Determinants and Prevalence of Stunting Among Rural Kavreli Pre-school Children

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Abstract

Background: Stunting is a reduced growth rate in human development. It is "height for age" value to be less than two standard deviations of the WHO Child Growth Standards median. Different studies have shown that inadequate nutrient intake, infections, unsafe water and poor child care are among its main determinants. In rural Nepal, stunting in children is one of the most serious public health concerns.

Aims and Objective: The objective of this study was to find the prevalence of stunting including severe stunting and its determinants in pre-school children aged 3-4 years in Kharelthowk VDC, Nepal.

Materials and Methods: A community based cross-sectional survey was conducted from July 2016 to January 2017 with systematic random sampling technique. Total 464 pre-school children of rural Kharelthowk VDC(Kavre district), both males and females of age between 3-4 years were enrolled in the study. A structured questionnaire was used to obtain information on socioeconomic characteristics and life style factors of children. WHO Anthro Software V3.2.2 was used for analyzing anthropometric parameters of the children and Statistical package for Social Sciences (SPSS) Windows version 21 was used to analyze the data.

Result: The prevalence of stunting in pre-school children was 46.9%. The prevalence of stunting was significantly higher among male children (51%) than female children (42.7%). The study revealed that stunting was significantly associated with inadequate nutrition intake, infections, poor child care and socio-economic status of the family. Conclusion: The magnitude of stunting is very high compared to developed countries. Thus, proper attention should be given for the intervention on causes of stunting among pre-school children in order to avoid further risks in future.

Key words: Stunting; Pre-school children; Kavre

Introduction

Stunting in pre-school children is associated with adverse physiological consequences, including poor cognition and educational achievements, lost productivity and, when accompanied by huge weight gain later in childhood(1). In developing countries, it is estimated that 29% of children aged less than five years (under-five children) are stunted [<-2 standard deviation (SD) height-for-age] or malnourished. Although stunting has declined recently, prevalence is still extremely high, especially in South Central Asia, which alone accounts for about half of the global problem(2). Child malnutrition is affected by several determinants, such as intrauterine growth retardation, lack of exclusive breastfeeding, inappropriate complementary feeding, and continuous attacks of infectious illnesses, food unavailability, and micronutrient deficiencies(3). Although the pathogenesis of stunting is not yet well-understood, many studies have shown that inadequate nutrient intake, infections, unsafe water and poor child care, literacy rate of mothers, are among its main determinants(4). Other factors in developing countries include low socioeconomic status, residence and poor access to health care services(5, 6). There is a wide variation in rates of malnutrition throughout Nepal, both ecologically and regionally. Nepal Demographic and Health Survey indicates that more rural children are stunted (low height for age), 42% than urban children (27%). Regional variation in nutritional status of children is substantial. Stunting levels are very high in the mountains (53 %) (7).

The present analyses describe levels and trends of stunting in pre-school children based on the WHO standards. Moreover, while the earlier research covered only stunting in urban areas and reported the trends, the present study was focused on the rural scenario of childhood stunting.

Methods

A cross-sectional community-based study was conducted in pre-school children of Kharelthowk VDC. The study was carried out from July 2016 to January 2017. Five trained volunteers were actively involved in collecting the data of pre-school children. Informed written consent was taken from the parents/guardian and school authority and Helsinki guidelines were followed. A self-designed structured questionnaire regarding lifestyle factors of child, economic status of family, etc was given to them. Anthropometric assessment was done, their weight, height, head circumference, mid-upper arm circumference were measured three consecutive times. Later on, mean was taken as their actual weight and height, which helped in calculating the BMI (body mass index). Anthropometric measurement was done by LG digital weighing machine (with a difference of only 20 grams), by Stadiometer and non stretchable measuring tape. The condition of the weighing machine was checked then was kept on firm flooring (heavy clothing and shoes were removed). Children were told to stand with both feet in the center of the scale and weight was recorded. Height measurement was done by Stadiometer; children were asked to stand up straight with feet and heels together keeping the heels back against the upright section of the stadiometer (arms relaxed by sides). Children were asked to look straight ahead at the marker. Three standard indices of physical growth given by WHO-Height-for-age (Stunting), Weight-for-age (Underweight) and weight-for-height (Wasting) that described the nutritional status of children was considered in this study.

WHO Classification (8).

Stunting: Height for age < -2 Standard Deviations (SD) of the WHO growth standard Median

Underweight: Weight for age < -2 Standard Deviations (SD) of the WHO growth standard Median

Wasting: Weight for Height < -2 Standard Deviations (SD) of the WHO growth standard Median

Overweight: Weight for Height > + 2 Standard Deviations (SD) of the WHO growth standard Median

Inclusion criteria: The pre-school children aged between 3 to 4 years.

Exclusion criteria: The children who were not in good health and uncooperative. Analysis was done by universally accepted WHO Anthro Software Version 3.2.2 and SPSS Version 21. Z test was used to calculate the P value. P-value of < 0.05 was considered as statistically significant

Results

A total of 464 pre-school children aged between 3-4 years were enrolled in the study. Of these 464 participants 237(51.07%) were males and 227(49.93%) were females (Figure 1). Among the mothers of participants, 54.5% (254) were literate and 45.5% (210) were illiterate (Figure 2). Prevalence of overall stunting was 46.9% (218). Prevalence of severe stunting in males and females were 8.8% and 3.5% respectively. Males were more stunted as compared to females. The prevalence of stunting in male and female population compared to its own counterpart was 51% and 42.7% respectively (Table 1). The prevalence of underweight and wasting of the study population was 31.2% and 17.5% respectively whereas overweight was among 4.3 % of the study population (Figure 4).

Figure 1: Sex wise distribution of the pre-school children

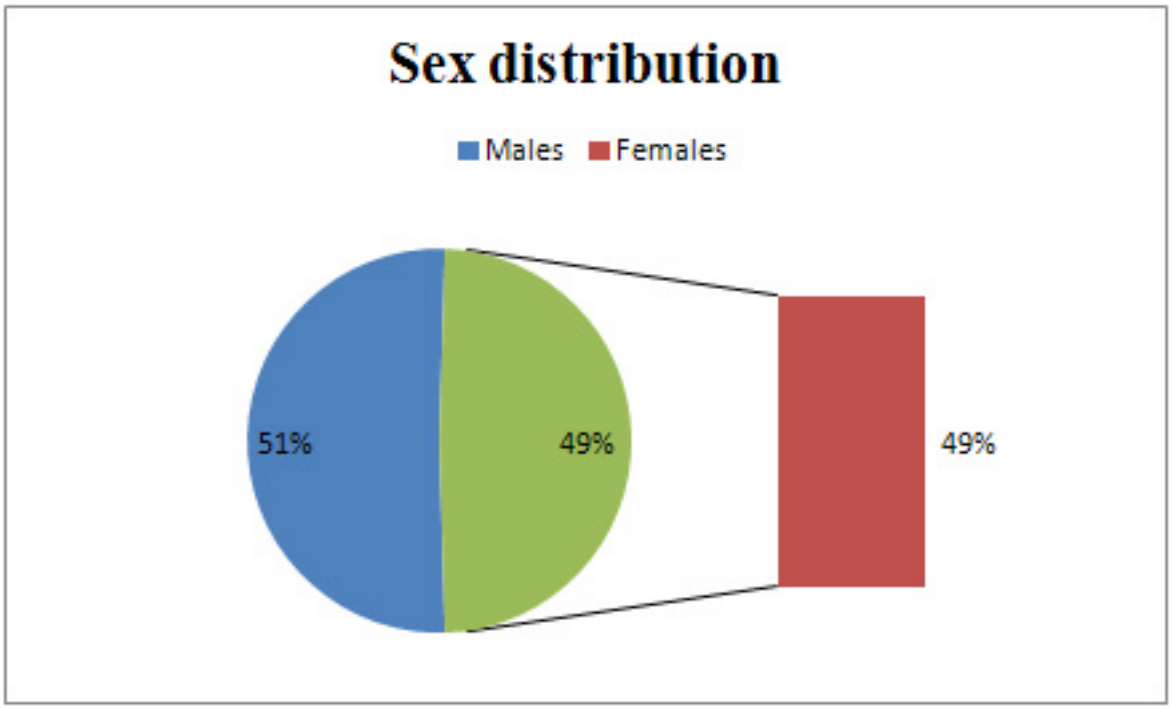

Figure 2: Literacy rate among mothers of pre-school children in the study population

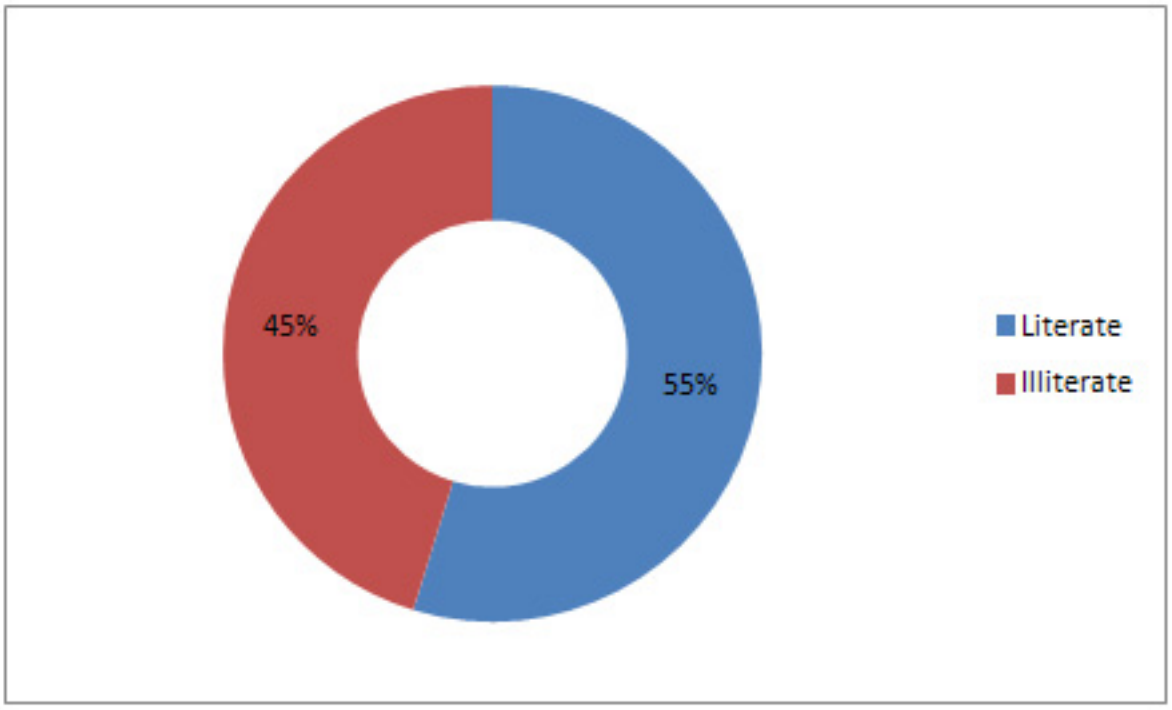

Table 1: Weight-for-height Stunting in the study population (95% CI)

Participants	Total No	No of severe stunting Children (< -3SD)	Percentage of severe stunting Children < -3 SD)	No of stunting Children (< -2SD)	Percentage of stunting Children (< -2 SD)	Mean Z Score	SD	P Value
Male	237	21	8.8	121	51.0	-1.43	0.97	0.076
Female	227	8	3.5	97	42.7	-1.10	0.84	0.135
Total	464	29	6.2	218	46.9	-1.26	0.92	0.103

Figure 3: Comparison of Stunting among male and female pre-school children in the study population

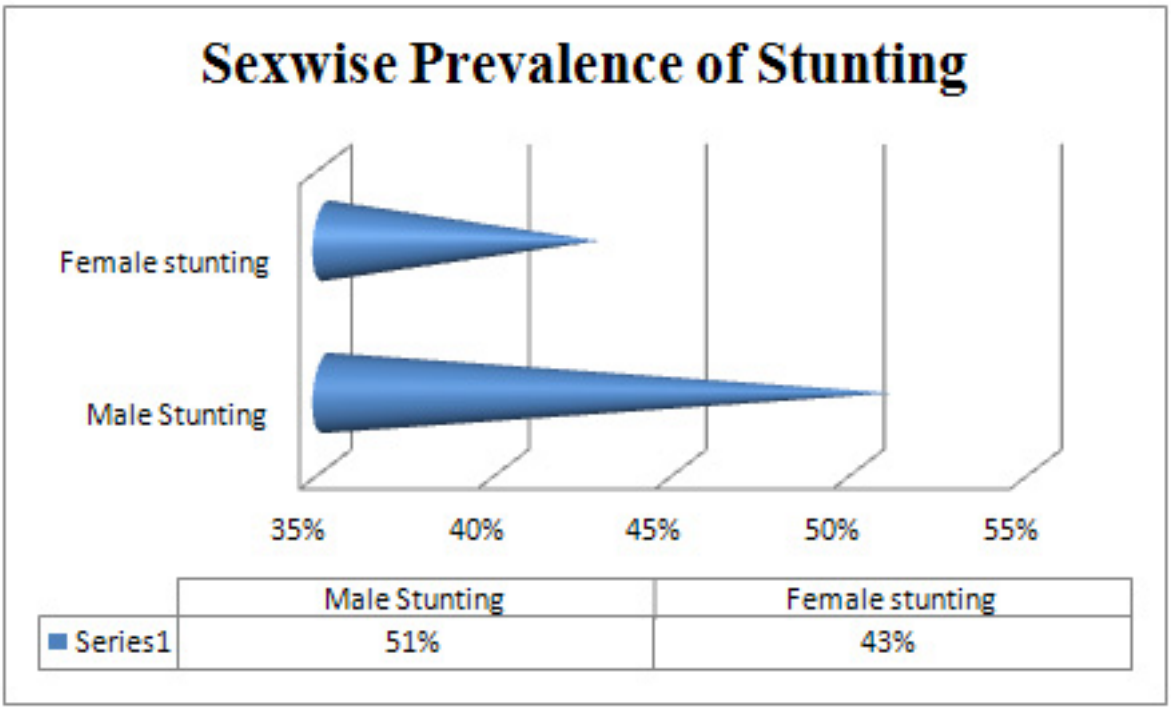

Figure 4: Prevalence of stunting, underweight, overweight and wasting among study children (3-4 Years of age)

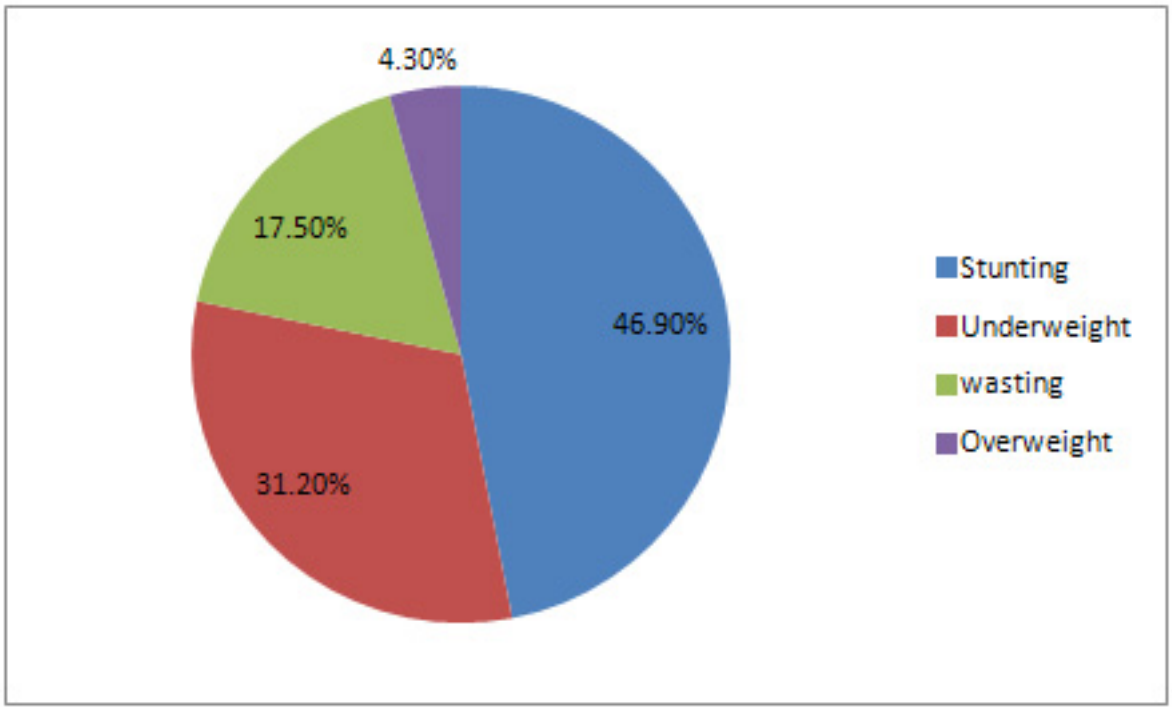

Table 2: Socio-demographic characteristics of study children

Variable	Number	Percentage (%)
Sex of the children		
Male	237	51.07
Female	227	48.93
Religion of the mothers		
Hindu	433	93.3
Buddhist	11	2.37
Christian	13	2.8
Others	07	1.53
Maternal education		
Literate	254	54.5
Illiterate	210	45.5
Annual Household Income		
Less than 1000$	334	71.98
1000$ to 2000$	105	22.62
More than 2000$	25	5.40

Table 3: Life style factors and health condition of the children

VARIABLES	No of participants	Percentage (%)
Feeding trends		
Usually takes normal meals	272	58.6
Difficulty in taking normal meals or eat less	151	32.5
Overeating tendency	41	8.9
Junk foods		
Likes very much	230	49.6
Not so much	234	50.4
Eating habit		
Watches TV/Tablets/Mobiles while eating	123	26.5
Doesn't watch anything while eating	341	73.5
Sleeping habit	265	57.11
Has normal sleep	199	14.22
Wakes up many times at night		
Involvement in physical activities		
Usually likes to play outdoors	348	75.00
Stays inside house watching TV/Playing indoor games	116	25.00
Health condition		
Usually becomes sick	233	50.2
Not so much	231	49.8
Exclusive Breastfeeding(EBF)		
Was exclusively breastfeed	329	71
Not exclusively breastfeed	135	29
Child birth weight(Health post/Hospital records)		
Had normal birth weight(≥ 2500 gm)	234	50.43
Below normal birth weight(< 2500 gm)	230	49.57

Discussion

In developing countries like Nepal, stunting in children has become a public health concern in recent times due to its bad impact on the health of the child in the future. People are still unaware of the situation and this may lead to epidemic causing increase risk of diabetes, hypertension and other diseases in future. In the present study the average age of the child was 3.5± 0.2 years. The youngest child was 36 months whereas the oldest among study population was 48 months. A study in Andhra Pradesh, India assessed 1013 tribal children and found that 48.27% were stunted (9). This study showed similar results to our study which showed 46.9% of children of age 3-4 years were stunted. Bisai et al. found the overall prevalence of stunting was 47.8 % in 3-6 years children(10). Another study from Rajasthan reported that 60 % were stunted among rural children less than 3 years (11). Rao et al. found that 51.6% were stunted among tribal pre-school children(12). In a study in Saudi Arabia it showed that a prevalence of stunting was 10.9% in under 5 children which is far lower as compared to us and our region(13). One noticeable aspect of our study is significantly higher prevalence of stunting among boys as compared with girls. Rao et al. in their study also had found a higher prevalence of stunting (54.4% vs. 48.8 %) among boys(12). But Stalin et al. in his study found that malnutrition was more prevalent among girls than boys in Tamilnadu, India (62.6% vs. 44%) (14).

The study clearly showed that the stunting was significantly associated with feeding habit, sleeping condition, health condition of child, child birth weight (Table 3) and lower socio-economic status of the family (Table 3).

Conclusion

The prevalence of stunting found in this study is very high as compared to developed countries. This is due to poor child nutrition, illness, low birth weight of child and poor economic conditions. Thus, proper attention should be given for the intervention on causes of stunting among pre-school children in order to avoid the diseases in future.

Limitations

The trend of studies in developing countries is only focused in urban areas. The problem of stunting in children is more in rural areas so this type of study should be concentrated more in rural areas.

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