. So they did not spend anything for maintenance or as rent (88.5%). It was observed that most of the families spent less than 10 per cent of the monthly, income on clothing, health, transportation, entertainment, education, savings, personal expenses, repayment of loans, kuries and fuels. The same pattern was observed by Abraham (1989) in her urban Kerala studies.

Most of the families (93.5%) had their own house with 3-4 rooms, concrete roofs and mosaic flooring. Fifty per cent of the families had separate drawing room, bed room, study room and store room in their house. Separate rooms for individual members were seen in majority of the families. Drinking water facilities for most of the families (86%) was found to be from their own well. All the families had electric connections and also lavatory facilities at home. Most of the families had good drainage system.

More than half of the families used radio and television as their recreational medium and majority of the families (87%) used their own vehicles for transportation. Only 28 per cent families were found to be members in social organizations. As revealed from the study the families enjoyed better living facilities as their income increased.

Almost all the families possessed a combination of different labour saving devices. The most common labour saving devices found in the families

were mixi, grinder, washing machine, heater, bread toaster and electric cooker. Majority of the families (63.5%) had no servants at home. Most of the mothers were unemployed and were full time housewives and this may be the reason for not engaging a servant at home. In the families with servants (36.5%), most of them engaged them for washing and cleaning jobs.

5.1(a) Details regarding selected adolescents

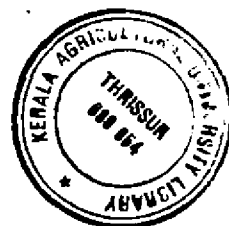
Thirty seven per cent of boys and 64 per cent of girls had normal birth weight. Among boys 39 per cent were having low birth weight. Engle (1991) and Sichieri *et al.* (1993) stated that birth weight of children is significantly correlated to the nutritional status. Since most of the families had only 2 children, the selected adolescents belonged to 1st or 2nd birth order. As reported by mothers, 85 per cent of the boys and 95 per cent of the girls had taken their immunization schedule completely. This may be due to the high educational status and awareness of the mothers.

Most of the boys (59%) and girls (65%) had no serious illness, other than fever for the past one year. Majority of the families utilized the services of private hospitals and they resorted to allopathic medicines for treatment.

5.1(b) Personal habits of adolescents

Newspaper reading was found to be a regular habit in majority of boys and girls (88%). Watching T.V news daily was also observed in most of the adolescents (80.5%). Adolescent boys were more interested in watching T.V news and reading newspapers daily (85%) than girls (76%).

Regarding friends adolescent boys had more number of friends than girls. Most of the boys (57%) had more than ten friends, whereas 32 per cent of girls had 1-3 or 4-7 number of friends.



Mahan and Ress (1984) viewed that adolescents in general were found to be active and are found to engage themselves in various activities. But in this study, it was found that majority of the adolescents (84.5%) were not members in any of the social organizations. This is contradictory to the findings of Paul (1993) who reported that most of the adolescent boys and girls participated in the activities of various organizations in their locality.

The mode of conveyance to reach their college and school was by bus for majority of boys (71%) and girls (63%). Among boys 20 per cent used their bicycles and some (6%) had their own two wheelers. Twenty two per cent of girls used to walk to their college and school.

All the adolescents watched T.V programmes daily and this was supported by Furwhan and Gunter (1989) who reported that, most of the adolescents were in the habit of watching T.V programmes daily.

Forty five per cent of adolescent boys went to movies occasionally while 59 per cent of adolescent girls went to movies once in a week. Among boys 12 per cent went to see movies several times in a week.

Adolescent boys were interested in sports and games during their free time. Helping parents and being with friends were also found to be their leisure time activities. Paul (1993) also observed the same leisure time activities among adolescents. Where as, most of the girls were interested in watching T.V programmes and reading. They also helped their parents in household activities during leisure time.

Majority of the adolescents (93% boys and 99% girls) were interested in watching T.V advertisements. More girls (91%) were motivated by advertisements to buy processed food items than boys (78%). This finding is in line with the observations made by Shaw *et al.* (1993) who found that students are more influenced by the advertisements and they are also attracted by the packaging and

the incentives given by the companies. There was no significant difference between boys and girls in their trend to purchase processed foods motivated by T.V advertisements.

It was interesting to note that, most of the boys (30.8%) preferred to buy soft drinks whereas, girls preferred to buy chocolates followed by soft drinks. Shaw *et al.* (1993) in their study also observed that among all the processed food items maximum consumption was for carbonated soft drinks among students.

Brand name of the soft drinks appears as one of the most important factor influencing the buying decision of adolescents. Boys (95%) were more interested in branded soft drinks than girls (86%). There is significant difference between boys and girls in their preference of branded soft drinks.

Among soft drinks, majority of the adolescent boys and girls preferred cocacola and pepsi as their favourite brand. The selection of a particular brand of the soft drinks by adolescents can be much influenced by media advertisements. The most weighted reason for the increase in consumption of soft drinks appears to be easy availability of these products. This justifies the argument that demand for processed foods and soft drinks are often created and reinforced by the media of communication.

Most of them (96%) were found to take their breakfast regularly and carried their (96.5%) packed lunch with them. Majority of the boys (94.8%) preferred rice for their lunch whereas 10.4 per cent of the girls preferred breakfast items for their lunch also. Five per cent of girls and 3 per cent of boys skipped their breakfast. Lack of time, not feeling hungry and dieting were some of the reasons reported by adolescents who skipped their breakfast. Devadas (2000) stated that lack of time, fasting, food dislikes and petty quarrels at home often forced adolescents to miss meals very often.

Majority of the adolescents (73.5%) received pocket money. When analysed between boys and girls more boys (85%) got pocket money than girls (62%). Most of them got more than 25 rupees per week as their pocket money. Nearly 38 per cent of the boys and 20.9 per cent of the girls spent more than 50 per cent of their pocket money. Girls (29%) were more interested to save their pocket money than boys (17.6%). Most of the boys spent their pocket money to eat from outside where as, girls spent their pocket money on books.

Taking meals from outside the home is a preferred trend among adolescents. The present study revealed that more boys (70%) had the habit of eating outside than girls (57%) but this difference was not statistically significant. This was supported by Devadas (2000) who reported that boys easily develop a tendency to eat outside, especially from hotels than girls. But this is contradictory to the findings of Paul (1993), who reported that majority of the adolescents did not have the habit of taking food from outside the home.

Among the adolescents who had the habit of eating from outside, 55.1 per cent went out only occasionally and 24.3 per cent went out once in a week where as girls (24.6%) went out once in a month for eating. A significant difference was observed between boys and girls in their frequency of eating from outside.

Most of the boys preferred to go out with friends for eating whereas girls preferred family members. There is significant difference between boys and girls with whom they prefer to go out for eating. Most of them preferred non vegetarian foods from outside and there was no significant difference in the preference of food between boys and girls.

Most of the adolescents celebrated special occasions such as birthdays and marriage in their family with friends and family members. There is no significant difference between boys and girls regarding celebration of special

occasions and the type of occasions they are celebrating. Girls (80.1%) preferred home for celebration where as 57.6 per cent of boys preferred home and 26.1 per cent of boys preferred outside for celebration. There observed a significant difference between boys and girls regarding the place of celebration of various occasions.

There is a significant difference between boys and girls with respect to their weight consciousness. It was found that, boys were more conscious about their weight than girls. Majority of the boys (28%) preferred exercise to maintain their body weight and figure. Where as, girls were interested only in walking to maintain their body weight. Dieting was found in girls (21.7%) than in boys (13.3%). The same pattern was reported by Wardle and Marsland (1990) in their studies among adolescents. About half an hour was spent by boys (34.7%) and girls daily (30%) for weight maintaining practices. There was no significant difference between boys and girls in their time spent on such activities.

Cigarette smoking, alcohol consumption and drug addiction are a few health hazards usually seen among adolescents. In this study it was heartening to note that one boy had the habit of smoking and 3 per cent boys had drinking habits. None of the girls had any unhealthy personal habits. Mathrubhoomi (2000) reported that in Kerala about 4 per cent high school students and 40 per cent college students are addicted to alcohol. As pointed out by Vidya (1995) a number of factors may influence the use of tobacco and alcohol by children and teenagers including adult use. Malayala Manorama (2000) revealed that God's own country ranked first in alcohol consumption among other states in India. This condition lead to easy access of children to these products and most importantly aggressive marketing by the cigarette and alcohol industry.

5.2 Food consumption pattern of families

Majority of the families (82%) were non vegetarians and most of the families (61%) followed three major meals pattern, consisting of breakfast, lunch and dinner. This finding is in line with the results of the studies conducted by Karuna (1993), Udaya (1996), Shyna (1996) and Devi (2000) who reported a pattern of three meals a day among the households of Kerala. In most of the families, it was mothers who decided the menu of the day.

Regarding the frequency of use of various food items, all the families used cereals, milk and milk products, fats and oils and sugar / jaggery daily.

Among protein rich foods, daily consumption of pulses was found only in 13 per cent of the families. Most of the families consumed pulses twice a week.

Eventhough majority of the families were non vegetarians, consumption of meat was only once in a week (34.5%) but daily consumption of fish was observed in 19 per cent of the families. Fish was consumed more than twice a week in 24 per cent of the families. Egg was consumed once in a week by most of the families.

Protective foods like other vegetables were included in the daily diet by majority of the families but green leafy vegetables was consumed once in a week or occasionally. Roots and tubers were consumed daily and more than twice in a week. Majority of the families consumed fruits daily or more than twice in a week.

It was interesting to note that, 24 per cent of the families used rice as meals for breakfast. A combination of different preparations such as pittu, idli, dosa, chapathi, poori, bread, appam and uppuma was prepared by families for breakfast. Most of them preferred vegetable preparations as side dish for breakfast. Vegetables in combination with dhals and also eggs were preferred as side dishes for breakfast by many families.

For lunch, 90 per cent families used plain boiled rice daily and some families prepared items like biriyani, fried rice and pulav etc. Occasionally majority of the families used vegetable and fish preparations as side dish for lunch.

Rice and chappathi was the two main items prepared by the families for dinner. Nearly 28 per cent of the families used vegetable preparations, vegetable and dhal (7.5%), meat preparations (7%) and fish preparations (6%) as side dish for dinner.

For evening tea fried items like samosa, pazampori, baji, vada and chips were preferred by the families.

In this study it was found that the use of various convenient foods such as ready to cook food mixes was only occasional by the families. Among the processed foods, pickles were used daily by most of the families (48%) and this finding was supported by Jeeja (1996) who reported that majority of the families purchased pickles more frequently because they are part of typical Kerala lunch. The change in the consumption pattern in the recent years has created a high demand for food products in processed and preserved form to suit the changing life style. These products include, jam, pickles, squashes, dehydrated fruits & vegetables, bread, butter, cheese & sherbets. Bread, biscuits, chips and pappads were the most frequently used other processed foods by the families. Consumption of processed foods increases if both spouses are working. But, most of the women in this study were housewives and that may be the reason for the low purchasing pattern of other convenient foods by the families.

Food preferences and food habits of adolescents are formed as a result of complex interactions of many factors when the individual and with that of his environment (Mahan and Ress, 1984). Rao (1985) opined that teenage period is the time when they exercise full authority in matter of what they will or will not eat. Frequency score for different preparations consumed by adolescents for breakfast,

lunch, dinner and evening tea revealed that for breakfast most of the adolescents preferred rice based preparations. This was supported by Bundier *et al.* (1991) who reported that for breakfast, adolescents preferred traditional sort of foods. Boys preferred rice based preparations more than girls. Girls preferred wheat based preparations for breakfast more than boys. During breakfast, tea was highly preferred than coffee by both boys and girls.

Most frequently used side dishes (score above 75%) for breakfast were preparations with vegetables and egg. Fruits and meat preparations were used medium frequently (50-75%). Whereas preparations with fish, chicken, and green leafy vegetables were used less frequently (<50%) as side dish for breakfast.

Girls preferred fruits and preparations with vegetables and meat more than boys. Whereas, boys preferred preparations with egg, fish and chicken than girls as side dish for breakfast.

Regarding lunch, rice was used more frequently and wheat based preparations were used less frequently as main item. Boys preferred wheat based preparations for lunch than girls.

Preparations with vegetables, meat, chicken, fish and egg were used most frequently as side dish for lunch. Preparations with green leafy vegetables and dhal were used moderately and fruits were used less frequently during lunch. Fruits and preparations with vegetables, egg, chicken and green leafy vegetables were preferred more by girls. Where as, boys preferred preparations with fish and meat as side dish for lunch.

For dinner, rice (98%) and wheat based preparations (86%) were used most frequently. Girls preferred rice where as boys preferred wheat based preparations for dinner.

Preparations with vegetables, egg, meat and chicken scored above 75 per cent as side dish for dinner. Dhal and fish preparations scored between 50-75 per cent. Fruits and preparations with green leafy vegetables scored below 50 per cent as side dish for dinner.

Vegetable and egg preparations were preferred as side dish for dinner by most girls. Boys preferred preparations with meat, chicken, fish and green leafy vegetables as dinner side dish.

During tea time, adolescents preferred tea (95%) than coffee (24.3%). Boys and girls showed more preference to tea than coffee. Along with tea fried foods such as chips, vada, cutlet, samosa, baji, pazhampori etc. were used most frequently. Where as steamed foods were used moderately and baked foods were used less frequently.

Most of the families celebrated special occasions (72.5%) such as birthday, marriage, death related functions, festivals and feasts. Most of the families prepared non vegetarian foods for celebrating various occasions, except on the death of a family member or a relative.

Majority of the families (66.5%) purchased prepared foods that too, non vegetarian foods from hotels occasionally. The frequency of purchase of prepared foods was found to be once in a week in 8.3 per cent of families.

Most of the families changed their diet during illness and they gave equal importance for family members in food distribution.

5.3 Attitude of adolescents and their parents towards eating habits

From the observations made in the study it is noticeable that, in general about 67 per cent of adolescents had favourable to highly favourable attitude towards their eating habits. Among the respondents only 10 per cent have less

favourable attitude. Attitude is a mental disposition towards any objects which an individual possess and it has three components - affective, cognitive and behavioural. One's overt behaviour is always an interactive product of these components of attitude and socio-cultural contexts. The theory of cognitive consistency (Festinger, 1957) needs a special mention here. The individuals who are conscious, aware and bothered about the ill effects of deviated food habits will have either consistent behaviour with their beliefs and attitudes or otherwise will be in dissonance with their attitude. Those who are with less favourable attitude towards their own behaviour can be placed in such category who are in the dilemma cognitive dissonance.

Parents and media can play emphatic roles in building up and sustaining the consonance and sustained attitude towards healthy food habits among the children. The authorities like Public Relation Department, Health Department, Youth Welfare etc. should take care to ban harmful commercial and propaganda. Parents role on developing and moulding the attitude and behaviour of their children towards food intake cannot be exaggerated. It is from the parents actually the children first learn what to eat and not to eat. Hence the eating habits of children are actually the extended behaviour of the parents, but influenced by secondary groups and environment in which they move and get influenced. In total though the resulting behaviour will be an outcome of the interaction of learned and inherent behaviour.

As more than half of the adolescent respondents had favourable to highly favourable attitude. It can be assumed that majority of children were non in dissonance with what actually their parents expected out of them in their socio-economic background and culture. This was well established from the further observations and analysis done with regard to parents attitude towards their children's eating habits. The increased restrictions on the part of the girls by their parents might be the reason behind observation in the case of girls attitude. Similarly the boys may be in possession of increased cognitive consonance as

observed in the higher percentage of boys in favourable attitude towards their habits than in the case of girls.

Majority of the parents of adolescent boys (53%) and girls (58%) had favourable attitude towards the eating habits of their children. It was also observed that parents of adolescent girls had more favourable attitude than the parents of adolescent boys.

5.4 Nutritional status of adolescents

5.4.1 Anthropometric measurements

Mean body weight of adolescent boys and girls were significantly low when compared to the Indian standard values as given by ICMR (1990). But studies conducted by Nagi *et al.* (1995) revealed that Indian adolescents had normal height and weight.

When body weight of boys and girls were distributed as normal, more than standard and less than standard it was found that majority of them were below the standard values for weight. But among boys and girls, more boys belonged to this group (68%). More girls were having normal body weight and more than standard body weight when compared to boys.

The same trend was seen with height also. About 52 per cent of the boys were having height less than the standard while it is only 14 per cent among girls. Eighty per cent of the girls had height more than standard values where as it was only 46 per cent among boys. Girls were found to be in a better position in their anthropometric measurements when compared to boys.

Weight for age has been used as an index of malnutrition which reveals current nutritional status (Sathy *et al.* 1991, Lucas, 1992 and Narins, 1992). Fifty per cent of the adolescents were having normal weight for their age. Between boys and girls 60 per cent of girls were found to have normal weight for their age.

Whereas among boys it was 40 per cent. Prevalence of grade II malnutrition was also found to be more among boys than girls. One boy even exhibited grade III malnutrition. But Paul (1993) studied the anthropometric measurements of adolescents in the age group of 16-18 years and indicated that weight for age of adolescent boys and girls were below Indian standards.

Body Mass Index (BMI) indicates the nutritional status and it has good correlation with fatness (Rao and Vijayaraghavan, 1996). Body Mass Index of adolescents revealed a high prevalence of chronic energy deficiency grade I and grade III. More girls (32%) belonged to chronic energy deficiency grade I. But most of the boys belonged to chronic energy deficiency grade III (26%). About 4 per cent of both boys and girls were found to be obese. More girls were found to have normal BMI when compared to boys.

5.4.2 Clinical manifestations of deficiency symptoms

Clinical examination is the most important part of nutritional assessment as direct information on signs and symptoms of dietary deficiencies prevalent are obtained (Swaminathan, 1986). Majority of adolescents did not manifest any clinical symptoms of malnutrition.

5.4.3 Actual food and nutrient intake

An understanding of nutrient intake in the dietaries would help in planning diet to overcome diet related morbidities (Thimmayamma and Rau, 1996).

Consumption of food groups like fruits, fats and oils, flesh foods and eggs and sugar and jaggery were more than RDA among adolescents. Among girls along with the above food stuffs consumption of cereals and pulses were found to be higher than RDA and among boys consumption of other vegetables also was higher than RDA.

Consumption of pulses was 58 per cent of RDA by boys and green leafy vegetables was 32 per cent of RDA by girls and was significantly low. Among girls consumption of milk and milk products was only 80 per cent of RDA. Whereas among boys it was 88 per cent of RDA. Consumption of flesh foods was significantly high among boys.

This findings in food consumption pattern of adolescents is in line with the findings of Sarojini and Vijayalakshmi (1989) and Paul (1993). The former reported that adolescent girls preferred less amounts of milk, milk products and green leafy vegetables. The latter found that the intake of green leafy vegetables was far below the recommended levels among adolescents. Akkamahadevi *et al.* (1998) in their study in adolescents found that the intakes of green leafy vegetables, other vegetables, fruits, cereals, pulses, sugar/ and jaggery, milk and milk products were low in adolescent girls.

The deficiency observed in the intake of different foods are reflected in the intake of nutrients also (Sarojini and Vijayalakshmi, 1989). This study indicated that the energy intake of adolescent girls was higher than RDA and it was also higher than the intake of boys. The calorie intake of adolescent boys was found to be only 95 per cent of RDA. This finding is in line with the findings of Suman (2000) who reported that the energy intake of adolescent girls was higher than RDA and the intake of energy by adolescent boys was lower than RDA. As the body mass almost doubles, adolescents are particularly vulnerable to even modest level of energy restriction (Murthy, 2000). And this is reflected in their body mass index where most of the boys belonged to Chronic energy deficiency grade III.

But this is contradictory to the findings of Michaud *et al.* (1990) and spyckerelle *et al.* (1991) who revealed that the energy intake of boys was greater than girls. Rao (1996) observed that calorie intakes of Indian adolescents were only around 70 per cent of RDA.

Nagi *et al.* (1994), Kochhar *et al.* (1995) and Chaturvedi *et al.* (1996) reported that the diets of Indian adolescent girls were deficient in energy and protein. But in this study it was found that the intake of protein was higher than the RDA in both boys and girls. This may be due to their high intake of flesh foods.

Among girls, the intake of calcium, thiamine, niacin and vitamin C was higher than the RDA. A higher intake of calcium, vitamin C and thiamine among adolescent girls was supported by Manjula *et al.* (1995) and Kochhar *et al.* (1995). But a low intake of calcium among adolescent girls was reported by Paul (1993) and Premeela *et al.* (1995).

It was observed that adolescent girls had low intake of iron, retinol and riboflavin than the recommended levels. Low intake of green leafy vegetables may be a reason for this low iron intake among girls. The same was reported by Paul (1993) in her Kerala studies. Deficient intake of iron among adolescent girls was reported by Nagi *et al.* (1994), Kochhar *et al.* (1995) and Lyhne (1998).

Among boys the intake of calcium, iron, retinol and riboflavin was lower than the recommended levels. But this observation is in contrast to the findings of Premeela *et al.* (1995) who reported that boys had higher intake of calcium and vitamin A than girls.

5.4.4 Haemoglobin levels

Biochemical estimation give more definite information on nutritional status than anthropometric and food intake measurements and they are therefore employed in diagnosing and confirming nutritional deficiencies (Okoye, 1992). In the present study, 20 per cent boys had acceptable haemoglobin level above 12 g/dl. No girls had this acceptable level. Where as majority of the girls (80%) had haemoglobin levels between 10-12 g/dl. This was supported by Gopalan (1986) who reported the incidence of anaemia as 60-79 per cent in Indian girls. Kapoor and Aneja (1992) reported that anaemia is a major health problem among

adolescent boys and girls of different socio economic back ground. Forty per cent of the boys were having haemoglobin values between 8-10 g/dl lower than the girls. Paul (1993) in her Kerala studies revealed that 30 per cent of adolescent girls and 20 per cent of adolescent boys were anaemic. In the present study even though 20 per cent of boys were having acceptable haemoglobin levels, 40 per cent were having low haemoglobin levels of 8-10 g/dl. Among girls nobody has acceptable levels but 80 per cent had haemoglobin values between 10-12 g/dl. Thus the prevalence of moderate anaemia was found to be more among boys and mild anaemia among girls.

Summary

1

6. SUMMARY

The present study, "Food habits and nutritional profile of adolescents" was carried out among 200 adolescents (100 boys and 100 girls) in Thrissur Municipal area, to find out their food consumption pattern, nutritional status and the attitude of adolescents and their parents towards their eating habits.

Most of the families followed nuclear family system with four members. Educational status of both the parents were high. Majority of the families had good housing conditions and living facilities.

Majority of the fathers were working in private sectors and earned above 12000 rupees per month. Where as most of the mothers though highly educated were unemployed. A greater part of monthly income was spent on food by most of the families.

Radio and television were the major recreational medium in most of the families and they used their own vehicle for transportation. All the families had different labour saving devices and most of the families had no servants at home.

Among adolescents more girls were found to have normal birth weight and most of them had completed their immunization schedule.

All the adolescents watched T.V daily and most of them read news papers daily. Boys had more number of friends than girls and they were not members in any social organizations. Most of them went to college and school by bus.

Boys spent their leisure time in sports and games where as, girls were interested in watching T.V and reading. Most of them watched T.V advertisements and more girls were motivated by advertisements to buy processed foods such as soft drinks and chocolates.

Majority of the adolescents, never skipped their breakfast and carried packed lunch with them and most of them preferred rice for lunch. Lack of time, not feeling hungry, not feeling well are some of the reasons reported by most of the adolescents who skipped their breakfast.

Most of them received more than 25 rupees per week as their pocket money. Boys spent their pocket money to eat from outside where as most of the girls saved their pocket money or spent on books.

Among boys, 24.3 per cent went once in a week and 24.6 per cent girls went once in a month for eating from outside. There is significant difference between boys and girls with whom they prefer to go out for eating. Most of the boys preferred friends where as girls preferred family members to go out for eating. Majority of the adolescents preferred non vegetarian foods.

Boys were more interested in branded soft drinks than girls. They celebrated special occasions like birthday and marriage with their friends and family members at home.

Adolescent boys were more conscious about their weight and figure than girls. Boys preferred exercise where as girls preferred walking to maintain their body weight and most of them spent about half an hour for such activities.

Among boys, one had smoking habit and 3 per cent had the habit of taking alcoholic drinks. None of the girls had unhealthy personal habits.

Boys had more favourable attitude towards their eating habits than girls. Parents of adolescent girls had more favourable attitude than the parents of boys towards the eating habits of their children.

Dietary habits of the families revealed that majority of them were non vegetarians and followed three major meal pattern. All the families used cereals, milk and milk products, fats and oils and sugar or jaggery daily.

Regarding breakfast habits, most of the families used a combination of different preparations such as pittu, idli, chapathi etc. and most of them preferred vegetable preparations for breakfast.

For lunch, plain boiled rice was the main dish and preparations with vegetables and fish was used as side dish. Rice and chapathi were preferred by most of the families along with vegetable preparations for dinner. For evening tea fried items were preferred by most of the families.

Most frequently used breakfast items by adolescents were rice based preparations as main item and preparations with vegetables and egg as side dish. Boys preferred rice based preparations and girls preferred wheat based preparations for breakfast.

Frequency score revealed that rice was used most frequently for lunch by most of the adolescents. Preparations with vegetables, meat, fish, chicken and egg were used most frequently as side dish for lunch by most of the adolescents.

Rice as well as wheat based preparations were used most frequently during dinner. For dinner, preparations with vegetables, egg, meat and chicken were used most frequently. For evening tea, most of them preferred tea and fried foods.

Majority of the families celebrated special occasions such as birthday, marriage etc. and most of them prepared non vegetarian foods. Most of the families purchased non vegetarian foods from hotels occasionally.

Anthropometric measurements revealed that mean body weight of adolescents were significantly low when compared to the Indian standard values given by ICMR (1990). But mean body height of girls was above the standard values.

The weight for age distribution of adolescents according to Gomez *et al.* (1956) classification revealed that 60 per cent girls 40 per cent boys were having normal weight for age. Prevalence of grade I and grade II malnutrition was observed more among adolescents boys.

Regarding BMI, most of the girls (32 per cent) belonged to chronic energy deficiency grade I and most of the boys (26 per cent) belonged to chronic energy deficiency of grade III. More girls had normal BMI than boys.

Most of the adolescents did not manifest any clinical symptoms of malnutrition.

Consumption of fruits, fats and oils, flesh foods, egg and sugar or jaggery were more than RDA among adolescents. Cereals and pulses were consumed more by girls whereas boys consumed more amounts of vegetables. Consumption of green leafy vegetables was significantly low in girls.

Regarding nutrients, the intake of protein, thiamine, niacin and vitamin C by adolescents were higher than RDA. But the intake of iron, retinol and riboflavin was lower than RDA. Among girls intake of energy and calcium were also higher than RDA.

In the present study, it was found that, majority of the adolescent girls had haemoglobin levels between 10-12 g/dl and 20 per cent boys had haemoglobin level above 12 g/dl. But 40 per cent of boys were having haemoglobin levels between 8-10 g/dl a value much lower than majority of the girls.

Thus, the diets of adolescents in general were predominantly cereal based. The consumption of fats and oils, fish and other flesh foods including eggs, and sugar and jaggery was found to be high compared to RDA. But their diets were deficient in green leafy vegetables, roots and tubers and milk & milk products. Consumption of other vegetables among girls was found to be low and among

boys it was pulses which was deficient. Consumption of fruits was found to be good among adolescents.

Their diets were deficient in iron, retinol and riboflavin. But the intake of protein, thiamine, niacin and vitamin C was found to be satisfactory. There observed a marginal deficiency of energy and calcium in the diets of adolescent boys.

Nutritional status of adolescents as assessed by anthropometric measurements such as height and weight showed that mean weight of adolescents were below the Indian standards but mean height of girls were significantly higher than the standard.

Prevalence of different degrees of malnutrition among adolescents as judged by weight for age showed that majority of the girls belonged to normal group and had grade I malnutrition. But majority of the boys had grade I and grade II malnutrition.

Chronic energy deficiency as assessed by BMI showed that prevalence of Chronic energy deficiency grade II and grade III was more among adolescent boys where as Chronic energy deficiency grade I was observed among girls. The prevalence of grade I obesity was found in both boys and girls at the same rate (4%).

The prevalence of anaemia as assessed by haemoglobin content of blood revealed that mild anaemia is prevalent among adolescent girls but among boys the prevalence rate was mild to moderate.



References

REFERENCES

- Abraham, S. 1989. Dietary factors and diabetes. M.Sc. (Food Science and Nutrition) thesis, Kerala Agricultural University, Vellanikkara, Thrissur
- Ahmed, F., Hasan, N. and Kabir, Y. 1997. Vitamin deficiency among adolescent female garment factory workers in Bangladesh. *European J. Clin. Nutr.* **51(1)**:698-702
- Ajayi, O.A. and Korede, O. 1991. Plasma vitamin B₆ concentration in Nigeria adolescents. *European J. Clin. Nutr.* **45(2)**:111-115
- Akkamahadevi, K.A., Kasturiba, B. and Katarki, P.A. 1998. Energy and blood forming nutrients in the diet of rural and urban adolescent girl. *Indian J. Nutr. Dietetics.* **35(4)**:95
- Albertson, A.M., Tobelmann, R.C. and Marquart, L. 1997. Estimated dietary calcium intake and food sources for adolescent females. *J. Adolescent Health* **20(1)**:20-26
- *Amstrong, P.L. 1989. Iron deficiency in adolescents. *Br. Medical J. Clinical Res.* **298**:499,6672
- Andersen, L.F., Nes, M., Lillegard, T. Sandstand, B., Bjorneboe, G.F. and Drevon, C.A. 1995. Dietary intake among Norwegian adolescents. *European J. Clin. Nutr.* **49(8)**:555-564
- Anderson, A.S., Macintyre, S. and West, P. 1993. Adolescent meal pattern grazing habits in the west of Scotland. *Health Bulletin* **51(3)**:158-165
- Andrados, J.L.R. 1995. The influence of family, school and peers on adolescent drug misuse. *International J. Addict.* **30**:1407-1423
- Bagchi, K. 1999. The urgent need to uplift the health of adolescent girls. *Indian J. Nutr. Dietetics* **6(5)**:127
- Bali, P. 1990. Indian adolescents and their health and reproductive health. Proc. Workshop on Towards the Preparation of Adolescent for Safe Motherhood through the ICDS Programme. National Institute of Public Co-operation and Child Development, Delhi. p.83
- Bass, M.A., Wakefield, L. and Kolara, K. 1979. *Community Nutrition and Individual Food Behaviour*. Burgers Publishing Co., Minnesota, p.10

- Begum, R. 1991. *A Text Book of Food, Nutrition and Dietetics*. Sterling Publishers, New Delhi, p.10
- Best, J.W. 1989. *Research in Education*. Prentice Hall of India Private Ltd., New Delhi, p.136
- Bhatnagar, O.P. 1981. *Research Methods and Measurements in Behavioural Sciences*. Agricole Publishing Acadamey, New Delhi, pp.106-118
- Bozz, A., Nassanato, P., Geeco, A.M. and Ganbardella, S. 1980. Qualitative study of the nutritional habits of two population of compulsory intermediate school in Nepal. *Nutr. Abstr. Reviews*. 52:6
- Bull, N.L. 1992. Dietary habits, food consumption and nutrient intake during adolescence. *J. Adolescent Health*. 13(5):384-388
- Bundier, F., Pinochet, C., Baldi, C., Ferry, B., Henry, Y. and Laona, P. 1991. Diet survey of adolescents in a department in the east of France : breakfast drinks and fast foods. *Med. Nurt* : 305-39
- Cameron, N., Jones, P.K.M., Moodie, A., Mitchell, I., Bowie, M., Mann, M.D and Hausen, J.D.L. 1986. Timing and magnitude of adolescent growth in height and weight in cape coloured children after kwashiorkor. *J. Pediatrics* :109, 548
- Census of India 1991. Provisional population totals. Series 1, paper 1 of 1991. Registrar general and Census Commission of India. p.67
- Chapman and Hall. 1995. Nutritional and physiological significance. *British Nutrition Foundation*. p.81
- Chaturvedi, S., Kapil, U., Ganasekaran, N., Sachdev, H.P.S., Pandey, R.M. and Bhanli, T. 1996. Nutrient intake among adolescent girls belonging to poor socio economic group of rural area of Rajasthan. *Indian Pediatrics*. 33(3):197-201
- Cherian. 1992. Food consumption and energy expenditure pattern of agricultural labourers of Trivandram district. M.Sc (FS&N) thesis, Kerala Agricultural University, Vellanikkara, Thrissur
- Crawley, H.F. 1993. The energy nutrient and food intakes of teenagers aged 16-17 yrs. In Britain. *Br. J. Nutr.* 70(1):15-26
- Cusatis, D.C. and Shannon, D.M. 1996. Influences on adolescent eating behaviour. *J. Adolescent Health*. 18(1):27-34

- *Dawes, M.A., Tarter, R.E. and Krisci, L. 1997. Behaviour and 2 year follow up for boys at risk for substance abuse. *Drug Alcohol Depend.* 45:165-176
- Delinious, T. and Gurney, I. 1951. *The problem of optimum stratification II.* Sk and Akt. 34:135-148
- Desai, I.P. 1996. Dietary pattern and nutritional profile of children *J. ICCW.* 3(2):28-36
- Dévasdas, R.P. 1994. Empowering women towards improving family nutrition. *Proc. NIN platinum Jubilee Symposium nutrition Soc. India.* National Institute of Nutrition, Hyderabad, India. 41:85-105
- Devadas, R.P. 2000. Adolescent nutrition and its impact on low birth weight. *Pediatric Nutr. Series.* p.5
- Devadas, R.P. and Jaya, N. 1984. *A Text book on child Development.* Macmillan India Ltd, Madras. pp.147-149
- Devadas, R.P. and Kulandaivel. 1975. *Handbook of Methodology of Research.* Sri Ramakrishnan Mission Vidyalaya Press Coimbatore, p.50-54
- Devi, L.N. 2000. Nutritional and health impact of substituting green gram by soya products in school lunch programme in Thrissur district. M.Sc (Food Science and Nutrition) thesis. Kerala Agricultural University, Vellanikkara
- Dorothy, A., Wenik, Martin, Baren, Paul, S. and Dewan. 1980. The challenge of being well nourished. *Nutrition.* 15-18
- *Doyle, E.I and Feldman, R.H.L. 1997. Factors affecting nutrition behaviour among middle class adolescents in Urban area of northern region of Brazil. *Revista de-saude Publica* 31(4):342-350
- Driskell, J.H. and Korlund, M.K. 1991. Nutritional assessment of southern adolescent girls. *Nutr. Res.* 11(7):835-840
- Edwards, A.L. 1957. *Techniques of Attitude Scale Construction.* Appletion Century crofts Inc., New York
- Engle, P.L. 1991. Maternal work and child care strategies in peri urban Guatamela : Nutritional effects. *Child Dev.* 62(5):959-965
- *Epps, R.P., Lunn, W.R. and Manley, M.W. 1998. Tobacco, Youth and sports. *Adolescent Med.* 9:483

- *Epps, R.P., Manley, M.W. and Glynn, T.J. 1995. Tobacco use among adolescents: strategies for prevention. *J. pediatric clinical Nutr. Am.* 42:389
- *Erbersdobler, H.F. 1991. Fast food in the nutrition of children and adolescents. *Ernahrungs – Unsachau.* 38(9): 347-350 .
- Festinger, L. 1957. *Theory of cognitive dissonance.* Evanston, III:Row, Peterson and Company, P. 117.
- Fisher, M., Pastore, D., Schneider, M., Pegler, C. and Napolitano, B. 1994. Eating attitudes in urban and sub-urban adolescents. *International J. Eating Disorders.* 16(1):67-74
- Furwhan, A. and Gunter, B. 1989. *The anatomy of adolescence.* Wiley Inter Science Publication New York. p.62
- Giray, M., Tarin, O. and Kinik, E. 1992. Obesity in adolescence. *International J. obesity.* 22(3):268-274
- Gomez, F., Ramos, G.R., Frenk, S., Carvioto, T., Charez, R. and Vazquez, J., 1956. Mortality is sewnd and third degree malnutrition. *J. Trop. Paediatrics* 2:77-83
- Gopalan, C. 1986. Prophylatic iron supplementation for under previlleged school boys. *Nutr. Abstr. Reviews.* 56(2):120
- Gopaldas, T. and Sheshadri, S. 1987. *Nutrition monitoring and Assessment.* Oxford University Press, New Delhi, pp.219-221
- Greenwood, J.L. 1978. Nutritional status of adolescent girls in regard to zinc, Copper and Iron. *Am. J. clinical Nutr.* 33:269-275
- Gunn, R.A.J., Hackett, A.F., Jenkins, C.N., Appleton, D.R. 1991. Empty Calories? Nutrient intake in relation to sugar intake in English adolescents. *J. Human Nutr. Dietetics.* 4(2):101-111
- *Hamdaoui, M., Hedhill, A., Tritar, B. and Dogri, T. 1991. Study of iron status in an adolescent population including both sexes in the region of Tunis. *Med. Nutr.* 27(4):209-214
- Indian Council of Medical Research 1989. Nutritional requirements and recommended dietary allowances for Indians. ICMR, New Delhi
- Indian Council of Medical Research 1990. Nutrient requirements and recommended dietary allowances for Indians. ICMR, New Delhi, p.7

- Jaffe, S. 1996. The substance abusing youth. *Child and Adolescent Psychiatry* (ed. Parmelle, D.X.). St. Louis, mosby year Book Inc. pp.224-237
- James, W.P.T., Luizzi, F. and Waterlow, J.C. 1988. Definition of chronic energy deficiency in adults – Report of working party of the intervention dietary energy consultation group. *Am. J. Clin. Nutr.* 42:968-981
- Jayanthakumari, S. 1993. Food consumption pattern of selected farm families in Thiruvanthapuram District. M.Sc (Food Science and Nutrition) thesis, Kerala Agricultural University, Vellanikkara, Thrissur
- Jeeja, T.V. 1996. Marketing practices of fruit and vegetable processing industries in Thrissur district. M.Sc (Co-operation and Banking) thesis. Kerala Agricultural University Vellanikkara, Thrissur
- Jha, P.N. and Singh, K.N. 1973. Scale to measure attitude towards high yielding varieties programme. *Indian J. Extension Education.* 9:10
- Johndhale, J.P., reddy, N.S. and Nalwade, V.M. 1999. Prevalence of anaemia among school going adolescent girls of Parbhani. *Indian J. Nutr. Dietetics.* 36:268-274
- Joshi, S.B., Kanade, A.N. and Rao, S. 1998. Growth pattern of rural Indian boys aged 8-18 yrs. A longitudinal study. *Indian J. Nutr. Dietetics.* 35(6):149-156
- Kanani, S. 1995. Strategies for combating anaemia in adolescent girls. *Indian J. Pediatrics.* 62:375-377
- Kapoor, G. and Aneja, S. 1992. Nutrition disorders in adolescent girls. *Indian Pediatrics.* 29(8):969-973
- Karuna, M.S. 1993. Nutritional status of women engaged in fish wending in Trivandrum district. Ph.D (Food Science and Nutrition) thesis. Kerala Agricultural University, Vellanikkara, Thrissur.
- Kochhar, A., Hira, C.K. Sadana, B., Grover, K. and Mann, S.K. 1995. Nutrient adequacy of rural adolescent boys in Ludhiana district of Punjab. *J. Res.* 32(1):98-106
- Krishna, B.L., Sanghi, S., Gurvani, M., Chowdhary, B. and Garg, M.P. 1980. An epidemiological study of smoking in urban school boys of Hjines. *Indian J. Pediatrics.* 47:403

- Lacey, J.H., Chadbund, C., Crisp, A.H., Whitehead, J. and Stordy, J. 1978. Variation in energy intake of adolescent girls. *J. Human Nutr.* 32:419-426
- Lalmas, F.P., Gasawlet, M. Nieto, M., Baraza, J.C. and Zamora, S. 1996. Estimates of food intake and dietary habits in random sample of adolescents in South East Spain. *J. Human Nutr. Dietetics.* 9(6):463-471
- *Lancia, B., Mattera, M. and Peechia, P. 1995. Breakfast in the eating habits of adolescents. *Clinica Diets.* 22(1):1-2
- *Likerts, R. 1932. A technique for the measurements of attitudes. *Arch. Psychol.* No. 140
- Lucas, B. 1992. *Nutrition in childhood.* Wiley publications, New York. p.110
- *Lyhne, A.N. 1998. Dietary habits and physical activity of Danish adolescents. *Scandinavian J. Nutr.*
- Macvean, A.D.L., Richards, N.D., Elton, R.A., Moffat, W.M.C and Beattie, T.F. 1997. Nutrient intake in Scottish adolescent. *Proc. Nutr. Soc.* 56(3):303 A
- Mahan, K. and Ress, J.M. 1984. *Nutrition in Adolescence.* Times mirror / Mosky College Publishing, U.S.A. pp.72-75
- Malayala Manorama Daily. 2000. Government should with draw from alcohol sale. November 7 th. Thrissur edition
- Manjula, P., Barigidal, Sharada, G.S., Rao, S., Adwani, M.R. and Naik, R. 1995. Nutritional status of adolescents in an urban area of Karnataka. *Indian J. Nutr. Dietetics.* 32(5):134-138
- Manocha, S., Gupta, M.C and Gandhi, B.M. 1988. Difference in dietary intake of obese females belonging to different income groups. *Indian J. Nutr. Dietetics.* 22:52
- Manoff, R.K. 1973. Potential uses of mass media in nutrition programmes. *J. Nutr. Education.* 5:125
- Marshall and Tanner, J.M. 1986. Sequence, tempo and individual variation in the growth and development of boys and girls aged twelve to sixteen. *Nutr. Abstract Reviews* 52(6):132
- Mathew, S. and Bhatnagar, V. 1992. Nutritional quality of packed lunches brought by adolescent girls. *Indian J. Nutr. Dietetics.* 29(12):370

Mathruboomi Daily. 2000. 6th November Thrissur edition

Matkovic, V., Fontana, D., Tominac, C., Goel, P. and Chesnutt, C.H. 1990. Factors that influence peak bone mass formation: a study of calcium balance and the inheritance of bone mass in adolescent females. *Am. J. Clinical Nutr.* 52(5):878-888

*Meijer, B., Branski, D. and Knol, K. 1996. Cigarette smoking habits among school children. *Chest.* 110:921

*Michaud, C., Corniglion, J.M., Musse, N., Michel, F., Nicolas, J.R. and Mejean, L. 1991. Sources of macronutrients and energy in the food of adolescent student. *Med. Nutr.* 27(1):19-24

*Michaud, C., Musse, N., Khan, J.P., Grebert, M., Burlet, C. and Mejian, L. 1989. Food behaviour of adolescents 15 to 19 years living in Nancy. Comparison with recommended dietary allowances for French population. *Revue d'Epidemiologie Publique.* 37(2):149-159

Michaud, C., Musse, N., Nicolas, J. and Mejean, L. 1990. Nutrient intake and food consumption in the adolescents school day breakfast in Lorraine. *Nutr. Res.* 10(11):1195-1203

*Miller, P. 1997. Family structure, personality drinking, smoking and illicit drug use: A study of UK teenagers. *Drug Alcohol Depend.* 45(2):129

Mohan, D. and Desai, N.G. 1993. A survey on drug dependence in the community, urban megapolis, Delhi. Report submitted to ICMR.

*Moon, H.N., Hong, S.J. and Suh, S.J. 1992. Prevalence of obesity in children and adolescents. *Korean J. Nutr.* 25(5):413-418

Moynihan, P.J., Anderson, C., Adamson, A.J., Gunne, A.J., Appleton, D.R. and Butler, T.J. 1994. Dietary sources of iron in English adolescents. *J. Human Nutr. Dietetics* 7(3):225-230

Murthy, L.S.N. 2000. Adolescent growth and nutrition. *Health Education.* XV.p.68

*Musgrave, K.O., Achterber, C.L. and Thorukury, M. 1981. Strategies for measuring adolescent snacking pattern. *Nutr. Rep. Int.* 24(3):557-573

Myron, W. 1980. *Nutrition in Health and Disease.* A Wiley Inter Science Publication New York. p.190

- *Nagi, M.K., Chawla, S. and Sharma, S. 1995. A study on the nutritional status of adolescent girls. *Pl. Fds. Hum. Nutr.* 47(3):201-209
- Nagi, M.K., Chawla, S. and Verma, S. 1994. Nutritional profile of adolescent girls of Ludhiana city. *J. Res.* 31(3):353-358
- *Narins, C.M.D. 1992. Water electrolytes and acid base balance. *Krauses and Fd Nutr. Diet Therapy.* P. 141
- *Niedzwiedz, R.M., Charzeuska, J., Chanojnoska, Z and Chabros, K. 1992. Calcium content in diets of adolescents. *Zywnie – Czlowieka –I- metabolism.* 19(4):244-251
- NIN. 1983. A manual of Laboratory Techniques (ed. Raghuramulu, N., Nair K.M. and Kalyasundaram, S.). Hyderabad
- *Ninsing, S. and Shaw, N.S. 1996. Iron deficiency and anaemia in school children and adolescents. *J. Formosan – Medical* 95(9):692-698
- NNMB. 1996. National Nutrition Monitoring Bureau. *Report of Repeat Survey.* National Institute of Nutrition, Hyderabad
- Qin, M.C. and Yu, W.Y. 1990. Study on Iron nutritional status in adolescents. *Biomedical and Environmental Sci.* 3(1):113-119
- Okoye, Z.S.C. 1992. *Biochemical Aspects of Nutrition.* Prentice Hall of India Pvt. Ltd. New Delhi, p.184
- Pandey, D. 1995. Dietary pattern among early adolescent orphans. *Am. J. Clin. Nutr.* 60(2):472-479
- Paul, M.E. 1993. Food preference and dietary habits of adolescent among agricultural labourers. M.Sc (Food Science and Nutrition) thesis. Kerala Agricultural University, Vellanikkara, Thrissur
- *Pearce, J.H., Ahos, R.J. Terry, R.D. 1987. Attitude towards eating and reported dieting practices of adolescent girls in relation to body image. *J. New Zealand Dietetic Ass.* 4:41
- Philippe, I., Baundier, F., Mazelin, A., Bowrdenon, D. and Pinochet, C. 1988. Study of dietary habits of 225 adolescent girls 16-18 yrs. *Old. Nutr. Dietetics.* 23(2):126, 131-136
- Prattala, R. 1988. Socio-demographic differences in fat and sugar consumption pattern among adolescents. *Ecology Fd Nutr.* 22(1):53-64

- Premeela, Y. Rao, K.K and Sarojini, G. 1995. A comparative study on the nutritional status of rural adolescent girls and boys. (11-18 yrs) in Andhra Pradesh. *Indian J. Nutr. Dietetics.* 32(7):175-179
- Pushpamma, P., Geervani, P. and Devil, N.L. 1982. Food intake, nutrient adequacy and anthropometry of adolescents in Andhra Pradesh. *Indian J. Med. Res.* 75:61-67
- Rajesh, J. 1991. Implications of changing food habits. *J. Nutr. Education.* 12(1):211
- Rai, S.C and Sarup, S. 1995. Pattern of rural development in Southern India. *Kurukshetra* p.27
- Raman, L., Rau, P. and Rao, V. 1985. Nutritional status and age at menarche. *Proc. Nutr. Soc. India.* National Institute of Nutrition. Hyderabad
- Rao, N. 1985. Nutrient requirements of adolescents. *Proc. Nutr. Soc. India.* pp.43-57
- Rao, S., 1996. Nutrition in adolescence. *Proc. Nutr. Soc. India.* pp.43-57
- Rao, D.H. and Vijayaraghavan, K. 1996. Anthropometric assessment of nutritional status. *Text book of Human Nutrition.* (ed. Bamji, M.S., Rao, N.P and Reddy, V.) oxford and IBH Publishing Co. Pvt. Ltd., Calcutta, p.20
- Rao, V.K. and Rahman, M.V. 1999. Weighment method of diet survey. A case study of reference periods by economic status. *Indian J. Nutr. Dietctis.* 36:505
- Reaburn, J.A., Krohde, M. and Law, D. 1979. Social determinants in food selection. *J. Am. Dietetic Ass.* 74:637-641
- *Reggiani, E., Arras, G.B., Trabacca, S., Senarega, D. and Chiodini, G. 1989. Nutritional status and body composition of adolescent female gymnasts. *J. sports med. Physical Fitness.* 29(3):285-288
- Reid, J. 1993. Food and nutrition guidelines for healthy adolescents. *Proc. Nutr, Soc.* pp.55-58
- Rousham, E.K. 1997. Sex differences in nutritional status in rural Bangladesh. The influence of socio economic status. *Proc. Nutr. Soc.* 56(2), p.278 (A)
- Runyan, T.R. 1976. *Nutrition for Today* Harper and Raw Publications. New York. p.394

- Ryan, Y.M.D., Donoghue, M., Cantwell, H., Johnson, H. and Fhynn, M.A.T. 1997. Meat avoidance and dietary calcium intakes of Irish teenage girls. *Proc. Nutr. Soc.* 56 (1A):50A
- Saini, M. and Verma, S. 1989. Assessment of nutritional status of school girls. *Scientific programme Abstr.* Nutrition Society of India, p.59
- Salar, J. Galan, P., Arija, U., Hemeburg, C.M. and Horckerg, S. 1990. Iron status and food intake in a representative sample of children and adolescents. *Nutr. Res.* 10(4):379-390
- *Samuelson, G., Boratteby, L.E., Berggren, K., Elverby, J.E. and Kemple, B. 1996. Dietary iron intake and iron status in adolescents. *Acta Paediatrica.* 85(9):1033-1038
- Sarojini, K.S. and Vijayalakshmi, P. 1989. Adequacy of recommended dietary allowances of ICMR for adolescent girls. *Indian J. Nutr. Dietetics.* 26(6):149
- Sarupriya, S. and Mathew, S. 1988. Nutritional status of tribal adolescents of village Gogunda, Rajasthan. *Indian J. Nutr. Dietetics* 25(9):281-287
- Sathy, N., Elizabeth, K.E., Nair, M.K.C and Bai, S. 1991. Growth faltering and developmental delay in children with protein energy malnutrition. *J. Indian Acad. Paediatrics.* 28(3):255-258
- Saxena, K.J. 1986. The joint and nuclear family – A personal experience. *Indian J. Social Work* XL VII:32 36
- Schwartz. R.H. 1998. Adolescent heroin use : a review. *Indian J. Pediatrics* 102:4461-1466
- Scohorrr, B.C.D., Sanjur and Erickson, E.C. 1972. Teenage food habits. *J. Home Economics.* 61(4):415
- Shaw, A., Mathur, P. and Mehrotra, N.N. 1993. A study of consumers attitude towards processed foods. *Food Packer.* XLVII (2):19
- Shyna, P.K. 1996. Nutritional profile and mental functions of preschool children belonging to agricultural labourer families in Thrissur district. M.Sc. (Food Science and Nutrition) thesis, Kerala Agricultural University, Vellanikkara, Thrissur

- *Sichieri, R. Moura, A.S., Godoy, J.L., Niero, N. and Mastumoto, F.N. 1993. Nutritional status of children and occupational categories of the family in a rural community of Parana, Brazil. *Cadernos-de-saude-Publica*. 9(1):28-35
- Sidhu, R.S. 1985. *Methodology of Research in Education*. Sterling publishing Private Ltd, New Delhi, p.85
- Someya, R., Negishi, Y., Mizunto, K. Muto, S. 1989. *Nutrition Abstracts and Reviews*, 60:7
- Spiegelere, M., Dramix, M. and Hennart, P. 1998. The influence of socio economic status on the incidence and evolution of obesity during early adolescence. *International J. obesity*. 22(3):268-274
- Spillman, D.A., Harvey, P.W.J., Gillespie, M. and Heywood, P.F. 1994. Developing needs assessment for adolescent nutrition education. *Australian J. Nutr. Dietetics*. 51(1):9-13
- *Spyckerelle, Y., Herbeth, B., Barthelemy, D.L., Bairati, I. and Deschamps, J.P. 1990. Dietary habits of adolescent girls in Lorraine. *Archives Francaises de Pediatrie* 47(6):455-459
- *Spyckerelle, Y., Herbeth, B. and Deschamps, J.P. 1991. Food habits of adolescents. *Cahiers Nutr. Dietetics* 26(6):426-431
- Story, M. and Alton, I. 1996. Adolescent nutrition – Current trends and critical issues. *Topics clinical Nutr.* 11(3):56-59
- Stroz, N.S and Greene, W.H. 1983. Body weight, body image and perception of fat diet in adolescent girls. *J. Nutr. Education* 15:15-18
- Suman, K.T. 2000. Effect of amaranth on the health and nutritional profile of adolescents. M.Sc. (Food Science and Nutrition) thesis. Kerala Agricultural University, Vellanikkara, Thrissur
- Swadi, H. and Zeitlin, H. 1993. Child and adolescent psychiatry. *Recent Advance in Clinical Psychiatry* (ed. Granville and Grossman). Church Hill Living Stone Pvt. Ltd. New Delhi. pp.6-10
- Swaminathan, M. 1986. *Principles of Nutrition and Dietetics*. The Bangalore printing and Publishing Co. Ltd. Bangalore, p.8
- Sweeting, H., Anderson, A. and West, P. 1994. Socio demographic correlates of dietary habits in mild to late adolescence. *European J. Clinical Nutr.* 48(10):736-748

- *Tait, F.S.J. and Asp, N.G. 1996. Iron requirements and prevalence of iron deficiency of adolescents: An overview. *Proc. Swedish Nutr. Foundation's 20th International Symp.* 24-27 August, 1995, Sweden pp.137-148
- Tanner, J.M. 1986. Sequence, Tempo and individual variation in the growth and development of boys and girls, aged twelve to sixteen. *Nutr. Abstr. Reviews.* 52(6):132
- Thimmayamma, B.V.S. and Rau, P. 1996. Dietary assessment as part of nutritional status. *Text book of Human Nutrition.* (ed. Bamji, M.S., Rao, N.P. and Reddy, V.). Oxford and IBH Publishing Co. Pvt. Ltd. New Delhi. pp.125-135
- Thimmayamma, B.V.S., Rau, P. and Rao, V.K. 1982. Socio economic status, diet and nutrient adequacies of different population groups in urban and rural Hyderabad. *Indian J. Nutr. Dietetics.* 19:173-183
- Tripathi, B.M. and Lal, R. 1999. Substance abuse in children and adolescents. *Indian J. Pediatrics.* 66:569-575
- Udaya, P.K. 1996. Food consumption pattern and nutritional status of farm women in Thrissur district. M.Sc thesis, Kerala Agricultural University, Vellanikkara, Thrissur
- Vidya, S.G. 1995. Young tobacco users. *World Health.* 48(4):30
- Vijayaraghavan, K. 1987. Anthropometry for assessment of nutritional status. *Indian J. Paediatrics.* 54(4):511-520
- Wardle, J. and Masland, L. 1990. Adolescent concern about weight and eating : a social development perspective. *J. Psychosomatic res.* 34(4):377-391
- *Wardle, J. Marsland, L. Sheikh, Y., Qwinn, M., Fedoroff, I. and ogden, J. 1992. Eating style and eating behaviour in adolescents. *Appetite* 18(3):167-183
- Witschi, J.C., Capper, A.L. and Ellisn, R.C. 1990. Sources of fat, fatty acids, and cholestrol in the diets of adolescents. *J. Am. Dietetic Ass.* 90(10):1429-1439
- Worsley, A., Worsley, A.J., Mcconnon, S. and Silva, P.A. 1993. Reported food consumption and dietary habits of Newzealand adolescents. *J. Paediatrics and Child Health.* 29(13):209-214
- Worthington, W. 1988. *Nutrition in Adolescence.* Times mirror / mosky college publishers, U.S.A p.307

Wright, L.S. 1984. Physiological development in adolescence. *Nutrition in Adolescence*. (ed Mahan, K. and Ress, J.M) Times mirror / mosky College Publishing, U.S.A. p.165

*Zwiauwer, K. Widhalm, K. and Brubacher, G. 1988. Low plasma levels of vitamin A and vitamin E during weight reduction. *Acta Paediatrica Scandinavica*. 77(5):760-761

* Originals not seen

Appendices

APPENDIX-I

INTERVIEW SCHEDULE TO ELICIT INFORMATION REGARDING THE SOCIO-ECONOMIC CONDITIONS OF THE FAMILIES

1. Name of the head of the family :
2. Address :
3. Place of survey :
4. Municipality :
5. Age of the respondent :
6. Type of family : Joint / Nuclear
7. Family size : Adults / Children
8. Religion : Hindu
1. Nair 2. S.C. 3. O.B.C.
Christian / Muslim
9. Education level : Illiterate/LPS/UPS/High School/College
Father :
Mother :
10. Occupational status
Father : Yes/No
If yes, : Gazetted / Non gazetted
a) Gazetted
1. Doctor
2. Govt. College Professor
3. Govt. School Headmaster
4. Agricultural Officer
5. Others
b) Non gazetted
1. Lecturer
2. Teacher
3. Bank
4. Clerk
5. Engineer
6. Others

Mother : Yes/No
 If yes, : Gazetted / Non gazetted
 a) Gazetted
 1. Doctor
 2. Govt. College Professor
 3. Govt. School Headmaster
 4. Agricultural Officer
 5. Others
 b) Non gazetted
 1. Lecturer
 2. Teacher
 3. Bank
 4. Clerk
 5. Engineer
 6. Others

11. Other source of income of the family

1. Agriculture
2. Poultry
3. Cattle wealth
4. House rent
5. Others

12. Total income (Rs./month) :
 approximately

13. Details of housing condition

- a) Type of house : 1 room/2 rooms/3-4 rooms/6-8 rooms/
 8 and more
- b) Rooms are bath attached : Yes/No
- c) Type of roof : Tiled/concrete
- d) Type of floor : Mosaic/Marble/Tiles/Granite
- e) Separate rooms for individual : Yes/No
 members

14. Details of ownership

- a) Staying in own house : Yes/No
 If yes,
 any housing loan : Yes/No
- b) Rent received if a portion is : Rs. _____ /month
 left out

15. Other characteristics

- a) Separate kitchen : Yes/No
- b) Usage of different rooms is the house :
 1. Drawing room
 2. Study room
 3. Bed room
 4. Store room
- c) Source of drinking water : Own well/Public tap/Public well/Tank/river
- d) Lavatory facilities : Yes/No
 (Own latrine/Public latrine)
- e) Drainage facilities : Yes/No
- f) Electricity facilities : Yes/No
- g) Information source utilisation/ recreational facilities : Own radio/Radio & T.V./Radio, T.V. & V.C.R. etc.
- h) Transport facilities : Own bicycle/Bicycle-motor bike/Bicycle, motorbike & car/Bus/Jeep
- i) Are you a member of any social organisation, if yes : Yes/No
 1. Rotary club
 2. Lions club
 3. Mahila Samajam
 4. Co-operative Society
 5. Youth club
 6. Others
 7. Nil

16. Monthly expenditure pattern

Sl.No.	Item	Expenditure (monthly) (approximately)
1	Food	
2	Clothing	
3	Shelter	
4	Rent	
5	Transportation	
6	Education	
7	Entertainment	
8	Health	
9	Savings	
10	Own expenses	
11	Repayment of loans	
12	Kuries	
13	Others	
14	Fuel	

17. Details regarding index child : Male/Female
 Age :
 1. Birth weight of index child :
 2. Birth order of index child : First/Second/Third/Fourth/Fifth/Sixth
 3. Immunization details of index child : Complete/Partially/Complete/Not taken
 child
4. Morbidity pattern of index child (Details of epidemic that had affected your child (index child) during the past one year)

Sl.No.	Diseases	Duration	Treatment
1	Diarrhoea and vomiting		
2	Measles		
3	Chicken pox		
4	Mumps		
5	Fever		
6	Jaundice		
7	Respiratory diseases		
8	Others		

18. When anybody in your family is sick, : Yes/No
 do you make use of health centre facilities
 If yes, : 1. Hospital
 a) Government
 b) Private
 2. Dispensary
 3. Maternal and child health centre
 4. Ayurvedic
 5. Homeo
 6. Others

PERSONAL HABITS OF ADOLESENT

1. Reading newspapers : Daily/Occasionally/Never
 2. Reading weeklies/magazines and newspapers : Daily/Occasionally/Never
 3. Viewing T.V. news and reading newspapers : Daily/Occasionally/Never
 4. Do you watch T.V. advertisements : Yes/No
 If yes, Do you buy things motivated by advertisements
 1. Soft drinks
 2. Snacks
 3. Chocolates
 4. Ice cream
 5. Biscuits
 6. Any other

5. Watching film : Several times in a week/once in a week/
once in a month/occasionally
6. Leisure time activity : a. Helping parents
b. Watching T.V.
c. Seeing film
d. Gossiping
e. Reading
f. Being with friends
g. Sports and games
h. Arts
7. Number of friends : Nil/1-3/4-7/8-10/above 10
8. Membership in any organization : Yes/No
If yes, specify
9. Participation in organization : Active/Not active
10. Conveyance to college : Own car/Own bike/Own bicycle/Bus/
By foot
11. Do you have habit of taking : Yes/No
breakfast.
If No, reason
12. Do you take packed lunch : Yes/No
If Yes, what type of food : Bread/rice/breakfast item/any other

If No, from where do you take lunch:
13. How much amount do you get as :
pocket money
- How do you spend it : 1. Eating outside
2. Books
3. Dress
4. Film
5. Cassettes
6. Smoking
7. Liquor
8. Savings
- Percentage of pocket money spent :

14. Do you like soft drinks : Yes/No
 If Yes, please specify : a) Cocacola
 b) Thumsup
 c) Pepsi
 d) Mirinda
 e) Fanta
 f) Limca
15. Frequency of eating outside : 1) Once in a week
 2) Twice in a week
 3) Once in a month
 4) Daily
 5) Occasionally
 6) Never
16. With whom do you usually go outdoors for having foods : 1) Family members
 2) With friends
 3) Anybody else
17. Do you have the habit of eating from outside : Yes/No
 If Yes, specify the type of food you prefer :
18. Do you celebrate special occasions : Yes/No
 If Yes, what are they : 1) Birthday
 2) Passing examination
 3) Marriage
 4) Any others (specify)
19. How do you celebrate these occasions : 1) With family members
 2) With friends
 3) Both
20. Where do you celebrate : 1) Home
 2) Outside
 3) Both
21. Are you weight conscious : Yes/No
22. For keeping your weight what do you do : 1) Diet control
 2) Exercise
 3) Both
 4) Jogging
 5) Walking
 6) Swimming
 7) Cycling
 8) Any other

23. The time spent on above activities :

24. Details regarding some personal habits of the respondent

a) Smoking : Yes/No

If Yes, Number of cigarettes per day:

Frequency of smoking : a) Daily
b) Once in a day
c) Twice in a week
d) Once in a month
e) Occasionally
f) Never

b) Drinking alcohol : Yes/No

If Yes, Number of pegs at a time:

Frequency of drinking : a) Daily
b) Once in a week
c) Once in a month
d) Occasionally
e) Never

Place of drinking : Home/outside

c) Others, specify.

APPENDIX-II

INTERVIEW SCHEDULE TO ELICIT INFORMATION ON FOOD CONSUMPTION AND DIETARY PATTERN OF THE FAMILIES

1. Name of the house wife :
2. Address :
3. Place of residence :
4. Age :
5. Food habit : Vegetarian/Non-vegetarian
6. Who decides the menu of the day :
 - 1) Father
 - 2) Yourself
 - 3) Children
 - 4) Servant
7. Meal pattern of the family :
 - 1) One major meal
 - 2) Two major meals
 - 3) Three major meals

8. Common breakfast preparation

Major

- 1) Pittu
- 2) Idli
- 3) Dosa
- 4) Uppuma
- 5) Appam
- 6) Poori
- 7) Chapathi
- 8) Bread
- 9) Idiappam
- 10) Rice
- 11) Any other

Side dish

- 1) Vegetable preparation
- 2) Dhal Preparation
- 3) Egg preparation
- 4) Meat preparation
- 5) Chicken preparation

9. Common preparations for lunch

Major

- 1) Rice
- 2) Biryani
- 3) Fried rice
- 4) Pulav
- 5) Any other

Side dish

- 1) Dhal preparation
- 2) Vegetable preparation
- 3) Fish preparation
- 4) Meat preparation
- 5) Chicken preparation
- 6) Egg preparation

10. Common preparation for tea time

1. Vada
2. Cutlet
3. Samosa
4. Puffs
5. Cake
6. Sandwich
7. Any other

11. Common preparations for dinner

Major

- 1) Chapathi
- 2) Paratha
- 3) Nan
- 4) Battura
- 5) Rice
- 6) Any other

Side dish

- 1) Dhal preparation
- 2) Vegetable preparation
- 3) Fish preparation
- 4) Meat preparation
- 5) Chicken preparation
- 6) Egg preparation

12. Frequency of use of different food materials

Foods	Daily	Frequency of use (weekly)				Occas- ionally	Never
		Once	Twice	Thrice	Four times		
1. Cereals							
2. Pulses							
3. Green leafy vegetables							
4. Roots & tubers							
5. Other vegetable							
6. Fruits							
7. Milk & milk products							
8. Meat							
9. Fish							
10. Egg							
11. Fats and oils							
12. Sugar/Jaggery							

16. Do you prepare different foods on special occasions : Yes/No
If Yes,

Occasions	Foods prepared	Reasons
Birthday Marriage Death Festivals Feasts Others		

17. Do you give equal importance : Yes/No
for family members in food
distribution

18. Do your child like your preparations : Yes/No
If Yes
What type of preparations

19. Do you change the dietary pattern : Yes/No
of child during these following
diseased conditions

Diseases	Food items included	Reasons	Food items excluded	Reasons

20. Do you use medicines to cure : Yes/No
diseases. If Yes, : Ayurvedic/Allopathi/Homeo

21. Have you breast fed the index : Yes/No
child. If No, reasons

22. Labour saving devices at home

1. Oven
2. Mixi
3. Grinder
4. Dish washer
5. Bread toaster
6. Heater
7. Chapathi maker
8. Juicer

- 9. Electric cooker
- 10. Kitchen mate
- 11. Washing machine
- 12. Any others

23. Do you have servants at home : Yes/No
If Yes, works done by the servants :
1) Cooking
2) Washing
3) Cleaning
4) Purchasing
5) All

If No, reasons

- No. of servants at home : 1/2/3/4 & more
No. of part time servants :
No. of full time servants :
Time spent by servants on house- :
hold activities
Time spent by house wife on :
household activities

APPENDIX-III

ATTITUDE OF ADOLESCENTS TOWARDS THEIR EATING HABITS

Statements	't' value
1. Fast foods are tasty	2.17
2. Fast foods are not good for health	1.88
3. Taking fast foods occasionally is harmless	2.10
4. Fast foods contain lot of energy	0.63
5. Fast foods contain all the nutrients in required amounts	0.54
6. Home made foods are tastier than fast foods	0.49
7. Home made foods are nutritious	2.64*
8. Non vegetarian foods are more preferred	1.82
9. Skipping a meal is good to reduce weight	2.49*
10. Consumption of snacks now and then is good	0.77
11. Drinking of milk increases body weight	1.34
12. Consumption of breakfast makes sleepy	0.35
13. Intake of plenty of fruits and vegetables are good	2.01
14. Ice cream is not good for health	0.195
15. Snacks are consumed just for fun	2.26*
16. Diversity in foods increases intention different foods	1.75
17. Food habits are influenced by friends	0.98
18. Ready to eat foods are tastier than home made foods	0.83
19. Chemicals in processed foods are harmless	1.55
20. Idli like preparations are more preferred for breakfast	1.24
21. Meals are not preferred during lunch	0
22. Kanji for dinner time is good for body	0.53
23. Light foods are preferred than meals during lunch	0.88
24. Daily 3 major meals based on rice preparation is good for health	0.49
25. Consumption of raw fruits and vegetables reduces nutrient loss	2.50*
26. Home made foods are always good for health	3.70*
27. Eating always from outside is not harmful to health	2.46*
28. Chapathi is good for dinner	0.86
29. Prefer to go out with friends to have food	1.15
30. Preferring to eat from outside at least once in a week	5.40*
31. Fried foods make health problem	0.21
32. Bread, biscuits and chips are more preferred than rice based preparations	1.38
33. Not bothered about the harmful effects of fast foods while having it	2.22*
34. Foods consumed from outside is less hygenic	0.27
35. All foods that are available from outside is adultered	0.45
36. Occasional consumption of adulterated food is not harmful	0
37. Home made foods are not harmful to health	4.06*
38. Intake of plenty of butter and ghee is good	0.47
39. Cornflakes is very tasty	0.71
40. Daily consumption of processed foods cause no side effects	0.64
41. Soft drinks are not harmful to health	2.40*

Appendix-III. Continued

Statements	't' value
42. Taking other foods in between major meals is a bad habit	1.38
43. It is preferable to follow the food habits of parents	0.23
44. Non vegetarian foods are good for body	0.37
45. Keeping time for food intake is not good	1.83
46. Advertisements influence the food habits very much	0
47. Chemicals added in soft drinks are good for health	0.26
48. Eating from outside is today's trend	0.22

ATTITUDE OF PARENTS TOWARDS THE EATING HABITS OF ADOLESCENTS

Statements	't' value
1. Eating outside cause no problems to children	1.83
2. Food consumed from outside is good for health	1.04
3. Having food from outside once in a week is fun	0.63
4. Children taking food from outside is preferred	1.41
5. Children dislike home made foods due to the influence of fast foods	2.54*
6. Chemicals present in fast foods cause illness	1.12
7. Home made foods are less preferred by children	0.87
8. Children prefer bakery items	3.30*
9. Chemicals in fast foods are not harmful to health	1.19
10. Children are permitted to take food from fast food centers	1.69
11. Children prefer fried food items	4.01*
12. Frequent consumption of snacks are not good for children	2.83*
13. Prefer to take food from outside with children	2.79*
14. Consuming only home made foods make us healthy	1.83
15. Excessive consumption of fruits is harmful to health	3.10*
16. Children should eat lots of vegetables	1.82
17. Home made foods should be hygienic	2.10*
18. Foods should be prepared at home based on children's preference	1.59
19. Boys should be given more foods	0.72
20. Foods preferred by boys are always prepared in home	0.21
21. Employed parents are unable to give proper attention to children's diet	3.57*
22. Occasional use of processed foods do no harm	0.77
23. Friends have more influence on the eating habits of children	3.18*
24. Chemicals in extruded foods are good for health	0.35
25. Items prepared from noodles, vermicelli etc. cause illness in children	0.57
26. Daily consumption of fast food is good for health	1.84
27. As improved technology is used in the production of extruded foods there is no loss of nutritional quality	0.59
28. Ready to eat foods contain lot of energy	0.40
29. Children prefer food items made from rava and maida	0.52

Appendix-III. Continued

Statements	't' value
30. Rice flakes, cornflakes etc. are more nutritious	1.67
31. Idli and dosa etc. made at home are less tasty	0.57
32. Ready to eat foods available in packets are more hygienic	0.84
33. Consuming a lot of processed foods is good for health	1.23
34. Adulterated food is harmful to health	2.04
35. Foods with added non permitted colours are good to health	0.54
36. Use of ready to eat foods save time	0.56
37. Children are compelled to eat food	1.54
38. Food needs of children are not properly cared	1.69
39. Children prefer non vegetarian foods	4.17*
40. Consuming soft drinks make no health problems	0.16
41. Todays children are careless in their food habits	2.01
42. Children should be discouraged to take food from outside	1.14
43. Home made foods are less tasty	1.36
44. Advertisements influence the food habits of children	1.33
45. Eating food from outside has become a habit to secure a position in society	0.19

APPENDIX-IV(a)

**FAMILY AND INDIVIDUAL FOOD CONSUMPTION SURVEY -
WEIGHMENT METHOD**

Name of the Investigator :

Name of the head of the family :

Name of the subject :

Serial No. :

Address :

Date :

Food consumption

Name of the meal	Method	Weight of total raw ingredients used by the family (g)	Weight of total cooked food consumed by the family (g)	Amount of cooked food consumed by the individual (g)	Raw equivalents used by the individuals

APPENDIX-IV(b)

FAMILY AND INDIVIDUAL FOOD CONSUMPTION SURVEY - WEIGHMENT METHOD

Family No. Name of the head of the family: Date:

District : State :

Age and sex composition of those who have taken part in the meal

Age	Adult	12-21	9-12	7-9	5-7	3-5	1-3	Below 1	Guest (age)
Male									
Female									

Cereals

1. Rice
2. Rice flour
3. Wheat flour
4. Ragi
5. Maida
6. Semolina (Ravai)
7. Others

Pulses

7. Bengal gram
8. Black gram
9. Red gram
10. Soyabean
11. Green gram
12. Others

Leafy vegetables

13. Amaranth
14. Cabbage
15. Drumstick leaves
16. Others

Other vegetables

Roots and tubers

17. Carrot
18. Onion
19. Beetroot
20. Tapioca
21. Potato
22. Sweet potato
23. Yam
24. Others

Nuts and oil seeds

- 25. Cashewnuts
- 26. Coconut, dry
- 27. Coconut, fresh
- 28. Groundnut
- 29. Others

Spices and condiments

Fruits

- 30. Amla
- 31. Apple
- 32. Banana, ripe
- 33. Lime and orange
- 34. Mango, ripe
- 36. Watermelon
- 37. Grapes
- 38. Pineapple
- 39. Tomato, ripe
- 40. Others

Fish

- 41. Fish, fresh
- 42. Fish, dry

Other flesh foods

- 43. Meat
- 44. Chicken
- 45. Liver
- 46. Egg

Milk and milk products

- 47. Milk
- 48. Curds
- 49. Butter milk
- 50. Skimmed milk
- 51. Cheese

Fats and oils

- 52. Butter
- 53. Ghee
- 54. Hydrogenated oil
- 55. Cooking oil

Other food stuffs

- 56. Biscuit
- 57. Bread
- 58. Sugar
- 59. Jaggery
- 60. Pappad
- 61. Pickle

APPENDIX - V

Schedule for Clinical Assessment (N.A.C.I.C.M.R.)

1. Sex :
2. Age :
3. Height :
4. Weight :
5. General appearance :

0. Good
1. Fair
2. Poor
3. Very poor

6. Eyes :
 - a) Conjunctiva
 - i) Xerosis

0. Absent, glistening & moist

1. Slightly dry on exposure for a minute, lack of lustres

2. Conjunctiva dry and wrinkld

3. Conjunctiva very dry and Bitot's spot present

ii) Pigmentation

0. Normal colour
1. Slightly discolouration
2. Moderate browning in patches
3. Severe earthy discolouration

iii) Discharge

0. Absent
1. Watery, excessive, lachrymation
2. Mucopurulent
3. Purulent

b) Cornea

i) Xerosis :

- 0. Absent
- 1. Slight dryness and diminished sensibility
- 2. Haziness and diminished transparency
- 3. Ulceration

ii) Vascularization

- 0. Absent
- 1. Circumcorneal infection
- 2. Vascularization of cornea

c) Lids

i) Excoriation

- 0. Absent
- 1. Slight excoriation
- 2. Blepharitis

ii) Folliculosis

- 0. Absent
- 1. A few granules
- 2. Lids covered with extensive granules
- 3. Hypertrophy

iii) Angular conjunctivitis

- 0. Absent
- 1. Present

d) Functional

i) Night blindness

- 0. Absent
- 1. Present

NB : Exclude other eye diseases not associated with nutritional defects.

7. Mouth :

a) Lips

i) Condition :

- 0. Normal
- 1. Angular stomatitis mild
- 2. Angular stomatitis, marked

b) Tongue

i) Colour

- 0. Normal
- 1. Pale but coated
- 2. Red
- 3. Red & raw

ii) Surface

- 0. Normal
- 1. Fissured
- 2. Ulcered
- 3. Glazed & atrophic

c) Buccal mucosa

i) Condition

- 0. Normal
- 1. Bleeding/gingivitis
- 2. Pyorrhoea
- 3. Retracted

d) Gums

i) Condition

- 0. Normal

e) Teeth

i) Fluorosis

- 0. Absent
- 1. Chalky teeth
- 2. Pitting of teeth
- 3. Mottled & discoloured teeth

ii) Carries

- 0. Absent
- 1. Slight
- 2. Marked

8. Hair :

i) Condition

- 0. Normal
- 1. Loss of lustre
- 2. Discoloured & dry
- 3. Sparse & brittle

9. Skin :

a) General

i) Appearances

- 0. Normal
- 1. Loss of lustre
- 2. Dry & rough or crazy pavements
- 3. Hyper keratosis, phrynoderma

ii) Elasticity

- 0. Normal
- 1. Diminished
- 2. Wrinkled skin

b) Regional

i) Trunk

- 0. Normal
- 1. Collar-like pigmentation & dermatitis around the neck
- 2. Moon face

ii) Face

- 0. Normal
- 1. Nasolabial seborrhoea
- 2. Symmetrical suborbit pigmentation
- 3. Moon face

iii) Perineum

- 0. Normal
- 1. Scrotal or pudendal dermatitis

iv) Extremities

0. Normal

1. Symmetrical dermatitis with pigmentation of glove or stocking type

10. Adipose tissue:

(To be judged by the examination of the arm over the biceps)

i) Quantity

0. Normal

1. Deficient

11. Oedema:

i) Distribution

0. Absent

1. Oedema on dependent parts

2. Oedema on face & dependant parts

3. General anasarca

12. Bones:

i) Condition

0. Normal

1. Stigma of past rickets

13. Heart:

i) Size

0. Normal

1. Apex outside the nipple line

2. Enlarged

14. Alimentary systems

i) Appetite

0. Normal

1. Anorexia

ii) Stools

- 0. Normal evacuation
- 1. Diarrhoea

iii) Liver

- 0. Not palpable
- 1. Palpable

iv) Spleen

- 0. Not palpable
- 1. Palpable

15. Nervous system:

i) Calf tenderness

- 0. Absent
- 1. Present

ii) Paresis

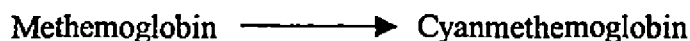
- 0. Absent
- 1. Present

APPENDIX-VI

ESTIMATION OF HAEMOGLOBIN (Cyanmethaemoglobin method (NIN, 1983))

PRINCIPLE

The Hb (oxyhaemoglobin, methemoglobin, carboxy haemoglobin) is converted to cyanmethemoglobin according to the following reaction.



The absorbance of cyanmethemoglobin is proportional to the Hb concentration.

REAGENT

Drabkin's solution: Dissolve 0.05 g of KCN, 0.20 g of potassium ferricyanide and 1.00 g of sodium bicarbonate in 1 l of distilled water.

PROCEDURE

20 μl of blood is transferred with the help of a Hb pipette into a test tube containing 5 ml of Drabkin's solution. Mixed thoroughly and reading taken in a photo electric colorimeter at 546 nm. Optical density of standard haemoglobin solution was also measured using a colorimeter. Hb content of the sample was found out by the formula

$$\text{Hb (gm/dl)} = \frac{\text{Optical density of sample}}{\text{Optical density of standard}} \times N \times 0.251$$

Where,

$$N = \text{Concentration of standard haemoglobin} = 60 \text{ mg/dl}$$

APPENDIX-VII

FORMULA FOR CALCULATION OF FOOD FREQUENCY SCORE

Based on frequency of use of different food preparations for breakfast, lunch, dinner and evening tea by the adolescents, food frequency scores were calculated as suggested by Reaburn *et al.* (1979). The formula used for the calculation is given below:

$$\text{Percentage of total score} = \frac{R_1 S_1 + R_2 S_2 + \dots + R_n S_n}{N}$$

S_n = Scale of rating

R_1 = Percentage of respondents selecting a rating

N = Maximum scale rating

APPENDIX-VIII

DELINIOUS - HODGES CUMULATIVE METHOD OF CLASSIFICATION

The respondents were classified as explained by Delinious and Gurney (1951). Having arranged data into ascending or descending order, several arbitrary classes were formed depending on the number of classes to be finally obtained. The upper limit of each class was obtained using the formula.

$$U = l + \left[\frac{NK - m}{f} \right] C$$

where,

U = upper limit of the new class

K = quartile number

N = $\Sigma \sqrt{f}$

l = lower limit of the quartile class

m = Cum \sqrt{f} below the quartile class

f = frequency of the quartile class

c = class interval of the arbitrary classes

FOOD HABITS AND NUTRITIONAL PROFILE OF ADOLESCENTS

By
SHIJI PAUL

ABSTRACT OF THE THESIS

**Submitted in partial fulfilment of the
requirement for the degree of**

Master of Science in Home Science
(FOOD SCIENCE AND NUTRITION)

**Faculty of Agriculture
Kerala Agricultural University**

**Department of Home Science
COLLEGE OF HORTICULTURE
VELLANIKKARA, THRISSUR - 680 656
KERALA, INDIA**

2001

ABSTRACT

The present study entitled, "Food habits and nutritional profile of adolescents" was carried out among 200 adolescents (100 boys and 100 girls) in Thrissur Municipal area.

Nuclear family system with good housing and living conditions was found in most of the families. Educational status of parents was high. Most of the fathers were working in private sectors and earned above 12000 rupees per month. But most of the mothers were unemployed.

Majority of the adolescents completed their immunization schedule and more girls had normal birth weight than boys.

All the adolescents were having the habit of watching T.V. programmes daily. Boys had more number of friends than girls. Most of the boys were interested in sports & games where as girls were interested in watching T.V programmes and reading during their leisure time. Most of them were interested in watching T.V. advertisements and more girls were motivated to purchase processed foods than boys. Boys preferred soft drinks where as girls preferred chocolates.

Majority of the adolescents took their breakfast and carried packed lunch. Boys received more pocket money than girls. Most of the boys spent their pocket money where as girls saved their pocket money.

Boys preferred the company of their friends to go outside for eating once in a week. But girls went out once in a month with their family members and all adolescents preferred non vegetarian foods.

Boys preferred branded soft drinks and were more conscious about their body weight and figure than girls.

Unhealthy personal habits were observed only among boys.

Boys had more favourable attitude than girls towards their own eating habits. But parents of adolescent girls had more favourable attitude towards the eating habits of their daughters.

Majority of the families were non vegetarians and followed 3 major meal pattern. Cereals, milk and milk products, fats and oils and sugar / jaggery were used daily but processed foods were used less frequently by the families.

Most of the families preferred rice and rice based preparations for breakfast, lunch and dinner and fried foods were preferred for evening tea.

Adolescents also preferred cereal based preparations for breakfast, lunch and dinner. Preparations with vegetables, egg, meat, chicken & fish were used most frequently as side dishes.

Majority of the families celebrated special occasions and bought prepared non vegetarian foods from hotels. Consumption of foods such as green leafy vegetables, milk and milk products and roots and tubers and nutrients such as iron, retinol and riboflavin were low among adolescents.

Mean body weight of the adolescents was below the Indian standard but mean height of girls was above the Indian standard. Majority of the adolescent boys had grade I and grade II malnutrition whereas girls had grade I malnutrition. Chronic energy deficiency of grade II and III was more prevalent among adolescent boys.

Clinical manifestations of deficiency symptoms was very low among the adolescents. The prevalence of anaemia was mild to moderate in boys and it was mild in girls.