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Nutritional Status of Toddlers (1-3 Years) of Rural Area of Niwai Tehsil, Tonk, Rajasthan, India

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Abstract: To assess the nutritional status of toddlers of different villages of Niwai tehsil, Dist-Tonk, Rajasthan. Toddler aged 1-3 years were selected through random sampling from villages of Niwai Tehsil, District-Tonk, Rajasthan. Anthropometric measurements were taken according to standard procedures and dietary survey was done through 24 h recall method for 3 consecutive days. Hemoglobin level was measured by cyanomethnoglobin method. Overall, scenario of anthropometric measurements have revealed that according to weight for age, height for age and weight for height 20, 40 and 12% were normal respectively while 42, 43 and 16% were normal according to MUAC, head/chest circumference ratio, tricep's skin fold thickness. Results of clinical examination shown that sign and symptoms of protein energy malnutrition as flag sign, dull and dry hairs, skin pigmentation, bitot's spot in the form of vitamin A deficiency were prevalent and dietary intake was less than recommended dietary allowances. About 75% of children were found to be anaemic. The nutritional status of children in rural communities is affected by low family income and behavioral problems. To improve nutritional status of children the full implementation of the poverty alleviation programmes should be considered and appropriate measures need to be taken to support needy families with children. Appropriate measures should be taken by the respective authorities to improve childhood health and nutritional status.

Key words: MUAC aid upper arm circumference, RDA recommended dietary allowances, stunting, wasting, toddlers, Rajasthan

INTRODUCTION

Malnutrition is still considered one of the major public health problems in many countries, affecting >30% of children under 5 years of age. Under nutrition is the most important cause of death in this age group in developing countries (Sawaya *et al*., 2005) in which nutritional deficit is common. Generally, three anthropometric indicators are often used to assess nutritional status during childhood: underweight (low weight or age), stunting (low height for age) and wasting (low weight for height) (WHO, 1995). Growth during childhood is widely used to assess adequate health, nutrition and development of children and to estimate overall nutritional status as well as health status of a population. It is well documented that chronic under nutrition is associated with slower cognitive development and serious health impairment later in life which reduce the quality of life (Scrimshaw, 1995). Malnutrition varies from country to country depending on economic, ecological, social and other factors. The problem is more severe among children aged 1-3 years who suffer from Kwashiorkor and Marasmus (4%) and under weight (60%). The majority of deaths associated with malnutrition occur in children who are marginally malnourished (Pelletier, 1994). About 50% of the children under 5 years old in India are moderately or severely undernourished. Moreover, several studies have shown that the degree of under nutrition is higher among the underprivileged communities (Bisai *et al*., 2008a, b, 2009). In general, tribal populations are considered to be underprivileged in India (Ghosh and Bharati, 2006; Bisai and Bose, 2009).

In 2006, an estimated 9.5 million children died before their fifth birthday and two thirds of these deaths occurred in the first year of life. Under nutrition is associated with at least 35% of child death. It is also a major disabler preventing children who survive from reaching their full potential development (WHO, 2001). Severe acute malnutrition remains a major killer of children under 5 years of age. Until recently, treatment has been restricted to facility-based approaches, greatly limiting its coverage and impact. New evidence suggests however that large numbers of children with severe acutemalnutrition can be treated in their communities without being admitted to a health facility or a therapeutic feeding centre (Steve and Sadler, 2001).

The principle aim of nutritional assessment of the community is then to map out the magnitude and

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geographical distribution of malnutrition as public health problem and to discover and to analyze the ecological factors that are directly and indirectly responsible for it.

Since, Rajasthan, situated in an Eastern region is a dry coastal area affected more by the adverse effects of malnutrition. Thus, study was basically planned in the rural area of Niwai Tehsil of Tonk district in Rajasthan for the assessment of nutritional status of children aged (1-3 years) because people living here are poor, ignorant, illiterate and lack their balance diet with the prevailing conditions of superstitions and food taboos.

MATERIALS AND METHODS

Toddler belongs to age group of 1-3 years of the three villages (Banasthali, Haripura Motipura) of Niwai, Distt-Tonk, Rajasthan were selected on the basis of random sampling. Total samples were consisted of 100 toddler among which 30 were from Banasthali village and 35 from each village of Haripura, Motipura. Nutritional status was assessed by anthropometric method, clinical examination, dietary survey; biochemical assessment through home visits after counseling and attaining their Parent's permission. In the beginning some of them were reluctant but after explaining the advantages of this survey and how their child can be benefited through this survey, they finally agreed. A questionnaire was designed to collect general information (type of family, age, sex, order of children, types of food habits and socio-economic status) about toddlers by asking question from the mothers of selected subjects through interview method.

Anthropometry measurements: Anthropometric measurements weight for age, height for age, weight for height, mid-upper arm circumferences, head/chest circumference ratio and triceps skin fold thickness was noted for selected samples using standardized techniques.

Weight for age: Weight was measured using a portable weighing balance to the nearest of 0.25 kg with the child wearing light clothes and no shoes. For children unable to stand, weight was measured using a hanging baby scale with a 15 kg capacity and was recorded to the nearest 100 g. Weight for age is an important determination of malnutrition was compared by 50th percentile value of WHO in 2006 standards and classified by the Indian Academy of Pediatrics (Table 1).

Height for age: For children unable to stand, a floor board was used to measure their height. For all other children, height was measured by a anthropometer to the nearest 0.5 cm. Height for age is useful for malnutrition spread over a prolonged period (chronic malnutrition) and compared by 50th percentile value of WHO in 2006 standards and classified by Vishveshwara's Rao classification (Table 2).

Weight for height: Weight for height is an age independent indice and has often been considered as a good index of current nutritional status. It was compared by 50th percentile value of WHO in 2006 standards and classified by the Waterlow's classification (Table 3).

Mid-upper arm circumference: Mid arm circumference is measured midway of left arm between the point of the shoulder (acromian) and olecranon process to the nearest of 0.1 cm. It is used to indicate the status of muscle development and compared by 50th percentile value of WHO in 2006 (Table 4).

Head/chest circumference ratio: It is a useful index of malnutrition. Chest circumference was measured with a flexible tape by placing at the level of the nipple in a plane at right angle to the spine to the nearest of 0.1 cm. Head circumference was measured by placing the tape firmly around the head just above the supra-orbital ridges to the nearest of 0.1 cm (Table 5).

Triceps skin fold thickness: It was measured with the Harpender Callipers with a accuracy of 0.1 mm. This

Table 1: Indian academy of pediatrics classification for weight for age

Weight for age	Grade
<50%	IVmalnutrition
51-60	III malnutrition
61-70	II malnutrition
71-80	I malnutrition
>80%	Normal

Table 2: Vishveshwara Rao's classif ication for height for age

Height for age	Grades
<80% of the standard	Poor
80-90% of the standard	Mildretardation
91-100% of the standard	Normal

Table 3: Waterlow's classification for weight for height

Weight for height	Grade
<75%	Severe malnutrition
75-84%	Moderate malnutrition
85-90%	Marginal malnutrition
>90%	Normal

Table 4: Classification for mid upper arm circumference

Mid upper arm circumference (cm)	Grades
<12.5	Severe malnutrition
12.5-13.5	Moderate malnutrition
>13.5	Normal

Table 5: Classification for head/chest circumference ratio

Head chest ratio	Grade
<1	Normal
>1	Malnourished

Table 6: Classification of tricep's skin fold thickness

Tricep's skin fold thickness (%)	Grades
<60	Severe malnutrition
60-80	Moderate malnutrition
80-90	Marginal malnutrition
90-110	Normal

measurement is basically taken to assess the subcutaneous fat in the children and classified according to Table 6.

Clinical examination: The results of examination of clinical signs were recorded and each children was clinically examined for the presence/absence of clinical signs attributable to malnutrition because it covers the information about the presence of clinical signs related to hair face, eyes, lips, tongue, teeth, skin, etc. The signs and symptoms were compared according to the report of WHO expert committee of medical assessment on nutritional status. Various forms of clinical malnutrition namely protein energy malnutrition, vitamin a deficiency, iron deficiency, vitamin B complex deficiency, calcium deficiency and extremities were determined and the significance of related factors like unavailability of food was assessed.

Dietary assessment: Total 24 h recall method was used to measure the nutrient intake and type of food taken by parents of children through standardized cups for consecutive 3 days. Questionnaire was designed to collect information from mother about the types of food preparations made at breakfast, lunch, afternoon tea time and dinner; amount of raw ingredients used for each of the preparations; information of the total cooked amount of each preparation was noted in terms of standardized cups; intake of each cooked food item by toddler. Cooked amount of each food item consumed by toddler was then converted into raw food stuffs by using following formula: Individual intake in terms of raw ingredient (g) = [Total raw amount of each ingredient (g)/Total cooked amount (g)] x Individual intake of cooked amount (g)

Biochemical assessment: Haemoglobin status of toddlers were estimated by Cyanomethaemglobin Method through gentle prick on index finger of left hand using a sterilized needle. The 0.02 mL of blood was taken with the help of an accurately calibrated pipette on to 1.5×1.5 cm Whatman No. 1 filter paper. This was allowed to dry and marked with pencil, kept in a polythene bag. Filter paper was carried out to the lab and then blood was eluted from filter paper in 5 mL of Drapkin's reagent and mark as test. Similarly, known amount of cyanomethemoglobin was added in 5 mL of Drapkin's reagent and mark as standard. Blank was prepared by takinh 5 mL of drapkin's reagent. Extinction was read in a colorimeter at 540 nm.

Statistical analysis: Data were expressed as mean and percentage. The database was created in Microsofts Excel. Data analysis was by SPSS Version 10.0 (SPSS Inc.).

RESULTS

It was observed from Table 7 that only 20, 40, 12% of the children were normal according to weight for age, height for age, weight for height, respectively. Around 80% of children were having weight below the standard, i.e., they were underweight while stunting and wasting was prevalent in 60 and 88% children, respectively. Severe condition of underweight, stunting and wasting was prevalent in 25, 20 and 40%, respectively. Mid upper arm circumference and head/chest circumference ratio of children having normal were 42 and 43%, respectively while rest of the children were having these parameter below standard. On the other hand, tricep's skin fold thickness showed that 16% of the children were having normal muscle mass, 26% children were suffering from mild malnutrition category, 38% were suffering from moderate malnutrition category and rest 20% were suffering from severe malnutrition category among the children of all the villages.

For assessment of various diseases on the clinical manifestation jelliffe classification was used to rule out the particular deficiency disease in the villages (Table 8). The deficiency signs commonly observed among children were of protein energy malnutrition. A pale eye was the most observed clinical sign. Around 63% children were having pale eyes and suffering from anaemia. Next clinical sign which was most prevalent in children was flag sign. Clinical signs suggestive of active and healed rickets such as epiphyseal enlargement, beadings of ribs was not frequently seen while presence of B complex deficiency was found. On the other hand, bitot's spot and mild flourosis was least prevalent, i.e., only 4% among the children.

Dietary survey revealed that villages' diet was monotonous and insufficient with the number of meal being restricted to one or two per day. Mean energy and protein intake of children were 706.66 kcal day^{-1} and 13.86 g day^{-1} which was 56.98 and 63% of recommended dietary allowances, respectively (Table 9) while mean calcium intake was 225 mg day^{-1} which was 56.25% of RDA. On the other hand, iron and vitamin A mean intake was 5.33 mg day^{-1} and 793.3 μg day^{-1} which was only

Table 7: Prevalence of malnutrition according to different anthropometric measurements

Anthropometric	Classification	Percentage
Weight for age	Grade IV malnutrition	25
(underweight)	Grade III malnutrition	19
	Grade II malnutrition	25
	Grade I malnutrition	11
	Normal	20
Height for age	Poor	20
(Stunting) chronic	Mild retardation	40
	Normal	40
Weight for height	Severe malnutrition	40
(wasting) acute	Moderate malnutrition	26
	Marginal malnutrition	22
	Normal	12
Mid upper arm circumference	Severe Malnutrition	18
	Moderate malnutrition	40
	Normal	42
Head/chest circumference ratio	Malnourished	57
	Normal	43
Tricep's skin fold thickness	Severe malnutrition	20
	Moderate malnutrition	38
	Marginal malnutrition	26
	Normal	16

Table 8: Prevalence of clinical sign and symptoms among toddlers

Symptoms	Percentage
Flag sign	51
Dull dry hairs	42
Pale eyes	63
Bitot's spot	4
Corneal Xerosis	37
Skin pigmentation	32
Mild flourosis	4
B complex deficiency	15

Table 9: Nutrient intake of toddlers through dietary intake

Nutrients	Mean intake	Percentage of RDA
Energy	706.66 (kcal day^{-1})	56.98
Protein	13.86 (gm day^{-1})	63.00
Iron	5.33 (mg day^{-1})	44.44
Calcium	225 (mg day^{-1})	56.25
Vitamin A (β-carotene)	793.3 (μg day^{-1})	49.58

Table 10: Hemoglobin status of toddlers

Anemic (%)	Non anemic (%)
73	27

44.44 and 49.58% of recommended dietary allowances, respectively. In Table 10, it was clear that 73% of children were anemic and 27% were non anemic according to hemoglobin estimation.

DISCUSSION

Studies have shown that under nutrition of children is increasing over the years and researchers are also conducting more studies on this problem since it poses a major threat to the health and well-being of any population. This problem is not only associated with serious long-term consequences for the child but also adversely related to the economic development of a nation (Nyaruhucha *et al*., 2006). Under nutrition continues to be a cause of ill health and premature mortality among children in developing countries including India (Nandy *et al*., 2005). It has been found that under nutrition during childhood is a major health problem in most of the provinces of India. In different parts of West Bengal numerous studies have been conducted on the health and nutritional status of tribal children and adolescents (Tiwari *et al*., 2001; Halder, 2005; Mittal and Srivastava, 2006; Chowdhury *et al*., 2008). The present study reports on the level of malnutrition and the impact of some socioeconomic and demographic characteristics of households on the nutritional status of children under 3 years of age in three villages (Banasthali, Haripura and Motipura) of Niwai, Distt-Tonk, Rajasthan.

In general, the prevalence of underweight in children (0-6 years) of India ranged from 37.4-93.9% (Table 11). The prevalence of underweight in the present study (80%) was higher than that in Baiga (Chakma *et al*., 2009), Kodaku (Dolla *et al*., 2005), Raj Gond (Sharma *et al*., 2006), Lodha (Bisai *et al*., 2008a), Gond (Rao *et al*., 2005; Mitra *et al*., 2007a, b), Bharia (Dolla *et al*., 2006), Saharias (Rao *et al*., 2006), Bihar (Yadav and Singh, 1999), Kora-Mudi (Bisai and Mallick, 2011) and tribal children from West Bengal (IIPS), Andhra Pradesh (Laxmaiah *et al*., 2007), Maharastra (Khandare *et al*., 2008) and the national (IIPS and Macro International, 2007) prevalence as assessed during 2005 to 2006 except Kamar (Mitra *et al*., 2007a, b). There is a strong association between the severity of weight for age deficits and mortality rates but even mild malnutrition which is much more common, augments case-fatality rates of disease. This synergism has been found to be strongest in populations with high morbidity and malnutrition (Pelletier *et al*., 1993). The high prevalence of stunting reflects the compromised overall health in this population which is consistent with its very high infant and less than five mortality rates (McElroy *et al*., 2001). The prevalence of stunting ranged between 35.1 and 67.8% (Table 3). But it was higher in the present study than in tribal preschool children of Baiga (Chakma *et al*., 2009), Kodaku (Dolla *et al*., 2005), Raj Gond (Sharma *et al*., 2006), Lodha (Bisai *et al*., 2008b), Gond (Rao *et al*., 2005; Mitra *et al*., 2007a, b), Bharia (Dolla *et al*., 2006) and tribal children from West Bengal, Andhra Pradesh (Laxmaiah *et al*., 2007), India (IIPS and Macro International, 2007). In contrast, the prevalence of stunting was lower in the present study than in the Saharias (Rao *et al*., 2006), Kamar (Mitra *et al*., 2007a, b) and tribal children from Maharashtra (Khandare *et al*., 2008). However, the rate of stunting was similar to that of the tribal population of Bihar (Yadav and Singh, 1999). Moreover, the prevalence of wasting was higher

Table 11: The prevalence of undernutrition in different studies conducted in tribal children

Studies	District	State	Age group	Sample size	Underweight (%)	Stunting (%)	Wasting (%)
Preschool children							
Laxmaiah *et al.* (2007)	Khammm	Andhra Pradesh	1-5	390	65.4	46.4	21.3
Yadav and Singh (1999)	17 tribal districts	Bihar	0-6	1847	55.0	60.0	25.0
Mitra *et al.* (2007a)	Korba	Chattisgarh	1-5	180	60.0	55.6	55.0
Mitra *et al.* (2007b)	Raipur, Dhamtary	Chattisgarh	4-6	132	93.9	67.4	85.6
Mitra *et al.* (2007a, b)	Korba	Chattisgarh	1-5	199	48.2	47.7	48.2
Chakma *et al.* (2009)	Dindori	Madhya Pradesh	1-5	251	61.0	44.3	37.2
Rao *et al.* (2005)	Jabalpur	Madhya Pradesh	0-5	1022	61.6	51.6	32.9
Dolla *et al.* (2005)	Sarguja	Madhya Pradesh	1-5	182	59.8	43.0	35.0
Dolla *et al.* (2006)	Chhindwara	Madhya Pradesh	1-5	-	52.5	48.1	33.9
Sharma *et al.* (2006)	Balaghat	Madhya Pradesh	1-5	123	37.4	46.3	41.5
Khandare *et al.* (2008)	Thane	Maharastra	0-6	40	68.7	60.4	30.2
Rao *et al.* (2006)	Baran	Rajasthan	1-5	193	72.1	67.8	13.4
Bisai *et al.* (2008a)	Paschim Medinipur	West Bengal	1-5	74	47.3	35.1	20.3
IIPS (2008)		West Bengal	<5	150	59.7	58.6	20.7
IIPS (2007)		India	<5	4448	54.5	53.9	27.6
Bisai and Mallick (2011)	Paschim Medinipur	West Bengal	2-5	47	61.7	51.1	27.7

in the present study in comparison to studies of tribal children from Madhya Pradesh (Chakma *et al*., 2009; Dolla *et al*., 2005, 2006; Sharma *et al*., 2006; Rao *et al*., 2005), Chatttisgarh (Mitra *et al*., 2007a, b), Maharashtra (Khandare *et al*., 2008), Andhra Pradesh (Laxmaiah *et al*., 2007), Bihar (Yadav and Singh, 1999) and West Bengal, Saharias (Rao *et al*., 2006), Lodhas (Bisai *et al*., 2008a, b). There were large variations in the rate of wasting: 13.4% for Saharia (Rao *et al*., 2006) children to 85.6% for Kamar (Mitra *et al*., 2007a, b) tribal children. Thus, these studies and present study clearly indicated that tribal preschool children were experiencing acute malnutrition. About 58% of children were wasted according to MUAC in present study but no children found wasted according to Verena.

The prevalence of under nutrition (underweight, stunting and wasting) in almost all studies was in the category high to very high (Table 11). In the present study, 25, 20 and 40% of children were found to be severely underweight, stunted and wasted, respectively. In Bisai and Mallick (2011) study, 16.0, 24.4 and 1.7% of children were found to be severely underweight, stunted and wasted, respectively. A recent study reported that 9.1, 12.7 and 3.6% of children were found to be severely underweight, stunted and wasted (Pelletier, 1994). Chowdhury *et al*. (2008) reported the rates of severe underweight, stunting and wasting as 7.9, 5.0 and 9.5%, respectively. These results clearly indicated that the prevalence of severe underweight and stunting was much higher in present study. Underweight is used as a composite indicator to reflect both acute and chronic under nutrition but stunting is an indicator of chronic or long-term nutritional deficiency and/or disease or illness (Bose *et al*., 2007). Thereby, the children in the present study experienced instant and prolonged nutritional stress. It is well documented that dietary insufficiencies are mainly reflected through the high prevalence of underweight, stunting and wasting in Indian preschool children (Bharati *et al*., 2009).

Family/household income was significantly associated with nutritional status of the under five children. Children belonging to the low-income group were at a higher risk of being wasted, underweight and stunted than children of better income families. Although, the economic differentials seem to be silent in rural society it appears to be an important predictor of childhood nutritional status.

Low income levels of developing nations limits the kinds and the amounts of food available for consumption (Ref). Low income also increases the likelihood of infection through such mechanisms as inadequate personal and environmental hygiene (Omawale and Mcleod, 1984). While chronic malnutrition is influenced by a various combination of long-term food deficiency, poor quality diet and low economic status, acute malnutrition is mainly attributable to illness and/or shortage of food.

It was observed that prevalence of various signs of protein calorie malnutrition was high in this study, i.e., dull dry hairs (42%) and flag sign (51%) which was similar to another study (44%) of Singh *et al*. (2006) while there was less prevalence of PEM (9.4%) seen in 1987 (DMRC, 1987). Vitamin A (Bitot's spot 4%) and B complex deficiency (15%) were found less prevalent in present study while bitot's spot and B complex deficiency were 0.2, 17.6, 3, 80.2 and 0.9% prevalent in Singh *et al*. (2006) and other studies done in 1987, 1986 (DMRC, 1986, 1987), respectively. Clinical sign for anemia (pale eyes) was prevalent in 63% children in present study. On the other hand, 30.5, 73.5 and 0.3% were prevalent in Singh *et al*. (2006) and other studies done in 1987, 1986 (DMRC, 1986, 1987), respectively.

Table 12: Nutrient intake in different studies among children under five year of age

Studies	Energy (kcal day^{-1})	Protein (g day^{-1})	Iron (mg day^{-1})	Calciummg (day^{-1})	Vitamin A (μg day^{-1})
Tomomsi *et al.* (2011)	1547	58.20	6.30	520.0	490.0
Inge *et al.* (2008)	5915.7 kJ/day	54.90	7.20	860.2	-
Singh *et al.* (2006)	341.6	12.00	-	-	-
DMRC (1987)	926	30.65	-	-	-
DMRC (1986)	876.5	27.35	-	-	-
DMRC (1986)	1048.5	32.70	-	-	-
Present study	706.6	13.86	5.33	225.0	793.3
RDA	1240	22.00	12.00	400.0	1600.0

Nutrient intake (energy, protein, iron, calcium and vitamin A) by preschool children in different studies was shown in Table 12. Energy intake was ranged between 341.6 kcal day^{-1} to 5915.7 kJ day^{-1}. In present study energy intake was less than other studies (DMRC, 1986, 1987; Huybrechts *et al*., 2008; Kobayashi *et al*., 2011) while least energy intake was seen in Singh *et al.* (2006) study. In present and Singh *et al.* (2006) study protein intake was below the RDA while in other studies (DMRC, 1986, 1987; Huybrechts *et al*., 2008; Kobayashi *et al*., 2011) it was higher than RDA. 6.3 and 7.2 mg day^{-1} iron intake was seen in Kobayashi *et al.* (2011) and Huybrechts *et al.* (2008) study which was low than RDA and similar results was found in present study with a iron intake of 5.33 mg day^{-1}. Calcium intake per day in present study was seen 225 mg which was lower in comparison to RDA while Huybrechts *et al.* (2008) it was higher than RDA, i.e., 860.2 mg day^{-1}. On the other hand, vitamin a intake in present study was 793.3 μg day^{-1} while 490 μg day^{-1} was seen in Kobayashi *et al.* (2011) study which were lower than RDA.

Despite declines in the prevalence of iron deficiency over the past 30 years with the routine supplementation of infant foods with iron, iron deficiency remains the most common nutritional deficiency in infants and young children (Rees *et al*., 1985). Data from the Third National Health and Nutrition Examination Survey (NHANES III) indicate that in 1988 to 94, 9% of toddlers aged 1-2 years were iron deficient (Looker *et al*., 1997). Nationally, one out of seven children had a poor iron status. Almost one third of children (27.9%) were anemic on the basis of hemoglobin concentration with moderate and severe anemia being relatively uncommon. Overall, 87% of children under 5 years of age had some level of anemia (Hb<11 g dL^{-1}) (Schellenberg *et al*., 2003). In present study 73% of children were anemic while only 27% children were non anemic. Low HAZ, WHZ and WAZ scores were all associated with an increased risk of anemia (Schellenberg *et al*., 2003). Concerns about the high prevalence of anemia are heightened by the fact that most children were at risk of acute malaria which may further reduce hemoglobin levels to a point where physiological compromise is inevitable.

CONCLUSION

This study conclude that the nutritional status of the sample population reveals a gloomy picture. An urgent need is required to take appropriate steps for improvement of nutritional status of this marginalized scheduled tribe community. It may be recommended that more empirical and field based studies should be undertaken on the nutritional status of similar small and underprivileged tribal communities. This study indicated family income and less dietary intake has been an important predictor of malnutrition even in the seemingly uniformly poor society. Thus, development and poverty alleviation programme must focus on the poorest segment of societies to improve their economic status and thereby the health conditions.

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