

## STREET CHILDREN IN BENIN CITY, NIGERIA: NUTRITIONAL STATUS, PHYSICAL CHARACTERISTICS AND THEIR DETERMINANTS.

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### SUMMARY

Street living/ working has damning consequences on children as it happens at crucial life stages, impeding development, education and acquisition of skills that are invaluable to adult lives. It compromises their health and socio economic potentials. Among its health consequences are malnutrition and impaired physical growth. Being relatively alien and new in African traditional culture its effects on nutrition and physical growth have not been adequately documented. The study therefore sought to evaluate the nutritional status and growth characteristics of street children found in Benin City, Edo State.

The prospective, descriptive, cross sectional study involved all street children aged 10- 17 years found in 19 markets and 30 motor parks located in the three urban Local Government Areas in Benin City. Following assenting, children were recruited into the study. A structured proforma was used to obtain biodata and nutritional history from each subject following preliminary visits. Physical examination and anthropometric assessment were then carried out. Weight for age, height for age and BMI stratification were done in accordance with WHO recommendations

A total of 225 each of street children and age/sex matched controls (84 (37.3%) males and 141(62.7%) females) were enrolled in the study. The mean (range) age for the respondents was  $13.14 \pm 1.75$  (10-17 years). Modal age bracket in the two groups was 13-15 years. One hundred (42.2%) of 221 subjects had just a meal/day. Significantly more subjects (46 or 20.4%) compared to controls (6 or 2.7%) were stunted ( $\chi^2 = 35.53$ ;  $p=0.001$ ). More male subjects compared to females were significantly stunted (27.4% vs 16.3%;  $\chi^2 = 8.11$ ,  $p=0.02$ ). More subjects (40 or 17.8%) than controls (three or 1.3%) were underweight ( $\chi^2 = 35.12$ ;  $p=0.001$ ). Significantly more subjects compared to controls were thin (10.2% vs 0.04%;  $\chi^2 = 21.30$ ;  $p=0.001$  and severely thin (3.1% vs 0.4%;  $\chi^2 = 4.58$ ;  $p=0.003$ ). Mean BMI of male and female subjects were also significantly lower than values in controls ( $t= 2.39$ ;  $p=0.019$ ;  $t=7.77$ ,  $p=0.0001$ ). The prevalence of underweight, stunting, thinness and severe thinness were independent of the duration of stay in the street. Bus conductors (46.2%) and beggars (45.9%) were more prone to stunting. Beggars were also more likely to be underweight (43.2%) and have low BMI (24.3%). Over 40.0% of subjects had sibling(s) who were also street children. School dropout was more prevalent in older adolescents (38.0%).

Undernutrition is rampant among adolescent street children in Benin City. Those in similar climes in Nigeria may suffer same fate. Public health measures to reduce incidence of street children would have added benefit of causing a reduction in the prevalence of adolescent malnutrition in Nigeria.

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## **INTRODUCTION**

Street children are persons less than 18 years of age for whom the street has become home and/ or their source of livelihood.<sup>1</sup> For such children, street activities/ trade or street living are of paramount importance to survival. The concept includes street-living children who live and sleep in public places as well as street-working children who work on the streets during the day, returning to their family homes to sleep at night. Innate abilities of affected children are compromised as street activities occur at crucial preparatory phase for independent, productive living as adults. It is a harbinger of poverty which it perpetuates in adulthood. It comes with child right abuses and violations as occur in many African countries.<sup>2</sup>

Due to lack of adult supervision and intense energy expenditure, street children are subjected to psychosocial and health problems including accidents, sexual abuse, low self esteem, illicit drug use, poor educational achievements and malnutrition. The intricate interplay of these problems further intensifies the severity of each individual problem and gives rise to a cascade of consequences including poor physical growth and nutritional status. In Nigeria, rural-urban migration, urban poverty, difficult living conditions and unstable families have led to the growing problem of working children and street children.<sup>3</sup> Other promoters include absence of dedicated programmes meant to protect, promote and enforce rights of children.

Childhood malnutrition is particularly worrisome because it has been internationally accepted as a reliable indicator of standard of living of a given population.<sup>4</sup> Effects of malnutrition include impaired growth and cognition.<sup>5</sup> Others are behavioural problems, violence and antisocial behaviours. Malnutrition creates and maintains poverty, which further hampers economic and social development.<sup>6</sup> Rates of undernutrition amongst street children are high in some African countries.<sup>7,8</sup> Globally there are over 100 million street children: 40 million in Latin America, 30 million in Asia, 10 million in Africa and the

remaining 20 million in Europe, the United States, Canada and Australia.<sup>9,10</sup>

Among direct methods of assessment of nutritional status are anthropometry, clinical methods, dietary evaluation.<sup>11,12</sup> Anthropometry is commonly used in community based studies for groups of populations.<sup>7,13-16</sup> To interpret anthropometric data, growth reference standards are used. Data obtained in subjects can also be compared with values in age and sex-matched controls to allow for interpretation of results. This is particularly relevant due to the paucity of local reference data for Nigerian children.

Comparative studies on physical growth characteristics and nutrition on street children in Nigeria are sparse. This is against the backdrop of recent concerns about the upsurge in incidence of street children in Nigeria and the increasing cases of vices traceable to this group of persons. Regular screening for malnutrition in these vulnerable children is therefore justified as it could facilitate early detection of persons at risk and provide leverage for prompt intervention. Considering the public health significance of childhood malnutrition and the dearth of studies comparing the nutritional status of street children with that of “non-street” children in Nigeria, this study is essential in identifying the exact impact of street life on the physical growth and nutrition of children in the study locale.

## **SUBJECTS AND METHODS**

### **Study Location**

The study was carried out in the cosmopolitan city of Benin which is the Capital of Edo State, Nigeria. With a projected population growth rate of 2.7%, children aged 10 - <18 years would be 297,516 or 23.0% of the population of the State in 2013.<sup>17</sup> Benin City made up of three Local Government Areas (LGAs) (Oredo, Egor and Ikpoba-Okha) had a 2013 projected population of 1,309,711.<sup>17</sup>

### **Study type, locations and selection of participants**

The prospective, descriptive and cross-sectional study was carried out in all 19

markets and 30 motor parks in the City Street children are found mainly at such motor parks and market places and the adjoining streets. This is in deference to the pattern used in a similar study on street children in an African country.<sup>7</sup> The minimum sample size estimated using the formula for comparing two study populations and as previously described<sup>18</sup> was 138. Incorporation of non response rate of 10.0% meant a minimum of 152 subjects were required each for subjects and controls.

As the total number of eligible subjects was unknown a whole population sampling was adopted. This meant recruiting all persons who met the eligibility criteria from designated locations in Benin metropolis. Controls were school children recruited from public and private secondary schools in Benin metropolis using systematic random sampling method.

#### **Inclusion criteria for subjects and controls.**

Subjects were street children (including those on the street and children of the street) aged 10 and 17 years who gave assent for the study. For controls verbal assents as well as written consent were obtained respectively from pupils and their parents/guardians. Participation in the study was made entirely voluntary.

#### **Pre-study visits**

Recruitments were preceded by pre-study visits meant to explain essence of the study, seek maximum cooperation of stakeholders and identify examinations sites.

#### **Test instrument & interview.**

Pre tested, semi structured, researcher administered questionnaires served as test instrument while anthropometric measurements were recorded in a proforma. Whereas street children were interviewed between the hours of 9am and 6pm, all the days of the week (excluding Sundays), controls were at break. All eligible subjects were recruited. Twenty four hour recall of feeding pattern and feeds was utilised while double recruitment was avoided with the used of indelible ink to the left thumb nail.

#### **Anthropometry**

The weight and height of each child were measured using standard procedures. From the weight in grams and height in meters the body mass index of each child was derived using standard formula.<sup>19</sup> Measurements obtained were compared between the two study groups as well as with reference values for age and sex. Weight for age, height for age and BMI stratifications were done using the 2007 WHO Growth Standard Charts and the CDC charts for Children and Adolescents.<sup>20</sup>

#### **Data analysis**

Data collected was entered into Microsoft excel 2007 electronic spreadsheet and checked for accuracy to avoid multiple entries. SPSS version 16.0 was used for analysis. The data was segregated according to age, gender, tribe, form of "street child" and vocation. For continuous variables, mean, range and standard deviation were computed. Discrete variables were expressed in proportions. Associations were determined between indices of malnutrition on one hand and age, gender, tribe, vocation on the other. Chi-square statistical test of significance or Fishers Exact test as appropriate was used to test associations between qualitative variables. In all tests of significance, p values less than 0.05 was regarded as statistically significant.

## **RESULTS**

#### **Characteristics of the study population.**

A total of 225 each of street children and controls were recruited comprising 84 (37.3%) boys and 141 (62.7%) girls and giving a male: female ratio of 1:1.7. in each group.

#### **Age and gender distribution of the study population.**

Tables I shows the age and gender distribution of the study subjects. The mean ages of subjects was  $13.14 \pm 1.75$  years, (range: 10 to 17 years.) while the modal age bracket was 13-15 years for both subjects and controls. In both groups late adolescents were

least represented while early and middle adolescent groups constituted 80.0-90.0% of either group.

#### **Feeding pattern among street children:**

One hundred (42.2%) of the 221 subjects who gave information on feeding pattern had only a meal or two per day. One hundred and eight (48.9%) and 13 (5.9%) subjects had access to three and > three meals/day respectively. Dietary recall amongst 220 street children showed that 110 had access to protein rich diets with every meal. Forty four (20.0%), 47(21.4%), 6(2.7%) and 13(5.9%) children respectively had access to protein rich diets once or less daily, 2-3 times weekly, once weekly and less than once per week.

#### **Height for age of the study population.**

One hundred and seventy four street children (77.3%) had normal heights for age, 46 (20.4%) were stunted, while 5 (2.2%) had tall stature (Table II). Corresponding figures for controls were 212(94.2%), 6(2.7%) and 7(3.1%). Significantly more subjects 46(20.4%) were stunted compared to controls 6(2.7%) ( $\chi^2 = 35.53$ ,  $p = 0.001$ ). The five subjects with tall stature were all females.

#### **Weight for age grading of subjects and controls**

Among the 225 street children 184 (81.8%) had normal weight for age, 40 (17.8%) were underweight while only one (0.4%) was obese. On the other hand, 211 (93.8%) of the controls had normal weight for age, three (1.3%) were underweight while 11(4.9%) were obese. Significantly more street children were underweight compared to controls (17.8% vs 1.3%;  $\chi^2 = 35.12$ ;  $p = 0.001$ ), while normal weight and obesity were significantly more prevalent amongst controls, (81.8% vs 93.8%;  $\chi^2 = 15.10$ ;  $p = 0.001$  and 0.4% vs 4.9%;  $\chi^2 = 8.56$ ; 0.003 respectively). (Table III).

#### **Weight stratification of subjects and controls using body mass index.**

The weight stratification of street children and controls are as shown in Table IV. One hundred and sixty nine subjects (75.1%) compared to 173 (76.9%) controls had normal BMI. Significantly more controls were overweight compared to street children ( $p = 0.002$ ) while significantly more street children were thin and severely thin when compared with controls, ( $p = 0.001$  and  $p = 0.03$  respectively). Mean BMI for male and female street children were significantly lower than values in controls ( $t = 2.39$ ;  $p = 0.019$ ;  $t = 7.77$ ;  $p = 0.0001$ ).

#### **Effects of length of stay on the street and prevalence of growth deficits in street children**

Only 218 children gave details of the length of time they had spent working on the streets. Seventy seven (35.3%), 67 (30.7%) and 74 (33.9%) of the respondents had spent <1 year, 1 – 3 years and > 3 years respectively working in the streets. Twelve or 30.8%, 8 or 20.5% and 19 or 48.7% of the 39 subjects with underweight had spent <1 year, 1 – 3 years and > 3 years respectively working in the streets. Corresponding figures for 44 stunted subjects were 13 or 29.5%, 11 or 25.0% and 20 or 45.5%. The prevalence of underweight, stunting, and low BMI was independent of length of stay on the street.

#### **Effects of daily duration of street stay on prevalence of indices of under nutrition.**

Table V shows that 18 (36.7%), 19 (38.8%) and 13 (26.5%) of street children who spent > 8 hours in the street were underweight, stunted and thin/ severely thin respectively. Street children who spent fewer than 8 hours daily in the street had significantly less prevalence of the indices of undernutrition. ( $p = 0.002$ , 0.004 and 0.02 respectively).



**Nature of street work and prevalence of indices of under nutrition among street children**

The vocation of street children in relation to prevalence of indices of undernutrition is as shown in Table VI. Beggars were more prone to underweight (43.2%) and low BMI (24.3%) Another vocation associated with underweight and low BMI was working as bus conductor (15.4%). Bus conductors (46.2%), beggars (45.9%) and truck pushers (45.5%) were more prone to stunting.

**Meal frequency and prevalence of indices of under nutrition among street children**

Significant relationships existed between frequency of intake of meals and the prevalence of stunting ( $\chi^2 = 9.45$ ;  $p = 0.02$ ) among 221 street children. There were 4 non-respondents for this analysis.

**Family clustering of street children and school dropout rate.**

Family clustering of street children was observed in 94(42.9%) of 219 subjects with the information. Such subjects had one or more siblings who were also street child/children. Six subjects withheld information in this regard. School dropout rate was virtually nonexistent among early adolescents. In mid and late adolescent periods however, dropout rate ranged from 18.0-38.0% with highest rate among children aged 17 years.

**Table I: Age and gender distribution of study participants.**

Age bracket (years)	Street children n (%)		Controls n (%)	
	Male	Female	Male	Female
10-12	32 (38.1)	64 (45.4)	33 (39.3)	65 (46.1)
13-15	40 (47.6)	64 (45.4)	42 (50.0)	62 (44.0)
≥16	12 (14.3)	13 (9.2)	9 (10.7)	14 (9.9)
Total	84 (100.0)	141 (100.0)	84 (100.0)	141 (100.0)

**Table II. Height for age grading of the study subjects and controls**

Height for age grading	Subjects n (%)	Controls n (%)	$\chi^2$	p value
Tall stature	5 (2.2)	6 (2.7)	0.09	0.76
Normal	174 (77.3)	212 (94.2)	26.30	0.001*
Stunted	46 (20.4)	7 (3.1)	35.53	0.001*
Total	225 (100.0)	225 (100.0)		

**Table III: Weight for age grading of subjects and controls.**

<b>Weight for age Grading</b>	<b>Subjects n (%)</b>	<b>Controls n (%)</b>	$\chi^2$	<b>p value</b>
Obese	01 (0.4)	11(4.9)	8.56	0.003*
Normal	184 (81.8)	211(93.8)	15.10	0.001*
Underweight	40 (17.8)	3 (1.3)	35.12	0.001*

**Table IV: Weight stratification of street children and controls using BMI.**

<b>Weight Stratification</b>	<b>Subjects n (%)</b>	<b>Controls n (%)</b>	$\chi^2$	<b>p value</b>
Obese	7 (3.1)	9 (4.0)	0.26	0.610
Overweight	19 (8.4)	41 (18.2)	9.31	0.002*
Normal	169 (75.1)	173 (76.9)	0.20	0.660
Thinness	23 (10.2)	1 (0.4)	21.30	0.001*
Severe thinness	7 (3.1)	1 (0.4)	4.58	0.030*
<b>Total</b>	<b>225 (100.0)</b>	<b>225 (100.0)</b>		

\*= statistically significant.

**Table V: Daily duration of street stay and prevalence of indices of under nutrition**

<b>Indices of Under nutrition</b>	<b>&lt; 3/d n=8 (%)</b>	<b>3 - 5 hrs/d n = 156 (%)</b>	<b>6 - 8 hrs/d n=9(%)</b>	<b>&gt; 8 hrs/d n=49(%)</b>	<b>p-value<sup>+</sup></b>	<b>OR (95% C.I.)</b>
Underweight	0 (0.0)	20 (12.8)	1 (11.1)	18 (36.7)	0.002*	0.40(0.21 - 0.77)
Stunted	1 (12.5)	23 (14.7)	1 (11.1)	19 (38.8)	0.004*	0.38(0.20 - 0.76)
Low BMI	0 (0.0)	15 (9.6)	1 (11.1)	13 (26.5)	0.02*	0.46(0.22 - 0.96)

\*statistically significant; <sup>+</sup> Fishers exact test

Table VI: Nature of street work and prevalence of indices of under nutrition among street children

Indices of Under nutrition	Vocation					p-value <sup>+</sup>	OR (95%C.I.)
	Trading(%)	Hawking(%)	Truck pushing(%)	Bus Conductor(%)	Begging(%)		
Underweight	7 (12.7)	14 (13.1)	1(9.1)	2 (15.4)	15 (40.5)	0.005 <sup>*</sup>	0.44 (0.25 –0.81)
Stunted	4 (7.3)	14 (13.1)	5 (45.5)	6 (46.2)	15 (40.5)	0.0001 <sup>*</sup>	0.25(0.15 –0.44)
Low BMI	6 (10.9)	13 (12.1)	0 (0.0)	2 (15.4)	8 (21.6)	0.21	0.66(0.36 – 1.12)

\* statistically significant ; <sup>+</sup> Fishers exact test . Scavengers =0%

Table VII: Meal frequency and prevalence of indices of under nutrition among street

Indices of Under nutrition	Number of meals per day (%)				p-value <sup>+</sup>	OR (95%C.I.)
	1	2	3	>3		
Underweight	9 (25.7)	13 (20.0)	17 (15.7)	0 (0.0)	0.07	0.32(0.27– 1.15)
Stunted	11 (31.4)	17 (26.2)	13 (12.0)	3 (23.1)	0.02 <sup>*</sup>	0.57(0.33–0.98)
Low BMI	4 (11.4)	9 (13.8)	15 (13.9)	1 (8.3)	0.88	1.03(0.56 –1.95)

statistically significant; <sup>+</sup> Fishers exact tes

## DISCUSSION

In the study poor physical growth characteristics were demonstrated among street children compared to their control counterparts. This is evidenced by the significantly higher prevalence of underweight, stunting, thinness and severe thinness among street children. Furthermore, there was a higher prevalence of stunting among male street children compared to females. Whereas underweight, thinness and severe thinness are reflective of acute undernutrition stunting is indicative of long standing undernutrition. Thus, both acute and chronic undernutrition were prevalent among street children perhaps, a clear indication that they were nutritionally disadvantaged compared to other children of the same age and gender who lived in the same locality but did not engage in any form of street activity.

The poor physical growth of the street children in the present study may be partly or

wholly connected with their street work and the peculiarities of street life. This can readily be explained by the fact that street work requires physical energy which in turn places increased demand for calories on the body in order to maintain optimal growth and nutrition in growing children. Where the energy expenditure persistently exceeds intake, a mismatch occurs which leads to growth faltering. Sebanjo and Oshikoya<sup>14</sup> in Abeokuta had noted higher prevalence of underweight among physically active children in their study on school children aged 5 to 19 years. They attributed this to a negative balance between the energy expended on exercises and energy intake and thus recommended caution when giving advice/suggestions on physical activity to adolescents in order to ensure the promotion of appropriate energy balance and adequate nutritional status. The same reason can readily account for the observation of a

significantly higher prevalence of stunting among male street children compared to females. Virtually all truck pushers and bus conductors in the present study were males. Such energy-sapping physical activities on the long term could cause chronic calorie deficit as implied by stunting.

To buttress this assertion, it was further observed that the number of hours street children spent working on daily basis was a determinant of their poor physical growth indices. Underweight, stunting and low BMI were most prevalent among the street children who spent long hours (over 8 hours) daily in the streets. Also of note is the observed negative effects prolonged stay or cumulative number of years in the street had on physical growth characteristics of street children. Though not statistically significant, indices of malnutrition were more prevalent among children who had spent over 3 years working in the streets.

Another factor that significantly determined growth parameters of street children was the nature of vocation. Poor growth characteristics were more prevalent among beggars and bus conductors in comparison with other vocations. This observation could be explained by the fact that begging and serving as conductors in buses are very energy demanding vocations, as they often require the children to move speedily and actively from place to place. In addition to this, an integral part of the bus conductor's job is lifting/ carrying of heavy luggage and this in itself could be energy demanding. The beggars on the other hand, likely to be among the "poorest of the poor", were unlikely to afford regular meals and would probably live under more austere conditions compared to other street children. These factors cause persistent energy supply and demand mismatch that could find expression in poor physical growth indices as seen among bus conductors and beggars in comparison with other street children. Our observations are in keeping with the report of

the Nigerian Child Labour Survey which identified begging as one of the worst forms of child labour.<sup>21</sup>

It is further noted that eating less than three meals per day and infrequent consumption of animal protein were contributors to poor growth of street children. Our findings showed that the average street child was plagued by food insecurity as almost half (49.3%) of them had access to fewer than three meals per day. In addition, it may be conjectured that the meals would be of low qualities. Foods of poor nutritive value and inadequate quantity expose the growing child to macro and micronutrient deficiencies and also cause impaired growth/poor physical and mental health.<sup>22-24</sup> This study did not have as part of her objectives the assessment for micronutrient deficiencies. Chances are that they would be highly prevalent among street children.

A striking observation in the present study is the fact that almost half of the street children had one or more siblings also engaged in street work. This perhaps may suggest that street work was becoming a norm in some Nigerian families and further gives credence to the report that child labour is a survival strategy in Nigeria.<sup>25</sup> This observation is particularly worrisome considering the immense loss of human potential so early in life which eventually translates to huge losses in human and economic resources later in the life of the individuals and the entire community. Such economic losses arise from frequent exposure to accidents and diseases as well as poor educational attainment. The hope of sustainable economic development of a given community can be marred when a major force of its youths is lost so early to the prospects of sound education and a healthy productive life through the ills of street childhood.

In conclusion, the present study observed the adverse effects that street activity/ life had on the overall wellbeing of the child especially with respect to their nutritional status. It also identified the factors that are associated with poor nutritional status



of street children as: male gender, inadequate quantity/qualities of meals, working long hours a day, begging and being a bus conductor. The study also noted that street activity/street life are not likely transient events in Benin City, with street children often engaging in such activities for several years, with almost half of such children having sibling(s) also engaged in street work. The findings of this study thus buttress the fact that the street child in Benin City, Edo State, like other street children all over the world are excluded, vulnerable and in especially difficult circumstances. The attainment of millennium development goals in Nigeria could be jeopardised by the advent and perpetration of street children. Concerted efforts should therefore be made in curbing the street child phenomenon in the Country.

Measures to improve the welfare of the child should be put in place. These may entail strengthening existing laws/conventions on child right protection, child labour and abuse and guaranteeing rights of children to education.

### **Limitations**

We acknowledge that all eligible children in Benin City may not have been recruited, granted that such individuals are highly mobile and their conditions stigmatising. In such scenarios the true burden of the condition may have been underestimated.

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