

Nutritional Profile of Preschool Children: A Review

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KEYWORDS Underweight. Stunting. Wasting. Z-score. Global Scenario

ABSTRACT This paper reviews the prevalence of undernutrition among preschool children. The current review uses the z-score system to estimate the magnitude of undernutrition among preschool children because it reflects both previous and current nutritional status of the children. Hitherto, the research results from India revealed that the prevalence of underweight (93.3%), stunting (86.6%) and wasting (85.3%) was the highest among the Kinnaura of Kinnaur in Himachal Pradesh; the lowest observed prevalence of underweight (15.0%), stunting (11.4%) and wasting (10.8%) was among the Punjabi preschool children (Punjab). Studies beyond India revealed that the highest and lowest prevalence of underweight, stunting and wasting was observed from Dhaka (Bangladesh) and Salvador (Central America). Thus, the present review revealed that the nutritional status of preschool children, particularly of tribal and rural areas, was in critical situation. Urgent nutritional attention is required.

INTRODUCTION

Health and nutritional status are two crucial and interlinked aspects of human development, which in turn interact with demographic variables in important ways. While health and nutrition conditions can be related with aggregate economic growth, there is no necessary or linear causation, and policy interventions can play an important role in determining both access to health services and nutrition, as well as outcome indicators in this area (West Bengal Human Development Report 2004). The present study is a review paper undertaken to determine the comparative prevalence of undernutrition widespread among preschool children of India and abroad. Stunting, underweight and wasting were used to evaluate the nutritional status of the subjects because these measures reflect both previous and current nutritional status of the children. A total number of 34 Indian and 9 international studies are reviewed here. *Undernutrition is a deficiency of calories or of one or more essential nutrients.* Globally, it is estimated that among preschool age children in developing countries, underweight, stunted and wasted accounts for 183, 226 and 67 million, respectively (Mitra and

Tiwari 1997). India has the highest occurrence of childhood malnutrition in the world (Bamji 2003). One out of every three children less than five years of age in developing countries is malnourished. It is a major drain on developing countries' prospects for development because malnourished children require more intense care from their parents and are less physically and intellectually productive as adults. Given the fundamental importance of undernutrition to child survival and health, the evaluation of nutritional status, especially among rural children of various ethnic groups, has immense implications for policy makers and planners alike (Nandy and Miranda 2008).

Chronic hunger and undernutrition is the worst tribulation of the poverty that still plagues millions of households in India, and the plight of children is of special concern. Undernutrition in childhood is one of the reasons for the high child mortality rate and is also highly detrimental for the future of those who survive (Pelletier 1994). Chronic undernutrition in childhood is linked to slower cognitive development and serious health impairments later in life that reduce the quality of life and also the economic productivity of people (Scrimshaw 1996). Undernutrition is hence not only a consequence of poverty but also a cause.

The current review uses the z-score system to estimate the magnitude of undernutrition among less than 6 years aged preschool children of Indian subcontinent and other countries.

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METHODS

The intent of the present literature review was to summarize research findings regarding the available evidence of nutritional status among preschool children.

Data on published literature (between 1988 and 2009) related to nutritional status of preschool children were collected by using electronic search engines <GOOGLE and PUBMED>. The following key words used to conduct this search: *preschool children, undernutrition, underweight, stunted and wasted*. Likely studies for review were selected from published research studies in English language that reported prevalence of undernutrition (using stunting, underweight and wasting) by age and region basis world wide. The lists of published related articles (references) were also used to trace the relevant studies. A total of 43 studies have been identified (34 studies were from India and 9 from other countries) where z-score were used for assessing the undernutrition among the preschool children.

Following the United States National Center for Health Statistics (NCHS) (Hamill et al. 1979) age- and sex- specific -2 z-scores has been considered to defining undernutrition.

- Stunting: <-2 HAZ (z-score for height-for-age);
- Underweight: <-2 WAZ (z-score for weight-for-age);
- Wasting: <-2 WHZ (z-score for weight-for-height).

RESULT AND DISCUSSION

A total of 43 scientific papers were considered for this study. In India, the sample sizes ranged from 68 to 7413 children and the sample sizes reviewed in 9 International studies ranged from 157 to 17017. In majority of the studies, the age of the children was less than six years. Out of the 34 Indian studies, 11 comprised of tribals/indigenous groups (viz. Saharia, Gond, Kodaku, Raj Gond, Kalahandi, Dhodia, Kinnaura, Bhil, Dhur Gond, and Kamar) from the states of Rajasthan, Madhya Pradesh, Chhatisgarh, Madhya Pradesh, Orissa and Bihar and the Coastal, Himalayan and Desert regions. Table 1 shows the comparative prevalence of undernutrition, un-

derweight, stunting and wasting of the preschool children under study. It appears from this table, that in the Indian subcontinent, the prevalence of underweight, stunting and wasting was 93.3%, 86.6% and 85.3%, respectively among the Kinnaura (Himalayan Ecology), which is observed to be the highest among all the reviewed populations from India. The prevalence of underweight, stunting and wasting was 15.0%, 11.4% and 10.8%, respectively among the Punjabi preschool children (Punjab), which is observed to be the lowest. Table 1 also shows that among all the reviewed studies from the other parts of the world, the highest prevalence of underweight, stunting and wasting was. 73.2%, 68.4% and 31.2%, respectively, was observed from Dhaka (Bangladesh). However, the prevalence of underweight, stunting and wasting was 10.5%, 22.0% and 2.9% respectively among the Salvador preschool children of Central America, which was observed to be the lowest.

From above, we can conclude that the nutritional condition of majority of studied populations, particularly tribal and rural ones, was unsatisfactory. This implied that most of these were experiencing severe to critical nutritional stress. Proactive nutritional supplementation programmes are mandatory to improve the nutritional profile of these populations. These interventions should be monitored regularly to determine their efficacy in combating undernutrition.

Since malnutrition has many causes, only multiple and synergistic interventions embedded in true multisectoral programmes can be effective (Bhargava 2001). From this present review one can clearly understand the situation at a glance about the critical position of the tribal and rural preschoolers of developing countries with respect to other urban sectors of developing countries and developed countries that may be experiencing the opposite trends of malnutrition (that is, problem of overweight and obesity). This important point must be borne in mind before the authorities rethink about the policies made by the policy makers to plan for the effective strategies to combat the prevalence the undernutrition among children in disadvantaged populations. However, one of the limitations of the present review was the lack information on correlates of undernutrition. Future investigations should review the various correlates of undernutrition.

Table 1: Nutritional status among preschool children of different national and international samples.

<i>S. No.</i>	<i>Population</i>	<i>N</i>	<i>Age group</i>	<i>Under-nutrition</i>	<i>WAZ</i>	<i>HAZ</i>	<i>WHZ</i>	<i>Study area</i>	<i>Reference</i>
<i>National</i>									
1	Saharia tribal children	238	1-5 years	-	72.0%	68.0 %	13.0 %	Rajasthan, India	Rao et al. 2006
2	Gond tribal children	1022	1-5 years	-	61.7%	51.7%	32.8%	M.P, India	Rao et al. 2005
3.	Kodaku children	182	1-5 years	-	59.8%	43.0%	35.0%	Chhatisgarh, India	Dolla et al. 2005
4	Raj Gond	123	1-5 years	-	37.4%	46.3%	41.5%	M.P, India	Sharma et al. 2006
5	Kalahandi	751	0-5 years	-	78.4%	-	-	Orissa, India	Mahapatra et al. 2000
6	Rural children	227	0-59 months	-	51.3%	46.0%	38.8%	Kolkata, India	Dey and Chaudhuri 2008
7	Bauri children	219	2-6 years	-	48.4%	37.8%	21.5%	Purulia, W.B, Indi	Das and Bose 2009. JLS
8	ICDS children	673	1-5 years	-	39.4%	-	-	Chapra, W.B, India	Biswas et al. 2009
9	Bauri children	347	2-6 years	-	51.2%	39.2	26.6	Purulia, W.B, India	Das and Bose 2009
10	Bengalee children	533	3-5 years	-	30.8%	—	9.3%	Chapra, W.B, India	Bose et al 2007
11	Dhodia children	306	0-5* (below 6 years)	-	-	15.3%	11.3%	Coastal, India	Kshatriya and Ghosh 2008
12	Kinnaura children	327	0-5* (below 6 years)	-	93.3%	86.6%	85.3%	Himalayan ecology, India	Kshatriya and Ghosh 2008
13	Bhil Children	356	0-5* (below 6 years)	-	-	5.6%	7.3%	Desert ecology, Indi	Kshatriya and Ghosh 2008
14	Children	Un-known	< 3 years	47.0%	-	-	-	India	NFHS-2 1998-99
15	Children	Un-known	< 3 years	-	45.9%	38.4%	19.1%	India	NFHS-3 2005-06
16	Drought affected children	914	0-5 years	-	60.0%	53.0%	28.0%	Western Rajasthan, India	Singh et al. 2006
17	Sc pre-school	1000	1-5 years	90.8%	-	-	-	Amritsar, Punjab, India	Uppal et al 2005
18	Tribal children	1847	0-6 years	-	55.0%	60.0%	-	Bihar, India	Yadav and Singh 1999
19	Refugee camp children	125	<5 years	34.4%	-	-	-	Tamil Nadu, India	Bazray et al. 2005
20	Fishing community children	136	< 5 years	35.3%	-	-	-	Tamil Nadu, India	Bazray et al. 2005
21	ICDS children	3157	< 5 years	62.9%	-	-	-	Vadodara city, India	Bhalani and Kotecha 2002-07 to 2002-09
22	Anganwari children	217	< 5 years	-	36.4%	51.6%	10.6%	Allahabad, India	Kumar et al 2006
23	Slum children	1061	1.5 – 3.5 years	-	67.6%	62.8%	26.5%	Lucknow, India	Awasthi and Pande 1997
24	Urban slum children	520	<5 years	75.0%	-	-	-	Varanasi, India	Mishra et al. 2001
25	NIDS children	7413	< 5 years	42.0%	-	-	-	Chandigarh, India	Swami et al. 2000

Table 1: Contd...

S. No.	Population	N	Age group	Under-nutrition	WAZ	HAZ	WHZ	Study area	Reference
26	ICDS children	1286	<5 years	51.6%	-	-	-	Chandigarh, India	Swami et al. 2001
27	Urban slum children	486	< 5 years	81.8%	-	-	-	Delhi, India	Kapil and Bali 1989
28	Urban slum children	630	< 6 years	-	57.6%	53.0%	22.5%	Delhi, India	Saxena et al. 1997
29	Urban slum pre-school children	584	< 6 years	60.5%	-	-	-	Srinagar, India	Bhat et al. 1997
30	Dhur Gond	68	< 5 years	100.0%	-	-	-	Chhatisgarh, India	Chandraker et al 2009
31	Slum children	113	3-6 years	-	63.7%	47.8%	32.7%	Midnapore Town,	W.B, India Bisai et al. 2009
32	Kamar tribal children (Boys)	309	4-6 years	-	93.8%	66.0 %	85.5%	Chhatisgarh, India	Mitra et al. 2007
33	Pre-school children	6531	1 – 5 years	-	15.0%	11.4%	10.8%	Punjab	Kaur et al. 2005
34	Slum children	100	0-60 months	-	43.0%	35.0%	28.0%	Gujarat	Shah and Patel 2009
<i>International</i>									
35	Pre-school children	392	0-5 years	-	73.2%	68.4%	31.2%	Dhaka, Bangladesh	Pryer et al. 2003
36	Rural Children	2103	0-5 years	-	20.0%	30.0%	4.0%	Western Kenya	Arthur et al. 2003
37	Children	157	< 5 years	-	30.0%	47.0%	7.0%	Western Kenya	Bloss et al. 2004
38	Tibetan Children	1655	0-3 years	-	23.7%	39.0%	5.6%	China	Dang 2004
39	Children	650	< 5 years	-	31.8%	44.3%	11.9%	Vietnam	Hien and Kam 2008
40	Preschool children	511	0-59 months	-	40.0%	61.0%	17.0%	Kaduna and Kano, Nigeria	Ifeanyi et al. 2009
41	Salvadorian children	Un-known	3-59 months	-	10.5%	22.0%	2.9%	Salvadore	Srawn et al. 1996
42	Pre-school children	17017	0-6 years	-	23.3%	15.4%	3.1%	Cape Verde Island	Wennberg 1988
43	Pre-school children	5333	< 5 years	-	47.0%	44.0%	10.0%	Bangladesh	Rahaman and Chowdhury 2009

CONCLUSION

The preschool children of several populations were experiencing severe to critical nutritional stress. Based on World Health Organization classification of severity of malnutrition, the overall prevalence of stunting was high (30-39 %), whereas those of underweight (≥ 30 %) and wasting (≥ 15 %) were very high. Valuable health and nutritional promotion programs can be formulated based on the findings of such researches with the ultimate objective of decreasing childhood undernutrition worldwide.

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