

NUTRITIONAL DEFICIENCIES AMONG TRIBAL GUJJAR CHILDREN OF UDHAMPUR DISTRICT OF J&K

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ABSTRACT

The present study was carried out with the objective of analyzing the nutritional status of preschool aged children of Gujjar tribe through the clinical assessment of nutritional deficiencies among them. The entire study was carried out on the semi-nomadic Gujjar tribe residing in Udhampur district of Jammu and Kashmir UT. The sample for the study comprised 150 children in the age group of 3-6 years, and their mothers. The sample was drawn through a combination of random and purposive sampling technique from five villages of Udhampur namely Battal Ballian, Camp area, Kharodiyar, Dhal par and Dhandal. Self-devised interview schedule, observations and clinical signs and symptoms checklist were used for data collection. Findings of the study show that out of the seven indicators of inadequate nutrition majority of the sample children were found to suffer from two namely, diarrhea and mouth problems. Clinical assessment of the children reveals that majority of the sample Gujjar children showed signs of nutritional deficiencies as indicated by the condition of their hair, mouth, nail and skin. Some of the noticeable signs of nutritional deficiencies noted included faded, sparse and thin hair, mouth sore, fissured and swollen tongue, angular stomatitis, dry and rough skin, edema, brittle and spoon shaped nails, white marks on nails, cuticle tear, dark under eye circles, and pale lower eyelids. All these conditions indicate that these children especially suffer from Protein, Vitamin A, Vitamin B and Iron deficiency.

KEYWORDS: *Gujjar Children, J&K, Nutritional Deficiencies, Clinical Symptoms*

Article History

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INTRODUCTION

Children in the age group of 0-6 years constitute 13.1% of the total population of India. According to the Census report of 2011, the total number of children aged 0-6 years is 158.79 million which is reduced by 3.1% compared to the child population in 2001 census. Even though there was an absolute increase of about 181 million in the population, however, there has been a reduction of 5.05 million in the child population aged 0-6 years across 2001 and 2011. India is listed among the countries where malnutrition and child mortality is alarmingly high. Office of the Registrar General of India mentions that overall the mortality rate especially infant and under-five mortality rate is declining over the years, yet there are some states where these rates are very high. Despite the progress in health care sector, many young children in the age group 0-6 years continuously lose their lives due to inadequate nutrition and appropriate care. The mortality rates and nutritional status of the children reflects the threats in child health (Usmani and Ahmed, 2016).

The tribal groups known as indigenous people of the land are an important constituent of Indian population. According to Census 2011, the tribal population of India is 10.43 crores, aggregating to 8.6% of the total population (GOI, 2013). There are 427 groups have been recognized as scheduled tribes and these groups inhabit widely varying ecological and geo-climatic conditions (hilly, forest, desert, etc.) in different concentration throughout the country. Owing to their remote and isolated living, tribal groups are often difficult to reach (Basu, 2000). On all indicators of development, they remain the most excluded despite the fact that various policies and programs have been pursued for their upliftment in the post-Independence India. Needless to say that exclusion from fruits of development has adversely affected the quality of life of the tribal people (Xaxa, 2011).

Indigenous populations are routinely marginalized and deprived of their access to fundamental resources. Inferior health outcomes among these communities can in part be attributed to inadequate access to health care facilities and medical services (Mohankumar, 2009). Widespread malnutrition is one malaise afflicting the tribal children and this exposes these children to infection and infectious diseases, resulting in high mortality rates (Maharatna, 2005). Infant mortality among tribals was 84.2 as compared to 67.6 per 1000 for the general population in 2002. Child mortality was 46.3 in comparison to 29.3 for the general population. The figure for under-five mortality among tribals was as high as 126.6 per cent in contrast to 94.9 per cent for the general population. The percentage of undernourished children (weight for age) was 64.9 in case of tribes; the figure being 51.8 for the general population. Childhood vaccination (full immunization) reached a mere 26.4 per cent in comparison to 42.0 per cent for the general population. Tribal people also scored low on health indicators like birth-weight, life-expectancy at birth, infant mortality rate, and prevalence of various diseases. School going children, adolescent boys and girls and women of reproductive age are also affected by chronic energy deficiency. Around 70-80 per cent of the tribal population seem to suffer from various stages of anaemia – mild, moderate or severe (Xaxa, 2011). About half of the Indian tribal pre-school children are malnourished and are exposed to the high risk of functional impairments (Radhakrishna and Ravi, 2004). The current level of malnutrition especially among the children of tribal communities is unacceptably high. Nutritional deficiencies commonly noted among the tribal populations of India include those associated with poor intake of the vitamins and minerals.

With this as background, the present study examines the occurrence of nutritional deficiencies among the Gujjar tribal children aged 3-6 years.

RESEARCH METHODOLOGY

The Methodological framework for the study is described under the following heads:

The Sample: The sample for the study was divided into two groups:

Group I: The core group for the study comprised 150 preschool aged children i.e., 3-6 year olds belonging to Gujjar tribal families. These children were observed for clinical symptoms of nutritional deficiencies.

Group II: Mothers of the Group I preschool aged children constituted this group. They were the key informant about their child's nutritional status, and also provided vital information to their identification.

Locale of the Study: Udhampur district of Jammu and Kashmir is known to have high concentration of Gujjar tribe. As part of their seasonal migration pattern the semi nomadic and nomadic groups of the tribe inhabit the area for a significant duration. Udhampur district is divided into 7 blocks namely Majalta, Ramnagar, Chenani, Udhampur, Dudu, Ghordi and Pancheri. Largest number of Gujjar tribe families is found in Udhampur block and hence the entire sample was drawn from this block.

Sampling Criteria: The following criteria were referred to for the selection of sample children and mothers:

- Children in the age group of 3-6 years were selected.
- Only those children who belonged to Gujjar Tribe of Udhampur District were selected
- The selected child was free from any apparent physical disorder or disability.
- Those children were included who's mothers were willing to actively participate and provide required information to the researcher.
- The selected mother should belong to semi nomadic Gujjar tribe families and should be residing in the selected locale of Udhampur district.

Sampling Technique: A combination of purposive and random sampling technique was used for sample selection. Out the 7 blocks of Udhampur District, Udhampur block was selected purposively as this block had high concentration of Gujjar tribe. As per the inputs of the Rural Development Department of Udhampur District, there were 08 villages which were dominated by semi-nomadic Gujjar tribe. Out of these 8 areas, 5 areas namely Battle Billion, Camp Area, Dhal Par, Handel and Kharodiyar were selected by lottery method. Once the areas were selected, personal visits were carried out to each of the area and with the help of the local community leader/ head a list of Gujjar households having at least one child in the age group of 3-6 years were prepared. If the child fulfilled the other sampling criteria as well he/she was selected to be a sample unit. Personal interactions were then carried out with the sample children and their mothers.

Tools for Data Collection: Interview schedule was framed and used with the sample mothers to gather basic information about the children and their health condition. Participant observations were carried with the sample children. These observations were supplemented with a clinical signs and symptoms checklist based on ICMR guidelines to identify nutritional deficiency among them. The checklist was noted to have inter-rater validity and split half reliability score of 0.89.

Data Analysis: Data gathered was analyzed both quantitatively as well as qualitatively. Since the data gathered about the children was mostly numerical or nominal in nature, it was subjected to quantitative analysis.

RESULTS AND DISCUSSION

The results of the study are presented and discussed as follows:

Identification Information: This section contains information pertaining to the age of the sample children, their locale wise distribution, their family size, birth order, and number of siblings; and also the age of their mothers and their educational qualification.

Age of Sample Children

Table 1: Age of Sample Children

Age	Boys (n=75)	Girls (n=75)	Total (n=150)
3-4 yrs	20 (26.66%)	20 (26.66%)	40 (26.66%)
4-5 yrs	31 (41.33%)	37 (49.33%)	68 (45.33%)
5-6 yrs	24 (32%)	18 (24%)	42 (28%)
MEAN±S.D	4.69±1.06	4.50±1.18	4.60±1.12
χ^2 between boys and girls= 1.387, p=0.499, insignificant			

The sample children of Gujjar community were in the age group of 3-6 years. 26.66% of them were 3-4 years old, 45.33% were 4-5 years old and 28% were 5-6 years old. The overall mean age of the children was 4.60 ± 1.12 years, while that of the sample boys was 4.69 ± 1.06 years and of the sample girls were 4.50 ± 1.18 years.

Location Wise Distribution of Sample Children

Table 2: Location Wise Distribution of Sample Children

Village	Boys (n= 75)	Girls (n = 75)	Total (n= 150)
Battal Ballian	18 (24%)	14 (18.66%)	32 (21.33%)
Camp Area	12 (16%)	18 (24%)	30 (20%)
Kharodiyan	15 (20%)	15 (20%)	30 (20%)
Dhal Par	20 (26.66%)	17 (22.66%)	37 (24.66%)
Dhandal	10 (13.33%)	11 (14.66%)	21 (14%)

In the methodology, it is already mentioned that the sample children were selected from a total of five villages. Table 2 represents data on the location wise distribution of sample preschoolers. Majority of the sample children 24.66% were selected from Dhal Par, 21.33% from Battal Ballian, 20% each from Camp area and Kharodiyan and only 14% children were selected from Dhandal. Majority of the male preschoolers were selected from Dhal Par (26.66%) and Battal Ballian (24%), whereas most of the sample girls were drawn from Camp Area (24%) and Dhal Par (22.66%).

Family Size of Sample Children

Table 3: Family Size of Sample Children

Family Size	Boys (n= 75)	Girls (n = 75)	Total (n= 150)
Small (Upto 4 members)	15 (20%)	16 (21.33%)	31 (20.66%)
Medium (Upto 8 members)	35 (46.66%)	32 (42.66%)	67 (44.66%)
Large (Above 8 members)	25 (33.33%)	27 (36%)	52 (34.66%)
χ^2 between boys and girls= 0.244, p = 0.88, insignificant			

Most (44.66%) of the sample children belonged to medium sized families, having 5 to 8 family members. Usually such families comprised of a young couple with their children and their old parents. These families occupied one single kulla and hence constituted a family. 34.66% of them had large family size, the minimum was noted to be nine members and maximum were 12 members. Only 20.66% of the cases there were only 4 family members in the families. In most of these families, it was noted that the parents were recently married couples and the sample preschooler was their first born or second born child.

Ordinal Position of the Sample Children

Table 4: Ordinal Position of the Children

Birth Order	Boys (n= 75)	Girls (n = 75)	Total (n= 150)
1 st / 2 nd	20 (26.66%)	14 (18.66%)	34 (22.66%)
3 rd / 4 th	25 (33.33%)	26 (34.66%)	51 (34%)
5 th / 6 th	23 (30.66%)	23 (30.66%)	46 (30.66%)
7 th / 8 th	07 (9.33%)	12 (16%)	19 (12.66%)
χ^2 between boys and girls= 0.889, p=0.64, insignificant			

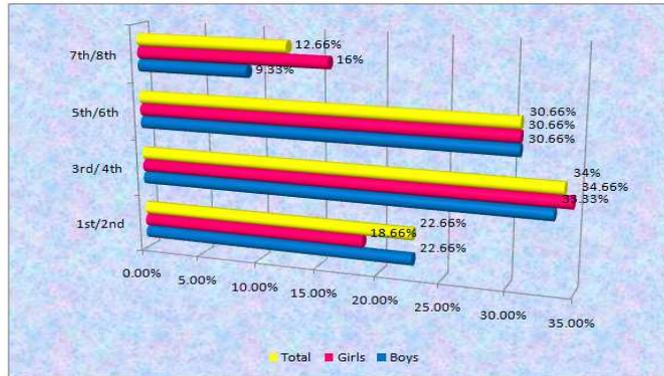


Figure 1: Birth Order of Sample Children.

The findings on the birth order of the sample preschoolers reveal that majority (34%) of them were either 3rd or 4th born among their siblings. 30.66% of these children were either 5th or 6th born. The birth order of the children also reconfirms that there was a trend of having a large number of children among the Gujjar tribe.

Number of Siblings in the Family

Table 5: Number of Siblings

Number	Boys (n= 75)	Girls (n = 75)	Total (n= 150)
1-3	17 (22.66%)	23 (30.66%)	40 (26%)
4-6	34 (45.66%)	33 (44%)	67 (44.66%)
7-10	24 (32%)	19 (25.33%)	43 (28.66%)
χ^2 between boys and girls= 1.496, p=0.473, insignificant			

There was trend of having a large number of children among the selected tribal community. In majority of the cases (44.66%), there were 4 to 6 siblings available to the selected sample preschooler. In 28.66% cases, there were 7 to 10 siblings available and in the remaining 26% cases there were only 1 to 3 siblings.

Clinical Assessment for Nutritional Deficiency

The body requires many different vitamins and minerals that are crucial for both body development and preventing disease. These vitamins and minerals are together known as micronutrients. Since the body does not produce these, so these are derived from the diet consumed. A nutritional deficiency occurs when the body doesn't absorb from the food or get necessary amounts of nutrition. These nutritional deficiencies can lead to different health problems.

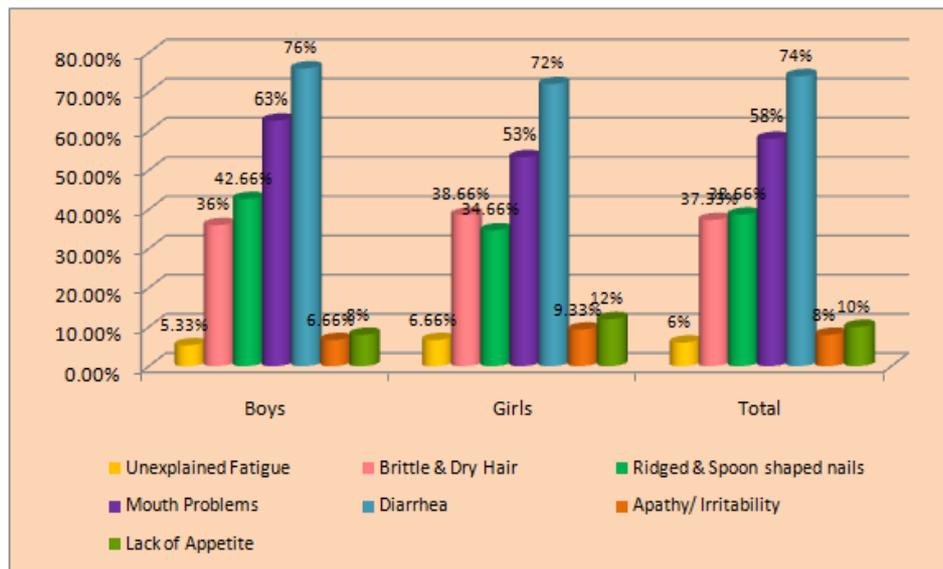
Major Signs of Inadequate Nutrition

Clinical assessment of each of the sample Gujjar child was carried out to analyze if they suffered from inadequate nutrition and nutritional deficiencies. Of the seven parameters, most of the sample children were noted to show at least two of them frequently. 74% of them (76% boys and 72% girls) suffered from recurrent bouts of diarrhea; gastrointestinal infections were quite common among these children. Additionally, it was found that 58% of the children (62.66% boys and 53.33% girls) suffered from mouth related conditions, including angular cheilitis, dry lips, mouth sores, bleeding and swollen gums. Ridged or spoon shaped nailed were observed in 38.66% children (42.66% boys and 34.66% girls). Often such a condition of nails is attributed to deficiency of Iron, Zinc, and Vitamin B. 37.33% of the sample children had brittle and dry hair. In many cases the hair also appeared discolored and lackluster. Slightly more girls (38.66%) than boys (36%) suffered from this condition of hair. Brittle and dry hair is often caused when the diet is deficit of essential fatty acids, proteins, iron and other essential nutrients.

Table 6: Major Signs of Inadequate Nutrition

Signs	Boys (n =75)	Girls (n = 75)	Total (n =150)
Unexplained Fatigue	04 (5.33%)	05 (6.66%)	9 (6%)
Brittle and Dry Hair	27 (36%)	29 (38.66%)	56 (37.33%)
Ridged or Spoon shaped nails	32(42.66%)	26 (34.66%)	58 (38.66%)
Mouth Problems	47 (62.66%)	40 (53.33%)	87 (58%)
Diarrhea	57 (76%)	54 (72%)	111 (74%)
Apathy or Irritability	5 (6.66%)	7 (9.33%)	12 (8%)
Lack of appetite	6 (8%)	9 (12%)	15 (10%)

However, at the same time only a few children had lack of appetite (10%), showed apathy or irritability (8%) and only 6% of the children (4: boys and 5: Girls) reported to be suffering from unexplained fatigue.

**Figure 2: Major Signs of Inadequate Nutrition in Sample Children.**

Manifestation of Nutrient Deficiencies

Nutritional deficiencies often manifest themselves by causing changes in the body noticeable in the condition of hair, mouth and teeth, nails, eyes, muscles and joints, skin etc.

Condition of Hair

Table 7: Status of Hair of Sample Children

Condition of Hair	Nutrient Deficiency	Boys (n = 75)	Girls (n = 75)	Total (n = 150)
Sparse & thin	Protein, zinc deficiency	24 (32%)	27 (36%)	51 (34%)
Easy to pull out	Protein deficiency	18 (24%)	22 (29.33%)	40 (26.66%)
Corkscrew coiled hair	Vit C & Vit A deficiency	17 (22.66%)	11 (14.66%)	28 (18.66%)
Faded Hair Color	Protein deficiency	27 (36%)	35 (46.66%)	62 (41.33%)

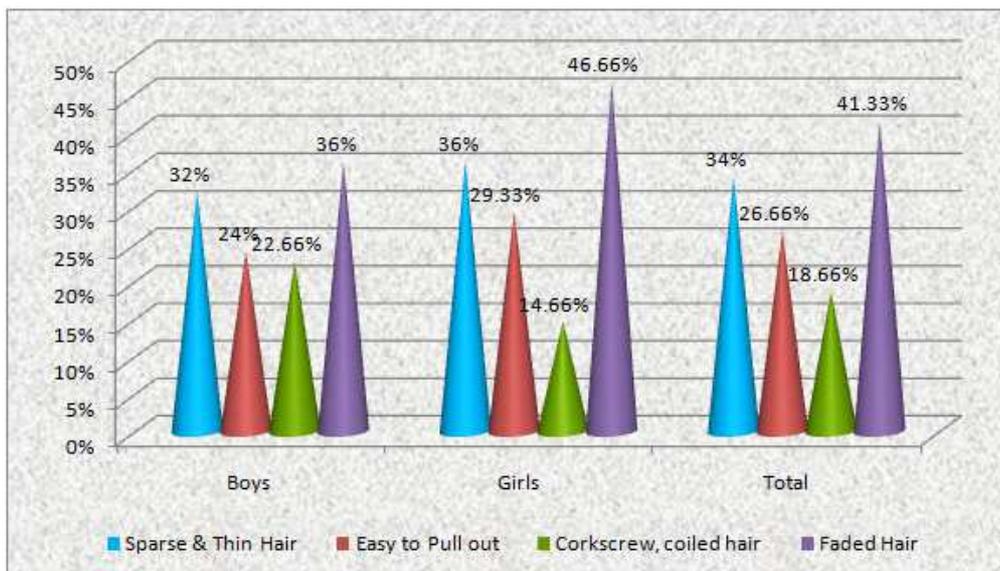


Figure 3: Condition of Hair of the Sample Children.

The condition of the hair is a fair indicator of an individual’s health. Findings of the study reveal that 41.33% of the sample children had faded, dry and brittle hair. More girls (46.66%) than boys (36%) had faded hair. 34% of them had sparse and thin hair, their hair lacked volume and in some cases even the scalp was visible. This problem was evident in more girls (36%) than the boys (32%). Hair breakage and easy to pull out hair was noted among 26.66% of the cases. Corkscrew coiled hair was also noted in more boys (22.66%) than girls (14.66%).

Status of Mouth

Different conditions of the mouth signifying nutritional deficiencies were very frequently noted among the tribal children. Out of these, angular stomatitis/cheilitis and fissured tongue were the most commonly noted symptoms among the children. 56.66% of the children had noticeable redness and stomatitis at the mouth corners. More boys (60%) had this condition than the girls (53.33%). Sores inside the mouth and tongue were also very common (54%). Often these sores were painful and caused discomfort to the children. Glossitis was noted among 41.33% of the children (38.66% boys and 44% girls). Due to this condition the tongue of the children was red, and swollen with white patches on it. Sometimes due to it the children faced difficulty in swallowing. Bleeding and spongy gums were also noted among 29.33% of the cases. Sometimes this condition was also accompanied with tooth ache and bad breath.

Table 8: Mouth Conditions Associated with Nutritional Deficiencies

Condition of Mouth	Nutrient Deficiency	Boys (n = 75)	Girls (n = 75)	Total (n = 150)
Glossitis/ Swollen tongue	Riboflavin, Niacin, Folic Acid, B12, Protein deficiency	29 (38.66%)	33 (44%)	62 (41.33%)
Bleeding, spongy gums	Vit C, A, K, Folic Acid, Niacin deficiency	21 (28%)	23 (30.66%)	44 (29.33%)
Angular stomatitis/cheilitis, fissured tongue	B2, B6 and niacin deficiency	45 (60%)	40 (53.33%)	85 (56.66%)
Sore mouth and tongue	B2, B3, Folic Acid, Iron deficiency	42 (56%)	39 (52%)	81 (54%)

Status of Skin

Table 9: Status of Skin of Gujjar Children

Condition of Skin	Nutrient Deficiency	Boys (n = 75)	Girls (n = 75)	Total (n = 150)
Bumps at the back of the arms	Vit A deficiency	9 (12%)	8 (10.66%)	17 (11.33%)
Dry or rough skin	Vit A, Vit E, Fatty Acid deficiency	43 (57.33%)	49 (65.33%)	92 (61.33%)
Unusual nose bleeding	Vit C deficiency	2 (2.66%)	--	2 (1.33%)
Red stretch marks	Zinc deficiency	1 (1.33%)	2 (2.66%)	3 (2%)
Dermatitis	B2, B3, Biotin deficiency	15 (20%)	13 (17.33%)	28 (18.66%)
Pallor	Folic Acid, Iron, B12 deficiency	27 (36%)	30 (40%)	57 (38%)
Pigmentation	Niacin, PEM	30 (40%)	32 (42.66%)	62 (41.33%)

Skin condition of many sample children was found to be unsatisfactory. 61.33% of them had dry/ rough skin; their skin was flaky and splitting especially of their arms and legs. 65.33% girls and 57.33% boys suffered from this condition. 41.33% children (40% boys and 42.66%) also suffered from skin pigmentation. Their skin was noted to be patchy and uneven. Pallor was also noted in 38% of the cases, as here the skin of the children was noticeably pale. Dermatitis characterized by red itchy, scaly rash and inflammation was noticed in 18.66% cases. Unusual nose bleeding and red stretch marks were however, comparatively rare.

Condition of Muscles and Joints

Table 10: Various Conditions of the Muscles and Joints

Condition of Muscles & Joints	Nutrient Deficiency	Boys (n = 75)	Girls (n = 75)	Total (n = 150)
Muscle Cramping	Magnesium, B1, B2, B6 deficiency	5 (6.66%)	6 (8%)	11 (7.33%)
Twitching	B1, B2, B3, Vit D, Magnesium, Calcium deficiency	12 (16%)	14 (18.66%)	26 (17.33%)
Odema/ Swelling	B1, B6, Potassium deficiency	15 (20%)	30 (40%)	45 (30%)
Numbness/ tingling	B12, B5 deficiency	6 (8%)	3 (4%)	9 (6%)
Clicking Joints	Manganese deficiency	4 (5.33%)	3 (4%)	7 (4.66%)

Conditions related to muscles and joints were comparatively less common among the sample children. Odema and swelling was the only condition which was fairly common. 30% of the children suffered from this condition and comparatively more girls (40%) suffered from the condition than the boys (20%). Muscle cramping (7.33%), twitching (17.33%), numbness/ feelings of tingling (6%) and clicking joints (4.66%) were rare among the children.

Status of Nails

Table 11: Status of Nails among the Sample Children

Condition of Nails	Nutrient Deficiency	Boys (n = 75)	Girls (n = 75)	Total (n = 150)
Spoon shaped nails	B12, Iron deficiency	32(42.66%)	26 (34.66%)	58 (38.66%)
White marks	Calcium or zinc deficiency	54 (72%)	60 (80%)	114 (76%)
Pale nails	Iron, Biotin deficiency	20 (26.66%)	26 (34.66%)	46 (30.66%)
Brittle nails	Calcium, Magnesium, Iodine deficiency	31 (41.33%)	33 (44%)	54 (42.66%)
Cuticles tear easily	Protein deficiency	49 (65.33%)	32 (42.66%)	81 (54%)

The condition of the nails is a valuable indicator of the health of an individual. White marks on the nails were the most commonly noted condition both among the males (72%) and females (80%). Cuticles also tore easily in 54% children; further this was noted to be more common among boys (65.33%) than the girls (42.66%). Brittle nails (42.66%),

spoon shaped nails (38.66%), and pale nails (30.66%) were also noted among the sample. Their nails were found to be broken, yellowish and at times also had ridges on them.

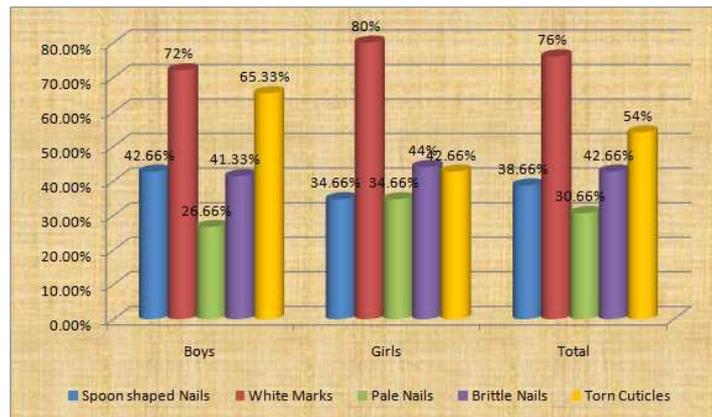


Figure 4: Status of Nails of the Sample Children.

Condition of Eyes

Table 12: Condition of Eyes Indicating Nutritional Deficiencies

Condition of Eyes	Nutrient Deficiency	Boys (n = 75)	Girls (n = 75)	Total (n = 150)
Dark circles, bags under the eyes	Allergies, dehydration	39 (52%)	48 (64%)	87 (58%)
Poor night vision	Vit A deficiency	8 (10.66%)	5 (6.66%)	15 (8.66%)
Nearsightedness	Vit D deficiency	5 (6.66)	11 (14.66%)	16 (10.66%)
Pale lower eyelid	Iron deficiency	39 (52%)	50 (66.66%)	89 (59.33%)
Photophobia- blurring, Conjunctival inflammation	Bit B2, Vit A deficiency	12 (16%)	5 (6.66%)	17 (11.33%)

Among the eye conditions, pale lower eyelids were most common (59.33%) among the sample children. Their entire eyes seemed pale and yellowish indicating they may be suffering from anemia. Dark circles and puffy eyes marked by bags under the eyes were noted among 58% sample children. These were comparatively more common among the girls (64%) than the boys (52%). However, other eye conditions such as poor night vision, nearsightedness and photophobia were noted among only a few cases.

The findings related to the condition of various body parts of the sample children reveal that many of them showed the signs of nutritional deficiencies. The condition of their hair, skin, mouth, and nails suggest that many of them are suffering from protein, vitamin and iron deficiencies. They however, faced lesser problems related to their muscles and joints, and eyes.

CONCLUSIONS

The present research was carried out to identify the common nutritional deficiencies encountered by children belonging to the Gujjar tribal group of Jammu and Kashmir, India. The core group of the study comprised of 150 Gujjar children in the age group of 3-6 years residing in the mountainous district of Udhampur (J&K). The mothers of these children were included in the sample, as they were the key informant about their child’s health and well-being. Direct observations for clinical signs of nutritional deficiencies were carried out.

The preliminary analysis of the sample children’s background variables indicate that most of the children (44.66%) belonged to medium sized family members, having 8 members at least. But in 34.66% cases, the family size was large and comprised of 9-12 members each. There was a trend of having large number of children and the birth order of the

sample children is a testimonial to this. 46.66% of the children had 4-6 siblings, 28.66% had 7-10 siblings and remaining had 1-3 siblings at home. Many earlier studies also indicate that many tribal communities continue to have larger number of children. Prusty (2014) in his study noted that knowledge and use of contemporary contraceptive methods are considerably lower among tribal women when compared to non-tribal women of Jharkhand, Madhya Pradesh and Chhattisgarh.

Clinical assessment of the sample children was carried out to identify the major signs of malnutrition based on WHO seven indicators. Findings highlight that out of the seven major indicators of inadequate nutrition most of the sample children showed two symptoms namely recurrent diarrhea and mouth ailments. Majority of them also had brittle and dry hair along with ridged or spoon shaped nails. However, only a few of the sample children suffered from unexplained fatigue, apathy/ irritability and lack of appetite. Similar results were noted in the studies by Gokhale et al, 2018 and Rao et al, 2005.

Detailed analysis of the manifestation of the nutritional deficiencies reveal that many of the sample children show the signs of nutritional deficiencies as indicated by the condition of their hair, mouth, nails and skin. They however, as a group had lesser problems related to their eyes and muscles and joints. Many of these children had faded, sparse and thin hair, along with easy to pull out hair indicating that they suffer from protein and zinc deficiency. Prominent problems related to the mouth found among the children were angular stomatitis / cheilitis, mouth and tongue sores, and glossitis. The presence of such conditions indicates that the children suffer from deficiency of Vitamin B2, B3, B6, Niacin, Protein and Iron. Among the various skin conditions, three were most prominent and included dry/ rough skin, pigmentation and pallor. These conditions are usually linked to Vitamin A, E, B12, Niacin, Folic acid, and Iron deficiency. Dry skin in addition may be caused due to deficiency of essential fatty acids, while pigmentation due to Protein energy malnutrition. Condition of the nails gives a fair idea about the nutritional status of an individual and here it was noted that majority of the children had white marks on their nails, their cuticles tore off easily, they had brittle and spoon shaped nails with a pale nail bed. These conditions are usually indicative of Calcium, Iron, Zinc, Magnesium, Iodine, B12 and Protein deficiency. Further, most of these conditions except spoon shaped nails and tearing of cuticles were noted more among the girls than the boys. Among the various muscles and joints condition only edema was noticeable in 30% of the children suggesting Vitamin B1, B6 and Potassium deficiency and among the eye indicators only dark circles and pale lower eyelid was noticed among more than half of the sample children. Overall, the findings indicate that many of the sample children have noticeable nutritional deficiencies and the changes of their body indicates that these children are especially suffering from Protein, Vitamin A, B-complex and Iron deficiency. Debbarma et al (2018) found that many tribal children of Khowai District of Tripura underwent changes in hair, teeth and skin due to malnutrition. Nambiar et al (2015) also reported that Vitamin A deficiency and anemia are two alarming public health problems among the tribal children of Rathwa community.

Given the findings of the study, it is important that nutritional deficiencies of the tribal Gujjar children be addressed as soon as possible, because these have the potential of impacting not only their physical but also their cognitive and mental development. Supplementary nutrition should be made available to the children and the pregnant and lactating women of the community. Also, there should be mandatory screening of all tribal children for nutritional deficiencies. In fact, nutritional status screening and surveillance centers should be opened in all tribal areas to help the children overcome malnutrition and nutritional imbalances.

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