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PREVALENCE OF ANEMIA AMONG THE TRIBAL ADOLESCENT GIRLS IN JAVVADU HILLS IN THIRUVANNAMALAI, TAMIL NADU

Pediatrics

P.Saravanakumar	Assistant Professor, Department of Community Medicine, Govt. Stanley Medical College, Chennai, Tamil Nadu.
Muthusundari.A	Resident, DMCH, Institute of Child Health and Hospital for Children, Chennai
Saradha Suresh	IMNCI Nodal Officer, Institute of Child Health& Hospital for Children, Chennai,
Chitra A	Associate Professor of Community Medicine, Madras Medical College, Chennai.

ABSTRACT

Background: Anemia during adolescence contributes to maternal, fetal morbidity and mortality in future. Tribal population is vulnerable and underserved wherein it is indeed essential to explore anemia among tribal adolescent girls to prevent future morbidity and maternal mortality.
Objectives: To assess the prevalence of anemia and risk factors among tribal adolescent girls in Javvadu hills in Thiruvannamalai, Tamil Nadu.
Materials and Methods: A cross-sectional study was conducted among 200 tribal adolescent girls in Jamanamarathur Block of Javvadu hills in Thiruvannamalai during January 2017. Socio-demographic and anthropometric details were obtained and Hemoglobin was estimated using Cyan method. Statistical analysis was done using IBM SPSS version 21.
Results: Overall prevalence of anemia was 76%. About 7% had severe anemia. Age, menstruation, barefoot walking, poor awareness and under-nutrition were the significant factors.
Conclusion: Health education, proper utilization of health services and timely intervention will alleviate this public health problem among tribal adolescent girls.

Introduction:

Adolescence after the infancy is the second critical period of rapid physical growth and changes in body composition and physiology. It is of utmost importance to achieve optimum growth during this period for future healthy and productive life[1]. Poor nutrition among the adolescent girls resulting in short stature and low lean body mass is associated with many adverse health problems particularly in future during motherhood[1].Under-nutrition among adolescents is a serious public health problem globally, especially in developing countries[2]. Adolescents form an important vulnerable, neglected sector of population, which constitutes about 22 percent of Indian population[3]. Choudhary et al reported the prevalence of under-nutrition among the adolescent girls in rural area in India to be 46.6%[4].

During the adolescence, there is an increased demand for iron requirement in both boys and girls but more so in girls because of menstruation. Anemia not only affects the present health status of girls but also has deleterious effects in future pregnancy[1]. Anemia accounts for about 40% maternal deaths, three times greater risk of delivering low birth weight and nine times higher risk of perinatal mortality thus contributing significantly for increased infant mortality[5]. In India, NFHS-4 estimates reveal the prevalence of anemia to be 53% in adolescent girls in rural area[6]. Early detection and effective intervention of anemia among the adolescent girls improves the future productive life in terms of maternal and child health.

Tribal population constitutes around 8% of total population in India[7]. The prevalence of malnutrition among the tribal children, adolescents and mothers is reported to be high in India. Soudarssanane et al reported the high prevalence of malnutrition and anemia among the tribal mothers and adolescents in south India and the need for intervention programs to overcome the health problems among the underserved community[8]. Basu et al recommended the need for intervention for anemia and under-nutrition during the childhood and adolescence for a safe and healthy motherhood[9]. There is paucity of data on anemia among the tribal population in Tamil Nadu. Irular tribes are one among the six primitive tribes in Tamil Nadu who have settled in Javvadu Hills in Thiruvannamalai district in Tamil nadu[7]. This study aims to assess the prevalence of anemia and the associated risk factors among the adolescent girls belonging to the Irular tribes of Javvadu Hills in Tamil Nadu.

Materials and Methods:

A community based cross-sectional study was conducted among the Irular tribal adolescent girls of age 10 to 19 years in Athipet Health sub-centre of Jamanamarathur block in Javvadu hills of Thiruvannamalai District in Tamil Nadu chosen by Multi-stage random sampling method during January 2017. NNMB 2013 report 23 reported the prevalence of anemia among the tribal adolescent girls to be 66.6% 10. With alpha at 5, precision of 10%, the sample size was calculated to be 200. The adolescent girls were recruited from the register maintained in ICDS in the sub-centre. After informed consent from mothers, the details of socio-demographic data, menstrual status, anthropometric details, awareness about anemia, utilization of health services were gathered with a semi-structured questionnaire. Hemoglobin was estimated by CyanmethHemoglobin method using a photoelectric Calorimeter with green filter (520 nm wavelength). Girls were examined for clinical signs of Nutritional deficiency. Anemia was defined as Hemoglobin level < 12 gm/dl for non-pregnant adolescent girls while Hb < 11gm/dl for pregnant girls. Severe anemia was defined as Hb < 7gm/dl. BMI was calculated with CDC 2000 charts with under-nutrition defined as BMI < 18.5. Statistical analysis was done using IBM SPSS package version [21].

Results:

Out of 200 adolescent girls who had participated in this study, 54 were early adolescent age (10-13yrs), 61 were mid-adolescent age(14-16 years) and 85 belonged to late adolescent age(17-19yrs). Only 37% were literates and all belonged to lower socio-economic status. 78% of girls were menstruating and 33% of girls were married below the age of 18 years with 12 girls being pregnant during this study. Overall prevalence of anemia was 76%. Anemia was more common among the menstruating girls (72%). Out of 12 pregnant mothers, 10 were anemic of whom 2 were severely anemic. Fig1 depicts the severity of anemia among the tribal adolescent girls. About 7% were severely anemic with Hb<7gm/dl and severity of anemia was noticed to increase with increasing age with statistical significance ($\chi^2 = 17.3$, p <0.001) Fig2. In late adolescents, it was noticed that 18% were severely anemic when compared to the early adolescent girls wherein only 3% had severe anemia. Also the severity of anemia was associated with menstrual status and pregnancy probably due to increasing demands. Based on BMI, the severity of thinness was observed to increase with advancing age (Table 1). Also Table 2 depicts the factors associated with anemia among the tribal adolescent girls. Of which, age, menstrual status, poor awareness on healthy food, under-utilization of health services like regular deworming, IFA intake and ICDS were the significant factors determining the high prevalence of anemia among the adolescent girls.

Discussion:

Adolescence is the crucial period of transition between childhood and

adulthood wherein the nutritional requirements if not met during this vulnerable period, results in under-nutrition and ill-health which in turn reflects on the future maternal and child nutrition[1]. Anemia in the adolescent period if not detected and intervened during the adolescence leads to increased morbidity and mortality in future motherhood as well as underweight in offspring1. In our study, 200 adolescent girls were recruited of whom 76% were anemic whereas the prevalence of anemia among the tribals in India is about 66.6% as per NNMB report 201310. Soudarssanane et al also reported the high prevalence of anemia and malnutrition among the tribal population in India[8].

In this study, there was no association between Anemia and educational status among the Irular tribal adolescent girls. But Meenal Vinay Kulkarni et al concluded the strong association between the educational status and anemia. In our study, poor awareness on anemia and its causes, preventive measures was noticed among the adolescent girls[11]. In our study, anemia was noticed to be high in post-menarchal girls(72%) as against pre-menarchal group(28%) which was similar to study reported by Siddharam S M et al wherein 71% of post-menarchal girls had anemia when compared to pre-menarchal girls probably due to increased physiological demands but no nutritional support[12]. But Rajaratnam et al[13] and Agrwal[14] et al had reported only minor difference in anemic status among pre and post-menarchal group of adolescent girls. Rekha Dutt et al reported a significant association between marital status, menstrual status and the severity of anemia[15].

In this study, the severity of anemia increased with increase in age reflecting the increasing demand for Iron and micronutrients and mismatch of nutritional support. Also the awareness regarding the causes of anemia and the preventive measures is very low in this study population. There is also under-utilization of health services like IFA tablets, Nutritional Health education, regular deworming etc. Premalatha T et al reported the prevalence of decreased community awareness regarding the causes and prevention of anemia in their study[5]. This highlights the need for nutritional interventional programmes to create awareness regarding this public health problem at the primary health care level. Meenal Vinay Kulkarni et al stressed the need for nutritional education along with nutritional supplementation as well as Iron and Folate supplementation at primary health care level[11]. Health services with regular follow-up in the remote and inaccessible areas of tribal settlement is needed to prevent morbidity due to malnutrition particularly anemia during the adolescence. Telake et al also recommended the need for focused health services to promote health among the adolescents in the rural area and underserved areas[16]. A comprehensive Adolescent Health Initiative at the primary health care level is the need of the hour as recommended by Patil et al to overcome this nutritional problem for a future healthy productive life[17]. The tribal population remain geographically isolated and scattered throughout the state and there is a need for larger sample to explore this public health problem in depth. Also a qualitative research will throw more light on customs, cultural beliefs and dietary pattern governing the nutritional status of tribal adolescent girls.
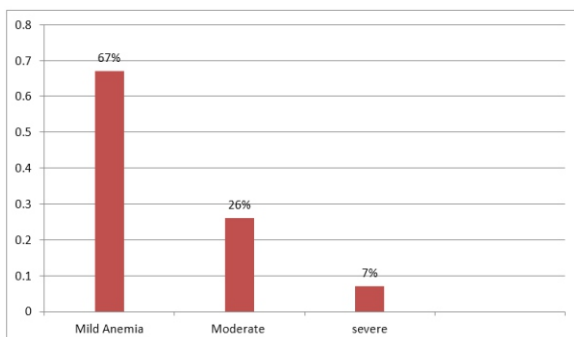
Fig1: Severity of Anemia

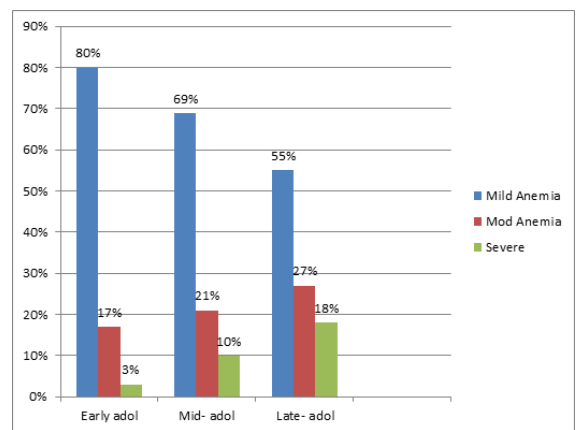**Fig 2: Severity of anemia with increasing age**

Table 1: Under-nutrition based on Body Mass Index among the tribal adolescent girls

Body Mass Index BMI (n= 200)	Early adolescence (10-13 years age)	Mid adolescence (14-16 years)	Late adolescence (17-19years)
Overall Thinness (BMI< 18.5) = 127	20	41	66
Mild Thinness (BMI 17 – 18.4)	6	11	13
Moderate Thinness (BMI 16 -16.99)	8	10	16
Severe Thinness (BMI < 16)	6	20	37

Table 2: Logistic regression for Factors associated with anemia among the adolescent girls

Factors	Odds ratio	95% Confidence Interval	p value
Age	3.21	1.12 - 5.22	0.031
Educational status of mothers	3.91	1.99 - 5.89	0.046
Socio-economic status	1.27	0.85 - 2.96	0.378
Awareness about nutrition	6.13	1.48 - 9.22	0.021
Menstrual status	5.12	2.23 – 8.24	0.002
Barefoot walking	3.12	1.28 – 5.44	0.021
IFA intake	5.97	3.33 - 8.32	0.001
Dietary pattern	3.86	1.23 – 6.22	0.012
Thinness based on BMI	4.35	2.28 – 5.15	0.003
Utilization of ICDS services	3.18	1.39 – 6.23	0.048

p value < 0.05 indicates statistically significant association

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