International Journal of Contemporary Pediatrics
Suman RL et al. Int J Contemp Pediatr. 2023 Feb;10(2):215-220
http://www.ijpediatrics.com
pISSN 2349-3283 | eISSN 2349-3291

DOI: https://dx.doi.org/10.18203/2349-3291.ijcp20230087

Original Research Article

Prevalence of severe acute malnutrition among 6-59 months children from community-based SAM management program in Dungarpur district of southern Rajasthan: diving deeper through study of block-wise prevalence

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Received: 12 December 2022
Revised: 10 January 2023
Accepted: 13 January 2023

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ABSTRACT

Background: Acute malnutrition (severe and moderate) is a major public health problem in India and especially Rajasthan. National family health surveys now provide prevalence of SAM children till district level but there's an undenying need for data at even more granular, like block level, to assess the field reality in more depth. The present study tries to demystify the same at block level by studying data collected from a community-based SAM management program i.e., AMMA (acute malnutrition management action) program in Dungarpur.
Methods: As part of AMMA program, block wise data from 20 districts of Rajasthan was collected monthly during implementation and its dedicated MIS was used as the source of this data. The data includes information of all children screened in the age-group of 6-59 months in Dungarpur district which was subsequently analyzed and studied till block level. The SAM prevalence is assessed, using Mid Upper Arm Circumference (MUAC) of 6-59 months children. <12.5 cm of MUAC was considered as acute malnutrition while <11.5 cm of MUAC was considered as SAM as per WHO standards.
Results: A total of 1,13,547 children were screened (84.91%) in the study period. A total of 4829 children (4.25%) were found with Acute Malnutrition, out of which 4622 were identified with moderately acute malnutrition (MAM) and 207 are identified with SAM. Out of total 207 children with SAM, 118 were girls (57%) while 89 (43%) were boys. The prevalence of SAM children in the district came out as 0.18% whereas state prevalence is 0.9%. Among blocks the SAM prevalence varied from as low as 0.02% in Dowda and Chikhali to as high as 0.63% in Jothari block.
Conclusions: Prevalence of SAM in Dungarpur district is low at 0.18% but block-wise analysis helped in further disaggregating the burden. To identify all children with acute malnutrition in the district there's an urgent need to do screening based on WFH Z-score instead of complete reliance on MUAC tape.

Keywords: Severe acute malnutrition, Community based management, Acute malnutrition, Mid upper arm circumference

INTRODUCTION

India is considered as a major global economy and a country in epidemiological transition, but growth faltering rates are much above critical levels of 20 per cent, and need immediate attention to achieve the sustainable development goals (SDGs).[1] As children are the foundation of every nation but malnutrition is a truly universal problem considered India's silent emergency, the World Bank report says that the rate of malnutrition cases among children in India is almost five times more than in China, and twice than in Sub-Saharan Africa.[2] Malnourished children are more prone towards the risk of infection because of reduced immunity power, hidden co-morbidities and higher risk of death as estimated to be around 11 times higher as compared to the well-nourished children.[2] According to the National Family Health Survey (NFHS-5) 2019-21, India data showed that 32.1 per cent children below 5 years of age fall under the category of underweight, 19.3 percent wasted, 7.7 percent severely wasted in the country.[3] It can be observed that prevalence of malnutrition in children under 5 years of age is higher in Rajasthan as compared to national average for most of the nutritional indicators (Underweight, Wasting, etc.), Dungarpur on the other hand has better figures than both National average and state average. Similarly, when we see the SAM prevalence by MUAC (Children aged 6-59 months with MUAC <11.5 cm) in Rajasthan, it comes out to 1% whereas the National Average is 0.9% as per Comprehensive National Nutrition Survey (CNNS)[8]. No district wise data is available in CNNS Survey. It's important to note here that, MUAC has been extensively used for Screening and anthropometry purposes during AMMA Program so as to not miss out any children due to unavailability of growth monitoring devices (Figure 1).

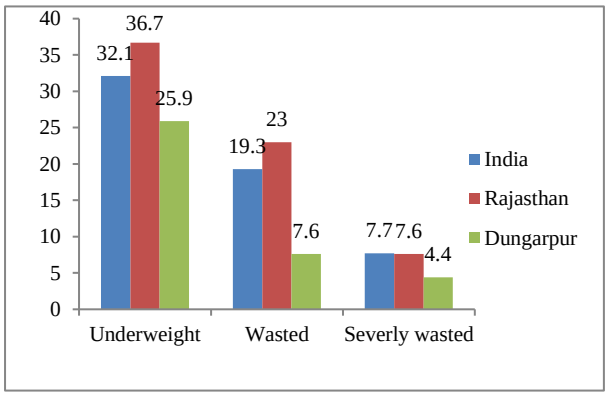

Figure 1: NFHS-5 comparative data of National, State and District.

Dungarpur, located in the southernmost tip of Rajasthan, is one of the least developed districts in the state and India at large. According to census of India 2011, it ranks 25th in terms of population, 31st in terms of area and 8th in terms of population density. The economy of Dungarpur district is mainly dependent on agriculture as 64.2% workers in the district are either cultivators or agricultural labourers. The literacy rate in Dungarpur district is 59.5 percent which is lower than the State Average (66.1%) and it ranks 27th among the other districts of the state.[5] In the National Family Health Survey 5th (2019-2021) and 4th (2015-16) survey report, it is observed that there is drastic change in child feeding practices and nutritional status. A positive sign of improvement can be observed in the survey report from NFHS 4th to 5th, there is a reduction of underweight (weight-for-age) and wasted (weight-for-height) category near to half and one fourth of severely wasted (weight-for-height) children below five years of age from previous status in the Dungarpur district.

Table 1: NFHS-5 and NFHS-4 survey report on child feeding practices and nutritional status.

Indicator	NFHS-4 (2015-2016) (%)	NFHS-5 (2019-2021) (%)	Change/ Improvement (%)
Underweight	53.4	25.9	27.5
Wasted	37.5	15.6	21.9
Severely wasted	16.1	4.4	11.7

The Scheduled caste and scheduled tribe population in Dungarpur district is 3.8% and 70.8% respectively whereas the State percent of Scheduled Caste and Scheduled Tribe population is 17.8% and 13.5% respectively. It falls in the tribal majority area under Udaipur division with poor health infrastructure coupled with limited health awareness has resulted in depriving health status for the local population (Census, 2011).[5] A save the children study from 2010 found that in Dungarpur as much as 30 percent of loans taken by poor households are used for health purposes. As parents become ill and are unable to work, medical costs escalate and households adopt various coping strategies that impact children negatively, as well as affect their long-term development opportunities. The most common coping strategy is to take children out of school to be at home and help with domestic chores or to send them into the laborer market.[6] The sociocultural framework also describes the firm beliefs in 'Bhopas' and harmful traditional treatment practices developing the challenges to overcome child mortality and nutritional related diseases.[7] Malnutrition is a condition which can be described as deficiencies, excesses or imbalances in a person's intake of energy, protein or macro-micro nutrients.[9] For a better life, nutrition plays a major role in every stage of human life. Improved nutrition helps to maintain overall health including physical, mental and cognitive as well as in inequality eradication. To combat malnutrition, government is constantly promoting and ensuring various community and facility-based interventions like Four Ante -Natal check-ups, Early initiation of breastfeeding, exclusive breast feeding, complementary feeding, supplementary nutrition program through departments of women and child development (DWCD) and medical, health and family welfare (DMHFW). In 2015, CMAM

was implemented in 10 high priority and 3 tribal districts of Rajasthan by the NHM as POSHAN (positive and optimum care of children through a social household approach for nutrition) (National health mission & government of Rajasthan, 2018, 2019). The project observed that around 88% of SAM children were cured to normal nutritional status after 12 weeks of outpatient therapeutic care using Energy Dense Nutrition Supplement (EDNS) (National health mission & government of Rajasthan, 2016). With this background in the year 2018, integrated management of acute malnutrition (IMAM), POSHAN Phase 2 was implemented in 20 districts of Rajasthan. After 12 weeks of treatment, 70.4% SAM children were cured, 12.2% defaulted and 17.4% were non-recovered and referred to malnutrition treatment center (MTC) for further treatment (National Health Mission & Government of Rajasthan, 2019).[10] Encouraged by the pilot program's success, Rajasthan scaled up its community management programme under POSHAN-II across 20 districts of Rajasthan involving 10,000 SAM children. This has been hailed as one of the largest CMAM projects in the country. The children were provided energy-dense nutrition supplements (EDNS) for two months resulting in a recovery rate of 75% and around 95% retained nutrition levels even after the stoppage of these supplements.[11-13] In context of the above, community management of acute malnutrition (CMAM), a community-based programme for management of acute malnutrition by the department of women and child development, Government of Rajasthan was initially rolled out in Dungarpur District, Rajasthan. A detailed guideline for the CMAM programme (named as AMMA) was released during the POSHAN Maah in 2020, and the program was scaled up to 20 districts of Rajasthan by integrated child development scheme (ICDS) run by DWCD in the year 2021. This program is different from previous C-SAM (CMAM 2014-15, IMAM 2018-19 programs, health lead) pilots in many aspects. It focuses on; It is a continuous program and children were screened door to door, identified, enrolled and referred (if needed) on MCHN-day, followed by weekly home visits, counseling, promotion of home-based energy dense feeding, regular monthly anthropometry and tracked regularly. It doesn't involve any Energy Dense Nutrient Supplement (EDNS) instead promotes home-based energy dense feeding through locally available nutritious and diverse foods groups along with supplementary provision of THR/Dry Ration provided by ICDS. This also has a provision of identification and tracking of MAM children as well, so that they can be prevented from falling into the SAM category. Under this study SAM children in the age group of 06 to 59 months were considered as children who can be effectively managed in their local surroundings without disturbing the daily routine of family life, minimizing the hospital stay during covid times. It is clearly understood that community approach can reach more uncomplicated SAM children with limited resources by inducing the practice of accepting the home-based energy dense locally available nutritious and diversified food groups, transferring the Anganwadi centers' services and good practices to the beneficiaries' mind by enriching their knowledge level, capacity building of field level workers and ultimately lowering the burden of facility-based care during COVID times.

Aim and objectives

The objectives of the study were; to assess the prevalence of different grades of malnutrition in SAM children at block level and to find out gaps to strengthen data collection and quality for improved program implementation.

METHODS

Study type, area, population and duration

This is a cross sectional study of the data from an ongoing Government program. This study was conducted in the tribal district Dungarpur located in Southern Rajasthan. The whole district with total 9 ICDS blocks having 2117 of Anganwadi centers (AWCs) was chosen for the study. Data collection period was from December 2021 to January 2022.

Sampling technique

A census sampling technique was used in this study, where every member of the population (children between the ages of 6 to 59 months enrolled in Anganwadi centers in the 9 ICDS blocks of Dungarpur) were included in the study.

Inclusion and exclusion criteria

All the children (1,33,733) belonging to the age group of 6 to 59 months enrolled in the AWCs in the 9 ICDS blocks of Dungarpur were chosen to form the study population. The SAM and MAM prevalence was calculated with the denominator being the number of 6 to 59 months of children that were screened out of the above target population in the study month. All children outside Dungarpur district and outside this age group were excluded.

Data collection, processing, analysis and research tool

Data was collected by ASHAs and Anganwadi Workers by Door-to-door screening and identification at Anganwadi centers. ASHAs conducted door-to-door screening of 6-59 months children using MUAC tapes and submitted reports to Lady Supervisors. Lady supervisors then checked and corrected the information if needed and after correction shared it at the block level office for data entry into Google Sheets. SAM prevalence was assessed with MUAC tapes due to its universal availability, which is in contrast to the otherwise gold standard for SAM identification, Weight-for-Height as availability of weight and height measuring instrument across the district is inconsistent. <12.5 cm of MUAC was considered as acute malnutrition while <11.5

cm of MUAC was considered as SAM as per WHO standards. Data was entered by block level national nutrition mission, (NNM) staff block program assistants (BPAs) to Google sheets. Data was analyzed using Microsoft Excel.

RESULTS

A total of 113,547 children were screened in 2117 Anganwadi centers (AWCs) in the month of December in the Dungarpur District under AMMA Program. This accounts for 84.91% screening in the district. The screening percentage ranged from as low as 43.91% in Chikhali to as high as 95.9% in Sagwara-II. 7 out of 9 blocks had more than 85% screening in the district (Figure 2).

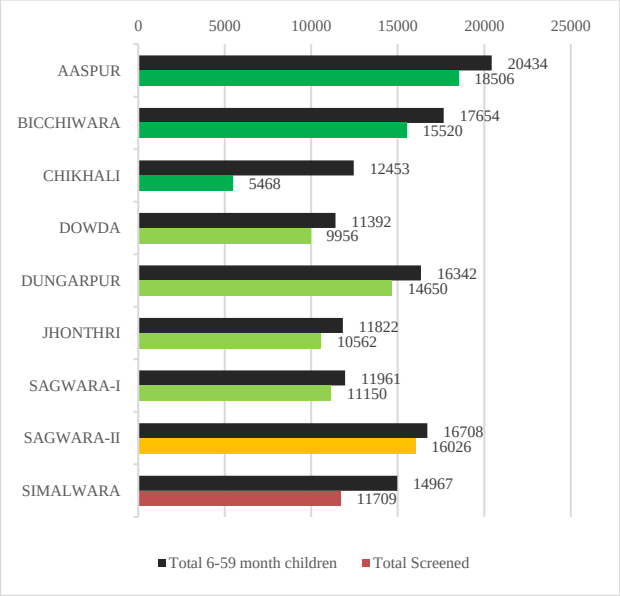

Figure 2: Target vs. total children screened.

As in case of Chikhali total Target population (Children from 6-59 months) was 12,453 whereas only 5,468 children out of those were screened in the study month. Block-wise absolute numbers of children screened is depicted in (Table 2). Global Acute Malnutrition (GAM) Children are defined as the total number of children which have MUAC less than 12.5 cm; which means that GAM is the summation of MAM and SAM children. It is a cumulative indicator to indicate total prevalence of acute malnutrition.

Percent prevalence of MAM, SAM and GAM among the 9 blocks is depicted in (Table 3). Dungarpur block had highest GAM prevalence at 7.21%, followed by Jhonthri at 6.85%, Simalwara at 6.49% and Sagwara-I at 6.34%. All of these blocks are at least 1% point higher than the state average as per CNNS (5.2%). On the other end, Aaspur, with more than 90% screening, had only 1.93% of GAM prevalence. Interesting to note that although GAM prevalence is higher in 4 out of 9 blocks, Overall, GAM prevalence in Dungarpur (4.25%) is lower than that in Rajasthan (5.2%).

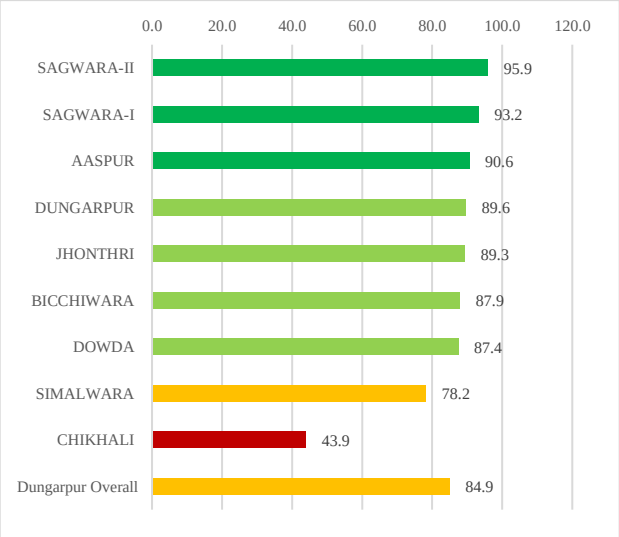

Figure 3: Percentage of children screened.

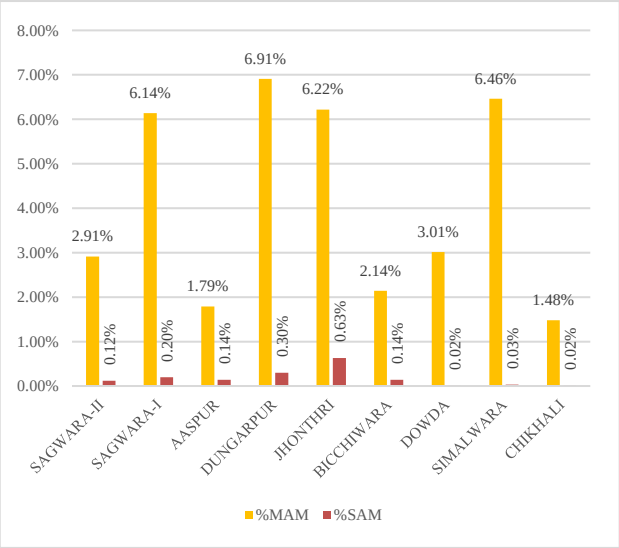

Figure 4: Block wise prevalence of acute malnutrition.

Moderately acute malnutrition (MAM) prevalence pattern is similar to GAM prevalence pattern; with the same 4 blocks having higher prevalence than state average, but Dungarpur district average MAM prevalence is only 4.07% as compared to 4.2% for the Rajasthan state. Severely acute malnutrition (SAM) shows a different pattern though. SAM prevalence in Dungarpur district is significantly low as compared to Rajasthan state average (1%). Also, no block has a higher prevalence of SAM children than 0.63% (Jhonthri) and hence all of them have lower prevalence than the state average. Chikhali (0.02%), Dowda (0.02%) and Simalwara (0.03%) virtually have no cases of severe wasting when measured through MUAC.

Table 2: Block-wise Screening numbers disaggregated by gender.

Block wise Screening	6-59 months children as per survey	Boys	Girls	% boys screened	% girls screened
Sagwara-II	16708	8519	8189	74.9	117.8
Sagwara-I	11961	6196	5765	93.3	93.1
Aaspur	20434	10504	9930	90.2	91.0
Dungarpur	16342	8169	8173	90.1	89.2
Jhonthri	11822	5984	5838	88.6	90.1
Bicchiwara	17654	9194	8460	87.3	88.5
Dowda	11392	5871	5521	87.6	87.2
Simalwara	14967	7486	7481	78.6	77.9
Chikhali	12453	3298	9155	86.3	28.7
Total	133733	65221	68512	86.2	83.7

DISCUSSION

Acute malnutrition prevalence in Dungarpur district overall is lower than the state average from CNNS's survey across all the indicators (MAM, SAM and GAM) but this does not show the complete picture.[5] If we go a level deeper and analyze the prevalence of acute malnutrition at block level, we could see many blocks where the prevalence is higher than the state average. In fact, the GAM prevalence goes beyond 7% in Dungarpur block.

Table 3: Block-wise prevalence of acute malnutrition.

Block	%MAM	%SAM	%GAM
Sagwara-II	2.91	0.12	3.03
Sagwara-I	6.14	0.20	6.34
Aaspur	1.79	0.14	1.93
Dungarpur	6.91	0.30	7.21
Jhonthri	6.22	0.63	6.85
Bicchiwara	2.14	0.14	2.28
Dowda	3.01	0.02	3.03
Simalwara	6.46	0.03	6.49
Chikhali	1.48	0.02	1.50

This highlights the fact that even in seemingly low prevalence districts, we will always tend to find clusters where the prevalence can be higher than the average and expected values and hence the need to bifurcate the available information at deeper levels is required and will be helpful in making a more renewed policy implementation strategy. 4 out of 9 blocks have higher than 6% MAM prevalence whereas district average and state average is only 4 and 4.2% respectively. Discussing challenges in implementation, the % screening shows that two blocks have considerably very low screening coverage. When inquired about the reason behind the lower screening coverage in these two blocks it was observed that both the blocks were having vacancy crisis at Lady Supervisor level. In fact, in the Chikhali block, 3 posts for LS were vacant and the remaining 3 supervisors had to coordinate the work of the 6 sectors in the block. Although, the overall screening percentage in the district was 85%, the remaining 15% of children account for a total 77,535 children in absolute numbers. Hence, it becomes imperative that % coverage of screening should constantly be increased to make the community management program universal in nature and to achieve that the directorate must ensure that all vacant positions of Front-line functionaries (FLFs) be immediately filled and regular training of all of the FLFs is carried out.

When comparing SAM prevalence in the district (0.2%), It is intriguingly low even when compared to just 1% of the state average as given by CNNS.[6-7]

The highest point a block touch is just 0.6% in Jhonthri. It's hence important to notice that this low percentage prevalence of SAM can be widely attributed to the fact that MUAC as a tool captures only a very small percentage of children with SAM cases with the current cutoff of <11.5 cm.[9-12] This low prevalence of SAM may be due to in the past two years the health department has done two pilot programs of CSAM but MAM prevalence is still high and there the children because of any sickness or acute disaster may slip to SAM. So, SAM prevention also includes MAM prevention. A 2021 study showed that with this cut-off MUAC's sensitivity is only 13.6%, i.e., only 13.6 cases out of 100 SAM cases are correctly identified by MUAC.[13]

Basically, saying that the actual prevalence might be around 4~5% in the worst-off blocks. This calls for immediate availability of weight and height measuring instruments so that a large number of SAM cases that are going undetected can be identified and treated accordingly. Although this type of granular analysis of data from government systems do highlight the trends across geographical variations within the district, there are natural limitations that come with such type of analysis. The data availability, data integrity, it's external validity and subjectivity due ongoing program, inaccuracies or errors, either due to human error during data collection or due to limitations in the data collection and management systems used, individual biases of the frontline functionaries are few of the caveats that need to be keep in mind while understanding these findings.

CONCLUSION

Analysing the situation on a deeper administrative level gives a better, clearer picture of the situation in the field. The district average of Dungarpur was better than Rajasthan state average, but there were blocks which had substantially higher prevalence of Acute malnutrition, which highlights the need of advanced efforts for such blocks, both in capacity of functionaries as well as monitoring of the C-SAM program. Availability of growth monitoring devices at all AWCs is a must and due to the lack of standard GMDs, we're missing out on a huge number of malnourished children, as the current/ emergency anthropometry tool (MUAC) lacks way behind in identifying all SAM cases successfully due to poor sensitivity at current cut-offs.

Recommendations

Authors recommend that in order to achieve universal coverage in the community health program it is imperative to ensure the frontline functionaries' availability across the region. All vacant positions need to be filled to improve the coverage.

ACKNOWLEDGEMENTS

Authors would like to thank Department of Women and Child Development, Government of Rajasthan, for supporting implementation of AMMA program by integrated child development scheme with technical support from UNICEF Rajasthan and Regional center of excellence (RCoE) Udaipur.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Suman RL, Tomar MS, Agrawal K, Dangi S, Yadav M, Singh M, et al. Prevalence of severe acute malnutrition among 6-59 months children from community-based SAM management program in Dungarpur district of southern Rajasthan: diving deeper through study of block-wise prevalence. Int J Contemp Pediatr 2023;10:215-20.