

Original Article

Epidemiology of under-nutrition in Irular tribal pre-school children in Chengam, Tamilnadu, India.

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Received: 02 Feb 2022

Accepted: 27 Feb 2022

Published: 12 March 2022

Abstract

Background: Under-nutrition among the children under the age of five renders them vulnerable to recurrent infections, growth retardation, low efficiency in future and even death. Under-nutrition as a global health problem is indeed of serious concern in tribal community which is a vulnerable sector. Various studies have highlighted the burden of under-nutrition nation-wide among different tribal groups in India. This study is aimed to explore the malnutrition among Irular tribal children in Tamilnadu, India.

Methods: A Community based cross-sectional survey was designed among the 450 tribal mothers and children in Chengam, Tamilnadu, India during January to December 2021. Mothers were interviewed with semi-structured Tamil questionnaire with socio-demographic details, nutrition, health-seeking behavior, Clinical and anthropometric examination of children. Under-nutrition was defined - weight for age (Z-Score) < 2 SD. Median for age and sex-WHO standards. Data was entered in SPSS. Chi Square and Logistic regression were used for analysis. A $p < 0.05$ was considered as statistically significant.

Results: Prevalence of Under-weight was 44%, stunting-28.4%, wasting-37.8% and Severe Acute Malnutrition-8.7%. Majority were females. Overall, the nutritional status was poor. Advancing age, sex, maternal illiteracy, lack of awareness on nutrition, food insecurity and under-utilization of health services were the major underlying determinants.

Conclusion: The burden of under-nutrition is indeed a serious concern in the preschool children in Irular tribes in Tamilnadu, India wherein the socio-cultural, nutritional determinants and health seeking behavior have to be addressed at the level of Primary Health care to combat malnutrition and prevent morbidities as well as mortality.

Keywords: Child, Preschool; Malnutrition; Epidemiology; Indigenous Peoples; Social Determinants of Health.

Cite this article as: Saravanakumar P, Adhilakshmi A.R., Megala M. Epidemiology of under-nutrition in Irular tribal pre-school children in Chengam, Tamilnadu, India. *Soc Determinants Health*. 2022;8(1):1-7. DOI: <http://dx.doi.org/10.22037/sdh.v8i1.37945>

Introduction

Nutritional status of a child depends, not only on the food provided but also on the health care delivery which remains as a basic right of the child. Under-nutrition during the age of first five

years of life leads to irreversible growth retardation as well as impaired efficiency, immunity rendering them vulnerable to morbidities and mortality (1). Globally, under-nutrition is identified as the underlying cause that leads to almost of 50% of all deaths in children under the age

of five and loss of 3 million lives annually (2). In 2016, more than half of all the under-nourished children under the age of five hailed from Asia while 33% were from Africa (3). In India, malnutrition in this vulnerable age is indeed a public health problem as per NFHS4 which had reported the prevalence of underweight among the under-five children to be 35.7% (4). If the burden of under-nutrition is high in general population, then it is indeed important to explore the burden in tribal population which remains underserved and vulnerable sector.

Tribal people are the social groups who are characterized by their distinctive culture, beliefs, traits along with territorial isolation constituting about 8.2% of population in India as a whole (5). Venkat Naidu K had highlighted the burden of high prevalence of under-nutrition among the tribal under-five children in overall India (6). Meshram II et al also reported the high prevalence of malnutrition among the tribal under-five children residing in North India (7). In the state of Tamil Nadu in South India, the tribal population comprises of 1% of total population wherein six tribal groups like Kota, Kurumba, Todas, Malaiyazhi, Irulars and Kaattunaiken have been identified as the primitive tribal communities (8). There is paucity of data on the health and the nutritional status of Irular children in this state. Hence this study was designed to explore the under-nutrition and the determinants among the Irular tribal preschool children in Tamil Nadu, India.

Methods:

A Community based cross-sectional study was designed and conducted among the Irular under-five children and their mothers residing in the tribal settlement in Chengam block in Tiruvannamalai HUD in Tamilnadu, South India (with total tribal population of 22,486) chosen at random during the period January 2021 to December 2021. Uposoma Dey et al had reported in their systematic review, that the prevalence of under-nutrition among the

tribal under-five children in the Indian country was 42.9% (9). Based on this, the sample size for this study was calculated as 450 (alpha at 5, 95% CI, Absolute precision of 5, 10% for non-responsiveness). After Institutional Ethics Committee clearance and prior permission from the Public Health authorities, local tribal leaders, the mothers with their tribal preschool children were chosen by simple random sampling as per the family register maintained by the Village health team and were interviewed by house- house visit.

A semi-structured questionnaire in regional language, Tamil was administered which contained the following– details of socio-demographic characteristics, details of antenatal period, delivery, postnatal period, infant feeding practices, nutrition, Family food security based on USAID- HFIAS (10), Health seeking behavior for immunization, minor ailments, clinical examination and anthropometric measurements of the children. Underweight was defined as follows- weight for age below -2 SD Median for age & sex, Z score as per WHO growth standards, stunting was defined as height for age below -2 SD Median for age & sex and wasting was defined as weight for height below - 2 SD Median for age & sex. Mid arm circumference (MUAC < 13.5cm was defined as under-nutrition. Severe Acute Malnutrition (SAM) was defined as the weight for height below -3 SD Median for age & sex, MUAC < 11.5cm. Data was entered in SPSS and analyzed. Descriptive statistics like mean, SD, proportion were used. Chi Square test & logistic regression were used for analysis. A p value<0.05 was considered as statistically significant.

Results

About 450 tribal mothers with their children
Table.1: Age and gender distribution of the tribal children

Age	Male n=248	Female n=202	Total n= 450	Percent
< 1 year	51	45	96	21.3
1-3 years	79	80	159	35.3
3-5 years	118	77	195	43.4

Table.2: Details of family and environmental sanitation:

No.	Parameters	N=450	%
1	Type of house		
	Katcha (mud)	407	90.4
	Semi-pucca (Thatched roof)	43	9.6
2	Type of family		
	Nuclear	325	72.2
3	Source of water		
	Well	-	-
	Use of Pump	410	91.1
	Use of Pipe water	40	8.9
4	Sanitation practices		
	Open defecation	367	81.6
5	Use of toilet facility in the house		
	yes	83	18.4
6	Bare foot walking		
	Yes	364	80.9

had participated in this study. Age and gender distribution is given in Table 1, wherein majority (43.4%) was in the age 3 to 5 years. In the age group < 1 year, the mean age was 9 months $\pm$ SD 1.53, in the age group 1-3 years, the mean age (months) was 23.09 ± 7.83 followed by the age 3 to 5 years wherein the mean age was 46.9 months $\pm$ 7.36. Mean age of the mothers was 23.99 ± 4.72 . Majority of mothers (65.6%) were illiterates and about 61.8% were involved in coolie daily labor. About 34.7% of fathers were involved in unskilled job and the rest in semi-skilled job. About 82.4% were Hindus and the rest were Christians. All were of lower socio-economic status and the details of family, environment and sanitation practices are described in Table 2. Higher order birth (3 and above) was observed among 32.3% of the study participants. Almost all the tribal mothers had attended at least three antenatal visits with the Village Health nurse and except three mothers all had

institutional deliveries with 21% being LSCS done in Govt. Medical College in the district. About 87% were born term and 34% had low birth weight < 2.5kg. About 33% of children were given pre-lacteal feeds with colostrum discarded, about 46% only were exclusively breastfed and about 53% of child had experienced delayed complementary feeding (> 8 months of age) in this study group. Details of infant feeding and child feeding practices are described in the Table 3. Majority of the mothers had the practice of seeking the health centre for minor ailments in their children with only 10% practiced the use of native medicines. Almost 88% of children were fully immunized along with Vitamin A supplementation by the village health nurse. There was no regular monitoring of health and nutritional status of the children done by the health personnel. About 32% of the mothers had not utilized ICDS for their children due to the location of ICDS centre at a long

Table 3: Details of practices of Infant feeding and child feeding.

No.	Feeding practices & Nutrition	(n = 450)	Frequency%
1	Poor maternal awareness	252	56
2	Exclusive breastfeeding	207	46
3	Delayed introduction of complementary feeding (beyond the age of 8 months)	239	53.1
4.	Inadequate calorie intake	193	42.8
5	Inadequate protein intake	210	46.6
6.	Lack of nutritional supplements	186	41.3
7.	Family food insecurity	157	34.8

Table 4: Clinical features of nutritional deficiencies in the participants:

No.	Clinical Parameters	N=450	%
Hair color			
1	Loss of pigment	144	32
EYES			
2	Pallor of Conjunctiva - yes	311	69.1
	Bitot's spot - yes	33	7.3
EAR			
3	Wax - yes	228	50.7
	Pus - yes	95	21.1
ORAL CAVITY			
4	Presence of Cheilitis - yes	198	44.0
	Presence of Glossitis - yes	135	30.0
	Presence of Dental Caries - yes	281	62.4
Hygiene practices			
5	Skin for Impetigo - yes	82	18.2
6	Hygiene in nails +	60	13.3
7	Palmar pallor +	85	18.9
8	Goitre	nil	--

distance from their settlement area and also due to reasons like job. On clinical examination, majority of the tribal children had features suggestive of Macro and

Table 5: Determinants for under-nutrition of the study participants.

No.	Determinants	Odds ratio(CI)
1.	Advancing age of child (>3years)	2.45 (1.33-4.09)
2.	Sex of the child	1.26 (1.01 -2.42)
3.	Poor environmental sanitation	2.21 (1.47-3.74)
4.	Infant feeding practices	7.42 (4.01-11.94)
5.	Inadequate nutrition	6.48 (3.01-9.94)
6.	Family food insecurity	2.78 (1.18-4.43)
7.	Health seeking behavior	1.71 (1.16-2.82)

micro-nutrient deficiencies with no systemic involvement which are described in Table 4.

The prevalence of under-nutrition as per weight for age below 2 SD for Median age & sex in this study group was observed to be 44% (39.5 to 48.6 CI) with severe Acute Malnutrition (SAM) as 8.7% (Fig 1). Majority of the undernourished were females (64.1%). Overall, about 28.4% were stunted (Fig.2), 37.8% of the children were wasted (Fig.3) and 41.2% had MUAC < 13.5cm suggestive of under-nutrition. The overall nutritional status of the tribal preschool children was observed to be poor. Major epidemiological determinants of under-nutrition in this study group were the age of the child (>3 years), sex, order of birth, maternal illiteracy, not exclusively breastfeeding for first six months, delayed complementary feeding, inadequacy of nutrition, Family food insecurity, no regular monitoring of nutritional status and lack of nutritional supplements which were statistically significant (Table 5).

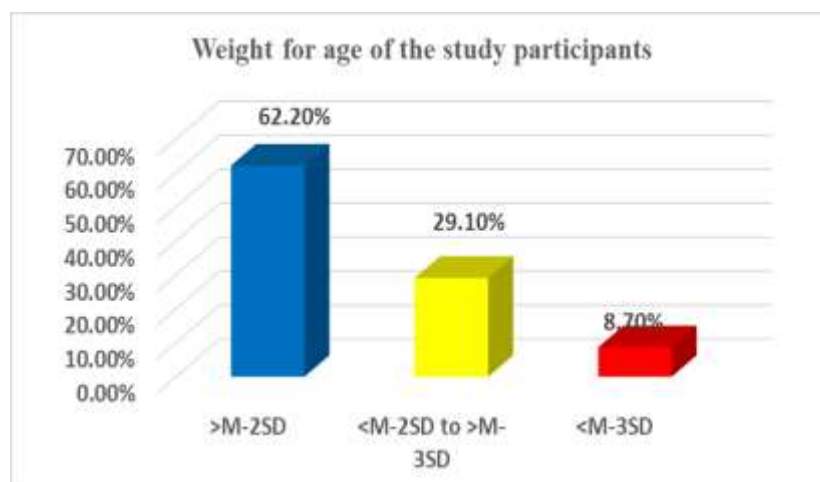


Fig.1: Prevalence of under-weight as per weight for age

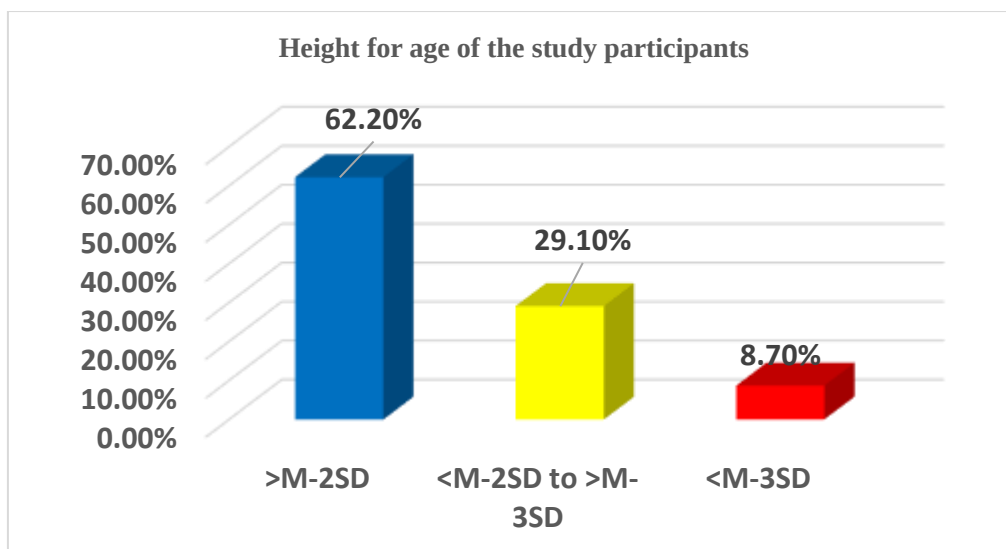


Fig.2: Stunting as per Height for age

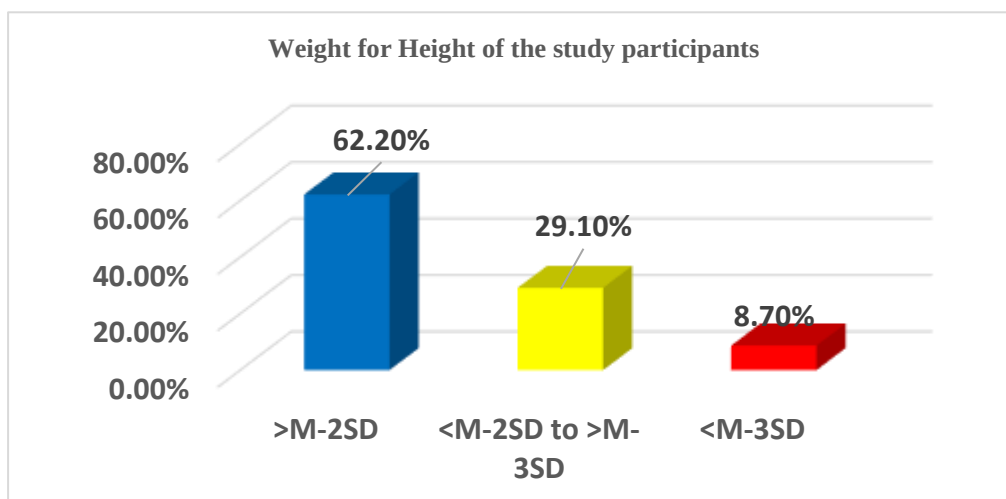


Fig.3: Wasting as per weight for Height

Discussion

Nutrition during the first 1000 days beginning from the pregnancy till the start of the third year of life remains the corner stone in the life of every child for its growth and development and any insult in the form of malnutrition during this crucial period leads to irreversible stunting of growth, impaired cognition and low efficiency in future life (1). Under-nutrition not only leads to recurrent infections, morbidities but also is the underlying cause leading to almost half of all deaths in the children under the age of five, globally (2,3). Our study was designed to explore the epidemiology of under-nutrition among the tribal preschool children in Chengam block of Tamil Nadu, India wherein the

prevalence of under-weight was observed to be 44% (39.5 to 48.6 CI). This is quite high as reported by Kshtriya GK et al among the under-five children in tribal community in Himalayas, Desert and Coastal ecology with reference to Dhodia, Kinnaura and Bhil tribes in India (11) and that reported by Venkat Naidu K (6). The high prevalence of stunting and wasting was also an important concern in terms of retarded growth and predisposition to recurrent infections. Indeed, the high prevalence of under-nutrition remains as a serious public health problem among this vulnerable sector of the society. The severity of under-nutrition was observed to increase with advancing age of the children i.e. Severe Acute Malnutrition(SAM) was higher among the children above the age of

three years as reported by Uposoma Dey et al which reflects the mismatch of demand and supply of nutrients with advancing age (9). In this study, female children were suffering from higher prevalence of under-nutrition than their male counterparts as similar to that reported by Vinod Mishra et al wherein the role of sex differentials in the practice of childhood feeding had a negative impact on the health and nutritional status of the children (12). It was observed that the higher order birth (3 and more children) in the family had an association with under-weight among the study participants wherein adopting of practice of family planning methods in this community was poor due to socio-cultural beliefs. The overall environmental sanitation was observed to be poor in this sector which had a deleterious impact on the nutritional status of the child as similarly reported by Uposoma Dey et al that access to clean water, safe environment and good sanitation were one of the major determinants of health and good nutritional status of the growing child (9).

Meshram II et al had indicated that educational status of the mothers and their awareness on nutrition were one of the important determinants of the health and good nutritional status of the preschool children (7). In this study also, it was evident that maternal illiteracy and lack of awareness on infant and child feeding practices had a played a negative impact on the nutritional status of the tribal children. Only 46% of the mothers had successfully practiced exclusive breastfeeding for first six months of age in their children while cultural practices of discarding colostrum and using pre-lacteal feeds like honey, sugar water were observed to be high in this community. Mridula Bandyopadhyay et al had reported such similar practices in the tribal community in West Bengal in India (13). Dash et al too had highlighted the harmful practice of discarding the colostrum and the practice of using prelacteal feeds in the Santal tribes settled in Orissa, India (14). Fear of insufficient

breast-milk and cultural practices had played a role in this practice among the tribal community. Though the village health nurse had given health education to avoid harmful practices, still there exist challenges in the adoption of healthy behaviour. Also, the delayed introduction of complementary feeding beyond the age of 8 months to 12 months had a negative impact on the nutritional status of the children. Arun Gupta et al too had indicated that timely complementary feeding between 6 to 8 months of age and appropriate feeding had played a vital role in normal nutrition and growth of infants and children under the age of five (15). There was inadequate calorie intake and protein intake in the regular diet of these children added to higher prevalence of 34% of food insecurity in the family which all had been the major determinants of under-nutrition in this tribal community. Meshram II et al also had stressed that inadequate calorie, nutrients, protein in the regular diet were the important predictors of under-weight, stunting and wasting in the children under the age of five (7). Meshram II et al also had highlighted that the awareness among the mothers regarding good nutritious food, utilization of health services for immunization, minor ailments, nutritional supplementation like ICDS services are predictive factors for normal growth and development of the preschool children (7).

In this study, majority of the mothers had availed the following health services for their children like Immunization, vitamin A supplementation, treatment of minor ailments like respiratory infections, Diarrhoea in the nearby Primary Health Centre. But still the practice of using native medicines, non-utilization of ICDS services, lack of regular monitoring of nutritional status of the growing children existed in this vulnerable population which is indeed a challenge to the health system. Uposoma Dey et al also had emphasized the need for utilization of all health services by the tribal community at the level of Primary

Health care to reduce the burden of recurrent infections and malnutrition in these children (9). The limitations of the study are as follows: there is a need for qualitative research to explore more about the socio-cultural beliefs of this community as well as larger sample have to be involved to explore more of this public health issue. Also, this study did not focus on laboratory-based investigations for the under-nutrition which will be scope of future studies.

Hence there is an urgent need to improve the overall socio-economic status, educational status, reduce higher order birth in the families, improve food security, health education to increase awareness on the ideal practices adopted in Infant and child feeding among the mothers, to improve their health seeking behaviour for better utilization of all health services at the level of Primary Health Care to combat malnutrition in their children as well as reduce morbidities and mortality in this vulnerable sector of society.

Acknowledgement

We acknowledge and extend our gratitude to the Public Health authorities, Health personnel and local tribal leaders and all the tribal mothers with children who had participated in this study.

Authorship Criteria

P.Saravanakumar: concept and design of study, acquisition of data or analysis & interpretation; A.R. Adhilakshmi: drafting the article and revising it critically for important intellectual content; Megala.M: editing, review and final approval of the version to be published

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