MANAGEMENT SPONSORED

MINOR RESEARCH PROJECT

NUTRITIONAL STATUS OF ADOLESCENT GIRLS

By

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Lecturer in Microbiology

Submitted to

The Research Committee

HINDU COLLEGE, GUNTUR

January 2022

DECLARATION

We hereby declare that the **Management, Hindu College, Guntur** sponsored Minor Research Project titled **NUTRITIONAL STATUS OF ADOLESCENT GIRLS** comprises of our own and original work. It has not been submitted fully or partially to any other institution or organization and is not published.

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CERTIFICATE

Certified that this is a genuine and bonafide work done by **G. SWARNA LATHA,** Lecturer in Microbiology with the Minor Research Project titled **NUTRITIONAL STATUS OF ADOLESCENT GIRLS** sanctioned by **Management, Hindu College, Guntur**.

Principal

Hindu College, Guntur

ACKNOWLEDGEMENTS

At the outset I express my sincere gratitude to the **Management, Hindu College, Guntur** for sanctioning me a Minor Research Project on this fertile area and for their continued inspirational support in pursuing research work.

My sincere thanks are due with Sri Ch. Ramakrishna Murthy, Secretary & Correspondent, Hindu College Committee for having sponsored this project and their encouragement and support throughout this endeavor for their academic advice and encouragement.

I express my gratitude to Sri P.M PRASAD, Principal of the College, Dr. J. Umamaheswara Rao, Director, Allied Science Courses and the colleagues of the Department of Microbiology and Biomedical Sciences for their constant help and encouragement.

G Swarna Latha

(G. SWARNA LATHA)

PREFACE

The nutritional status of adolescents is often measured in terms of weight-for-weight expressed as body mass index [BMI. No international data exists, however the sorted data available indicates that the average BMI among 11-18 year olds is considerably lower in the developed world than in industrialized countries. The majority of rural children enter adolescense with poor nutritional status.

Various issues [Joshi et al 1990; Roo et al 1998 a, 2000 b; kanade et al [1999] related to adolescent growth of rural children from six villages near pune in the longitudinal study carried out during 1992-98. It was observed that children who were under weight as well as stunted near take off have significantly lower attained values of weight and height as compared to their normal counter part through out adolescense. Infact the differences at the start [11 year age] in weight [4kg] and height cm almost increased to 12 kg and 10 cm by adulthood. Entering adolescense with poor nutritional status thus tampers the capacity catch up growth and effects final adult size. Joshi et al, [1998].

The present study was planned with the following objectives.

1. In study the eating patterns and food habits of adolescent girls.

2 To assess the effects of the low nutritional status of adolescent girls.

The review divided into different sections for better understanding of the problem.

SECTION -1- Food habits and eating patters of adolescent girls

SECTION - II - Growth pattern of adolescent girls

SECTION - III - Food intake and Nutritional status of Adolescent girls.

SECTION - IV - Nutritional status, deficiencies - and its relating to future Mother hood.

CONTENTS

INTRODUCTION

The word 'adolescense' has its origin from a Latin word ' adolescere" which means to ,grow or ‘grow to maturity.' and adulthood. It is the process of development from childhood to maturity and adulthood. Its period beginning with the appearance of secondary sex characteristics and terminating with the cessation of sonmatic growth. Adolescense comprises nearly half of the total growth period of human life. It has itsbeginning of the total growth period of human life) by about 10 to 12 years in boys and girls[Nelson. 1975]. WHO detined adolescense as the period between 10 to 19 years while in India it has been defined as the period between 10 to 18 years [NIPCCD, 1989]

[CEDPA, 1989] This is implementing the better life option programme for adolescents in India. India has one of the fastest growing youth populations in the world, with an estimated 190 million adolescent girls of 10 years of age. They comprise one quarter of India's rapidly growing populations. It alsO report that girls are caught in the cycle of early marriages, repeated pregnancy and poverty.

Studies conducted by Tanner [1962] Vijayaraghavan etal, [1971] Vir[19901 have shown that adolescense is a crucial phase of growth, since it offers the second and last chance for the catch up growth in the life of girls. In India on the basis of the available growth data. It is estimated that 14% adult women in the reproduction period have body weight less than 14% adult woman in the reproductive period have body weight less than 38 kg and 16.6 percent have height less than 145 cms. Adolescense comprises nearly half of the growing period in man with the beginning of adolescense. Growing rate rises sharply until a peak is reached which then is followed by a decline. Adolescent growth sport is a characteristic phenomenon and height and weight increase, there are significant variations between the sexes in the process of growth and development.

On an average girls begin the adolescent growth spurt between the ages of 10 and 12 years. While the male growth spurt generally beings 1 Vz to 2 years later between 12 and 14 years of age. The velocity of growth rate at which growth process is greater in males than in females during adolescense.

The ICMR [1972] conducted a cross sectional study of 1,27,866 children aged 1-21 years belonging to different socio economic clases in the results as, related to the Growth of adolescent girls, indicate that form 16-18 years. The Average Indian girlsgain 23.3 cms in height and 18.8 by weight and much of this growth between 10 and 15 years.

Swaminathan[1964] states that in india the diet of a large majority of the Population & predominantly of cereals and to lacking in the protein rich and protective foods. The intake of nutrients such as energy, protein, Vitamin A, Iron are much Below the RDA..

[ICMR 1982] human nutritional requirements are dependent on age and sex. The nutritional requirement of females differ from males in certain important respects During

certain age periods. The nutrient requirement s of woman are lower than in Men. Since the growth rate during adolescence and adult body weight attained are Lower in woman than men.

Carrison[1963] studied the health of people in different sections of india and Showed greater differences in stature and well being which were attributed to diet. The findings of Macdonals[1983]; stoz and waiter [1983] indicated that the adolescence group classically exhibits poor eating habits particularly in comparison to their male counter part. Since many of the girls want to loose weight and are attracted to fad diets. this is attributed to their concern than with their concern than with their body appearance.

Eating between meals is reported to be common among teenagers. Cookies, Fruit, milk, soft drinks and candy were the five most frequently consumed food Categories. Food intake of working and non working adolescents reveled that the Working adolescents were likely to eat the evening meal away from home. They were likely to include a sand-witch type food and less likely to include a vegetable other than potatoes at the evening meal, than were the non working teenagers. [Skinner et al, 1984]

A food consumption survey by borit [1965]. On 283 people revealed that diets were poor in low income groups cassel [1957] found that extreme poverty is one of the main factors responsible for the inadequacy of the diet of people.

Social status attributed to certain foods may be much more important to people Than any nutritive value it contains. Devadas [1968] stated that prestige demands that one should have rare and costly items of foods. Foods which are in abundance and are cheap like greens and papaya are regarded with disdain. Prestige also stands in the way of accepting new practices and a stimulant to change food habits.

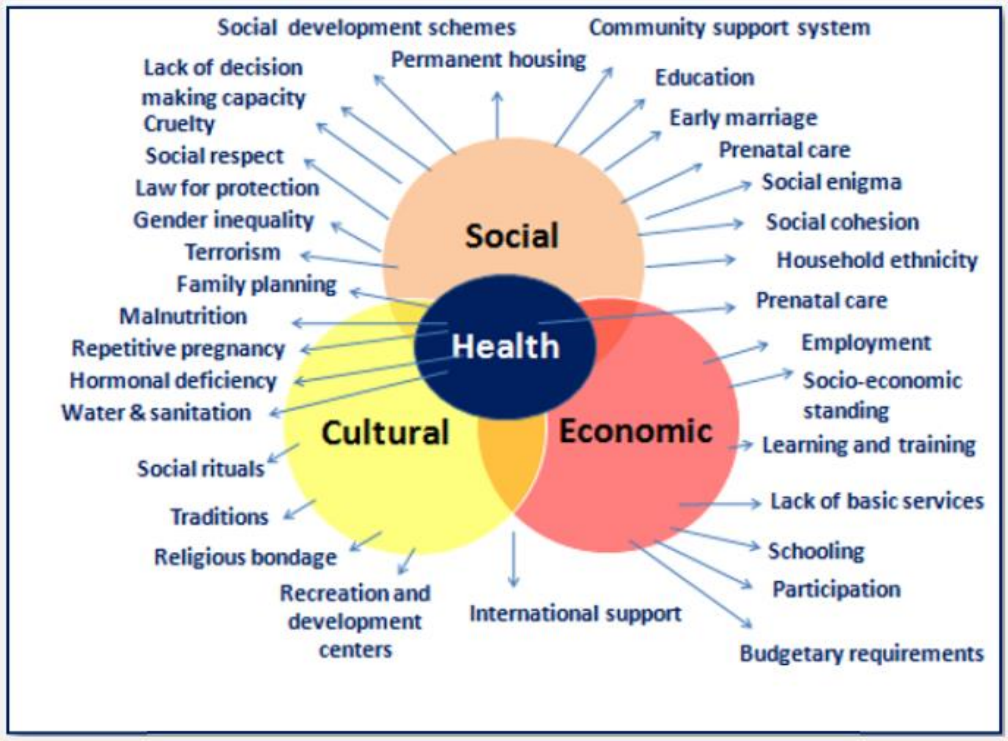
Leverton [1960] observed some superstitions and prejudices that there is a danger when protein are avoided some of superstitions are:

- Milk is the only food for children
- Milk eaten with fish is harmful
- Meat is hard on kidney.

Mecdonald et al [1983]attempted to identify the variables that differentiate between adolescent girls with poor dietary intakes and those with good dietary intakes. It was hypothesized that those with poor diets would be less active, have lower self esteem and a larger body image perception.

Storz et al[1983] also studied body weight and body image and in addition the perceived destrability of fad diet among adolescent girls. Most were within or below the average range for body weight yet most wanted to loose weight and expressed dissatisfaction with their own physique. Most of the subjects rated more healthy methods of weight reduction higher than fad diets but many nevertheless reported that they had one or more fad type diets. The low energy crash diet was second in popularly only to an exercise programme.

A US study shoed that female adolescents generally did not tend to increase energy intake with increasing age. Consequently many female adolescents were unable to meet the energy and nutrient requirements for optimal growth at this crucial part of their life. The study showed that for female adolescents there was a general increase in food intake with age and most were able to meet their energy and nutritional requirements throughout adolescent period. Data form the Australian bureau of statistics [1995], revealed similar trends energy intake for boys increased by 17 % from 11590 kg to 15530 kg between the ages of 12-15 years and 16-18 years and in contrast, the energy intake reported by girls increased for age group.



Disease diagnosis

Studies by WHO(1994) NFHS(1998-99) ICRW(1990) have shown that adolescense is the second most critical period of physical growth in the life cycle after the first year. Twenty five percent of adult height is attained during adolescense. For many adolescents, inadequate quality and quantity of food are the prime determinants of nutrition problems. In young girls in India anaemia is one of the primary contributors to the maternal mortality (20-25%) Fifty six percent of adolescent girls are anaemic. Twenty seven percent of adolescents in the developing countries are anaemic. The International center for Research on women(ICRW) studies documented high rates in India 55%o, Nepal 42%, cameroon32%.

A survey conducted by (ICMR 1989) and (N.I.N 2000) confirm the high prevalence of anaemia among adolescent girls. The prevalence of anaemia was 54.9% among adolescent girls in the age group of 15-19 years. A recent survey conducted by (N.I.N 2000) in Mehabubnagar district of Andhra pradesh also revealed high prevalence of anaemia 91.8% among adolescent girls, indicating the gravity of the problem of anaemia among this group is high.

There is some evidence that micronutrients may enhance statural growth in adolescents., even after the growth spurt, height gain was observed, for instance, in pregnant Nigerian adolescents, and it was associated with iron and folate and folate supplementation (Harrison etal,1985). There is also evidence from supplementation trials that marginal zinc status may limit skeletal growth in Adolescents (King 1996). In Chile, zinc supplements increased height in stunted pre-adolescent and adolescent boys, but not girls(Castillo-Duran 1994). In crisis situation over long periods of time, adolescents may be seriously affected by malnutrition and yet, have little access to supplementary or therapeutic feeding programmes.

Stunting is commonly observed among adolescents in populations with a high rates of malnutrition. It was highly prevalent in the adolescents 9 out of 11 ICRW studies ranging from 27% to65%(Kurg, welch 1994) chronic undernutrition is responsible at adolescense for delayed growth and maturation; magnified obstetrie risk, and reduced work capacity. Stunting was highly prevalent in adolescent boys and girls ranging from 32% in India to 65% in Philippines.

Vitamin A deficiency is not only a problem in young children; but it has been reported in pregnant women, and it is associated with excess maternal mortality (West et al 1999). Sub clinical vitamin A deficiency may also be widespread among adolescents. In Malawi, low serum retinal was observed in 27% of rural adolescent girls. [Fazio-Tirrozzo etal 1998]

Calcium requirement are greater during adolescense since it is the period of peak bone mass increase [Rees 1989] up to 37% may be accumulated during the growth spurt of adolescense [key et al 1994]. There is some evidence of continuing bone acquisition after the adolescent growth spurt and consumption of dairy products was reported to be associated with higher bone mass and density in Caucasian adolescent girls Necket et al [1992]. Adolescent diets are often inadequate in calcium. USA, particularly in girls, Osteoporosis was considered as relatively animportant problem in developing countries.

OBJECTIVES:

The present study was planned with the following objectives.

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REVIEW OF LITERATURE

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Various issues [Joshi et al 1990; Roo et al 1998 a, 2000 b; kanade et al [1999] related to adolescent growth of rural children from six villages near pune in the longitudinal study carried out during 1992-98. It was observed that children who were under weight as well as stunted near take off have significantly lower attained values of weight and height as compared to their normal counter part through out adolescense. Infact the differences at the start [11 year age] in weight [4kg] and height cm almost increased to 12 kg and 10 cm by adulthood. Entering adolescense with poor nutritional status thus tampers the capacity catch up growth and effects final adult size. Joshi et al, [1998].

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SECTION - I FOOD HABITS AND EATING PATTERN OF

ADOLESCENT GIRLS.

Eating disorders rank as the third most common chronic illness in adolescent females, with an incidence of up to 5% the prevalence has been increased dramatically over the past three decades. [Kreipe et al 2000].

Beeuwakes [1960| stated that choice of food is determined by economic, social and psychological factor individually or in combination, Devadas [1960] reported that income, family size, caste, urbanization, religion, customs, beliefs, culture, taste etc influence the food intake.

A food consumption survey by borit[1965] on 283 people revealed that diets were poor in the low income groups. Cassel [1957] found that extreme poverty is one of the main factors responsible for the inadequacy of the diet of people.

Several beliefs exist about foods and food intakes are distributed by these beliefs reported by Rajalakshmi [1969] that in south India wheat is believed to be heat giving, bananas are believed to result in convulsions in children. Potatoes and pumpkin are believed to result in flatus [gas].

Dieting is a common practice among adolescent female and is not confined to those who are actually over weight. Dwyer et al ,[1967| found that many more girls diet to loose weight. Dieting starts at around the age of 14-15 years and omission of certain foods or of snacks wee the most common feature. Although adolescent as a whole it was greater among the dieters and the overweight adolescents

Storz et al ,[1983] studied body weight and body image and in addition the perceived desirability of fad diet among adolescent girls. Most where within or below the average range for body weight. Yet most wanted to loose weight and expressed dissatisfaction with these own physique. Most of the subjects rated more healthy methods of weight reduction higher than fad diets but many nevertheless reported that they had tried one or more fad type diets. The low energy crash diet was second in popularity only to an exercise programme.

Michaud et al, [1989] conducted a dietary survey on adolescent school day break fast in France. Only 2.6 % skipped breakfast. Among girls of older teens, aged 16-19 years showed more inadequate breakfast [62%] than younger teens, aged 13-15 years |47.2%]. Nuber [and percent] of inadequate breakfast according to sex and by age are presented in below table.

TABLE-2

NUMBER [AND %] OF GIRLS CONSUMING IDEAL, CORRECT AND INADEQUATE BREAK FAST ACCORDING TO AGE.

Sex	Age	Ideal *	Correct*	Inasequate breakfast
Girls	13-15 years	[9.4%]	[43.4%]	[47.2%]
	16-18 years	[3.3%]	[34.7%]	[62%]

Ideal: Combination of one food from three categories Milk, Bread and cereal Correct: Association of one food from 2 categories Milk/Dietary products bread or cereal. Inadequate: All other choices.

SECTION- II

GROWTH PATTERN OF ADOLESCENT GIRLS

Growth indicated an increase in number of physical size of cells which make up the body [Watson & Lowrey, 1967]. The British medical dictionary defines growth as the progressive development of living being of part of an organization from its earliest state to maturity including the attendant state to maturity including the attendant increase in size". Growth in man lasts up to 20 years or more.

Growth and development of infants and children and body size of adults are widely used as overall health and nutritional status of a community. Growth during the adolescent period is an important to determinant of adult body size. They are very few longitudinal studies which have looked into the growth pattern and the velocity of height and weight of gain of Indian girls during adoleseense. [NFI 1990]

In a nationwide survey of 7,000 children of 5-17 years of age form 14 public schools, Vijayaraghavan et al, [1971] observed that the Indian well to do children were as tall and heavy as American children of corresponding age. In the second part of the study a group of 2000 school children drown from schools catering to low income groups, in Hyderabad were assessed for their height [Ht] and [wt]. These children exhibited poor growth indicating under nutrition in the majority of cases. Nearly 93 percent was as tall as the well to do children with regard to weight none of the low income group children had weights equal to that of well to do group. The clinical picture indicated that none of the well to do group had any signs of nutritional deficiency diseases. On the other hand 20% of the children in the low income group had one or more nutritional deficiency signs.

ICMR [1972] conducted in 1968 a nationwide cross sectional study of 1,27,866 children aged 1-21 years belonging to different socio economic classes. The results stated to the growth of adolescent girls indicate that from (10-18) is the average Indian girl gains 23.3 in weight and 157 in height and increases

thereafter in are very small particularly with respect to height. Girls of the low socio economic group |LSGl gained heights similar to those seen in girls of the high socio economic group HSG] between 10 and 15 is but thereafter, the LSG gained more than HSG where as the pattern of the weight gain was slightly different in LSG girls gained considerably less weight than did the girls of the during the 10 and 15%. (But during the next three years LSG girls gained the litde weight more as in-the case of. height increments.

Studies by Agarwal et al, [1990-1974] Guptha et al, [1973] on the physical growth during adolescense of age 8-18 years of different socioeconomic at Varanasi have demonstrated that the girls are heavier as well as taller around 9 to 14 years of age than boys of the same age group. There after the growth in girls is minimal. The gain in height as well as weight in girls

is very minimal after the on set of menarche[Men age is 12 years and 1 month]the boys over take girls in weight as well as in height by 14 years.]

Tripath et al, [1967] examined the adolescent children belonging toe different socio economic groups for physical and sexual growth velocities and various growth characteristics like weight and height. Weight and height were found to be directly related to sexual maturity. The girls demonstrated height spurts were the maximum increments were seen during the age period of 10-14 years.

According to Sathyavathi et al, [1987] in rural areas the means for weight in the age group 10-18 showed significantly higher values for the boys as compared to girls, who showed significantly higher mean values as compared to boys.

The plane of nutrition classifications base on the wt for age, ht for age and wt for ht.

The weight for age classification is at three levels

Normal: >90% of the standard

Grade 1: >75% - 90% of the standard

Grade IK 75% of the standard

Rao et al, 1984

The height for age classification is at two levels, above 90% of the standard and [90% of the standard and denoted as normal and abnormal group respectively [Rav et al 1984]

A study was conducted by Ksuma [2001] on 1108 children in the age group of 9-15 years in a drought prone area of Chittoor district as per this classification irrespectiye of age and income level the percent distributíon of girls is as 18.86 and 81.13/in the subnormal and normal group respectively [Table -3]: a majority of the girls are in the normal group.

(The results observed for the age wise distribution of girls, with the exception of 15 and 16 years. The percent of 15 and 16 years girls having hit <90 percent of the 10.0 and 13.33 percent) While at the 10 years a higher percentage [32.4] of girls have heights <90 percent of the standard is observed that at 10 years the percent of girls is normal. Group is at a lower level. Where as it is 16 year 89 percent are in this group.

TABLE -3

DISTRIBUTION OF SUBJECTS AS FOR HEIGHT FOR AGE CLASSFICATION UNDER THE THREE INCOME GROUPS

Age	< 90% of standard height				>90% of standard height			
Y	VL	L	M	TOTAL %	VL	L	M	TOTAL[%]
10	30	22	03	55[32.4]	23	31	61	115[67.6%]
11	32	06	02	40[27.9]	20	47	68	135[77.1]
12	21	12	01	34[21.7]	29	45	49	123[78.4]
13	26	12	01	39[26.0]	24	38	49	117[74.0]
14	23	11	01	35[23.3]	26	40	49	115[76.7]
15	02	-	-	02[1.4]	48	51	51	150[98.7]
16	04	-	-	04[2.6]	48	52	50	150[77.5]
TOTAL %	138 (66.02)	63 [30.14]	08 [3.80]	209 [18.86]	21 [24.25]	30.4 [33.80]	377 [41.90]	899 [81 . 13]

Income Wise distribution mean that majority [66.02 percent] of VL group has ht <90 % a very negligible percent of M girls are in this group. In the

Normal category a majority of girls belong to M group [41.9 %] followed by LS group [33.8%] and relatively a lower percent of girls [24.25%] in VL are in this group Same pattern is evident with each income group at each age level [10 to 16]

(In the study conducted by Kusuma [2001] made to ahalyse the body composition and age related changes in body composition of 1100 adolescent girls the focus [1] body mass index.)

Kusuma [2001] studied on BMI of1N08 adolescent girls and it is observed that the mean BMI registered ranges from 14.64% to 16.69% for the 10 to 164 old adolescents. The lowest BMI is recorded for 10 to 124 girls,[Table 4] the highest BMI is recorded for the 164 girls. No consistent trend is related to age is evident.

When the date is segregated as per income generally an increase in BMI with an increase in age as is evident of L and M groups join the 104 on wards. The VL group however did not show a consistent pattern of increase with age.

TABLE -4

MEAN BODY MASS INDEX [BMI] FOR AGE AND INCOME OF THE RURAL GIRLS

Age	**Present study**					
Y	VL	L	M	Combined income groups [CIG]	RI*	RII**
10	14.55+1.14 53	14.54 +1.14 53	14.8 ± 1.14 64	14.64 ± 1.14 170	17.15	15.6
11	14.84+1.15 52	14.49 +1.25 53	14.78 ± 1.56 70	14.71 ± 1.56 175	17.28	14.8
12	13.78+1.51 50	14.53 +1.62 57	14.97 ± 1.96 50	14.75 ± 1.86 157	18.64	14.54
13	15.51+1.70 50	15.36 +1.48 57	16.54 ± 2.16 30	15.80 ± 1.68 150	18.76	16.50
14	14.77+1.64 [49]	15.36 +1.83 51	16.63 ± 12.37 50	15.59 ± 2.08 150	18.98	17.31
15	14.91+1.51 [51]	15.67 +1.22 51	16.63 ± 1.63 51	15.71 ± 1.61 152	19.9	17.36
16	15.58+1.51 50	17.6 ± 2.25 54	17.37 ± 1.69 50	16.48 ± 1.69 50	20.4	18.13

METHODS AND MATERIALS

3. METHODS AND MATERIALS

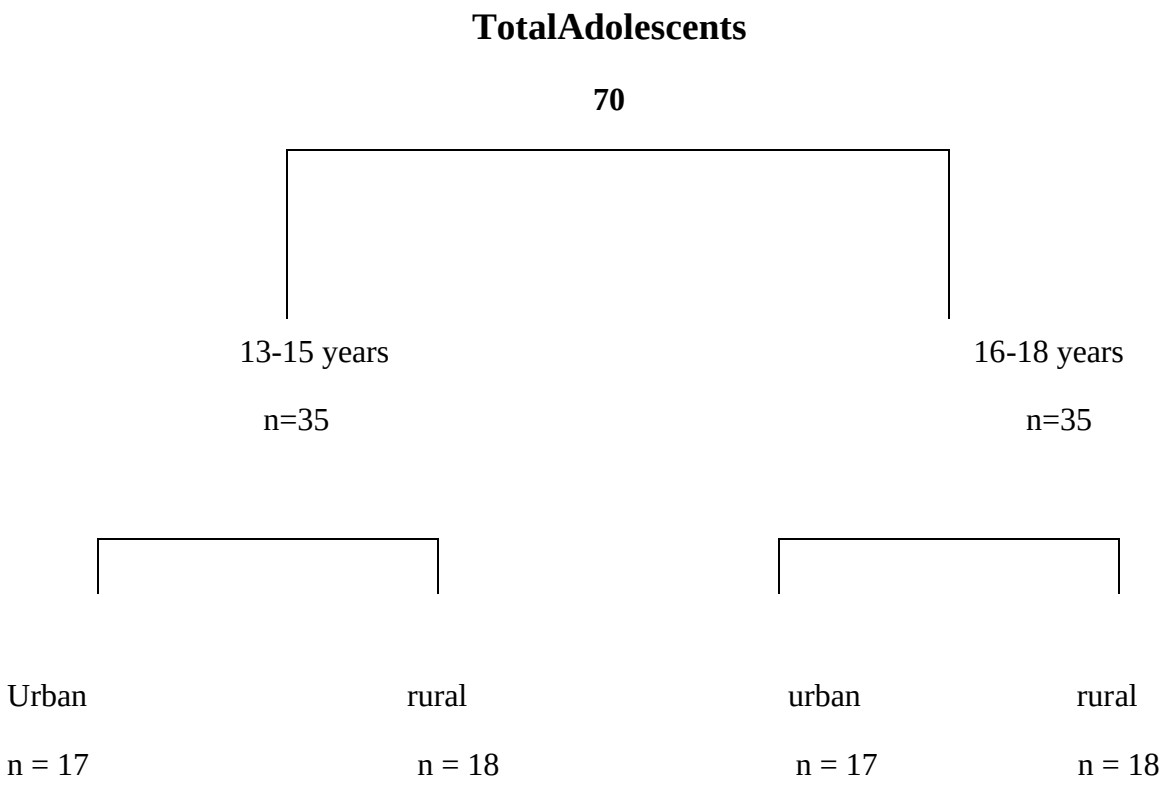
The present investigation on the nutritional status of adolescent girls [13-18 years] the study was taken up with the following objectives.

1. To study the eating pattern and food habits an nutrient intake of adolescent girls.
2. to assess these effects on the nutritional status of adolescent girls.

Selection of the sample:

Children in age group of 13-18 years were drawn from two schools and two colleges in urban back ground [Guntur] rural back ground Nambur|. The sample taken was 150. Among 150 girls 75 girls are 16-15 years age group another 75 girls are 13-15 year age group. Among 13-15 years age groups at 37 girls are 37 girls are urban and 38 girls are rural among 16-18 year age group 37 girls are urban, 38 girls are rural areas.

Experimental design is shown in chart.



The following parameters were used for this purpose.

1. Questionnaire, general information, Name, age, educational back ground, economic status veg and non veg, rural or urban.
2. Dietary survey: 1 day diet was collected using a questionnaire
3. Survey of eating patten and food habits [likes, dislikes]
4. diet and nutrient intake like calories, protein, calcium, iron, zinc vitamin A etc.
5. Anthropometric data on

   a. Height
   b. Weight
   c. Waist
   d.
   e. Hip

Diet survey:

A diet survey was conducted to record the general information concerning food consumption patterns and nutrients content of the diets consumed by each subjects, data pertaining to dietary intake was collected using a dietary schedule.

For this purpose all the subjects were requested to measure the cooked food they consumed at each meal. Using the given standard cups for one day. The calories provided to the women are standardized with different cooked food items

Thus the cooked weights of food was converted back to raw weights of foods. To obtain the actival nutrient intake by the subject Rajyalaksmi [1981] energy, protein, calcium, iron, zine vitamin A were caleulated by using food tables [Gopalan 1989].

Somatic Measurements:

Anthropometric is the most important unbiased method to ascertain the growth pattern and the nutrition status of community. The two basic measurements recommended for this by Gelliffe [1996] are height and weight.

Weight:

Weight is the simplest anthropometric measurements with the least individual error. Amongst all other measurements of body weight is probably the best index of nutrition and growth [Watson & Lowery] weighing is the key anthropometric measurement indicator of clinical nutrition.[Gomez et al 1966]. The subject was made stand comfortably and steadily ona weighing machine [Bathroom scale] without foot wear and with normal light clothing in the early in morning hours. The bath room scales used was checked periodically for reliability with standard grocers' weights. It has an accuracy of 0.5 kg. No allowance was made for clothing worn by the subjects as the weight of clothes worn is usually less than 0.4 to 0.6 kgs.

Height:

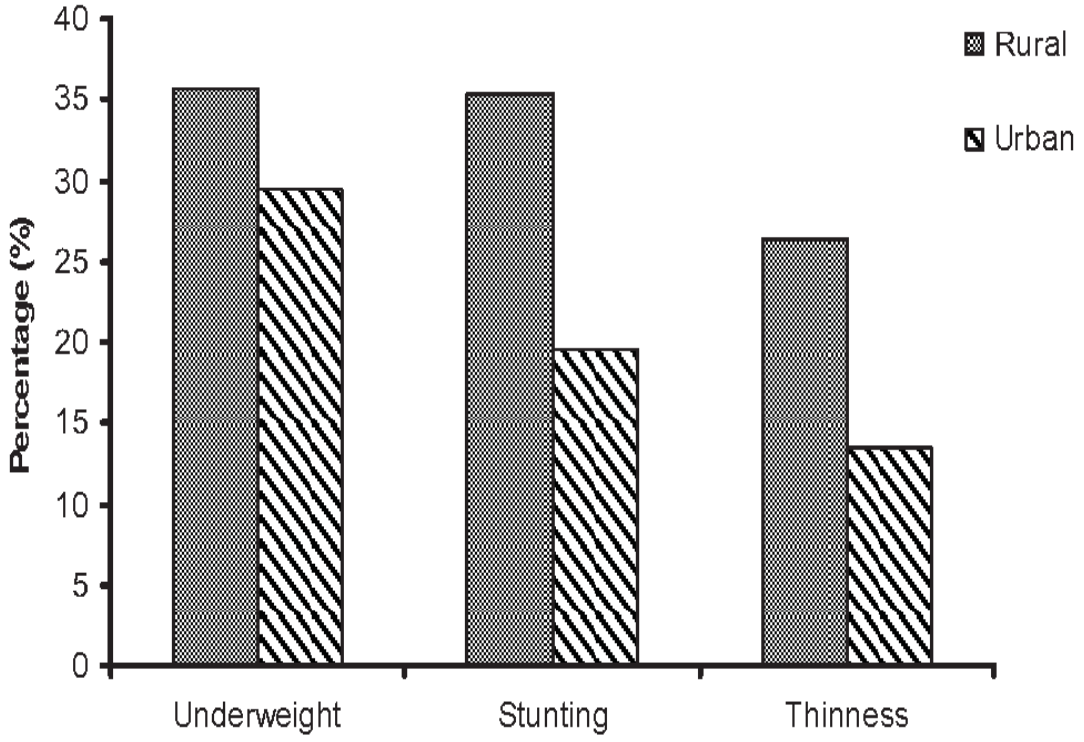
Height was measured according to Jellife [1996]. For this a vertical measuring rods was fixed to a wall. After removing the slippers, the subjects was made to stand on the flat floor by the side of the scale with feet parallel and with hells, buttocks, and shoulders and back of head touching the wall up right., the head was held comfortably erect with the lower border of the orbit in the same horizontal plian- on the external nutritional auditory meatus. The arms were held hanging at the sides in a natural manner. The head piece which is a metal bar was gently lowered, raising the hair and making contact with the top of the head. Thus height was recorded from the scale in centimeter to an accuracy of 0.01 cm.

STATISTICAL ANALYSIS:

Obtained was analyzed by using different statistical methods such as standard

deviation. This test finds the significant difference between any two variables. Correlation is also done in this study the data.

BAR GRAPH SHOWING PERCENTAGE SCORES OF DIFFERENT GROWTH PARAMETERS OF RURAL AND URBAN ADOLESCENT GIRLS.



RESULTS AND DISCUSSIONS

3. RESULTS AND DISCUSSION

Adolescense is a phase of rapid growth. The nutritional needs to meet the rapid growth during the adolescent period are tremendous. In many countries problems are shared by young people over food, where food simply is not a limiting factor. It is necessary to similar to and educate the ability to choose a balanced diet where the range of items is so vast and to select food which will not only satisfy appetite and taste good but will fulfill nutritional requirements. In this context the present investigation was undertaken to know the nutritional status of adolescent girls with the following objectives.

1. To study the food habits and eating patterns of adolescent girls and
2. To asses these effects on their nutritional status of adolescent girls,

For this purpose 150-adolescents aged 13-18 years were selected as the subjects. These were divided into two groups(13-15) years and (16-18) years. Adolescents from each age group were further divided into urban area and rural area. To study the above objectives the following parameters used.

1. Survey of eating patterns and food habits using oral questionnaire method.
2. Dietary and nutrient intakes to see the nutritional status and
3. Anthropometric data like height and weight to see the normal health of the individuals

The results of this study are discussed in this chapter under the following sections.

General information of the subjects

- Anthropometry
- Dietary and nutritional
- aspects Likes & dislikes
- Nutrient intakes

The Adolescent Girls' Anaemia Control Programme :
A decade of programming experience to break the inter-generational cycle of malnutrition in India
The journey from Pilot to Scale

General information on age, education, type of diet are presented in table no.13. it shows the total of 75 girls from urban [Guntur] and 75 girls from Rural Guntur] taken from the study. In this age group 13-15 years 49.3% are from urban area. And 49.3% are from rural area. In the age group l6-18 years 50.6% are from urban and 50.6% from rural area.

It regarding to educational status 49.3% of the urban children and 50.6% of rural girls belong to< 10th class. 50.6% from urban and 49.3% from rural area had education above 10" class.

The type of the diet [Vegetarian and non-Vegetarian] i,e consumed by the girls from urban area 46.6% are vegetarians and 29.3% are non-vegetarians. Girls from rural area 29.3% are vegetarians and 70.6% are non-vegetarians.

TABLE -13

GENERAL INFORMATION ON AGE, EDUCATION, TYPE OF DIET

SI.No	General information	Urban Girls n =75	Rural Girls n =75
		N with	% in Parenthesis
1	Age 13-15 Years 16-18 Years	 12[48.3%] 13[51.6%]	 12[48.3%] 13[51.6%]
2	Education <10* class >10th class	 12[48.3%] 13[51.6%]	 13[51.6%] 12[48.3%]
3	Type of diet Vegetarians Non - Vegetarians	 11[44.6%] 14[55.3%]	 7[27.3%] 18[72.6%]

Table no 14 shows the percent of adolescent girls below and above the standard height, weight, BMI in the urban and rural areas. For this purpose 5 girls from urban area and A5 girls from rural area are taken for the study. The results shows that in the 13-15 years age group fra 41.3% of the urban girls and 45.3% ef the urbar gialsad 45.3% rural girls are below the standard heights. 8% of the urban girls and 5.3% of

the rural girls are in the standard heights. With regards to the 16-18 years age group

45.3% of the urban girls and 46.6% of the rural girls are < standard height for that age.

Weight:

Weight is also measured for this two age groups. Results shows that 40% of the urban girls % 46.6% of the rural girls are seam to be under weight according to the standards of ICMR. Similarly in the 16-18 years age group 45.3% of the urban girls and 46.6% of the rural girls are under weight. Only 5.3% of the urban girls and 2.6% of the rural girls are in the normal standard weight group. In both the age groups the higher percentage of the girls are less then standard weights.

BMI:

BMI is calculated for this two age groups and its found that 30.1% of the urban and 33.31 of the rural children in the 13-15 years of age group are < 18 grade of BMI. This shows that both rural group are Chronically undernourished than the urban group. Similarly when the (16-18) years of age group is considered 30.1% of the urban group and 41% of the rural group are <18 grade BMl. Again Ihere also the rural group seem to be chronically undernourished than the urban group.

According to Phadke [1968] Indian girls start life with a deficit in weight of eighteen percent and the deficit of still eighteen percent at 5 years and 23 percent at 10 years when compared with American and British girl.

Cross sectional data of the ICMR Growth study [1972] showed that between the ages of 10-18 years the average Indian girl gains 53.3 cm in height and 18.8 kg in weight much of this is gained between the ages of the 10-15 years [21.2 cm and 15.2 kg] and inoreases thereafter are small particularly with respect to height.

SUMMARY AND CONCLUSION

4. SUMMARY AND CONCLUSION

Adolescense is pinpointed as a period of great storm and stress as well as of immense physical, mental and emotional potential. Yet Adolescents are declared ass a group that has been sadly neglected. The present study was conceived in this background. The main focus of the study is to present nutritional status of adolescent girls. Students en food habits, eating pattern and nutritional status of adolescent girls have not been many and there are reports that this age group-is neglected. With 1egard to their nutritional needs and hence this study is-planned. The total number of adolescents aged 13-18 years included for the study were-150 from High schools and Colleges.

The objectives of this study are:

- Food habits, eating pattern and utritional status of adolescent giris.
- To asses these effects on the growth status of the adolescents.

To achieve the above objectives the following parameters were used:

- Survey of eating pattern and food habits using oral questionnaire method
- Dietary and nutrient intakes to see the nutritional status.
- Anthropometric data like height & weight to sec the nomal health of the irdividuals.

The results obtained are sunmmarized and present it in this section under different

heads.

- General information
- Anthropometrie measurements
- Dietary patten
- Nutrient intake

General information:

- The subjects are Adolescents in the age group (13-15) years and (16-18)yrs.
- Two areas are selected one is urban area and other area rural area.
- In the urban area (13-15) years age group 55.3% non- vegetarians and 44.6% are vegetarian girls. Similar from the (16-18) years age group 70.6% non-vegetarians and 27.3% are vegetarians.
- Education status of the Adolescent girls is in the urban area 48.3% < 10^{th} class and 51.6%> 10^{th} class. In the rural area 50.6%< 10th class and 49.3%> 10^{th} class.

Adolescent Girls(AG) Scheme

- *Girl to girl approach*
- *AG 11-15yrs, school dropouts*
- *family income < Rs.6400/year*
- *urban & rural*
- *3 AG/ anganwadi*
- *Balika Mandal*
- *AG 11-18yrs*
- *20 AG/ Anganwadi for 6 month*

Anthropometric measurements:

The mean height of the girlś (13-15) years age group is 152.6 cm respectively. The percentage deficits in the height 86.6- cm-respectively. Similarly the mean heights of the 16-18 years are 158 cm respectively. The percentage deficits in the heights are 91.9% respectively.

The mean body weight of the 13-15 years age group is 39.7%. Fhe percent of deficits in the weight is 86.6%. Similarly in the 16-18 yrs age group the mean weight of the girls is 46.9% deficit in the weight is 91.9%.

BMI is calculated for this two age groups and its found that 30.1% of the urban & 33.3% of the rural girls intake 13-15 yrs-age group are < 18 grade BMI. Similarly in 16-18 yrs age group 30.1% urban and 41% rural girls are< 18 grade BMI. This shows that the rural group seem to be chronically undernourished than the urban group.

Dietary pattern:

- In the study three main meal pattern observed as usually in the South Indian population.

A. In the early morning coffee/ tea/ milk are taken by the adolescents.

B. The meal pattern is followed same in both rural and urban girls.

- Adolescents are in the habit of skipping of meals and the percentage is 64%. 36% consume regular meals.
- Breakfast they take Idli/ dosa/ upma/ chapathi with chutney or vegetable.
- During leasure time they consume fast foods. 57.3% of the adolescents take fast foods urban girls taking more fast foods than rural girls.
- At lunch time adolescents consume rice, dhal, non-veg. vegetables, cura or buttermilk.

Nutrient intakes:

- All the nutrient intakes are less than the RDA. In both the urban and rural

  girls.

- In the 13-15 years age group the mean energy intake of the urban girls is 1555 k cals there is deficiency in 505 Kcals respectively where as in the rural grls the mean energy intake is 1355 Kcals there is deficiency in 725 Kcals.

- Rural girls taking less amount of kcals when compare to urban girls.
- The mean consumption of protein in 13-15 years in urban girls is 35.l and 34.2 gms in rural girls. There is a deficiency of 29.9gms and 30.8gms protein. Similarly in 16-18 years age group protein intake is 39.7 and 37.4 gms in the urban and rural girls respectively. There is deficiency of 23.3 gms and 25.6 gms of protein in both the urban and rural girls.

- The mean consumption of calcium in 13-15 years age group is 527 mg and 460.7 mg respectively. There is deficiency in 79.3 mg and 139.3 mg in both the groups. Where as in 16-18 years age group 49.5 mg and 99.9 mg in both the girls are deficit.

- The mean consumption of iron in 13-15 years in urban girls is8.7 mg and 6.7 mg in rural girls. There is deficit in 19.3 mg and 21.5 mg urban and rural girls respectively. Similarly in 16-18 years age group 7.8 mg and 6.8 mg deficiency is observed.

- Iron there is a deficiency of 20 mg. This shows that the deficiency is more than 1/3 of the nutrient requirement.

- Intake of B-carotene is also less than the RDA and only 3/4 of the

  requirement is met.

Adolescents constitute about 22% of the population form an important physiological group whose nutritional needs demand a Special attention. All the physical and all the physiological changes that occur during adolescent period place a greater demand on their nutritional requirements.

The adolescents considerably fall short of all the essential nutrients. The intakes of nutrients by adolescents in both age groups are lower than the RDA. Adolescents are having certain food habits, eating pattern which influence the food intake. The adolescents with poor food habits, eating pattern and under nutrition lower somatic measurements resulting in growth retardation.

Adolescents require nutrition education which can improve their food habits in a better and healthy manner which in turn affects the nutrient intakes to some extent. More emphasis should be given to this age group who are going to be the future mothers and home makers and also for the healthy development of the nation.

In the present study the intake of nutrients in both urban & rural girls are lower than the RDA. The rural girls are more deficient than in all the nutrients below the urban girls. Significant difference is seen in energy in both the 13-15 years and 16-18 years girls.

Inadequate dietary intake of energy, protein, calcium, vitamin A, iron nutritional deficiencies are wide spread in our country. Particularly among the low income group population both in urban and rural area.

So from the above data it can be concluded that both age group of the adolescent girls should improve their dietary habits and should have a good Sould nutritional status. They should meet the RDA.

SUGGESTIONS AND LIMITATIONS

5. LIMITATIONS OF THE STUDY

In the present study only 150 students have been taken as the sample but a slightly higher samples could have been taken. But with the regular course work and also because of the student's resistance to participate in the study with their other activities it could not be done.

SUGGESTIONS FOR FURTHER STUDY

1. Large samples could be taken.
2. The same study can be extended with variables like slum and rural adolescents.
3. The same study on the bio chemical assessment to find out the nutritional deficiency would be interesting.

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APENDICES

APPENDIX –I

QUESTIONNAIRE

NUTRITONAL STATUS OF ADOLESCENT GIRLS

General Information : Date:

Name : Place:

Age :

Educatioon :

Economic Status :

Veg/Non-veg :

Rural Urban area :

Anthropometric Measurements :

Height

[cm]

Weight

[kgs]

Waist [cm]

Hip

[cms]

Clinical Assessment :

Depigmentation of the hair :

Bitot's Spots :

Watering eyes :

Angular stomatities :

Do you take any tablets [vitamins & Minerals]?

Do you take food regularly or not why?

Eating Pattern:

1. Do you eat break fast ?

2. Number of meals you take?

FOODS	LIKES	REASONS	DISLIKES	REASONS

7. Do you have the habit of going to hotels and restaurants?

What items do you like ?

8. Do you eat fruits regularly which fruits do you like?

9. Do you take coo drinks and fast foods?

DIETARY DATA OF SUBJECTS USING 24 hrs RECALL METHOD:

Early Morning : Milk/Tea/ Coffee

Break fast : idly/ dosai/ upma/ chapathi

Chutney/ vegetable

Mid morning : Fruit Juices/ Coconut-water/ Butter milk/ Cool drink.

Milk/Tea/Coffee

Lunch : Rice Non

Veg Dhal

Veg.Roots/Leafy Vegetables /Other veg.

Sambar / Rasam

Tea time : Biscuits/ Bread/ Pakoda/ Fast-food/ fruits

Milk /tea /Coffee

Dinner : Rice

Non Veg Dhal

Veg.Roots/ Leafy Vegetables/Other veg.

Sambar/ Rasam

Bed time : Milk/Fruit

APENDIX-II

SOMATIC MEASUREMENTS OF [13-15 YEARS] GIRLS IN URBAN

	height	weight	waist	ip
	cm	kgs	cm	cm
1	152	48	24	33
2	153	46	24	30
3	149	38	23	31
4	147	36	24	31
5	144	38	24	32
6	149	44	23	32
7	155	45	23	32
8	160	47	25	31
9	152	48	24	29
10	159	49	22	32
11	157	41	23	29
12	147	42	22	28
13	160	40	25	35
14	149	38	24	31
15	155	45	23	29
16	159	48	21	29
17	157	49	26	35
18	150	35	25	32
19	154	39	22	32
20	157	45	29	38
21	147	42	25	35
22	154	45	28	36
23	142	39	21	32
24	155	45	23	31
25	160	49	24	33
26	152	45	23	30
27	149	41	25	30
28	152	49	22	33
29	155	46	23	32
30	155	54	24	29
31	152	45	21	29
32	155	47	23	29
33	157	44	23	32
34	154	48	29	31
35	162	54	22	30
36	154	34	22	30
37	149	41	23	30

SOMATIC MEASUREMENTS OF [13-15 YEARS] GIRLS IN RURAL

Sl.no	height	weight	waist	hip
	cm	kgs	cm	cm
1	152	39	29	35
2	157	45	26	36
3	147	35	29	38
4	150	47	27	36
5	153	43	23	31
6	160	45	26	34
7	153	35	25	32
8	161	48	26	34
9	149	53	26	35
10	149	45	26	32
11	149	46	23	31
12	154	44	29	35
13	154	39	26	35
14	157	46	26	36
15	147	39	28	34
16	155	54	29	32
17	149	44	28	33
18	154	36	26	34
19	154	54	28	35
20	154	55	32	38
21	147	31	22	28
22	149	40	27	31
23	158	40	23	35
24	157	36	22	32
25	152	40	25	32
26	150	55	30	48
27	156	54	29	38
28	149	38	24	30
29	157	34	23	31
30	154	40	34	46
31	160	53	36	47

32	157	36	24	31
33	149	36	25	36
34	156	38	26	34
35	150	47	30	28
36	155	40	30	40
37	150	39	25	32

SOMATIC MEASUREMENTS OF |16-18] YEARS GIRLS IN URBAN

Sl.no	height	weight	waist	hip
1	155	45	29	39
2	165	46	30	40
3	156	48	31	42
4	162	46	28	36
5	157	50	30	40
6	159	52	35	45
7	159	55	33	45
8	155	48	29	39
9	162	44	28	37
10	161	42	29	36
11	156	54	28	35
12	156	48	29	38
13	150	35	29	39
14	155	32	30	41
15	158	44	28	36
16	160	45	36	45
17	155	40	29	38
18	158	49	32	42
19	165	46	29	39
20	160	48	28	36
21	165	48	28	38
22	157	44	29	41
23	154	50	28	38
24	156	44	28	32
25	152	46	29	36

26	156	42	32	46
27	155	35	28	35
28	156	46	26	38
29	165	50	29	35
30	162	48	29	32
31	156	56	31	42
32	155	40	32	41
33	156	48	29	38
34	154	42	28	37
35	159	55	33	45
36	155	46	29	42
37	155	50	30	41
38	158	44	28	36

SOMATIC MEASUREMENTS OF [16-18] YEARS GIRLS IN RURAL

Sl.no	height	weight	waist	hip
	cm	kgs	cm	cm
1	158	48	32	42
2	162	52	29	39
3	162	41	28	38
4	155	46	32	42
5	157	48	33	43
6	161	41	29	38
7	155	48	32	41
8	162	48	31	39
9	163	46	32	41
10	165	48	29	36
11	155	46	28	39
12	160	46	29	39
13	160	48	26	38
14	158	45	24	34
15	161	46	26	35
16	158	43	28	39
17	155	42	29	35
18	152	43	29	36
19	162	49	28	31
20	161	48	29	31
21	165	50	31	41
22	155	40	30	41
23	156	51	28	38
24	148	40	28	39
25	167	58	31	41
26	156	44	28	39
27	158	42	30	38
28	152	43	29	39
29	155	46	28	39
30	151	40	29	38
31	155	41	28	39

32	161	46	29	38
33	152	41	28	39
34	155	42	28	34
35	152	41	20	38
36	156	42	29	36
37	159	45	30	41