Prevalence of anaemia and undernutrition among street children in Mysuru, India

*K Jagadish Kumar1, K B Chethak1, H V Rama2, H R Bhaktavatsala1, V Vikash1

Sri Lanka Journal of Child Health, 2017; 46: 44-47

Abstract
Objectives: To assess the haemoglobin levels and nutritional status of the street children in Mysuru.

Method: In this prospective study, 204 street children were recruited. Clinical examination was done and haemoglobin was estimated with the cyanmethaemoglobin method. Classification of anaemia and undernutrition was done according to WHO criteria.

Results: Anaemia was noted in 52.5% children and 62.6% of these anaemic children had moderate anaemia. Prevalence of underweight, stunting and wasting was 76.5%, 36.8% and 52% respectively.

Conclusion: Of the street children in Mysuru, 52.5% had anaemia, 76.5% were underweight, 36.8% had stunting and 52% had wasting according to WHO criteria.

DOI: http://dx.doi.org/10.4038/sljch.v46i1.8105

(Key Words: Street children, undernutrition, anaemia)

Introduction

Children must be cared, nurtured and educated properly to promote the progress of the nation. Some of the unfortunate children lack parental upbringing and support and grow in street as street children. Often they meet with a harsh physical and psychological environment making them vulnerable for many health infirmities1,2.

Un fortunately, problems of street children are growing at an alarming speed throughout the world3,4. It is very difficult to estimate the exact number of street children throughout the world, but the number is likely to be as high as 100 million4,5,6. India accounts for 10% of the world street children7. In India, around 63% of children go to bed hungry and 53% suffer from chronic malnutrition, which reflects the poor status of children in general7. Little is known about the health and nutritional status of street children. Anaemia is the common treatable problem which can lead to intellectual and cognitive dysfunctions in children7. Most of the studies reported anaemia on clinical grounds not on estimation of haemoglobin levels4,8,9.

Objective

The main objective of this study was to estimate the haemoglobin levels and to assess nutrition of street children in Mysore city.

Method

This prospective, cross sectional descriptive study was conducted in the city of Mysuru, Karnataka State, India. For this study a convenient sample size of 204 street children were enrolled. Ethical approval was obtained from Jagadguru Sri Shivarathreeshwara Medical College, Mysuru Ethical Committee. Consent was obtained from the District Block Education Officer, Sarva Shikshana Abhiyana Programme and Officer in Charge for Street Children, Non-Governmental Organisation (NGO), Mysuru. Information about the age of the child was collected from the caretakers of the children (NGO/guardians/parents). Informed consent was also obtained from the individual subjects. A detailed clinical examination was followed by anthropometric measurement. Weight was measured with a portable scale and height was measured using a stadiometer in standing position. All the observations were recorded in a predesigned case report form. Classification of various degrees of anaemia and undernutrition was done according to World Health Organization (WHO) criteria10,11. Prevalence of malnutrition (underweight, stunting and wasting,) by age and sex classification was based on WHO reference curves. The height and weight of each child was
compared with the WHO child growth standards for that particular age and sex to get weight for age, height for age and weight for height indices. Children below two standard deviations (2SD) of the reference median on any of these indices were considered as malnourished and termed as underweight, stunted and wasted respectively. Haemoglobin was estimated by the cyanhaemoglobin method.

All data obtained were entered in MS excel sheet, analysed and interpreted in terms of mean, SD and percentages as appropriate. SPSS version 22 was used for further analysis like Chi-square test / Z-test for difference between proportions. The association and differences were interpreted to be statistically significant at p<0.05.

**Results**

Of 204 children, 158 (77.5%) were males. There were 178 (87.2%) children in the age group of 7-16 years. Prevalence of underweight, stunting and wasting according to age and sex among the street children is shown in Table 1.

| Category      | Number of children (%) | Undernutrition Present | Undernutrition Absent | Wasting Present | Wasting Absent | Stunting Present | Stunting Absent |
|---------------|-------------------------|-------------------------|-----------------------|----------------|---------------|------------------|----------------|
| Age (Years)   |                         |                         |                       |                |               |                  |                |
| Less than 7   | 26 (13.0)               | 18 (69.2%)              | 08 (30.8%)            | 09 (34.6%)     | 17 (65.4%)    | 12 (46.2%)       | 14 (53.8%)     |
| 7-10          | 83 (40.5)               | 63 (75.9%)              | 20 (24.1%)            | 40 (48.2%)     | 43 (51.8%)    | 20 (24.1%)       | 63 (75.9%)     |
| 11-16         | 95 (46.5)               | 75 (78.9%)              | 20 (21.1%)            | 57 (60.0%)     | 38 (40.0%)    | 43 (45.3%)       | 52 (54.7%)     |
| Total         | 204                     | 156 (76.5%)             | 48 (23.5%)            | 106 (52.0%)    | 98 (48.0%)    | 75 (36.8%)       | 129 (63.2%)    |

'P' value - 0.578 0.048 0.008

Sex

| Age (years) | Male | Female | Mild | Moderate | Severe |
|-------------|------|--------|------|----------|--------|
| Less than 7 | 158 (77.5) | 46 (22.5) | 124 (78.5%) | 34 (21.5%) | 88 (55.7%) | 70 (44.3%) | 56 (35.4%) | 102 (64.6%) |
| 7-10        | 83 (40.5)   | 32 (69.6%) | 14 (30.4%) | 28 (60.9%) | 19 (41.3%) | 27 (58.7%) |
| 11-16       | 95 (46.5)   | 32 (69.6%) | 14 (30.4%) | 28 (60.9%) | 19 (41.3%) | 27 (58.7%) |
| Total       | 204         | 156 (76.5%) | 48 (23.5%) | 106 (52.0%) | 98 (48.0%) | 75 (36.8%) | 129 (63.2%) |

'P' value - 0.146 0.035 0.289

The overall prevalence of underweight, wasting and stunting in street children is 76.5%, 52% and 36.8% respectively (Table 1). Higher prevalence of underweight was seen among boys when compared to girls but this was not statistically significant (p=0.14). Prevalence of wasting was significantly higher in boys (p=0.03). There was no significant difference in the prevalence of stunting between genders (p=0.28) (Table 1).

The WHO classification of anaemia was used\(^1\). This is as follows:

- **Children 5-11 years of age:** mild = 11.0-11.4g/dl; moderate = 8.0-10.9g/dl; severe = below 8.0g/dl.
- **Females >15 years:** mild = 11.0-11.9g/dl; moderate = 8.0-10.9g/dl; severe = below 8.0g/dl.
- **Males > 15 years:** 11.0-12.9g/dl; moderate = 8.0-10.9g/dl; severe = below 8.0g/dl.

Prevalence and severity of anaemia among street children according to the WHO classification is shown in Table 2.

| Age (years) | No. | Anaemia + | Male | Female | Mild | Moderate | Severe |
|-------------|-----|-----------|------|--------|------|----------|--------|
| 05          | 04  | 01        | 01   | 00     | 00   | 01       | 00     |
| 06          | 22  | 11        | 05   | 06     | 03   | 07       | 01     |
| 07          | 17  | 06        | 04   | 02     | 02   | 04       | 00     |
| 08          | 22  | 08        | 07   | 01     | 04   | 04       | 00     |
| 09          | 16  | 10        | 09   | 01     | 03   | 07       | 00     |
| 10          | 28  | 11        | 08   | 03     | 03   | 08       | 00     |
| 11          | 19  | 12        | 10   | 02     | 06   | 06       | 00     |
| 12          | 31  | 23        | 18   | 05     | 09   | 14       | 00     |
| 13          | 23  | 13        | 12   | 01     | 04   | 08       | 01     |
| 14          | 17  | 10        | 08   | 02     | 04   | 06       | 00     |
| 15          | 04  | 02        | 01   | 01     | 00   | 02       | 00     |
| 16          | 01  | 00        | 00   | 00     | 00   | 00       | 00     |
| Total       | 204 | 107       | 83   | 24     | 38   | 67       | 02     |

45
All of them were Hindus. Overall 52.4% of street children were anaemic and this was seen nearly equally in both genders (males = 52.5%, females = 52.2%). Majority of anaemic children were in the moderate group (62.6%) according to WHO classification (Table 2).

Discussion
Street environment poses lots of risks and hazards leading to numerous health problems. About 72% of street children belong to 6–12 years of age group and 13% children were aged below 6 years according to UNICEF. It is uncommon to find children below 5 years as street children. The age of the street children in our study ranged from 5 to 16 years and 87% of them belong to the age group of 7–16 years. Several studies have shown that the majority of the street children are boys. In our study, 77.5% of street children were boys. This could be attributed to increased emotional gap and conflict between parents and children at the time of puberty. In contrast, girls work as domestic servants in houses as street life is more dangerous because they are vulnerable to sexual abuse.

Most of the studies reported anaemia on clinical grounds not on estimation of haemoglobin levels. Various studies reported anaemia in more than 70% of street children. Study conducted in Beni-Suef city revealed anaemia in 86.1% of street children, who also had high prevalence of parasitic infestation which they attributed to the very high prevalence of anaemia. Among street children in Ghana, anaemia was detected in 78% and 92% of them had parasitic infestations. The studies from Alexandria and Cairo also observed anaemia in 78% and 73% of street children respectively. In our study, prevalence of anaemia is comparatively less than the above studies. However, a study from Nepal revealed 6.2% of street children were anaemic. Almost 47.9% children in this study consumed meat multiple times a week and this may be the reason for the low prevalence of anaemia. In another study from Indonesia, the prevalence of anaemia was only 29.3% of street children and it was more common in females (45.3%) compared to males (23.4%) unlike in our study group.

Malnutrition is highly prevalent in developing and underdeveloped countries. In India, the undernutrition is noticed up to the tune of 50% in the adolescent age group. Our study reflected the same with accentuated proportion of malnutrition in street children. This increase prevalence of malnutrition may be because of lack of good nutritious diet which is necessary for the young adolescents for their normal growth. Most of the street children around the world are malnourished and underweight. Study from Kenya reported stunting in 31.1% and underweight in 41.9% of street children. Kiwanis magazine, reported it as high as 83% in Ghana. Rita Patrias et al from Indonesia have reported that 42.7% and 80.4% of street children were underweight and stunted respectively. Irregular earnings, irregular availability of food and spending on health issues predispose these street children to undernutrition. This is generally compounded by unhealthy lifestyles and bad habits such as smoking cigarettes, addiction to glue, or liquor etc. A limitation of the study is that the age of the child was obtained from NGOs in some instances and this may not be very reliable.

Conclusions
Of the street children in Mysuru, 52.5% had anaemia, 76.5% were overweight, 36.8% had stunting and 52% had wasting according to WHO criteria.

Acknowledgments
We are thankful to Dr. Siddalinga Hugar. Department of Community Medicine, JSS Medical College, Mysore for his assistance in statistical analysis.

References
1. Making health care accessible to street children. In: Fernandez N, Daruwalla N, Choure S, Tiwari K. project team. The ‘Hospital on Wheels’ Project (2000-2006) SNEHA. 2008. Available from: snehamumbai@snehamumbai.org
2. Patra S, Anand K. Homelessness: A hidden public health problem. Indian Journal of Public Health 2008; 52:164-70. PMID: 19189843
3. Elazim Mohamed AA, Adly Labeeb S, El Hafnawy TM, Mohamed AG. Health status and risk factors of street children in Beni-Suef City. Assist University Bulletin for Environmental Researches 2011; 14:109-30.
4. Thapa K, Ghatane S, Rimal SP. Health problems among the street children of Dharan municipality. *Kathmandu University Medical Journal* 2009; 7: 272-9.

5. Street Children of India - Slumdogs Available from: www.slumdogs.org/street-children-of-india.html

6. Improving the lives of street children. In: Pillai MV, Manoj Kumar Pattanaik MK, editors. Icfai Books. The Icfai University Press © 2008 Printed in India. ISBN: 978-81-314-xxxx-x

7. Jauregui-Lobera I: Iron deficiency and cognitive functions. *Neuropsychiatric Disease and Treatment* 2014; 10:2087-95. https://doi.org/10.2147/NDT.S72491 PMid: 25419131 PMCid: PMC4235202

8. Singh D, Sareen N, Ojha A, Sareen D. Street children of Udaipur: Demographic profile and future prospects. *Stud Tribals Tribals* 2008; 6(2): 135-9

9. Eltalhaly EM, Schawki MM, Ghobashi MM, AUC Social Research Center. An evaluation of the health condition of street children in Cairo. Public Health and Human rights, APHA 134th Annual Meeting and Exposition; November 4-8, 2006.Boston.

10. The WHO child growth standards. Available from: http://www.who.int/childgrowth/standards /Technical_report.pdf. Accessed on 12-1-2016

11. Haemoglobin concentrations for the diagnosis of anaemia and assessment of severity VMNIS | Vitamin and Mineral Nutrition Information System WHO/NMH/NHD/MNM/11.1. WHO home page: http://www.who.int © World Health Organization 2011.

12. Mgr.Beata Pietkiewicz-Pareek. Common social problems among Street Children in India.In: Advanced Research in Scientific Areas. 2012 December, Section 6. Psychology, Sociology and Pedagogy, Social Science. International Virtual Conference. Slovakia http://www.arsa-conf.com. EDIS - Publishing Institution of the University of Zilina 2012.p.981-985

13. Agnihotri P. Street boys of Delhi: A study of their family and demographic characteristics. *Indian Journal of Medical Science* 2001; 55:543e8.

14. Pemberton S. Saving the street children. Kiwanis Magazine.2007. Indianapolis: Kiwanis International; p. 1-6.

15. Salem EM, Abdel-Latif F. Sociodemographic characteristics of street children in Alexandria. *East Mediterranean Health Journal* 2002; 8:64-73. PMid: 15330562

16. Patriasih R, Widiaty I, Dewi M, Sukandar D. Nutrient intake and nutritional status of street children in Bandung. *Journal of Nutrition and Food* 2010; 5: 178–84.

17. Deka MK, Malhotra AK, Yadav R, Gupta S. Dietary pattern and nutritional deficiencies among urban adolescents. *Journal of Family Medicine and Primary Care*. 2015; 4:364-8. https://doi.org/10.4103/2249-4863.161319 PMid: 2628775 PMCid: PMC4535096

18. Ayaya SO, Esamai FO. Health Problems of the street children in Eldoret, Kenya. *East Africa Medical Journal* 2001; 78: 624-9. https://doi.org/10.4314/eamj.v78i12.8930 PMid: 12199442