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PREVALENCE AND DETERMINANTS OF NUTRITIONAL STATUS AMONG PRESCHOOLERS IN A RURAL AREA OF THIRUVANANTHAPURAM DISTRICT, KERALA

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Abstract

Malnutrition among preschoolers is of grave concern and it lingers unabated in India, despite nutritional intervention policies of the State. Though Kerala is far ahead of other States in health outcomes, the triple burden of malnutrition is rampant. A micro-level analysis is conducted to assess the prevalence and determinants of stunting and underweight among 189 preschool children in Vithura, a tribal-dominated rural Panchayat in Thiruvananthapuram district of Kerala. In the study area, 38 per cent of children are stunted, which is higher among children belonging to tribal communities, and 19 per cent of preschool children are underweight. The occurrence of underweight is 27 per cent among tribal children, whereas it is 17 per cent among non-tribals. Caste, asset ownership status and maternal height are significantly associated with stunting, whereas underweight is significantly associated with asset ownership. In the logit model, caste significantly contributes to normal height for age. It is found that high asset group and age of the child being '13-36' months increase the probability of being not underweight.

Keywords: Stunting, Underweight, Anthropometric Assessment, Preschool Children, Kerala.

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Introduction

India's dismal performance in Global Hunger Index 2021(von Grebmer et al., 2021) rings an alarming wake-up call. Despite relatively rapid economic growth, surplus food production, and a multiplicity of government programmes, prevalence of stunting, wasting, and underweight are still high. Malnutrition continues to plague the lives of vulnerable groups. At the global level, more than thirty-three per cent of all child mortality can be attributed to malnutrition (World Health Organisation (WHO, n.d.). Thirty-five per cent of children below five years are chronically malnourished or stunted in India. One out of every five children is wasted; thirty-two per cent of children under five are underweight (IIPS & ICF, 2021). Significant inequalities in nutritional outcomes are the consequence of inequities arising from the marginalisation or disempowerment of individuals or social groups (Micha et al., 2020). Reduction in malnutrition among children has not kept pace with income growth (Ramalingaswamy et al.,1996; Panagariya, 2013). Good nutrition is a critical input in averting not only diseases linked to impoverishment but also chronic diseases, affecting irrespectively the haves and the have-nots (Banerjee & Duflo, 2011). Investment in early childhood is a critical input in determining subsequent cognitive development. Nutrient-deficient children have inadequate physical and cognitive development as well as display dismal performance in schools (Moock & Leslie, 1986). The onslaught of various illnesses, directly or indirectly linked to undernutrition, affects health and educational attainment of these malnourished children, thereby lowering future productivity and income-earning capacity (Thomas & Strauss, 1997).

A number of conceptual models tried to analyse the multitude and complex set of factors that determine nutritional outcomes (United Nations Children's Fund (UNICEF), 1990; Smith & Haddad, 2000; FAO, 2007). Three critical inputs, namely food, health, and care influence nutritional outcome (UNICEF, 2013). Studies on determinants of malnutrition have identified demographic, socio-economic, childcare variables, availability of clean water, proper sanitation, maternal nutrition, status of women, child feeding practices, and access to healthcare as the plausible factors leading to child undernutrition (UNICEF, 1990; Ramalingaswamy et al., 1996; Engle et al., 1999; Smith et al., 2003; Nandy et al., 2005).

According to the latest Comprehensive National Nutrition Survey 2019 (CNNS), one in every five children (20.5 per cent) is malnourished in Kerala. Kerala has shown dismal performance in NFHS 5 compared to the previous rounds; stunting increased from 19.7 per cent to 23.4 per cent, wasting marginally increased from 15.7 to 15.8 per cent and underweight increased from 16.1 to 19.7 per cent (IIPS &ICF, 2021). In Kerala, stunting and anaemia are highest among tribal children under 5 (International Institute for Population Sciences (IIPS) &ICF, 2021). Using primary data, the study assesses the incidence and determinants of anthropometric failures among children less than five in a rural area of Thiruvananthapuram district of Kerala.

Methodology

Study Design: Various rounds of NFHS provide the macro-level statistics on the nutritional status of children under five in India. Often, aggregate results may be misleading as the severity of malnutrition at the disaggregated level may be masked by the average and may fail to capture the real cause of the problem at the micro-level. Most of the studies at the micro-level focused on the high-burden malnutrition States in India. Hence, researchers seemed uninterested in analysing the nutritional status of children in Kerala at the household level.

Malnutrition among children under five is a serious concern among the marginalised, especially the tribal population- 'Adivasis.' Even within districts with a considerable size of tribal population, there are wide inter-district variations in nutritional outcomes. Several existing micro-level studies have either focused on analysing the nutritional outcome of either children of tribal

communities or children of 'other communities' separately and there is a dearth of literature relating to cross-sectional studies among the nutritional status of preschoolers in a tribal-dominated Panchayat of Kerala. Hence, an attempt in this direction is undertaken.

The tribal population of Kerala is geographically concentrated. Out of the 14 districts, those having at least five per cent of the tribal population have been considered for identifying the closest lying district from Kerala State average in terms of anthropometric parameters. From the Kerala average of stunting, wasting and underweight (based on NFHS 4), the mean absolute deviation of these indicators, scaled by the State average, are calculated for six districts. The districts are ranked based on the combined sum so obtained. Based on these calculations, Thiruvananthapuram is the closest to the Kerala State average and is hence chosen for the study. Out of the total tribal population of Kerala, 5.52 per cent live in Thiruvananthapuram district, and the tribal group of Thiruvananthapuram are called Kanikkars.

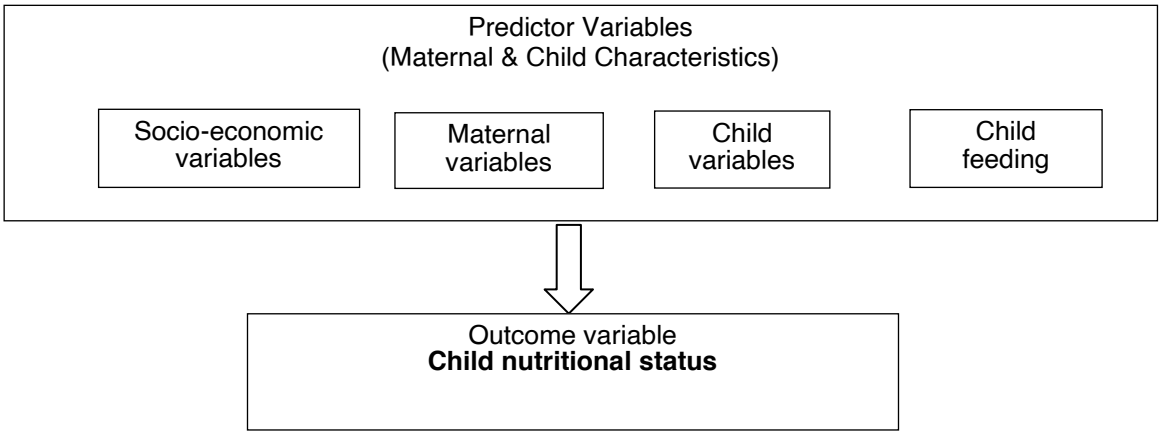
The total child population of Thiruvananthapuram district is 2,62,118 (Government of India, 2011 b). As per the 2011 census, the district has 7,822 tribal households. The tribal population in the district is spread across 14 Panchayats in 6 blocks. Vellanad block has the highest percentage of tribal population to total population. In Vellanad block, Vithura Panchayat has the highest tribal households - 1,644 households in 78 settlements. The total child population (0-6 years) of Vithura Panchayat is 1669. Approximately 10 per cent of the total population is taken as the sample size. Against this backdrop, a cross-sectional study was conducted among 189 preschoolers (0-59 months) in Vithura, tribal-dominated Panchayat in Thiruvananthapuram district, Kerala. Vithura Panchayat is situated in the foothills of the Western Ghats and is 37 kilometres away from the State capital, Thiruvananthapuram. Quota sampling procedure was employed and proportional weightage was assigned for socio-demographic characteristics, namely gender and caste in the sample design. Each Anganwadi under the Integrated Child Development Scheme (ICDS) has a complete list of children under five, coming under its geographical jurisdiction. Samples were randomly selected with the assistance of ASHA workers, Anganwadi teachers and tribal promoters. The respondents were the mothers of preschool children and not the head of the household, and that is a limitation of the study. A pre-tested structured interview was conducted to elicit socio-economic, household, child, maternal characteristics, and child feeding practices.

Evaluation of Child Nutritional Outcome

Conventionally, nutritional assessment is gauged using anthropometric indicators, namely low height for age or stunting, low weight for age or underweight and low weight for height or wasting. This study analyses the nutritional outcomes in terms of stunting and underweight. WHO child growth standards are used to determine the nutritional status. For children below two years, recumbent length in cm is taken and for children aged 25- 59 months, height is measured using inch measuring tape. The height of the mothers is also taken in a similar way. Calibrated weighing machine has been used to measure the weight of children and their mothers. Maternal nutritional status is gauged based on Body Mass Index (BMI). To avoid any possibility of errors in measurement, weight and height measurements were taken with the assistance of trained healthcare professionals. Anthropometric measurements were used to determine Z scores for height for age (HAZ) and weight for age (WAZ), using WHO Anthro software. Z score cut-off is -2 SD (WHO, 1986). Children whose HAZ and WAZ are less than -2 standard deviations from the median of the reference population are categorised as stunted and underweight respectively (WHO, 2010). Stunting is a symptom of past undernutrition and underweight is a symptom of either past or current undernutrition and is a composite measure of stunting and wasting. Since clinical assessment of nutritional status is beyond the scope of social science research, the present study relies on anthropometric methods to ascertain nutritional status, which is another limitation of the study.

Figure 1

Conceptual Framework for the Study of Child Nutritional Status and its Determinants



Source: A simplified framework developed by the authors.

The conceptual framework used in the present study is given in Figure 1. The predictor variables in the model are maternal and child characteristics and the variables pertaining are divided into socio-economic variables, maternal variables, child variables, and child feeding practices. These, in turn, affect the child nutritional status, and the outcome is measured using anthropometric indicators.

Methods

Chi-square test analyses the association of stunting and underweight with selected explanatory variables. Binary logistic regression models analyse the effects of explanatory variables on normal height for age and normal weight for age.

Dependent variables: Normal height for age, and normal weight for age for children aged 0-59 months. The binary dependent variables for the logistic regression model are: 0=stunted,1=Normal; 0=underweight,1=Normal.

Table 1

Description of Explanatory Variables

Categories	Explanatory Variables	Description
Socio-Economic Characteristics	Caste	Tribal=0; Non Tribal =1
	Asset Position	Low asset group-0, High asset group-1
Maternal Characteristics	Mother's Education	Up to 10^{th} -0, Plus two-1, Graduation and above-2
	BMI status of mother	Underweight-0, Normal-1, Overweight-2
Child Characteristics	Age	Up to 12 months-0, 13-36 months -1, 37-59 months-2
	Birth interval	Less than two years -0, More than two years-1
Child feeding Characteristics	Duration of breastfeeding	Less than one year-0, Between one and two years-1, More than two years-2
	Initiation of supplementary feeding	Less than six months-0, More than 6 months -1

Source: Field Survey, 2019.

The reference category is assigned the value zero.

Results

Characteristics of Study Population: In Vithura, out of 189 samples, 33 children (17 per cent) are tribal, whereas non-tribal communities constitute SC (11.6 per cent), OBC (30.7 per cent) and General (40.2 per cent). Gender-wise analysis shows that 51.5 and 48.5 per cent are female and male children, respectively, and the mean age of mothers is 28 years.

Table 2

Distribution of Children by Selected Explanatory Variables Associated with Stunting and Underweight

Characteristics	Category	Height for age		Weight for age		Number of children
		Normal (Height for age≥-2SD)	Stunted (Height for age<-2SD)	Normal (weight for age≥-2SD)	Underweight (weight for age<-2SD)	
Caste	Tribal	36.4	63.6	72.7	27.3	33
	Non Tribal	67.3	32.7	82.7	17.3	156
	Test Statistic	c^2 = 11.060; df=1, p = 0.001		c^2 =1.754; df=1, p = 0.185		
Asset Ownership Status	Low Asset Group	52.1		47.9		65.9
	High Asset Group	68.1		31.9		90.5
	Test Statistic	c^2 = 4.893; df=1, p = 0.027		c^2 = 17.819; df=1, p = 0.000		
Child's age	Less than 12 months	56.70	43.30	76.7	23.3	30
	13-36 months	62.90	37.10	84.5	15.5	97
	37-59 months	62.9	37.1	77.4	22.6	62
	Test statistics	c^2 = 0.415; df=2, p= 0.813		c^2 = 1.667; df=2, p= 0.434		
Gender of the child	Male	57.7	42.3	79.40	20.6	97
	Female	66.3	33.7	82.60	17.4	92
	Test Statistics	c^2 = 1.471; df=1, p= 0.225		c^2 =0.319; df=1, p= 0.572		
Birth Weight	Up to 2.5 kg	54.3	45.7	74.3	25.7`	35
	2.5 to 3.5 kg	61.2	38.8	80.6	19.4	129
	>3.5 kg	76.0	24.0	92.0	8.0	25
	Test Statistics	c^2 = 2.992; df=2, p= 0.224		c^2 = 2.997; df=2, p= 0.223		
Mother's education	Up to 10th Std	50.0	50.0	80.6	19.4	36
	Higher Secondary	63.3	36.7	78.6	21.4	98
	Graduation & above	67.3	32.7	85.5	14.5	55
	Test statistics	c^2 = 2.912; df=2; p= 0.233		c^2 = 1.087; df=2; p= 0.581		
Mother's Height	Short (<155 cm)	50.9	49.1	76.4	23.6	106
	Tall (>155 cm)	75.9	24.1	86.7	13.3	83
	Test statistics	c^2 = 12.298; df=1; p= 0.000		c^2 = 3.223; df=1; p= 0.073		

Source: Field Survey, 2019.

In the study area, 38 per cent of children are stunted, which is higher among tribal children. Stunting is the highest in the youngest age group. In the study, asset ownership is taken as a proxy for wealth status. The more durable assets a household has, the wealthier it is. For the construction of asset ownership index, the household possession of consumer durable assets like TV, refrigerator, mobile phone, dining table, car, scooter, etc., are considered. Non-tribal households have higher asset ownership. Stunting is higher among children from households belonging to the 'low asset group'. Children belonging to low asset groups are unable to access nutritionally adequate and diverse food. Among children 'less than 12 months', stunting is 43 per cent and it falls to 37 per cent in the age group of '13 to 59 months'. Caste, asset ownership status and maternal height are significantly associated with stunting. (See Table 2).

In Vithura Panchayat, 19 per cent of preschool children are underweight. Occurrence of underweight is 27 per cent among tribal children, whereas it is 17 per cent among non-tribals. The percentage of underweight children is more in families with low asset group. Among children living in families with low asset group, 34.2 per cent are underweight. Underweight is significantly associated with asset ownership. The percentage of underweight children is 23.3 per cent in the age group of 'less than 12 months', and in the age group of '13 to 36 months,' it falls to 15 per cent. Thereafter, it increases to 22.6 per cent in the age group of '37 to 59 months.' Underweight is more among males, and a higher percentage of underweight children is observed among children born with low birth weight, though the association is not statistically significant. It is lowest among children whose maternal education is 'graduation or more'. The proportion of underweight is higher among children whose mothers are short. Among children born to short mothers, 23.6 per cent are underweight, whereas it is 13.3 per cent among children born to tall mothers (See Table 2).

A possible alternative to gain an understanding of the levels of malnutrition among children under 5 is to make an enquiry of the factors leading to good nutritional outcomes. Hence, an attempt is made to arrive at the determinants of normal height for age and weight for age among preschoolers in the study area. Binary logistic regression is employed to ascertain the empirically significant predictors of normal height for age (dependent variable), from the a priori identified independent variables based on literature review. The linkage between access to safe drinking water, proper sanitation facilities and undernutrition is undisputed. As per the NFHS 5 (2019-21), 95 per cent of households in Kerala use improved source of drinking water facilities and 99 per cent of households have access to improved sanitation facilities (IIPS & ICF,2021; Seth, 2021). In the study area too, cent per cent of households had access to safe drinking water and proper sanitation facilities. Hence, those variables are not considered in the regression model.

Determinants of normal height for age are analysed in terms of the probability of avoiding stunting. Table 3 depicts the estimates of binary logistic regression for normal height for age. The statistically non-significant value of Chi-square (14.173; $p>0.05$) confirms that the identified predictors generally, as a group, failed theoretically to segregate normal height for age children (response variable) from that of stunting, signifying the non-viability of the identified variables in predicting the likelihood of normal height for age. A cursory look at Table 3 can corroborate this result.

The most marginalised lot among all communities is the tribal community, and hence is taken as the reference category for the logistic regression model. From the result, it can be inferred that the change from tribal to non-tribal, from low asset group to high asset group, improvement in mother's education, improvement in BMI status, change in the age of children, and change in the initiation of supplementary feeding can increase the chance to become normal height for age. Caste is the only statistically significant predictor, which is also a liberal measure. It is found to contribute to normal height for age, in the logit model, with a log-ordered estimate of 0.918, standard error of 0.476, Wald Chi-square value of

Table 3

The Estimates of Logistic Regression of Normal Height for Age

Characteristics	B	S.E.	Wald	df	p	Exp(B)	95%C.I.for EXP(B)	
							Lower	Upper
(1) Caste (Non-tribal)	.918	.476	3.712	1	.054	2.503	.984	6.366
(2) High asset group	.401	.356	1.272	1	.259	1.494	.744	3.000
(3) Mother's education			.299	2	.861			
Mother's education (Plus Two)	.246	.450	.298	1	.585	1.279	.529	3.092
Mother's education (graduation and above)	.197	.530	.139	1	.710	1.218	.431	3.439
(4) BMI status of mothers			.414	2	.813			
BMI status (normal)	.183	.549	.111	1	.739	1.200	.410	3.518
BMI status (overweight)	.336	.569	.349	1	.555	1.400	.459	4.271
(5) Age of child			.988	2	.610			
Age of child (13-36 months)	.552	.659	.702	1	.402	1.737	.478	6.315
Age of child (37 to 59 months)	.661	.665	.987	1	.320	1.937	.526	7.132
(6) Birth interval (more than two years)	-.007	.344	.000	1	.985	.993	.506	1.949
(7) Duration of breastfeeding			.676	2	.713			
Duration of breastfeeding (Between one and two years)	-.426	.572	.556	1	.456	.653	.213	2.001
Duration of breastfeeding (More than two years)	-.439	.551	.633	1	.426	.645	.219	1.900
(8) Initiation of supplementary feeding (more than 6 months)	.072	.480	.023	1	.881	1.075	.419	2.756
Constant	-1.155	.749	2.378	1	.123	.315		
Chi square=14.173; p=0.290								

Source: Field Survey, 2019.

3.712 and p<0.1 (0.054). The estimated odd ratio (Exp (B)) indicates a positive relationship of 2.503 fold, at 95% CI (0.984, 6.366), with any favourable change in the reference category of caste.

Table 4 depicts the estimates of binary logistic regression for the likelihood of being not underweight. The goodness of fit of the model is revealed from the significant value of Chi-square statistics (27.525; p<.05).

The predictor variable high asset group, in the logit model, is found to contribute to a child being normal weight for age, with a log-ordered estimate of 1.888, standard error of 0.485, Wald Chi-square value of 15.173 and p<0.05. The estimated odd ratio indicates a positive relationship of 6.603 fold, at 95% CI (2.554, 17.070), with any favourable change in the reference category of the asset group. Age of the child '13 to 36 months' is found to predict the probability of a child being normal weight for age, with a log-ordered estimate of 1.849, standard error of 0.958, Wald Chi-square value of 3.727 and p >0.05, but <0.1. The estimated odd ratio indicates a positive relationship of 6.354 fold, at 95% CI (0.972,41.522), with any favourable change in the reference category.

Table 4

The Estimates of Logistic Regression of Normal Weight for Age

Characteristics	B	S.E.	Wald	Df	P	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
(1)Caste (Non-tribal)	-.260	.603	.186	1	.666	.771	.236	2.516
(2) High asset group	1.888	.485	15.173	1	.000	6.603	2.554	17.070
(3)Mother's education			.364	2	.834			
Mother's education (Plus two)	-.360	.606	.352	1	.553	.698	.213	2.290
Mother's education (graduation and above)	-.374	.748	.249	1	.617	.688	.159	2.983
(4) BMI status of mothers			2.314	2	.314			
BMI status (normal)	-.528	.663	.634	1	.426	.590	.161	2.162
BMI status (overweight)	.139	.713	.038	1	.845	1.149	.284	4.653
(5) Age of child			3.913	2	.141			
Age of child (13-36 months)	1.849	.958	3.727	1	.054	6.354	.972	41.522
Age of child (37 to 59 months)	1.409	.943	2.232	1	.135	4.093	.644	25.991
(6) Birth interval (more than two years)	.468	.460	1.039	1	.308	1.598	.649	3.932
(7) Duration of breastfeeding			2.188	2	.335			
Duration of breastfeeding (Between one and two years)	-.996	.892	1.245	1	.265	.370	.064	2.124
Duration of breastfeeding (More than two years)	-1.286	.879	2.141	1	.143	.276	.049	1.548
(8)Initiation of supplementary feeding (more than 6 months)	.332	.605	.301	1	.583	1.394	.426	4.560
Constant	.301	.875	.119	1	.731	1.352		
Chi square=27.525; p=0.006								

Discussion

In the study area, stunting is higher among tribal preschool children. A number of studies assert the higher risk of undernutrition among preschool children belonging to indigenous tribal communities compared to their rural counterparts (Rajaram et al., 2007; Ghosh & Varerkar, 2019). At the all-India level, the incidence of stunting, wasting, and underweight among tribal children are 40.9, 23.2 and 39.5 per cent, respectively, while the corresponding figures for 'others' (non-marginalised groups) are much lower (30.1 per cent stunting, 17.5 per cent wasting and 27.0 per cent underweight) (IIPS & ICF, 2021). In Kerala, the percentage of stunting is 36.9 among tribal whereas it is 22.2 among 'others' (IIPS &ICF, 2021). 'Kanikkars' are short in stature and the genetic predisposition might be one of the reasons for stunting. The study finds that stunting is highest among children less than a year, and it is significantly higher among children whose mothers are short.

In this study, there is no significant association between gender and underweight among children. Several studies point to sex bias in families culminating in nutritional deprivation among girls. Studies by Sen and Sengupta (1983), Benjamin and Zachariah (1993), and Banerjee and Mandal

(2005) found that females suffer from more protein energy malnutrition compared to their male counterparts. The high social status of women in Kerala, high levels of literacy, and below-replacement level fertility have helped Kerala in eliminating the sex bias. A high level of health and nutrition awareness could be observed even among the less educated mothers. The findings from Vithura Panchayat affirm the absence of gender-specific discrimination. In the study, low birth weight children are more prone to be underweight, but the association is not statistically significant. The percentage of underweight children is lowest among children of mothers with more years of education. Among children born to illiterate mothers, underweight is twice the percentage compared to those who had completed high school (IIPS & Macro International, 2007). In Vithura Panchayat, the percentage of underweight is lowest among children whose mothers have 'graduation and above'. The findings of our study establish that underweight is higher among children whose mothers are short. Subramanian et al. (2009) using NFHS 3, concluded that anthropometric failure was substantially higher among children born to short mothers.

Logistic regression exercise from the present study indicates that the likelihood of other social groups to be normal (height for age) is 2.503 times higher compared to the tribal category. Sabharwal (2011) estimates that the probability of tribal children being malnourished is 1.4 times compared to 'other' category children. Discrimination in income opportunities, limited access to healthcare services, and nutrition schemes of the Government result in adverse child nutritional outcomes (Thorat & Sadana, 2009). The high asset group in the logit model was found to significantly contribute to the child being normal weight for his/her age. A study by Li et al. (2020) found poor household wealth to be a major factor contributing to underweight among children. Poverty cannot be cited as the lone culprit of accentuating undernutrition. Low-income households are at risk of inadequate dietary intake, access to healthcare, illiteracy, large family, sustainable employment, and suboptimal feeding practices. The age of the child '13 to 36 months' was found to predict the probability of the child being normal weight for his/her age. Borooah et al. (2014) reported that States with the lowest incidence of underweight have a wider reach of the Integrated Child Development Service (ICDS). In Vithura Panchayat, 33 Anganwadis cater to the supplementary nutritional requirements of preschool children and their nutritional status (weight for age) is monitored monthly by Anganwadi workers. Mothers/caretakers of moderately and severely underweight children are provided nutrition advice and are given guidance on feeding strategies. Moderate and severely underweight children are monitored more frequently. Underweight teenage girls are given supplementary foods in the form of take-home rations. Anganwadi arranges health and nutrition awareness classes for teenage girls in order to equip them to be self-sufficient, healthy and informed mothers. These kinds of interventions can arrest the intergenerational transmission of malnutrition. The logistic regression exercise indicates that the likelihood ofSC and ST children being malnourished is about 1.4 times that of children from the "other" category

Policy Implications

Poor diets and resulting malnutrition are not simply a matter of personal choice. Most people cannot access or afford a healthy diet for a productive life. Though Kerala claims to have many 'firsts,' malnutrition is higher among marginalised groups. The levels of utilisation of Anganwadi services are relatively less among tribals and the need of the hour is to increase its utilisation rate. In the absence of adequate attention and investments, it appears apparent that we will be grappling with a hunger pandemic, with serious long-term consequences. Nutrition awareness can complement formal education and it should be made an integral part of the academic curriculum. The study calls for regular nutritional surveillance programmes, more frequent nutritional surveys and targeted interventions in high-risk groups.

Conclusion

Reduction in child undernutrition depends on factors other than food security and income growth. A host of interdependent factors influence the nutritional outcome, and to effectively tackle the problem, a region-specific, multipronged strategy, addressing the risk drivers of malnutrition is required. In the study area, there is a significant difference in stunting among children based on caste, asset ownership and maternal height. Despite progressive social and health policies followed by Kerala, anthropometric failures are rampant among tribal children. The intergenerational transmission of malnutrition from mother to child cannot be mitigated overnight. The first thousand days from conception are crucial for the physical and mental development of a child. Maternal education, nutrition awareness, feeding practices, better healthcare access, clean water, sanitation and hygiene practices, and an all-inclusive social protection system can help reduce the burden of malnutrition.

Author's Contribution:

Anju Susan Thomas: Primary data collection

Both the authors were equally involved in conceptualisation, review, analysis and drafting of the paper.

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