

Nutrition status of young children in periphery of Lalitpur Sub-Metropolitan city in Nepal

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ABSTRACT

Background & Objectives: Under nutrition in young children is a major public health concern in countries like Nepal. Despite high rate of chronic malnutrition in young children, very less focus has been given to reduce it, thus affecting the lives of these children during adolescence. **Objectives:** To assess the nutritional status of young children aged between 6 to 12 years in Dukuchhap village in Lalitpur district of Nepal. **Materials & Methods:** A cross sectional study was conducted in all the households of Dukuchhap village in Lalitpur district during Community Diagnosis Program. Out of 338 young children, 319 were assessed by anthropometric measurements and the data was compared to the standards developed by World Health Organization. **Results:** A total of 319 children were assessed. Mean height, weight and BMI were high in children from Chhetri ethnicity and low in Dalit children. BMI for age was less than 5th percentile in 23.2% of children. The proportions of underweight and stunted children were 10% and 8.3% respectively. The percentage of underweight (16.9%) and stunted (12.2%) girls was more than that of boys. **Conclusion:** Nutritional status of young children in Dukuchhap village was found to be low especially considering the high proportion of underweight girls.

Key words: Nutritional status; semi urban; stunting; underweight; young children.

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INTRODUCTION

Nutritional status of young children (6 to 12 years) is known as mirror of health and well-being of the nation. Malnutrition among young children is becoming a major public health concern in low income countries like Nepal where under nutrition remains one of the primary causes of ill health. Nepal Demographic and Health Survey (NDHS 2011) revealed that young children are suffering from high rates of chronic malnutrition; 41% of children less than 5 years of age were stunted (height-for-age <-2 standard deviations (SD)), 29% were underweight (weight-for-age <-2 SD), and 11% were wasted (weight-for-height <-2 SD).¹ But Nepal has had less progress on it for many years. A study among 160 students studying from Grade

one to five (5 to 12 years) in two schools located in Boldephedeche and Mahure village of Kavrepalanchowk district of Nepal showed Grade II and Grade III under nutrition in 23% boys and 50.6% girls (weight for age per Indian Academy of Pediatrics).² A nutritional assessment survey was conducted among 786 students (4 to 14 years) from six schools in Pokhara municipality by Joshi HS et al³ using Waterlow Classification. Among them 13% students were found to be stunted, 12% wasted and 1% both stunted and wasted. Similar study was done by Shivaprakash NC and Joseph RB⁴ among 484 students aged 6 to 12 years studying in two schools in Mandya district, Karnataka state, India. They compared the weight and height to standards given by Indian Council of Medical Research. The

overall prevalence of underweight students was 30.3% and stunting was 27.9%.

According to Population Monograph of Nepal 2011, contribution of young children in total population of the country is 17.8% percent⁵. Stunting in childhood may result in impairment of intellectual achievement in education following reduced work capacity as well obstetric capacity in adulthood whereas thinness (low BMI for age) in childhood results in delayed maturation, deficiencies in muscular strength and reduced bone density later in life. World Bank report (1993) had emphasized that nutrition and health program to young children would be effective to save lives and catch up appropriate growth in adolescent period.⁶

This study aims to explore the nutritional status of young children in Dukuchhap village in Lalitpur district using anthropometric indicators – BMI for age, weight for age and height for age; and examine the association between gender and nutritional status.

MATERIALS AND METHODS

The study design was cross sectional type and it was a part of Community Diagnosis Program conducted in Dukuchhap village of Lalitpur district over a period of five days from 26th to 30th November, 2015. The purpose of study was explained to Household Head (HHH) or other Household (HH) member (more than 15 years of age) and consent was taken. According to interview with HHH, total population of young children (6 to 12 years) in Dukuchhap village was 338. Out of them, 319 children were present during period of census. Maximum of three visits were done in each HH to include as many children present. The data was collected using preformed community

diagnosis questionnaire. A series of questions were asked to HHH or other HH members followed by anthropometric and other measurements. A digital weighing machine was used to measure the weight to nearest 0.1 kg and measuring tape attached to a stick for height to nearest 1cm. The children were asked to remove their shoes and stand with heels joined together. A cardboard was placed on the top of the head such that it was perpendicular to the measuring stick.

Data were entered to Microsoft Excel 2007 and analyzed using Statistical Package for Social Sciences (SPSS) 15 (SPSS for Windows, Version 15.0. Chicago, SPSS Inc). Underweight (BMI for age less than 5th percentile), wasting (weight for height less than -2SD) and stunting (height for age less than -2SD) were defined according to World Health Organization (WHO) standards.

RESULTS

Demography

A total of 319 children belonging to 6 to 12 years were included in the study (Table-1). Among them, 153(48.0%) were boys and 166 (52.0%) were girls.

Mean weight, height and BMI according to ethnicity

Mean weight for boys was lowest in Dalit (23.1±5.8 kg) followed by Tamang (24.8±7.2 kg) and highest for Newar (27.8±5.9 kg). Mean weight for girls is lowest in Brahmin (24.2±8.1 kg) and highest for Chhetri (27.78±6.2 kg). Mean height for boys is lowest in Danuwar (123.8±13.0 cm) and Tamang (123.8±14.7cm); and highest for Brahmin (126.2±14.5cm). Mean height for girls is lowest for Newar (121.4±9.3cm) and highest for Chhetri (127.1±13.7 cm). Mean BMI for boys is lowest in Danuwar (15.4±3.3 kg/m²) and highest for Chhetri

Table-1: Demographic profile of study subjects (n=319)

Age (years)	Girls		Boys		Total	
	Number	%	Number	%	Number	%
6	21	43.8	27	56.2	48	100.0
7	25	59.5	17	40.5	42	100.0
8	14	46.7	16	53.3	30	100.0
9	24	55.8	19	44.2	43	100.0
10	27	54.0	23	46.0	50	100.0
11	21	45.6	25	54.3	46	100.0
12	34	56.7	26	43.3	60	100.0
Total	166	52.0	153	48.0	319	100.0

Table-2: Mean weight, height and BMI according to ethnicity (n=319)

Ethnic groups	Girls							Boys						
	No	Weight		Height		BMI		No	Weight		Height		BMI	
		Mean (kg)	SD	Mean (cm)	SD	Mean (kg/m ²)	SD		Mean (kg)	SD	Mean (cm)	SD	Mean (kg/m ²)	SD
Chhetri	28	27.7	6.2	127.1	13.7	17.2	2.9	17	26.2	5.3	124.1	11.9	17.0	2.9
Brahmin	20	24.4	8.1	123.5	15.7	15.6	2.2	23	26.5	8.5	126.2	14.5	16.3	2.97
Tamang	47	25.7	7.7	126.1	14.3	15.9	2.0	44	24.8	7.2	123.8	14.7	16.1	2.97
Danu-war	65	24.8	6.9	123.8	12.5	16.1	3.6	57	25.8	6.9	123.8	13.0	15.4	3.3
Newar	5	25.2	4.2	121.4	9.3	17.4	4.5	7	27.8	5.9	126.1	16.6	17.6	3.4
Dalit	1			-				5	23.1	5.8	124.8	13.4	14.7	1.98

Note: The mean and standard deviation of weight and height for Dalit girls in table-2 could not be calculated as there was only one Dalit girl in the community with weight 21.1 kg and height 120.0 cm.

Table-3: Body Mass Index for age of study subjects (n=319)

Gender	Underweight (BMI for age <5 th percentile)		Healthy weight (BMI for age 5 th to <85 th percentile)		Overweight (BMI for age 85 th to ≥95 th percentile)		Total	
	Number	%	Number	%	Number	%	Number	%
Girls	34	20.5	111	66.9	21	12.6	166	100.0
Boys	42	27.4	99	64.7	12	7.8	153	100.0
Total	76	23.8	210	65.8	33	10.3	319	100.0

Table-4: Nutritional status (WfA) of study subjects according gender (n=319).

Gender	Underweight (WfA<-2SD)		Normal (WfA between ±2SD)		Overweight (>2SD)		Total	
	Number	%	Number	%	Number	%	Number	%
Girls	29	17.5	134	80.7	3	1.8	166	100.0
Boys	5	3.3	146	95.4	2	1.3	153	100.0
Total	34	10.6	280	87.8	5	1.6	319	100.0

(17.0±2.9 kg/m²). Mean BMI for girls is lowest in Brahmin (15.6±2.2 kg/m²) and highest for Chhetri (17.2±2.9 kg/m²). All three indicators are high for boys in all ethnic groups except in Chhetri where girls have higher mean values compare to boys. (Table 2)

Body Mass Index for age:

Out of 319 children, 76 (23.8%) were found to be underweight (Table-3). The number of underweight boys (27.4%) is higher compared to girls (20.5%).

The percentage of healthy and overweight girls is more than that of boys.

Weight for age (WfA)

Out of 319 children, 34 (10.6%) were found to be underweight (Table-4) which is more compared to data in NDHS, 2011 (8%)⁴. The percentage of underweight girls (17.5%) is higher compared to boys (3.3%). This data opposite to the data in NDHS report (2011) according to which boys are slightly more likely to be underweight (30%) than

Table-5: Status of weight of children according to their age (n=319)

Age (years)	Underweight (WfA< -2SD)		Normal (WfA between $\pm 2SD$)		Weight for age (>2SD)		Total	
	No.	%	No.	%	No.	%	No.	%
Girls								
6	7	33.3	13	61.9	1	4.7	21	100.0
7	8	32	17	68.0	0	0.0	25	100.0
8	5	35.7	9	64.3	0	0.0	14	100.0
9	7	29.2	17	70.8	0	0.0	24	100.0
10	0	0	26	96.3	1	3.7	27	100.0
11	0	0	20	95.2	1	4.8	21	100.0
12	2	5.9	32	94.1	0	0.0	34	100.0
Total	29	17.5	134	80.1	3	1.8	166	100.0
Boys								
6	2	7.4	24	88.9	1	3.7	27	100.0
7	1	5.9	15	88.2	1	5.9	17	100.0
8	1	6.2	15	93.7	0	0.0	16	100.0
9	1	5.3	18	94.7	0	0.0	19	100.0
10	0	0	23	100	0	0.0	23	100.0
11	0	0	25	100	0	0.0	25	100.0
12	0	0	26	100	0	0.0	26	100.0
Total	5	2.9	146	95.4	2	1.3	153	100.0

Table-6: Nutritional status of study subjects according to their height for age (n=319)

Gender	Stunted (HfA< -2SD)		Normal (HfA between $\pm 2SD$)		Height for age (> +2SD)		Total	
	No.	%	No.	%	No.	%	No.	%
Girls	50	30.1	115	69.3	1	0.6	166	100.0
Boys	6	3.9	147	96.1	1	0.6	153	100.0
Total	56	17.5	262	82.1	2	0.6	319	100.0

female (28%). The percentage of normal boys (95.4%) is more than that of girls (80.7%) 4. The proportion of underweight boys (Table-5) is highest in age group 6 years (7.4%) and lowest in age group 10 to 12 years (0%). The proportion of underweight girls is highest at the age 8years (35.7%) and lowest in the age of 10 to 11 years (4.8%). Only 1.6% of total children are overweight.

Height for age (HfA)

Out of 319 children, 56(30.1%) were found to be stunted (Table-6) which is lower compared to data in NDHS, 2011 (41%).⁴ The proportion of stunted girls (30.1%) is higher compared to boys (3.9%). This data is slightly different than the data in NDHS report (2011) according to which stunting is slightly higher in boys (41%) than girls (40%).⁴ The percentage of normal boys (96.1%) is more than

that of girls (69.3%). The proportion of stunted boys (Table-7) is highest at age of 10 years (39.1%); and 0% at ages of seven and seven years. The proportion of underweight girls is highest at the age 10 years (40.7%) and lowest in the age of six years (14.3%). Only 0.6% of total children have height for age greater than +2SD.

DISCUSSION

Malnutrition is a major public health concern as it has direct effect on the growth of children and human performance in long term. This study carried out in Dukuchhap village showed 23.8% children with BMI for age is less than 5th percentile, 10.6% underweight and 17.5% stunted. Girls were found to be more malnourished than boys. This result is in contrary to the results of NDHS, 2011¹ which

shows boys more prone to stunting and wasting. The reasons behind this result may be due to lesser number of people in village pursuing higher education, less age of mother at the time of child birth and lack of easy access to the health facilities. According to a report by UNICEF, the prevalence of malnutrition in world in terms of underweight, stunting and wasting is 27%, 31% and 10% respectively.⁷ A study carried out in schools in Rome by Rosati et al⁸ also showed 10.9% children (11.4% girls and 10.3% girls) to be thin based on their BMI. Another study in Ghana by Prince and Laar⁹ showed stunting and thinness in 50.3% and 19.4% children respectively. A nutritional assessment study done in Pokhara municipality also showed 23.07% boys and 46.3% girls under 1st degree malnutrition (Indian Association of Pediatrics).² A similar study carried out in Bharatpur municipality showed proportion of undernourished, stunted and wasted children to be 11.38%, 7.69% and 3.38% respectively with greater proportion of girls being undernourished.¹⁰ The proportion of severely underweight children was similar to this study (10.4%) in a study from Ilam district whereas that of severe stunting was higher (17.5%).¹¹

CONCLUSION

Nutritional status of young children in Dukuchhap village was found to be low. High proportion of underweight girls seems to be the main problem. Children belonging to Dalit community also have low average weight, height and BMI. So, the nutritional intervention programs should be directed to uplift the standard of children in these categories.

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REFERENCES

1. Ministry of Health and Population (MOHP), New Era, ICF International. Nepal Demographic and Health Survey 2011. 2011;163–71.
2. Bhandari N, Shrestha G. Nutritional status and morbidity pattern in school age children in Nepal. *J Coll Med Sci.* 2012;8(2):12–6. <https://doi.org/10.3126/jcmsn.v8i2.6832>.
3. Joshi H, Gupta R, Joshi M, Mahajan V. Determinants of Nutritional Status of School Children - A Cross Sectional Study in the Western Region of Nepal. *Natl J Integr Res Med.* 2011;2(1):10–5.
4. Shivaprakash N, Joseph R. Nutritional Status of Rural School-Going Children (6-12 Years) of Mandya District, Karnataka. *Int J Sci Study.* 2014;2(2):39–43.
5. Government of Nepal Central Bureau of Statistics. Population monograph of Nepal, Volume II [Internet]. First. Kathmandu: Central Bureau of Statistics; 2014. 1-401 p. Available from: <http://cbs.gov.np/image/data/Population/Population Monograph of Nepal 2014/Population Monograph of Nepal 2014 Volume I FinalPrintReady1.pdf>
6. The World Bank. World Development Report 1993 Investing in Health [Internet]. New York; 1993. Available from: <https://openknowledge.worldbank.org/handle/10986/5976>
7. UNICEF. The State of the World's Children 2004 [Internet]. New York; 2003. Available from: https://www.unicef.org/sowc04/files/SOWC_04_eng.pdf
8. Rosati P, Triunfo S, Scambia G. Child Nutritional Status: A Representative Survey in a Metropolitan School. *J Obes.* 2013;2013.
9. Prince A, Laar A. Nutritional Status of School-Age Children in the Nkwanta South District -Volta Region of Ghana. *Eur Sci J.* 2014;1010(3030):1857–7881.
10. Manandhar N, Krishna G, Patowary S. Nutritional status of primary school children. *J Inst Med.* 2008;30(2):14–7.
11. Gaurav K, Poudel I, Bhattarai S, Pradhan PMS, Pokharel P. Malnutrition Status Among Under - 5 Children in a Hill Community of Nepal. *Kathmandu Univ Med J.* 2014;48(4):264–8.