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RESEARCH ARTICLE

NUTRITION INTAKE & IMBALANCES AMONG CHILDREN (0-14 YEARS) OF GUJAR COMMUNITY IN GREAT KASHMIR HIMALAYAN RANGE (J&K STATE)

G.M. Rather & Sameer Fayaz
Department of Geography & Regional Development, University of Kashmir

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ABSTRACT

Variation in the availability of nutrients in diet and departure of same from standard requirement had badly affected the health of children of Gujar Community in Great Kashmir Himalayan Range of J&K state. The present research work was an attempt to investigate spatial variation and imbalances for nutrients in the diet like carbohydrates, proteins, fats, vitamins and minerals in comparison to recommended dietary allowances of ICMR that can serve as an important tool for development of health in children of the Gujar community of the study area.

INTRODUCTION

Nutrition plays an important role in the growth of children and the nutrition needs keep on changing at every stage during the first 18 years of life as, around this stage, a child nearly attains its mature size. During infancy and early childhood period the nutrition requirements are quite high due to rapid growth but they level off during middle childhood period. Around the onset of puberty an accelerated phase of growth begins and the nutritional requirements increases tremendously before they taper off to adult level (Nath, 1997). Inadequate amount of nutrients in diet in comparison to Indian Council of Medical Research (ICMR) recommended dietary allowances leads to malnutrition and under nutrition (Doshi,1995), that in-turn leads to not only low growth, under nutrition weight; increased risk of infectious diseases and deficiency diseases but also has a negative effect upon mental development (Verhasselt, 1997; Mishra, 1985).

There are many nutritional problems which effect children and the major ones are, low birth weight, protein energy malnutrition, exophthalmia, scurvy and nutrition anemia (Park, 2011). Malnourished children have poorer psychomotor development, leading to economic hardships for individuals and families in adulthood. When the body becomes stunted through lack of proper food during the growing period, there will never come a time in later life when this condition can be remedied. Nutritional deficiency may also cause, poor posture, certain bone deformities, narrow chest, poorly developed teeth and teeth badly placed in jaws (Dowd and Dent, 2011).

Malnutrition has long been recognized because of poverty (Aggarwal, 1986). Besides low income (Levinson, 1974), malnutrition is the result of household food insecurity, lack of clean water, lack of knowledge on good sanitation, and lack of alternative sources of income. It is also compounded by, inadequate care, gender inequality, poor health services, and poor environment. Malnutrition causes great deal of human sufferings both physical and emotional. it is a violation of a child's human rights (Oshaug *et al*. , 1994). It is associated with more than half of all children's deaths worldwide (Pelletier *et al* 1995) Adults who survive malnutrition as children are less physically and intellectually productive and suffer from higher levels of chorionic illness and disability . In India thirty per cent of children are born with low birth weight and almost 50 percent remain underweight by the age of three (UNICEF, 2012). Among the nutrition experts Patwardhan (1966) and Pelto (1991), have strongly stressed the consideration of geographical factors in identification and assessment of deficiency diseases. Nutrition patterns are affected not only by socio-economic and socio –cultural backwards of community but also by religion as religion plays a significant role to the extent that it imposes several restrictions on food consumed by them (Rani, Reddy and Sreedevamma, 2003).

Despite the economic growth in developing countries, under nutrition is still highly prevalent and is the main cause of chronic diseases. Every year, nearly 11 million children die before reaching their 5th birthday (Gupta, 2008). It has been estimated that nearly 30 percent of infants, children, adolescents, adults and elderly in the developing world are suffering from one or more of the multiple forms of malnutrition. (WHO, 1999). Standard of nutrition varies from country to country and within the regions of diverse agro-climatic conditions whatever standard is chosen, under nutrition and malnutrition is wide spread in India, because of in-adequate poor and faulty nutrition status (Jaffrey, 1988). Child ill health described as the silent emergency has been a major focus of attention for several decades. Several nutrition programmes like I.C.D.S and Minimum Needs Programme have been launched for the downtrodden sections of population in general and vulnerable sections of population which includes pre-school children in particular but these programmes have not been successful to raise the level of nutrition to the optimum level (Bagchi.1994, Sachar and Gill 1993, Price, 1994).

Tribal areas constitute a very significant part of backward areas of the country. Predominantly live in hilly and forest areas which are comparatively inaccessible and isolated and face the basic problems of poverty that leads to low health status (Gopalan, 1996). Gujars of Jammu and Kashmir are a scheduled tribes inhabiting mountainous and forest areas of Kashmir Himalayas .Due to physical constraints and low socio-economic set Gujars of Jammu and Kashmir face the problems of nutrition and health. The present research work was an attempt to analyze the magnitude and geographical distribution of imbalances in the nutrition intake of school children of Gujar community in Great Kashmir Himalayan Range.

Study Area

Great Kashmir Himalayan range is one of the most important physiographic divisions of Jammu and Kashmir State and extends uninterruptedly for a length of 150 km from Sundran drainage basin of Anantnag in the south to Kazinag ridge of Baramulla in the north. Great Kashmir Himalayan range is a massive topographical feature enclosing Kashmir Valley on the east-north east and north – northwest. The range lies between $33^0$22'32.02" N – $34^0$47'42.67" North latitude and $73^0$48'10.96" E – $75^0$34'22.23" East longitude.

* Corresponding author: **G.M. Rather**
Department of Geography & Regional Development, University of Kashmir

The mountainous range has an average altitude of 3442 meters and stretches over an area of 8948.84 sq. Kms. (Fig.1) Of the various mountain ranges girdling the Valley of Kashmir, Great Himalayan range is by far the most important range because of the altitude of its peaks, Kolahoi (5425) meters) , Sheshnag (5096), Saribal (4882) , Harmukh (4876 meters) , Shutiyan(4371 meters) Rang top (3487 meters). The region has a slope from 10-30^0 in the foothills and above 40^0 in the hilly areas. (Raza *et al*., 1978). The region is inhabited by Gujar community with very low socio-economic development.

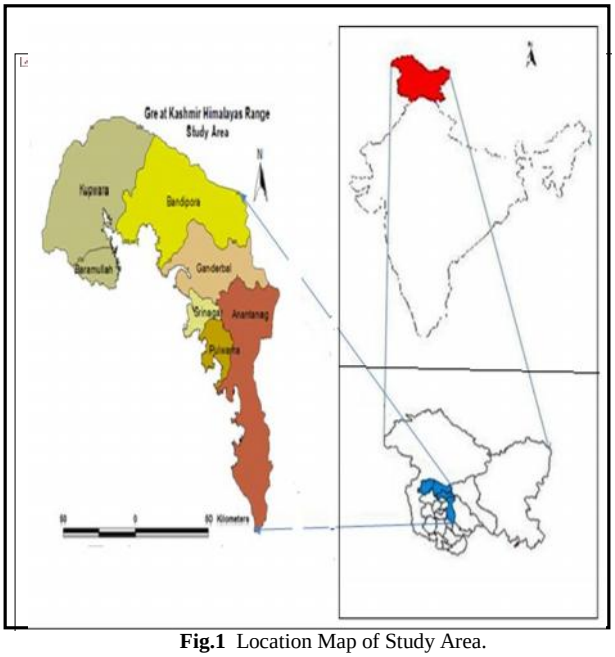


Fig.1 Location Map of Study Area.

Data Base and Methodology

The present research work was based on both primary and secondary data. Large data both primary and secondary was collected and generated from different sources.

A comprehensive methodology used for the present study. An outline of the various methodological steps is provided in the figure 2 and described under the following headings.

Delineation of Study Area and demarcation of Altitudinal Zones (Unit of Study)

Base map of the study area was delineated from 19 SOI Toposheets and processed digitally in GIS environment. Great Kashmir Himalayan Range was divided into the following seven altitudinal zones (Table 1)with the help of software's like ERADAS Imagine 9.0 and Arc view GIS 3.2a.

Selection of Sample Villages, Sample Households and Sample children (0-14 years)

Stratified Random Sampling technique was used for selection of around 20% of sample villages (60) and 20% of sample households (2080) in proportion to total number of villages and households from each altitudinal zone. For Micro level study, a Sample of 4160 children, one male and one female, falling in 0-14 years were selected for Micro study. The reason behind selection of this age group was because of renewed awareness that the determinants of chronic diseases in later life and health behavior are laid down in 0 – 14 years of age. This age group was further divided into three sub groups - (0-3, 4-6 and 7-14 years) for being ages of different levels of schooling (Table 2)..

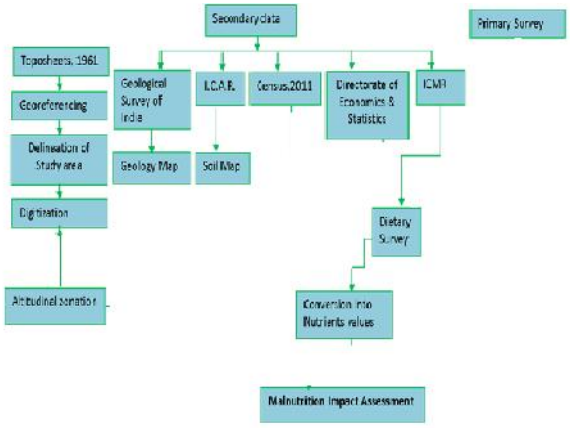


Fig. 2 Flow chart showing methodological framework of the study

Sample Survey / Field work

Field survey of 2080 sample households in stratified sample of 60 villages from seven altitudinal zones as unit of study was carried out (Fig. 2). Food intake , anthropogenic measurement and health survey of 4160 sample children, comprising of one male and one female from each household of sample village was carried out. A sample size of around 20 percent was use for sample villages and sample households (table 1). Location of all the sample villages (latitude, longitude and altitude) was recorded by using portable GPS (table 3). A structured schedule was used for primary data collection.

Dietary survey

Dietary survey of containing questions on food items consumed by the child per day for a period of 10 days preceding the date of survey. Average of these 10 days has been taken as food items taken as daily food intake of the child. Food intake in quantities was converted into nutritive values of carbohydrates, proteins, fats, vitamins and minerals in order to calculate total calories consumed by each child with the help of latest nutrition conversion chart formulated bynutrition expert committee constituted by ICMR.

Table 1 Altitudinal Zones in Great Kashmir Himalayan Range by Area

Altitudinal Zone	Alt. in meters amsl	Area in Sq. Kms.	Area in % to total Area
A	1600 – 1750	499.18	5.59
B	1750-1900	510.22	5.70
C	1900-2050	490.19	5.47
D	2050-2200	516.45	5.70
E	2200-2350	515.38	5.75
F	2350-2500	530.12	5.96
G	2500 – 6000	5887.30	65.83
	Total	**8948.84**	**100**

The nutrients intake for each sample child was calculated and compared with the standard requirement to calculate percentage departure by the formula.

$$\frac{\text{Surplus or Deficiency}}{\text{Standard requirement}} \times 100$$

Table 2 Sample frame of the study

Alt. Zone	Alt. In mts. (AMSL)	Total Area (Km ^{2})	Revenue villages			Number of households			Number of children(0-14 years)forMicro Study		
			Total InArea	Sample	Percentage of sample	Total in Sample villages	Sample	Percentage of sample	Male	Female	Total
A	1600-1750	499.18	9	2	22.22	460	92	20.00	92	92	184
B	1750- 1900	510.22	31	6	19.35	1000	200	20.00	200	200	400
C	1900- 2050	490.19	71	14	19.71	2380	476	20.00	476	476	952
D	2050- 2200	516.45	72	14	19.44	2290	458	20.00	458	458	916
E	2200- 2350	515.38	81	16	19.75	2790	558	20.00	558	558	1116
F	2350- 2500	530.12	40	8	20.00	1480	296	20.00	296	296	592
G	2500-6000	5887.30				Un inhabited by Gujars					
Total		8948.84	304	**60**	19.73	10,400	**2080**	**20.00**	**2080**	**2080**	**4160**

Table 3 Sample villages with altitude and geo-coordinates

S No.	Village Name	Lat./Long		Altitude (mamsl)	S No.	Village Name	Lat./Long		Altitude (mamsl)
1	Grand	33^{0}40’43” N	75^{0}15’20” E	1830	31	Dardpora Gugerpati	34^0 25’43” N	74^0 42’16.” E	2250
2	Hard kichloo	33^{0}50’45” N	75^{0}16’40” E	2390	32	Aragam Nagbal	34^{0}22’31” N	74^0 40’58E	2060
3	Gujran Batkot	33^{0}56’34” N	75^{0}18’07” E	2186	33	Chithi Bande chaliwan	34^{0}22’46” N	74^0 41’13.” E	2290
4	Ishnad	33^{0}52’08” N	75^{0}18’04” E	2268	34	Argam Halwadi	34^{0}22’30” N	74^0 40’57.” E	2055
5	Hapatnar	33^{0}48’ 17$^{“\ N}$	75 ^{0} 21’ 15”E	2520	35	Sumlar Gujarpati	34^{0}22’30” N	74^0 43’41” E	1885
6	Salia	33^{0}55’28” N	75^{0}17’26” E	2210	36	Chuntimula gujarpati	34^{0}24’23” N	74^0 44’05.” E	1980
7	Gous	33^{0}52’09” N	75^{0}18’32” E	2190	37	Chatibandhi Gorhajan	34^{0}23’40” N	74^0 42’25” E	1835
8	Shojan	33^{0}51’14” N	75^{0}18’25” E	1890	38	Malangam gujarpati	34^{0}26’12” N	74^0 33’26. E	1950
9	Grandwan	33^{0}52’43” N	75^{0}17’54” E	2020	39	Mulkalama gujarpati	34^{0}24’03” N	74^0 43’34” E	2375
10	Lidu	33^{0}57’31” N	75^{0}18’52” E	2049	40	Gujarpati Muqam	34^{0}26’58” N	74^0 34’36” E	2250
11	Rishkobal	33^{0}08’03” N	75^0 17’51” E	2350	41	Kudara	34^{0}25’03” N	74^0 47’01” E	2410
12	Nagbal	33^{0}52’32” N	75^{0}20’25” E	2260	42	Dachna Gujarpati	34^{0}26’02 ” N	74^0 30’56” E	1680
13	Dragund	34^{0}25’51” N	75^{0}04’55” E	2120	43	Manobal	34^{0}30’15” N	74^0 30’15” E	2055
14	Narasthan	34^{0}13’27” N	75^{0}05’25” E	2250	44	Londa	34^{0}18’24” N	74^0 10’20” E	2010
15	Guturu	34^{0}30’27” N	75^{0}25’20” E	2160	45	Nilzab	34^{0}30’25” N	74^0 12’42” E	2290
16	Hajannar	34^0 04’31” N	75^{0}03’37” E	1893	46	Potwari	34^{0}19’45” N	74^0 12’20” E	2065
17	Nogh	33^{0}55’46” N	75^{0}11’10” E	2142	47	Khaitan	34^{0}30’50” N	74^0 30’35” E	1935
18	Bangidar	33^{0}54’40” N	75^{0}14’09” E	2354	48	Nowgam	34^{0}28’19” N	74^0 14’25” E	1980
19	Basmia	33^{0}55’44” N	75^{0}11’06” E	2262	49	Lahkoot	34^{0}21’45” N	74^0 20’52” E	1955
20	Faqir Gujri	34^{0}24 ’16.” N	74^0 38’50.” E	2089	50	Rashiwari	34^{0}40’55” N	74^0 48’45” E	2410
21	Shal khud	34^{0}10’59” N	74^0 54’58 E	2215	51	Shiltra	34^0 19’14” N	74^0 12’08” E	1835
22	Nagbal gujarpati	34^{0}15’22” N	74^0 34’25” E	1967	52	Inderdaji	34^{0}20’12” N	74^0 08’54” E	1950
23	Khanan	34^{0}18’47” N	74^0 51’59” E	2030	53	Khuri payeen	34^{0}39’55” N	74^0 45’30” E	2250
24	Poshkar	34^{0}14’26” N	74^0 58’05” E	2080	54	Khuri Bala	34^{0}42’15” N	74^0 45’40” E	2315
25	Pahalnar	34^{0}20’49” N	75^0 51’59” E	2142	55	Wadur bala	34^0 18’26” N	74^0 11’06” E	2058
26	Wangat	34^{0}19’33” N	75^0 06’50” E	2195	56	Turkkpora	34^{0}32’52” N	74^0 26’35” E	2386
27	Astan mohla	34^{0}15’29” N	74^0 54’44” E	2048	57	Wanpur	34^{0}28’12” N	74^0 16’30” E	2036
28	Yarmukam	34^{0}17’44” N	74^0 47’11” E	2360	58	Wahalutar	34^{0}46’22” N	74^0 14’32” E	2253
29	Tsunt Wali war	34^{0}47’14” N	74^0 54’28” E	2370	59	Potus	34^{0}45’20” N	74^0 12’28” E	2 146
30	Waniarm	34^{0}17’44” N	74^0 48’30” E	2295	60	Naidhu	34^{0}25’23” N	74^0 16’55” E	1684

Source: Based on GPS readings during Sample survey, 2013

Table 4 Average Energy intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt.in meters (amsl)	Sample Villages.	No. of male Sample children (Male & Female –same ratio)	Aveg. Energy intake(Kcal) among sample children by age and sex					
			Male children			Female children		
			0 – 3Years RDA1060	4 – 6years RDA1350	7 – 14year RDA2223	0 – 3Years RDA1060	4 – 6Years RDA1350	7 – 14years RDA2010
Zone-A (1600 – 1750)	2	184	313.58 (-70.42)	420.96 (68.82)	591.145(73.14)	336.14(-68.29)	478.815 (-64.53)	603.57 (-70)
Zone - B (1750-1900)	6	400	375.95 (-68.61)	500.04 (-62.96)	711.63 (-68.01)	327.10 (-69.14)	474.93 (-67.11)	691.88 (-65.62)
Zone - C (1900-2050)	14	952	349.27 (-68.22)	458.59 (-66.03)	676.61 (-69.59)	330.14 (-68.85)	462.29 (-65.76)	670.05 (-66.66)
Zone - D (2050-2200)	14	916	342.68 (-70.62)	451.05 (-66.59)	654.39 (-70.58)	306.52 (-71.08)	430.29 (-68.13)	630.23 (-68.65)
Zone - E (2200-2350)	16	1116	332.40 (-71.55)	458.47 (66.04)	645.25 (-71)	295.90 (-72.08)	425.60 (-68.47)	591.03 (-70.59)
Zone - F (2350-2500)	8	592	274.52 (-74.10)	448.00 (66.81)	624.57 (-72)	280.64 (-73.52)	389.08 (-70.64)	573.32 (-71.49)
Zone – G (2500- 6000)								
Total	**60**	**4160**	**331.40(-70.59)**	**456.18 (66.21)**	**650.60 (70.76)**	**312.74 (-70.50)**	**443.50 (-67.44)**	**626.68(-68.85)**

Source: Based on data obtained from Sample survey, 2013

Figures in parenthesis represent per cent age departure from RDA.

RESULTS AND DISCUSSION

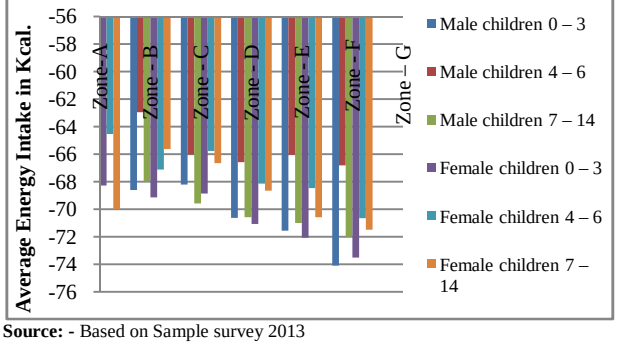
Nutrition intake Among Sample Children

The 24 hours recall of the food consumed for the last ten consecutive days was used to assess the nutrition intake of the sample children. Nutrition intake was calculated by conversion of food items consumed into nutrient values from latest ICMR recommended nutrition conversion chart and the average nutrition intake of sample children is discussed as under.

Energy intake

The average energy intake of sample children in Great Kashmir Himalayan Range was 331.40, 456.18 and 650.60 kcal for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 312.74, 443.50 and 626.68 kcal for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Fig. 3). Analysis of the data reveals that the average energy intake of sample children varies in different sample villages and different altitudinal zones by both age and sex (Table 4) and was lower than the ICMR recommended dietary allowances because of low nutrition intake and the low agricultural productivity.

Fig . 3 : Average Energy Intake Among Sample Children in Great Kashmir Himalyan Range



Source: - Based on Sample survey 2013

Proteins

Proteins are important nutrients essential for the growth of children especially during 0 to 14 years. Milk and milk products although available because of raring of livestock by Gujars but very less used as dietary product especially for children.

Table 5 Average Protein intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt. in meters (amsl)	Sample Villages.	No. ofmale Sample children (Male & Female – same ratio)	Aveg. Protein intake (mg) among sample children by age and sex					
			Male children			Female children		
			0 – 3Years RDA16.7	4 – 6years RDA20.1	7 – 14years RDA41.23	0 – 3Years RDA16.7	4 – 6years RDA20.1	7 – 14years RDA40.6
Zone-A (1600 – 1750)	2	184	9.540 (-43)	13.128(-35)	19.704 (-52)	10.861 (-35)	14.822 (-26)	18.886 (-53)
Zone – B (1750-1900)	6	400	10.262 (-39)	15.858 (-21)	23.165 (-44)	11.373 (-32)	15.338 (-24)	21.348 (-47)
Zone – C (1900-2050)	14	952	10.641 (-36)	14.511 (-28)	21.975 (-47)	12.481 (-25)	15.133 (-25)	21.044 (-48)
Zone – D (2050-2200)	14	916	10.966 (-34)	14.975 (-25)	21.490 (-48)	12.595 (-25)	14.672 (-27)	21.060 (-48)
Zone – E (2200-2350)	16	1116	10.235 (-39)	15.179 (-24)	23.047 (-44)	12.346 (-26)	14.180 (-29)	20.729 (-49)
Zone – F (2350-2500)	8	592	10.171 (-39)	14.829 (-26)	22.183 (-46)	11.878 (-29)	14.204 (-29)	20.170 (-50)
Zone – G (2500 – 6000)			Uninhabited					
Total	**60**	**4160**	**10.469 (-37)**	**14.747 (-27)**	**21.927 (-47)**	**11.922 (-29)**	**14.725 (-27)**	**20.540 (-49)**

Source: Based on data obtained from Sample survey, 2013

Figures in parenthesis represent percentage departure from RDA.

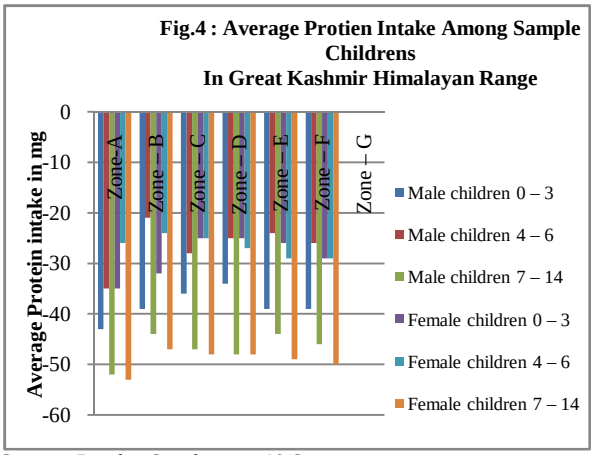
Table 6 Average Fat intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt. in meters(amsl)	Sample Villages.	No. ofmale Sample children (Male & Female – same ratio)	Aveg. Fat intake (mg) among children by age and sex					
			Male children			Female children		
			0 – 3Years RDA27	4 – 6years RDA25	7 – 14years RDA36	0 – 3Years RDA27	4 – 6years RDA25	7 – 14years RDA35
Zone-A (1600 – 1750)	2	184	3.690 (-86)	5.649 (-77)	7.417 (-79)	2.718 (-90)	3.952 (-84)	5.000 (-86)
Zone – B (1750-1900)	6	400	7.287 (-73)	6.939 (-72)	7.686 (-79)	3.069 (-89)	4.382 (-82)	4.627 (-87)
Zone – C (1900-2050)	14	952	5.481 (-80)	5.891 (-76)	6.715 (-81)	4.130 (-85)	4.150 (-83)	4.947 (-86)
Zone – D (2050-2200)	14	916	6.660 (-75)	6.073 (-76)	6.990 (-81)	3.431 (-87)	3.926 (-84)	4.881 (-86)
Zone – E (2200-2350)	16	1116	4.935 (-82)	5.953 (-76)	7.227 (-80)	3.548 (-87)	3.723 (-85)	4.851 (-86)
Zone – F (2350-2500)	8	592	4.168 (-85)	4.817 (-81)	5.675 (-84)	3.576 (-87)	4.089 (-84)	4.455 (-87)
Zone – G (2500 – 6000)			Uninhabited					
Total	**60**	**4160**	**5.370 (-85)**	**5.887 (-76)**	**6.952 (-81)**	**3.412 (-87)**	**4.037 (-84)**	**4.794 (-86)**

Source: Based on data obtained from Sample survey, 2013

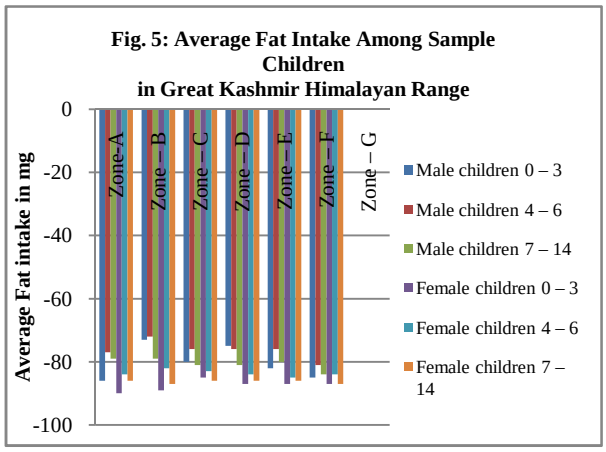
Figures in parenthesis represent percentage departure from RDA.

There are very less sources of dietary protein contribution by ICDS centres.



Source: - Based on Sample survey 2013

20.540 gm for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Table 5) .



Source: - Based on Sample survey 2013

Table 7 Average Vitamin A intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt. in meters(amsl)	Sample Villages.	No. of Sample children (Male & Female – same ratio)	Aveg. Vitamin A intake by children by age and sex					
			Male children			Female children		
			0 – 3Years RDA400	4 – 6years RDA600	7 – 14Years RDA600	0 – 3Years RDA400	4 – 6years RDA600	7 – 14years RDA600
Zone-A (1600 – 1750)	2	184	24.811(-94)	33.749 (-92)	51.419(-91)	22.007(-94)	29.190 (-93)	40.660 (-93)
Zone – B (1750-1900)	6	400	25.256 (-94)	28.126 (-93)	61.141(-90)	21.341(-95)	39.004 (-90)	44.972 (-93)
Zone – C (1900-2050)	14	952	37.613(-91)	44.048 (-89)	65.933(-89)	25.009(-94)	32.730 (-92)	44.225 (-93)
Zone – D (2050-2200)	14	916	41.706(-90)	36.473 (-91)	65.350(-89)	32.428(-92)	30.487 (-92)	47.449 (-92)
Zone – E (2200-2350)	16	1116	30.556(-92)	38.634 (-90)	65.021(-89)	24.161(-94)	30.723 (-92)	46.689 (-92)
Zone – F (2350-2500)	8	592	30.077(-92)	34.696 (-91)	61.045(-90)	24.355(-94)	29.754 (-93)	45.209 (-92)
Zone – G (2500 – 6000)			Uninhabited					
Total	**60**	**4160**	**31.669(-92)**	**35.960 (-91)**	**61.651(-90)**	**25.717(-94)**	**31.981 (-92)**	**44.867 (-93)**

Source: Based on data obtained from Sample survey, 2013

Figures in parenthesis represent percentage departure from RDA.

Table 8 Vitamin C intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt. in meters (amsl)	Sample Villages.	No. of Sample children (Male & Female – same ratio)	Aveg. Vitamin C intake by children by age and sex					
			Male children			Female children		
			0 – 3Years RDA40	4 – 6years RDA40	7 – 14years RDA40	0 – 3Years RDA40	4 – 6years RDA40	7 – 14years RDA40
Zone-A (1600 – 1750)	2	184	0.217 (-99)	0.949 (-98)	0.829 (-98)	0.291 (-99)	0.549 (-99)	0.733 (-98)
Zone – B (1750-1900)	6	400	0.388 (-99)	2.059 (-95)	1.828 (-95)	0.327 (-99)	0.588 (-99)	0.712 (-98)
Zone – C (1900-2050)	14	952	1.873 (-95)	2.275 (-94)	2.871 (-93)	0.481 (-99)	0.503 (-99)	0.658 (-98)
Zone – D (2050-2200)	14	916	1.105 (-97)	1.942 (-95)	2.014 (-95)	0.437 (-99)	0.541 (-99)	0.683 (-98)
Zone – E (2200-2350)	16	1116	1.927 (-95)	2.026 (-95)	1.978 (-95)	0.463 (-99)	0.474 (-99)	0.639 (-98)
Zone – F (2350-2500)	8	592	1.370 (-97)	1.654 (-96)	1.938 (-95)	0.508 (-99)	0.548 (-99)	0.629 (-98)
Zone – G (2500 – 6000)			Uninhabited					
Total	**60**	**4160**	**1.230 (-97)**	**1.818 (-95)**	**1.910 (-95)**	**0.413 (-99)**	**0.534 (-99)**	**0.676 (-98)**

Source: Based on data obtained from Sample survey, 2013

Figures in parenthesis represent percentage departure from RDA.

The average protein intake of sample children in Great Kashmir Himalayan Range was 10.469 , 14.747 and 21.927 gm for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 11.922, 14.725 and

Analysis of the data reveals that the average protein intake of sample children varies in different sample villages and different altitudinal zones by both age and sex and was lower than the ICMR recommended dietary allowances. Protein

intake for the male children in the age group 0 to 3 was lowest (9.540 gm) for male and 10.861gms for female in the altitudinal zone A and the highest (10.966 gm) for male and 12.595 gms for female in the altitudinal zone D . The reason could be because of having livestock rearing as dominant activity and thus the availability of milk to feed the children of 0-3 age group in the altitudinal zone D as compared to altitudinal zone A. It is very interesting to note that there is an almost increase in average protein intake in all age groups with increase in altitude from altitude zone A to altitude zone D but with a declining trend from altitude zone D to altitude zone F (Fig. 4). The reason could be very less attention towards child nutrition especially in altitude zone E and F both by the families and at ICDS centres.

varies in different altitudinal zones by both age and sex and was lower than the ICMR recommended dietary allowances (Fig. 5).

Vitamins (A & C)

The average vitamin A intake of sample children in Great Kashmir Himalayan Range was 31.669 , 35.960 and 61.651 ug for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 25.717, 31.981 and 44.867 ug for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Table 7) . Analysis of the table 8 reveals that the average vitamin A intake of sample children varies in different sample villages and different altitudinal zones by both age and sex and was lower than the

Table 9 Average Iron intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt. in meters (amsl)	Sample Villages.	No. ofmale Sample children (Male & Female – same ratio)	Aveg. Iron intake (mg) among children by age and sex					
			Male children			Female children		
			0 – 3Years RDA9	4 – 6years RDA13	7 – 14years RDA23	0 – 3Years RDA9	4 – 6years RDA13	7 – 14years RDA27
Zone-A (1600 – 1750)	2	184	3.724 (-59)	5.424 (-58)	8.707 (-62)	5.724 (-36)	6.668 (-49)	8.436 (-69)
Zone – B (1750-1900)	6	400	4.063 (-55)	7.222 (-44)	11.178 (-51)	4.744 (-47)	8.133 (-37)	9.599 (-64)
Zone – C (1900-2050)	14	952	4.305 (-52)	6.275 (-52)	10.663 (-54)	6.068 (-33)	7.359 (-43)	10.282 (-62)
Zone – D (2050-2200)	14	916	4.753 (-47)	6.905 (-47)	10.310 (-55)	6.314 (-30)	7.292 (-44)	10.080 (-63)
Zone – E (2200-2350)	16	1116	4.824 (-46)	6.847 (-47)	10.932 (-52)	6.436 (-28)	8.007 (-38)	9.817 (-64)
Zone – F (2350-2500)	8	592	4.968 (-45)	6.655 (-49)	10.720 (-53)	7.016 (-22)	9.424 (-28)	10.161 (-62)
Zone – G (2500 – 6000)	Uninhabited							
Total	**60**	**4160**	**4.440 (-51)**	**6.555 (-50)**	**10.418 (-55)**	**6.050 (-33)**	**7.814 (-40)**	**9.729 (-64)**

Source: Based on data obtained from Sample survey, 2013

Figures in parenthesis represent percentage departure from RDA.

Table 10 Average Calcium intake among sample children in Great Kashmir Himalayan Range

Altitudinal Zone with Alt. in meters (amsl)	Sample Villages.	No. ofmale Sample children (Male & Female – same ratio)	Aveg. Calcium intake (mg) among children by age and sex					
			Male children			Female children		
			0 – 3Years RDA600	4 – 6years RDA600	7 – 14years RDA800	0 – 3Years RDA600	4 – 6years RDA600	7 – 14years RDA800
Zone-A (1600 – 1750)	2	184	22.648 (-96)	35.206(-94)	49.178 (-94)	42.654 (-93)	49.416 (-92)	64.977 (-92)
Zone – B (1750-1900)	6	400	29.462 (-95)	42.634(-93)	55.981 (-93)	34.086 (-94)	55.089 (-91)	66.849 (-92)
Zone – C (1900-2050)	14	952	29.167 (-95)	38.623(-94)	57.676 (-93)	45.379 (-92)	48.998 (-92)	64.993 (-92)
Zone – D (2050-2200)	14	916	34.322 (-94)	45.578(-92)	57.484 (-93)	45.087 (-92)	49.019 (-92)	65.049 (-92)
Zone – E (2200-2350)	16	1116	32.538 (-95)	44.109(-93)	58.889 (-93)	42.326 (-93)	46.497 (-92)	63.002 (-92)
Zone – F (2350-2500)	8	592	32.168 (-95)	39.885(-93)	51.964 (-94)	44.724 (-93)	52.817 (-91)	60.282 (-92)
Zone – G (2500 – 6000)	Uninhabited							
Total	**60**	**4160**	**30.051 (-95)**	**41.006(-93)**	**55.195 (-93)**	**42.376(-93)**	**50.306(-92)**	**64.192 (-92)**

Source: Based on data obtained from Sample survey, 2013

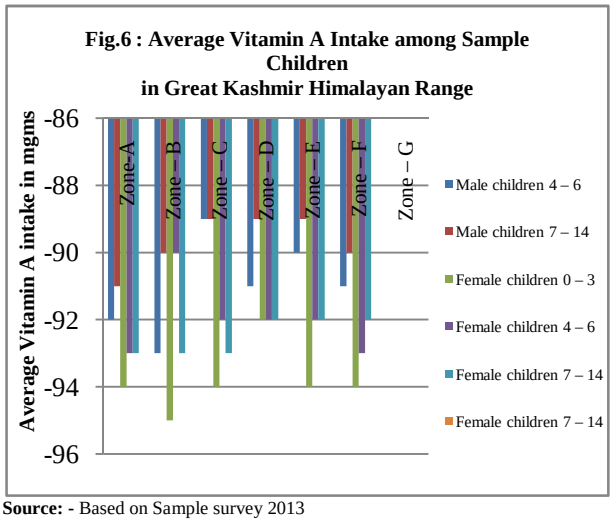
Figures in parenthesis represent percentage departure from RDA.

Dietary Fat

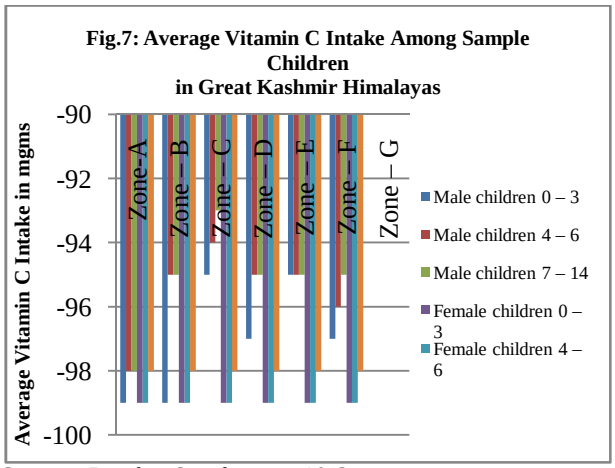
The average intake of dietary fat in sample children in Great Kashmir Himalayan Range was 5.370, 5.887 and 6.952 gm for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 3.412 , 4.037 and 4.794 gm for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Table 6). Analysis of the data reveals that the average fat intake of sample children

ICMR recommended dietary allowances. Vitamin A intake for the male children in the age group 0 to 3 was lowest (24.811 ug) for male and 22.007 ug for female in the altitudinal zone A and the highest (41.706 ug) for male and 32.428 ug for female in the altitudinal zone D . The reason could be because of having livestock rearing as dominant activity and thus the availability of milk to feed the children of 0-3 age group in the altitudinal zone D as compared to altitudinal zone A. It is very interesting to note that there is

an almost increase in average vitamin A intake in all age groups with increase in altitude from altitude zone A to altitude zone D but with a declining trend from altitude zone D to altitude zone F (Fig. 6). The reason could be very less attention towards child nutrition especially in altitude zone E and F both by the families and at ICDS centres.



Source: - Based on Sample survey 2013

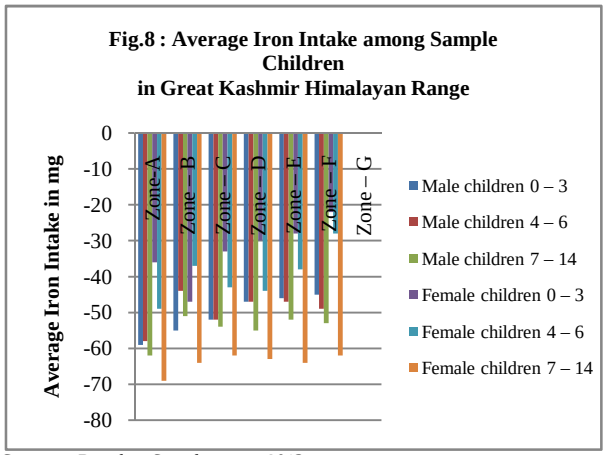


Source: - Based on Sample survey 2013

The average vitamin C intake of sample children in Great Kashmir Himalayan Range was 1.230, 1.818 and 1.910 ug for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 0.413, 0.534 and 0.676 ug for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Table 8). Average vitamin C intake by sample children shows variation in different altitudinal zones. Analysis of data reveals that vitamin C intake for the male children in the age group 0 to 3 was lowest (0.217 ug) in the altitudinal zone A and the highest (1.927 ug) in the altitudinal zone E. However in case of females 0-3 age group was the highest (0.508ug) vitamin C intake was noted in the altitudinal zone F and lowest (0.291ug) in altitudinal zone A. Inter altitudinal variation in vitamin C is clear from the figure 7.

Minerals (Iron & Calcium)

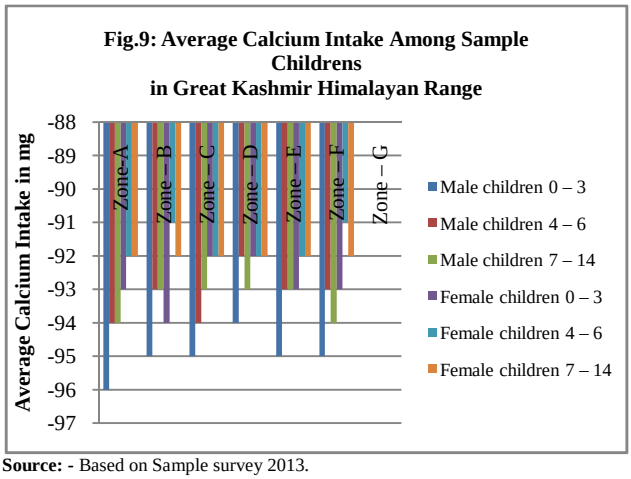
The average intake of iron among sample children in Great Kashmir Himalayan Range was 4.440 , 6.555 and 10.418 for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 6.050, 7.814 and 9.729 mg for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Table 9) . Inter altitudinal variation in iron intake is clear from the figure 8.



Source: - Based on Sample survey 2013

Average iron intake for the male children in the age group 0 to 3 was lowest (3.724 mg) in the altitudinal zone A and the highest (4.968 mg) in the altitudinal zone F and in case of females of the same age group, the lowest calcium intake (5.724 mg) was noted in the altitudinal zone A and highest (7.016mg) in altitudinal zone F.

The average intake of calcium among sample children in Great Kashmir Himalayan Range was 30.051 , 41.006 and 55.195 mg for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for male children and 42.376, 50.306 and 64.192 mg for the age groups 0 to 3, 4 to 6 and 7 to 14 years respectively for female children (Table 10) . Inter altitudinal variation in iron intake is clear from the table 5.8. Inter altitudinal variation in calcium intake for both male and female sample children is clear from the figure 9.



Source: - Based on Sample survey 2013.

CONCLUSION AND SUGGESTIONS

Analysis of data obtained from sample survey leads to the conclusion that nutrition intake of children in both male and female was deficit in terms of almost all nutrients like proteins, fats, vitamin A and C, Iron, calcium and Kcal. than the RDA of ICMR. Deficiency of Vitamin C, Calcium and Iron was very high. Percentage departure was negative in all the case of all nutrients. Imbalances were found more in case of female children as compared to male children. Declining trend with the increase in altitude was noted in dietary intake of all the nutrients.

Suggestions

On the basis of inferences drawn from the present analysis, the following measures are suggested for improving the nutritional status of children (0- 14 years) in this mountainous region.

Full coverage under ICDS and Strengthening of existing ICDS

Enrolment of children was very large and there was no arrangement and funds for additional children. There is need of strengthening and proper functioning of existing mid day meals programme .Proper maintenance of supply to ICDS centers is of foremost importance. New ICDS centers needs to be opened in the needful areas. Proper monitoring of health status of children at ICDS centers is very important.

Proper coordination between functionaries

Malnutrition of children in this mountainous area can be reduced, if there is coordination between the various functionaries. The AWW, ANM and other health visitors should have to work in coordination for the proper enrolment of all the child population of the area.

Adoption of early infant feeding practices

Weaning of children after 6 months in more than 80 per cent of the sample households was the main cause of malnutrition. There is a need for educating population about proper breast feeding and bottle feeding of the child right from very early stage. Weaning of children by complementary foods should be started at a very early stage.

Awareness and full involvement of the community

No child health promotion programme can be successful unless community for whom it is intended is aware about it. Awareness programmes needs to be organized in the sample villages to make the people aware about child health promotion programmes.

Acknowledgement

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