

FOOD PREFERENCE AND DIETARY HABITS OF
ADOLESCENTS AMONG AGRICULTURAL LABOURERS

By

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THESIS

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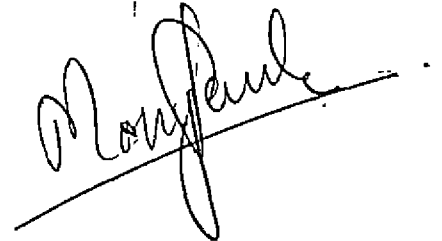
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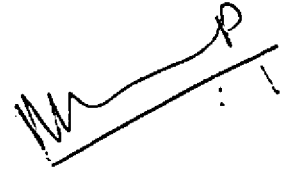


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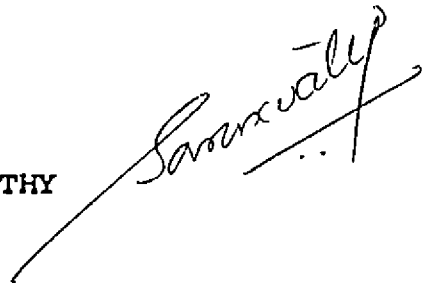
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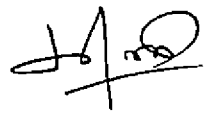


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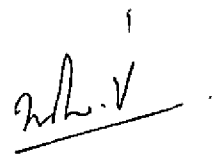
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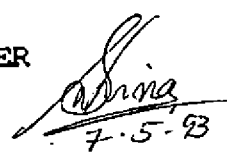
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INTRODUCTION

INTRODUCTION

Adolescence is defined as youthfulness and represents a period of rapid change. The average adolescent is involved in a very busy schedule of scholastic and extra curricular activities often including part time employment. This is a period of rapid change in many parameters such as physical growth, sexual development and personality patterns.

Population of adolescents in India is 22.5 percent and the significant segment of the population of Kerala is composed of adolescent and preadolescent group (Bali, 1990). They are the pillars of our nation, and from the point of view of the quality of future generation they are the most crucial segment of our population. Their attainments and competence will be the major determinants of the health and nutrition of our next generation. But this group of population has been neglected in all our developmental and educational programmes (Shivpuri, 1990). Probably the most neglected subject of research in the entire field of health and nutrition in India and in abroad is the adolescents.

Adolescents are a vital age group for two reasons (1) as it is an entrant populations for parenthood (2) and it is a vital age group which is undergoing physical, phycho-sexual and social changes which needs a careful

consideration and compassionate management (Bali, 1990).

All physical, and physiological changes impose a great demand on nutritional requirement during adolescence, and their nutritional requirements are much greater than any other group (McNutt and McNutt, 1978). Nutrition surveys carried out indicate that the incidence of dietary inadequacies are higher during adolescence (Guthrie, 1979). Biological, psychological and developmental changes during this period has a dynamic effect on the food preferences, food habits and eating behaviour of adolescents. These food preferences and habits are formed as a result of the complex interaction of many factors, within the individual and with that of his environment (Mahan and Rees, 1984). Even children who have excellent dietary pattern are likely to become malnourished during adolescence. Over weight or obesity on one hand and leanness on other hand, skin problems like 'Acne vulgaris', and their pre-occupation with concepts of their appearance and body function, had led many of the adolescents to adopt varied dietary patterns. Nutritionists who attempt to assess the needs of adolescents and the adequacy of their diets often report conflicting results or acknowledge that the information available is grossly inadequate.

In order to have a better understanding of the food preferences and food habits of adolescents the present study was proposed with the following objectives.

1. To study the factors influencing the dietary habits and food preferences of adolescent boys and girls.
2. To assess their nutritional status and to locate dietary or nutritional deficiencies if any.

REVIEW OF LITERATURE

'Adolescence' is derived from 'adolescere'-the Latin verb meaning to grow into maturity (Eggert, 1984). Mahan and Rees (1984) divided adolescence into three stages, early, middle and late, early adolescence includes the onset of puberty and usually occurs by the ages of 10-12 years in girls and 11 to 13 years in boys. Middle adolescence continues through the ages of 12 to 15 years in girls and 13 to 16 years in boys. Late adolescence complete the process of somatic growth through the ages of 16 to 21 years in both sexes.

According to Marshall and Tanner (1986) in the past, the word 'adolescence' was used synonymously with puberty and more recently it has become a common practice to use 'adolescence' to refer to the physiological changes associated with puberty.

Shivpuri (1990) pointed out that in India, 55 percent population is below the age of 20 years. Bali (1990) reported that rural population of adolescents is about 78.4 percent while urban population is 21.6 percent.

Characteristics of the Adolescents

Briggs and Calloway (1979) reported that adolescence is a time of great physical, biological and emotional

adjustment. 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. According to Eggert (1984) adolescence is reported to be the time between the onset of puberty and adulthood.

Suitor and Hunter (1980) has the opinion that adolescence is a transition stage in the life cycle linking childhood to adulthood. Banik (1979) opined that the adolescent is no longer a child, yet he has not reached adult in social, legal or socio economic status. He has also reported that adolescents are particularly vulnerable to conflicts in the socio-cultural matrix which surrounds them in our society.

Place (1980) stated that the adolescent stage of life is the period of identifying one self as a total person. Banik (1979) reported that many behavioural problems of the adolescents are due to maladjustments and these are much greatest among adolescents who do not have close, harmonious relationship with their parents.

Shivpuri (1990) has the opinion that adolescent girls in India are more neglected than adolescent boys. She has also pointed out that, they are without proper nutrition, medical care, hardly any opportunities for education, employment and self development.

Mc Nutt and Mc Nutt (1978) reported that an adolescent may have the same size of an adult but his nutritional requirements are much greater and hence he should not be considered as an adult. Rao (1990) remarked that physical and physiological changes occurring in adolescents impose a great demand on nutritional requirements during adolescence. According to Davidson (1980) nutritional requirement of adolescents were conditioned primarily by spurt in growth and the additional food requirements are met through increased appetite.

Dietary habits of Adolescents

Food habits of an individual are the characteristic and repetitive acts that he performs under the impetus of the need to provide himself with nourishment and simultaneously to meet an assortment of social and emotional goals (Giffit et al., 1972). Burton (1978) has the opinion that eating habits were one of the greatest obstacles to the establishment of optimal diets among the majority of persons. Price (1984) remarked that dietary practices of the different populations of India are influenced by income, geographical area, rural urban setting, religion and superstitions.

Parental attitudes and social factors are the predictors of adolescent's food preferences and dietary

complexities (Yperman and Vermesch, 1960). Studies of Martin and Coolidge (1978) revealed that family eating practices are among the most important influences on the teenagers food habits. Wilson et al. (1971) and Rao (1985) were of the opinion that teenage period is the time when they exercise full authority in matter of what they will and will not eat. Mahan and Rees (1984) reported that adolescents' food habits are reflective of many and diverse influences such as the family, peers and their own physico social development.

Briggs (1979) stated that the demand for independence of adolescent may lead to abandonment of dietary practices taught in the family and acceptance of fad diets and food patterns followed by the peer group.

Worth (1983) reported that there was very little difference in the nutritive value of food selected by adolescents. The rich adolescents were found to include more fruits and vegetables than the poor.

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 adolescents' 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. Ikeda et al. (1983) reported that adolescents had fairly correct knowledge of their food intake which was controlled mainly by their desire to keep in a better physical condition.

Parish (1971) reported that teenagers often eliminated high nutrient density foods and they might thus lack nutrients that are important during critical time of physiological development. Kardjati et al. (1983) reported that female adolescents were found to consume the same type of food irrespective of their physiological state. Gupta and Saxena (1977) reported that the eating habits of the rural and urban adolescents belonging to the low socio-economic status were almost same. Wardle and Marsland (1990) was of the opinion that dieting was more common in adolescent girls from higher socio-economic background.

Eating in between meals is a common dietary habit possessed by adolescents. Pearce et al. (1987) reported that 15 percent of adolescent girls surveyed viewed snack eating as eating for fun while 14 percent viewed snack eating as eating out of control. Musgrave et al. (1981) opined that there was no real difference in eating snacks between

REVIEW OF LITERATURE

girls and boys. Story et al. (1986) found that mean energy intake and snack eating pattern were not significantly different in the lean and fat youths.

Guzman et al. (1981), from their study among 1535 adolescents in Central Luzon found that 40 percent adolescents were in the habit of taking meals 5 times a day. The three main meals was reported to comprise of rice, fish and cereal preparation.

The staple diets of adolescent boys and girls of low socio-economic status in West Rajasthan were composed of mainly cereals, pulses and non leafy vegetables (Gupta and Saxena, 1977). A diet survey was conducted by Sarupriya et al. (1988), among adolescents in Rajasthan found that they followed 2 meals a day with main food items of chappathi made from maize flour and green pulse preparation for dinner.

Khan and Lipke (1982) reported that compared to other age groups of population, adolescents neglected breakfast. While Worthington (1988) observed that female adolescents were found to skip the evening meal, breakfast and lunch more often than males. Philippe et al. (1988) surveyed 225 adolescent girls in France and found that 45 percent of them skipped breakfast. Lack of time, dieting and not feeling well were the reasons reported by them for the skipping of breakfast. Someya et al. (1989) reported that

adolescents who skipped breakfast took more snacks, between meals or late nights. Hirai et al. (1989) reported that breakfast was not taken by 19 percent adolescents and those who take breakfast took more food items daily. Haugen (1981) revealed that majority of the adolescents surveyed in Minnesota considered that eating at least one meal a day with family members is important.

Martin and Coolidge (1978) viewed that the adolescents who ate most poorly were those who eat with their peers or alone. They also remarked that adolescents who eat with their family usually ate better.

Gilliespie's studies (1983) suggested that snacks chosen at home by the adolescents were better than those chosen away from home. Guthrie (1979) reported that the more meals eaten away from home the less likely an adolescent was to consume meals of adequate nutritional content which no doubt represented a response to the habits of the peer group.

Bozza et al. (1980) had the opinion that the main meal of the adolescents were found to be in school. They had also pointed out that intake of high nutritive value foods such as eggs and fish were found to be low, while intake of fruits and vegetables were below optimum.

Miric (1979) conducted a survey to find out the frequency of consumption of different foods among the adolescents and observed that 21.3 percent ate egg 3 times a week, 72 percent ate fish once in a week and 68.9 percent had the habit of drinking black coffee.

George and Krondl (1983) studied the perceptions and food use of 57 boys and 78 girls of 14 to 17 years age and concluded that boys selected foods high in fat, salt and sugar more frequently than girls, in contrast the girls ate vegetables often for the strong desire to be slim.

Perron and Endres (1985) studied the relationship between nutrition knowledge and attitudes and dietary practice of adolescents and found that nutrition knowledge and attitudes were positively connected indicating the more nutrition knowledge a subject had, the more positive was the adolescent towards nutrition and vice versa.

Kohli (1988) reported that the adolescents gathered information regarding foods from general reading. Mass media and parents also served as sources of information.

Bozza et al. (1980) studied the food habits of school children 11 to 16 years old and found that intake of some foods of high nutritional value such as eggs, fish, fruits, and vegetables were below the optimum and they also reported that there were differences between the sexes in food habits.

Food preference of the adolescents

According to Eggert (1984) food preferences are formed as a result of the complex interactions of many factors in an individual's environment. These preferences play a critical role in influencing food choices and consumption. Bull (1988) stated that adolescents' food preferences and food selection were influenced by social or external pressures.

Carlisle (1980) stated that vegetables had a low acceptance among adolescents. They accepted raw vegetables, more readily than cooked ones and sweet tasting vegetables over bland or bitter ones. Sato et al. (1984) reported that adolescents preferred meat. Kardjati et al. (1983) pointed out that the traditional menu consumed by the adolescents mainly consisted of rice, pulses, non-leafy vegetables and some visible fats.

Gnwecki et al. (1981) reported that raw vegetables, salad items, especially tomato and carrot were popular among adolescents. Desserts were also found to be highly appreciated. Parent (1984) reported that among adolescents intake of milk was very low and that of confectionery was high. Musgrave et al. (1981) reported that high sucrose snacks were popular and milk was found to be the most popular drink.

Chavance and Dumar (1982) reported that the average total weekly consumption of beverages of adolescents was 7 litres. Krishnakumari et al. (1983) reported that the intake of fruits and greens by the adolescents were negligible.

Sato et al. (1984) opined that adolescents prefer the quicker and simpler methods of cooking such as grilling and frying. Gnweki and Pazola (1981) reported that roasting and frying was the most popular mode of preparations while boiling the least.

Hirai et al. (1989) estimated that mean numbers of food items taken by the adolescent daily was 19, and no difference was noted in the number of food items taken in different days of the week.

Food consumption pattern of the adolescents

Bindu et al. (1979) reported that carbohydrate intake was found to be more or less same in rural and urban college students of age 15-20. But urban adolescents were found to consume significantly higher amounts of proteins, fat and calories than rural counter parts.

Mc Coy and Kenny (1984) revealed that urban girls consume more energy foods than rural girls.

Post et al. (1987) reported that the energy intake on weekened days was consistently higher for girls and boys in all age groups. The proportional intake of fat and sugar were rather high especially on weekened days.

Bundy et al. (1982) from their study revealed that snacks provided several dietary components particularly energy, vitamin B6, iron and Mg to adolescent boys and girls.

Singh et al. (1980) reported about the deficient energy intake and surplus protein intake in the diets of adolescents of Himachal Pradesh.

Chandana and Bhat (1984) revealed that intakes of energy, vitamin C, calcium and zinc of adolescents were below than the recommended. Whereas phosphorus, thiamine, riboflavin and carotene intakes were adequate.

Saini and Verma (1989) revealed that the daily mean intake of energy in adolescent girls from high socio-economic group was significantly more than those from low socio-economic group. Protein and calcium intake were adequate only in the respondents from high socio-economic group whereas the iron intake in all the subjects were far from satisfactory.

Bundy et al. (1982) reported that thiamine and riboflavin intakes were generally low in adolescents.

In a study conducted by Rao (1966) it was found that most adolescents diet contains less than 1 g calcium daily.

Amounts of vitamin A and of riboflavin in their diet were discussed to be inadequate.

Chandana et al. (1984) observed that among the adolescents the intakes of vitamin C, calcium and zinc were below the recommended allowances. Whereas phosphorus, thiamine, riboflavin and carotene intakes were inadequate.

Mc Naughton and Cahu (1970) reported that employed adolescents were found to have poorer dietary intakes than those who remained in school, particularly among girls.

Veloso et al. (1984) found that the diet of the obese adolescent children in high socio-economic groups consisted of a higher percentage of proteins and a lower percentage of carbohydrate compared to the diet of the adolescents in low socio-economic group. Adolescents in high socio-economic group consumed larger amounts of animal protein and simple carbohydrate whereas the adolescents in low socio-economic group consumed larger amounts of vegetables and starch.

Chavance and Dumar (1982) reported that out of the 1535 adolescents they surveyed only 13.7 percent of the children ate meals which completely met the recommended dietary allowances (R.D.A.). Energy, protein and niacin intakes exceeded 90 percent of RDA whereas calcium, vitamin A, thiamine, riboflavin and ascorbic acid, intakes of most adolescents were below 90 percent of the RDA. They had also

reported that the iron intake of most of the boys were found to be 90 percent or more of the RDA. While in most of the girls, iron intake was below 70 percent of the RDA. Marin et al. (1988) reported from his survey that energy intake of adolescent boys did not differ significantly from the ideal value whereas in adolescent girls energy supply was found to be deficient. Intakes of calcium, zinc, thiamine, niacin and riboflavin were low, but the diets were found to be rich in ascorbic acid.

Lamberg (1984) reported that the dietary vitamin D intake increased with increasing age of adolescents. The main dietary sources of vitamin D were vitamin enriched margarine, fish, fish products and eggs.

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

Schaefer and Johnson (1969) reported that adolescents diet in poverty areas were found seriously lacking in iron and vitamin A. Sobry (1973) also found that the diet of adolescents were deficient to iron, calcium, vitamin A, D, C and riboflavin.

Khangaonkar et al. (1990) reported that the main source of B-carotene in the diet of adolescents was cereals

accounting for 47.9 percent of the total B-carotene intake. Devadas (1970) reported that the intake of cereals, green leafy vegetables, roots and tubers and other vegetables by the adolescent were reported to be below the recommended allowances.

Krishnakumari et al. (1983) in her survey reported that the intake of fruits and greens by the adolescents were negligible.

Occurrence of deficiency diseases in adolescents

According to McCoy and Kenny (1984) adolescence is a critical period in the development of disease.

Sarupriya and Mathew (1988) studied the nutritional status of adolescent boys and girls and reported that only 40 percent had normal body weight and 90 percent of the subjects had one or other variable signs of deficiency disease. Tripathi et al. (1985) reported that there were no criteria for diagnosing the varying degree of under nutrition in adolescence.

Chopdar and Mishra (1981) reported that adolescents suffer from vitamin deficiencies anaemia and other infections like gastrointestinal and upper respiratory infections. Gupta and Saxena (1971) stated that all the nutritional deficiency diseases were more prevalent in rural adolescents

than urban adolescents. Raman et al. (1985) reported that incidence of anaemia were higher in rural girls than urban girls. Similarly incidence of deficiency signs of vitamin A and B-complex were more in urban slum girls than urban elites of same age groups.

Gupta and Saxena (1971) reported the occurrence of vitamin A deficiency, anaemia and vitamin B complex deficiency among the adolescents. He had also reported that the incidence of nutritional deficiency diseases were high in vegetarians than non-vegetarian adolescents. Similar findings were also reported by Taneja et al. (1978) and Rao et al. (1983).

Taneja and Sandal (1978) reported that dental diseases were maximum in 15-17 years age groups. A report published by NNMB (1984) had revealed the high incidence of dental caries among the adolescents in Kerala.

Weiner et al. (1980) reported that mean haemoglobin level of adolescents were lowest when they were consuming the diet containing high amounts of cellulose.

Occurrence of vitamin A and B complex deficiencies were reported among adolescent boys and girls between the ages of 12 to 21 in a report published by NNMB (1984). However they had reported about the less prevalence of angular stomatitis among the adolescents of Kerala.

Shank (1974) and Daniel et al. (1975) reported that iron deficiency was reported in teenagers of all races in both sexes with different income levels.

Nutrition survey conducted by United States Department of Health, Education and Welfare during 1968-'70 reported that intakes of calcium, iron and vitamin A and sometimes riboflavin and vitamin C may fall far short of the probable needs of many teenagers.

MATERIALS AND METHODS

MATERIALS AND METHODS

A study was undertaken to assess the dietary habits, food preferences and nutritional status of adolescent boys and girls belonging to the agricultural labourer families.

Area of study

The area selected for the study was the agricultural labourer families in Trivandrum District.

Selection of samples

Hundred families of agricultural labourers having adolescents between the ages of 16 to 18 were selected through systematic random sampling for the study. From the above families, 50 male and 50 female adolescents were selected purposively, for the study.

Plan of action

Plan of action of the present study comprises a pilot survey to locate families with adolescents between the ages 16 to 18.

1. A baseline survey to monitor the socio-economic and personal characteristics of the adolescents.
2. A dietary survey of the adolescents to assess the food habits, food consumption pattern and food preferences of

the adolescents. The actual food intake of the adolescents were ascertained by food weighing survey.

3. Assessment of the nutritional status of the adolescents by conducting
 - a) Anthropometric measurements of the adolescents whereby weight and height for age were monitored.
 - b) Clinical assessment of the adolescents with the help of a qualified physician.
 - c) Biochemical investigations of the adolescents.

Development of Tools

Interview method was used for the collection of data. Bass et al. (1979) reported that interview method is most suitable, since it proceeds systematically and records the collected information quickly.

1. To elicit information regarding the socio-economic, personal characteristics and dietary pattern of the farm families, oral questionnaire method was used. According to Seema and Sirshi (1985) to ascertain socio-economic and personal characteristics, parameters such as age, marital status, type of family, size of family, monthly income and caste are to be ascertained.

The schedule developed to elicit information on socio-economic characteristics of the families were formed in such a way to collect details regarding the religion, type of family, total number of family members, number of adults and children in the family, age of the respondents, educational and employment status of parents and respondents and their total monthly income.

Personal characteristics of the adolescents such as reading newspapers/weeklies and magazines, viewing Television, type of their leisure time activity, hobbies, number of friends, membership and participation in organisation, details regarding the unhealthy habits were also collected.

The questionnaire developed was pretested and is presented in Appendix I.

2. The questionnaire used for the dietary survey was developed in such a way to collect information regarding the food expenditure pattern of the family, eating pattern of the adolescents, frequency of using different foodstuffs, food preparations commonly used and their preference, meal frequency, nibbling habits, their preference for beverages, type of food they take from outside and the frequency of taking beverages. The questionnaire structured for the survey was pretested and is presented in Appendix II.

Schedule required for finding out the food preference of adolescence were formulated in malayalam keeping in mind that this will be more convenient for the interviewee to record their preference for various foods. In accordance with the commonly used food stuffs in each food group categories the foods were tested.

The preference of the respondents were rated on a 3 point scale viz.

3. very much like
2. like
1. dislike
0. very much dislike

The questionnaire used for the survey was pretested and presented in Appendix III.

Gore et al. (1977) suggested that only weighment methods can give reasonably accurate values of dietary intake. According to Rao (1975) any single day or 2 day weighment method would be as efficient a tool as that of 7 days. Tilve (1977) reported that individual intake can be obtained accurately by actual weighing of food items consumed. Raw equivalents of foods were calculated accordingly. The schedule structured is presented in Appendix IV.

3. Nutritional status of the selected subjects were assessed through taking anthropometric, clinical and biochemical investigations.

a) Assessment ^{of} anthropometric measurements
^

Anthropometry has been accepted as an important tool for the assessment of nutritional status. Weisell (1982) reported that anthropometric data which are being used increasingly in estimating nutritional status. Of the various parameters, weight for age, weight for height, arm circumference and height for age either singly or in combination were extensively used for determining nutritional status (Vijayaraghavan, 1987) weight for age and height for age has regarded as an reliable measurement in assessing growth (Gopalhas, 1981). According to Gopalan (1987) the average heights of populations are a broad index of their nutritional status. In this study weight and height of the subjects were taken as suggested by Jelliff (1966). Body Mass Index (BMI - W/kg/H²m) has been shown to be a good indicator of nutritional status and functional status (Nutritional News, 1990). Low BMI values are associated with higher mortality. Normal values of BMI is 20 to 25 for men and 19 to 29 for women (Antia, 1989).

b) According to Swaminathan (1986) clinical examination is the most important part of nutritional assessment as we get direct information on signs and symptoms of dietary deficiencies prevalent among adolescents. A schedule structured for clinical examination is presented in Appendix V.

Biochemical investigation

The procedure followed in Haemoglobin estimation was presented in Appendix VI.

Conduct of the study

The survey was conducted by the investigator through house visits, personal enquiry and also by observation. Socio-economic, personal characteristics and dietary habits of adolescents comprising 50 adolescent boys and 50 adolescent girls, were assessed by questionnaire method.

To find out the food preferences of adolescents respondents were asked to record their order of preference for each of the food items recorded in the questionnaire.

Actual food intake was assessed in 20 adolescents comprising 10 adolescent boys and 10 adolescent girls. One day weightment was done for assessing the actual intake. During the food weightment survey the investigator was with the families throughout the period of weightment. All the raw

foods taken out for cooking were weighed and the total cooked weight of each preparation were recorded. The food consumed by the adolescent and items remaining after eating were also weighed to find out the exact amount of foods consumed by them.

The nutritive value of the foods consumed was calculated using food composition tables. The quantity of each food items as well as the computed nutritive value was then compared with the recommended daily allowances of foods and nutrients for adolescents (1989).

Nutritional status of the selected subjects were assessed through taking anthropometric clinical and biochemical investigations. Weight of the respondents were taken using a bathroom balance which was checked by calibration with standard weight. The height of an individual was made up of the sum of four components legs, pelvis, spine and skull. In this study only total height was measured.

With the help of a qualified physician from the adjacent primary health centre clinical symptoms of malnutrition among the adolescents were assessed.

Haemoglobin estimation of the adolescents was conducted by the cyanomethaemoglobin method.

Interpretation of data collected

From the data collected food preferences and nutritional status of the adolescents were interpreted and presented in results. Suitable statistical techniques were applied for interpreting the data collected.

RESULTS

RESULTS

A study was conducted to assess the food preference, dietary habits and nutritional status of the adolescents belonging to the Agricultural labourers families. The data collected was analysed and the results are presented under the following heads.

1. Socio-economic pattern of the families of the adolescents
 2. Personal characteristics of the adolescents
 3. Dietary habits and food consumption pattern of the adolescents
 4. Food preference of adolescents
 5. Assessment of the nutritional status of the adolescents
1. Socio-economic pattern of the families of the adolescents

The socio-economic pattern of the families of the 100 adolescents with particular reference to religion, type of family, size of the family, educational and employment status of adolescents and their parents and monthly income were assessed.

Details regarding the religion of the families surveyed are presented in Table 1.

Table 1. Religionwise distribution of the families surveyed

Religion	Families in percentage
Hindu	70
Christian	25
Muslim	5
Total	100

As depicted in Table 1, 70 percent of families were Hindus, 25 percent were Christians and 5 percent were Muslims. Among the families surveyed 77 percent were scheduled caste and 23 percent belonged to forward community.

Type of the families surveyed are given in Table 2.

Table 2. Type of the families surveyed

Type of family	Families in percentage
Nuclear	80
Extended	16
Joint	4
Total	100

As depicted in Table 2, majority of the families (80 percent) belonged to nuclear families. Among the

remaining families 16 percent were extended type and 4 percent were joint type families.

Size of the families surveyed are presented in Table 3.

Table 3. Size of the families surveyed

Family size	Percent
5-7	49
8-10	30
Below 4	21
Total	100

As revealed in Table 3, 21 percent of families were small sized when 49 percent belonged to medium sized and 30 percent was having 8 to 10 members.

Number of adult members and children in the families were collected and are presented in Table 4.

Table 4. Percentage distribution of adults and children in the families

Number	Adults	Children
1-2	66	33
3-4	23	46
above 4	11	21
Total	100	100

Number of adults in the families were found to be 1-2 in 66 percent families while in 23 percent families number of adults were 3 to 4. Only in 11 percent of the families had more number of adults (above 4). With regard to the number of children in the families, it was found that 33 percent of families had 1-2 children. While 3 to 4 children were found in 46 percent families. The remaining 21 percent families had children above 4 numbers.

Educational status of the respondents and their parents are given in Table 5.

Table 5. Educational status of parents and respondents

Educational status	Mother (percent)	Father (percent)	Respondent (percent)
Illiterate	11	17	-
Primary	42	39	3
Upper primary	27	12	2
High school	20	27	61
College	0	5	34
Total	100	100	100

Among the 100 families 47 percent of respondents mothers and 44 percent of respondents fathers were found to be moderately educated (upper primary to college level).

Forty two percent of mothers and 39 percent of fathers had only basic education (primary level), 11 percent mothers and 17 percent fathers were found to be illiterate.

Sixty one percent of the respondents had education upto high school level and 34 percent upto college level. Only 3 percent studied had ^{education} upto primary level. None of the adolescents was found to be illiterate. It was also noted that among the respondents 92 percent ^{were} was found to be undergoing education at the time of the survey and 8 percent adolescents were drop outs.

Employment status of the respondents and their parents were enquired and the details are depicted in Table 6.

Table 6. Employment status of respondents and their parents

	Father	Mother	Respondents
Not employed	8	50	94
Agricultural labourer	92	40	6
Government jobs	-	7	-
Private job	-	3	-
Total	100	100	100

Half of the respondents mothers were found to be housewives while 40 percent were Agricultural labourers.

Majority of the respondent's fathers were agricultural labourers. Eight percent did not engage in any sort of jobs mainly due to health reasons. It was also observed that in 40 percent families, both the parents were Agricultural labourers. Employment status of the respondents indicated that only 6 percent of the adolescents were found to be employed.

Numbers of earning members in the family may influence the total income of a family. The number of members employed in the families of the adolescents were assessed and the details are given in Table 7.

Table 7. Distribution of employed members in the families

No. of members	Families in percentage
One member	58
Two members	30
Three members	9
Above 3	3
Total	100

In 58 percent families only one member⁶ is employed. While in 30 percent families two members were found to be employed. The number of families with more than 3 members

employed were only 3 percent.

Total monthly income of the families were collected and Table 8 represents the income levels of the families surveyed.

Table 8. Monthly income of the families of adolescents

Income	Families in percentage
401-600	13
601-800	31
801-1000	20
1000-2000	36
Total	100

Thirty six percent families had a monthly income ranging from Rs.1000 to 2000. While 20 percent had income ranging from Rs.801-1000, thirty one percent families had an income ranging from Rs.601-800 and 13 percent families were in the income level of Rs.401-600.

Apart from the income from employment, rearing of domestic animals and sale of the farm products contributed to the total income of the families. It was observed that only in 15 percent families rearing of domestic animals contributed to the total income while in 12 percent families

sale of farm products contributed to the total income. However the income obtained by the rearing of the domestic animals or the sale of farm products ranged from only Rs.100 to 400 per month in 27 percent of families.

Table 9 gives the per capita income of the families surveyed.

Table 9. Per capita income of the families

Per capita income (in range)	Percentage of families
Rs.	
100-200	66
201-300	24
301-400	8
401-500	2
Total	100

66 percent families had the per capita income ranging from Rs.100 to 200. 24 percent families had the per capita income ranging from Rs.201-300. 8 percent families had the per capita income ranging from Rs.301-400 and only 2 percent families had per capita income ranging from Rs.401-500.

The percentage distribution of income contributed by father and mother are presented in Table 10. Male

members (head of the family) contributed 76 to 100 percent of total income in 45 percent families, only 17 percent families below 50 percent of total income was contributed by the head of the family. But in the case of female members 14 percent of them contributed a major share (76-100 percent) to the total income. In 32 percent families female member mainly mother contributed 50 to 75 percent of total income and in 54 percent families mother contributed below 50 percent to the total income.

Table 10. Income earned by father and mother of the adolescents

Percentage of income	No. of families	Percentage
Father		
76-100	45	49
50-75	38	41
Below 50	9	10
Nil	8	-
Mother		
76-100	7	14
50-75	16	32
Below 50	27	54
Nil	50	-

2. Personal characteristics of the adolescents surveyed

Personal characteristics of the adolescents such as reading habits, exposure to different mass media, leisure

time activities, hobbies, participation in different organizations, details regarding the unhealthy habits were assessed.

Reading habits of adolescent boys and girls surveyed and are presented in Table 11.

Table 11 revealed that 70 percent adolescent boys and 48 percent adolescent girls were in the habit of reading newspapers daily. However, 24 percent boys, and 46 percent of the girls were not in the habit of reading newspapers. Six percent of adolescents both boys and girls were occasional readers.

With regard to the habit of reading magazines/weeklies, it was found that 26 percent boys and 50 percent girls read weeklies/magazines. Eighteen percent boys and 6 percent girls were the occasional readers of the magazines/weeklies. It was observed that 56 percent boys and 44 percent girls were not in the habit of reading weeklies/magazines.

Habit of listening radio and viewing television by the adolescent boys and girls were enquired and the details are given in Table 12.

Forty four percent girls and 42 percent boys were found to view the television programme daily from the neighbouring houses, since they do not possess ~~the~~ ~~own~~ television sets in their own houses. Twenty eight percent

Table 11. Reading habits of the adolescents

	Reading Newspapers					Reading Weeklies/Magazines				
	A.B		A.G		Total	A.B		A.G		Total
	No.	Percent	No.	Percent		No.	Percent	No.	Percent	
Never	12	24	23	46	35	28	56	22	44	50
Daily	35	70	24	38	59	13	26	25	50	38
Occasionally	3	6	3	6	6	9	18	3	6	12
Total	50	100	50	100	100	50	100	50	100	100

A.B - Adolescent boy

A.G - Adolescent girl

Table 12. Habit of listening to radio/television programmes among the adolescents

	Viewing TV					Listening to Radio				
	A.B		A.G		Total	A.B		A.G		Total
	No.	Percent	No.	Percent		No.	Percent	No.	Percent	
Never	15	30	21	42	36	10	20	5	10	15
Daily	21	42	22	44	43	30	60	25	50	55
Occasionally	14	28	7	14	21	10	20	20	40	30
Total	50	100	50	100	100	50	100	50	100	100

A.B - Adolescent boy

A.G - Adolescent girl

adolescent boys and 14 percent adolescent girls were occasional viewers of television programmes. However 30 percent boys and 42 percent girls were not in the habit of viewing television programme. Sixty percent boys and 50 percent girls were found to listen the radio programmes daily. While 20 percent boys and 40 percent girls were occasional listeners of the radio programmes. However 20 percent boys and 10 percent girls did not like to listen radio programmes.

Respondents were asked to list out their activities at home after school hours and the details are presented in Table 13. It was observed that 30 percent adolescent boys and 60 percent adolescent girls were found to engage in their class works after coming from school. While 30 percent of both boys and girls assisted their parents in their household task. Ten percent boys were found to spend their time in cycling. While another 20 percent spent their time in sports and games activities. Ten percent each of boys and girls were found to enjoy gossiping during their leisure time.

Table 13. Type of leisure time activities of the adolescents surveyed

Activities	Adolescent boys		Adolescent girls	
	No.	Percent	No.	Percent
Doing home work	15	30	30	60
Helping parents	15	30	15	30
Cycling	5	10	0	0
Gossiping	5	10	5	10
Sports and games	10	20	0	0
Total	50	100	50	100

Table 14. Possession of friends by the adolescents

Number of friends (in range)	A.B		A.G	
	No.	Percent	No.	Percent
Above 10	20	40	12	24
8-10	8	16	7	14
4-7	15	30	17	34
1-3	7	14	14	28
Total	50	100	50	100

A.B - Adolescent boys

A.G - Adolescent girls

Peer group play an important role in adolescents' life. Table 14 depicts the details of the adolescents friends. As revealed in Table 14, 40 percent boys and 24 percent girls had friends above 10 numbers. 16 percent boys and 14 percent girls had friends between 8-10 numbers. 30 percent boys and 34 percent girls had friends between 4 to 7 numbers. Lesser number of friends (upto 3) were possessed by among 14 percent boys and 28 percent girls.

Participation of Adolescents in various organizations were analysed and the data are presented in Table 15.

Table 15. Participation of adolescents in various organisations

Organizations	A.B		A.G	
	No.	Percent	No.	Percent
Nil	34	68	48	96
Youth club	8	16	0	0
Politics	8	16	2	4
Total	50	100	50	100

Majority of the adolescents (96 percent girls and 68 percent boys) were not the members of any type of organizations. However 16 percent boys and 4 percent girls were found to have membership in school/college unions. Sixteen percent boys had membership in youth clubs, and none

of the girls were the members of any youth clubs.

Table 16. Adolescents participation in various organizations

	A.B		A.G	
	No.	Percent	No.	Percent
Active	10	62	-	-
Not Active	6	38	2	100
Total	16	100	2	100

Among the adolescents who were the members of various organizations, it was found that 62 percent boys actively participated in various organizations. While others did not participate actively. However adolescent girls were not found to be active in organizations.

Smoking, drinking and drug addiction were found to be a public health problem of major significance and concern during adolescence. Hence in the present study, details regarding the unhealthy practices of the boys and girls were assessed. It was observed none the respondents studied possessed such habits.

3. Dietary habits and food consumption pattern of the adolescents

The food consumption pattern of the families were assessed with regard to the dietary practice of the families,

food expenditure pattern, frequency of use of different food stuffs, the inclusion of various food items in the daily menu and their preferences. The results obtained are presented below.

Dietary habits of the families indicated that all the families surveyed and all the adolescents under study were found to be non-vegetarians.

The food expenditure pattern of the families are presented in Table 17.

Table 17. Percentage of income spent for food by the families

Percentage of income	Families in percentage
25-50	40
51-75	46
76-90	14
Total	100

Fourteen percent families spent 76 to 90 percent of their income for food. 46 percent families spent 51-75 percent of their income for food and 40 percent families spent 25-50 percent of their total income for food.

Monthly food expenditure pattern of the families surveyed are presented in Table 18.

Table 18. Monthly food expenditure pattern of the families

Cereals		Pulses		Vegetables		Green leafy vegetables		Roots and Tubers			Fruits		Egg	
26-50	51-75	1-10	11-20	1-10	11-20	Nil	1-5	1-5	6-10	11-15	Nil	1-5	Nil	1-10
100 (50)	-	100 (50)	-	20 (10)	80 (40)	20 (10)	80 (40)	40 (20)	44 (22)	16 (8)	-	100 (50)	40 (20)	60 (30)
96 (48)	4 (2)	96 (48)	4 (2)	16 (8)	84 (42)	16 (8)	84 (42)	48 (24)	44 (22)	8 (4)	6 (3)	94 (47)	78 (39)	22 (11)
98	2	98	2	18	82	18	82	44	44	12	3	97	59	41

Table 18 (Contd.)

Meat			Fish			Fats & oils			Sugar & jaggery			Spices			Bakery items		
Nil	1-5	6-10	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	11-15	1-5	6-10	Nil
76 (38)	14 (7)	10 (5)	8 (4)	80 (40)	12 (6)	40 (20)	50 (25)	10 (5)	76 (38)	24 (12)	-	52 (26)	40 (20)	8 (4)	10 (5)	4 (2)	86 (43)
94 (47)	6 (3)	-	4 (2)	60 (30)	16 (8)	46 (23)	34 (27)	-	76 (38)	24 (12)	-	66 (33)	30 (15)	4 (2)	-	-	100 (50)
85	10	5	6	70	14	43	52	5	76	24	-	59	35	6	5	2	93

AB - Adolescent Boys

AG - Adolescent Girls

26-50 percent of the income was spent for cereals by 98 percent respondents. While only 10 percent of the income was found to be spent for purchase of pulses by 98 percent families (both adolescent boys and adolescent girls). In eighty two percent families 11-20 percent of the family income was spent for vegetables, and 1-5 percent to green leafy vegetables. In the case of roots and tubers 44 percent families spent 1-5 percent and another 44 percent spent 6-10 percent of their income for the purchase of roots and tubers. The percentage of income spent for the purchase of fruits ^{were} was found to be 1-5 percent by 97 percent families. Forty one percent families spent 1-10 percent of the income for the purchase of eggs whereas, more than 50 percent families did not spent any money for the purchase of eggs. The percentage of income incurred for the meat items ~~was~~^{were} found to be 1-5 percent by 10 percent families and 6-10 percent by 5 percent families. It was observed that majority of families (76 percent with adolescent boys and 94 percent with adolescent girls) did not incurred any money for the purchase of meat. Seventy percent families (80 percent families with adolescent boys and 60 percent with adolescent girls) spent 6-10 percent of their income for buying fish. The percent of families who spent 11-15 percent of their income for fish was found to be 14 percent. 52 percent families spent 6-10 percent and 43 percent families spent

1-5 percent of their income for the purchase of fats and oils. The income spent for the purchase of sugar and jaggery was found to be 1-5 percent by 76 percent families and 6-10 percent by 24 percent families. 59 percent families (52 percent families with adolescent boys and 66 percent with adolescent girls) spent only 1-5 percent of their income for spices. The percent of families who spent 6-10 percent of their income for spices was found to be 35 percent. Only 7 percent of families spent 1-10 percent of their total family income for purchasing bakery items. While majority of the families do not spent any money for the purchase of bakery items.

Frequency of use of various food items by the adolescents was assessed and the details are presented in the Table 19.

The major food articles included in the daily dietaries of all the adolescents were found to be cereals, fats and oils, sugar and jaggery and spices. Next to cereals, fish was found to be a food item included in the daily diet of the adolescents surveyed. All the boys and 47 percent girls included fish daily. Eighty two percent (78 percent boys and 86 percent girls) and 77 percent (80 percent boys and 74 percent girls) adolescents were found to include milk and vegetable respectively in the daily diets. Consumption of pulses, roots and tubers were found to be included

Table 19. Frequency of use of various foods among the adolescents

	Daily		Thrice in a week				Twice in a week				Once in a week				Occasionally				Never					
	AB		AG		AB		AG		AB		AG		AB		AG		AB		AG					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%		
Cereals	50	100	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Pulses	2	4	2	4	10	20	21	42	13	26	4	8	12	24	7	14	13	26	16	32	-	-	-	
Vegetables	40	80	37	74	7	14	7	14	3	6	6	12	-	-	-	-	-	-	-	-	-	-	-	
Green leafy vegetables	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	50	100	48	96	-	-	-	
Roots and tubers	-	-	6	12	18	36	24	48	29	58	17	34	3	6	1	2	-	-	2	4	-	-	-	
Fruits	-	-	-	-	14	28	10	20	5	10	4	8	1	2	-	-	31	62	35	70	-	-	-	
Milk	39	78	43	86	-	-	2	4	-	-	-	-	-	-	-	-	9	18	4	8	-	-	-	
Fish	50	100	47	94	-	-	3	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Meat	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47	94	38	76	3	6	12	24
Egg	-	-	-	-	2	4	2	4	2	4	3	6	-	-	5	10	37	74	31	62	9	18	9	18
Fats and oils	50	100	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sugar and jaggery	50	100	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Spices	50	100	50	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

AB - Adolescent boys
 AG - Adolescent girls

in the daily dietaries of negligible adolescents. Pulses was found to be used thrice in a week by 20 percent adolescent boys as against adolescent girls, while 26 percent adolescent boys and 32 percent adolescent girls were occasional users of pulses. While majority of the adolescents surveyed included green leafy vegetables, in the dietaries only occasionally.

Consumption of roots and tubers 'thrice in a week' was observed in 36 percent adolescent boys as against 48 percent adolescent girls. 58 percent adolescent boys and 34 percent adolescent girls included roots and tubers twice in a week. More than 66 percent adolescents include fruits occasionally in their daily dietaries. 94 percent adolescent boys use meat occasionally in their diet as against 76 percent in adolescent girls. While 24 percent adolescent girls and 6 percent adolescent boys were not in the habit of using meat in their diets. 74 percent adolescent boys and 62 percent adolescent girls use egg only occasionally. While 18 percent of the families including both group^{child} not use egg in the dietaries. Based on the frequency of use of different food groups in the daily dietaries food use frequency scores were calculated as suggested by Reaburn et al. (1979). The method was appended in Appendix VII.

The food frequency scores obtained for each food group was depicted in Table 20.

Table 20. The food use frequency score obtained by the adolescent boys and girls

Food items	Food use frequency scores	
	A.B	A.G
Cereals	100	100
Pulses	25	54
Vegetables	94	92
G.L. vegetables	20	21
Roots and tubers	66	72
Fruits	42	35
Milk	82	91
Fish	100	99
Meat	18	15
Egg	20	23
Fats & oils	100	100
Sugar & jaggery	100	100
Spices	100	100

A.B - Adolescent boys

A.G - Adolescent girls

Table 21. Frequency of use of different food groups among adolescents

Most frequently used foods scores above 60		Medium frequently used foods scores between 25-59		Low frequently used foods scores below 24	
A.B	A.G	A.B	A.G	A.B	A.G
Cereals	Cereals	Pulses	Pulses	Green leafy	Green leafy
Vegetables	Vegetables	Fruits	Fruits	Vegetables	Vegetables
Roots and tubers	Roots and tubers			Meat	Meat
Milk	Milk			Egg	Egg
Fish	Fish				
Fats & oils	Fats & oils				
Sugar & jaggery	Sugar & jaggery				
Spices	Spices				

A.B - Adolescent boys

A.G - Adolescent girls

According to the scores obtained by the adolescents the frequency of use of food groups were classified into three groups, and the details are given in Table 21.

As depicted in Table 21 cereals, vegetables, roots and tubers, milk, fish, fats and oils, sugar & jaggery and spices were the high frequently used food items by the adolescents. Pulses and fruits were found to be medium frequently used foods and green leafy vegetables, meat and egg were the low frequently used foods among the adolescent boys and girls.

'Meal frequency' followed in the families of the adolescents surveyed were assessed and it was found that three meal pattern viz., breakfast, lunch and supper was followed in all the families surveyed. However, it was also observed that 80 percent adolescent boys and 60 percent adolescent girls takes meals 4 times a day. Remaining adolescents surveyed followed three meal pattern.

Table 22. Meal frequency followed by the adolescents

	A.B		A.G	
Thrice	10	20	20	40
4 times	40	80	30	60
Total	50	100	50	100

An analysis of the meal pattern of the adolescents (Table 23) revealed that cereal preparations such as puttu and uppuma along with tea was the commonly used item for breakfast by 85 percent of adolescents (80 percent boys and 90 percent girls). However 13 percent adolescents (18 percent boys and 8 percent girls) take kanji and chammanthi (preparations with coconut and chilli) for breakfast.

Rice with fish or rice with vegetable was found to be the commonly consumed preparation for lunch in majority of adolescents (69 percent both boys and girls). However, 44 percent adolescent boys and 18 percent adolescent girls were of the practice of taking breakfast preparation for lunch, as they were carrying packet lunch.

Eighty percent boys and 60 percent girls were in the habit of taking lunch prepared at home during evening time. Among the remaining adolescents 7 percent take only tea/coffee, 5 percent take tea/coffee with some cereal preparations, 9 percent take coffee/tea with root & tubers preparation and 8 percent take coffee/tea with some pulse preparation.

Cereal-fish combination was found to be the commonly used preparation for 45 percent adolescents, whereas cereal-fish-vegetable combination was used for dinner by another 40 percent adolescents. Fifteen percent adolescents take the same food prepared for lunch for dinner.

Table 23. Distribution of the families of respondents as per food ^{Combinations} preparations commonly used for the meals

	Breakfast			Lunch			Evening tea			Dinner		
	A.B	A.G	Total	A.B	A.G.	Total	A.B	A.G	Total	A.B	A.G	Total
Black coffee + cereal	2 (1)	2 (1)	(2)									
Tea							6 (3)	8 (4)	7			
Tea + cereal	80 (40)	90 (45)	85					10 (5)	5			
Cereal + fish				28 (14)	42 (21)	35				50 (25)	40 (20)	45
Cereal + vegetables				28 (14)	40 (20)	34						
Cereal + fish + vegetables										40 (20)	40 (20)	40
Tea + roots & tubers							8 (4)	10 (5)	9			
Tea + pulse							6 (3)	10 (5)	8			
Tea + banana								2 (1)	1			
Kanji + chammanthi	18 (9)	8 (4)	13									
Same as breakfast				44 (22)	18 (9)	31				10 (5)	20 (10)	15
Same as lunch							80 (40)	60 (30)	70	10 (5)	20 (10)	15

Numbers in parenthesis

A.B - Adolescent Boys

A.G - Adolescent Girls

Preference of the adolescents with regard to the various food preparations were enquired and the data is depicted in Table 24. As revealed in the table it was observed that all the adolescent boys and girls preferred cereal preparations for breakfast. Among the cereal preparations puttu and uppuma were found to be the most favourite items for them.

For lunch all the adolescent boys and 50 percent adolescent girls preferred rice with fish and vegetable preparation whereas the remaining girls preferred rice with fish for the lunch.

Twenty percent adolescent boys and 40 percent adolescent girls preferred tea/coffee with cereal preparations for evening tea. Cereal preparations like 'adda', 'iddiyappam', 'panroll', 'uppuma' and 'puttu' were their favourites for evening snacks. Twenty percent girls and 40 percent boys liked tea/coffee with roots and tubers like tapioca or sweet potato. Another 60 percent boys and 20 percent girls preferred tea/coffee with pulse preparations like 'Sukiyan', 'vada' etc. for evening tea.

For dinner 75 percent adolescents (100 percent boys and 50 percent girls) liked cereal with fish & vegetable preparations. Remaining 50 percent of girls liked cereal with fish preparations for dinner.

Table 24. Distribution of adolescents as per the preference for various food ^{combin} preparations

	Breakfast			Lunch			Evening tea			Dinner			
	A.B	A.G	Total	A.B	A.G	Total	A.B	A.G	Total	A.B	A.G	Total	
Black coffee + cereal													
Tea													
Tea + cereal	100 (50)	100 (50)	100				20 (10)	40 (20)	30				
Cereal + fish					50 (25)	25					50 (25)	25	
Cereal + vegetables													
Cereal + fish + vegetables				100 (50)	50 (25)	75					100 (50)	50 (25)	75
Tea + roots + tubers							20 (10)	40 (20)	30				
Tea + Tuber							60 (30)	20 (10)	40				
Tea + Banana													
Kanji + chutney													
Same as breakfast													
Same as lunch													

Numbers in parenthesis

A.B - Adolescent Boys

A.G - Adolescent Girls

Among the different type of preparations the highest preference was recorded for sweet dish by all the adolescent girls and 90 percent of adolescent boys (Table 25). While 10 percent boys liked all types of preparations.

Table 25 c

Table 26. Distribution of adolescents as per their preference for cooking methods and type of preparations

Particulars	A.B		A.G	
	No.	Percentage	No.	Percentage
a) Cooking methods				
Deep fried foods	40	80	40	80
Shallow fried foods	10	20	10	20
b) Type of preparation				
Sweet preparation	45	90	50	100
All types	5	10	-	-

Table 26 reveals the preference of the adolescents for foods prepared by different methods of cooking. It was observed that among the different cooking methods 80 percent adolescents (both boys and girls) preferred deep fried foods. Remaining 20 percent preferred shallow fried foods. The other methods of cooking such as boiling, steaming, baking etc. were found to be not liked much by the adolescents.

Table 27. Adolescents preference for beverages

	A.B		A.G	
	No.	Percent	No.	Percent
Tea	45	90	20	40
Coffee	5	10	30	60
Total	50	100	50	100

Table 27 depicts the preference of adolescents for beverages. Ninety percent of boys preferred tea while only 40 percent girls prefer tea. Majority of the girls preferred coffee.

Nibbling or eating inbetween is a common practice observed in adolescents. Such snacks ate inbetween meals reduce appetite and subsequently affect the food intake of the adolescents.

Table 28 gives an account of the nibbling habit of the adolescents.

Seventy percent adolescent girls and 60 percent adolescent boys were found to possess the habit of eating inbetween the meals while the nibbling habit was absent in 40 percent adolescent boys and 30 percent adolescent girls.

67 percent boys drink coffee or tea inbetween meals while 33 percent take sweet or fried items. Whereas among

Table 28. Nibbling Habit of Adolescents

Particulars	A.B		A.G	
	No.	Percent	No.	Percent
a) Nibbling Habit				
Yes	30	60	35	70
No	20	40	15	30
Total	50	100	50	100
b) Type of foods taken inbetween meals				
Coffee/tea	20	67		
Sweet or fried items	10	33	25	71
Total	30	100	25	100

A.B - Adolescent Boys

A.G - Adolescent Girls

girls 29 percent drink only coffee or tea while (71 percent) preferred to eat sweets or fried items inbetween meals. The practice of taking meals outside home by the adolescents was assessed and found that majority of the adolescent (60 percent male and 100 percent female) did not have the habit of taking food outside the home. Among those who take food from outside 20 percent boys drank coffee/tea and other 20 percent ate foods such as biscuits/banana/candies.

4. Food preference of adolescents

Preference of the adolescents for various food articles commonly used for culinary purposes in Kerala were assessed using a 3 point preference rating scale and the details are presented in Table 29.

The Table 29 shows the preference of adolescent boys and girls for cereals and pulses. All adolescent boys and girls were found to like rice and wheat very much. But more than 50 percent of adolescents (56 percent boys and 50 percent girls) disliked ragi, which is a minor millet. Only 20 percent boys and 32 percent girls liked ragi which is a minor millet. The adolescents who were not familiar with ragi was found to be negligible in boys and girls.

The percentage of adolescent boys who preferred greengram either 'extremely or very much' was found to be 4 and

Table 29. Preference of the adolescents for cereals and pulses (in percentage)

	Rice		Wheat		Ragi		Peas		Bengalgram		Redgram		Greengram		Horsegram	
	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G
Very much like	-	-	-	-	-	-	6	6	16	10	6	12	4	8	4	-
Like	100	100	100	100	26	32	86	86	84	90	88	76	78	56	72	52
Dislike	-	-	-	-	56	50	8	8	-	-	6	12	12	36	14	38
Very much dislike	-	-	-	-	18	18	-	-	-	-	-	-	6	-	10	10
No remarks																

A.B - Adolescent Boys

A.G - Adolescent Girls

78 percent respectively, as against 8 and 56 percent in girls. 36 percent adolescent girls and 12 percent adolescent boys were found to like green gram 'little'. Red gram was also found to be liked very much by 94 percent adolescent boys and 88 percent adolescent girls. With regard to horse gram 76 percent adolescent boys preferred it as against 52 percent in girls.

The table 30 shows the preference of adolescents for roots and tubers. Majority of boys and girls liked tapioca (92 percent boys and 100 percent girls), potato (90 percent boys and 90 percent girls), yam (92 percent boys and girls), colocassia (90 percent boys and 86 percent girls), carrot (84 percent boys and 90 percent girls), beet root (86 percent boys and 76 percent girls), sweet potato (88 percent boys and girls), coleus (86 percent boys and 100 percent girls), Dioscorea (94 percent boys and girls), lesser yam (88 percent boys and 86 percent girls), small onion (100 percent boys and girls), big onion (100 percent boys and girls). The tubers which are not liked that much was found to be radish in both groups.

The Table 31 shows the adolescents preference for vegetables. Highly preferred vegetables were found to be ladies finger (94 percent boys and 90 percent girls), cucumber (96 percent boys and 98 percent girls), dolichos beans

Table 30. Preference of adolescents for roots and tubers

	Tapioca		Potato		Yam		Colocassia		Carrot		Beet root		Sweet potato		Raddish		Coleaus		Diascorea		Lesser yam		Small onion		Big onion	
	AB	AG	AB	AG	AP	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG
Very much like	14	8	6	22	18	6	6	22	16	10	18	10	32	8	-	-	12	6	24	4	14	4	-	-	4	6
Like	78	92	84	64	74	84	84	64	68	80	68	66	56	80	52	32	74	94	70	90	74	82	100	100	86	94
Dislike	8	-	10	14	-	-	10	14	-	4	-	-	-	4	12	20	14	-	4	6	10	10	-	-	-	-
Very dislike	-	-	-	-	-	4	-	-	16	6	-	4	-	-	20	12	-	-	2	-	-	4	-	-	-	-
No remarks	-	-	-	-	8	6	-	-	-	-	14	20	12	8	16	36	-	-	-	-	-	-	-	-	-	-

AB - Adolescent boys

AG - Adolescent girls

Table 31. Preference of adolescents for vegetables (in percentage)

	Ladies finger		Cucumber		Brinjal		Bitter gourd		Ash gourd		Snake gourd		Plantain		Beans		Pumpkin		Ivy gourd		Dolichos beans		Bread fruit		
	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	
Very much like	16	8	12	10	6	-	-	-	-	6	6	6	6	6	6	12	14	4	4	6	-	4	8	30	30
Like	78	82	84	88	72	72	50	40	60	46	66	80	66	74	62	74	72	56	26	52	84	88	62	64	
Dislike	6	10	-	2	22	18	18	48	10	44	28	14	16	20	26	12	24	32	50	6	6	2	6	6	
Very much dislike	-	-	4	-	-	-	8	10	8	4	-	-	12	-	-	-	-	8	6	14	6	2	2	-	
No remarks	-	-	-	-	-	-	24	20	22	-	-	-	-	-	-	-	-	-	12	28	-	-	-	-	

AB - Adolescent boys

AG - Adolescent girls

Preference of adolescents for vegetables

	Papaya		Plantain flower		Plantain stem		Peas	
	AB	AG	AB	AG	AB	AG	AB	AG
Very much like	12	12	8	8	26	16	8	4
Like	62	74	66	70	60	58	66	74
Dislike	20	14	18	-	14	22	10	10
Very much dislike	6	-	-	4	-	4	16	12
No remarks	-	-	8	18	-	-	-	-

(88 percent boys and 96 percent girls), bread fruit (92 percent boys and 94 percent girls) followed by brinjal (78 percent boys and 72 percent girls), snake gourd (72 percent boys and 86 percent girls), plantain (72 percent boys and 80 percent girls), beans (74 percent boys and 88 percent girls), pumpkin (76 percent boys and 60 percent girls), pappaya (74 percent boys and 86 percent girls), plantain flower (74 percent boys and 78 percent girls), plantain stem (86 percent boys and 74 percent girls) and peas (72 percent boys and 78 percent girls) among majority of adolescents. Only 50 percent boys and 40 percent girls liked bitter gourd. 60 percent boys and 52 percent girls liked ash gourd and only 32 percent boys and 52 percent girls liked Ivy gourd.

With regard to green leafy vegetables it was observed that amaranthus and cabbage was the highly preferred green leaf by majority of adolescent boys and girls (Table 32). The percentage of adolescent boys who preferred amaranthus and cabbage was 96 and 86 percent respectively as against 86 and 98 percent in adolescent girls. The percentage of adolescent boys who preferred drumstick leaves was found to be 80 percent whereas only 60 percent adolescent girls preferred drumstick leaves. Coriander leaves and curry leaves are generally other green leaves generally used for culinary purpose in little quantities. Among these curry leaves was found to liked equally by both adolescent boys

Table 32. Percentage preference for green leafy vegetables

	Amaranthus		Drumstick leaves		Cabbage		Coriander leaves		Curry leaves	
	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G
Very much like	10	10	6	10	4	10	44	56	-	-
Like	86	76	74	50	82	88	-	26	66	66
Dislike	4	12	14	28	14	-	24	10	30	28
Very much dislike	-	2	6	12	-	2	-	-	4	4
No remarks	-	-	-	-	-	-	32	8	-	2

A.B - Adolescent boys

A.G - Adolescent girls

and adolescent girls (66 percent) whereas coriander leaves was liked more by the girls than boys (82 percent girls and 44 percent boys).

The Table 33 shows the preference of the adolescents for fruits. It was observed that fruits like banana, tomato, goose berry, jack fruit, mango, guava, orange, apple, pappaya, pineapple, zapota, dates, sabargil, cashew fruits, and grapes were liked very much by the majority of adolescent boys and girls. Since more than 90 percent recorded highest preference for the above fruits. The next preferred fruits among the adolescents were Ayani (52 percent boys and 82 percent girls), palm fruit (64 percent boys and 70 percent girls), rose apple (62 percent boys and 64 percent girls), star gooseberry (38 percent boys and 54 percent girls) and water melon (36 percent boys and girls). The adolescents who recorded their dislike for the fruits like Indian gooseberry, jack fruit, mango, papaya and cashew fruit were found to be negligible.

Equal preference for nuts and oil seeds indicated that all the boys and girls surveyed equally liked groundnut, coconut and cashewnut (Table 34). Whereas preference for gingelli seeds was found to be 80 percent in boys and 60 percent in girls.

Table 33. Preference of adolescents for fruits (in percentage)

	Big Banana		Tomato		Goose berry		Jack fruit		Mango		Guava		Orange		Apple		Papaya		Pineapple		Zapota		Ayani		Palm fruit	
	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG
Very much like	52	46	-	10	-	50	4	-	4	-	-	-	-	-	50	44	-	-	-	-	50	50	-	82	36	20
Like	48	54	100	90	88	50	96	96	96	96	100	100	100	100	50	56	96	100	100	100	50	50	52		28	50
Dislike	-	-	-	-	12	-	-	4	-	4	-	-	-	-	-	-	4	-	-	-	-	-	16	16	12	8
Very much dislike	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	15
No remarks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32	2	22	

Preference of Adolescents for fruits

	Anona		Rose apple		Star Goose berry		Water melon		Dates		Sabargil		Cashewnut		Grapes		Small banana	
	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG
Very much like	8	24	12	14	-	-	-	-	12	10	30	24	12—24	50	50	-	-	
Like	54	38	52	58	38	54	36	36	88	90	70	76	76	64	50	50	50	50
Dislike	18	18	18	28	34	16	24	4	-	-	-	-	12	12	-	-	-	-
Very much dislike	2	-	-	-	18	-	-	-	-	-	-	-	-	-	-	-	-	-
No remarks	18	20	18	-	10	30	40	40	-	-	-	-	-	-	-	-	-	-

AB - Adolescent Boys

AG - Adolescent Girls

Table 34. Percentage preference for nuts & oil seeds

	Groundnut		Gingelly		Coconut		Cashewnut	
	A.B	A.G	A.B	A.G	A.B	A.G	A.B	A.G
Very much like	-	-	-	-	-	-	100	100
Like	100	100	80	60	100	100	-	-
Dislike	-	-	20	40	-	-	-	-
Very dislike	-	-	-	-	-	-	-	-
No remarks	-	-	-	-	-	-	-	-

A.B - Adolescent boys

A.G - Adolescent girls

The Table 35 shows the preference of animal products for adolescent boys and girls. Eighty eight percent boys and 90 percent girls liked cows milk. Seventy four percent boys and 64 percent girls liked goats milk. But only 40 percent boys and 20 percent girls liked buffalo milk. Curd was disliked by only 8 percent boys and girls. All the others liked it. Majority of the adolescents liked butter and butter milk.

Similarly all the adolescents liked hen's egg however 90 percent boys and 94 percent girls liked duck's egg very much. Majority of the boys and girls preferred fish. The percentage of adolescents, who dislike fish was found to be negligible.

All the adolescents were found to like mutton very much. Next preferred meat was chicken (96 percent boys and 84 percent girls). Beef was liked by 90 percent boys and 72 percent girls.

Preference score of individual food items which are commonly used in our culinary purposes were measured as suggested by Reaburn et al. (1979). Preference scores obtained for different food articles by the adolescent boys and adolescent girls were given in Appendix VIII.

Based on the preference score obtained by the adolescent boys and girls for individual food articles were

Table 35. Preference of adolescents for Animal Products (in percentage)

	Goats milk		Cows milk		Buffalo milk		Curd		Butter milk		Butter		Hen's egg		Duck's egg		Fish		Beef		Chicken		Mutton	
	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG	AB	AG
Very much like	-	-	20	-	-	-	18	18	44	48	40	-	30	40	90	94	8	10	22	72	6	-	-	-
Like	74	64	68	90	40	20	74	74	56	42	40	100	70	60	-	-	90	85	68	-	90	84	100	100
Dislike	8	36	-	-	-	-	8	8	-	10	20	-	-	-	10	6	2	5	10	28	4	16	-	-
Very dislike	18	-	12	10	60	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
No remarks	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AB - Adolescent Boys

AG - Adolescent Girls

classified to highly preferred ones, medium preferred ones and low preferred ones. Highly preferred foods ^{were} ~~are~~ those with scores above (mean + standard deviation). Medium preferred foods ^{were} ~~are~~ those with scores between (mean - standard deviation) and mean + standard deviation) and low preferred foods ^{were} ~~are~~ those with score less than (mean - standard deviation). Foods according to the order of preference among the adolescent boys and adolescent girls ^{were} ~~are~~ indicated in Table 36, 37 and 38.

Highly preferred foods were found to be ducks egg, fruits such as apple, grapes, plantain, sapota, cashewnuts in both groups apart from hen's egg and ayani in adolescent girls.

Low preferred foods were identified as ragi, raddish, bittergourd, Ivy gourd, star gooseberry and watermelon in both boys and girls apart from horsegram, palm fruit, in adolescent girls and ashgourd and ayani in adolescent boys.

Commonly used cereals, pulses, vegetables, roots and tubers, green leafy vegetables, milk and milk products, fruits and nuts & oilseeds were found to be their medium preference foods.

Difference in the food preference of adolescent boys and girls with regard to different food articles were computed. Significant difference was noted among adolescent

Table 36. Highly preferred foods among adolescents
(scores above 76.44)

Food articles	A.B	Food articles	A.G
	Preference score		Preference score
Butter milk	81	Hens egg	80
Duck's egg	90	Ducks egg	90
Apple	83	Apple	81
Sapota	83	Sapota	83
Grapes	83	Ayani	87
Plantain	83	Grapes	83
Cashewnuts	100	Plantain	83
		Cashewnut	100

A.B - Adolescent boys

A.G - Adolescent girls

Table 37. Low preferred foods among adolescents
(scores below 50.36)

Food articles	A.B	Food articles	A.G
	Preference score		Preference score
Ragi	35	Ragi	38
Raddish	38	Raddish	28
Bitter gourd	39	Horsegram	47
Ash gourd	43	Bitter gourd	42
Ivy gourd	40	Ivy gourd	36
Buffalo milk	26	Buffalo milk	13
Ayani	40	Palm fruit	38
Anona	44	Star gooseberry	41
Star gooseberry	36	Watermelon	29
Watermelon	32		

A.B - Adolescent boys

A.G - Adolescent girls

Table 38. Medium preferred foods among adolescents
(Scores between 50.36 and 76.44)

Adolescent boys		Adolescent girls	
Food articles	Score	Food articles	Score
Rice	66	Rice	66
Wheat	66	Wheat	66
Peas	66	Peas	66
Bengalgram	72	Bengalgram	70
Redgram	66	Redgram	66
Greengram	60	Greengram	57
Horsegram	56	Tapioca	69
Tapioca	68	Potato	69
Potato	65	Yam	62
Yam	67	Colocassia	69
Colocassia	65	Carrot	65
Carrot	61	Beet root	54
Beet root	63	Sweet potato	61
Sweet potato	69	Coleaus	68
Coleus	66	Diascorea	68
Diascorea	66	Lesser yam	62
Lesser yam	66	Small onion	66
Small onion	66	Big onion	68
Big onion	65	Cucumber	68
Ladies finger	68	Brinjal	54
Cucumber	68	Ashgourd	51

Adolescent boys		Adolescent girls	
Food articles	Score	Food articles	Score
Brinjal	61	Snake gourd	59
Snake gourd	59	Plantain	62
Plantain	55	Beans	67
Beans	55	Pumpkin	52
Pumpkin	60	Dolichos beans	67
Dolichos beans	62	Bread fruit	74
Bread fruit	73	Papaya	66
Papaya	60	Plantain flower	54
Plantain flower	58	Plantain stem	62
Plantain stem	70	Peas	56
Peas	56	Amaranthus	65
Amaranthus	68	Drumstic leaves	53
Drumstic leaves	60	Cabbage	68
Cabbage	63	Coriander leaves	76
Coriander leaves	76	Curry leaves	53
Curry leaves	54	Goats milk	54
Goats milk	52	Cows milk	60
Cows milk	65	Curd	70
Curd	70	Butter milk	76
Butter	73	Butter	66
Hens egg	76	Fish	68
Fish	68	Beef	72

Adolescent boys		Adolescent girls	
Food articles	Score	Food articles	Score
Beef	70	Chicken	61
Chicken	60	Mutton	66
Mutton	66	Tomato	70
Tomato	66	Jack fruit	65
Gooseberry	62	Mango	65
Jack fruit	68	Guava	66
Mango	68	Orange	66
Guava	66	Papaya	66
Orange	66	Pineapple	66
Papaya	65	Anona	55
Pineapple	66	Dates	70
Palm fruit	58	Sabargil	74
Dates	70	Cashew fruit	70
Sabargil	76	Groundnut	66
Cashew fruit	66	Gingelly	53
Groundnut	66	Coconut	66
Gingelly	60		
Coconut	66		

L value

Horsegram - 1.975

Bittergourd - 2.74

Ayani - 6.9

Palm fruit - 4.13

boys and adolescent girls for a few food articles viz., horsegram, bittergourd, ayani and palm fruit. The average food preference score obtained by the adolescent boys and adolescent girls were determined and the details are presented in Table 39.

Table 39. Average food preference score of adolescents

Average food preference score	A.B		A.G	
	No.	Percent	No.	Percent
Above 4	19	36	8	16
3.5-4	27	54	41	82
Below 3.5	4	8	1	2
Total	50	100	50	100

A.B - Adolescent boy

A.G - Adolescent girl

From the table it was revealed that majority of the adolescents (54 percent boys and 82 percent girls) had the average score between 3.5 to 3.9. Thirty six percent adolescent boys and 16 percent adolescent girls had score above 4. Only 8 percent adolescent boys and only 2 percent adolescent girls had scores below 3.5.

Food preference of an individual are formed as a result of the interactions with factors in an individuals

environment, socio-economic and external pressures. In the present study the influence of factors such as total income of the family, type and size of family, educational status of the individual and their parents and the influence of the peers on the food preference of the adolescents were worked out using correlation coefficient. The results are presented in Table 40.

Table 40. *The impact of various Factors on Food preference*

Factors	A.B	A.G
Total income	0.1392	0.0763
Type of family	0.2594	0.0805
Size of family	0.2759	0.1730
Employment status of father	0.1574	0.0033
Educational status of mother	0.0181	0.1440
Educational status of respondent	0.2277	0.2447
Number of friends	0.0836	0.1276
	$r = 0.05 - 0.2788$	$r = 0.01 - 0.3613$

A.B - Adolescent boys

A.G - Adolescent girls

It is evident that none of the above factors had an impact on the food preferences of the studied

adolescent boys and girls as the correlations are not significant.

Table 41. Actual food intake of the Adolescents estimated by weight method

Food stuffs	A.B			A.G		
	RDA	Amount consumed	% of RDA met	RDA	Amount consumed	% of RDA met
Cereals	450	471	105	350	397	113
Pulses	50	16	33	50	37.5	75
G.L. vegetable	100	5	5	150	15	10
Other vegetable	175	86	49	150	65	44
Fruits	30	15	52	30	18	60
Milk	150	74	50	150	42	28
Fish and egg	30	132	443	30	96	321
Sugar & jaggery	40	24	60	30	18	60
Nuts & oilseeds	50	16	33	30	16	53

A.B - Adolescent boys

A.G - Adolescent girls

Actual food intake of the Adolescents

Dietary intake of 20 adolescents (10 boys and 10 girls) were assessed by one day weight survey. Comparison of the diets were made with the RDA (suggested by (ICMR). The

FIG. AVERAGE INTAKE OF FOOD STUFFS

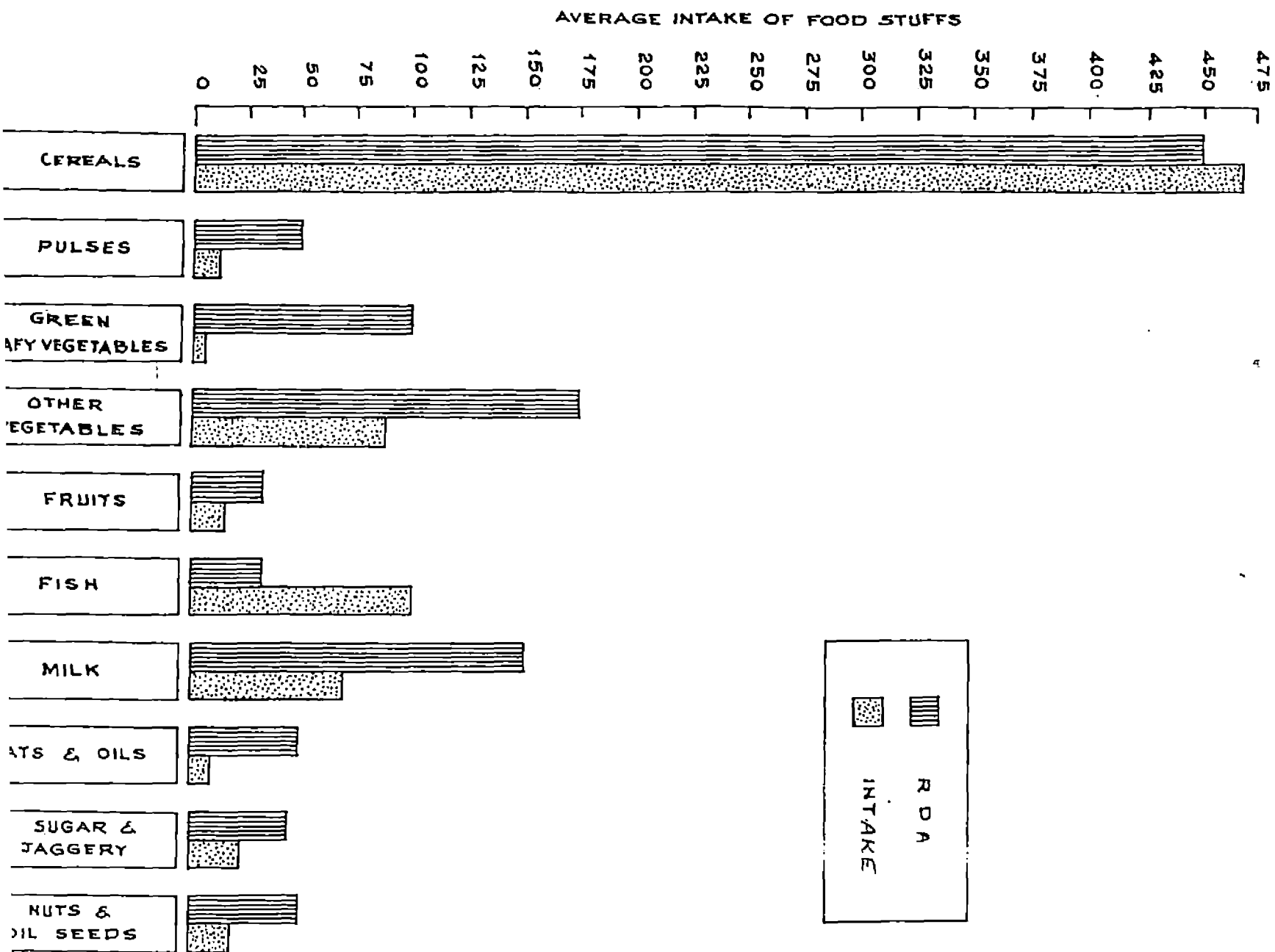
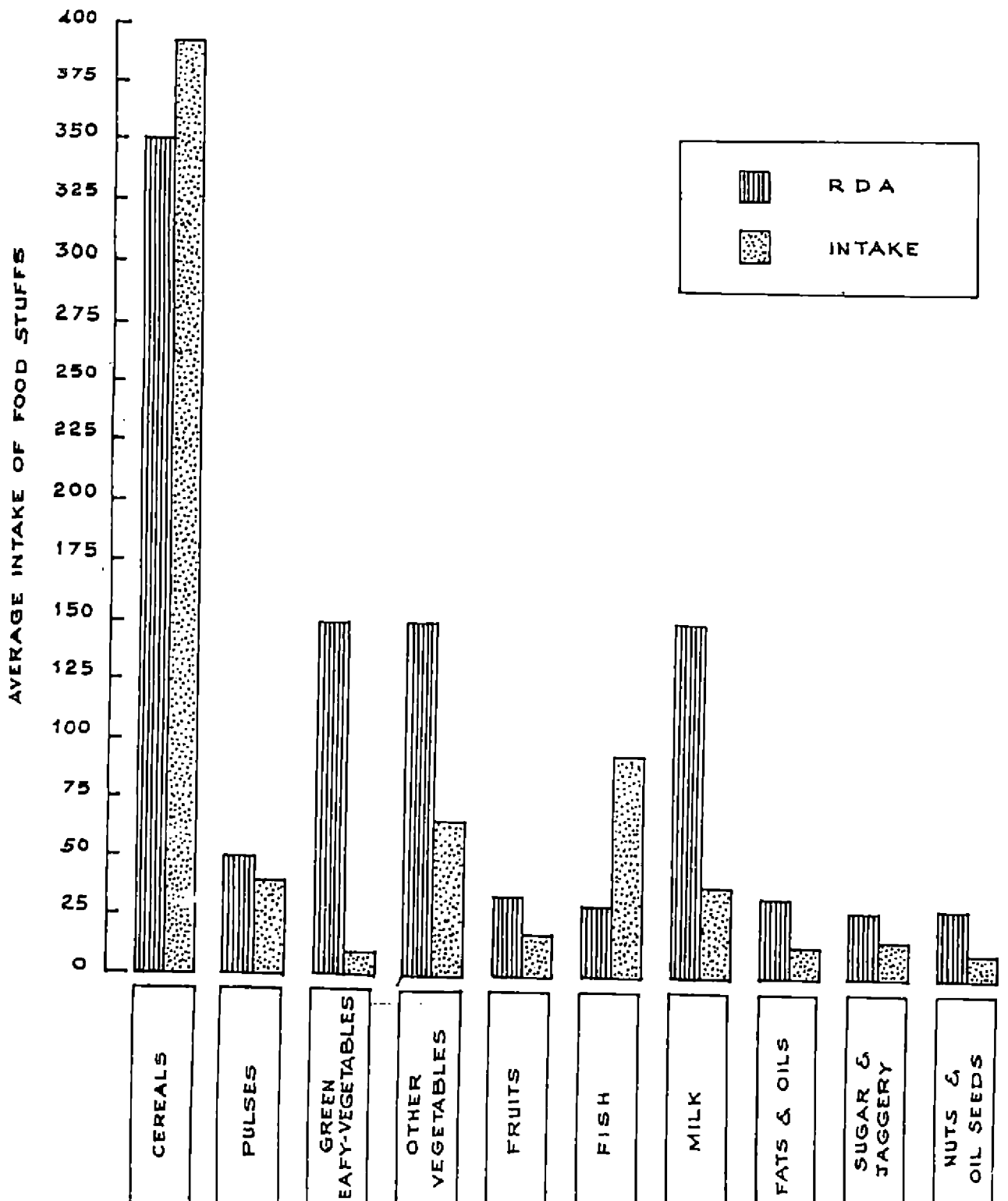


FIG. AVERAGE INTAKE OF FOOD STUFFS (FEMALE).



average quantity of foods consumed by the Adolescents obtained from actual food weighment are presented in Table 41.

As revealed in the table, the intake of cereals and fish was found to be higher than the suggested allowances of ICMR in both adolescent boys and girls. Intake of all the other foods were found to be below the RDA in both boys and girls. Intake of pulses ^{was} found to be 75 percent of RDA in girls as against 33 percent in boys. Intake of other vegetables, fruits, and milk were found to be 44, 60 and 28 percent respectively of the RDA in adolescent girls and 49, 52 and 50 percent respectively of the RDA in adolescent boys. The intake of green leafy¹ vegetables ^{was} found to be only 5 percent and 10 percent respectively of the R.D.As in adolescent boys and girls.

The intakes of sugar & jaggery was about 60 percent of the RDA in both adolescent boys and girls. While intake of nuts and oilseeds ^{was} 33 percent of RDA in adolescent boys as against 53 percent in adolescent girls.

Nutrient intake of the adolescents

The average nutrient intake of the adolescents are depicted in Table 42. This table depicted that the percentage of RDA met by adolescent boys and girls with regard to calories and proteins were 90 and 99 percent respectively.

Table 42. Nutrient intake of the adolescents estimated by weighment method

Nutrients	A.B			A.G		
	RDA (1989)	Amount consumed	Percentage of RDA met	RDA	Amount consumed	Percentage of RDA met
Protein (g)	79	71.9	90.8	65	64	90
Energy (kcal)	2600	2354	91.0	2050	2037	90
Cal (mg)	500	358.1	72.0	500	408	82
Iron (mg)	50	27.1	54	30	27	90
Retinol (μ g)	600	109	18	600	174	29
Thiamine (mg)	1.3	1.3	100	1	1	
Riboflavin (mg)	1.6	54	34	1.2	14.65	
Niacin (mg)	17	20	118	14	18	
Vitamin C (mg)	40	35.7	90	40	40	

A.B - Adolescent boys

A.G - Adolescent girls

The nutrients such as thiamine, niacin and vitamin C was met satisfactorily in adolescent girls whereas the percentage of RDA met by adolescent boys with regard to thiamine and vitamin C was found to be 100 and 90 percent respectively. The percentage of calcium, iron, retinol and riboflavin met by adolescent boys were 72, 54, 18, and 34 percent respectively as against 82, 90, 29 and 54 percent in adolescent girls.

5. Assessment of nutritional status of adolescents

The Table 43 and 44 represents the weight for age profile of adolescent boys and girls. The observed average weight of adolescent boys were compared with NCHS standard and standard recommended by ICMR (1990). The average weight for age profile of boys in the age groups 16, 17, 18 was found to be 39.6, 45.6 and 47 respectively, which was found to be lower than both International and Indian standards.

Similarly observed average weight of adolescent girls were compared with NCHS standard and Indian standard (Regional standards of Coimbatore). The average weight for age of adolescent girls in the age group of 16, 17, 18 was found to be 38, 42 and 46 kg respectively. These weights have also found to below the Indian standard as well as NCHS standard.

Table 43. Weight for age profile of the adolescent boys

Age	Sample size	Observed average weight (kg)	NCHS standard (kg)	ICMR (1990) standard (kg)
16	19	39.6	58.0	55.54
17	14	45.6	62.7	57.91
18	17	47	65.0	58.38

Table 44. Weight for age profile of the adolescent girls

Age	Sample size	Observed average weight (kg)	NCHS standard (kg)	NFI standard (1989) (kg)
16	28	38	53.0	46.9
17	16	42	54.0	48.1
18	6	46	54.4	48.7

FIG. WEIGHT FOR AGE PROFILE OF ADOLESCENT BOYS.

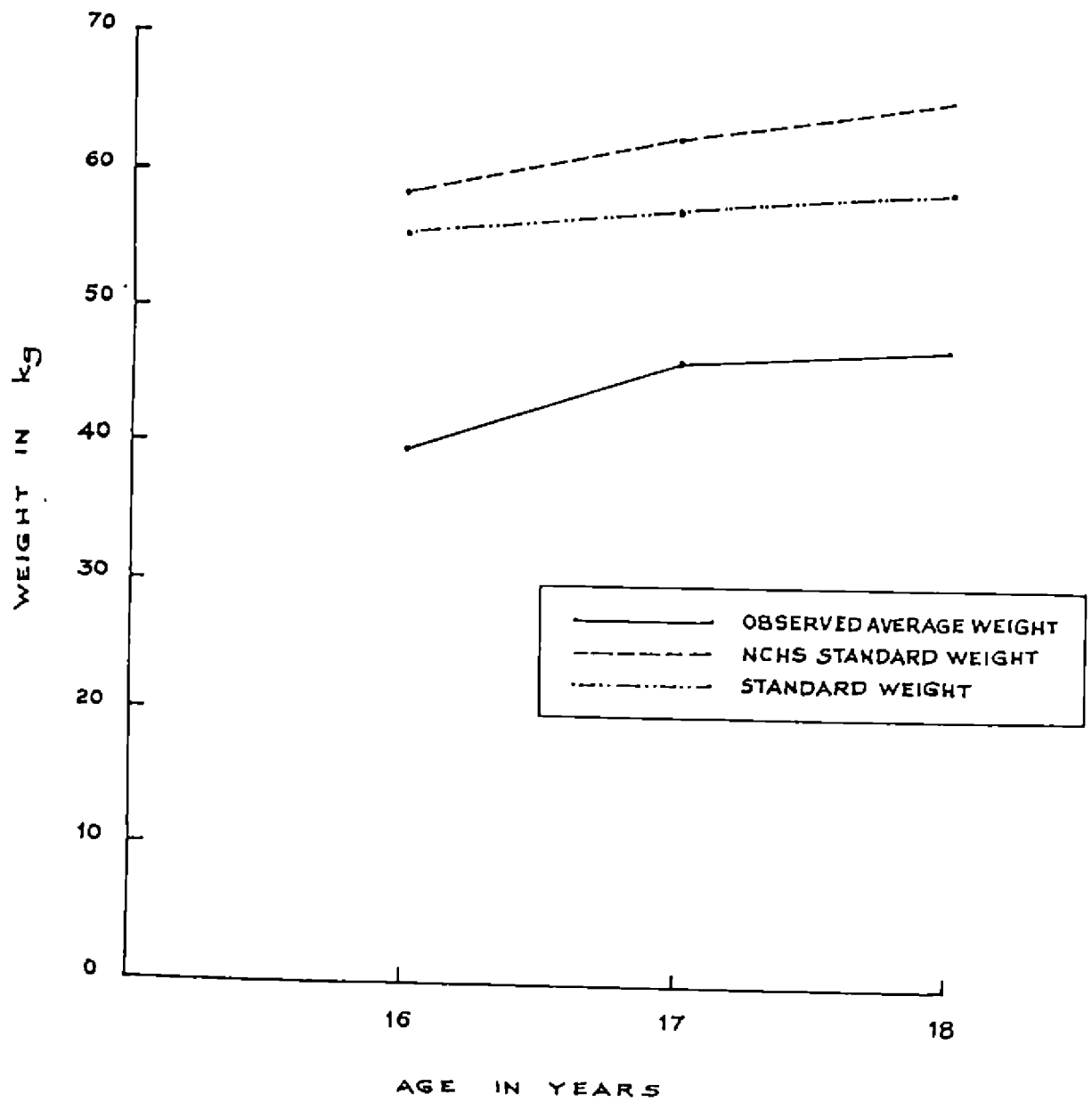


FIG. WEIGHT FOR AGE PROFILE OF ADOLESCENT GIRLS.

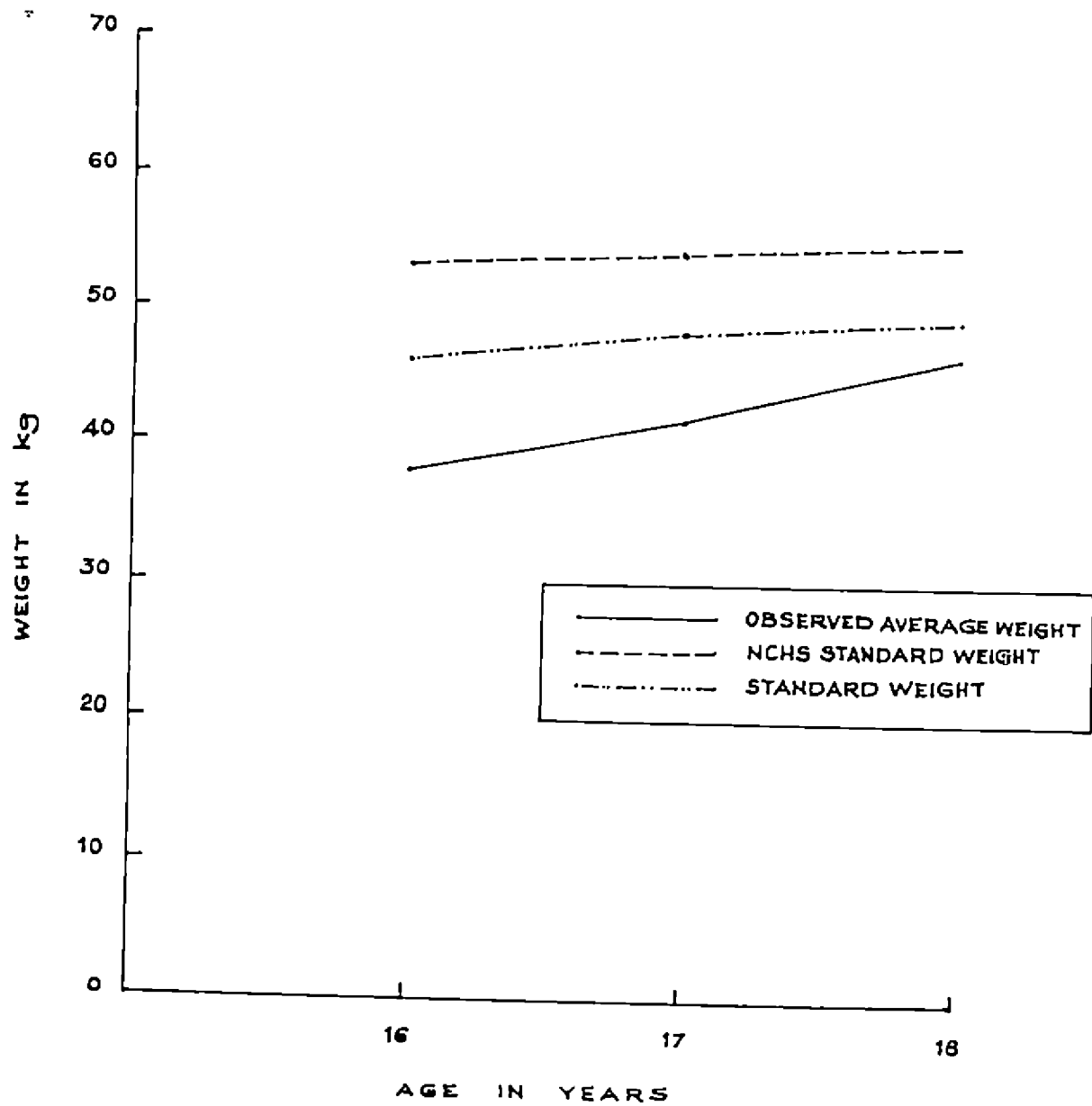


Table 45. Gomez classification of adolescents according to the degree of malnutrition

Deviation of weight for age from the standard	Classification	A.B		A.G	
		No.	Percent	No.	Percent
60%	Grade III malnutrition	0	0	0	0
61-75%	Grade II malnutrition	25	50	16	32
76-90%	Grade I malnutrition	25	50	22	44
90%	Normal	0	0	12	24

Based on the deviation from the standards suggested for weight for age, both adolescent boys and girls were grouped according to the degree of malnutrition. The results obtained are presented in Table 45.

As revealed in the Table, 50 percent each of the boys were found to be in grade II and grade I malnutrition. None of them were found to ^{be} normal or belongs to grade-III malnutrition whereas 24 percent adolescent girls were found to be normal. The percentage of girls belonging to grade I and grade II malnutrition was found to 44 and 32 percent respectively.

The average height for age of the adolescent boys and girls are presented in Table 46 and 47.

Table 46. Height for age profile of the adolescent boys

Age	Sample size	Observed height (cm)	NCHS standard (cm)	ICMR standard (1990) (cm)
16	19	156.4	171	168.4
17	14	160	175	173
18	17	165	177	172.05

Table 47. Height for age profile of the adolescent girls

Age	Sample size	Observed height (cm)	NCHS standard (cm)	NFI (1989) Coimbatore region (cm)
16	28	150	162	156.9
17	16	151.8	163	157.5
18	6	152	164	158

The observed average height for age of boys and girls were compared with NCHS standard as well as Indian standards. The average height for age profile of boys in the age group of 16, 17, 18 was found to be 156.4, 160 and 165 respectively. The average height for age profile of girls in the age group of 16, 17 and 18 was 150, 151.8 and 152 cm respectively. The observed average height for age of both boys and girls were found to be below the NCHS standard and Indian standards.

FIG. HEIGHT FOR AGE PROFILE OF ADOLESCENT BOYS.

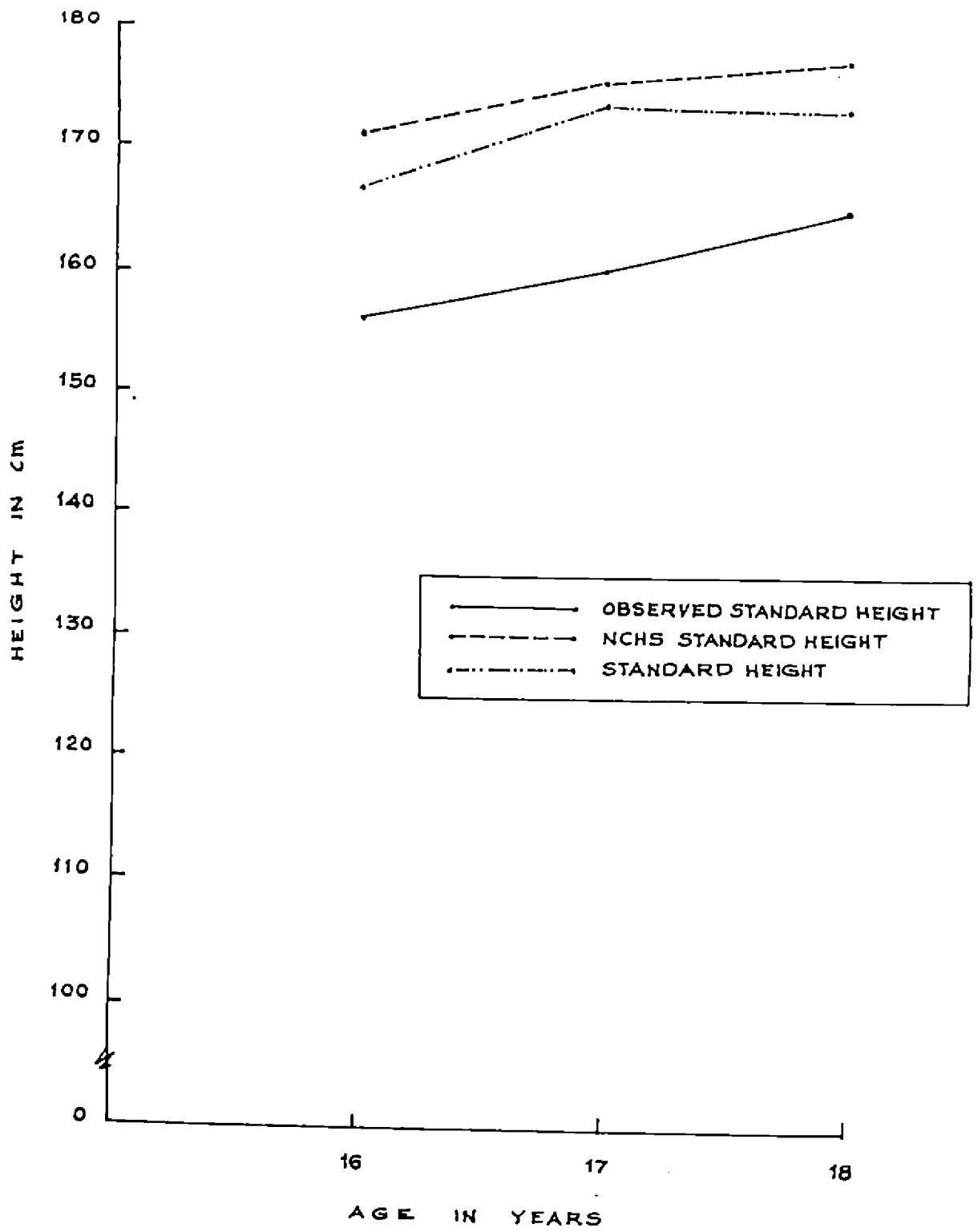
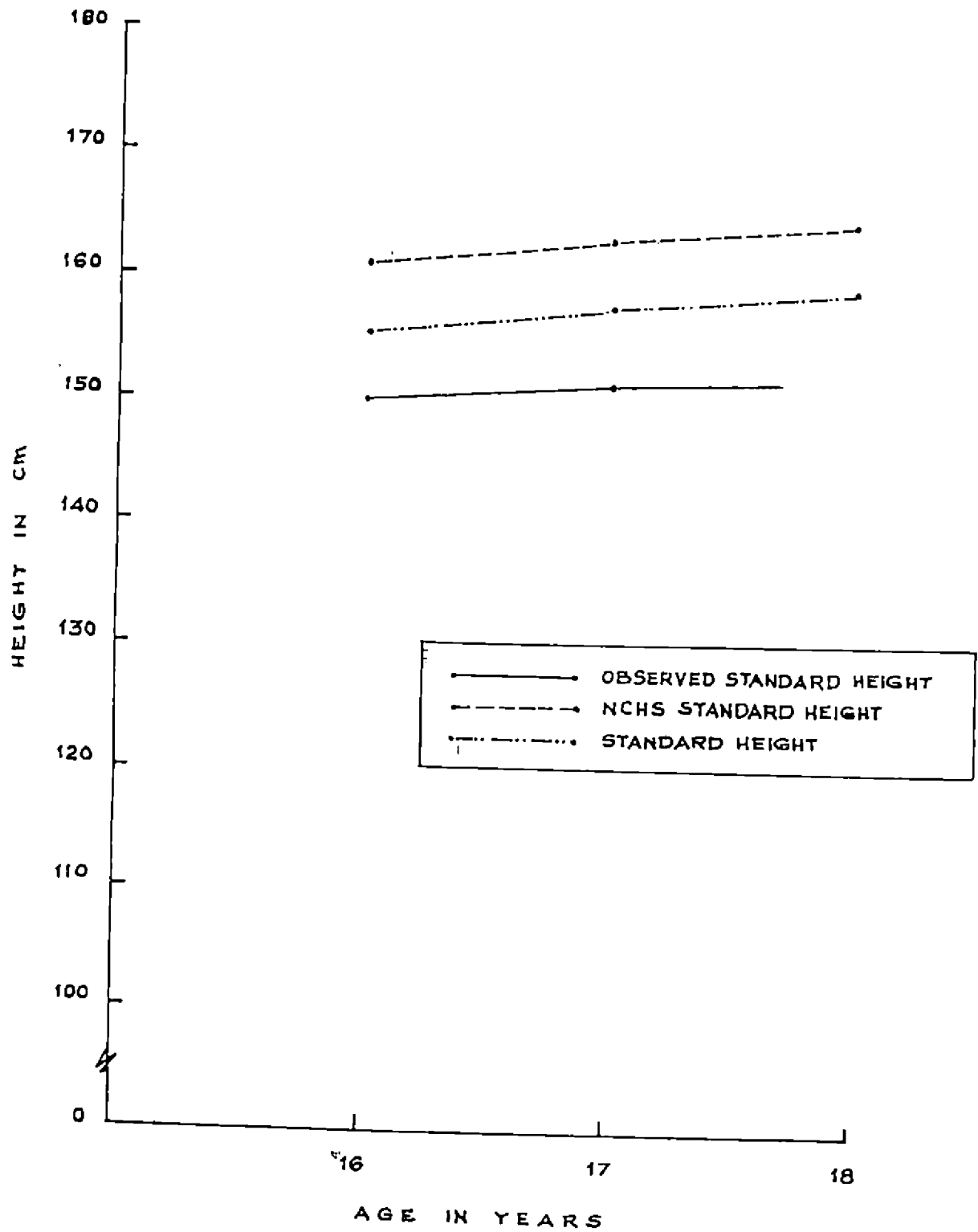


FIG. HEIGHT FOR AGE PROFILE OF ADOLESCENT GIRLS.



Based on the deviation from the Indian standards height for age, both boys and girls were grouped according to McLaren's classification. The results obtained are presented in Table 48.

Table 48. Classification of the adolescents according to height for age profile (McLaren's)

Height for age	Classification	A.B		A.G	
		No.	Percent	No.	Percent
80%	Dwarf	0	0	0	0
80-93%	Short	32	64	7	14
93-105%	Normal	18	36	43	86

From above table, it was found that 64 percent boys were considered as 'Short' while 36 percent of them were found to be ^{be} normal. In the case of girls 86 percent were found to be normal and only 14 percent considered as short.

The ratio between height and weight as reflected in body mass index was worked out and details are presented in Table 49.

Table 49. Body Mass Index of the adolescents

	A.B		A.G	
	No.	Percent	No.	Percent
Below normal	47	94	41	82
Normal	3	6	9	18
Above normal	0	0	0	0

Normal values of BMI 20-25 for men 19-24 for women

A.B - Adolescent boys

A.G - Adolescent girls

From the above table it was obvious that 82 percent adolescent girls were below the normal value of BMI as against 94 percent in adolescent boys. Eighteen percent adolescent girls and 6 percent adolescent boys were found to have BMI in the normal range. None of them were found to be above normal.

Results of the clinical examination carried out among the adolescents were presented in Table 50.

Table 50. Clinical status of the children

Deficiencies	A.B		A.G	
	No.	Percent	No.	Percent
Anaemia	10	10	15	30
Pigmentation	7	14	15	30
Bleeding of gunus	5	10	4	8
Bitot's spot	1	2	-	-
Night blindness	2	4	2	4
Angular stomatitis	1	2	3	6
^{dental} Teeth caries	10	20	14	28
Mottled enamel	1	2	1	2
Thyroid enlargement	-	-	2	4

A.B - Adolescent boys

A.G - Adolescent girls

Common deficiencies observed among the adolescents were Anaemia (30 percent in girls and 20 percent in boys). Pigmentation of skin (30 percent in girls and 14 percent in boys), bleeding gum (10 percent in boys and 8 percent in girls). Night blindness (4 percent each in boys and girls), angular stomatitis (2 percent in boys and 6 percent in girls), mottled enamel (2 percent both in boys and girls), Thyroid enlargement (4 percent in boys). 2 percent boys had bitof's spots. Non-nutritional manifestations such as dental caries and tooth decay was also observed in 20 percent boys and 28 percent girls.

Table 51. Haemoglobin levels of the adolescents

Observed haemoglobin range (gm/ml)	A.B		A.G	
	No.	Percent	No.	Percent
8 to 10	23	46	24	48
10 to 11	14	28	18	36
Above 11	13	26	8	16

A.B - Adolescent boys

A.G - Adolescent girls

Haemoglobin levels of the adolescents surveyed are depicted in Table 51. Twenty six percent of adolescent boys and 16 percent adolescent girls had normal haemoglobin values while 28 percent boys and 36 percent girls had haemoglobin between 10.1-11.9 gm/ml. Haemoglobin levels between 8-10 gm/ml

was located in 46 percent adolescent boys and 48 percent in adolescent girls.

Table 52. Nutritional status index of the adolescents

Age in years	Average nutritional status index			
	Number	Adolescent boys	Number	Adolescent girls
16	19	37.05	28	48.01
17	14	37.18	16	49.33
18	17	38.40	6	51.25

Nutritional status index of the adolescents was worked out by using anthropometric data and haemoglobin values and the index worked out for the adolescent boys and adolescent girls are given in Appendix IX.

The average nutritional status index of the adolescent boys and adolescent girls for the age groups 16, 17, and 18 are presented in Table 52.

From the above table it obvious that nutritional status of girls were significantly higher than that of boys in the age groups 16, 17 and 18.

DISCUSSION

DISCUSSION

The present study was carried out to assess the food preference, dietary habits and nutritional status of adolescents of Agricultural labourer families.

Socio-economic pattern of the families

Survey conducted to assess the socio-economic conditions of the families of the adolescents, indicated that majority of the families (70 percent) belonged to Hindu community and were from under privileged communities. Thomas (1989) and Sujatha (1990) reported that most of the Agricultural labourers belonged to underprivileged communities. In the present study majority of the families were found to be nuclear type. George (1988), Nagammal (1989) and Thomas (1989) had reported that, most of the families residing in the rural/coastal areas of Trivandrum district were of nuclear type.

Medium sized families with 5 to 7 members were found in 50 percent families. Thomas (1989) also reported the same. Number of adults and children present in the families indicated that in majority of the families only 1-2 adult members were found. While 1-2 children were found only in 33 percent families. Forty six percent families were with 3-4 children.

Educational status of the parents of the adolescents indicated that only 11 percent of adolescents mothers and 17 percent adolescent's fathers were found to be illiterate. Panikar (1979) reported that literacy rate of Agricultural labourers in Kerala were found to be 72 percent. Nearly 50 percent adolescent's mothers and 44 percent adolescent's fathers were found to had moderate education. Compared to adolescents fathers adolescents mothers were better in educational status. Educational status of the adolescents indicated that 95 percent of them had fairly good education (High School to College level). It was encouraging to note that none of them were illiterate.

Agriculture was the main source of livelihood in the families surveyed. As per the occupational distribution of the parents of the adolescents, it was revealed that 40 percent of respondents mothers and majority of the respondents fathers were engaged solely in Agriculture. Another 50 percent mothers of the respondents were found to be housewives. Both the parents were found to be engaged in Agriculture jobs in 40 percent families. In majority of families respondents were unemployed. This may be due to the factor that majority of adolescents were undergoing education. It can be concluded that, in most of the families father (head of the family) was the main bread winner and half of the respondents mothers were economically dependent.

Economic status of the families indicated that 36 percent families had a monthly income ranging from 1000 to 2000 whereas 44 percent families were found to had an income below Rs.800/month. Rearing of domestic animals or sale of farm produce were not found to contribute much to total income in majority of families.

On analysing the per capita income of the families, it was observed that, only very few families (10 percent) had a per capita income above Rs.300 while majority were in the per capita income ranging from Rs.100 to Rs.200. In rural India about 50 percent of the rural population spent less than Rs.140/- per month per person (National Sample Survey, 1987-88). Major share of the income was earned by the male member in majority of the families ~~has~~ studied. Contribution of the female members (housewives) were found to be below 50 percent in 54 percent families. UNICEF (1990) reported that in India, share of earnings of female workers in the family income was found to be below 50 percent.

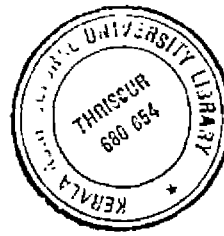
2. Personal characteristics of the adolescents surveyed

Manoff (1973) pointed out that mass media had an influence in modifying the adolescents food beliefs, food attitudes, and eating pattern. Personal characteristics of the adolescents such as reading habits, exposure to mass media, and their social participation was assessed.

It was observed that adolescent boys were more interested in reading newspapers than girls, since 70 percent boys and 38 percent girls read newspapers daily. In contrast to this 50 percent adolescent girls read weeklies and magazines as against 21 percent of adolescent boys. More than 50 percent of the adolescent boys were not in the habit of reading magazines or weeklies.

Approximately half of the adolescents were found to be the daily viewers of television (TV) programmes. However 36 percent adolescent boys and girls were not in the habit of viewing television. Furuhan and Gunter (1989) reported that the majority of the adolescents were in the habit of watching television programmes daily. In the present study, poor socio-economic background of the respondents may be the reason for the poor response of the TV programmes. Compared to the viewing of TV, listening to the radio programmes were more popular among the studied adolescents.

Mahan and Rees (1984) viewed that adolescents in general were found to be active and are found to engage themselves in various activities. On analysing the different type of activities in which adolescents were engaged during their free time, it was revealed that, majority of adolescent girls and 30 percent adolescent boys were engaged in attending



to their class work. It was interesting to note that in the present study an equal number of adolescent boys and girls help their parents in their household task. This finding is unlike those reported by Patwardhan (1985). He found that in rural areas only girls were generally involved in household activities such as cooking and serving, house care, care of cloths, shopping and care of family members. In the present study, boys (30 percent) were found to enjoy sports and games activities including cycling compared to girls while an equal percentage of both adolescent boys and girls were found to enjoy gossiping with their friends. This was supported by Shingi et al. (1980). They had reported that popular activity among adolescents is gossips apart from games and sports.

According to Mussen et al. (1990) peers play a crucial role in the psychological and social development of most adolescents. Santrok (1981) viewed that adolescents spent more time with peers than with parents. On assessing the peer group relation among the study group, it was observed that more than fifty percent adolescent boys and 38 percent girls had friends ranging from 8-10 numbers but when compared to girls boys had more number of friends. Lesser number of friends were also observed in girls.

Participation of adolescents in various organization indicated that majority of adolescent boys and girls, in the

present study were not found to participate in the activities of various organizations. However 32 percent boys and negligible percent girls were found to be involved in school/college unions and other local youth clubs. It was found that when compared to girls boys participated in the school/college unions actively.

On assessing the unhealthy habits such as smoking, drinking, drug addiction etc. possessed by the study group, it was noted that none of them possessed such unhealthy habits. Krishna (1980) viewed that Indian children did not seem to smoke as frequently as their western counterparts. This probably is related to the social structure where children are restrained by social norms and parental restrictions. However, Singhi et al. (1980) reported that the prevalence of smoking in school going rural adolescents is high.

3. Dietary habits and food consumption pattern of the adolescents

Dietary habits of the families surveyed indicated that all the families surveyed and all the adolescents under study were non-vegetarians. The percentage of income spent for food items indicated that majority of the families spent 51-90 percent of their income for food. Whereas 40 percent families spent 25-50 percent of the income for food. Thomas

(1981) in her study among the agricultural labourers also found the same.

On further enquiry about the distribution of money for the purchase of various food items, it was revealed that majority of the families allocated more money for the purchase of cereals (26-50 percent) followed by vegetables and fish. The percentage of income spent by majority of the families for pulses, roots and tubers, fats & oils and spices was found to be 1-10 percent whereas 1-5 percent of their income was found to be spent for the purchase of green leafy vegetables, fruits and sugar & jaggery. The percentage of income spent by the families for meat, egg and bakery items were found to be very less.

On assessing frequency of use of various food items indicated that rice was used as a staple among all the adolescents surveyed. Apart from rice, fats & oils, sugar & jaggery and spices were found to be daily included in the dietaries, as these items were needed in small quantities daily for various preparations. Next to cereal, fish was found to be the food item included in the daily diets of majority of adolescents (97 percent). This was followed by milk (which is mainly used for making coffee/tea) (82 percent families) and vegetables (77 percent families). Consumption of pulses, green leafy vegetables, roots & tubers, fruits

and other foods like meat and egg were found to be included in the daily dietaries of negligible adolescents. Unlike the earlier studies, it was also noted that daily consumption of roots and tubers were found to be poor in these adolescents. They include this food item only thrice or twice in a week in the dietaries. Frequency of use of Green leafy vegetable, meat, fruits and egg was found to be used less frequently in diets of the surveyed adolescents. Comparison of the frequency of use of various foods among the adolescent boys and adolescent girls revealed that frequency of use of pulses, roots and tubers were found to be comparatively more among the adolescent girls as against vegetables, meat, fish and egg among the adolescent boys. Pulses and fruits were medium frequently used foods and green leafy vegetables, meat and egg were low frequently used foods among both the adolescent boys and girls. Other food items were high frequently used items for them.

3 meal a day pattern was generally followed in the families. However, majority of the adolescents in the families take 4 meals per day. This was supported by Dorothy et al. (1980). They had opined that for active teenagers, 3 meals a day is not enough to satisfy their appetite. But Musgrave et al. (1981) reported that most adolescents take only 3 meals a day.

The type of various preparations consumed by the adolescents for the main meals was analysed. The result indicated that cereal preparations such as puttu & uppuma along with tea was the commonly used item for breakfast by majority of adolescents. Among the surveyed adolescents 31 percent consume the same preparation made for breakfast for their lunch. Because they take packed lunch. Others take rice with fish or rice with vegetables for their lunch. Majority of the adolescents take the lunch prepared at home in the evening in addition to the packed lunch. Rest of the adolescents were in the habit of taking tea/coffee with or without some light snacks. Cereal-fish combination/cereal-fish-vegetable combination was consumed for dinner by majority of adolescents. Kardjati et al. (1983) reported that adolescents traditional menu consisted of rice, pulses, vegetables and some visible fats. An analysis of the daily meal pattern of the families surveyed in Trivandrum District indicated that rice, tapioca and fish were common ingredients in the meals (Sujatha, 1990).

Adolescents preferences for various preparation was enquired and it was found that cereal preparations especially puttu and uppuma was found to be the favourite item for both boys and girls. Compared to adolescent girls, adolescent boys preferred rice along with fish and vegetable preparations, for the main meal. Whereas half the adolescent girls

preferred rice with fish alone for lunch. The same trend was observed for dinner also. From the preference pattern of the adolescents for various preparations indicated that mainly cereal based preparations were liked by both adolescent boys and girls. The deep rooted food habits inhabited by the families might have influenced their preferences.

Assessing the preference of adolescents for different cooking methods indicated that deep frying was the most favourite method of cooking for adolescents. This finding coincides with those reported by Sato et al. (1984) and Guweki and Pazola (1981) who had reported that adolescents prefer deep frying. With regard to the type of preparation the adolescents prefer, it was observed that sweet preparation scored the highest. Tuorilla and Kuttanen (1985) supported the above findings. Preference of the adolescents for beverages revealed that majority of adolescent boys preferred tea while majority of adolescent girls prefer coffee. However, it was noted that majority of adolescents in the present study limit their intake of coffee/tea in a day. Chavance and Dumar (1982) reported that the average total weekly consumption of beverages was 7 litres. Prattala (1988) reported that girls used less coffee and soft drinks than boys.

Consumption of snack foods by the adolescent was found to be increased over the past years (Parish, 1971). On analysing the nibbling habit of the adolescents in the present study, it was found that majority of adolescent boys and girls possessed this habit. Musgrave et al. (1981) observed no real differences between girls and boys in snacking pattern.

Taking meals outside the home is a preferred trend in adolescents. However, in this study it was found that majority of the surveyed adolescent boys and all the adolescent girls were not in the habit of taking food from the hotels or restaurants. The economic condition of the respondents may be the limiting factor.

4. Food preference of adolescents

Food preference of the adolescents were assessed. Results indicated that both adolescent boys and adolescent girls liked common cereals like rice and wheat but majority disliked ragi. Bengalgram, peas, redgram, greengram and horsegram were found to be the preferred pulses among the surveyed adolescents. Among these bengalgram and peas were found to be the highly preferred pulses.

It was observed that roots and tubers were found to be highly preferred food items for both adolescent boys and

girls. Since majority of them recorded their 'likeness' to roots & tubers such as tapioca, potato, yam, colocassia, carrot, beet root, sweet potato, coleaus, Dioscorea, lesser yam, small onion and big onion.

The highly preferred vegetables for both boys and girls were found to be ladies finger, cucumber, dolichos beans and bread fruit followed by brinjal, snakegourd, plantain, beans, pumpkin, pappaya, plantain stem, plantain flower and peas. Preference of the adolescents for bitter gourd, ash gourd and ivy gourd was found less compared to other vegetables.

With regard to green leafy vegetables, amaranthus and cabbage were liked by majority of adolescents followed by drumstick leaves and corriander leaves.

Majority of adolescents were found to preferred fruits like banana, tomato, gooseberry, jackfruit, mango, guava, orange, apple, pappaya, pineapple, sapota, dates, sabargilli, cashew fruits and grapes. Not much difference was noticed in the preference for fruits among adolescent boys and girls. The reason for the highest preference for the above fruits may be due to the fact that these fruits are available in plenty during seasons in our State. The fruits like ayani, palm fruit, anona, rose apple, star gooseberry and water melon were also found to be preferred by adolescent boys and girls.

Among the nuts and oil seeds, groundnut, coconut, cashewnuts were equally preferred by both boys and girls.

With regard to milk and milk products, cows milk was highly preferred followed by goats and buffalo milk. Compared to girls adolescent boys prefer goats milk and buffalo milk. Majority of them recorded their 'likeness' for milk products such as curd, butter milk and butter. Both hen's egg and duck's egg was liked by most of the adolescent boys and girls. Fish was also liked majority of adolescents. The most preferred meat among the adolescents was found to be mutton followed by chicken and beef.

From the food preference score it was found that highly preferred foods of both adolescent boys and girls were found to be ducks egg, fruits such as apple, grapes, plantain, sapota, and cashewnuts. Low preferred foods were identified as ragi, raddish, bitter gourd, ivyⁱ gourd, star gooseberry and water melon in both adolescent boys and girls. Commonly used cereals, pulses, vegetables, roots and tubers, green leafy vegetables, milk and milk products, fruits and nuts and oil seeds were found to be their medium preferred foods. Significant difference in the food preference was noted only in very few foods namely horsegram, bitter gourd, ayani and palm fruit. In the present study the influence of factors such as total income of the family, type and size of

family, educational status of the respondents and their parents and the influence of peers were not found to influence on the food preference of the adolescents.

Actual food intake of the adolescents revealed that cereals and fish were met above the RDA suggested by ICMR (1984). Inclusion of pulses were comparatively better in girls than in boys. The inclusion of all the food groups such as pulses, green leafy, vegetables, roots and tuber, fruits and milk were found to be below RDA suggested by ICMR. Inclusion of vegetables and milk was found to be more in adolescent boys than in adolescent girls. Whereas consumption of fruits were better in girls.

The average nutrient intake of the adolescents indicated that the intake of energy was found to be 2354 and 2037 calories respectively in adolescent boys and adolescent girls and the average protein intake was found to be 71.87 and 64.09 respectively. The percentage of RDA met by adolescent boys and girls with regard to calories and proteins was 90, whereas the percentage of RDA met by adolescent girls was 99 percent.

Retinol, riboflavin, calcium and iron were the nutrients, which inadequately met by the adolescents. McNutt and McNutt (1978) when compared to RDA reported that low intake of green leafy vegetables among the adolescents

contributed to the low amount of retinol in the diet. Rao (1966) reported that amounts of vitamin A and riboflavin was found to be inadequate in adolescence. The nutrient which was met least by the adolescents was retinol. The percentage of RDA met with regard to calcium, iron and riboflavin was comparatively better in girls than boys.

5 Assessment of the nutritional status of the adolescents

Anthropometric measurements taken for assessing the nutritional status of the adolescents revealed that the average weight for age of adolescent boys and girls were below the NCHS standard as well as Indian standards. Deficit in body weight was reported among the rural and urban adolescents of low socio-economic status by NIN (1990). Pant and Solanki (1989) reported that the mean height and weight of adolescent boys were far below the NCHS standard. Classification of adolescent boys and girls according to the degree of malnutrition indicated that the percentage of adolescent boys suffering from Grade I and Grade II malnutrition were more when compared to the adolescent girls. Moreover 24 per cent of adolescent girls were found to be normal.

Height for age profile revealed the same trend. Height for age profile of the adolescents indicated that the average height for age of adolescent boys and girls were far below the NCHS standard and Indian standard. Vijaya Raghavan et al.

(1971) reported that well-to-do Indian children were found to be taller and heavier than the children belonging to lower income group of corresponding ages. The reason for low income group children lagging behind the well-to-do group in growth is obvious that these underprivileged children are constantly exposed to severe nutritional, social and environmental strains as revealed in several studies (Madhavan et al., 1967), Ramachandran et al. (1968), Sha and Udani (1968).

According to the classification suggested by Mclareas for height for age it was observed that none of them were found to be dwarf. Compared to adolescent boys and adolescent girls were found to have normal height for age.

Body mass index (BMI) of children indicated that majority of boys and girls were below the normal range of BMI. Only 18 percent girls and 6 percent boys had normal BMI. It can be inferred that none of the surveyed adolescents were obese.

Clinical examination was the most effective measure to find out the nutritional deficiencies among individuals. Clinical assessment revealed that anaemia was observed in 30 percent adolescent girls while the occurrence was only 20 percent boys. Pigmentation skin, bleeding of gums, night blindness, angular stomatitis mottled enamel are the other deficiencies seen in adolescents. Gupta and Saxena (1977)

reported that vitamin A deficiencies, anaemia and vitamin B complex deficiencies were noted among the adolescents. Apart from the deficiency disease teeth caries was also observed in the surveyed adolescents. High incidence of dental caries was reported from Kerala (NNMB, 1984). Pant and Solanki (1989) reported the occurrence of dental caries in adolescents.

Haemoglobin levels of the adolescents indicated that only small percentage of adolescent boys and girls were found to have normal haemoglobin levels. Compared to girls more boys were found to have normal haemoglobin level. Weiner et al. (1980) reported that mean haemoglobin levels of adolescents were found to low. Saini and Verma (1989) reported that the mean haemoglobin value of girls from low socio-economic group varied from 9.4 to 10.68 g/100 ml.

Nutritional status index computed revealed that in the present study nutritional status of adolescent girls were better than the adolescent boys in age groups 16, 17 & 18.

SUMMARY

SUMMARY

A study entitled "Food preference and dietary habits of adolescents among agricultural labourer families" was undertaken among 100 Agricultural labourer families of Trivandrum District.

The socio-economic background, personal characteristics, personal characteristics, dietary habits, food consumption pattern, food preferences, anthropometric, clinical, biochemical investigations and nutritional status of the adolescents were assessed.

The analysis of data on socio-economic background of the adolescents revealed that majority of the families belonged to Hindu community and majority of them were from under privileged communities. Nearly 50 percent families studied were medium sized with 5 to 7 members. In majority of families 1-2 adult members and 3-4 children were found. None of the adolescents surveyed were illiterate. In most of the families father was the main bread winner and half of the respondents mothers were economically dependent. Nearly 50 percent of the families were found to have an income only below Rs.800/month. Majority of the families were in the per capita income ranging from 100 to 200.

On analysing the personal characteristics of adolescents it was observed that adolescent boys were more interested in reading newspapers, while girls were found to be interested in reading magazines/weeklies. Listening to the radio programmes were found to be more popular among the adolescents than the viewing of television. Adolescent boys enjoy sports and game activities more than adolescent girls while both adolescent boys and adolescent girls enjoy gossiping with their friends. In the present study majority of adolescent boys and girls were not found to participate in the activities of various organizations. Unhealthy habits such as smoking, drinking, drug addiction etc. were found to be absent among the studied adolescents.

Dietary habits and food consumption pattern of the families surveyed indicated that all the families surveyed and all the adolescents under study were non-vegetarians. Majority of the families spent 51-90 percent of their income for food and they allocate more money for the purchase of cereals, which was followed by vegetables, fish, pulses, green leafy vegetables, fruits and sugar and jaggery. Cereals, vegetables, roots and tubers, milk, fish, fats & oils, sugar & jaggery and spices were high frequently used foods, among the adolescents whereas pulses and fruits were medium frequently used foods and green leafy vegetables, meat and egg were low frequently used foods of both adolescent boys

and girls.

Adolescents were found to prefer cereal based preparations. Frying was the most favourite method of cooking for adolescents and they preferred sweet preparation more than other preparations. Most of the adolescent boys and adolescent girls possessed nibbling habit. Highly preferred foods among the adolescents were egg, apple, grapes, plantain, sapota and cashewnuts and low preferred foods were ragi, raddish, bitter gourd, Ivy gourd, star gooseberry, watermelon etc. Commonly used cereals, pulses, vegetables, roots & tubers, green leafy vegetables, milk and milk products, fruits and nuts and oil seeds were found to be their medium preferred foods. Food preference of adolescent boys and girls were not found to vary very much, and factors such as total income of the family, type and size of family, educational status of adolescents and their parents and the peers were not found to influence the food preferences of the adolescents.

Actual food intake of the adolescents indicated that the intake of cereals and fish were met above the Recommended dietary allowances. Foods, belonging to all the other food groups were found to met insufficiently. With regard to the nutrient intake of adolescent boys and girls protein, energy, thiamine and niacin were found to be met above 90 percent

of recommended dietary allowances apart from vitamin C in adolescent girls.

Anthropometric measurements of the studied adolescents indicated that weight for age and height for age of adolescents boys and girls were below the NCHS standard as well as the Indian standards. The percentage of adolescent boys suffering from Grade I and Grade II malnutrition were more when compared to the adolescent girls. Clinical examination of the adolescents revealed that anaemia, pigmentation of skin, dental caries were the most common clinical manifestation in both boys and girls. Compared to girls more boys were found to had normal haemoglobin level. Nutritional status index computed revealed that, nutritional status of adolescent girls were better than adolescent boys.

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* Original not seen

APPENDICES

APPENDIX I

Kerala Agricultural University
Department of Home Science, Vellayani

Name of investigator: Mony E. Paul

Food preference and dietary habits of Adolescents in
Agricultural labourers family

Schedule to collect socio-economic and personal characteri-
stics of adolescents

1. Name of the respondent:
2. Name of the Head of the family:
3. Full address:
4. Religion:
5. Caste:
6. Type of family:
7. Family size (O.N):
8. Family size:
9. Number of adults in the family:
10. Number of children in the family:
11. Educational status of father:
12. Educational status of mother:
13. Educational status of respondent:
14. Current educational status of the respondent:
15. Employment status of father:

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16. Employment status of mother:
 17. Employment status of respondent:
 18. Total number of members employed in your family:
 19. Income from your job (0 no.)/month:
 20. Income from your job (range)/month:
 21. Income from fathers job/month (0 no.):
 22. Income from fathers job/month (range):
 23. Income from mothers job/month (0 no.):
 24. Income from mothers job/month (range):
 25. Income from domestic animals:
 26. Income from farm products:
 27. Total family income/month (0 no.):
 28. Total family income/month (range):

Personal characteristics of the respondent

29. Reading news papers:
30. Reading weeklies/magazines:
31. Viewing T.V:
32. Writing articles:
33. Type of leisure time activity:
34. Your hobby:
35. Number of friends:
36. Membership in any organisation:
37. Participation in organisation:
38. Details regarding the unhealthy habits of the respondent:

APPENDIX II

Kerala Agricultural University
Department of Home Science, Vellayani

Food preference and dietary habits of Adolescents in
Agricultural labourers family

Schedule to collect dietary characteristics of adolescents

39. Eating pattern of your family:

40. Eating pattern of respondent:

Food expenditure pattern of the family in
percentage of total monthly income

41. Cereals (0 no.):

42. (%)

43. Pulses (0 no.):

44. Pulses (%)

45. Vegetables (0 no.):

46. " (%)

47. Green leafy vegetables (0 no.):

48. " (%)

49. Roots and tubers (0 no.):

50. " (%)

51. Fruits (0 no.):

52. Fruits (%)

53. Egg (0 no.):

- 54. Egg (%)
- 55. Meat (0 no.):
- 56. Meat (%)
- 57. Fish (0 no.):
- 58. Fish (%)
- 59. Fats & oils (0 no.):
- 60. " (%)
- 61. Sugar & jaggery (0 no.):
- 62. " (%)
- 63. Spices (0 no.):
- 64. " (%)
- 65. Bakery items (0 no.):
- 66. " (%)
- 67. Beverages (0 no.):
- 68. Beverages (%)

Frequency of using different foodstuffs

- 69. Cereals:
- 70. Pulses:
- 71. Vegetables:
- 72. Green leafy vegetables:
- 73. Roots & tubers:
- 74. Fruits:
- 75. Milk:
- 76. Fish:

- 77. Meat:
- 78. Egg:
- 79. Fats & oils:
- 80. Sugar & jaggery:
- 81. Spices:

Food preparations commonly used

- 82. Breakfast:
- 83. Preparation you like most:
- 84. Lunch:
- 85. Preparations you like most:
- 86. Evening Tea:
- 87. Preparations you like most:
- 88. Dinner:
- 89. Preparations you like most:
- 90. Preference for foods prepared by different cooking methods:
- 91. Preference for type of preparations:

Meal pattern of the respondent

- 92. Number of times you eat in a day:
- 93. Nibbling habit of respondent:
- 94. Food you eat during inbetween meals:
- 95. Your preference for beverages:
- 96. Type of food you take from outside:
- 97. Frequency of taking beverages:

APPENDIX III

Kerala Agricultural University
Department of Home Science, Vellayani

Food preference and dietary habits of Adolescents in
Agricultural labourers family

Schedule to collect food preferences of adolescents

	<u>Extremely liked</u>	<u>Liked</u>	<u>Not liked that much</u>	<u>Not at all liked</u>
1. Rice				
2. Wheat				
3. Ragi				
4. Peas				
5. Blackgram				
6. Redgram				
7. Greengram				
8. Horsegram				
9. Amaranthus				
10. Drumstick leaves				
11. Cabbage				
12. Corriander leaves				
13. Curry leaves				
14. Tapioca				
15. Potato				
16. Yam				

	<u>Extremely</u> <u>liked</u>	<u>Liked</u>	<u>Not liked</u> <u>that much</u>	<u>Not at</u> <u>all liked</u>
17. Colocassia				
18. Carrot				
19. Beet root				
20. Sweet potato				
21. Raddish				
22. Coleaus				
23. Dioscorea				
24. Lesser yam				
25. Small onion				
26. Big onion				
27. Bhindi				
28. Cucumber				
29. Brinjal				
30. Bitter gourd				
31. Ash gourd				
32. Snake gourd				
33. Plantain				
34. Beans				
35. Pumpkin				
36. Ivy gourd				
37. Dolichos beans				
38. Bread fruit				
39. Pappaya				

<u>Extremely</u>	<u>Liked</u>	<u>Not liked</u>	<u>Not at</u>
<u>liked</u>		<u>that much</u>	<u>all</u>
			<u>liked</u>

40. Plantain flower

41. Plantain stem

42. Peas

43. Nenthran

44. Tomato

45. Indian gooseberry

46. Jack fruit

47. Mango

48. Guava

49. Orange

50. Apple

51. Pappaya

52. Pineapple

53. Sapota

54. Ayani

55. Palm fruit

56. Anona

57. Rose apple

58. Star gooseberry

59. Watermelon

60. Dates

61. Sabargil

62. Cashew fruit

	<u>Extremely</u> <u>liked</u>	<u>Liked</u>	<u>Not liked</u> <u>that much</u>	<u>Not at</u> <u>all</u> <u>liked</u>
63. Grapes				
64. Small banana				
65. Groundnut				
66. Gingelly				
67. Coconut				
68. Cashewnut				
69. Goat's milk				
70. Cow's milk				
71. Buffalo milk				
72. Curd				
73. Butter milk				
74. Butter				
75. Hen's egg				
76. Duck's egg				
77. Fish				
78. Beef				
79. Chicken				
80. Mutton				

APPENDIX V

KERALA AGRICULTURAL UNIVERSITY

Department of Home Science

Food preference and dietary habits of Adolescents in
Agricultural labourers family

Nutrition Assessment Schedule

Serial No.

Name of the Respondent:

Age:

Anthropometry

- | | |
|-----------|-----------|
| 1. Height | 2. Weight |
|-----------|-----------|

Clinical Examination

- | | |
|----------------------------------|----------------------------|
| 1. Parotid enlargement | 13. Dermatitis |
| 2. Oedema | 14. Pellagra |
| 3. Emaciation | 15. Pigmentation at skin |
| 4. Marasmus | 16. Phrynoderma |
| 5. Conjunctival xerosis | 17. Koilonychia |
| 6. Bitot's spots | 18. Gums-spongy, bleeding |
| 7. Corneal xerosis/Keratomalacia | 19. Epiphyseal Enlargement |
| 8. Night blindness | 20. Beading of ribs |
| 9. Photophobia | 21. Bow legs |
| 10. Anaemia | 22. Teeth caries |
| 11. Angular stomatitis | 23. Mottled enamel |
| 12. Cheilosis | |

24. Enlargement of spleen

25. Enlargement of liver

Soft

Firm

Hard

26. Thyroid enlargement

APPENDIX VI

Haemoglobin cyanmethaemoglobin method

Principle:

Haemoglobin is converted into cyanmethaemoglobin by the addition of potassium cyanide and ferricyanide. The colour of cyanmethaemoglobin is read in a photoelectric calorimeter at 540 nm against a standard solution. Since cyanide has the maximum affinity for haemoglobin, this method estimates the total haemoglobin.

Reagent:

Drabkin's solution: Dissolve 0.05 g of potassium cyanide, 0.2 g of potassium ferricyanide and 1 g of sodium bicarbonate in one litre distilled water.

Procedure:

20 ml of blood are measured accurately from a haemoglobin pipette and delivered on to a whatman No. 1 filter paper disc. The filter paper is air dried, labelled and can be stored upto one week. The portion of filter paper containing the blood is cut and dipped in 5 ml, Drabkin's solution taken in a test tube. Wait for 30 minutes and mix the contents on a vortex mixture and take the readings.

Construction of standard curve

If the blood drawn from the subject contains haemoglobin 15 g/dl after estimation then prepare three reference standards as follows.

1. Reference standard A.

4 ml blood in 1000 ml Drabkin's reagent contains haemoglobin 15 g/dl.

2. Reference standard B.

300 ml of reference standard A + 200 ml Drabkins reagent contains haemoglobin concentration of 10 g/dl.

3. Reference standard C.

200 ml of reference standard A and 300 ml Drabkins reagent contains a haemoglobin concentration of 7.5 g/dl.

Thus we have three reference standards at three levels of haemoglobin concentration. 5 ml from each standard whenever haemoglobin estimations are done.

APPENDIX VII

Formulae for making food use frequency Table

$$\text{Score} = \frac{R_1 S_1 + R_2 S_2 \cdot \cdot \cdot + R_n S_n}{n}$$

S_n = Scale of rating

R_n = Percentage of respondents selecting a rating

n = Maximum scale rating

APPENDIX VIII

Food preference score of adolescent boys and girls

	A.B	A.G		A.B	A.G
Rice	66	66	Cucumber	68	68
Wheat	66	66	Brinjal	61	54
Ragi	35	38	Bitter gourd	39	42
Peas	66	66	Ash gourd	43	51
Bengalgram	72	70	Snake gourd	59	64
Redgram	66	66	Plantain	55	62
Greengram	60	57	Beans	55	67
Horsegram	56	47	Pumpkin	60	52
Tapioca	68	69	Ivy gourd	40	36
Potato	65	69	Dolichos beans	62	67
Yam	67	62	Bread fruit	73	74
Colocassia	65	69	Pappaya	60	66
Carrot	61	65	Plantain flower	58	54
Beet root	63	54	Plantain stem	70	62
Sweet potato	69	61	Peas	56	56
Raddish	38	28	Amaranthus	68	65
Coleaus	66	68	Drumstick leaves	60	53
Diascorea	66	68	Cabbage	63	68
Lesser yam	66	62	Corriander leaves	76	76
Small onion	66	66	Curry leaves	54	53
Big onion	65	68	Goat's milk	52	54
Ladies finger	68	68			

	A.B	A.G
Cows milk	65	60
Buffalo milk	26	13
Curd	70	70
Butter milk	81	76
Butter	73	66
Hen's egg	76	80
Duck's egg	90	90
Fish	68	68
Beef	70	72
Chicken	60	61
Mutton	66	66

	A.B	A.G
Banana	84	82
Tomato	66	70
Gooseberry	62	83
Jack fruit	68	65
Mango	68	65
Guava	66	66
Orange	66	66
Apple	83	81
Papaya	65	66
Pineapple	66	66
Sapota	83	83
Ayani	40	87
Palm fruit	58	38
Anona	44	55
Rose apple	52	62
Star gooseberry	36	41
Watermelon	32	29
Dates	70	70
Sabargil	76	74
Cashew fruit	66	70
Grapes	83	83
Plantain	83	83
Groundnut	66	66
Gingelly	60	53
Coconut	66	66
Cashewnut	100	100

APPENDIX IX

Nutritional status index of adolescent boys

	Age	Weight (kg)	Height (cm)	Haeglm	BMI	Nutritional status
1.	16	45	158	12.86	19.08	36.8
2.	16	50	162	10.62	16.89	35.6
3.	16	49	171	14.51	14.67	35.2
4.	16	38	161	11.00	16.61	35.2
5.	16	42	161	12.44	14	34.3
6.	16	34	157	10.89	16	34.5
7.	16	34	145	11	18	35.7
8.	16	45	158	14	17.6	35.6
9.	16	45	160	8.6	15.8	34.0
10.	16	36	151	8.9	15.8	36.3
11.	16	39	157	11.7	17.8	35.5
12.	16	40	150	10.68	14	34.1
13.	16	36	162	9.23	14.67	33.6
14.	16	33	150	9.77	19.53	36.16
15.	16	50	160	8.49	17.30	34.7
16.	16	41	154	11	15.2	34.6
17.	16	38	158	14.98	15.56	35.34
18.	16	35	150	8.68	14.16	33.5
19.	16	34	155	14.98	15.6	35.4
Average		39.6	156.4	11.38	16.21	37.05
20.	17	35	150	10.16	20.5	36.6
21.	17	45	148	9.2	19.5	37.6

	Age	Weight (kg)	Height (cm)	Haeglm	BMI	Nutritional status
22.	17	50	160	12.02	19.6	37.4
23.	17	43	148	15.01	17.46	37.4
24.	17	44	159	8.49	17.55	37.6
25.	17	46	162	12.32	17.6	37.9
26.	17	15	160	12.3	17.6	36.5
27.	17	41	164	10.2	15.2	37.3
28.	17	46	166	10.3	16.7	35.9
29.	17	50	158	11.3	20	36.7
30.	17	50	158	10.6	20	38.0
31.	17	50	175	8.4	16.3	37.9
32.	17	43	167	14.78	15.41	36.5
33.	17	40	155	11.73	16.67	37.2
Average		45.6	160	11.12	16.5	37.18
34.	18	45	165	8.29	16.57	37.6
35.	18	45	170	9.20	15.57	37.5
36.	18	45	162	9.33	17.18	37.9
37.	18	50	162	14.56	19.08	39.9
38.	18	44	159	12.79	17.46	38.7
39.	18	45	163	8.49	16.91	37.6
40.	18	43	152	13.34	18.69	39.1
41.	18	40	160	11.73	15.6	37.7
42.	18	40	166	11.77	14.5	37.5

	Age	Weight (kg)	Height (cm)	Haeglm	BMI	Nutritional status
43.	18	44	166	9.89	14.54	37.7
44.	18	49	167	9.89	16	38.4
45.	18	44	166	9.85	17.56	37.9
46.	18	53	172	11.11	15.9	39.6
47.	18	50	170	13.61	17.9	38.8
48.	18	53	171	11.73	17.3	38.8
49.	18	40	162	10	18.2	37.9
50.	18	55	172	12.75	15.27	40.1
Average		47	165	11.27	16.8	38.40

Nutritional status index of adolescent girls

	Age	Weight (kg)	Height (cm)	Haeglm	BMI	Nutritional status
1.	16	45	148	11.69	20.6	47.9
2.	16	45	148	9.78	20.6	47.1
3.	16	43	155	10.13	17.9	47
4.	16	37	145	11.68	17.6	47.1
5.	16	42	158	8.29	16.8	46.2
6.	16	40	148	8.92	18.3	46.2
7.	16	35	151	10.8	15.4	46.5
8.	16	35	157	8.72	14.2	45.7
9.	16	34	147	10.17	15.7	46.1
10.	16	41	155	10.52	17.08	47
11.	16	34	153	8.96	14.2	45.6
12.	16	50	151	9.7	21.9	47.6
13.	16	41	153	10.01	17.5	46.8
14.	16	35	150	8.33	15.6	45.5
15.	16	37	147	8.3	17.1	45.7
16.	16	35	154	9.27	15.35	45.9
17.	16	35	153	8.5	14.9	45.5
18.	16	30	146	8.9	14.1	45.2
19.	16	47	150	8.6	20.8	46.7
20.	16	36	150	8.2	16	45.5
21.	16	30	142	11.1	14	45.9
22.	16	35	149	8.7	14.8	45.1

	Age	Weight (kg)	Height (cm)	Haeglm	BMI	Nutritional status
23.	16	35	148	9.5	15.8	45.9
24.	16	35	140	11.34	17.8	46.7
25.	16	35	153	12.4	15.9	47.1
26.	16	35	154	10.21	14.5	45.8
27.	16	40	153	11.14	18	47.6
28.	16	40	153	16.2	15.6	47.3
Average		38	150	9.85	16.7	48.01
29.	17	48	140	12.44	24.5	50.7
30.	17	50	152	10.4	21.6	49.9
31.	17	40	147	9.85	18.5	48.7
32.	17	42	147	11.14	19.4	49.4
33.	17	39	153	8.72	16.7	48.1
34.	17	42	158	10.59	16.8	49.17
35.	17	45	156	12.87	18.52	50.4
36.	17	43	153	8.5	18.4	48.4
37.	17	35	150	8.49	15.6	47.6
38.	17	35	150	8.25	15.6	47.5
39.	17	42	160	10.7	16.5	47.5
40.	17	39	150	12.4	17.3	49.2
41.	17	43	154	12.39	18.14	49.6
42.	17	44	144	12.4	20	50.01
43.	17	37	158	14.6	14.8	50.16
44.	17	40	150	12.8	17.1	50.32
Average		42	151	9.8	18.1	49.33

	Age	Weight (kg)	Height (cm)	Haeglm	BMI	Nutritional status
45.	18	43	140	8.7	21.9	50.66
46.	18	50	155	10.7	21.7	52.25
47.	18	48	151	8.9	21.1	51.17
48.	18	43	152	4.9	18.6	51.05
49.	18	50	162	8.49	18.9	51.13
50.	18	48	155	11.77	14.8	51.23
Average		46	152	9.8	19.5	51.25

FOOD PREFERENCE AND DIETARY HABITS OF
ADOLESCENTS AMONG AGRICULTURAL LABOURERS

By

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ABSTRACT OF A THESIS

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ABSTRACT

A study entitled "Food preference and dietary habits of adolescents among agricultural labourer families" was undertaken to assess the socio-economic, personal characteristics, food consumption pattern, food preferences and the nutritional status of adolescents boys and girls.

Majority of the families surveyed belonged to Hindu community and were under privileged. The families were nuclear type with medium size. Father was the main bread winner and major share of the income was earned by the male member. The per capita income of majority of families were found to be between 100 to 200. All the surveyed adolescents were found to be well educated.

All of the surveyed adolescents were non-vegetarians. Cereals, vegetables, roots and tubers, milk, fish, fats and oils, sugar & jaggery and spices were found to be high frequently used foods among the adolescents. Pulses and fruits were medium frequently used foods. Green leafy vegetables, meat and egg were low frequently used foods among them. Cereal based preparations were liked by both adolescent boys and girls. They liked fried foods and sweet preparations. Adolescents most preferred foods were found to be egg, apple, grapes, plantain, sapota and cashewnuts and low preferred foods were ragi, raddish, bittergourd,

ivy gourd, star gooseberry and watermelon. Food preference of adolescent boys and girls were not found to vary very much. Factors such as total income of the family, type and size of family, educational status of adolescents and their parents, and the influence of peers were not found to influence the food preferences of the studied adolescents.

Consumption of cereals, and fish met above the recommended dietary allowances (RDA), and nutrients such as protein, energy, thiamine and niacin was met above 90 percent of RDA in adolescent boys and girls apart from vitamin C in adolescent girls.

Weight for age and height for age of the adolescents were below the NCHS standard as well as Indian standards. Anaemia, pigmentation of skin, dental caries were the most common clinical manifestations in both adolescent boys and girls. Normal haemoglobin level was observed only in negligible adolescents. Nutritional status of adolescent girls were found to be better than adolescent boys in the present study.