

## **Growth and Development among Children Living In Orphanages of Odisha, an Eastern Indian State**

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### **I. Introduction**

Childhood is the most crucial and formative period of human life. A healthy childhood is essential for future growth and development. It is greatly influenced by parent, family, society and environment which formulate attitude, behavior, manner and emotions [1]. Millions of children across the world are deprived of this crucial phase of life, those are the orphans and abandoned children. In the absence of the child's parents, grandparents, or reluctant relatives not willing to take care of the child, orphanage act as an institution to provide care and support for these unfortunate children. These children are educated within or outside the orphanage. Orphanages provide an alternative for care and adoption for some of these children. There are about 153 million orphan children living in the world and Asia is the home for nearly 60 million of the children [2]. It has been observed that about 11 million abandoned children, 90% of whom are girls live in India [3, 4]. Orissa, an eastern Indian state has about 16,382 orphans who live in the orphanages [5]. There are 272 child care institutions in Odisha, registered under the government (Juvenile Justice Act 2014) and they provide care as per the norms of Act [5].

Growth and development is an important indicator of health. Under five mortality and morbidity is strongly associated with severe growth retardation [6] while impaired psycho-social, intellectual development and learning disability are associated with developmental delay [7, 8]. Microcephaly was associated with lower developmental quotient, higher co-morbidities in children with developmental delay [9]. Children in orphanage are often observed to eat substantial amounts of food, and their weight is consistently higher than their height, especially the weight/height index, suggested by some investigators that psychosocial deprivation is a major cause [10, 11] These children suffer from a variety of developmental and behavioural problems especially when they are raised in adverse condition during early ages of life [12] The lack of emotional and social attachment, adequate stimulation and interaction among the family members is an important cause of developmental impairment. Emotional deprivation, anxiety & insecurity influence the neurochemical regulation of growth hormone & affect the growth of the child. Children exposed to social-emotional neglect display growth deficiencies called psychosocial dwarfism [13].

No study has previously investigated child growth and development in orphanages in this corner of the country. Therefore, this study aims to assess the growth and developmental outcomes of children living in orphanages aged birth to 72 months and suggest possible remedial measures for a better adaptation to the society in future.

### **II. Materials & Methods**

This cross-sectional study was conducted in two orphanages in Bhubaneswar and one orphanage in Cuttack in the year 2014. The study protocol was approved by the Institutional Ethical committee and consent was taken from the orphanage authority before conducting the study. All children living in the orphanage from birth to 72 months were included in our study. Those children who were mentally retarded, physically handicapped, suffering from chronic disease, children living with their biological mother in orphanage were excluded from the study. Each child was examined individually and each caretaker was interviewed using a pre-designed pretested proforma. Weight was recorded using a digital weighing machine, height by stadiometer, length by infantometer, head circumference by measuring tape and development by Denver Developmental screening Kit. Nutritional status were assessed by WHO Z score growth charts (birth to 60 months), WHO BMI Z score charts (>60 to 72 months) and developmental assessment by DDST-II (birth to 72 months). Data collected were subjected to statistical analysis using SPSS 16 software and Chi-square test of association was used.

### III. Results

Out of 188 children between the age group birth to 72 months living in the orphanages, 146 children were included in our study. 36 (24.7%) were male and 110 (75.3%) were female. The baseline characteristics are depicted in Table 1. The mean age of children was  $26.8 \pm 24.9$  months, mean age at admission was  $9.6 \pm 11.2$  months and mean duration of stay was  $13.9 \pm 13.9$  months. The birth weight could be documented in only 43.8%. The nutritional status of the children are shown in Table 2. In less than 60 months stunting, wasting, underweight were found in 28(22.9%), 12(9.8%) and 26(21.3%) cases respectively. However severe stunting, severe wasting and severe underweight were found to be 18(14.7%), 10(8.2%) and 13(10.6%) respectively. Microcephaly were found in 36 (29.5%) children below 60 months as per WHO criteria. 24 children above 60 months age were assessed by using WHO BMI chart, only 2 children (8.3%) were thin & none of them were obese. Developmental delay assessed as per DDST –II in different age groups are given in Table 3. The total no of children with developmental delay were 76(52.1%), out of them 48(32.9%) had global delay and 28(19.2%) had isolated delay. Out of 122 children (birth to 60 months) 62 had developmental delay and 24(38.7%) of them had microcephaly.

**Table 1: Baseline characteristics of orphan children(n=146)**

Features	No(%)
*Mean age of children(months)	26.8±24.9
*mean age at admission (months)	9.6 ±11.2
*mean duration of stay (months)	13.9± 13.9
Age in months	<6 6-24 24-60 60-72
	34(23.3) 60(41.1) 28(19.2) 24(16.4)
Sex	Male Female
	36(24.7) 110(75.3)
Reason for admission to orphanage	Hospital abandonment Street abandonment Unmarried mother Left in orphanages due to poverty Left in orphanages due to paternal deprivation Double orphans
	64(43.8) 10(6.8) 18(12.3) 20(13.7) 32(21.9) 2(1.4)

\*Mean±SD

**Table 2: Nutritional status as per WHO Z score charts among different age groups (n=122)**

Age in months	Height/age			Weight/height			Weight/age		
	Stunting	Severe stunting	Total	Wasting	Severe wasting	Total	Underweight	Severely underweight	Total
<6	6 (4.9%)	12(9.8%)	18(14.7%)	5(4.1%)	0	5(4.1%)	4(3.3%)	2(1.6%)	6(4.9%)
6 to 24	16(13.1%)	4(3.3%)	20(16.4%)	7(5.7%)	8(6.6%)	15(12.3%)	11(9.0%)	7(5.7%)	18(14.7%)
>24 to 60	6(4.9%)	2(1.6%)	8 (6.5%)	0	2(1.6%)	2(1.6%)	11(9.0%)	4(3.3%)	15(12.3%)
Total	28(22.9%)	18(14.7%)	46(37.6%)	12(9.8%)	10(8.2%)	22(18%)	26(21.3%)	13(10.6%)	39(31.9%)

**Table 3: Developmental delay as per DDST –II (birth to 72 months) (n=146)**

Age in months	Gross motor	Fine motor	Language	Personal -social
<6	4(2.7%)	6(4.1%)	12(8.2%)	2(1.4%)
6 to 24	14(9.6%)	32(21.9%)	36(24.7%)	28(19.2%)
>24 to 60	4(2.7%)	6(4.1%)	14(9.6%)	8(5.5%)
>60	2(1.4%)	4(2.8%)	14(9.6%)	0
Total	24(16.4%)	48(32.9%)	76(52.1%)	38(26.1%)

### IV. Discussion

According to UNICEF[14], 2013 the prevalence of stunting in India among under five is 48% (moderate to severe) and wasting is 20% (moderate and severe) with an underweight prevalence of 43% (moderate and severe). It was observed in the present study in the age group of 0 to 60 months that total stunting (stunted & severely stunted) was present in 37.6%, total wasting (wasted & severely wasted) in 18%, total underweight (underweight & severely underweight) was present in 31.9%. The total stunting, wasting and underweight are maximum at the age of 6 to 24 months. The prevalence of malnutrition among children living in orphanages of Bhubaneswar & Cuttack is less in comparison to national standard [14]. Microcephaly were found in 36 (29.5%) children. Miller L, et al. observed the orphan children of Guatemala and found that 17%

had microcephaly, which is lesser than our study[15]. Park H, et al. studied on internationally adopted children[16] and found that 16% children have microcephaly which indicated that percentage of microcephaly was more in our study, indicating abnormal brain growth of orphan children, probably due to effect of maternal insult in intrauterine period [17,18] and/ or lack of environmental stimulation [19]. Development of the study population was evaluated by DDST II (birth to 72 months). It was observed that language development delay was found in 52.1% of children, fine motor delay in 32.9%, personal & social delay in 26.1% and gross motor delay in 16.4% of children. It was also found that highest developmental delay was present in age group of 6 to 24 months. Out of 122 children (birth to 60 months) 62 had developmental delay. Among these 62 children, 24(38.7%) had microcephaly. The prevalence of developmental delay in our study was 52.1%, out of them global delay in 32.9% and isolated delay in 19.2% children. Nair MKC, et al. studied developmental screening in high risk children by using DDST II in 2111 children between 0 to 6yrs in developmental assessment clinic and observed that 45.1% were developmental delay, 60.9% were gross motor delay, 36.6% were fine motor delay, 34.1% were personal-social delay & 44.5% were language delay[20]. Miller LC, et al. studied on adopted children in China (large scale study) showing 55% children having gross delay, fine motor delay in 40%, language delays in 43%, social emotional delays in 28%[21]. Waterberg N, et al. observed that the prevalence of microcephaly is 15-20% in children with developmental delay [22]. The language delay is higher in our study as compared to these studies, however the other domains of developmental delay is higher in these studies. The reasons for language delay were, the paucity of language exposure in institutional environment, inattention (possibly due to diminished auditory exposure during early life), lack of facilities for auditory screening and presence of global developmental delay[23]. Despite proper nutrition, regular immunization, health care and good hygiene, a significant no of these children suffer from developmental delay due to lack of maternal and family care.

## V. Conclusion

Maternal deprivation (psychosocial deprivation) in orphan children leads to developmental delay in spite of good nutrition. Delay in language, deprivation in personal and social domain leads to cognitive delay, which later may leads to school failure. The results imply the need for long-term and socio-culturally appropriate intervention and routine screening of growth and development along with medical care to improve child health in the orphanages.

## Contributions

SR, BKM and RT designed the study, drafted the manuscript, reviewed the literature; SR,DDP and BKM collected data; SR, NM and SNP reviewed the literature, SNP and DDP helped in writing the paper. Finally all authors approved the manuscript.

**Conflict Of Interest:** None Stated.

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