ORIGINAL ARTICLE

Nutritional status and substance abuse among street children in South India

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Abstract

Introduction: Street children are the most neglected and vulnerable population group in most of the urban cities in India, and are at risk of undernutrition, and substance abuse. **Aims** & **Objectives:** To assess the nutritional status, prevalence of anemia, risk behavior and substance abuse among street children. **Material & Methods**: It was a street based cross-sectional study carried out on the streets of Hyderabad. Data on age, schooling, family history, reasons for street life, number of years on street etc was collected on pre-designed proforma. Anthropometric measurements such as height and weight were measured and history of substance abuse was obtained from all children, while sexual history was obtained from 12-18 years children. 20 µL finger prick blood sample was collected for hemoglobin estimation. Association was tested using chi square analyses. **Results:** A total of 305 children of 8-18 years of age were covered. The prevalence of thinness was 26% and that of anemia was 54% among street children. It was observed that about 42% of street children were involved in substance abuse and 14% in sexual risk behaviour. Risk of substance abuse was higher among children staying in railway premises, on street for more than 5 yrs and working in hotels. Sexual involvement was more prevalent among children living in railway or bus station premises and among those living on street for >5 years. **Conclusion:** Prevalence of anemia was high among street children. The risk of substance abuse and sexual risk behavior was significantly associated with place and duration of stay on the streets.

Key Words

Street children; Anemia; Nutritional status; Smoking; Substance abuse; Risk behavior

Introduction

Street children constitute a marginalized population in most urban centers of the world. Estimation of the exact number of street children in urban areas is difficult and also the magnitude of problems they experience. The United Nations estimated that the population of street children in the world is around 100 million, which is constantly increasing in number (1).

UNICEF has defined a street child as, "any girl or boy, for whom the street has become his or her habitual abode and/or source of livelihood; and who is inadequately protected, supervised, or directed by responsible adults" (2).

Street children are of two types: Children of the street are those who live in the streets, the street is their home, while children on the street are children who spent one afternoon or morning, or at least one day per week in the street (3).

There is no reliable data regarding the exact number of street children in India because of their floating (moving often) nature. However, Indian embassy has estimated that there are 314,700 street children in metros such as Bombay, Calcutta, Madras, Kanpur,

Bangalore and Hyderabad and around 100,000 in Delhi (4).

The street children are defenseless victims of brutal violence, sexual exploitation, neglect, drug addiction and human rights violations (5). Street children are not only underweight, but their growth has often been stunted, many suffering from chronic diseases like Vitamin A deficiency, TB, leprosy, typhoid, malaria, and systemic diseases, because of poor hygiene (6).

A host of complex circumstances usually leads youth to migrate to the street, sometimes for away from their homes (7). The important reason for street life is familial poor socioeconomic condition, forcing many children and youths to search for work on street in order to help their families earn money. Youths in street circumstances are often transient and perform unskilled jobs (8).

Street children often suffer from different forms of discrimination, further increasing social vulnerability, thus indulging in substance & drug use and sexual risk behavior making them more vulnerable to HIV/AIDS (8). Substance abuse is widespread among street children. The most common substances used by street children in are inhalants, alcohol, marijuana, cocaine, coca paste, Valium and Rohypnol (1).

Substance abuse refers to the harmful or hazardous use of psychoactive substances, including alcohol and illicit drugs (9).

Hyderabad is one of the fastest growing metropolitan cities in India. However no systematic studies are carried out to study nutritional and health status among them.

Aims & Objectives

To assess nutritional status and prevalence of anemia among street children

To assess substance abuse and risk behavior among street children

Material and Methods

Study design & setting: It was a street based cross-sectional study, carried out on the streets of twin cities of Hyderabad and Secunderabad, Andhra Pradesh using convenience sampling method. The study period was 1 year (data collection 6 months) duration.

Sample size: Assuming 60% prevalence of underweight, 95% confidence interval and 6% absolute precision, about 256=300 children were covered.

Selection of subjects: Street children are mostly observed in the premises of railway station, bus stand, public parks, market areas and on streets of urban areas. These sites were first identified with the help of people working with street children. These sites were visited for confirmation and updated. These sites were visited 3 to 4 times during the study as all the children were not available at a time. These children were contacted directly by the team and were explained about the purpose of the study. If the child is willing to give information, were included in the study and complete information about him and his family was obtained on pretested proforma. **Inclusion criteria:** Children between 8-18 years of age, living on the streets of greater Hyderabad Municipal Corporation (GHMC) areas of Hyderabad & Secunderabad, and Children who have minimal (once in a while) or no contacts with family**. Exclusion criteria:** Children who had family and spending some time on the streets for earning of money**. Ethical clearance:** Ethical clearance was obtained from Institutional Ethical Review Committee, National Institute of Nutrition (NIN), Hyderabad and also from Scientific Advisory Committee of NIN. Written informed consent was obtained from the subjects. **Data collection**: Data was collected by a team consisting of Medical doctor, technician and one technical assistant from the Institute. Information was obtained from all the selected children about their education status, family demographic particulars, place of stay, duration of stay on the street, and reasons for street life. Information was also obtained on substance and drug abuse, its reasons and risk behaviour such as having sex with prostitute or other street girl or with peers. Age was obtained from the children by asking indirect question such as years of schooling, number of years on street, age when came on street etc. most of the children were literate, hence no problem in age determination. Anthropometric measurement such as height and weight was carried out. Height (cm) was measured with anthropometer rod without shoe/chappal, in standing position with a accuracy of 0.1 cm, while weight (kg) was measured with SECA weighing scale with minimal clothes and without shoe with a accuracy of 100 gm using standard procedure (10). History of substance and drug abuse for all children and their involvement in risk behaviour such as indulgence in sexual activity was obtained only for ≥12 years children.

A finger-prick blood sample of 20 µL was collected using a fixed volume Finn pipette, and transferred into a test tube containing 5mL of Drabkin's solution. The hemoglobin (Hb) concentration in the finger prick blood sample was estimated by the cyanmethemoglobin method using a colorimeter (11). The criteria recommended by WHO (2001) were used to diagnose anemia among children (12). Blood for hemoglobin estimation was collected from 250 children. **Data Analysis**: The data collected was scrutinized and entered into the computer, analysis was be carried out by using SPSS Windows version 17.0. Descriptive analysis such as mean standard deviation, and proportions was done. Chi square test was used to study association between risk behaviour with independent variables such as age, education, place of stay, duration of street life, substance abuse such as smoking, alcohol and others. Logistic regression analysis was carried out using risk behavior as dependant variable and age, education, place of stay, type of work and duration of street life as independent variables.

Nutritional status was assessed by using WHO 2006 standards [13], using Z scores (WHO reference values. BMI Z-score value less than -2SD was considered as thinness. For anemia, Hb level of <11.5 g/dl for <12 yrs children, for 12-14 yrs children, Hb level of <12 g/dl, for ≥14 yrs children, Hb level of <13 g/dl was used (12).

Results

A total of 305 children were covered, age ranging from 8-18 years. Mean age of the children was 14.5 years (SD 2.4 yrs). About two thirds (69.8%) of the children were 14-18 years of age. Majority (75.7%) belongs to Hindu religion. About one forth (25.9%) were illiterate and only 18% were educated 8-10th standard. About 29% each were staying either in the premises of railway station or on the street (Table 1).

Prevalence of undernutrition

The overall prevalence of thinness (Median-2SD) was about 26% and was higher among 13-18 years (28.2%) as compared to 8-12 years children (19.6%) (Figure 1). The overall prevalence of stunting (Median-2SD) was 48% and was higher among <10 years (54.5%) and ≥ 14 years children (51.2%) as compared to 10-13 years children (37%).

Prevalence of Anemia: The overall prevalence of anemia was 54% and was higher among 8-11 years children (60.5%) and ≥ 14 years children (55%) as compared with 12-14 years children (47%) (Figure 2)

Substance abuse: It was observed that about 42% children were involved in substance abuse, 24% were smokers, 17% children (12-18 yrs) were consuming alcohol, 18% were using gutka, 35% were using tobacco in any form, such as chewing, smoking, while 10.5% were using ganja and 5% were inhaling whitener.

Association between different socio demographic particulars and involvement in sexual activity

It was observed that involvement in sexual activity was significantly ($p<0.05$) higher among children ≥15 years as compared to 12-14 years children. Indulgence in sexual activity was more among educated as compared to illiterate children, although not significant. Indulgence in sexual activity was associated with place of stay, duration of street life, among tobacco and ganja smokers and those consuming alcohol were (Table 2).

Association between substance abuse with different variables: It was observed that smoking was significantly associated with age, place of stay, duration of stay and type of work. Prevalence of smoking was 32% among ≥15 years children as compared to 8-14 year children. Similarly the prevalence of smoking was higher among children staying in the premises of railway station/bus stop (34%) as compared to those living in other places.

Alcohol consumption was observed to be significantly associated with age group, duration of street life and type of work they, while ganja smoking was significantly associated with age, place of stay and duration of street life (Table 3).

Regression analysis for risk behavior with different variables: Risk behavior (having unprotected sex and engaged in sex) was 6 times higher (OR 6.01, 1.38-26.10) among children living on street for more than 5 years, 5 times higher (OR 5.19, 1.94-14.06) among smokers and 3 times higher (OR 2.85, 1.04-7.83) among those consuming alcohol (Table 4).

The risk of smoking was significantly ($p<0.01$) higher among children more than14 years of age (OR 3.55, 1.55-8.02), children staying on railway premises (OR 6.54, 2.76-15.39) and on street (OR 3.45, 1.46-8.17) as compared to children living with other places such as accommodation provided by employer. The risk was also higher among children working in hotels (OR 8.15, 2.45-27.04) as compared to those not working.

Alcohol consumption was observed to be significantly associated with age. The risk was higher (OR 4.3, CI=1.60-11.67) among older children (≥15

yrs) as compared to younger children (12-14 yrs). The risk was 9 times more (OR 9.5, 2.77-32.27) among children who were staying on streets for more than 5 yrs as compared to < 1 yr duration.

The risk of ganja smoking was significantly (p<0.01) higher among children more than14 years of age (OR 7.84, 1.79-34.26), and children living in railway/bus stand premises (OR 5.99, 1.61-22.31). The risk of ganja smoking was 6 times higher (OR 5.88, 1.39-24.77) among children who were staying on streets for more than 5 yrs as compared to < 1 yr duration (Table 5).

Discussion

This is the first kind of study carried out by NIN systematically with adequate sample size. Very few studies have been carried out to assess nutritional status of street children. The present study reported that the maximum number of street children was in the age group of 10-18 years which is similar to other study (14,15). The study reported 26% prevalence of thinness, which is lower as compared to other studies. The study by Das *et al* (2008) in urban slum reported 38% prevalence of thinness among adolescent boys (16), while another study reported 43% prevalence of underweight and 80% stunting among street children in Badung, West Java (17).

The current prevalence of anemia was high compared to other studies (17). A study by Patriasih among street children of >12 years in West Jawa reported 23% prevalence of anemia (17).

Our study reported lower prevalence of smoking, alcohol consumption and ganja smoking. Previous studies carried out in Mumbai observed high rates of smoking among street children (13,18,19). The study by Naik *et al* (2011) reported that 37% were smokers, 24% were consuming alcohol and 25% were smoking Ganja/charas etc (14). The high rates of substance abuse reported in this study may be because denominator in calculating the rates of smoking, alcohol and Ganja smoking was children who were involved in substance abuse and not the total number of children studied. Malhotra *et al* (2007) in their study observed that 38% of street children were smokers, while 58% were using tobacco in other form (20). Another study by Pagare *et al* (2004) among street children in Delhi reported 22% street children were consuming alcohol, while 57% were indulged in substance use (5).

The prevalence of substance abuse observed in this study is lower than that reported by others among street children (21,22). Peer pressure was an important reason for substance abuse among street children.

Regression analysis showed that sexual indulgence was associated with smoking, alcohol consumption and ganja smoking, the risk of smoking was significantly associated with place of stay and type of work the street children were doing, while the risk of alcohol consumption and ganja smoking was associated with duration of street life.

Study carried out in Filipino among street children observed that the risk for smoking was 2 times higher, 1.3 times for alcohol use and 5.5 times for drug use among street children as compared to non-street children (23).

It was observed that the risk of involvement in unprotected sexual activity was more in children more than 14 years of age and also among children who spend more than 5 years on street. Similar findings were also observed by other authors (7).

Conclusion

Although undernutrition was observed among 26% of street children, the prevalence of anemia and substance abuse was high (54% & 42% respectively). Substance abuse was observed high among children living >5 years on street and staying in railway premises, while involvement in unprotected sex was observed high among smokers, consuming alcohol and spends >5 years on street. The most important reason as stated by the street children for being on the street was to earn money for self and family as they were socioeconomically poor. So, ensuring the employment opportunities at local level is necessary in order to prevent migration from villages to cities. Also act on 'Cigarettes and other tobacco products (Prohibition of advertisement and regulation of trade & commerce, Production, Supply and Distribution) Act, 2003, which restrict sale of these products to minors needs to be strengthened.

Recommendation

Government and Non-Government Organization working for street children should be sensitized to cover these children through child centered approach to prevent substance and drug abuse and to prevent undernutrition and anemia by providing proper care to them.

Limitation of the study

Most of the information was obtained from the children, hence there is chances of recall bias, also

history about sexual involvement and substance abuse was based on their responses, hence cannot claim proper information may be given or not, but the authors tried their best to collect the information.

Relevance of the study

No systematic study on prevalence of undernutrition and anemia is available for street children in India. As undernutrition and anemia are important problem among these children. Also substance abuse and risk behavior is high among them as they are at risk of contracting sexually transmitted infections, which is serious concern. This study focuses on these issues among street children which will help local authorities and NGOs to take corrective steps to prevent these problems among street children

Authors Contribution

All the authors were involved in data collection. Author 3 collected blood samples and analyze it for hemoglobin estimation. Author 1 drafted the manuscript and was involved in writing study proposal, design of study, carrying out survey and analyses of data.

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Tables

TABLE 1 PARTICULAR OF STREET CHILDREN

Particulars	N (%)
Age groups (yrs)	
8-9	11 (3.6)
10-13	81 (26.6)
14-18	213 (69.8)
Mean age	14.5
Education	
Illiterate	79 (25.9)
1-4th class	83 (27.2)
5-7th class	88 (28.9)
8-10th class	55 (18.0)
Place of stay	
Street	88 (28.9)
Near public park	32 (10.5)
Railway station	88 (28.9)
Bus station	15 (4.9)
Others	82 (26.9)
Duration of stay on street	
<1 yr	153 (50.2)
1yr -<5 yrs	133 (43.6)
>5 yrs	19 (6.2)

TABLE 2 ASSOCIATIONS BETWEEN SEXUAL ACTIVITIES WITH DIFFERENT VARIABLES

Particulars	Involvement in Sexual activity			
Age groups (yrs)	N (%)	Yes	No	$\chi 2$, p value
12-14	87 (32.8)	5.8	94.2	4.76, 0.03
≥15	178 (67.2)	15.2	84.8	
Education				
Illiterate	69 (26.0)	11.6	88.4	0.40, 0.81
1-7th class	141 (53.2)	11.3	88.7	
8-10th class	55 (20.8)	14.5	85.5	
Place of stay				
Street / public park	101 (38.1)	8.9	91.1	5.9, 0.05
Railway/ Bus station	83 (31.3)	19.3	80.7	
Others	81 (30.6)	8.6	91.4	
Duration of stay				
<1 yr	130 (49.1)	4.6	95.4	18.1, 0.001
1yr -<5 yrs	118 (44.5)	16.9	83.1	
>5 yrs	17 (6.4)	35.3	64.7	
Smoking				
Yes	72 (27.2)	31.9	68.1	36.7, 0.001
No	193 (72.8)	4.7	95.3	
Alcohol consumption				
Yes	44 (16.6)	40.9	59.1	41.3, 0.001
No	221 (83.4)	6.3	93.7	

Ganja smoking				
Yes	11 (4.1)	72.7	27.3	39.7, 0.001
No	254 (95.9)	9.4	90.6	
Type of work				
No work	40 (15.1)	0.0	100	7.27, 0.12
Rag pickers	32 (12.1)	15.6	84.4	
Labours	35 (13.2)	17.1	82.9	
Waiters in hotels	69 (26.0)	11.6	88.4	
Others	89 (33.6)	14.6	85.4	

TABLE 3 ASSOCIATIONS BETWEEN SUBSTANCE ABUSE WITH DIFFERENT VARIABLES

Particulars		Substance abuse (%)		
Age groups (yrs)	N (%)	Smoking	Alcohol	Ganja smoking
• **8-14**	127 (41.6)	11.9	4.0	3.2
• **15-18**	178 (58.4)	32.4	21.8	15.6
• **Pooled**	305 (100)	23.9	14.4	10.5
$\varkappa$2, p value		17.0, 0.001	19.0, 0.001	12.2, 0.002
Education				
• Illiterate	79 (25.9)	20.3	13.9	8.9
• 1-7th class	171 (56.1)	23.4	11.7	9.9
• 8-10th class	55 (18.0)	32.7	23.6	14.5
$\varkappa$2, p value		2.9, 0.23	4.8, 0.08	1.24, 0.53
Place of stay				
• Street / public park	120 (39.3)	24.2	15.8	11.7
• Railway/ Bus station	103 (33.8)	34.0	16.5	14.6
• Others	82 (26.9)	12.2	9.8	3.7
$\varkappa$2, p value		11.79, 0.003	2.0, 0.36	6.07, 0.04
Duration of stay				
• **1 month-1 yr**	153 (50.2)	19.0	5.2	3.9
• **1yr -<5 yrs**	133 (43.6)	27.1	21.8	16.5
• **>5 yrs**	19 (6.2)	42.1	36.8	21.1
• **$\varkappa$2, p value**		6.55, 0.03	24.1, 0.001	14.47, 0.001
Type of work				
• Labours	35 (11.5)	14.3	14.3	11.4
• Waiters in hotels	71 (23.3)	43.7	15.5	12.7
• Rag pickers	42 (13.8)	19.0	21.4	11.9
• Others	102 (33.4)	25.5	17.6	12.7
• No work	55 (18.0)	7.3	1.8	1.8
$\varkappa$2, p value		25.78, 0.001	9.67, 0.04	5.4, 0.24

TABLE 4 LOGISTIC REGRESSION ANALYSIS FOR SEXUAL INDULGENCE AMONG STREET CHILDREN

Particulars	Involvement in sexual activity	
	OR	CI
Duration of stay		
<1 yr	1.0	
1yr -<5 yrs	2.93	1.03-8.22
>5 yrs	6.01	1.38-26.10
Smoking		
Yes	5.19	1.91-14.06
No	1.0	
Alcohol consumption		
Yes	2.85	1.04-7.83
No	1.0	

TABLE 5 LOGISTIC REGRESSION ANALYSES FOR SUBSTANCE ABUSE AMONG STREET CHILDREN

Particulars	Substance abuse (OR , CI)		
	Smoking	Alcohol consumption	Ganja smoking
Age groups (yrs)			
12-14	1.0	1.0	1.0
≥15	3.55, 1.55-8.02**	4.32, 1.60-11.67**	7.84, 1.79-34.26**
Place of stay			
Street /Near public park	3.45, 1.46-8.17**	-	3.71, 1.00--13.80
Railway/ Bus station	6.54, 2.76-15.39**	-	5.99, 1.61-22.31
Others	1.0	-	1.0
Duration of stay			
1 month-1 yr	-	1.0	1.0
1yr -<5 yrs	-	5.0, 2.15-11.60**	4.81, 1.82-12.73**
>5 yrs	-	9.46, 2.77-32.27**	5.88, 1.39-24.77**
Type of work			
Labours	1.92, 0.44-8.32	-	-
Waiters in hotels	8.15, 2.45-27.04**	-	-
Rag pickers	3.62, 0.92-14.31	-	-
Others	5.04, 1.56-16.28**	-	-
No work	1.0		

Figures

FIGURE 1 PREVALENCE (%) OF UNDERNUTRITION AMONG 8-18 YRS STREET CHILDREN-USING BMI AGE & SEX SPECIFIC CENTILES-WHO STANDARDS

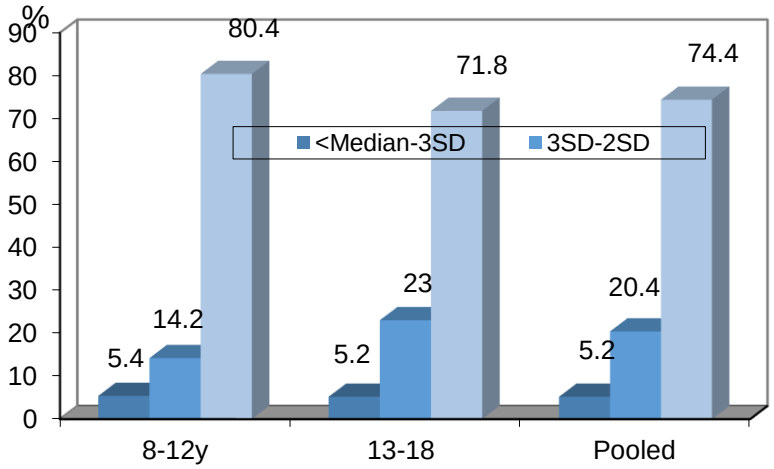

FIGURE 2 PREVALENCE (%) OF ANAEMIA AMONG 8-18 YRS STREET CHILDREN-WHO STANDARDS