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Research Article

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Severe Acute Malnutrition in Tribal Under-Five children in Javvadu Hills, Tamil Nadu

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ABSTRACT

Background: Severe acute malnutrition (SAM) in under-5 children is an important public health problem that is associated with high mortality and long-term health consequences. Globally, 26 million children suffer from SAM, of these more than 8.1 million children are in India. National Family Health Survey-4 indicates a higher prevalence of SAM (7.5%) in the general population than the previous report (6.4%). Indeed the burden of malnutrition is expected to be higher among the tribal children in India. Hence this study aimed to explore the Severe Acute Malnutrition among the tribal under-five children in Javvadu Hills of Tamil Nadu.
Methods: A community-based cross-sectional survey was conducted among 450 tribal under-five children and mothers residing in Javvadu Hills in Thiruvannamalai District, Tamil Nadu from September 2019 to Feb 2020 using PPS-Cluster sampling technique with semi-structured questionnaire with anthropometric measurements. Data were analyzed using SPSS. Chi-square test and logistic regression were used.
Results: Out of 450 children, about 42(9.3%) had weight-for-Ht (M<-3S.D.) suggestive of SAM. Among those with SAM, 71% were females. About 66% had low birth weight, 79% were Anemic, 81% had calorie and protein inadequacy, 88.1% were partially immunized and 88% had food insecurity and 78% had the recurrent illness. Maternal illiteracy, poor awareness of nutrition, Food insecurity and poor access to health facilities were significant factors in SAM.
Conclusions: SAM is highly prevalent among tribal children, a serious threat to child survival and morbidity. Improving literacy, Socioeconomic status, nutritional awareness, food security, health-seeking behaviour will alleviate this public health problem.

Key-words: Nutritional awareness, Maternal illiteracy, Severe Acute Malnutrition, Tribal

INTRODUCTION

Malnutrition is characterized by a pathological condition resulting from the lack of energy as well as protein in different proportions, which can also be aggravated by recurrent infection Malnutrition includes being stunted (low height-for-age (HAZ), wasted (low weight-for-height (WHZ) and underweight (low weight-for-age) [1,2]. Globally Malnutrition affects one in every three people afflicting all age groups especially the poor and vulnerable and leads to approximately 10.4 million annual deaths in under-five in the developing world [3]. In developing countries, malnutrition is the most important risk factor for causing about 300,000 deaths annually directly or indirectly for more than 50% of all deaths in children [4,5]. As per the Global Hunger Index 2008, India scored 23.7 points and was placed in 66th position among 88 countries [6,7]. Expert Committee in ICMR had stated in malnutrition report in 2010 suggests that about 39% of Indian children had stunted growth and 42% suffered from underweight [8].

Severe acute malnutrition (SAM) defined as severe wasting (weight-for-height Z score<-3.S.D.) with or without nutritional edema is a life-threatening condition requiring urgent intervention to prevent mortality, promote recovery and reduce morbidity like long term health consequences [8]. As per NFHS3, the reported prevalence of SAM in India was 7.9% [9] and NFHS4,

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reported 7.4% which is a quite significant problem in the general population itself [10]. Indeed the Severe Acute Malnutrition is a serious issue in the tribal population who are already a vulnerable sector of the nation. India is home to almost half of the tribal population distributed globally [11]. Tribal people are social groups characterized by more superstitious, illiterate with traditional, distinctive culture and beliefs with socio-economic backwardness accounting for 8.2% of the total population [11,12]. Kshatriya *et al.* [13] and Dutta *et al.* [14] had reported widespread prevalence of Under-nutrition among the tribal children in the Himalayas, Coastal and Desert ecology in India. Samiran *et al.* [15] also reported that malnutrition is highly prevalent in tribal children under the age of five in West Bengal. There is a paucity of data on Under-nutrition and SAM in tribal under-five children in Tamil Nadu [16], which is home to a tribal population of 7, 94,697 as per Census 2011 [17,18]. Hence this study was designed to assess the prevalence of malnutrition among the under-five children in Javvadu Hills in Thiruvannamalai District of Tamil Nadu, India.

MATERIALS AND METHODS

A community-based cross-sectional survey was planned to assess the under-nutrition among the tribal under-five children of sample size 450 based on Probability Proportional sampling (PPS) Cluster sampling technique in tribal villages in Javvadu Hills of Thiruvannamalai District in Tamil Nadu chosen at random from September 2019 to February 2020.

This district has a tribal population of 46,440 who have settled in Javvadu hills with 118 tribal villages with about 4814 children under the age of five years. About 30 clusters with 15 children in each under the age of five were included in this study that was drawn by simple random sampling in each cluster using the under-five register maintained by the village health nurse. Children with developmental delay, documented chronic systemic diseases, metabolic disorders on special diets were excluded from the study.

Mothers were interviewed with a semi-structured questionnaire in Tamil, which included socio-demographic details, Maternal history on antenatal, intra-natal, postnatal details, breastfeeding and complementary feeding practices, Immunization, nutrition, food security based on USAID (HFIAS)[18], health-seeking behaviour and case format for clinical and anthropometric assessment of children and Hemoglobin estimation. The study on Severe Acute Malnutrition among the tribal under-five children is a part of the large cross-sectional survey, which is presented as follows. SAM was defined as weight for height below-3 S.D., Mid arm circumference <11.5 cm.

Ethical Approval- Prior permission from Institutional Review Board in Madras Medical College, Chennai was obtained and permission from public health authorities & local tribal leaders.

Statistical Analysis- Data was entered in MS Excel, analyzed in SPSS version 16 with descriptive statistics like Mean, Proportion and inferential statistics as Chi-Square test and logistic regression.

RESULTS

This community based cross-sectional study on overall under-nutrition among 450 tribal under-five children in Javvadu hills in Thiruvannamalai District of Tamil Nadu revealed a high prevalence of Severe Acute Malnutrition as 9.3% (42 children) of whom 71% were females. The mean age of children with SAM was 3.8+/- 0.89. The majority of the children were more than 3 years of age.

Table 1 show the socio-demographic details wherein all were of lower socio-economic class. About 66% of these children were born with low birth weight (birth wt.<2.5kg). There was poor awareness among the mothers of these children regarding ideal infant feeding practices and ideal nutrition during the age of under-five.

Table 1: Socio-demographic details of children with SAM

S.No	Variables	N= 42 (%)
1.	Age more than 3 years	29 (69)
2.	Male Female	12(29) 30(71)
3.	Higher-order birth (3 and >)	28(66)
4.	Maternal illiteracy	34 (81)
5.	Open defecation practices	35(83)
6.	Unsafe drinking water	31(74)
7.	Barefoot walking	37(88)

N= Frequency

Table 2 describes the nutritional determinants of Severe Acute Malnutrition. About 88% of them were not exclusively breastfed and only 45% had complementary

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feeding started at 6 to 8 months of age. There was a high prevalence of calorie and protein inadequacy in the diet of these children, which was about 81%. Only 11% of the children with Severe Acute Malnutrition had utilized ICDS for supplementary nutrition, which was due to the long distance of the ICDS centre from their residence.

Table 2: Nutritional determinants of SAM

S.No	Variables	N= 42 (%)
1.	Exclusive breastfeeding	5 (12)
2	Complementary feeding 6 to 8 months	19(45)
3	Calorie and protein inadequacy	34(81)
4	ICDS nutritional supplements – utilization	5(11)
5	Vitamin A supplementation	9(21)

N= Frequency

Table 3 describes the prevalence of Anemia and the severity, where about 79% were anaemic of which the majority were girls. The severity of anaemia also was found to be higher in girls. Clinically about 80% had pallor, 66% had Bitot spots, 88% had dental caries and 67% had impetigo, unclean nails and dress.

Table 3: Prevalence of Anemia among the tribal children

Hemoglobin (gm/dl)	n=42	Male	Female	Percentage (%)
>11	9	3	6	21
9-11	18	5	13	43
7-9	11	4	7	26
<7	4	1	3	10

n= Frequency

Table 4 shows the health seeking behaviour of the mothers for their children wherein about 88% were partially immunized for the age and poor utilization of health services provided by the Primary Health centre in the Hills due to difficult terrain and poor access to transport facilities with a high prevalence of recurrent infections like respiratory tract infections and Diarrhoea. Only 21% of children were monitored for weight gain by the health personnel and regular deworming was done in 16% of these children with Severe Acute Malnutrition.

Table 4: Health seeking behaviour of the mothers of children with SAM

S.No	Variables	N= 42 (%)
1.	Partial Immunization	37(88)
2.	Recurrent respiratory infections (>3 episodes in past 3 months)	27(64)
3.	Recurrent Diarrhoea (>3 episodes past 3 months)	33(78)
4.	Monitoring by health Personnel	9(21)
5	Regular deworming	7(16)

N= Frequency

The major determinants of SAM in these children were the age of children (>3 years of age), female gender, higher-order birth (3 and above), inadequate nutrition, food insecurity in family and under-utilization of health services with statistical significance as described in Table 5.

Table 5: Determinants of SAM

S.No	Determinants	OR (CI)
1.	Age of child 3 & above	2.4 (1.22–3.12)
2.	Female Gender	3.1 (2.12–4.11)
3.	Higher-order birth	1.2 (1.01–2.38)
4.	Inadequate Nutrition	3.84 (2.19–5.65)
5.	Family Food insecurity	1.8 (1.16–2.82)
6.	Under-utilization of Health services	2.12 (1.41–3.58)

OR (CI)= Odds Ratio (Confidence Interval)

DISCUSSION

Under nutrition renders the children under the age of five years at a greater risk of acquiring recurrent infections, which may be associated with delayed recovery, stunting of growth potential, low efficiency in a future life as well as mortality [1,2]. Malnutrition is the leading cause of almost half of all deaths in under-five

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age worldwide, which is a preventable one [3]. In India, also almost 42% of children under the age of five suffer from under-nutrition particularly Severe Acute Malnutrition (SAM) accounts for 7.4%, which needs emergency attention to prevent deaths [10]. In tribal populations, SAM is reported to be higher which needs to be explored. This study conducted among the tribal under-five children in Javvadu hills of Thiruvannamalai district identified the prevalence of SAM to be 9.3% (CI-8.1 to 10.4), which was higher than the national figures [10]. Kshatriya *et al.* [13] reported the prevalence of SAM to be 8.1% among the tribal children in the Himalayan region in North India. SAM was observed to be higher as age advanced in the under-five population may be due to mismatch of need and intake of nutrients in the diet. Dutta *et al*. [14] also reported the prevalence of under-nutrition to increase with advancing age in the tribal children in Garhwal Himalayas attributed to demand and supply mismatch in nutrients. Rao *et al*. [19] had stressed that malnutrition sets in if nutritional demand was not met as age advanced from infancy to five years of age in their study among the tribal children in Andaman and Nicobar. Also, the severity of under-nutrition was found higher at the age of 5 years in tribal preschool children as reported by Rekha Rachel Philip et al in the Wayanad district of Kerala [20].

In this study, Severe Acute Malnutrition was observed to be higher in female children than males as reported by Sahu *et al*. [21]; Soudarssanane *et al*. [22] in tribal children in India. Also, about 79% of children were suffering from Anemia in this study, which is higher than that reported as 62% by Venkat *et al.* [23] in their study. Anaemia is indeed an important public health problem among the tribal children in the under-five population which not only affects their growth and development but is also an important risk factor for recurrent infections even death [24,25]. Practices like open defecation and barefoot walking were observed to be high in our study which is indeed an important risk factor for worm infestation and anaemia in the under-five age group as also reported by Sreedhar *et al*. [26].

In this study, we observed that challenges like the low prevalence of exclusive breastfeeding, delayed complementary feeding practices, poor awareness among the mothers on nutritional foods thereby high prevalence of calorie and protein inadequacy in the regular diet of these children. Soudarssanane *et al.* [22] also reported that awareness on giving colostrum, exclusive breastfeeding, timely complementary feeding and good nutrition was poor among the tribal mothers thereby an important determinant in the high prevalence of under-nutrition among the tribal children. We also observed that the mothers failed to utilize the ICDS services regularly due to the distance of ICDS centres from their residence which was mostly in difficult hilly terrain also immunization services, regular deworming and monitoring of health status of these children were also under-utilized due to the inaccessibility of the health care centre. Meshram II et al also reported that utilization of ICDS services was observed to be low among the tribal mothers in their study secondary to inaccessibility to health services [27]. Rao *et al*. [28] also reported that recurrent infections and poor monitoring of nutrition of the tribal children be an important factor in the management of under-nutrition among tribal pre-school children. The limitations of this study are as follows like larger sample size involving still more difficult areas of the tribal settlement; qualitative research on the beliefs of the mothers will throw more light into this public health problem. Also, we have not investigated for Hemoglobinopathies and other investigations for under-nutrition which will be the future scope of research.

Thus the major determinants of severe acute malnutrition among the tribal under-five children observed in this study were low birth weight, higher-order birth, inadequate nutrition, food insecurity in the family and under-utilization of health services. Dolla *et al.* [29] also reported that higher-order birth, low birth weight, low prevalence of exclusive breastfeeding and poor maternal awareness on nutrition were important determinants in under-nutrition which have to be prevented at the primary care level right from antenatal care throughout infancy to five years to prevent the malnutrition in this age group. Reddy *et al*. [30] also reported that a holistic approach is needed to combat malnutrition among the tribal under-five children. Hence we need to focus on primary care on improving antenatal care, awareness on exclusive breast feeding, adequate nutrition, regular monitoring of health status and utilization of all health services provided to the under-five children to the fullest extent to prevent malnutrition and mortality due to severe acute malnutrition among this vulnerable sector.

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CONCLUSIONS

Severe Acute Malnutrition is highly prevalent among tribal children under the age of five years than the general population which indeed renders the child succumb to recurrent infections as well as a serious threat to survival. There is an urgent need to focus on improving socio-economic status, maternal literacy, awareness on nutrition, food security, accessibility to health services and health-seeking behaviour among this tribal population to alleviate the major public health problem of Malnutrition and thereby reduce the morbidity and mortality in the under-five population.

Furthermore, studies that will focus on the health of the tribal population as a whole, their socio-cultural beliefs, awareness of all the health services provided by the public health sector and difficulties in utilization of Primary health care are needed towards the long term prevention of under-nutrition in this vulnerable sector of the society.

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CONTRIBUTION OF AUTHORS

Research concept- Saravana Kumar P
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