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To Assess the Nutritional Status and Morbidity Pattern of Children aged 6 Months to 5 Years belonging to the Rural Area of Abhanpur Block

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Introduction: Malnutrition among children is India's well-known social and public health problem. There is a similar situation in Chhattisgarh with 37% under-5 children underweight. About 700 million people in India live in rural areas and have basic health facilities and poor environmental conditions that make children susceptible to infectious diseases. **Objective:** To assess the nutritional status and morbidity pattern in children aged 6-60months belonging to the rural area of abhanpur block. **Methods:** Cross-sectional study was conducted in a rural area the Abhanpur block of the Raipur district. A sample of 360 children from January 2019 to December 2020 was anthropometrically and clinically assessed for their nutritional status and their morbidity pattern. Socioeconomic variables were also collected to identify the determinants of nutritional status and morbidity patterns. Where was analyzed using SPSS-20 and WHO-Anthroplus Informed consent and ethical issues were considered. **Results:** Out of the 360 children, the mean age of sample children was 2.73±1.16 years, 28.61% were in the 2-3 year age group and 51.39% were female. The majority of them belong to low socioeconomic (78.33%) status. As per WHO nutritional measurement criteria, 26.12% were underweight, 5.88% were severe wasting, and 9.44% in severe stunting. Major morbidity conditions among study participants were respiratory infections (28.32%), diarrhea (18.21%), conjunctival-pallor (20%), scabies (21.51%), and 11.94% dental carries. Parental education, diarrhea/respiratory- infection, and the mother's occupation were significant determinants for underweight study children. **Conclusion:** Almost every 4th the Children living in the rural area are underweight and have many common morbidities which lead them into the vicious cycle of recurrent infections and malnutrition.

Keywords: Malnutrition, Anganwadi, rural area, Morbidity, Parental education

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Introduction

Malnutrition among children in India is a well-known public health problem defined as a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients [1]. Nearly half of all deaths in children under 5 are attributable to undernutrition translates into a loss of about 3 million young lives a year [2]. Undernutrition puts children at greater risk of dying from common infections, increases the frequency and severity of such infections, and contributes to delayed recovery [2].

Malnutrition is often associated with high rates of mortality and morbidity and is an underlying factor in almost one-third to half of all children under five years who die each year of preventable causes. [3]. Morbidity in under-five children belonging to rural areas is more than the children from the same age group from higher socioeconomic strata. Assessment of their growth is useful at both the individual and population levels [4]. The Union government in India started the Integrated Child Development Services (ICDS) Scheme; to enhance the health, nutrition, and learning opportunities of children <6 years of age especially targeted for the poor and the deprived. All children in the eligible age groups can avail of supplementary nutrition provided at the AWCs.

The morbid conditions are more prevalent in rural children who are exposed to various risk factors like poor hygienic conditions, poor nutrition, etc. [5]. Chhattisgarh is predominantly a rural tribal state with poor child health indicators. As per NFHS-4 state has 37.7% of under 5children were underweight [6]. Literature searches on the internet and the library revealed limited data on the morbidity profile as a whole in the under-fives. There is a need for community-based information on morbidity patterns among under-five children. The current study has been done with the purpose to assess the nutritional and morbidity status of children aged 6 months to 5 years living in a rural area of Abhanpur block of the state capital city Raipur, in Chhattisgarh.

Objective

To assess the nutritional status and morbidity pattern in children aged six months to five years living in a rural area of Abhanpur Block in the Raipur district.

Material and Methods

Study setting: The study was conducted in rural areas of the Abhanpur block of the Raipur district.

Study design: Community-based cross-sectional study conducted between January 2019 to December 2020.

Study population – Children belonging to six months of age to five years of age group in rural areas of Abhanpur block.

Sample size- The sample size was determined using the formula 4pq/d2, Where, the p= prevalence of malnutrition in rural areas is 37.60%. q = 1-p and d relative error using 5% at 99.9% of confidence interval. The sample size for the study at 99.9% CI is 360.

Sampling technique: Systematic sampling was done to collect the desired sample.

Inclusion criteria –

- Children of age 6 months to 5 years
- Children of the above age group whose parents consented to the study

Exclusion criteria –

- Children above the age group of >5 years
- IUGR and small for date babies, children with organic diseases, and with any physical disability

Data collection and methodology

Every sixth house in the village was checked for the availability of children between 6 months to 59 months. A portable weighing scale of 100 kg capacity with a sensitivity of 0.1 kg was used to record the weight of the selected children. The body weight was noted to the nearest o.1 kg when the subject was standing upright on the balance with bare feet and in school uniform, The length was measured by an infantometer in the supine position for children below 2 years, and the height of the child as measured for those who can stand.

Socio-demographic information was collected by using the pretested and predesigned structured schedule by interview technique. A modified Kuppuswamy scale was used to classify the socioeconomic class of families. History of child illness and immunization status was reported by the caretaker of the children.

The age, and date of birth, were recorded by asking the mother and confirmed by the records (MCP cards/Immunization cards).

Primary data collection tools were prepared in the form of interview schedules and pre-tested in the field for appropriateness. Changes were done according to pre-test results and printed in sufficient numbers for use in the field.

- The following schedules were filled during the study period

Schedule A Data collection format for Anthropometric measurement

Schedule B Interview questionnaire of study subjects

Schedule C Clinical Examination form

Data entry was done in Microsoft Excel and analysis was done using SPSS 20.0 and WHO Anthroplus software.

Ethical issue: Informed consent was taken from the 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 -2SD)

4. Morbidity pattern in children

Statistical analysis: Data were expressed as frequency and percentage. The Chi-square test was used to analyze the significance of the difference in the 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 statistical significance.

Results

Socio-demographic profile and malnutrition in rural children: In the present study 360 rural children aged between 6 months to 60 months and of that 48.6% were male and 51.4% were female children. Gender-wise distribution of malnutrition shows that 26.3% of male and 25.9% of female children were underweight. Wasting was seen at 20% of males and 16.80%% of females whereas 29.1% of male children were stunted and 27% of females were stunted.

Table 1.1: Gender and malnutrition

Sex	Frequency	Percentage	Underweight	Stunting	Wasting
Male	175	48.6	26.3%	29.10%	20%
Female	185	51.4	25.9%	27%	16.80%

Table-1.2: Age-wise distribution of malnutrition

Age group	Frequency	Percentage	Underweight	Stunting	Wasting
<1 year	13	3.6	46.2%	30.8%	15.4%
1-2 year	108	29.7	35.2%	38.9%	21.3%
2-3 year	82	22.5	31.7%	35.4%	18.3%
3-4 year	83	22.8	18.1%	21.7%	15.7%
4-5 year	74	20.3	12.2%	10.8%	17.6%

Table-1.3: Socio-economic class and malnutrition

Economic class	Frequency	Percentage	Underweight	Stunting	Wasting
Lower Middle Class-III	78	21.4	25.6%	24.4%	17.9%
Upper Lower Class-IV	103	28.3	29.1%	30.1%	18.4%
Lower Class-V	179	49.2	24.6%	28.5%	18.4%

Age distribution among study subjects shows that a maximum of 29.7% of children were b/w 1-2 years of age group. Prevalence of underweight was high in children from < 1 year (46.2%) and 1-2 year age group (35.2%). Prevalence of stunting was seen high in the 1-2 year age group (38.9%) and 2-3 years age group (35.4%). Wasting was seen high in the 1-2 year age group (21.3%) and 2-3 years age group (18.3%).

Socioeconomic status was calculated using the Modified Kuppuswamy scale. Table 1.3 shows that a maximum of 49.2% of families were in lower-class V and 28.3% were in upper-lower-class IV. Underweight was seen high (29.1%) in Upper lower class- IV wasting was also high (30.1%) in Upper lower class- IV and stunting were high and equal among lower class V and upper-lower class IV (18.4%). Significant association (P value= 0.002) between socioeconomic status and nutritional status (weight for age).

Table-2.1: Father's occupation and malnutrition status of children

Occupation	Frequency	Percentage	Underweight	Stunting	Wasting
Daily wages	239	66.39	25.9%	37.0%	28.1%
Government job	27	7.5	23.8%	23.8%	11.1%
Private job	32	8.89	21.9%	28.1%	18.4%
Self-Business	62	17.22	37.1%	40.3%	16.1%

Table-2.2: Mother's occupation and malnutrition status of children

Occupation	Frequency	Percentage	Underweight	Stunting	Wasting
Daily wages	228	63.33	40.0%	42.2%	28.4%
Government job	1	0.28	0.0%	0.0%	0.0%
Housewife	82	22.78	23.2%	30.5%	29.5%
Private job	4	1.11	0.0%	25.0%	45.0%
Self-business	45	12.5	25.0%	24.6%	21.1%

Table-2.3: Mother's education and malnutrition status of children

Education	Frequency	Percentage	Underweight	Stunting	Wasting
Illiterate	9	2.5	22.2%	44.4%	22.2%
Primary School	48	13.33	41.7%	39.6%	16.7%
Middle School	113	31.39	23.9%	28.3%	22.1%
High School	100	27.78	21.0%	21.0%	20.0%
Higher Secondary	54	15	22.2%	20.4%	14.8%
Graduate	23	6.39	39.1%	39.1%	13.0%
Post Graduate	13	3.61	23.1%	38.5%	14.0%

Parental occupation of study children was also noted in the present study. Table 2.1 shows that 15.94% of fathers of study participants were doing jobs in either the info al or informal sector. 66.39% were doing daily wage work and 17.22% were involved in the small-scale self-business. Daily wages fathers have a high prevalence rate of being underweight (25.9%), wasting (28.1%), and stunting (37%) in their children.

Whereas, Table 2.2 shows 63.33% of the mothers of study participants were daily wage workers and 22.78% were housewives. Daily wage mothers have 40% of their children underweight, 42.2% stunted, and 28.4% wasting. Significant association (P value= 0.03) between parental occupation and nutritional status (weight for age). Mother's education of study children was reported in the present study.

Table 2.3 shows that 31.39% of mothers were educated till primary class, 27.78% of high school pass, and 15% were educated till primary school. Mothers who were educated till primary class had a high prevalence rate of being underweight (41.7%), wasting (16.7%), and stunting (39.6%). Significant association (P value= 0.001) between mother's education and nutritional status (weight for age) using chi-square test.

Anthropometric assessments of rural children

The 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 360 study children, Table 3 shows that 10.6% of children were in the category of severely underweight, 15.6% in moderate underweight, and 73.9% in the normal category. Height for Age (H/A) which measure the level of stunting, in Table 3 shows that 5.3% of children were in the category of severely stunting and 13.1% in moderate stunting. Table 3 also shows the status of wasting in study children, 9.4% of children were severely wasted, and 18.6% were in the moderate category.

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	10.6%	9.4%	5.3%
Moderate	15.6%	18.6%	13.1%
Normal	73.9%	71.9%	81.7%

Distribution of Major morbidity conditions in rural children: Table 4 shows the major morbidity (illness) among study children, 26.28% had acute respiratory infections in the last 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
Anaemia (Conjunctivital Pallor)	72	20
Dental Carries	43	11.94
Vitamin B Complex deficiency	17	4.72
Pale nail	23	6.39
Vitamin A deficiency (Bitot's spot)	5	1.39
Acute Respiratory Infection	102	28.32
Diarrhoeal disease	66	18.21
Skin infection (Scabies)	77	21.51

Table 5: Multivariate analysis for determinants of underweight in study subjects

Underweight	Odds Ratio	Std. Err.	P-value	[95% Conf.Interval]	
Age					
<1 year	Reference				
1-2 year	0.55	0.38	0.38	0.14	2.13
2-3 year	0.27	0.20	0.08	0.06	1.17
3-4 year	0.18	0.13	0.02	0.04	0.77
4-5 year	0.10	0.08	0.00	0.02	0.48
Sex					
Male	Reference				
Female	0.93	0.27	0.80	0.52	1.65
Mother's education					
Illiterate	Reference				
Primary education	5.38	6.00	0.13	0.61	47.88
Middle	1.55	1.64	0.68	0.20	12.36
High school	1.49	1.64	0.72	0.17	12.80
Higher secondary	0.92	1.07	0.94	0.09	9.05
Graduate	1.95	2.65	0.62	0.14	28.03
Postgraduate	1.76	2.80	0.72	0.08	39.69
Father's education					
Illiterate	Reference				
Primary education	0.27	0.26	0.18	0.04	1.82
Middle	0.25	0.22	0.12	0.04	1.41
High school	0.23	0.21	0.11	0.04	1.40
Higher secondary	0.20	0.20	0.11	0.03	1.44
Graduate	0.24	0.28	0.23	0.02	2.43
Postgraduate	0.49	0.67	0.61	0.03	7.18
Father's Occupation					
Self-Business	Reference				
Private job	0.88	0.80	0.89	0.15	5.21
govt job	0.78	0.71	0.78	0.13	4.65
Daily wages	0.09	0.10	0.04	0.01	0.84
Mother's Occupation					
Self-Business	Reference				
Daily wages	3.27	3.92	0.32	0.31	34.20
Housewife	0.41	0.32	0.26	0.09	1.93
family type					
Joint	Reference				
Nuclear	0.72	0.22	0.29	0.39	1.32
Socio-economic status					
Lower Middle Class-III	Reference				
Upper Lower Class-IV	0.92	0.38	0.83	0.41	2.07
Lower Class-V	1.12	0.43	0.76	0.53	2.39
Dental hygiene					
Normal	Reference				
Carries	15.46	6.91	0.00	6.44	37.12
_cons	6.28	7.64	0.13	0.58	68.18

Multivariate analysis for determinants of underweight in study subjects: A multivariate logistic regression statistical tool was used to understand the determinants of malnutrition in study subjects. Table.5. shows that children with an age of less than one year had more chance of being underweight and males were more underweight as compared to female children. Parent education does not have a significant impact on the underweight status of children. Mothers who were daily wage workers had a 3.27 times more chance of having their children underweight as compared to self-business. The type of family does not have a significant impact on the underweight status of the child. Children with lower socioeconomic status have more chance of having underweight as compared to the lower-middle and upper lower class. Children with dental carries have a significant impact on the underweight status of study subjects.

Discussion

In the present study maximum of 46.2% were underweight from the < 1 year age group followed by 35.2% from the 1-2 year of age group. Males and females were equal underweight and wasting was seen more in males as compared to females. A similar study by Vasudevan K et al (2019) assessed the nutritional status of children under five years of age in a rural area and reported that the proportion of moderate and severe underweight was highest in the age group of 11-23 months. [7]. Vandana et al (2011) found in a cross-sectional study in which children visiting the ICDS scheme. It was found that - wasting 22.0% in males and 23.1% in females and underweight is 54.9% in males and 64.1% in females respectively [8]. Since there is enough evidence available across India in many states that malnutrition has a higher burden in rural areas. Many studies show that malnutrition in less than five years is equal in both genders.

In present study's findings show that Illiterate mothers had more underweight children as compared to educated mothers. Similarly, wasting was seen as high in illiterate mothers (p=0.021). Similar to this father those who were illiterate had more underweight children. M C Gupta et al (1991) did a longitudinal study to find the relationship between childhood malnutrition to parental education. They reported a strong relationship was found between the nutritional status of children and

The educational level of their mothers (P < 0.025). Father's education was unrelated to the children's nutritional status [9]. Barooah V et al (2009) did a study in sixteen major states of India, using unit-record data on over 50,000 rural children, and found the positive role of maternal literacy in reducing the risk of child malnourishment. However; do not related to the father's education [10].

In the present study mother who was working as daily wagers have more underweight children as compared to housewives. Fathers with self-business had maximum underweight children as compared to those doing private jobs. Association assessed between the mother's occupation and the underweight status of study subjects was statistically significant (p=0.035). A study by Mittal et al (2007) in, Patiala shows that Mother's engagement in some occupations adversely affected a child's growth [11]. A study by Shaili et al (2016) in a rural area of Uttarakhand found that maximum undernutrition was found in children whose mothers were unskilled labourers by occupation, whereas children of housewives were found to be less undernourished [12].

In the present study maximum, underweight children belong to the upper lower class and wasted belong to the lower class. Logistic regression analysis also shows that families with a lower SES class have a high chance of having their children underweight (OR=1.12). Luke et al (2000) reported that socioeconomic status is directly as well as indirectly associated with a child's nutritional status. Poor socioeconomic status is manifested as hunger, which is directly associated with undernutrition. [13]. Arora D et al (2014) cross-sectional survey in, West Bengal shows that the nutritional status of children from lower socioeconomic classes was poor as compared to their counterparts who came from upper socioeconomic classes [14].

In our study as per WHO nutritional measurement criteria, 26.12% of children were underweight, 28.5% stunted, and 18.34% wasted. Many studies are reporting underweight children living in rural areas in a range of 18.3% to 56.30%. [15-18]. In the present study, 91.40% of children had continued their immunization schedule, various studies showed that immunization status has a positive relationship with the b/w nutritional status of children. [19] [20].

In the present study, major morbidity conditions among study participants were respiratory infections (28.32%) followed by diarrhea (18.21%). Nayak RK et al (2013) found in a similar study that acute respiratory infections were the most commonly reported morbidity in the past 15 days [21] S Vyas et al (2015) reported that diarrhea followed by ARI was the most common morbidity found in the study population. [12]. V Hanmanta et al (2018) found most common health morbidity observed was acute respiratory infection (ARI) followed by acute diarrheal disease [22].

In the present study, 20% of children were having some form of anemia measured by the presence of conjunctivitis pallor, scabies (21.51%) and dental caries (11.94%) were also the major morbidity conditions among children. Logistic regression analysis shows that children with dental carries have a significant impact on the underweight status of study subjects (OR=15.46, P=0.001). Narkhede et al (2012) and Nanjunda (2014) found that in those under five highest prevalent morbidity was anemia [23, 24]. Psoter et al (2005) found that caries of the primary dentition is associated with early childhood malnutrition [25]. Dasgupta et al (2014) found that 6% of study children were having skin and are significantly associated with nutritional status [26].

Conclusion

- Findings from the present study showed that children living in rural areas of Abhanpur Block in Raipur district have fewer underweight children (26.12%), stunting (28.05%), wasting (18.34%) as compared to the state average of underweight (39.6%), stunting (39.2%) and wasting (23.7%) in a rural area. In the present study, 26.3% of males were underweight as compared to 26% of females, wasting was seen by 20% of males and 16.8% of females. This demonstrates the better utilization of Anganwadi centres in rural areas of Abhanpur Block in the Raipur district. However, this study generalizes that every 4th Children living in rural areas of Abhanpur Block in Raipur district are underweight.
- Mothers' education, occupation, and socioeconomic status were the significant major social determinants for the nutritional status of rural children. In the present study, findings

- show that Illiterate mothers had more underweight (22.2%) children as compared to educated mothers. Similarly, wasting (22.2%) was high in illiterate mothers. In the present study, mothers working for daily wages have more children that are 25% underweight compared to 23.2% of children of housewives.
- In the present study, major morbidity conditions among study participants were respiratory infections (28.32%) followed by diarrhea (18.21%) as compared to the state average of ARI (2.2%) and diarrhea (8.6%) in rural areas. A strong and consistent association has been demonstrated between malnutrition and morbidity due to respiratory infections; Further, malnutrition is considered to be a more important risk factor for ARI than diarrhea.
- In the present study anemia was measured by the presence of pallor in study children and 20% of children were having anemia. In the present study, almost an equal number of male and female children were having nutritional anemia. Other morbidities were skin infections in form of scabies which is 21.51%, pallor (anemia) at 20%, and dental carries 11.94%. Dental carries have a significant impact on the underweight status of study subjects.

Contribution by author: SP: Supervision, review of literature, PB: the review of literature, analysis, data interpretation, DK: Data collections, methods validation, review.

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