Nutritional status of adolescent school children: A study in   the tribal areas of Srikakulam district in Andhra Pradesh.

Mr. S. Srinivasa Rao, Research Scholar, Department of Economics, Andhra University, Visakhapatnam-AP

ABSTRACT: *The present study is proposed to analyze the nutritional status of adolescent girls in public schools in the tribal areas of Srikakulam district of Andhra Pradesh. The results of the study reveals that the poor nutritional status of adolescents, especially girls, has important implications in terms of physical work capacity and adverse reproductive outcomes. The median age at marriage in the study area is around 18 years. Thus, the window period for intervention is quite short. School based mid-day meal programme and iron supplementation should receive priority in tribal areas. A beginning has been made by inclusion of adolescent girls as beneficiaries of iron tablets (once a week) under the Integrated Child Development Services (ICDS) scheme. Though the primary objective of this programme is to improve school attendance, it is likely to have a major impact on nutritional status of school children. However, much more needs to be done to address the issue of adolescent mal-nutrition at the national level.*

KEY WORDS: *Nutritional Deficiency, ICDS : Integrated Child Development Scheme, Adolescent girls, WHO: World Health Organization, PHC : Primary Health Center*

Good health is a balanced condition of human body, mind and the absence of any disease. World Health Organization defines human health as a 'state of complete physical, mental and spiritual well-being and not merely the absence of disease and/or infirmity'. Human life is materially and socially productive and culturally meaningful if one is endowed with physical and mental well being. The coping processes adopted by human being with their environment are both biological and cultural by nature. Gradually these biological and cultural forces became a kind of resource for human society. The concept of health, disease, illness and sickness are inextricably intertwined with social, cultural and economic factors, which are the product of and influenced by the well being of family members and on their access to resources. The socio-cultural factors more or less determine beliefs and practices related to health, disease and treatment (Van Bolen and Van Dormael, 1999; Behura, 2003, Panigrahi, 2004 and 2005).

Nutritional deficiency is the root cause for any disease to human beings. Nutrition played a key role in health of the human beings. Nutritional anemia is one of India's major public health problems. Adolescence is an intense anabolic period when requirements for all nutrients increases. Unhealthy food habits and lack of nutritional awareness are considered to be the main factors in determining nutritional status in the Society. Adolescence period is very crucial since there are the formative years in the life of an individual when major physical, psychological and behavioral changes take place.

Future of a society depends on adolescents and they form a great human resource for the Society. Adolescence in girls has been recognized a special period of transition from girlhood to womanhood. Adolescents have always remained in a dilemma as they are neither considered children nor adults. Adolescence is a journey from the world of the child to the world of the adult. It is an important stage of growth and development in the lifespan. Adolescence has been defined by WHO as the period of spanning between 10-19 years. Adolescence is an intense embolic period when requirements for all nutrients increase. The ultimate intention of nutritional assessment is to improve health. Diet and health are synonymous with the well-being of an individual. The 2011 Census data shows that there are more than 225 million adolescents. The UNO and its agencies like W H O, UNICEF, UNPA etc. consider adolescents as individuals between 10-19 years of age. The present study is proposed to analyze the nutritional status of adolescent girls in public schools in the tribal areas of Srikakulam district of Andhra Pradesh.

SOCIAL CONSEQUENCES OF THE POOR NUTRITIONAL STATUS:

The social consequences of disease and illness though universal but are specific to the community in terms of their manifestations. The normative orientation of a community by and large determines the perceptions about the diseases, its symptoms and methods of treatment (Kroeger.1983). Disease perceptions on the one hand and treatment and healing choices on the other are interdependent. Thus, discourse on the native perceptions and anemic understanding regarding disease is a necessity in understanding folk therapeutic behavior. It observed that, systematic investigation into folk system of disease classification has gained imperative consideration in Medical Anthropological studies from the late 1960s.

State intervention in health care system is of recent origin. The 'Human Capital School approach' (Schultz, 1961) attempted to measure the economic value of human being and gave the rationalities for 'investment in men', seems to have treated human being as a 'productive tool', which needs the cost of repairing and maintenance of human capital. The 'health care service' approach by Kenneth Arro (1978) emphasizes the supply and demands of health service providers. Since the inception of state intervention, attempts are being made to establish a state controlled and/or center based health service delivery system (Padhi and Mishra, 2002). High infant, child and maternal mortality and morbidity due to communicable diseases (malaria and respiratory infections), water borne diseases (cholera, gastro-enteritis, malnutrition, measles) and pregnancy related conditions forced the

state to look after Primary Health Care (PHC) approach emphasizing both on preventive and promotional health care in a more pragmatic and integrated manner (Green, 1992). Adolescence, a period of transition between childhood and adulthood, occupies a crucial position in the life of human beings. This period is characterized by an exceptionally rapid rate of growth. The peak rates of growth are exceeded only during the fetal life and early infancy. However, in comparison to infancy, there is much more individual variation both in timing and in degree of

growth. This has importance in terms of defining normality.

The United Nations' Sub Committee on Nutrition meeting held in Oslo in 1998 concluded that more data on health and nutrition of school age children are needed to assess their scale of problem. It also believed that the scale of nutritional problems might have been previously under estimated. Traditionally, the main health indicator used by health planners has been mortality rates. Adolescents have the lowest mortality among the different age groups and have therefore received low priority. However, recent studies have shown that the prevalence of malnutrition and anemia is high in these age groups (3-5). The present study was done with the objective of assessing the nutritional status of adolescent children attending a school in Tribal sub plan area of Srikakulam District A.P.

RELEVANCE OF THE STUDY:

Status of adolescent girls health can be assessed by using various parameters such as bio-chemical, anthropometric measurements etc. Hemoglobin concentration, body weight, stature and body mass index (BMI) are some of the most popularly used parameters for the evaluation of the girls. Anaemia is a global public health problem affecting both the developing and developed countries with major consequences for adolescent girls health as well as socio and economic development. Body Mass Index (BMI = weight in KG/height in M^2) has been widely adopted for assessing obesity and chronic energy deficiency of an adolescent individual, or a population. These study (project) aims to investigate the status of anemia and BMI among adolescent girls in Visakhapatnam and Vizianagaram Districts. It also intends to study the reliability of two hemoglobin estimation methods namely hemoglobin scale (HCS) and Sakit's hemoglobin meter methods for diagnosing anemia. The present study also examines the association between BMI and hemoglobin level of adolescent girls in the tribal areas of Srikakulam district of Andhra Pradesh..

The broad objective of the study is to estimate prevalence of anemia among adolescent girls in public schools in the tribal areas of Srikakulam district and to study socio-economic and other health factors associated with it. The specific objectives of the study are to assess the nutritional status of adolescent girls and to identify the correlation between Socio-demographic characters and nutritional status among them.

The number of studies are alone about the study subject related in the early years. But on the Srikakulam district no research works are done about adolescent girls health status in recent periods. The brief review of literature on the health status of adolescent girls in India is reviewed in general adolescent girls and words sufferers of the ravages of various forms of malnutrition because of their increased nutritional needs and low social power (Chowdari's etal 2009). Early adolescence is a period of rapid growth and maturation in human development. The nutritional status of adolescent girls, the future mothers, contributes significantly to the nutritional status of the community(Venkaiah 2002).

Simple random sampling is used to select the number schools so as to attain the calculated sample size. Thus Srikakulam Sub-Plan area is included in

the present study and all the adolescent girls of age group 10-19 years in selected schools who met inclusion criteria are included in the study. Consent for the participation in the study is taken from the school authorities with the intimation of parents of the student. The study proposal will be taken up after the approval of the school authorities. Multi-stage random sampling technique is used to select the requisite number of girls.

INDICATORS USED TO IDENTIFY THE NUTRITIONAL DEFICIANCY:

The study was conducted in the Tribal sub plan area of Srikakulam District A.P among students of Classes six to tenth. All children attending school at the time of the survey were included. Effort was made to examine the students who were absent on a particular day at the next visit. After explaining the purpose of visit, a verbal consent was obtained from the Principal of the school.

Age: This was determined from the register of the school. The school insists on a birth certificate at the time of admission and thereafter the age is increased by one every year. Only those children who were listed in the register to be in the age group of 12 to 18 years were included.

Height: Height in centimeters was marked on a wall in the school with the help of a measuring tape. All children were measured against the wall. The children were asked to remove the footwear, and stand with heels together and head positioned so that the line of vision was perpendicular to the body. A glass scale was brought down to the topmost point on the head. Height was recorded to the nearest 1 cm.

Weight: A bathroom scale was used. It was calibrated against known weights regularly. Zero error was checked for and removed if present every day. Clothes were not removed, as adequate privacy was not available. However, as the study period was in September, when the weather was warm, only light clothes were worn by the students. Weight was recorded to the nearest 500 grams.

Hemoglobin: This was estimated by cy.^nmethemogiobin method using a colorimeter. Known standards were run along with the test samples for maintaining quality control.

All the data was entered into computer in the SPSS package. Body Mass Index (BMI) was calculated from the measured height and weight by a self-written computer programme. The analysis was performed using SPSS package 10.5.

The anthropometric indicators recommended for adolescents are stunting (height for age <3rd percentile) and thinness (BMI for age <5th Percentile). Weight for age has been found to be unreliable and therefore has not been included in this analysis. These were calculated separately for boys and girls for each year of age, as the WHO reference norms vary by age and sex. In areas where distributions of adolescent height and BMI are substantially below those of National Center for Health Statistics (NCHS), WHO has advised that locally defined cut offs should be used. Therefore, results are also presented according to Indian standards. Anemia was defined as per the WHO criteria for different ages.

RESULTS ARRIVED FROM THE STUDY :

As per the registers available with the school, 672 children in the defined age group were enrolled. A total of 612 school children were present during the visit and full information was available for 600 students. Thus 612 enrolled school children were examined for height and weight. Almost 65% of the total children were from Seethampeta Mandal and rest from nearby Kotturu, Palakonda, Veeraghattam and Bhamini Mandals. Blood was collected from 456 children for hemoglobin. The prevalence of stunting is shown in Table I. Among boys, prevalence of stunting shows a declining trend from 56% at 12 years of age to 25% at 17 years of age. If Indian norms are used, the prevalence of stunting comes down from 33% at 12 years to 20% at 18 years. The prevalence of stunting drops down sharply at 14 years of age. This is likely due to the pubertal growth which occurs at this age. The prevalence among girls is along similar lines, though the number of girls in each age group is smaller. The increase in mean height is about 8 cm per year among boys and 5 cm per year among girls in the age group below fifteen years.

The prevalence of thinness among the school going adolescent children is shown in Table II. As per the NCHS norms prevalence of thinness among boys varies 31% to 52% without any clear trend. In girls, it varies 4% to 59%. Though, the numbers of girls are less in each age group, it appears that prevalence of thinness in girls is lower than in boys. The prevalence of anemia as defined by WHO is shown in Table III. The prevalence of anemia was 27.8% in young boys (12 yrs-14 yrs; n = 79) compared to 41.3% in older boys (15 yrs-18 yrs; n = 92). Anemia was present in 51% of young girls (n = 68) compared to

38.5% (n = 39) in older girls. The mean hemoglobin was higher in boys as compared to girls in both the age groups. None of the subjects had hemoglobin level below nine g/dl.

MEASURES SUGGESTED:

This study was school based and about 92.5% of the enrolled school students were examined. Thus, the results of this survey are representative of school going children but not necessarily representative of all the children in this age group in the study area. Based on our data of Seethampeta Mandal and rest from nearby Kotturu, Palakonda, Veeraghattam and Bhamini Mandals the school enrollment in this area is 77% in 11 yrs-15 yrs and 73.5% in 15-18 yrs. For boys, it is around 80% in all age group and among girls it is 73% in 11 yrs-15 yrs and 65% in 15 yrs-18 yrs. WHO recommends the use of vertical board with an attached metric rule and a horizontal headboard for measurement of height and a leveled platform scale with a beam and movable weights for the measurement of weight in adults? In this study however, for logistic reasons this protocol was not used. Sample size in many categories, especially which of girls, in this study was small. Therefore, the results in these categories should be interpreted with caution.

A high prevalence of stunting has been previously reported from India. The report on regional WHO Consultation on nutritional status of adolescent girls reported 45% prevalence of stunting among girls and 20% among boys with an average of 32% in both sexes. In our study the prevalence in the 12-18 year age group was 37.2% among girls and 41.0% among boys with an overall prevalence of 38.5%. A similarity in the

prevalence of stunting in boys and girls from developing countries has also been found by other workers. In our study, the mean height of the girls was more than the boys till 13 years, after which the boys were taller than the girls. This is probably because of the early onset of puberty in girls. A similar finding has been reported from Visakhapatnam district. However, at 14 yrs of age, the height of both girls and boys was about 10 cm more in Seethampeta Mandal as compared to the children in Visakhapatnam District.

Thinness as defined by a BMI <5th percentile was present in 43.8% of boys and 30.1% of girls. In a study among adolescent girls in Rajasthan, only 6.5% of the girls were found to have a BMI of more than 18.5. In another study in government schools of Palakonda the prevalence of stunting was 9.9% in upper socio economic class girls and 35.3% in lower middle class girls.

The overall prevalence of anemia in girls of this age group in the present study was 48%. A lady doctor from the PHC Seethampeta assessed the iron nutritional status among 312 Tribal schoolgirls of Seethampeta. The prevalence of anemia (Hb <12 g/dl) was 28% in girls who had attained menarche and 22% in girls who had not attained menarche. The poor nutritional status of adolescents, especially girls, has important implications in terms of physical work capacity and adverse reproductive outcomes. The median age at marriage in the study area is around 18 years. Thus, the window period for intervention is quite short. School based mid-day meal programme and iron supplementation should receive priority in tribal areas. A beginning has been made by inclusion of adolescent girls as beneficiaries of iron tablets (once a week) under the Integrated Child Development Services (ICDS) scheme. Though the primary objective of this programme is to improve school attendance, it is likely to have a major impact on nutritional status of school children. However, much more needs to be done to address the issue of adolescent mal-nutrition at the national level.

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