

# Nutritional Status of 1-5 Years Children in a Hilly Tribal District of North India

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## ABSTRACT

**Background:** Young children from tribal regions are more likely to be stunted, wasted, and underweight than their counterparts from other populations. The Current study was aimed at determining the prevalence of various nutritional indicators amongst 1-5 years tribal children and comparing them with the current national estimates.

**Material and Methods:** A Community based cross sectional study was conducted in Kinnaur, a tribal district of Himachal Pradesh. 30x7 cluster sampling design developed by WHO was adopted for selecting 350 participants. All eligible participants were measured for height, weight and mid-arm circumference according to the National Health and Nutrition Examination Survey 2009 revised guidelines of CDC Atlanta.

**Results:** The overall prevalence of Underweight children in current study was 21.4% (95% CI: 17.1-25.7%). Prevalence of Stunting and Wasting was found 27.4% (95% CI: 22.7-32.1%) and 11.1% (95% CI= 7.8-14.4%) respectively. The prevalence rates of Underweight and Wasting have been found significantly higher among the male children in comparison to female children (p-value <0.05).

**Conclusion:** Nutritional status of 1 to 5 years children in tribal region of Himachal has been found to be relatively better than its counterpart tribal regions of India and is apparently on the track of meeting the Millennium development goals' target of reaching a 26% proportion of underweight children less than 3 years of age as compared to the almost off the track national figures. Still there is scope for a lot of improvement through strengthening of health infrastructures and various existing interventions under national health programs for maternal and child health.

**Keywords:** Nutritional status, Underweight, Wasting, Stunting, Tribal children

wasting and stunting to be 28.9%, 9.7% and 32.2% respectively for rural areas of the state with no district wise data availability.<sup>4</sup> Current community based cross sectional study has been aimed to determine the prevalence of various nutritional indicators among 1-5 years children and comparing them with current national estimates.

## MATERIAL AND METHODS

A community based Cross-sectional survey among tribal pre-school children aged between 1 and 5 years residing in Kinnaur district was conducted on the sidelines of an ongoing Immunization survey under the aegis of National Health Mission, Himachal Pradesh. A sample size of 350 was calculated for the current study, anticipating the prevalence of underweight children to be 32% (DLHS-4), with an alpha error of 0.05% and non-response rate of 10%. 30x7 cluster sampling design developed by WHO has been adopted for selecting participants. It was a two-stage cluster sampling where in the first stage 30 clusters were selected with population proportion to size (PPS) from the list of the villages in the district (Census 2011) and thereafter in the second stage 12 units were selected within each cluster.

### Inclusion criteria

- All children between age 1-5 years who were present in the house during data collection
- Children whose parents or guardians consented for the study.

### Exclusion criteria

- Children who were diagnosed with any disease, chronic or acute and on treatment

The list of children between 1 and 5 years was identified from the concerned Anganwadi centre and the children were examined after sensitizing the parents and taking written informed consent. The parent/guardian and/or the child were explained about the procedure before each measurement. All study participants were measured for height, weight and mid-arm circumference according to the National Health and Nutrition Examination Survey 2009 revised guidelines of CDC Atlanta. The height was measured using a standardized portable stadiometer with a fixed vertical backboard and an adjustable headpiece to the nearest 0.1 cm. The weight of the child in kilograms was measured

## INTRODUCTION

Health is a prerequisite for human development and wellbeing of a community. The indigenous population of the nation, known as Adivasi or scheduled tribes (STs), is among the poorest, vulnerable and most marginalized groups of the nation. The term Scheduled Tribes first appeared in the Constitution of India in the Article 366 (25). The criterion followed for specification of a community as tribal were indications of primitive traits, distinctive culture, geographical isolation, shyness of contact with the community at large, and backwardness.<sup>1</sup> National level data show that health of indigenous people is significantly poorer than other groups. Young children from scheduled tribes and scheduled castes are more likely to be stunted, wasted, and underweight than children from other castes/tribes.<sup>2</sup>

Himachal Pradesh, with a population of About 70 lakhs has round 6% of tribal population spread over various districts. District Kinnaur of Himachal shares a distinction of being a district with entire tribal population.<sup>3</sup> District level household survey (DLHS-4) reports the prevalence of underweight,

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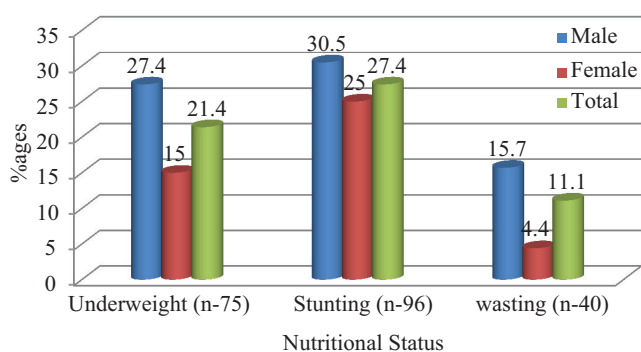
	Male(n-210)	Female (n-140)	Total (n-350)
Age in Months (Mean+/-SD)	36.3 ±12	34.2 ± 10.2	35.9 ±11.8
Weight in Kg (Mean+/-SD)	12.8 ± 2.7	12.7 ± 2.6	12.8 ± 2.7
Height/Length in cm (Mean+/-SD)	90.3 ± 9.4	88.7 ± 8.6	89.8± 9.1
MUAC in cm (Mean+/-SD)	16.1 ± 1.1	16.1 ± 1.2	16.1 ± 1.1

**Table-1:** Age, sex and anthropological characteristics of the children studied

Prevalence	Total (n-350)	Male (n-210)	Female (n-140)	p value*
Underweight	21.4%(75)	25.7% (54)	15% (21)	0.02
Stunting	27.4% (96)	30.5% (61)	25% (35)	0.32
Wasting	11.1% (39)	15.7% (33)	4.3% (6)	<0.01

\*2 tailed p-value calculated from chi square test of statistical significance.

**Table-2:** Sex distribution of nutritional status of the children studied:



**Figure-1:** Nutritional status of children in current study

using the UNICEF body weight scale. Weight was recorded to the nearest 0.1 kg. Both the equipments were calibrated before the commencement of data collection. The survey team for data collection consisted of two postgraduate students of Community Medicine. The investigators were trained in taking anthropometric measurements. All anthropometric measurements were taken by one investigator during one session. Initial standardization sessions were conducted for measuring weight and height. Children more than two SDs below the standard median of WHO Multi Centric Growth Reference Study were considered underweight (weight-for-age), stunted (height-for-age) and wasted (weight-for-height) respectively. Ethical clearance for conducting the study was obtained from the institutional ethical board of the institution.

## STATISTICAL ANALYSIS

The data was entered and analysed using the Microsoft Excel software. Qualitative variables (Prevalence of underweight, stunting and wasting) were summarized using percentages and proportion and 95% confidence interval. Quantitative variables (Age, height and weight) were summarized using mean and standard deviation. Association between two genders has been calculated using chi square test of significance and p value less than 0.05 has been considered statistically significant.

## RESULTS

A total of 350 children in the age group of 13-60 months of age were assessed for their nutritional status in the current study. 60 % (n-210) of these children studied were male while 40% (n-140) were female.

The mean ages in males and females children were found to be 36.3 ±12 months and 34.2 ± 10.2 months respectively. The mean weight and height/length among these children were found 12.8 ± 2.7 kg and 89.8 ± 9.1 cm respectively. Mean value for MUAC was 16.1 ± 1.1 cm in current study (Table-1).

The overall prevalence of Underweight children in current study was 21.4% (95% CI: 17.1-25.7%). Prevalence of Stunting and Wasting was found 27.4% (95% CI: 22.7-32.1%) and 11.1% (95% CI= 7.8-14.4%) respectively (Table-2) (Figure-1).

The prevalence of Underweight has been found significantly higher among the male children (25.7%) in comparison to female children (15%) with a p-value of 0.02. Wasting among male children (15.7%) has also been found significantly higher (p<0.01). Though more proportion of male children was found to be stunted in comparison to female children, but the difference was not statistically significant (p=0.32) (Table-2).

## DISCUSSION

It is widely acknowledged that a large section of the Indian population, especially the tribal communities, have not received the full benefits of development processes undertaken over the past six decades. Despite these special provisions, tribes are among the poorest and most marginalized sections of Indian society.

Prevalence of Underweight children in the current study in tribal region of Kinnaur was found to be 21.4%. Prevalence of Stunting and Wasting was found 27.4% and 11.1% respectively (Table-2). Prevalence of Underweight and Wasting has been found significantly higher among the male children (25.7%) in comparison to female children.

A study done by Chakrabarty et al on Nutritional status among the Shabar tribal children India revealed the highest prevalence of under-nutrition in the forest tribal children (33.87%) as compared to their rural (24.62%) counterparts.<sup>5</sup> In a study conducted by A Jaiswal et al among the tribe of Madhya Pradesh: Bhumia; prevalence of underweight children was found to be 58.6% and proportions of children with wasting and stunting was observed to be 36.2% and 42.2% respectively.<sup>6</sup> In another study conducted to see the nutritional status in under 5 children in a riverine tribal population of Dibrugarh, Assam by S Islam et al, the prevalence of underweight, wasted and stunted children was found to be 29%, 21.6% and 30.4% respectively.<sup>7</sup> Another study conducted by R Philip et al to explore the prevalence of under-nutrition in tribal preschool children in Wayanad district of Kerala, found the prevalence of underweight, wasting and stunting to be 39%, 20.5% and 38% respectively.<sup>8</sup> A study conducted by S Bisai on the tribal preschool children of West Bengal, India, found the prevalence of underweight, wasting and stunting to be 65.2%, 20.15 and 54.2% respectively.<sup>9</sup> Another study conducted by R Yadav on the tribal preschool children of Bihar, the prevalence of underweight, wasting and stunting was found to be very high i.e. 55%, 34.5% and 60 % respectively.<sup>10</sup>

The observed prevalence rates in our study are remarkably lower than the prevalence rates seen in the other tribal areas of India. The figures are even better than the average prevalence depicted for rural areas of Himachal Pradesh in the recently conducted DLHS-4 (underweight- 28.9%, stunting- 32.2% and wasting- 21.7%).<sup>4</sup>

This improved nutritional status in the tribal children of Kinnaur can be attributed to various factors. Kinnaur has witnessed a rapid transition from the earlier deprivation status to that of economic upliftment due to introduction of apple cultivation along with other products in horticulture supported by protective legislations for social upliftment. Increased employability along with horticulture and agriculture revolution and increased accessibility has led to the socioeconomic development which is indirectly reflected in the decreasing trends of child under-nutrition.

Also the literacy rate in district Kinnaur (84.3% and 64.4% among male and female respectively in 2001) has been reported to be far superior to the national literacy rate of tribes and is comparable to national literacy rate.<sup>11</sup> Current nutritional status also reflect the improved existing health infrastructure and better functioning of various interventions under national health programmes for improvement of maternal and child health. Still there is a lot of scope for improvement in future as huge proportions of children (21% underweight and 27% stunted) are still below their optimal nutritional status.

A detailed community based study to find out the determinants of underweight, wasting and stunting among the children is recommended. Further strengthening of existing health infrastructure and monitoring of various interventions under national health programme for improving maternal and child health has to be ensured for sustained as well as progressive improvement of nutritional status of children in this region.

## CONCLUSION

Nutritional status of 1 to 5 years children in tribal region of Himachal has been found relatively better than its counterpart tribal regions and is apparently on the track meeting the Millennium development goals target of reaching a 26% proportion of underweight children less than 3 years of age as compared to the almost off the track national figures. Still there is scope for a lot of improvement through the strengthening of health infrastructure and various existing interventions under national health programs for maternal and child health.

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