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Original Article

Functioning of a Nutritional Rehabilitation Center against acceptable levels of care

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ABSTRACT

Background: Establishment of Nutritional Rehabilitation Centers (NRCs) is an initiative under National Rural Health Mission to provide institutional care for children with severe acute malnutrition (SAM). The aim of the study was to assess the effectiveness of nutritional interventional measures in improving the nutritional status of children admitted to an NRC.
Methods: A retrospective health facility–based descriptive study was conducted in the NRC, Rural Health Training Center, All India Institute of Medical Sciences, Raipur.
Results: A total of 765 children were enrolled in the NRC between March 2015 and November 2019, and majority (87.97%) were admitted as per weight for height/length (<-3SD) criteria. The total number of SAM children with complications were 428 (55.94%). Of the 724 total discharges, 498 (68.78%) were cured, 197 (27.2%) were nonresponders and 28 (3.87%) were defaulters.
Conclusion: The findings suggest factors affecting nutritional rehabilitation that are complex and require a more integrated management in the health system and community. Regular review, supportive supervision and identification of nutrient-dense food from locally available low-cost ingredients is the need of the hour.

Introduction

Complementary feeding is the process of starting other foods and liquids when breast milk alone is no longer sufficient to meet the additional nutritional requirements of infants — initiated after 6 months of age — a critical period of growth during which nutrient deficiencies and other morbidities contribute to higher rates of malnutrition among children.[1–4] To achieve optimal growth and development, the World

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Health Organization (WHO) recommends that infants should be exclusively breastfed for the first six months of life, followed by nutritionally adequate and safe complementary foods, while continuing to breastfeed for up to two years or beyond.[5–7]

One of four children born in India are of low birth weight (LBW). Infants with LBW gain some of the growth and development in ideal conditions of nutritional supplementation. On contrary, additional nutritional insults of inadequate breastfeeding and/or complementary feeding further deteriorate the child and make the child malnourished.[8]

Poor complementary feeding practices result in low weight for age or underweight (used to classify malnutrition and determine its prevalence), low height/length for age (stunting, result of chronic malnutrition) and low weight for height (nutritional wasting or emaciation, result of acute malnutrition).[9,10] Globally in 2018, wasting threatened the lives of an estimated 7.3% or 49 million children, and stunting affected an estimated 21.9% or 149 million children, all under five years of age. This means that more than 1 in 3 children are not growing well particularly in the crucial first 1000 days — from conception to the child's second birthday — and often beyond. Also, over 340 million children are suffering from deficiencies of essential micronutrients resulting in at least 1 in 2 children with hidden hunger.[11,12]

The burden in developing countries, especially low- and middle-income countries is significantly high.[13,14] In India, the prevalence of LBW is 27%, wasting is 21%, stunting is 38.4% and underweight is 35.7%. Although the nutritional status has improved over years (National Family Health survey (NFHS) 3 to NFHS 4), the rate is not satisfactory to achieve the global targets.[15,16] In Chhattisgarh, the prevalence of LBW is variably reported between 15% and 55%, wasting is 23.1%, stunting is 37.6% and underweight is 37.7% — all at or above the national average. The number of children aged 6–8 months receiving solid or semi-solid food and breast milk, which is the prevalence of introduction of complementary feeds, is not encouraging either (53.8%).[17] According to NFHS 4, only 11.1% of breastfeeding children aged 6–23 months received an adequate diet, only 8.4% nonbreastfeeding children aged 6–23 months received an adequate diet and only 10.9% of total children aged 6–23 months received an adequate diet.[17] Also in Central India, the minimum dietary diversity (MDD) is only 12%, minimum meal frequency (MMF) is only 32% and minimum acceptable diet (MAD) is only 5%. All these factors signify poor complementary feeding practices and, thus, the poor health of children younger than 5 years in the state.[18,19]

A number of strategies[20] have been developed to improve complementary feeding practices in India, and establishment of Nutritional Rehabilitation Centers (NRCs) is one of them. These NRCs were set up at health facilities under National Rural Health Mission, in many districts across the country.[21–23] Reproductive and Child Health Program, Ministry of Health and Family Welfare, Government of India, in collaboration with the United Nations Children's Fund (UNICEF) and WHO, child nutrition and health experts and program managers have drafted operational guidelines for the facility-based care of children with severe acute malnutrition (SAM) — weight-for-height/length Z-scores below -3SD of the median WHO child growth standards, mid-upper arm circumference <115 mm or presence of nutritional edema and medical complications.[24]

Active and early case finding is an important determinant of case fatality rate, program coverage and its impact. Community mobilization is crucial for active and early case-finding. The field workers auxiliary nurse midwives, Anganwadi workers (AWWs) and Accredited Social Health Activist (ASHAs)/Mitanins (in Chhattisgarh) screen and mobilize children with SAM to the nearest NRC along with their mothers. The child is given appropriate feeds based on locally available foods and monitored 24 × 7 for a total period of 2 weeks in the NRC. The weight is monitored to achieve the target weight gain of 15%. Mothers are given 150 Rupees/day to compensate for the wage loss and are counseled and trained to make nutrient-dense foods from locally available sources at the lowest cost possible. A follow-up chart is prepared for the child after discharge, which has 4 follow-up visits (on day 15, day 30, and then monthly for 4–6 months till the child weight for height reaches -1SD). The field workers receive an incentive of 100 Rupees per SAM child referred to NRC and 50 Rupees for accompanying the child during each follow-up visit.[24,25]

The functioning of such centers has not been studied in greater detail in the Indian context and Chhattisgarh in particular. This study aimed to assess the effectiveness of nutritional interventional measures in improving the nutritional status of children admitted to NRCs.

Material and methods

A retrospective health facility–based descriptive study was conducted in the NRC, Civil Hospital, Kurud block of Dhamtari district, Chhattisgarh; currently the Rural Health Training Center, All India Institute of Medical Sciences, Raipur. This center is operational since March 2015 and covers over 1700 children aged 0–6 years. The monthly performance reports of NRC from March 2015 to November 2019 were accessed with due permission from the block medical officer, Civil Hospital, Kurud. Each monthly report constituted the unit of observation, 56 in total.

The data related to sociodemographic characteristics, admission (criteria for and type of admission), duration of stay, proportion of children who achieved target (15%) weight gain and/or >8 g/kg/day and discharge criteria were captured. The exit indicators considered were recovery/cure rate (number of beneficiaries that have reached discharge criteria within the reporting period divided by the total exits), death rate and defaulter rate (number of beneficiaries that defaulted during the reporting period divided by the total exits). Defaulter is a child with SAM admitted to the ward but absent (from the ward) for three consecutive days, decreased/no weight gain (g/kg/day) and increased length of stay (weeks). The performance of NRC was considered acceptable if recovery rate is >75%, death rate is <5%, defaulter rate <15%, weight gain ≥8 g and length of stay is between 1 and 4 weeks.[24] The operational definitions were followed as per the "Operational Guidelines on Facility-Based Management of Children with Severe Acute Malnutrition".

In case of missing data, the registers of respective years were referred to and gaps filled. The quality of data in registers and monthly performance reports was checked, randomly taking 3 months for each year. The data were entered and analyzed using Microsoft Excel. Ethical clearance for this study was obtained from the institutional ethics committee. A written informed consent was obtained from the patients/guardian.

Results

Of the total 765 children enrolled in the NRC from March 2015 to November 2019, 148 children (19.34%) were aged between 6 months and 1 year, 471 children (61.56%) were between 1 and 3 years and 146 children (19.08%) were older than 3 years but younger than 5 years. There were 363 (47.45%) male and 402 (52.54%) female children. Majority of the children admitted were of Other Backward Class (OBC) caste category (549 [71.76%]), and 203 (26.53%) were from Scheduled Caste/Scheduled Tribe (SC/ST) (Table 1).

Most of the children, 673 (87.97%), were admitted as per weight for height/length (<-3SD) criteria. The total number of children with SAM admitted was 695 (90.84%), and total number of children with SAM and other complications were 428 (55.94%). New cases were the common type of admission, 711 (92.94%), as shown in Table 2. Overall, the average number of admissions per month was 14, and the average NRC days per month was 232. Almost all (98.82%) children had completed their immunization till date.

Table 1 – Distribution of children admitted based on sociodemographic determinants.

Variable		Total children n = 765
Age	6 months to 1 year	148 (19.3%)
	1–3 years	471 (61.6%)
	>3 years	146 (19.1%)
Sex	Male	363 (47.5%)
	Female	402 (52.5%)
Caste	SC	89 (11.7%)
	ST	114 (14.9%)
	OBC	549 (71.8%)
	General	10 (1.3%)
	Others	3 (0.3%)
Completion of immunization status	Complete	756 (98.8%)
	Incomplete	9 (1.2%)
Case referred to NRC by whom	Own/self	135 (17.6%)
	AWC	263 (34.4%)
	Mitanin/ASHA	270 (35.3%)
	ANM	18 (2.4%)
	NRC staff during VHND	1 (0.1%)
	OPD	29 (3.8%)
	Child ward	0 (0.0%)
	Rashtriya Bal Swasthya Karyakram	32 (4.2%)
	Others	17 (2.2%)

OPD, outpatient department; VHND, village health and nutrition day.

Table 2 – Distribution of children admitted based on admission criteria.

Variables		Total admissions (n = 765)
Type of admission	New	711 (92.9%)
	Readmission[a]	54 (7.1%)
	Relapse[b]	0 (0.0%)
Criteria for admission	Weight for height/length (<-3SD)	673 (88.0%)
	MUAC (<11.5 cm)	184 (24.1%)
	Edema (+++/severe)	18 (2.4%)
	With 2 criteria	172 (22.5%)
	With 3 criteria	18 (2.4%)
	Total SAM	695 (90.8%)
	Total SAM with complications	428 (55.9%)

[a] A defaulter who has come back to the center within 2 months.
[b] A patient who has been discharged as cured from the programme within the last 2 months but is again eligible for admission to NRC. A large number of relapses are often a sign of food insecurity.
MUAC, mid-upper arm circumference.

Of the 724 total discharges, majority were after 15 days (603 or 83.28%) of admission. The number of discharges with 15% target weight gain were 432 (59.66%), whereas 267 (36.87%) children had achieved weight gain of more than or equal to 8 g per kilogram body weight per day. The average number of discharges per month was 13, and 498 of the total discharged were cured, 197 were nonresponders and 28 were defaulters. Follow-up activities were also conducted in the NRC with average monthly expected follow-up of 37, and the actual average monthly follow-up of 41 (Table 3).

The recovery/cure rate of NRC at Kurud is 68.78%, defaulter rate is 3.87% and the average weight gain is 13.642 g per kilogram body weight per day. The average bed occupancy per month was 83.85%, whereas the average length stay was 18 days. No deaths were reported during the study period.

Discussion

The study group included more female children (52.54%) than male children (47.45%). Majority, 61.56%, of the children were aged between 1 and 3 years throwing light on the poor complementary feeding practices, MDD, MMF and MAD in the state of Chhattisgarh.[17,18] Between NFHS 3 and NFHS 4, the percentage of children younger than 6 months and exclusively breastfed rose from 46.4% to 54.9%, but the percentage of children aged 6–8 months receiving solid or semi-solid food and breast milk had fallen to 42.7% from 52.6%.[15,17] Understanding the factors associated with poor complementary feeding practices was beyond the scope of this study. The possible reasons could be that the frontline/field workers, namely AWWs and ASHAs, who are trained to promote Infant and Young Child Feeding and counsel caregivers of children were trained with more emphasis and focus on breastfeeding than on age-appropriate complementary feeding.[26,27] This has resulted in poor baseline knowledge levels about complementary feeding and

Table 3 – Distribution of children admitted based on discharge criteria.

Variables		Total children discharged (n = 724)
Duration of stay	Discharge less than 7 days	28 (3.9%)
	Discharge between 7 and 15 days	93 (12.8%)
	Discharged after 15 days	603 (83.3%)
Number of children discharged, who achieved target (15%) weight gain		432 (59.7%)
Total number of children achieved weight gain ≥8 g/kg/day		267 (36.9%)
Output (after discharge from NRC)	Cured	498 (68.8%)
	Defaulter	28 (3.9%)
	Nonrespondent	197 (27.2%)
	Referred to higher facility	1 (0.1%)
	Death in NRC/follow-up	0 (0.0%)

recommended age to introduce solids to children for all frontline/field workers.[28] There are a number of other factors associated with poor complementary feeding practices such as age of mother, socioeconomic status, birth order, number of antenatal care visits, place of delivery, access to mass media, maternal education and women's autonomy over finances and household decisions.[18,29,30]

Majority of the children were from marginalized populations such as OBC and SC/ST categories.[31] This stands true with NFHS 4 and other works similar to that of Dhanalakshmi et al, Panda et al, Taneja et al, Hashmi et al, and Paul.[32–36] AWWs and ASHAs/Mitanins, the so-called field workers, were responsible for most of the referrals to NRC and detailing their participation in case finding through active screening, case finding and referral reflects good program functioning.[24,37–39] However, low self/own referral may reflect knowledge, access and attitude issues regarding complementary feeding and malnutrition, especially in mothers.[40–42]

Majority of the children were admitted based on weight for height/length criteria (<-3SD) and MUAC criteria (<11.5 cm), characterizing the simplicity of using a quantitative measure or tool to screen malnourished children. High percentage of children had medical complications (>50%) which may suggest delay in seeking treatment and undiagnosed medical illness, reflecting complex pathology of malnutrition.[43,44]

More than 83% of children were discharged after 15 days of admission with less than 4% defaulter rate, which could be because of standard of care being good. Also, the average length of stay was 18 days, much higher than that reported in other studies (Table 4).[32,34–36,45]

The nutritional interventional measures undertaken at NRCs in improving the nutritional status of admitted children resulted in almost 60% children achieving their target weight gain of 15%, whereas an additional 37% had weight gain of more than or equal to 8 g per kilogram body weight per day, which is considered to be adequate during stay at the NRC. Although cure rates were much better than those reported in other studies across different NRCs, the rates are less than acceptable levels. This along with 27% nonresponders suggest factors that are complex and require a more integrated management in the health system and community.

Table 4 – Average length of stay.

Study	Average length of stay (in days)
Dhanalakshmi K and Gayathri Devi[32]	8.45
Taneja G et al[34]	14
Hashmi G and Kumar[35]	7.17
Paul GP[36]	12.28
Rastogi S et al[45]	12.01

Recommendations

1. To positively reinforce field workers towards screening, referral and counseling of malnourished children and their mothers
2. To strengthen other modes of referral (Village Health and Nutrition Day (VHND), Rashtriya Bal Swasthya Karyakram, knowledge of mothers to increase self/own referral)
3. To identify nutrient-dense foods from locally available ingredients, at low cost possible, and to study their effectiveness in improving weight and, thus, cure rate
4. Further studies to examine the complex factors resulting in nonresponders to treatment, delayed care seeking and ineffective referral mechanisms.

Disclosure of competing interest

The authors have none to declare.

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