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SCREENING OF UNDER FIVE CHILDREN TO IDENTIFY MALNOURISHMENT: NEED OF TODAY

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Abstract:

Introduction: Malnutrition is one of the leading causes of morbidity and mortality in children under the age of 5 years in developing country like India. Severe acute malnutrition (SAM) remains a major health problem to children, as the mortality rates among SAM children are 9 fold higher than those in well-nourished children. In India there are about 57 million undernourished children according to National Family Health Survey (NFHS)-3. About 5 million children die every year due to the direct or indirect influence of malnutrition and the prevalence of severe underweight, and severe stunting among children in India is 16% and 24%, respectively. SAM needs to be prevented and treated effectively if the United Nations Millennium Development Goals of reducing children malnutrition and mortality by 50% by 2015 are to be met.

Material and Methods: Retrospective study is done from outpatient Department of Paediatrics at New civil hospital surat from January 2017 to October 2019.Measurements of height, length, weight and MUAC, assessment of visible severe wasting and bipedal edema was carried out. Weight was measured using digital weighing scale. In children ≥24 months, height was measured using Wall Mounted Stadiometer to the last completed 0.1 cm, and in children <24 months of age, length was measured using infantometer up to 0.1 cm. MUAC tape was used for measurement of MUAC (>6 months of age) up to 0.1 cm. The children having weight for height/length Z score < −3 SD and/or MUAC < 115 mm (6–59 months) and/or bilateral pedal oedema (other causes ruled out) were classified as SAM as per Government of India (GOI) guidelines.

Results: Complete anthropometric measurements were done on 11166 children of which 1624 (50.2%) were male and 1613 (49.8%) were female. 549 (4.92%) SAM patients were observed of which 266 (48.5%) were male and 283(51.5%) were female. No significant difference was observed in the distribution of male and female SAM patients with MUAC being 7.09± 2.56 cm. No significant seasonal variation in SAM was observed in all three years.

Conclusion: Prevalence of SAM was 4.92%. Both MUAC and Z-scoring showed fair degree of agreement to diagnose SAM among children aged 6-59 months.

Keywords: SAM, MUAC, Z score

Introduction

As per the sustainable development goal 3, target 3.2 lakhs about to end preventable deaths of children under 5 years of age and to reduce under-5 mortality to at least as low as 25/1000 live births by 2030 in all countries[i]. Malnutrition is one of the leading causes of morbidity and mortality in children under the age of 5 years in developing country like India. Severe acute malnutrition (SAM) remains a major health problem to children, as the mortality rates among SAM children are 9 fold higher than those in well-nourished children[ii]. Diets are frequently deficient in macronutrients like protein, carbohydrates and fat, leading to protein–energy malnutrition, micronutrients such as electrolytes, minerals and vitamins, leading to specific micronutrient deficiencies or both[iii].

SAM is diagnosed when the child has any one of the following criteria: weight for height (Wt/Ht) Z score <−3 standard deviation (SD), mid-upper arm circumference (MUAC) <115 mm or bipedal edema or visible severe wasting (anyone)[iv]. In India there are about 57 million undernourished children according to National Family Health Survey (NFHS)-3. About 5 million children die every year due to the direct or indirect influence of malnutrition and the prevalence of severe underweight, and severe stunting among children in India is 16% and 24%, respectively[v]. Also SAM is more prevalent in socioeconomically deprived communities[vi]. SAM needs to be prevented and treated effectively if the United Nations Millennium Development Goals of reducing children malnutrition and mortality by 50% by 2015 are to be met[vii].

With this background we planned a retrospective study with the primary objective to determine the

prevalence of SAM among less than 5 yrs old children in Surat district of Gujarat.

Material and Methods

A Retrospective study is conducted from out patient Department of Paediatrics in New Civil Hospital, Surat, Gujarat; from January 2017 to October 2019. Measurements of height, length, weight and MUAC and assessment of visible severe wasting and bipedal edema was carried out.

Weight was measured using digital weighing scale. In children ≥24 months, height was measured using Wall Mounted Stadiometer to the last completed 0.1 cm, and in children <24 months of age, length was measured using infantometer up to 0.1 cm. MUAC tape was used for measurement of MUAC (>6 months of age) up to 0.1 cm. The children having weight for height/length Z score < −3 SD and/or MUAC < 115 mm (6–59 months) and/or bilateral pedal oedema (other causes ruled out) were classified as SAM as per Government of India (GOI) guidelines

RESULTS

From January 2017 to October 2019 a total of 11166 children's were screened for the SAM attending the paediatric OPD of New Civil Hospital Surat Gujarat. Out of 11166 patients 5532 (49.54%) were male and 5634 (50.46%) were female. Complete anthropometric measurements were done on 11166 children. Data of these 11166 children were further analysed and included in this study.

SAM was diagnosed when the child has any one of the following criteria:

- Weight/Height Z score <−3SD
- MUAC <115 mm
- Malnutrition with bipedal edema or visible severe wasting.

Chart 1: Year wise screening of patients

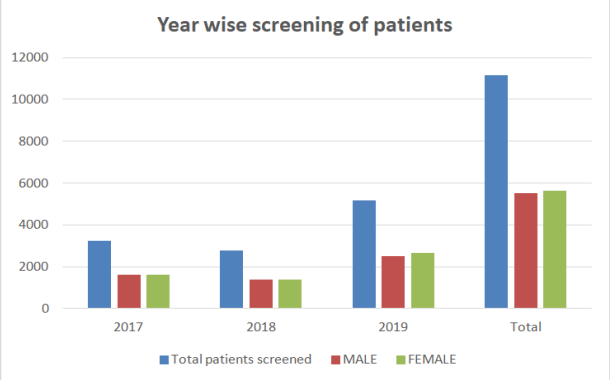

Table 1: Total patients screened

Year	Total patients Screened (6-59 months)	MALE	%	FEMALE	%
2017	3237	1624	50.2%	1613	49.8%
2018	2768	1396	50.4%	1372	49.6%
2019	5161	2512	48.7%	2649	51.3%
Total	11166	5532	49.5%	5634	50.5%

In year 2017 a total of 3237 patients were screened of which 1624 (50.2%) were male and 1613 (49.8%) were female. In 2018 out of 2786 patients screened 1396 (50.4%) were male and 1372 (49.6%) were female. In year 2019 up to October a total of 5161 patients were screened of which 2512 (48.7 %) were male and 2649 (51.3%) were female.

Chart 2: SAM

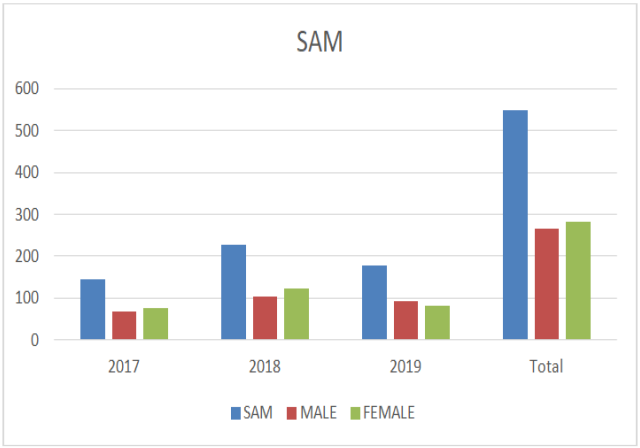

Table 2: Total SAM patients

Year	SAM	%	MALE	FEMALE
2017	144	4.45%	68 (47.2%)	76(52.8%)
2018	228	8.24%	104 (45.6%)	124(54.4%)
2019	177	3.43%	94(53.1%)	83(46.9%)
Total	549	4.92%	266 (48.5%)	283(51.5%)

Out of 11166 patients screened 549 (4.92%) SAM patients were observed of which 266 (48.5%) were male and 283(51.5%) were female. In 2017, 144 SAM patients were diagnosed of which 68 (47.2%) were male and 76(52.8%). In 2018, a total of 228 SAM patients were diagnosed of which 104 (45.6%) were male and 124(54.4%). In 2019, a total of 177 SAM patients were diagnosed of which 94(53.1%) were male and 83(46.9%).

No significant difference was observed in the distribution of male and female SAM patients.

Table 3: Yearwise MUAC

Year	MUAC (mean± SD)cm
2017	6.33± 2.21
2018	6.83± 1.99
2019	8.09 ± 3.48
Total	7.09± 2.56

Total MUAC is 7.09± 2.56, in year 2017 mean MUAC was 6.33± 2.21, in year 2018 mean MUAC is 6.83 ± 1.99 and in year 2019 mean MUAC is 8.09± 3.48.

Table 4: Year wise Standard Deviation of Wt/Ht

Year	Total No of patients screened	<-1 SD	<-2SD	<-3SD	<-4D
2017	3237	981 (30.30%)	533 (16.46%)	101 (3.12%)	43 (1.33%)
2018	2768	817 (29.51%)	414 (14.95%)	171 (6.18%)	57 (2.06%)
2019	5161	1241 (24.05%)	775 (15.12%)	127 (2.46%)	50 (0.97%)

Out of total screened patients of <5years in year 2017<-1SD, <-2SD, <-3SD and <-4D were 981(30.30%)**,** 533(16.46%), 101(3.12%) and 43(1.33%) respectively. In year 2018 <-1SD, <-2SD, <-3SD and <-4SD were 817(29.51%), 414(14.95%), 171(6.18%) and 57(2.06%) and in year of 2019 <-1SD, <-2SD, <-3SD and <-4SD were 1241(24.05%), 775(15.12%), 127(2.46%) and 50(0.97%) patients respectively.

Discussion

Malnutrition is a major public health problem in the developing world, especially in southern Asia and sub-Saharan Africa[viii]. Bacterial and parasitic diseases in developing countries and its high prevalence contributes greatly to malnutrition[ix]. Also malnutrition increases susceptibility and severity of infections, and is thus a major component of illness and death from disease[x]. Malnutrition is one of the most important risk factor for the burden of disease in developing countries, about 3,00,000 deaths per year and is indirectly responsible for about half of all deaths in young children and risk of death is directly correlated with the degree of malnutrition[xi, xii]. Poverty and illiteracy is the main underlying cause of malnutrition and its determinants. The degree and distribution of protein–energy malnutrition and micronutrient deficiencies in a given population depends on many factors: the political and economic situation of the country , the level of education and sanitation of the people , the season and climate conditions, cultural and religious food customs, food production, breast-feeding practices, prevalence of infectious diseases, the existence and effectiveness of nutrition programs and the availability and quality of health services[xiii].

In this study, we screened a total of 11166 children aged 6 months to 59 months to look for the prevalence of SAM. We observed that in this three years study the prevalence of SAM was 4.92% (549 cases) with 95% CI (confidence interval) of 0.0453 – 0.0533. In a study from Puducherry by Shewade HD et al, the prevalence of SAM among children from slums was reported as 3.6% (95% CI: 1.9–6.1)[xiv]. Rapid Survey on Children 2013–2014, by Government of India, documented the prevalence of severe wasting, severe underweight, and severe stunting as 4.6%, 9.4%, and 17.3%, respectively[xv].

In the present study out of 549 SAM cases, male were 266 (48.5%) and 283(51.5%) were female. These findings contrasted with other studies in which the percentage of male were higher than female,[xvixvii]. Mean MUAC in our study was 7.09± 2.56 cm. MUAC of 115-125mm and <115 mm respectively is used for community screening[xviii].In a study it was shown that Wt/Ht method as a more sensitive indicator of child malnutrition as more than double children identified to having SAM compared to MUAC[xix].

Out of total screened patients in year 2017, <-3SD and <-4SD were, 101(3.12%) and 43(1.33%) respectively. In year 2018, <-3SD and <-4SD were 171(6.18%) and 57(2.06%) and in year of 2019, <-3SD and <-4SD were, 127(2.46%) and 50(0.97%) patients respectively. In a study by Briend et al concluded that both MUAC<115 mm and Wt/Ht <−3SD carry a great risk for death[20] . Stunting levels in India are higher than African countries[21]. Also, it is shown that, low MUAC score (and a Wt/Ht>−3) might put a child at a greater risk to succumb to death from infectious diseases which need a typical Th1 response (e.g. viral infections) whereas a low Wt/Ht Z score might put a child at a higher risk for death by infectious diseases requiring an adequate humoral immune response[21].

Conclusion

Prevalence of SAM in this study was 4.92%. Both MUAC and Z-scoring showed fair degree of agreement to diagnose SAM among children aged 6-59 months. This may have important implications for screening, diagnosis and management of SAM.

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