Original Article

Indian Journal of Research in Anthropology
Volume 1 Number 1, July - December 2015

Nutritional Status of Hakkipikki and Iruliga Tribal Children in Mysore District, Karnataka

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Abstract

A cross-sectional study was undertaken on 400 tribal children (200 populations in each tribe), 202 boys and 198 girls aged 0 to 5^+ years through purposive sampling method. Anthropometric measurements were used to analyze the nutritional status. Assessment of nutritional status using WHO recommended anthropometric indicator and Z-score interpretation revealed, different grades of malnutrition.

Keywords: Iruliga; Wasting; Stunting; Nutrition.

Introduction

Early childhood, that is the period below the age of six years, is most crucial in an individual's life. A child's future is shaped during this period. Its behaviour and personality, physical and mental growth depends largely on the care that it receives during the period. Though in all societies parents look after their young children the practices followed by them for rearing children varies from culture to culture.

In India 20 per cent of children less than five years of age suffer from wasting due to acute undernutrition. More than one third of the world's children who are wasted live in India. 43 per cent of Indian children under five years are underweight and 48 per cent (i.e. 61 million children) are stunted due to chronic undernutrition, India accounts for more than 3 out of every 10 stunted children in the world. Undernutrition is substantially higher in rural than in urban areas. Short birth intervals are associated with higher levels of undernutrition.

Children from scheduled tribes have the poorest nutritional status on almost every measure and the high prevalence of wasting in this group (28 per cent) is of particular concern. Under-nutrition is associated with more than half of all child deaths throughout the World. It is a source of major waste of resources and lost productivity, because children who are undernourished are less productive both physically and intellectually as adults. In developing countries like India, which accounts for about 40% of undernourished children in the World, under-nutrition is largely due to dietary inadequacy in relation to children's needs. In India, many children live in backward and drought-prone rural areas, urban slums and those belonging to the socially backward groups like scheduled caste and tribal communities who are highly susceptible to under-nutrition. But conditions are worst among the scheduled tribal communities. Most of the tribal people of India have their own geographically isolated life style. Inadequate food habits, along with traditional sociocultural and biological activities, may lead to a high proportion of child under-nutrition (Suman Chakrabarty et al, 2010). Keeping this in view, the objective of present study was to access the nutritional status of Hakkipikki and Iruliga tribal children of Mysore district, Karnataka state.

Hakkipikki

The Hakkipikkis, a tribal population of Mysore district are known by different names in different regions; in their own dialect the Hakkipikkis call themselves as Raj Pardhi. In Kannada speaking areas of Mysore they are named as Hakkipikkis, people in Nilgiris call them Guddi Bethe. In the Hindi speaking regions this tribe is known as Mel Shikari. They speak a dialect known as Vaghri, which is a mixture of Gujarati, Hindi, Marathi and Rajasthani languages (Mann, 1980). It is originated from Indo-Aryan languages. The descent of the family is patrilineal type. A preferred form of family in Hakkipikki society is the nuclear one. The joint family among the Hakkipikkis is a recent introduction, especially after their being colonized at one place and given land and houses. They are multi-occupational. It is difficult to categorize, in absolute terms, the occupation as the main and subsidiary ones. The main occupation of the Hakkipikki is flower making and doll making, those owing land as well as bullocks, switch on to agriculture in the season and then primarily may appeal to an outsider only as cultivators. Occasionally and partly they go in for trapping of birds and animals and selling of combs, safety pins, hair remover and the indigenous medicines.

Iruliga

The Iruligas are a Jungle tribe, speaking a mixture of Kannada and Tamil. They are found in the districts of Mysore and Bangalore and also on the slopes of the Mysore side of the Nilgiris. The term Iruliga might have been derived from Irul (night) perhaps from their dark colour. Those living in and the neighbourhood of the Bangalore district prefer to call themselves Pujaris or Kadu Pujaris, probably on account of their worshipping silver deities, such as Mastamma, Mudalagiriappa or Madamma (Iyer, 1988). The Irulas, as their name indicate (Irul-black) are the darkest of the hill tribes of southern India. They possess the Negroid traits (short stature, flat nose, and prominent cheek bones, curly or wavy hair, and narrow foreheads). In some localities their marriage ceremonies are simple. Where they live in contact with the lower casts of the plains, they have imbibed their customs. The primary occupations are hunting, collection of honey, cultivation, basket making and agricultural labourers.

Materials and methods

The cross-sectional investigation was carried out on 400 tribal children, Hakkipikki (92 boys, 108 girls) and Iruliga (110 boys, 90 girls) tribal children belonging the age group of 0^+ to 5^+ years during the month of February to May 2008. The samples were collected from different tribal settlements of Hunsur and H.D. Kote taluks of Mysore district, Karnataka state, following purposive sampling technique.

Anthropometry offers a reliable method to assess the nutritional status of the children (Bhasin et. al. 1990). Nutritional anthropometry is concerned with the measurement of the variations of the physical dimensions and the gross composition of the human body at different age levels and degree of nutrition.

The anthropometric measurements like height, weight, and skin fold thickness were recorded, Height was measured with the help of anthropometric rod and weight by personal weighing balance with minimum clothing. The scale was calibrated against known weights regularly. The thickness of skin fold at triceps was measured using Holtain's skin fold caliper. Height and weight measurements of the children, taking age and sex in to consideration were expressed in terms of Z-score relative to National Center for Health Statistics reference data recommended by World Health Organization (De Onis et al, 2007). On each individual, four anthropometric measurements were taken and the indices are calculated.

Results and discussion

The result by analysis of growth parameters according to age, sex among Hakkipikki and Iruliga tribal children were presented in table. The findings are discussed as follows. Table 1 shows the prevalence of stunting of Hakkipikki and Iruliga children, majority of the below 1 year Hakkipikki girls constitute under severe (86.70%) category against 50.00% of boys. With respect to children of 1^+ year, 73.90% of girls fall under severe and 26.10% moderate level of stunting and all the boys come under severe category. At the age of 2^+ years all boys and girls come under severe level. While majority of the 3^+ year boys come under normal (42.90%) level and girls come under moderate (45.50%) level. Among the age group of 4^+ years 57.10% of girls and 54.50% girls fall under moderate category. With respect to the age group of 5^+ years, 67.70% of boys constituted under normal, moderate (22.60%) and severe (9.70%), but 73.10% of the girls come under severe level, 15.40% moderate and 11.50% under normal category.

Height for age of Iruliga children shows that majority of the girls of below 1 year (62.50%) constitute

Table 1: Age and Gender wise Height Deficit Classification (Stunting) of the Tribal Children

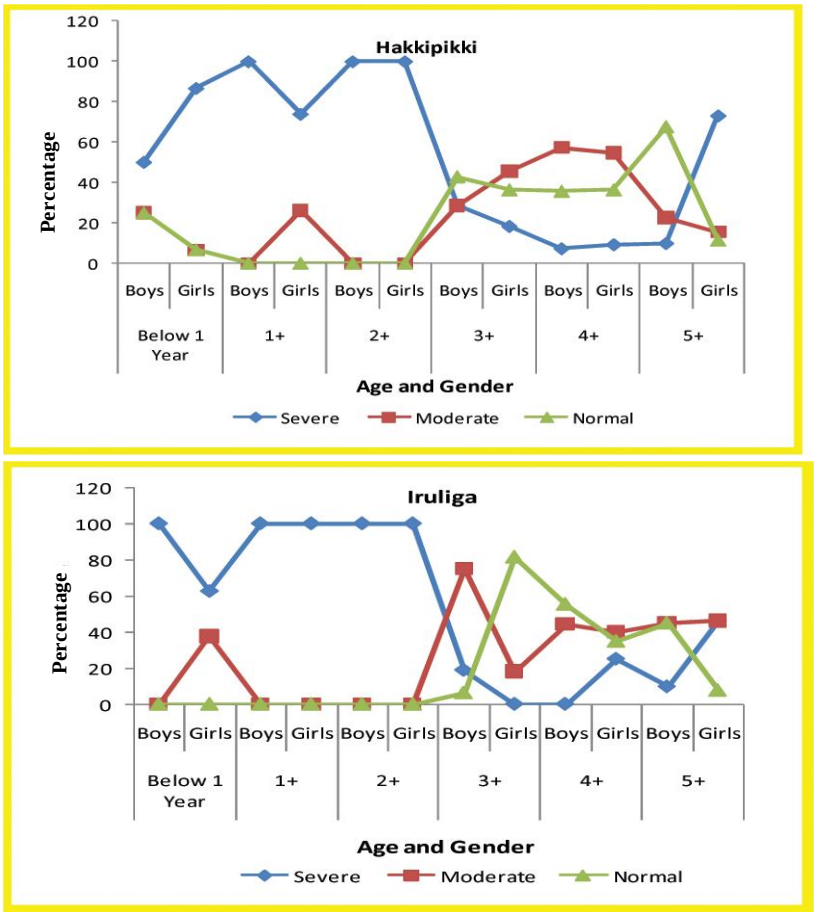
	Age (Years)	Gender		= -3SD Severe	< -2SD Moderate	> -1SD to < +2SD Normal	CC Value	P Value
Hakkipikki	Below 1 Year	Boys	No.	02	01	01	0.344	0.279
		N= 4	%	50.00	25.00	25.00		
		Girls	No.	13	01	01		
		N=15	%	86.70	6.70	6.70		
	1^+	Boys	No.	19	00	00	0.348	0.016*
		N= 19	%	100.00	0.00	0.00		
		Girls	No.	17	06	00		
		N=23	%	73.90	26.10	0.00		
	2^+	Boys	No.	17	00	00	-	-
		N= 17	%	100.00	0.00	0.00		
		Girls	No.	22	00	00		
		N= 22	%	100.00	0.00	0.00		
	3^+	Boys	No.	02	02	03	0.175	0.753
		N= 7	%	28.60	28.60	42.90		
		Girls	No.	02	05	04		
		N= 11	%	18.20	45.50	36.40		
	4^+	Boys	No.	01	08	05	0.039	0.981
		N= 14	%	7.10	57.10	35.70		
		Girls	No.	01	06	04		
		N = 11	%	9.10	54.50	36.40		
	5^+	Boys	No.	03	07	21	0.558	0.000**
		N= 31	%	9.70	22.60	67.70		
		Girls	No.	19	04	03		
		N=26	%	73.10	15.40	11.50		

				Height for Age (Z-Score Classification)				
Population	Age (Years)	Gender		= -3SD Severe	< -2SD Moderate	> -1SD to < +2SD Normal	CC Value	P Value
Iruliga	Below 1 Year	Boys	No.	21	00	00	0.482	0.003**
		N= 21	%	100.00	0.00	0.00		
		Girls	No.	05	03	00		
		N= 8	%	62.50	37.50	0.00		
	1^+	Boys	No.	18	00	00	-	-
		N= 18	%	100.00	0.00	0.00		
		Girls	No.	15	00	00		
		N= 15	%	100.00	0.00	0.00		
	2^+	Boys	No.	15	00	00	-	-
		N= 15	%	100.00	0.00	0.00		
		Girls	No.	23	00	00		
		N= 23	%	100.00	0.00	0.00		
	3^+	Boys	No.	03	12	01	0.612	0.000**
		N= 16	%	18.80	75.00	6.30		
		Girls	No.	00	02	09		
		N= 11	%	0.00	18.20	81.80		
	4^+	Boys	No.	00	04	05	0.302	0.233
		N= 9	%	0.00	44.40	55.60		
		Girls	No.	05	08	07		
		N= 20	%	25.00	40.00	35.00		
	5^+	Boys	No.	03	14	14	0.426	0.008**
		N= 31	%	9.70	45.20	45.20		
		Girls	No.	06	06	01		
		N= 13	%	46.20	46.20	7.70		

under severe level and 37.50% under moderate level but none of them fall under normal category. In boys all come under severe grade no Iruliga boys fall under normal and moderate level of stunting. With respect to 1^+ and 2^+ years all the girls and boys fall under severe category. Among 3^+ year's children, 81.80% of the girls constituted normal and 18.20% moderate category. None of them fall under severe form of

stunting. About 75.00% of the boys observed under moderate form of stunting. Among the children of m 4+ years 55.60% of the boys constitute normal level against 35.00% of girls. 40.00% of moderate girls found against 44.40% boys. None of the boys come under severe category, while 25.00% of the girls fall under severe category. However the level of stunting of 5+ years children shows that same percentage (45.20%) of normal and moderate level of height for age is found among boys and the same percentage (46.20%) of moderate and severe form of stunting observed among girls of 5 years.

Fig. 1: Age and Gender wise Height Deficit Classification (Stunting) of the Tribal Children



Weight for age indicates the underweight of the child, (Table-2) an important indicator of severe degree of malnutrition. According to Z-score classification, majority of Hakkipikki boys of below 1 year come under mild (50.00%) form of underweight followed by moderate (25.00%) and severe (25.00%) form, and girls constitute 60.00% moderate, 25.00% severe and 20.00% mild, and none of the children constitute normal grade. About 52.20% girls of 1+ year were moderate, 39.10% were mild and only 8.70% were normal. However, majority of the male children fall under severe grade of underweight (94.70%) and only 5.30% were moderate category. Among the boys of 2+ years, all the children fall under severe category and majority of the girls fall under moderate (72.70%) category followed by mild (27.30%). About 45.50% of girls of 3+ year were moderate, 27.30% were mild, 28.20% were severe and 9.10% were normal, but majority of the male children fall under normal category (57.10%) followed by moderate (28.60%) and severe (14.30%). Among the boys of 4+ years, majority of them fall under mild (42.90%) category. Whereas the girl's constitute equal percentage (18.20%) of mild and moderate form of underweight and 36.40% were normal and 27.30% were severe. Whereas, boys of 5+ year comes under severe form of underweight (41.90%) against 19.20% of girls. There was highly significant association between the age group of 1+ and 2+ years, a significant association was observed in 5+ year age group children.

Among Iruligas 87.50% girls of below 1 year were moderately malnourished, and majority of the boys fall under severe grade of malnutrition followed by moderate (28.60%) and mild (4.80%) form of underweight. Whereas 94.40% of boys of 1+ year

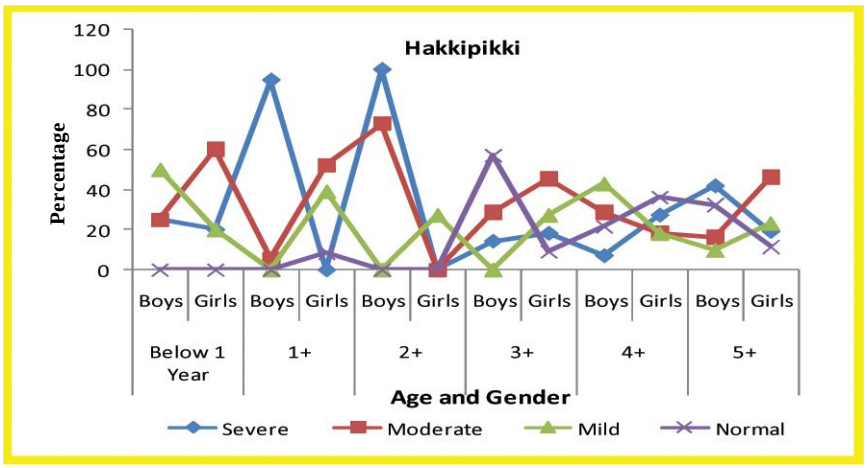
constitute severe form of under nutrition and only 5.60% come under moderate. Among girls, 53.30% fall under moderate form followed by mild (46.70%) category. None of the boys and girls comes under normal category. Majority of the boys of 2^+ years comes under severe (93.30%) category and only 6.70% were moderate. Whereas 56.50% of the girls fall under moderate and 43.50% were mild. With respect to 3^+ year age group majority of boys (50.00%) fall under moderate category followed by equal percentage (12.50%) of mild and normal. Among girls, 54.50% come under normal category followed by mild (36.40%) and moderate (9.10%). With respect to 4^+ years, majority of the boys (77.80%) fall under normal category against 35.00% of girls. At the age of 5^+ years, 53.80% girls were found to be under moderate category. Highly significant association was found between below 1 year, 1^+, 2^+ and 3^+ year age group children.

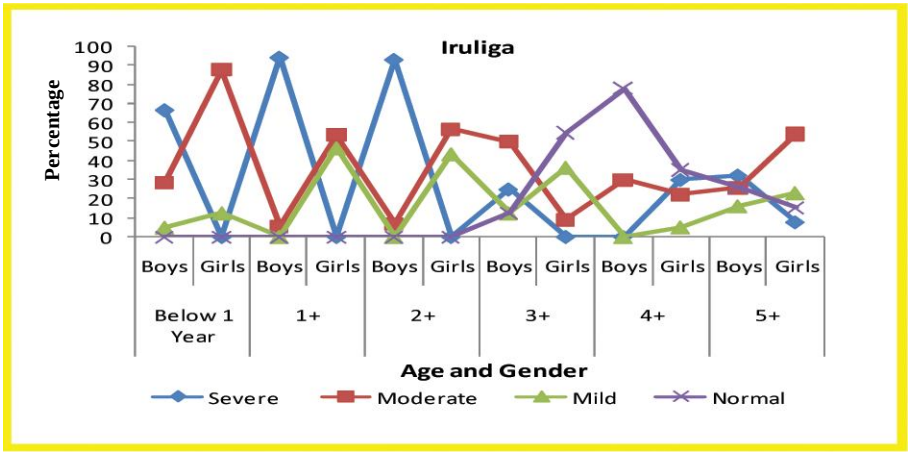
Table 2: Age and Gender wise Weight Deficit Classification (Underweight) of the Tribal Children

Population	Age (years)	Gender		< -3SD Severe	< -2SD Moderate	< -1SD Mild	< -1SD to < + 2SD Normal	CC Value	P Value
Hakkipikki	Below 1 Year	Boys	No.	01	01	02	00	0.298	0.396
		N=4	%	25.00	25.00	50.00	0.00		
		Girls	No.	03	09	03	00		
		N=15	%	20.00	60.00	20.00	0.00		
	1^+	Boys	No.	18	01	00	00	0.691	0.000**
		N=19	%	94.70	5.30	0.00	0.00		
		Girls	No.	00	12	09	02		
		N=23	%	0.00	52.20	39.10	8.70		
	2^+	Boys	No.	17	00	00	00	0.707	0.000**
		N=17	%	100.00	0.00	0.00	0.00		
		Girls	No.	00	16	06	00		
		N=22	%	0.00	72.70	27.30	0.00		
	3^+	Boys	No.	01	02	00	04	0.494	0.121
		N=7	%	14.30	28.60	0.00	57.10		
		Girls	No.	02	05	03	01		
		N=11	%	18.20	45.50	27.30	9.10		
	4^+	Boys	No.	01	04	06	03	0.350	0.321
		N=14	%	7.10	28.60	42.90	21.40		
		Girls	No.	03	02	02	04		
		N=11	%	27.30	18.20	18.20	36.40		
	5^+	Boys	No.	13	05	03	10	0.400	0.013*
		N=31	%	41.90	16.10	9.70	32.30		
		Girls	No.	05	12	06	03		
		N=26	%	19.20	46.20	23.10	11.50		

Population	Age (years)	Gender		Weight for Age (Z-Score Classification)				CC Value	P Value
				< -3SD Severe	< -2SD Moderate	< -1SD Mild	< -1SD to < +2SD Normal		
Iruliga	Below 1 Year	Boys	No.	14	06	01	00	0.512	0.006**
		N=21	%	66.70	28.60	4.80	0.00		
		Girls	No.	00	07	01	00		
		N=8	%	0.00	87.50	12.50	0.00		
	1^+	Boys	No.	17	01	00	00	0.686	0.002**
		N=18	%	94.40	5.60	0.00	0.00		
		Girls	No.	00	08	07	00		
		N=15	%	0.00	53.30	46.70	0.00		
	2^+	Boys	No.	14	01	00	00	0.688	0.001**
		N=15	%	93.30	6.70	0.00	0.00		
		Girls	No.	00	13	10	00		
		N=23	%	0.00	56.50	43.50	0.00		
	3^+	Boys	No.	04	08	02	02	0.548	0.009**
		N=16	%	25.00	50.00	12.50	12.50		
		Girls	No.	00	01	04	06		
		N=11	%	0.00	9.10	36.40	54.50		
	4^+	Boys	No.	00	02	00	07	0.403	0.131
		N=9	%	0.00	22.20	0.00	77.80		
		Girls	No.	06	06	01	07		
		N=20	%	30.00	30.00	5.00	35.00		
	5^+	Boys	No.	10	08	05	08	0.320	0.171
		N=31	%	32.30	25.80	16.10	25.80		
		Girls	No.	01	07	03	02		
		N=13	%	7.70	53.80	23.10	15.40		

Fig. 2: Age and Gender wise Weight Deficit Classification (Underweight) of the Tribal Children





Weight for height refers to wasting which is an indicator of past and long term under nutrition. The table 3 indicates that, majority of the below 1 year boys of Hakkipikkis (75.00%) comes under normal category followed by 25.00% mild category. However, none of the boys fall under severe and moderate form of wasting. Among girls, 73.30% fall under normal category and 13.30% fall under severe category. On the other hand, same percentage (6.70%) of moderate and mild form of wasting was observed. With respect to children of 1^+ year, majority of the boys constitute mild (52.60%) form followed by moderate (26.30%) and normal (15.80%) and 5.30% boys come under severe form of wasting. Whereas majority of the girls (95.70%) constitute normal and only 4.30% come under moderate level. None of the girls come under severe and mild category.

Among the age group of 2^+ years 70.60% of boys fall under mild category and same percentage (11.80%) of severe and normal category was observed. Among girls majority (72.70%) comes under normal category and 27.30% are moderate level but none of the girls fall under severe and mild category. Among the children of 4^+ years, 64.30% constitute normal category followed by mild (21.40%) and moderate (14.30%) category and none of the boys fall under severe category. Among girls, 36.40% fall under moderate level and 27.30% under normal category, while same percentage (18.20%) of girls fall under mild and severe form of wasting. In the age group of 5+ years, about 22.60% of boys and 53.80% of girls constitute normal grade and remaining children have mild, moderate and severe form of wasting. Overweight (3.80%) and obese (11.50%) girls are also found among this age group.

There was highly significant association found among the age group of 1^+ and 2^+ years children.

Among Iruliga children, majority (81.00%) of boys and girls (87.50%) constitute normal category, while 19.00% of boys and 12.50% of girls fall under moderate category. None of the boys and girls of below 1 year and 1^+ year children fall under severe and mild category. About 83.30% of boys and 73.30% of girls of 1^+ year constitute normal form of wasting. At the age of 2^+ years same percentage (40.00%) of

boys were observed under moderate and mild level of wasting and majority (65.20%) of girls fall under normal level. Among 3^+ years age group, 87.50% of the boys comes under moderate level of weight for height and same percentage (6.30%) of boys fall under mild and severe category. None of the boys comes under normal category. However, 81.80% girls were observed under normal and 18.20% under mild level of wasting. Cent percent of the boys of 4^+ years fall under mild category against 30.00% of girls. Among the boys of 5^+ years 41.90% were found to be severe followed by 6.50% moderate, 16.10% mild, 25.80% normal, 6.50% were found to be under risk of overweight, and only 3.20% fall under over weight category. Over all the children of Iruliga tribe shows highly significant association between age and gender of 2^+, 3^+ and 4^+ year children.

Table 3: Age and Gender wise Weight for Height Classification (Wasting) of the Tribal Children

Population	Age (years)	Gender		Weight for Height (Z-Score Classification) < -3SD Severe	< -2SD Moderate	< -1SD Mild	< -1SD to > +1SD Normal	> +1SD Risk of Over weight	> +2SD Over weight	> +3SD Obese	CC Value	P Value
Hakkipikki	Below 1 Year	Boys	No.	00	00	01	03	00	00	00	0.295	0.613
		N=4	%	0.00	0.00	25.00	75.00	0.00	0.00	0.00		
		Girls	No.	02	01	01	11	00	00	00		
		N=15	%	13.30	6.70	6.70	73.30	0.00	0.00	0.00		
	1+	Boys	No.	01	05	10	03	00	00	00	0.632	0.000**
		N=19	%	5.30	26.30	52.60	15.80	0.00	0.00	0.00		
		Girls	No.	00	01	00	22	00	00	00		
		N=23	%	0.00	4.30	0.00	95.70	0.00	0.00	0.00		
	2+	Boys	No.	02	01	12	02	00	00	00	0.648	0.000**
		N=17	%	11.80	5.90	70.60	11.80	0.00	0.00	0.00		
		Girls	No.	00	06	00	16	00	00	00		
		N=22	%	0.00	27.30	0.00	72.70	0.00	0.00	0.00		
	3+	Boys	No.	01	04	01	01	00	00	00	0.501	0.110
		N=7	%	14.30	57.10	14.30	14.30	0.00	0.00	0.00		
		Girls	No.	02	01	01	07	00	00	00		
		N=11	%	18.20	9.10	9.10	63.60	0.00	0.00	0.00		
	4+	Boys	No.	00	02	03	09	00	00	00	0.427	0.134
		N=14	%	0.00	14.30	21.40	64.30	0.00	0.00	0.00		
		Girls	No.	02	04	02	03	00	00	00		
		N=11	%	18.20	36.40	18.20	27.30	0.00	0.00	0.00		
	5+	Boys	No.	13	07	03	07	00	00	01	0.457	0.020*
		N=31	%	41.90	22.60	9.70	22.60	0.00	0.00	3.20		
		Girls	No.	03	04	00	14	01	01	03		
		N=26	%	11.50	15.40	0.00	53.80	3.80	3.80	11.50		

Population	Age (Years)	Gender		Weight for Height (Z-Score Classification) < -3SD Severe	< -2SD Moderate	< -1SD Mild	< -1SD to > +1SD Normal	> +1SD Risk of Over weight	> +2SD Over weight	CC Value	P Value
Iruliga	Below 1 Year	Boys	No.	00	04	00	17	00	00	0.077	0.677
		N=21	%	0.00	19.00	0.00	81.00	0.00	0.00		
		Girls	No.	00	01	00	07	00	00		
		N=8	%	0.00	12.50	0.00	87.50	0.00	0.00		
	1^+	Boys	No.	00	03	00	15	00	00	0.121	0.484
		N=18	%	0.00	16.70	0.00	83.30	0.00	0.00		
		Girls	No.	00	04	00	11	00	00		
		N=15	%	0.00	26.70	0.00	73.30	0.00	0.00		
	2^+	Boys	No.	00	06	06	03	00	00	0.508	0.001**
		N=15	%	0.00	40.00	40.00	20.00	0.00	0.00		
		Girls	No.	00	08	00	15	00	00		
		N=23	%	0.00	34.80	0.00	65.20	0.00	0.00		
	3^+	Boys	No.	01	14	01	00	00	00	0.688	0.000**
		N=16	%	6.30	87.50	6.30	0.00	0.00	0.00		
		Girls	No.	00	00	02	09	00	00		
		N=11	%	0.00	0.00	18.20	81.80	0.00	0.00		
	4^+	Boys	No.	00	00	09	00	00	00	0.544	0.007**
		N=9	%	0.00	0.00	100.00	0.00	0.00	0.00		
		Girls	No.	03	02	06	09	00	00		
		N=20	%	15.00	10.00	30.00	45.00	0.00	0.00		
	5^+	Boys	No.	13	02	05	08	02	01	0.365	0.237
		N=31	%	41.90	6.50	16.10	25.80	6.50	3.20		
		Girls	No.	01	03	03	05	01	00		
		N=13	%	7.70	23.10	23.10	38.50	7.70	0.00		

Fig. 3: Age and Gender wise Weight for Height Classification (Wasting) of the Tribal Children

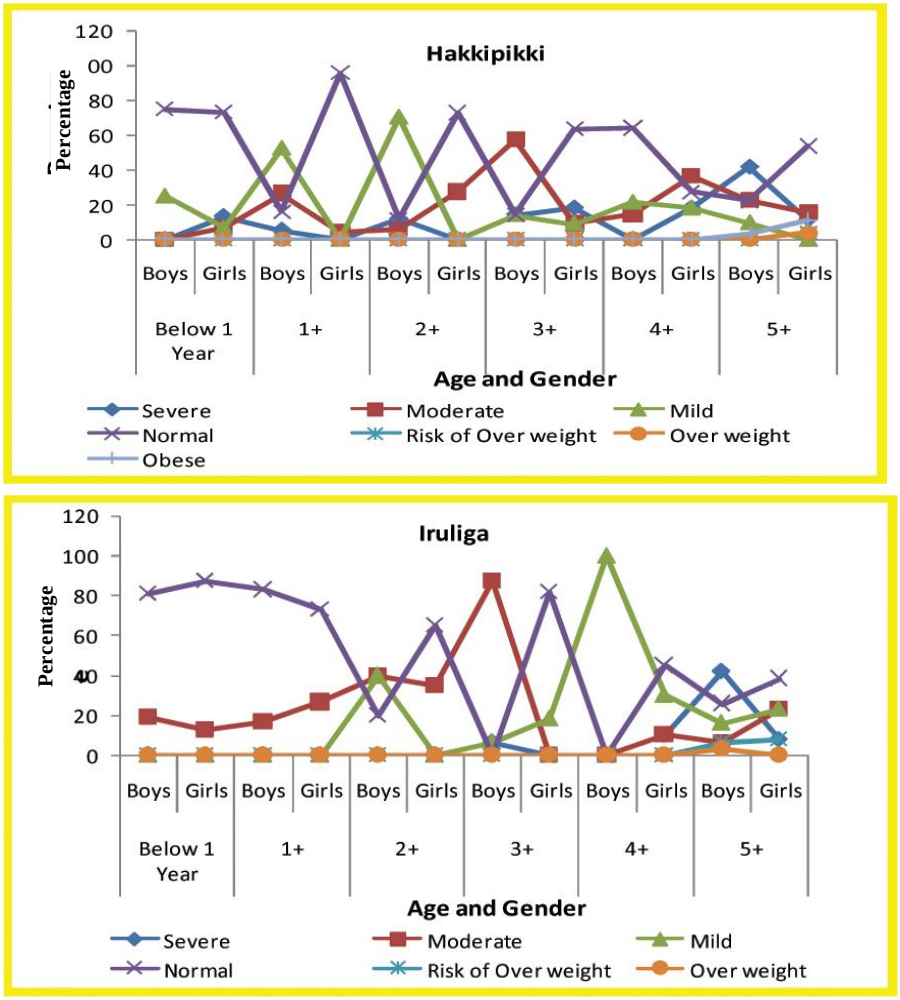
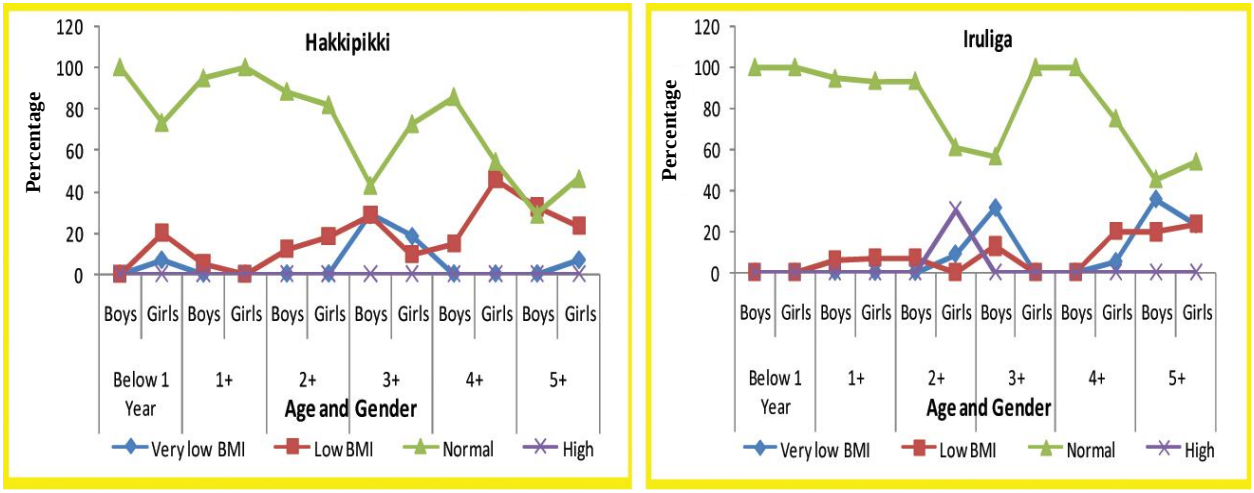


Table 4: Age and Gender wise Distribution of Body Mass Index Classification of the Tribal Children

Population	Age (Years)	Gender		BMI (Z-Score Classification) < -2SD Very low BMI	< -2SD to > +2SD Low BMI	> +2SD Normal	> +3SD High BMI	CC Value	P Value
Hakkipikki	Below 1 Year	Boys N=4	No	00	00	04	00	0.288	0.509
			%	0.00	0.00	100.00	0.00		
		Girls N=15	No	01	03	11	00		
			%	6.70	20.00	73.30	0.00		
	1+	Boys N=19	No	00	01	18	00	0.169	0.265
			%	0.00	5.30	94.70	0.00		
		Girls N =23	No	00	0	23	00		
			%	0.00	0.00	100.00	0.00		
	2+	Boys N=17	No	00	02	15	00	0.880	0.582
			%	0.00	11.80	88.20	0.00		
		Girls N =22	No	00	04	18	00		
			%	0.00	18.20	81.80	0.00		
	3+	Boys N=7	No	02	02	03	00	0.302	0.405
			%	28.60	28.60	42.90	0.00		
		Girls N =11	No	02	01	08	00		
			%	18.20	9.10	72.70	0.00		
	4+	Boys N=14	No	00	02	12	00	0.326	0.085
			%	0.00	14.30	85.70	0.00		
		Girls N =11	No	00	05	06	00		
			%	0.00	45.50	54.50	0.00		
	5+	Boys N=31	No	12	10	09	00	0.175	0.406
			%	38.70	32.30	29.00	0.00		
		Girls N =26	No	08	06	12	00		
			%	30.80	23.10	46.20	0.00		

Population	Age (Years)	Gender		BMI (Z-Score Classification)				CC Value	P Value
				< -2SD Very low BMI	< -2SD to > +2SD Low BMI	> +2SD Normal	> +3SD High BMI		
Iruliga	Below 1 year	Boys N=21	No.	00	00	21	00	-	-
			%	0.00	0.00	100.00	0.00		
		Girls N=8	No.	00	00	08	00		
			%	0.00	0.00	100.00	0.00		
	1+	Boys N=18	No.	00	01	17	00	0.023	0.894
			%	0.00	5.60	94.40	0.00		
		Girls N =15	No.	00	01	14	00		
			%	0.00	6.70	93.30	0.00		
	2+	Boys N=15	No.	00	01	14	00	0.432	0.034*
			%	0.00	6.70	93.30	0.00		
		Girls N =23	No.	02	00	14	07		
			%	8.70	0.00	60.90	30.40		
	3+	Boys N=16	No.	05	02	09	00	0.44	0.039*
			%	31.30	12.50	56.30	0.00		
		Girls N =11	No.	00	00	11	00		
			%	0.00	0.00	100.00	0.00		
	4+	Boys N=9	No.	00	00	09	00	0.293	0.257
			%	0.00	0.00	100.00	0.00		
		Girls N =20	No.	01	04	15	00		
			%	5.00	20.00	75.00	0.00		
	5+	Boys N=31	No.	11	06	14	00	0.121	0.723
			%	35.50	19.40	45.20	0.00		
		Girls N =13	No.	03	03	007	00		
			%	23.10	23.10	53.80	0.00		

Fig. 4: Age and Gender wise Distribution of Body Mass Index Classification of the Tribal Children



Body Mass Index (BMI)

The body mass index refers to muscle fat mass in the body; from the table 4 it was observed that cent-percent of below 1 year boys comes under normal BMI against 73.30% of girls. Majority (94.70%) of 1^+ year boys and all the girls fall under normal category. It was noticed that, in Hakkipikkis, up to 4^+ years most of the children fall under normal BMI. The low BMI was observed in 32.30% boys of 5^+ year old children against 23.10% girls and none of the children fall under high BMI category. The result shows no significant association with age and gender among Hakkipikki children. In Iruligas, almost same observations as in Hakkipikkis were made in the children from 0 to 5^+ year age group. None of the children fall under high BMI category. At the age of 2^+ years, 30.40% girls fall under high BMI. The contingency co-efficient and P value revealed that a significant association was found in the children of 2^+ and 3^+ year age group.

Conclusion

Assessment of nutritional status using WHO recommended anthropometric indicators and Z-score interpretation reveals that tribal children of Mysore district are suffering from different grades of

malnutrition. The widespread prevalence of malnutrition is in the form of stunting, wasting and underweight.

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