Risk areas of Mal nutrition among School children (0-14 years) in Gujars Community of Great Kashmir Himalayas

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ABSTRACT

The present research work was carried out on Identification of risk areas of Mal nutrition among School children (0-14 years) in Gujars Community of Great Kashmir Himalayas. Nutrition intake was examined in comparison to ICMR recommended dietary allowances and the sample school children were classified into nutrition intake departure grades. The weight of all sample children was measured, compared with ICMR standards and categorized into different nutritional grades based on weight for age. Data regarding prevalence of nutrition deficiency diseases was also obtained during field survey. Composite score method was employed for categorization of sample villages in risk areas. The investigation reveals that variation in the availability of nutrients in the diet has badly affected the health of school children. Majority of sample villages of higher altitudinal zones of E and F were areas of Iand II category of risk and were areas of very high and high priority. Suggestions have been made for better health of school children.

Keywords:*Malnutrition, Composite score, Great Kashmir Himalayas, Risk area*

INTRODUCTION

Nutrition plays an important role in the growth and development of children and 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). Children need to be provided normal diet, a diet that provides the child with food and fluids that meet his energy and nutrition needs (Sabarwal, 1999). 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), poor posture, certain bone deformities, narrow chest, poorly developed teeth and teeth badly placed in jaws (Dowd and Dent, 2011).

The nutrition needs of child 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). 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). Malnourished children have poorer psychomotor development, leading to economic hardships for individuals and families in adulthood.

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 (Oshaug *et al.,* 1994). Despite the improvement in survival of school children, there is still a major burden of diseases and ill health among this group particularly in the areas of poor nutrition and intestinal parasitic diseases that directly effects their education.

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 5^{th} birthday (Gupta, 2008). WHO has claimed that malnutrition contributes to 3.4 million child deaths at the global level (WHO, 2000).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). It is associated with more than half of all children′s deaths worldwide (Pelletier *et al*., 1995). 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). 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; Sacher and Gill, 1993; Price, 1994).

Tribal areas constituting 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, 2005). 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 *et al*., 2003). 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 up Gujars of Jammu and Kashmir face the problems of nutrition and health.

Impact of nutrition on health of children is not a recent approach in Medical geography but has attracted the attention of experts for the last more than half a century and hence very good literature is available regarding the nutrition and its related health problems among children. Some notable contributions are; McCarrison (1921), Tandon (1972),

Chatterjee (1976), Mishra (1985), Aggarwal (1986), Freund (1990), Kumar (1995), Zargar *et al.*, (1996), Kuhnlein and Pelto (1997), Pant (1998), Scrimshaw & Schürch (1998), Das *et al.*, (2000), Jood *et al.*, (2000), Mahapatra *et al.*, (2000**)**, Ray *et al.*, (2000), Rice *et al.*, (2000), Lakshmi and Padma (2004), Duboise (2004), Rather (2004), Agrahar (2005), Chapagain *et al.*, (2005), Das and Biswas (2005), Gopalan (2005), Kumari (2005), Salah *et al.*, (2006), Sohana *et al.*, (2007),Varma *et al.*, (2011), Khan and Khan (2012).

The present research paper was an attempt to analyze the magnitude and geographical distribution of malnutrition as a public health problem and to identify the causes that are directly or indirectly responsible for it.

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 kmfrom Sundran drainage basin of Anantnag in the south to Kazinag ridge of Baramulla in the north (Fig.1). 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°22′32.02″N–34°47′42.67″North latitude and 73°48′10.96″ E–75°34′22.23″ East longitude. The mountainous range has an average altitude of 3442 meters and stretches over an area of 8948.84 sq. Kms.

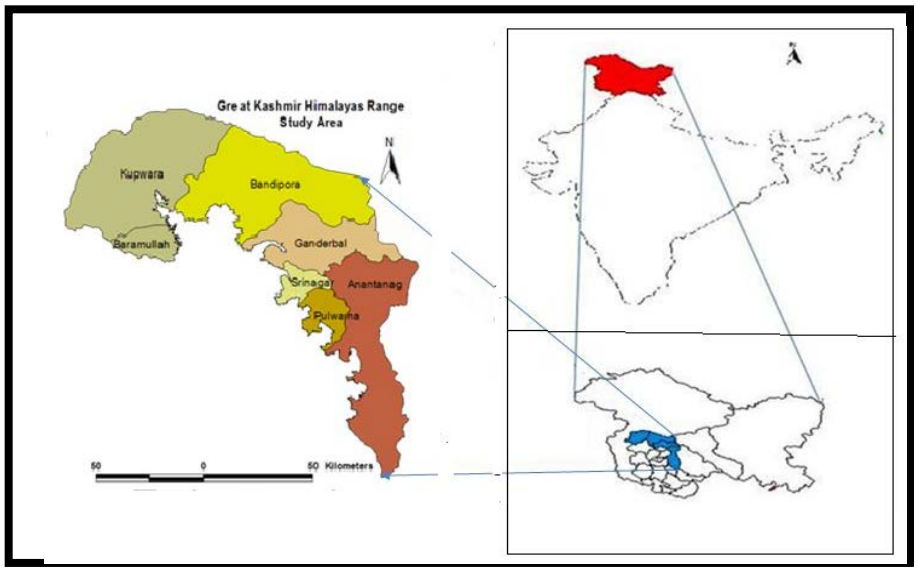

Fig. 1. LOCATION MAP

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, Kola hoi (5425) meters), Sheshnag (5096), Saribal (4882), Harmukh (4876 meters), Shutiyan (4371 meters) Rang top (3487 meters). The base contour of the range is around 1800 meters in the south and gradually decreases to around 1600 towards north. Below the base contour of the mountain range, the Valley of Kashmir has homogeneity in level. The region has a slope from 10-30° in the foothills and above 40°in the hilly areas. The present slope characteristics have evolved through a sequence of events including spectacular changes in base level through

faulting, folding and the consequent rejuvenation of drainage channels with pronounced effects on land forms in general and slope in particular (Raza *et al.*, 1978).

The region is inhabited by Gujar community with very low socio-economic development.

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 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 with the help of software′s like ERADAS Imagine 9.0 and Arc view GIS 3.2a. (Table 1)

Table 1. Altitudinal Zones by Area

Altitudinal Zone	Alt. in meters	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

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. 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 awareness that the determinants of chronic diseases in later life are laid down in 0-14 years of age. Geo-coordinates and altitude of each sample village was measured with the help of GPS during field survey.

Table 2. Sample frame

Alt. Zone	Alt. In mts. (AMSL)	Total Area (Km ^{2})	Revenue villages			Number of households			Number of children (0-14 years) for MICRO STUDY		
			Total In Area	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
	Total	8948.84	304	60	19.73	10,400	2080	20.00	2080	2080	4160

Source: Computed from SOI toposheets and census of India 2011

Table 3. Sample villages with altitude and geo-coordinates

S. No	**Village Name**	**Lat./Long**	**Altitude (Meters)**	**S.No**	**Village Name**	**Lat./Long**	**Altitude (Meters)**
1	Grand	33º40′43″N 75 º15′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 Bandechaliwan	$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″N75 ^{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	FaqirGujri	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	Shalkhud	$34^0$10′*59*″ N 74^0 *5*4′*5*8 E	2215	51	Shiltra	34^0 19′14″ N 74^0 12′08″ E	1835
22	Nagbalgujarpati	$34^0$1*5′22*″ N 74^0 *34*′2*5*″ 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	Khuripayeen	$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	KhuriBala	$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	Wadurbala	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	Astanmohla	$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	TsuntWaliwar	$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

Dietary survey and malnutrition grading

Dietary survey of 4160 sample children was carried out with the help of schedule containing questions on food items consumed by the child per day for a period of 10 days preceding the date of survey. Diet intake from ICDS centers was also taken into consideration. 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 by nutrition expert committee constituted by ICMR. The total energy intake in K cal.for each sample child was calculated and compared with the standard requirement to calculate percentage departure by the formula and all the children of each age group were classified into different departure classes.

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

Grades	**Nutrition intake Departure**
Normal	< 20%
Mild	20 – 30%
Moderate	30 – 40%
Severe	> 40%

Malnutrition Grading based on weight for age

As physical dimensions of body are influenced by nutrition particularly during the rapidly growing period of early childhood thus provide information regarding malnutrition. Weight for age is the best indicator and isused in the present study.

The weight of all individual sample children was measured by digital weight measuring machine and compared with ICMR standard and then be categorized into different nutritional grades by applying the following percentage departure formula.

$$\frac{Estimated\ Weigh}{Standard\ Weight} \times 100$$

Grades	**Weight Departure**
Normal	> 80%
Grade I	80 – 70 %
Grade II	70 – 60%

Grade III	60 – 50%
Grade IV	<50%

This classification was recommended by Indian Academy of Pediatrics (IAP).

Prevalence of nutrition deficiency diseases based on Health Survey

Health survey of 4160 sample children was carried out to generate data regarding incidence of malnutrition diseases among children. Prescriptions of Medical practitioners (both public & private) were used as source of data regarding incidence of diseases.

Identification of Risk Areas

In the present study Composite score method was used for identification of risk areas. Following three indicators which are the outcome of all the socio-economic indicators wereused for the study.

1) Nutrition intake departure from RDA.
2) Grades of Malnutrition based on weight for age.
3) Prevalence of nutrition deficiency diseases.

For removal of biasness of scale, all the sample children were classified by percentage into various grades of malnutrition on the basis of Weight for age departure and Grades of Malnutrition on the basis of energy intake departure. Ranks were assigned according to order of magnitude of grades as, 1 for Normal, 2 for Grade –I, 3 for Grade-II, 4 for Grade – III, and 5 for Grade- IV. The final rank for each grade was calculated by multiplying value of each grade by a number -1 for every 10 percent of number of children under each grade for each sample village. Ranks were assigned to number of cases suffering from various deficiency diseases as 5 for every 10 percent. Final ranks of various grades were added together to get composite score for each sample village. Sample villages along with altitudinal zone were then categorized into various categories of risk like very high, high, medium, low and very low. High composite score means high risk.

RESULTS AND DISCUSSIONS

The results of nutrition intake departure grades based on percentage departure from ICMR standards, malnutrition grades based on weight for age recommended by ICMR and the incidence of nutrition deficiency diseases for all 60 sample villages are shown in the Table 4.

Analysis of data reveals that almost all sample villages were having same pattern of ranking and the composite score varying from 90 to 120. Sample villages are classified intodifferent categories of risk (Table 5) and are discussed as under,

Table 4. Composite score for identification of risk area

Sample village	No. ofSample children(Male & Female – same ratio)	Per cent of sample children on the basis of weight for age departure with rank					Per cent of sample children on the basis of % energy intake departure with rank					Per cent of sample children suffering from nutrition deficiency diseases with rank	Composite Score
		NormalWeight for age (> 80%)	Grade-I (Weight for age 70 to)	Grade-II Weight for age 60to 70%)	Grade-III Weight for age 50 to 60%)	Grade-IV Weight for age < 50%)	Normal (Energy intake >80%)	Grade-I (Energy intake 70 to 80%)	Grade-II (Energy intake 60to 70%)	Grade-III(Energy intake 50	Grade-IV (Energy intake < 50%)		
Dachna	62	3.23 (1)	24.19 (6)	33.87 (12)	32.2 (16)	6.45 (5)	1.61 (1)	27.42 (6)	37.10 (12)	25.81 (12)	8.06 (5)	27.41 (15)	**91**
Nadihu	122	7.38 (1)	26.23 (6)	40.16 (15)	26.23 (12)	0.00 (0)	9.84 (1)	27.05 (6)	39.34 (12)	23.77 (12)	0.00 (0)	25.41 (15)	**80**
Grand	56	3.57 (1)	33.93 (8)	42.86 (15)	12.50 (8)	7.14 (5)	8.93 (1)	33.93 (8)	41.07 (15)	16.07 (8)	0.00 (0)	53.57 (30)	**99**
Sojan	80	6.25 (1)	33.75 (8)	45.00 (15)	15.00 (8)	0.00 (0)	6.25 (1)	31.25 (8)	42.50 (15)	20.00 (8)	0.00 (0)	46.25 (25)	**89**
Hajinar	78	3.85 (1)	32.05 (8)	43.59 (15)	20.51 (12)	0.00 (0)	5.13 (1)	34.62 (8)	42.31 (15)	17.95 (8)	0.00 (0)	50.00 (25)	**93**
Citibandi	72	9.72 (1)	26.39 (6)	38.89 (12)	25.00 (12)	0.00 (0)	11.11 (2)	22.22 (6)	38.89 (12)	27.78 (12)	0.00 (0)	51.38 (30)	**93**
Sumlar	52	5.77 (1)	28.85 (6)	38.46 (12)	26.92 (12)	0.00 (0)	7.69 (1)	30.77 (8)	34.62 (12)	26.92 (12)	0.00 (0)	63.46 (35)	**99**
Shiltra	62	11.29 (2)	27.42 (6)	40.32 (15)	20.97 (12)	0.00 (0)	12.90 (2)	29.03 (6)	38.71 (12)	19.35 (8)	0.00 (0)	53.22 (30)	**93**
Grandwan	52	1.92 (1)	17.31 (4)	28.85 (9)	42.31 (20)	9.62 (5)	1.92 (1)	23.08 (6)	32.69 (12)	34.62 (16)	7.69 (5)	65.38 (35)	**114**
Lidru	56	5.36 (1)	25.00 (6)	35.71 (12)	33.93 (16)	0.00 (0)	7.14 (1)	25.00 (6)	35.71 (12)	32.14 (16)	0.00 (0)	71.43 (40)	**110**
Dragund	80	0.00 (0)	23.75 (6)	37.50 (12)	36.25 (16)	2.50 (5)	2.50 (1)	27.50 (6)	38.75 (12)	28.75 (12)	2.50 (5)	45.00 (25)	**100**
NagbalGuj	96	5.21 (1)	34.38 (8)	37.50 (12)	22.92 (12)	0.00 (0)	10.46 (2)	32.29 (8)	35.42 (12)	19.79 (8)	2.04 (5)	43.75 (25)	**93**
Khanan	64	12.50 (1)	29.69 (6)	34.38 (12)	23.44 (12)	0.00 (0)	10.94 (2)	31.25 (8)	34.38 (12)	23.44 (12)	0.00 (0)	57.81 (30)	**95**
Astanmohla	70	2.86 (1)	30.00 (6)	34.29 (12)	32.86 (16)	0.00 (0)	5.71 (1)	25.71 (6)	35.71 (12)	30.00 (12)	2.86 (5)	52.85 (30)	**101**
Malangam	72	5.56 (1)	27.78 (6)	30.56 (12)	36.11 (16)	0.00 (0)	8.33 (1)	33.33 (8)	29.17 (9)	29.17 (12)	0.00 (0)	40.27 (25)	**90**
ChontimulaGuj	74	5.41 (1)	31.08 (8)	35.14 (12)	28.38 (12)	0.00 (0)	2.70 (1)	32.43 (8)	32.43 (12)	31.08 (16)	1.35 (5)	41.89 (25)	**100**
Khaitan	42	7.14 (1)	26.19 (6)	40.48 (15)	26.19 (12)	0.00 (0)	7.14 (1)	26.19 (6)	35.71 (12)	28.57 (12)	2.38 (5)	78.57 (40)	**110**
Inderdeji	62	3.23 (1)	17.74 (4)	45.16 (15)	33.879 (16)	0.00 (0)	3.23 (1)	17.74 (4)	33.87 (12)	40.32 (20)	4.84 (5)	75.80 (40)	**118**
Lehkoot	48	2.08	14.58	41.67	39.58	2.08	2.08	12.5	45.83	35.42	4.17	75.00	**122**

		(1)	(4)	(15)	(16)	(5)	(1)	0 (4)	(15)	(16)	(5)	(40)	
Nowgam	54	7.41 (1)	16.67 (4)	38.89 (12)	37.04 (16)	0.00 (5)	5.56 (1)	22.22 (6)	33.33 (12)	37.04 (16)	1.85 (5)	74.07 (40)	**113**
Londa	52	3.85 (1)	23.08 (6)	30.77 (12)	38.46 (16)	3.85 (5)	3.85 (1)	26.92 (6)	36.54 (12)	30.77 (16)	1.92 (5)	78.57 (40)	**120**
Wanpur	130	3.85 (1)	21.54 (6)	39.23 (12)	34.62 (16)	0.77 (5)	1.54 (1)	27.69 (6)	36.92 (12)	33.85 (16)	0.00 (0)	42.30 (25)	**100**
Gujran Batkoot	54	3.70 (1)	22.22 (6)	37.04 (12)	37.04 (16)	0.00 (0)	3.70 (1)	18.52 (4)	38.89 (12)	35.19 (16)	3.70 (5)	66.66 (35)	**108**
Guwas	50	2.00 (1)	22.00 (6)	32.00 (12)	40.00 (16)	4.00 (5)	2.00 (1)	24.00 (6)	34.00 (12)	36.00 (16)	4.00 (5)	54.00 (30)	**110**
Salia	66	6.06 (1)	30.30 (8)	33.33 (12)	28.79 (12)	1.52	6.06 (1)	30.30 (8)	31.82 (12)	30.30 (16)	1.52 (5)	50.00 (25)	**105**
Nough	72	4.17 (1)	26.39 (6)	34.72 (12)	33.33 (16)	1.39 (5)	5.56 (1)	23.61 (6)	37.50 (12)	31.94 (16)	1.39 (5)	54.16 (30)	**109**
Gutroo	84	4.76 (1)	21.43 (6)	41.67 (15)	30.95 (16)	1.19 (5)	1.19 (1)	23.81 (6)	40.48 (15)	32.14 (16)	3.57 (5)	46.42 (25)	**111**
FaqirGuj.	106	5.66 (1)	20.75 (6)	39.62 (12)	33.02 (16)	0.94 (5)	6.60 (1)	23.58 (6)	40.57 (15)	27.36 (12)	0.94 (5)	51.88 (30)	**109**
Poshkar	62	1.61 (1)	20.97 (6)	38.71 (12)	38.71 (16)	0.00 (0)	0.00 (0)	24.19 (6)	35.48 (12)	40.32 (20)	0.00 (0)	58.06 (30)	**103**
Pahalnar	58	5.17 (1)	22.41 (6)	36.21 (12)	34.48 (16)	1.72 (5)	6.90 (1)	20.69 (6)	41.38 (15)	29.31 (12)	1.72 (5)	63.79 (35)	**114**
Arg, Halwadi	60	6.67 (1)	23.33 (6)	38.33 (12)	30.00 (12)	1.67 (5)	5.00 (1)	26.67 (6)	33.33 (12)	31.67 (16)	3.33 (5)	65.00 (35)	**111**
Arg. Nagbal	62	3.23 (1)	24.19 (6)	37.10 (12)	30.65 (16)	4.84 (5)	4.84 (1)	24.19 (6)	32.26 (12)	35.48 (16)	3.23 (5)	54.83 (30)	**110**
Monbal	52	3.85 (1)	15.38 (4)	42.31 (15)	36.54 (16)	1.92 (5)	3.85 (1)	19.23 (4)	38.46 (12)	34.62 (16)	3.85 (5)	72.22 (40)	**121**
Waderbala	34	2.94 (1)	8.82 (2)	41.18 (15)	47.06 (20)	0.00 (0)	0.00 (1)	8.82 (2)	44.12 (15)	41.18 (20)	5.88 (5)	88.23 (45)	**125**
Potwari	60	1.67 (1)	20.00 (4)	36.67 (12)	35.00 (16)	6.67 (5)	1.67 (1)	23.33 (6)	36.67 (12)	33.33 (16)	5.00 (5)	63.33 (35)	**113**
Potus	96	1.04 (1)	20.83 (6)	32.29 (12)	41.67 (20)	4.17 (5)	2.08 (1)	22.92 (6)	39.58 (12)	32.29 (16)	3.13 (5)	55.20 (30)	**110**
NagbalAnatnag.	60	3.33 (1)	20.00 (4)	41.67 (15)	33.33 (16)	1.67 (5)	3.33 (1)	25.00 (6)	35.00 (12)	33.33 (16)	3.33 (5)	66.66 (35)	**116**
Ishnad	56	0.00 (0)	14.29 (4)	39.29 (12)	42.86 (20)	3.57 (5)	0.00 (0)	21.43 (6)	39.29 (12)	35.71 (16)	3.57 (5)	80.35 (45)	**125**
Reshkbal	76	3.95 (1)	21.05 (6)	34.21 (12)	39.47 (16)	1.32 (5)	2.63 (1)	21.05 (6)	34.21 (12)	39.47 (16)	2.63 (5)	53.94 (30)	**110**
Hardkichlo	54	1.85 (1)	22.22 (6)	35.19 (12)	33.33 (16)	7.41 (5)	1.85 (1)	22.22 (6)	29.63 (9))	38.89 (16)	7.41 (5)	88.89 (45)	**122**
Narastan	78	1.28 (1)	17.95 (4)	35.90 (12)	43.59 (20)	1.28 (5)	1.28 (1)	20.51 (6)	34.62 (12)	39.74 (16)	3.85 (5)	61.53 (35)	**117**
Basmia	76	1.32 (1)	17.11 (4)	36.84 (12)	42.11 (20)	2.63 (5)	1.32 (1)	21.05 (6)	34.21 (12)	39.47 (16)	3.95 (5)	59.21 (35)	**112**
Shalkhud	98	1.02 (1)	15.31 (4)	31.63 (12)	47.96 (20)	4.08 (5)	0.00 (0)	13.27 (4)	32.65 (12)	52.04 (24)	2.04 (5)	44.89 (25)	**114**
Wangat	86	3.49 (1)	16.28 (4)	37.21 (12)	43.02 (20)	0.00 (0)	3.49 (1)	16.28 (4)	38.37 (12)	40.70 (20)	1.16 (5)	45.34 (25)	**104**
Waniarm	66	0.00 (0)	18.18 (4)	37.88 (12)	42.42 (20)	1.52 (5)	0.00 (1)	13.64 (4)	37.88 (12)	46.97 (20)	1.52 (5)	68.18 (35)	**120**
Koilmuqam	58	1.72 (1)	15.52 (4)	43.10 (15)	39.66 (16)	0.00 (0)	1.72 (1)	17.24 (4)	43.10 (15)	36.21 (16)	1.72 (5)	77.58 (40)	**119**

Dardpora Gujarpati	60	0.00 (0)	10.00 (2)	40.00 (12)	43.33 (20)	6.67 (5)	0.00 (0)	8.33 (2)	38.33 (12)	48.33 (20)	5.00 (5)	81.67 (45)	**126**
Chitibandi Chaliwan	68	1.47 (1)	10.29 (4)	44.12 (15)	41.18 (20)	2.94 (5)	0.00 (0)	13.24 (4)	41.18 (15)	42.65 (20)	2.94 (5)	60.29 (35)	**124**
Khuripayeen	56	0.00 (0)	16.07 (4)	41.07 (15)	41.07 (20)	1.79 (5)	0.00 (0)	14.29 (4)	44.64 (15)	39.29 (16)	1.79 (5)	75.00 (40)	**124**
Nilzab	54	0.00 (0)	22.22 (6)	31.48 (12)	42.59 (20)	3.70 (5)	0.00 (0)	20.37 (6)	38.89 (12)	37.04 (16)	3.70 (5)	75.92 (40)	**120**
Khuribala	58	1.72 (1)	10.34 (4)	39.66 (12)	44.83 (20)	3.45 (5)	3.45 (1)	10.34 (4)	37.93 (12)	46.55 (20)	1.72 (5)	74.13 (40)	**124**
Wahalutar	112	0.89 (1)	15.18 (4)	41.07 (15)	40.18 (20)	2.68 (5)	0.00 (0)	15.18 (4)	37.50 (12)	43.75 (20)	3.57 (5)	53.57 (30)	**116**
Hapatnar	60	0.00 (0)	20.00 (4)	33.33 (12)	38.33 (16)	8.33 (5)	0.00 (1)	16.67 (4)	36.67 (12)	38.33 (16)	8.33 (5)	73.33 (40)	**114**
Bangidar	92	10.87 (2)	10.87 (4)	33.61 (12)	42.48 (20)	2.17 (5)	0.00 (1)	18.48 (4)	32.61 (12)	43.48 (20)	5.43 (5)	73.75 (40)	**124**
Yarmukam	80	0.00 (0)	12.50 (4)	32.50 (12)	55.00 (24)	0.00 (0)	0.00 (1)	10.00 (2)	42.50 (15)	46.25 (20)	1.25 (5)	61.25 (35)	**122**
ChontiWaliwar	94	0.00 (0)	3.19 (2)	42.55 (15)	52.13 (24)	2.13 (5)	0.00 (0)	11.70 (4)	39.36 (12)	42.55 (20)	6.38 (5)	62.76 (35)	**122**
Mulkhama	64	0.00 (0)	12.50 (4)	39.06 (12)	46.88 (20)	1.56 (5)	0.00 (0)	14.06 (4)	34.38 (12)	46.88 (20)	4.69 (5)	59.73 (30)	**112**
Kudara	56	0.00 (0)	10.71 (4)	33.93 (12)	46.43 (20)	8.93 (5)	0.00 (0)	12.50 (4)	26.79 (12)	46.43 (20)	14.29 (5)	96.42 (50)	**124**
Turkpora	78	0.00 (0)	7.69 (2)	38.46 (12)	46.15 (20)	7.69 (5)	1.28 (1)	15.38 (4)	32.05 (12)	41.03 (20)	10.26 (5)	76.92 (40)	**123**
Rishwari	68	1.47 (1)	17.65 (4)	30.88 (12)	44.12 (20)	5.88 (5)	0.00 (1)	19.12 (4)	30.88 (12)	42.65 (20)	7.35 (5)	69.11 (35)	**115**

Source: Based on Sample Survey, 2013-14.

Figures in parenthesis represent the ranks

Table 5. Classification of sample villages into various categories of risk

Composite Score	**Category of Risk area**	**Sample villages in different Altitudinal zones**					
		Alt. zone A	**Alt. zone B**	**Alt. zone C**	**Alt. zone D**	**Alt. zone E**	**Alt. zone F**
120 – 130	Very High			Lehkoot, Londa	Monabal,Waderbala.	Ishnad, Hardkichlo, Waniarm, Dardpora, Chaatib and ichaliwa, Khuripayeen. Nilzab, Khuribala	Bangidar, Yarmukam, Chontiwaliwar, Kudara,Turkpora
110 – 120	High			Grandwan, Lidru,Khaitan, Nowgam, Inderdaji	Gutroo, Pahalnar, Aragam Halwadi, Aragamnagba, Potwari, Potus, Guwas	Nagbal Anatnag, Narastan, Basmia, Shalkhud, Quilmukam, Wahalutar, Rishkbal	Hapatnar, Mulkhama, Rishwari

100 – 110	Medium			Dragund, Asthanmohla, Chontimula Gujarpat, Wanpur	Gujran, Batkoot, Salia, Nough, Faqir Gujri, Poshkar	Wangat	
90 – 100	Low	Dachna, Gujarpati	Grand, Sojan, Hajinar, Chitibandi Gorhajan, Sumlar, Shiltra	Nagbal Gujran, Khanan, Malangam			
80 – 90	Very Low	Nadihu					

Source: Based on Sample Survey, 2013-14.

Very High Risk Areas

All the sample villages with highest composite score of 120–130 are categorized under this group and includes the sample villages of Bangidar, Yarmukam, Chontiwaliwar, Kudara, Turkpora of altitudinal zone F, sample villages of Ishnad, Hardkichloo, Waniarm, Dardpora, Chatibandichaliwan, Khuripayeen, Nilzab, Khuribala of altitudinal zone E, sample villages of Monbal and Waderbala of altitude zone D and sample villages of Inderdaji and Lehkoot of altitude zone C. The reason could be because of lake of development in these high altitudinal zones and thus need top priority.

High Risk Areas

This risk area comprises of sample villages of Hapatnar, Mulkama and Rishwari of altitudinal zone F, Nagbal, Narastan, Basmia, Shalkhud, Quilmukam and Wahalutar of altitudinal zone E. sample villages of Gutroo, Pahalnar, Aragam Halwadi, Aragam Nagbal and Potwari of altitudinal zone D and sample villages Grandwan, Lidru, Khaitan, Nowgam and Londa of altitudinal zone C. This group of sample villages lakes behind in development and thus needs high priority.

Medium Risk Areas

This risk area comprises of sample villages of Rishkbal, Wangat of altitudinal zone E, sample villages of Gujran Batkoot, Guwas, Salia, Nough, Faqir Gujri, Poshkar, sample village Potus of altitudinal zone D and sample villages of Dragund, Khanan, Asthanmohla, Chontimula Gujarpati of altitudinal zone C

Low Risk Areas

Under this category falls the sample villages of Nagbal Gujran, Malangam Gujarpati, Wanpur of altitudinal zone C and sample villages of Grand, Sojan, Hajinar, Chatibandi Gorhajan, Sumlar and Shiltra of altitudinal zone B and sample villages of Dachina Gujarpati of altitudinal zone and because of low composite score of 90 -100 because of low altitude

Very Low Risk Areas

Sample village Naidhu of altitudinal zone A has the lowest composite score of 80- 90 because of better heath conditions of children and is categorized as very low risk area. The reason could be as of low altitude and very close to Baramulla Town.

CONCLUSION AND SUGGESTIONS

The study leads to the conclusion that majority of sample villages of higher altitudinal zones of E and F were areas of I and II category of risk and thus were areas of very high and high priority. While as samplevillages of altitude zone A and B were areas of IV and V category and thus areas of low priority. Study reveals that areas of risk increases with altitude.

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

1) There is need of strengthening and proper functioning of existing mid day meals programme. New ICDS centers needs to be opened in the needful areas. Proper monitoring of health status of children at ICDS centers is very important.The AWW, ANM and other health visitors should work in coordination.

2) People should be made aware about proper health care of children.There is a need for educating population about proper breast feeding and bottle feeding of the child right from very early stage.

ACKNOWLEDGEMENT

The author is highly thankful to ICSSR for providing funding assistance to theproject "Assessment of Malnutrition among Children – A Micro level study of Gujars of Great Kashmir Himalayan Range". The present research paper is a part of the Project.

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