Anemia among Homeless (street) Children in Khartoum State- Sudan

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Abstract

Introduction: Every street child has a reason for being in the street; usually Street children are the casualties of economic growth, war, poverty, loss of traditional value, domestic violence, physical and mental abuse. Moreover, there are many children are lured by the promise of excitement and freedom. They are susceptible to many diseases such as anemia, malaria and opportunistic infection.

 Purpose: The study aims to investigate the occurrence of anaemia among homeless street children. **Materials and Methods:** In this comparative community-based study, two groups of children from Khartoum State (n = 100) were randomly selected to participate, the homeless (street) children (n= 50) and resident children in Sudanese governmental rehabilitation center (Tayba Rehabilitation Center (TRC)) (n =50). All children were clinically examined for anemia. Venous blood samples were collected from all participants and complete blood count (CBC) for all samples were performed and analyzed by Sysmex Haematological analyzer. In addition to that peripheral blood picture were examined for each sample using light microscope (×100 oil immersion lens) **Discussion and Major Findings:** the study showed statistically significant difference ($p < 0.05$) with regard to reduction in their haemoglobin percentage (HGB %) and anemic children by Packed Cell Volume (PCV) in the resident children of Tayba Rehabilitation Center (TRC) (58% and 80%) and the homeless (street) children (76% and 94%) respectively. **Conclusion:** Children are the first victims of war; displacement, malnutrition, and poverty were found to be the main cause for many diseases, such as anaemia which almost equally distributed among the subjects of the two groups regardless of their life style. The study recommends the governmental and nongovernmental organization to cater for those children through provision of food, shelter and medical care. Also, the researcher recommends further study with larger sample size to be conducted to examine the different types of anemia prevalent among street children.

Introduction and Literature Review

Introduction:

Street children are the casualties of economic growth, war, poverty, loss of traditional values, domestic violence, physical and mental abuse. Every street child has a strong reason for being in the street. While some children are lured by the promise of excitement and freedom, the majority are pushed to the street by desperation and realization that they have nowhere else to go. In many countries, street children are named after their main survival activities, for example, **street gangs** (Stuttgart), **juvenile prostitutes** (Stuttgart, Manila). What is obvious is that street children are poverty-stricken and their needs and problems are result of wanting to meet the basic needs for survival. Street children go through the struggle of providing themselves with basic things such as food, shelter, health and clothing. Providing targeted interventions that meet the needs of the street children requires an understanding of who they are, what they need, what they do and how they can be identified (WHO, 2000).

Homeless (street) Child:

The term homeless child is used for a "child who has no home and who has been rejected by the society". The phenomenon does exist all around the world, but in Sudan it was evident during the seventies and in the eighties of the last century (Elhadary *et. al.,* 2012).

In 1983, a law of juvenile was issued along with a regulation in 1991 to regulate care and residence of homeless children. According to the law, a homeless child is defined as a child who lives in the street and refuses homecare, who has no job and no economic source to support him. He depends on begging and sometimes on illegal and non-ethical acts such as crimes (Ali, 2010).

The Department of homeless children in Khartoum state has divided homeless children into four categories according to the findings of a study conducted in 1987- 1988 on homeless children namely:

- A child who deserted his family and run away.
- An expelled child whether by his family or as a result of some other factors such as war or natural disasters.
- A homeless child (foundling).
- A child who has been forced out to work due to difficult economic conditions

A homeless child is "a child whose age is below 18 years old and who lives outside his home and depends on begging to subsist or on legal and illegal jobs or on donation of voluntary organizations" (Elhadary *et. al.,* 2012).

Civil war in South Sudan and Darfur led to different political, socio-economic consequences. Insecurity and health problems were the major impacts. All these factors contributed to the enlarged numbers of homeless children in Khartoum state, a very difficult problem to deal with.

Anaemia

Definition:

It is the hemoglobin concentration in blood of less than 13.5g\dl in adult males and less than 11.5g\dl in adult females (In neonates less than 15.0g\dl). Other definition: anaemia refers to decrease in the total number of circulating red cells, a decrease in the hemoglobin concentration, or decrease in the haematocrit (PCV) when compared with a normal group (Hoffbrand *et. al.,* 2001).

Symptoms:

Shortness of breath (particularly on exercise), weakness, lethargy, palpitation and headache are the major symptoms. In older subjects, symptoms of cardiac failure, visual disturbances due to retinal haemorrhages may complicate very severe anaemia, particularly of rapid onset (Hoffbrand *et. al.,* 2001).

Signs:

The sings may be divided into general and specific. General signs include pallor of mucous membranes which occurs if the haemoglobin level is less than 9-10g\dl. Skin color, on the other hand, is not a reliable sign of anaemia; the state of the blood

circulation rather than the haemoglobin content of the blood largely determine skin color. A hyperdynamic circulation may be present with tachycardia, features of congestive heart failure may be present. Specific signs are associated with particular types of anaemia e.g kiolonychia (spoon nails) with iron deficiency, jaundice with haemolytic or megaloblastic anaemias, leg ulcers with sickle cell and other haemolytic anemias, bone deformities with thalassaemia major and other severe congenital haemolytic anemias in addition to that the association of features of anaemia with excess infections or spontaneous bruising suggest that neutropenia or thrombocytopenia may also be present (Bain *et. al.,* 2016).

Affected population:

Anaemia can occur at any stage of life but is more frequent in pregnant women and children, due to increase in their physiological demands. In children, anaemia impairs cognitive, mental and psychomotor development (Grantham 2001).

In California, the prevalence of anaemia was 11.1% in 12–36-month-old children from low-income families (Schneider 2005) and 19% in homeless children under 3 years of age in New York in 2004 (Brito et.al., 2010)

India breaks the record of the world by having 10% of total street children worldwide, where in the state of Mysuru anemia was detected as 52.5% among them. The table below shows nutritional and growth status of street children in Africa.

Table 1: Nutritional and growth status of street children in Africa.

Country (city)	Author/year	Sample size (n)	Source	Results
South Africa (Durban)	Nzimakwe 1994[1]	50	Shelter/ place of safety	*Girls*: All above the third percentile for weight; 60% below the third percentile for height.
				Boys: 37.5% below the third percentile for weight; 62.5% below the third percentile for height.
				Malnutrition: 20% girls; 27.5% boys.
Kenya (Eldoret)	Ayaya 2001[2]	191	Street (snowball sample); school case control	Shelter and *on-the-street* children more likely to be undernourished than *of-the-street* or school children (64.3, 55.3, 27.7 and 20% respectively), as well as more stunted (51.8, 44.7, 17.4 and 20% respectively).
Egypt (Alexandria)	Salem 2002[3]	100	Street shelter	83% malnourished (wasting and stunting) and 78% anaemic.

(Cumber *et. al.,* 2015)

Materials and Methods:

In this comparative, community-based study two groups of children from Khartoum State (n = 100) were randomly selected to participate, the homeless (street) children (n= 50) and resident children in Sudanese governmental rehabilitation center (Tayba Rehabilitation Center (TRC)) (n =50). All children were clinically examined with regard to anemia. Venous blood samples were collected from all participants and complete blood counts (CBC) for all samples were performed and analyzed by Sysmex Haematological analyzer. In addition to that peripheral blood pictured were examined for each sample using light microscope (×100 oil immersion lens)

Results and Discussion

The main results obtained from the comparative studies covering two groups of street children, group I include 50 children from street and group II which consist of 50 resident children from Tayba Rehabilitation Center (TRC) in Khartoum town, were tabulated, analyzed and presented in the following tables and figures.

The age distribution of all participants revealed the mean age of the children interviewed in the street and those in TRC were 14 and 13 years respectively (Table2).

Table2: Age distribution

		Groups	
		Street children	Tayba Rehabilitation center
Age groups	13 - 14 years	28	34
		56.0%	68.0%
	15 - 16 years	14	11
		28.0%	22.0%
	17 - 18 years	8	5
		16.0%	10.0%
Total		50	50
		100.0%	100.0%

This research revealed a statistically significant difference (P < 0.05) with regard to reduction in hemoglobin percentages (76%and 58%) between the homeless (street) children and resident children in Sudanese governmental rehabilitation center (Tayba Rehabilitation Center (TRC) respectively (**P value = .041**) (Figure 1) and also there was a statistically significant difference (P < 0.05) in Packed Cell Volume (PCV) percentages (94% and 80%) in the homeless (street) children compared to the resident children of Tayba Rehabilitation Center (TRC) respectively (**P value = .036**) (Figure 2). Thus indicates the high prevalence of anaemia mainly moderate-to-severe anemia among both groups and this with concordance with Arnaud *et al*. (2017) in France which determined the high prevalence of anaemia among homeless children in Paris streets.
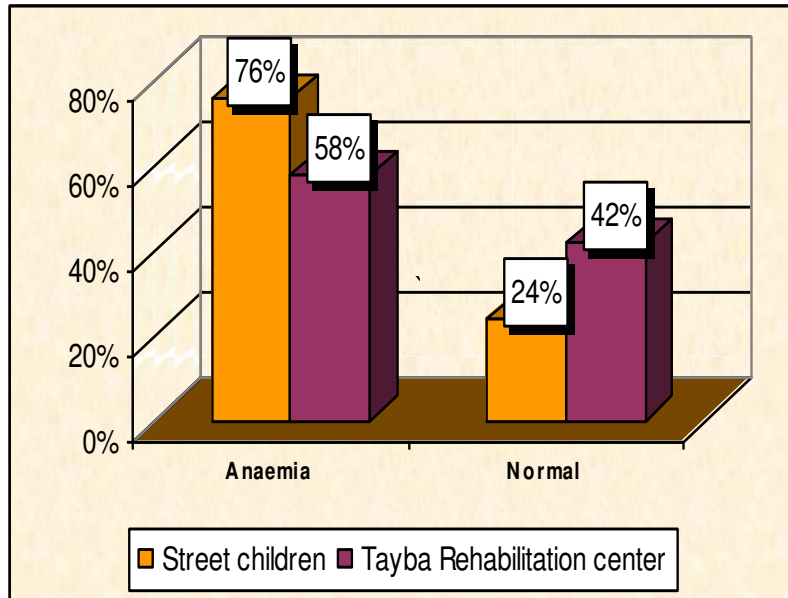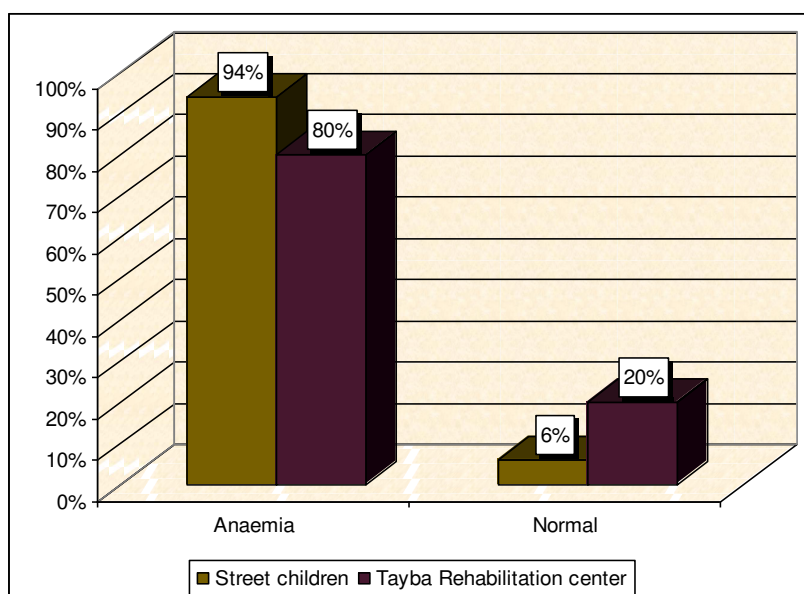

Figure 1: Haemoglobin concentration in the Street children compared to the resident children in Tayba Rehabilitation Center.

Figures 2: Packed Cell Volume (PCV) in homeless (street) children compared to the resident children in Tayba Rehabilitation Center.

Conclusion: The war was the dominant reason behind the phenomenon of street children moreover the malnutrition and poverty was found to be the main cause of the anaemia which almost equally distributed among the subjects of the two groups however there were differences in their life style. This study posed a strong recommendation to all major players in the governmental and non-governmental organization to focus on the urgent needs of those children. Also the researcher recommends the need for further study with larger sample size to be conducted to examine the different types of anemia among street children which threatens their wellbeing and humanity.

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