Nutritional status and morbidity pattern of children aged 6-60 months beneficiaries of anganwadi at urban slums area of Raipur city in Central India

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Abstract

Introduction: Malnutrition is one of the major social and public health concerns in India.There is similar situation in Chhattisgarh with 37% children underweight. About 200 million people in India are living in urban slums without basic health facilities, poor environment conditions that make children susceptible to infectious disease. **Objective:** To assess the nutritional status and morbidity pattern in children aged 6-60 months attending Anganwadi at urban slums of Raipur city. **Methods:** Cross sectional study was conducted in urban slum of Raipur city from July-2017 to June-2018. A representative sample of 605 children was anthropometrically and clinically assessed for their nutritional status and morbidity pattern. Socio-economic variables were also collected to identify the determinants of nutritional status and morbidity pattern. Data was analyzed using SPSS-20 and WHO-Anthroplus. Informed consent and ethical issues were considered. **Results:** Out of the 605 children, 46.28% were in <2 years age group and 47.77% were female. Majority of them belongs to low socioeconomic (87.93%) status. As per WHO nutritional measurement criteria, 20.16% were underweight, 21.16% stunting and 13.05% wasting. Major morbidity conditions among study participants were respiratory infections (26.28%), diarrhea (15.54%), conjunctival pallor (19.83%), scabies (18.51%) and 10.91% dental caries. Mother's education, diarrhoeal/respiratory infection, socio-economic status, mother's occupation were significant determinants for underweight in study children. **Conclusion:** Children benefited from Anganwadi centers in urban slum of Raipur has less underweight (20.16%) as compare to state average (29.1%) in urban area and better immunization coverage (92.40%).

Key words: Malnutrition, Anganwadi, Urban Slum, Morbidity, Parental education

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Introduction

Undernutrition is one of the most concerning health and development issues in India as in other developing countries [1]. As per NFHS-4 (2015-16) 35.8% of children are under weight, 21% wasted, and 38.4% stunted under five age group in India[2]. Strong evidence exists on synergism between undernutrition and child mortality due to common childhood illnesses [3]. The morbid conditions are more prevalent in the urban slum children who are exposed to various risk factors like overcrowding and poor nutrition [4].

Although, morbidity in the preschool children residing in the urban slum areas is more as compared to the

children from a higher socioeconomic strata [5]. Government of India started a centrally sponsored, Integrated Child Development Services (ICDS) Scheme; to enhance the health, nutrition, and learning opportunities of children <6 years of age. Under the ICDS Scheme; freshly, cooked food supplements are provided to children aged 3-6 years while take-home-rations of food grains are provided to children aged 6 months until 3 years [6].

Chhattisgarh is one of the poorest states in the country with one third of its population belonging to the scheduled tribes [7]. As per NFHS-4 state has 37.7% underweight under 5-children [8]. Literature search on the internet and the library revealed limited data on the morbidity profile as a whole in the children under age

of six. Thus, the varied morbidities and under nutrition in the children in urban slum areas intensifies the great need to study the distribution of health morbidities and malnutrition in 6-60 months children.

That will be of use in assessing the overall impact of various ongoing nutritional supplement, immunization status and disease control programs.

Objective: To assess the nutritional status and morbidity pattern in children aged 6-60 months beneficiaries of Anganwadi at urban slums area of Raipur city.

Material and Methods

Study setting: Study was conducted in Devendranagar sector urban slum of Raipur city.

Study design: Community based cross-sectional study conducted between July-2017 to June-2018.

Sampling framework- Raipur city has total 449 Anganwadi Centers (AWC). The study area Devendra-nagar sector has 24 AWCs. Out of these 24 Anganwadi centers, 15 were selected randomly for the study.

Sample size:1500 (0-6) Children are registered to Anganwadi centers in Devendra Nagar slum. Sample size for the study calculated using formula $4pq/d^2$ Where, p= prevalence of malnutrition in urban area 29.1%. q = 1-p and d relative error using 5% at 99.9% of confidence interval. Thus sample size for the study at 99.9% CI is 549. Non-responder rate was taken as 10% thus total sample size was 605.

Inclusion criteria

1. Child should be age group of 6-60 months and a resident of a particular selected area

2. Child should be enrolled in ICDS scheme

3. Children whose parents gave the informed consent

Exclusion criteria

1. Children aged more than 60 months,

2. IUGR babies, Small for date babies, children with organic diseases and with any physical disability

Results

Socio-demographic profile and malnutrition in urban slum children: In present study data was collected for 605 children between 6 to 60 months of age group. Out of that 316 (52.23%) were males and 289 (47.77%) were females. Table 1.1shows that 12.23% of female children were underweight in comparison to 7.76% male. Wasting was in 6.28% female and 6.78% male and stunting was in 8.92% female and 12.40% male children.

Data collection and study methodology- Anthropometric measurements were carried out like weight taken in a standardized scale in kilogram with minimum clothing and length measured by infantometer in supine position for children below 2 years and height of the child was measured for those who can stand. Socio-demographic information was collected by using the pretested and predesigned structured schedule by interview technique. Modified Kuppuswamy scale was used to classify socioeconomic class of families. History of child illness and immunization status was reported by care taker of children. The age, date of birth, was recorded by asking mother and confirmed by the records (MCP cards/Immunization cards). Data entry was done in Excel and analysis was done using SPSS 20.0 and WHO Anthroplus software.

Ethical issue: Informed consent was taken from mothers of all the study participants and ethical issues were considered.

Outcome measures

1. Stunted: - low height according to the age. (Z score=-3SD to -2 SD)

2. Wasted- low weight according to height. (Z score=-3SD to -2 SD)

3. Underweight:-low weight according to age. (Z score=-3SD to -2 SD)

4. Morbidity pattern in children

Association between nutritional status of children, socio-economic status of family, parental education and parental occupation was measured using statistical analysis.

Statistical analysis

- Data was expressed as frequency and percentage.
- Fischer's exact test or Chi square test was used toanalyze the significance of difference between frequency distribution of the data.
- Binary logistic regression was used to calculate the odds ratio and is used to explain the relationship between one dependent binary variable and one or more independent variables
- P value <0.05 was considered for statistical significance.

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Table-1.1: Gender and malnutrition					
Gender	Frequency	Percentage	Underweight	Wasting	Stunting
Male	316	52.23	7.76%	6.78%	12.40%
Female	289	47.77	12.23%	6.28%	8.92%
Table-1.2: Age wise distribution of malnutrition					
Age group	Frequency	Percentage	Underweight	Wasting	Stunting
<1 year	95	15.70	16%	0%	11.58%
1-2 year	185	30.58	10.80%	14.05%	16.22%
2-3 year	98	16.20	31.60%	15.30%	23.47%
3-4 year	142	23.47	28.90%	25.35%	30.28%
4-5 year	70	11.57	21.40%	2.86%	30%
5-6 year	15	2.48	0%	0%	0%
Table-1.3: Socio-economic classand malnutrition					
Economic class	Frequency	Percentage	Underweight	Wasting	Stunting
Lower Middle Class-III	73	12.07	13.70%	24.66%	0%
Upper Lower Class-IV	214	35.37	19.16%	9.813%	15.89%
Lower Class-V	318	52.56	25.47%	12.58%	29.56%

Age wise distribution of study subjects shows that highest number of children 30.58% taken in the study were from age group of 1-2 years, followed by 23.47% from 3-4 years, 16.20% from 2-3 years and 15.70% from <1 years. Table 1.2 shows that prevalence of underweight was high in children 2-3 year and 3-4 year age group i.e. 31.60% and 28.90%. Prevalence of wasting was high in 3-4 year i.e. 25.35% followed by 15.30% in 2-3 year age group. Stunting was high in 3-4 year age group i.e. 30.28% and in 4-5 year i.e. 30%.

Socio-economic status of study subjects was calculated using Modified Kuppuswamy scale. Table 1.3 shows that 52.56% of families were in lower class-V of socio-economic status, 35.37% in upper lower class-IV and 12.07% in lower middle class-III. Lower class- V has the highest prevalence of children underweight (25.47%), wasted (12.58%) and stunted (29.56). Significant association (P value= 0.000) between socio-economic status and nutritional status (weight for age) were found using chi-square test.

Parental occupation, education and malnutrition in slum children.

Table-2.1: Occupationof father and Malnutrition						
Occupation	Frequency	Percentage	Underweight	Wasting	Stunting	P value
Daily wages	182	30.08	38.46%	21.98%	36.81%	0.000
Job	244	40.33	7.79%	6.97%	11.48%	
Self Business	179	29.59	18.44%	12.29%	18.44%	
Table-2.2: Occupationof mother and Malnutrition						
Occupation	Frequency	Percentage	Underweight	Wasting	Stunting	P value
Daily wages	60	9.92	50%	31.67%	36.67%	0.000
Housewife	545	90.08	21.47%	11.01%	19.45%	
Table-2.3: Educational status of mother and Malnutrition						
Education	Frequency	Percentage	Underweight	Wasting	Stunting	P value
Illiterate	97	16.03	49.48%	20.62%	45.36%	0.001
Primary School	140	23.14	12.86%	12.14%	20.62%	
High School	30	4.96	3.33%	0%	36.67%	
Higher Secondary	338	55.87	16.27%	12.43%	15.68%	

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Parental occupation of study children was also noted in present study. Table 2.1 shows that 40.33% fathers of study participants were doing jobs either in formal or in-formal sector. 29.59% were involved in small scale of self-business and 30.08% were doing daily wages work.Daily wages fathers have high prevalence rate of underweight (38.46%), wasting (21.98%) and stunting (36.81%) in their children. Whereas, Table 2.2 shows 90.08% mothers of study participants were housewives and 9.92% were doing daily wages work. Daily wage mothers have 50% their children underweight, 31.67% wasted and 36.67% stunted. Significant association (P value= 0.000) between parental occupation and nutritional status (weight for age) using chi-square test.

Parental education of study children was reported in present study. Table 2.3 shows that 55.87% of mothers were educated till higher secondary, 4.97% high school pass, 23.03% educated till primary school and 16.03% were illiterate. Mothers those were illiterate having the high prevalence rate of underweight (49.48%), wasting (20.62%) and stunting (45.36%). Significant association (P value= 0.001) between mother's education and nutritional status (weight for age) using chi-square test.

Anthropometric assessments of slum children: Prevalence of malnutrition (stunting, wasting & underweight) was assessed based on WHO child growth standards 2006 generated for boys and girls aged 0 to 60 months separately. Among 605 study children, Table 3 shows that 8.26% children were in category of severely underweight, 11.90% in moderate underweight and 79.84% in normal category. Height for Age (H/A) which measure the level of stunting,in Table 6 shows that 6.61% children were in category of severely stunting and 14.55% in moderate stunting. Table 6 also shows the status of wasting in study children, 2.64% children were in severely wasting and 10.41% in moderatecategory.

Table-3: Nutritional status of study subjects as per WHO criteria			
Particular	Weight for Age (Underweight)	Weight for Height (Wasting)	Height for Age (Stunting)
Severe	8.26%	6.61%	2.64%
Moderate	11.90%	14.55%	10.41%
Normal	79.84%	78.85%	86.94%

In present study immunization status among study children was recorded by asking mother and confirmed by the records (MCP cards/Immunization cards). Results shows that 92.40% of children were continuing their immunization schedule, 1.32% dropouts and 6.28% were immunized haphazardly.

Distribution of Major morbidity conditions in slum children: Table 4 shows the major morbidity (illness) among study children, 26.28% had acute respiratory infections in last one year, 15.54% had diarrheal disease, 19.83% had conjunctival pallor (anemia), 18.51% had scabies, 10.91% had dental caries, 4.96% vitamin B complex deficiency and 1.25% had Vitamin A deficiency.

Table-4:Distribution of major morbidity conditions in study subjects		
Disease	Frequency	Percentage
Acute Respiratory Infection	159	26.28
Diarrhoeal disease	94	15.54
Skin infection (Scabies)	112	18.51
Anemia (Conjunctival Pallor)	120	19.83
Dental Caries	66	10.91
Vitamin B Complex deficiency	30	4.96
Vitamin A deficiency (Bitot's spot)	7	1.25

Significant determinants of underweight in study participants: Binary logistic regression statistical tool was used to understand the determinants of underweight in study subjects. Table 5 shows that mother's education (p value 0.03), mother's occupation (p value 0.04), Socio-economic status of family (p value 0.03), and occurrence of ARI (p value 0.002) and diarrhoea (p value 0.00), were the important significant determinants for underweight in study subjects.

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Table-5: Determinants of underweight in study participants						
Particular	Odds Ratio	Std. Err.	z	P>z	95% CI	
SEX						
Female	0.59	0.20	-1.53	0.125	0.30	1.16
MOTHER_EDUCATION						
Primary School	1.38	1.00	0.44	0.661	0.33	5.72
High School	1.00	1.59	0	0.999	0.04	22.34
Higher Secondary	0.21	0.21	-1.10	0.035	0.02	0.70
MOTHER_OCCUPATION						
Housewife	3.78	2.51	2	0.046	1.02	13.92
SOCIO-ECONOMIC STATUS						
Upper-lower	0.57	0.29	-1.11	0.266	0.21	1.54
Upper-Middle	0.26	0.17	-2.06	0.039	0.07	0.93
ARI						
Yes	0.28	0.12	-3.03	0.002	0.12	0.64
DIARRHOEA						
Yes	0.02	0.01	-6.58	0	0.00	0.05

Discussion

Our study concludes that female children were more underweight in comparison to male whereas stunting and wasting were more in male child. Female (12.23%) children were more underweight in comparison to (7.76%) male where as stunting is more in (12.40%) male children than female (8.92%). Pandey et al. assessed children visiting ICDS scheme found that stunting, wasting and underweight was more in females than male [9]. Any form of malnutrition is more in female children as compare to male children. Swami et al. and Banarjee B et al. reported statistically significant association of gender and underweight status in children [10,11].

In present study shows that 28.14% mothers of children were educated till primary school and out of that 21% were had severe underweight children. It was found (Table 5) that mothers of children who are educated till primary class (odds ratio=1.38) had more chance of having malnourished children that mothers who are educated till higher secondary (odds ratio=0.21). Findings of the present study are supported by Mittal et al. and Gupta et al. found that in urban slum that educated mothers were having better nourished children as compared to illiterate ones[12][13]. Abuya et al. concluded that overall, mother's education persists as a strong predictor of child's nutritional status in urban slum settings[14].K.Saitoet al. concluded that the gender of the child and maternal literacy were stronger risk factors for malnutrition than health-care availability and health-care-seeking attitudes[15].

Mothers on daily wages have 50% children underweight and daily wages fathers have 38.46% children underweight. Strong statistical significant association was noted between occupation of mothers and nutritional status of children (p=o.ooo). Our findings are supported by a study of Mittal et al. that mother's engagement in some occupation adversely affected child's growth [12]. In another study Shailiet al. showed that maximum under nutrition (88.46%) was found in children whose mothers were unskilled laborers by occupation, as compare to children of house wives[16].

In present study it was noted that children from the lower class- V has the highest prevalence of underweight (25.47%), wasting (12.58%) and stunting (29.56%). Significant association (P value= 0.000) between socio-economic status and nutritional status (weight for age) using chi-square test. Kanjilalet al. concluded that a disproportionate burden of stunting was observed among the children from poor SES, more so in urban areas [17]. Arora et al. showed that nutritional status of children from lower socio economic class was poor as compared to their counter parts came from upper socio economic class [18]. Poor socio economic status is manifested as hunger, which is directly associated with under nutrition[19].

In present study as per WHO nutritional measurement criteria [20], 20.16% children were underweight, 21.16% stunted, and 13.5% wasted. There are many studies reporting underweight in children living in

slums from a range of 34.4% 55.3% [21-24]. Since there are enough evidence available that across India in many states malnutrition has higher burden even in urban slum area. Present study shows that 92.40% of children were continuing their immunization schedule. Similar studies suggesting that immunization status was associated with various parameters but significant association was found with underweight[25][26].

In present study major morbidity conditions among study participants were respiratory infections (26.28%) followed by diarrhoea (15.54%). Regression analysis also shows that child who had ARI (OR=0.28) are more likely to malnourished as to those who had diarrhoea (OR=0.02). Mondal et al. and Hanmantaet al. reported that the most common health morbidity observed was acute respiratory infection (ARI) followed by acute diarrheal disease [27][28]. In contrast Vyas et al. found that, Diarrhoea (47.9%) followed by ARI (22.21%) were the commonest morbidities found in the study population [29].

In present study (19.83%) children were having conjunctival pallor (measure for anemia), (18.51%) scabies and (10.91%) dental caries.In a similar study Narkhedeet al. shows that more than three-quarter of children from urban slum were suffering from anemia [30]. Psoter et al. found in a review of the literature on malnutrition and dental caries suggest that caries of the primary dentition is associated with early childhood malnutrition [31]. Bhayade S et al. also concluded that significant association was found among malnutrition and dental caries [32]. Dasgupta et al. noted that skin diseases in children are significantly associated with nutritional status[13]. Anganwadi should conduct useful general health promotion activities which must include education of parents, general health issues and risk factors for malnutrition in preschool children.

Conclusion

Children visiting Anganwadi centers in urban slum of Raipur has less underweight children (20.16%) as compare to state average of (29.1%) underweight (NFHS-4, 2015) in urban area and better immunization coverage. This demonstrates the better utilization of Anganwadi centers in Raipur urban slum. Hereby it is recommended that more comprehensive approach is needed in providing supplementary diet at one hand and breaking the vicious cycle of malnutrition and morbidity on the other.

What this study adds to existing knowledge/practice: This study strengthens the conclusion that malnutrition

in children is public health issue in both rural and urban areas which leads to many morbid conditions in children. Supplementary nutritional programmes are useful but much more comprehensive strategy is needed to tackle malnutrition.

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