

Nutritional Status of Children Residing in Squatter Settlements on Pavements and Along Roadsides of Jaipur City as Determined by Anthropometry

Anuradha Goyle, Neetu Shekhawat, Harsha Saraf, Preeti Jain and Swati Vyas

Department of Home Science, University of Rajasthan, Jaipur 302 004, Rajasthan, India

E-mail: agoyle@rediffmail.com

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ABSTRACT The nutritional status of 296 children in the age group of 2-3 and 3-4 years residing in squatter settlements on pavements and along roadsides in Jaipur city was determined through anthropometry. Data on weights and heights of children were collected using standardized techniques. The results revealed that the weights and heights of these children were below those of their well-to-do counterparts. In the age group of 2-3 years, as per weight for age indicator using IAP classification, 35.5% boys and 32.4% girls were in the normal category. Similarly, in the age group of 3-4 years, 14.9% boys and 18.7% girls were in the normal category. In both the age groups, the rest suffered from varying grades of malnutrition.

INTRODUCTION

Families squatting along the roads and on the vacant plots of a city are a deprived lot. They have limited access to basic amenities like housing, water, electricity, education and medical as well as other facilities. They are exposed to the ill effects of the environment and the weather. Moreover, they reside in very unhygienic surroundings. The families are engaged in activities generating low incomes and are nomadic by nature, though some of the families have been squatting at the present site of residence for many years. Most of the children of such families are malnourished, exhibiting low weight for age in comparison to their counterparts in well-to-do families (Ray et al., 1999).

A number of studies have been conducted to assess the nutritional status of young children from urban slums (Ray et al., 1990; Busi et al., 1991; Sharma and Vali, 1991; Dwivedi et al., 1992; Garg et al., 1997; Awasthi and Pande, 1997; Ray et al., 1997). In India, dwellers of squatter settlements on pavements and along roadsides do not appear to have been studied well, more so the nutritional status of their children, though, studies discussing their demo-

graphic profile have appeared in literature (McGee, 1970; Bhargava, 1985; Saraswathi and Dhillon, 1985; Ali, 1995; Cho and Park, 1995; Sethuramalingam and Palaniswamy, 1995). Hence, this study was undertaken to determine the nutritional status of the children in the age group of 2-4 years in such settlements through anthropometry.

STUDY AREA AND METHODOLOGY

No enumeration of roadside squatter settlements had been made in Jaipur city when the present study was conducted from March 1999 to March 2001. The Jaipur Nagar Nigam and the Jaipur Development Authority (JDA) officials provided some information on the whereabouts of a few squatter settlements; the rest of the information was obtained from the residents of the squatter settlements, their leaders and local people living nearby. The inmates of squatter settlements on the pavements and vacant plots alongside the city roads were approached for data collection. A total of 42 squatter settlements and 296 families were covered. One child from each family was taken, and hence, a total of 296 children constituted the sample under the study. Of these, 150 were boys and 146 were girls. Their weight was measured using a standardized ATCO digital weighing balance. The body weight was recorded when the digital display of the body weight became stabilised. Those children who were not cooperative were weighed with their

Address for correspondence: Dr. Anuradha Goyle, Associate Professor, 41, Teachers Residence University of Rajasthan Campus Jaipur 302 004 Rajasthan, India
Telephone (R): 0141-2708112
E-mail: agoyle@rediffmail.com

mothers. The weight of the mother was deducted to yield the weight of the child. For measuring standing height, vertical anthro-pometric rod was used. The height was recorded to the nearest centimeter using the standardized procedure. The weights and heights of the children were compared with those of well-to-do Indian children (ICMR, 1990) and WHO standards (WHO, 1983). They were categorized as per Indian Academy of Pediatrics classification (Gopaldas and Seshadri, 1987) using weight for age as the indicator. The differences in the extent of malnutrition among the boys and the girls were statistically examined by chi square test (Gupta, 1982).

RESULTS

Weights and Heights: It is evident from Table 1 that the mean weight of the boys was 10.0 ± 1.44 kg and that of the girls was 9.6 ± 1.33 kg in the age category of 2-3 years. The mean height of the boys was 79.8 ± 4.72 cm and that of the girls was 78.9 ± 4.44 cm. In the age group of 3-4 years, the mean weight of the boys was 11.2 ± 1.26 kg and that of the girls was 11.0 ± 1.16 kg. The mean heights were recorded as 86.7 ± 6.03 cm for the boys and 85.5 ± 5.49 cm for the girls. The weights and heights of the children of the present study were 10.3 to 24.2% lower than those of well-to-do Indian children (Table 1).

Weight for Age: The children were classified, on the basis of the nutritional indicator weight

Table 1: Mean weights (kg) and heights (cm) of 2-4 year old children

	Present study	Well-to-do Indian children (ICMR, 1990)	Percentage of well-to-do Indian children
<i>Age 2-3 years</i>			
<i>Boys</i>			
Weight (n=77)	10.0 ± 1.44	12.51	79.9
Height (n=75)	79.8 ± 4.72	90.01	88.7
<i>Girls</i>			
Weight (n=71)	9.6 ± 1.33	11.67	82.3
Height (n=70)	78.9 ± 4.44	87.93	89.7
<i>Age 3-4 years</i>			
<i>Boys</i>			
Weight (n=74)	11.2 ± 1.26	14.78	75.8
Height (n=72)	86.7 ± 6.03	98.36	88.1
<i>Girls</i>			
Weight (n=75)	11.0 ± 1.16	13.79	79.8
Height (n=74)	85.5 ± 5.49	96.21	88.9

Mean $\pm$ SD.

for age, into various categories of malnutrition using IAP classification and NCHS standards. In the age group of 2-3 years, about 35% boys and 32% girls were found to be in the normal category. However, 30% boys and 34% girls were in grade I; 28% each of boys and girls were in grade II and 7% boys and 6% girls were in grade III of malnutrition (Table 2). In the age group of 3-4 years, about 15% boys and 19% girls were found to be in the normal category. However, 35% boys and 47% girls were in grade I, 42% boys and 27% girls in grade II, and 8% each of boys and girls were in grade III of malnutrition. On the whole, considering both the age categories and the sexes, only 25.3% of the sample under study could be categorized as normal, while the rest of the children suffered from varying degrees of malnutrition. The data also revealed that there were a higher percentage of underweight children in the older age group.

DISCUSSION

Ray et al. (1999) determined the nutritional status of pavement dweller children of Kolkata city. Out of 216 children in the age group of 24-59 months, 27.6% were in the normal category according to IAP classification and the rest suffered from grades I to IV of malnutrition. In the present study, 25.3% children in the age group of 2-4 years could be classified as normal according to weight for age criteria. The data of these two studies are comparable and present a dismal picture of the extent of malnutrition in children of families residing on pavements or in squatter settlements.

The nutritional status of children in some slums, too, has been assessed by anthropometry. Though slums are more organized and have better access to basic amenities, the situation as regards children's nutritional status is no better. In an urban slum of Kolkata, Ray et al. (1997) observed that in the age group of 24 to ≤ 36 months, 20% children were normal, and in the age group of 36 to ≤ 60 months, 27% children were in the normal category while the rest had some degree of malnutrition. Awasthi and Pande (1997) carried out a study on 1061 children between the ages of 1.5 and 3.5 years enrolled in *Anganwadi* centers in an urban slum of Lucknow. On comparing the height and weight data with the growth standards of the World Health Organisation, the authors found that 87.6%

Table 2: Extent of malnutrition in children as per IAP classification

	Boys	Girls	Total
<i>Age 2-3 years</i>			
Weight for age	(n=76)	(n=71)	(n=147)
Normal (>80% of NCHS median)	27 (35.5)	23 (32.4)	50(34.0)
Grade I (71-80% of NCHS median)	23 (30.3)	24 (33.8)	47(32.0)
Grade II (61-70% of NCHS median)	21 (27.6)	20 (28.2)	41(27.9)
Grade III (51-60% of NCHS median)	5 (6.6)	4 (5.6)	9 (6.1)
Grade IV (≤50% of NCHS median)	-	-	-
<i>Age 3-4 years</i>			
Weight for age	(n=74)	(n=75)	(n=149)
Normal (>80% of NCHS median)	11 (14.9)	14 (18.7)	25(16.8)
Grade I (71-80% of NCHS median)	26 (35.1)	35 (46.7)	61(40.9)
Grade II (61-70% of NCHS median)	31 (41.9)	20 (26.7)	51(34.2)
Grade III (51-60% of NCHS median)	6 (8.1)	6 (8.0)	12(8.1)
Grade IV (≤50% of NCHS median)	-	-	-

Figures in parentheses denote percentages.

of the children were underweight, 62.8% stunted and 26.5% wasted. Garg et al. (1997) determined the nutritional status of children (1-6 years) in slums of Ghaziabad city. The authors found a much higher percentage of children falling in the normal category as compared to the studies cited earlier. About 46% children in the age group of 1-3 years were found to be in the normal category, while 39.2% children in the age group of 3-6 years were in that category. The rest were suffering from various degrees of malnutrition. In different areas, varying degrees of malnutrition have been observed by researchers (Ray et al., 1990; Busi et al., 1991; Sharma and Vali, 1991; Dwivedi et al., 1992). In none of the studies noted above has the figure of children in the normal category as assessed by anthropometry exceeded 50%.

In the present study, the relationship between sex and nutritional status was not found to be statistically significant for either of the age groups, 2-3 years ($\chi^2 = 0.307$; $df=3$) and 3-4 years ($\chi^2 = 4.054$; $df=3$) for weight for age indicator. The results of the study of pavement dweller children by Ray et al. (1999) support those of the present study. Ray et al. (1999) found that the overall prevalence of malnutrition among female and male children was 71.9% and 67.1%, respectively, but the difference was not statistically significant. Similarly, Dwivedi et al. (1992) reported that the prevalence of malnutrition was slightly higher among females (65.0%) in comparison to that in males (61.9%). Here, again, the difference was not statistically significant. Garg et al. (1997) also found no significant sex variation in the nutritional status of children.

Busi et al. (1991) showed from their data that boys were observed to be better than girls in their nutritional status at all ages (0-60 months). Boys accounted for a higher percentage in normal and grade II malnutrition, while girls had a higher percentage in grades I and III of malnutrition. The difference was, however, statistically significant. Ray et al. (1990) reported that 68.83% of the females were undernourished as against 46.53% of the males. All the three grades of malnutrition were more prevalent in females. The relationship between sex and nutritional status was found to be statistically significant. Ray et al. (1997) found that the overall prevalence of malnutrition was more in females than in males, and the difference was statistically significant in the slum of Kolkata.

A look at the anthropometric data and the extent of malnutrition in the children of squatter settlements in the present study reveals a dismal picture. These children lag far behind well-to-do Indian children. Hence, concerted efforts are required to make these children attain their full potential.

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