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ORIGINAL RESEARCH

A Hospital Based Prospective Study to Assess the Risk Factors of Severe Acute Malnutrition (SAM) in Infants Below 6 Months of Age

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ABSTRACT

Background: Acute malnutrition is a public health problem of epidemic proportions. Feeding approaches for infants who are under 6 months of age with severe acute malnutrition should prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother or other caregiver. The aim of this study is to identify the various risk factors and determinants of severe acute malnutrition as defined by WHO growth reference standards in infants aged below 6 months of age at district hospital in Rajasthan.

Materials& Methods: A prospective observational study was conducted in the Department of Pediatrics, District hospital, Dholpur, Rajasthan, India during one year period. 30 comprised infants with SAM as defined by current WHO guidelines: weight- for- length Z- score (WLZ) <−3 and/or bilateral nutritional oedema (WHO, 2013); the other comprised age- and sex- matched infants who were not severely malnourished (control group) defined as WLZ≥−2to<2and mid- upper- arm circumference (MUAC)≥125 mm.

Results:Mean age of Cases and Controls was 16.03±1.18 and 20.38±1.23 weeks respectively. Mean length of infants was 60.3±3.12 cm in cases and 67.7±2.78 cm in control group, which was statistically significant (P<0.05*). The statistically significant of MUAC (mm) in between groups, which was shorter arm circumferences in malnourished infants. The duration of exclusive breast feeds was less (8.9±1.86 weeks) as compared to control group (20.8±4.36 weeks), which was statistically significant (P<0.05*).Mothers of the SAM infants were significantly lighter, shorter, and had lower MUAC than control mothers.

Conclusion: The study findings will help to increase the knowledge about the factors associated with severe acute malnutrition. There is a statistical correlation of Severe Acute Malnutrition with rural area, maternal Illiteracy and low socioeconomic status, and failure of exclusive breast feeding for 6 months.

Keywords:SAM, Infants, Risk factors, Mother.

INTRODUCTION

Acute malnutrition is a public health problem of epidemic proportions. Right now 52 million children of the age group less than five years' experience acute malnutrition and 34 million of them are bound to have Severe Acute Malnutrition (SAM).[1]According to the World Health Organization(WHO), starvation and malnutrition are the hazardous conditions to the world's

public health.[2]Malnutrition not only increases their risk of death or disability from common pediatric illnesses, such as respiratory tract infections and diarrhea, but also causes deficits in intellectual development and long-term health.[3-5]In infants who are under 6 months of age, severe acute malnutrition is defined by a very low weight-for-length or the presence of bilateral pitting oedema. Severe acute malnutrition is increasingly being recognized in infants under 6 months of age and is often associated with higher mortality in young infants than in older infants and children.[6]

In addition to causative factors such as low birth weight, persistent diarrhoea and chronic underlying diseases or disability, the development of severe acute malnutrition in infants under 6 months of age commonly reflects suboptimal feeding practices, especially breastfeeding practices.[6]

There are important physiological differences between young infants and older children that may require modified management approaches or clinical interventions. Clinical signs of infection and hydration status may also be more difficult to identify and interpret in the younger infant. WHO has developed a set of recommendations for the identification and management of severe acute malnutrition in infants who are under 6 months of age.[6] Feeding approaches for infants who are under 6 months of age with severe acute malnutrition should prioritize establishing, or re-establishing, effective exclusive breastfeeding by the mother or other caregiver.[6]The aim of this study is to identify the various risk factors and determinants of severe acute malnutrition as defined by WHO growth reference standards in infants aged below 6 months of age at district hospital in Rajasthan.

MATERIALS & METHODS

A prospective observational study was conducted in the Department of Pediatrics, District hospital, Dholpur, Rajasthan, India during one year period. 30 comprised infants with SAM as defined by current WHO guidelines: weight- for- length Z- score (WLZ) <−3 and/or bilateral nutritional oedema(WHO, 2013); the other comprised age- and sex- matched infants who were not severely malnourished (control group) defined as WLZ≥−2to<2and mid- upper- arm circumference (MUAC)≥125 mm. Exclusions were infants from twin/multiple pregnancies and those with obvious congenital anomalies that could affect feeding (e.g., cleft lip or palate).

METHODS

Detailed clinical history including child's Personal data (age, sex, religion, area, birth weight); Immunization history, developmental history, nutritional history including feeding practices was obtained using a predesigned questionnaire. Modified Kuppuswamy scale was used for scoring socioeconomic class. Detailed clinical examination and anthropometric measurements-weight, height and mid arm circumference was recorded.

STATISTICAL ANALYSIS

Simple distribution of the study variables and the cross tabulation were applied. Student t-test was applied to compare the means of variables. Chi-square ($\chi 2$) was done for statistical significance. Data was analyzed using SPSS 21.0 V software. p-value of<0.05 significant.

RESULTS

Mean age of Cases and Controls was 16.03±1.18 and 20.38±1.23 weeks respectively. Out of 30 SAM Cases, 60% were from rural area whereas 70% of controls belonged to rural region. Twenty-one (70%) mothers of Cases were Illiterate, whereas only 30 % of mothers in Controls were illiterate. Twenty-six (86.66%) Cases belonged to lower & upper lower, whereas 83.33% controls. Majority of cases (70%) had <2.5 kg body weight in both groups.

Mean length of infants was 60.3±3.12 cm in cases and 67.7±2.78 cm in control group, which was statistically significant (P<0.05*). The statistically significant of MUAC (mm) in between groups, which was shorter arm circumferences in malnourished infants. The duration of exclusive breast feeds was less (8.9±1.86 weeks) as compared to control group (20.8±4.36 weeks), which was statistically significant (P<0.05*).Mothers of the SAM infants were significantly lighter, shorter, and had lower MUAC than control mothers (table 1).

Table 1: Sociodemographic characteristics of the study participants

Socio-demographic		SAM (N=30)	Control (N=30)	P-value
Age (in weeks)		16.03±1.18	20.38±1.23	<0.05*
Sex	**Male**	10	10	1.00
	Female	20	20	
Area	**Rural**	18	21	<0.05*
	Urban	12	9	
Religion	**Hindus**	24	22	>0.05
	Muslims	5	6	
	Others	1	2	
Education	**Illiterate**	21	15	<0.05*
	Primary	7	13	
	Higher	2	2	
Socio-economic status	**Lower**	18	9	<0.05*
	Upper lower	8	16	
	Lower middle	4	3	
	Upper middle	0	2	
Birth weight	**<2.5 kg**	21	18	>0.05
	≥2.5 kg	9	12	
Length (cm)		60.3±3.12	67.7±2.78	<0.05*
MUAC (mm)		102.5±12.18	130.5±8.92	<0.05*
Duration of exclusive breast feeding (wks)		8.9±1.86	20.8±4.36	<0.05*
Mother's BMI (kg/m^2)		21.2±3.30	22.5±3.42	>0.05

Chi-square test

DISCUSSION

Malnutrition is the leading cause of morbidity and mortality among children due to acute illness and its adverse effects.

33.33% among cases were male and 66.66% were female. There was no significant association between gender and SAM with p- value of 1.00. Similar observations were made by Iqbal et al., in their study done in Bangladesh (240 males and 239 females) and Abate et al, study done in Nairobi, Ethiopia (51.2% were male and 48.8% were female).[7,8]

65% of participating infants were from rural region whereas only 35% belong to urban region. There was a significant association between SAM and rural region with p value <0.05. In rural areas inadequacies in nutrition and health education, nutritional surveillance, nutritional rehabilitation, primary health care, early diagnosis and prompt treatment etc. contribute to and perpetuate malnutrition.

Amsalu S et al in their study found that maternal illiteracy is one of the important risk factors associated with child malnutrition.[9] Studies done by Dhatrak PP et al.[10] at NKP Salve institute of medical Sciences, Nagpur in and Paramita and Senugupta et al[11] done in Urban slum of Ludhiana have identified maternal education as a significant determinant of child nutrition with illiterate mothers having more underweight children (p=0.004).

Our study showed statistically significant association between low socioeconomic class and severe acute malnutrition (p-value <0.05*). Goyal S et al in their study at Madhya Pradesh, found that poor socioeconomic status is a risk factor for SAM.[12] In a similar study done by Solomon Amsalu et al found that the socioeconomic risk factors for severe acute malnutrition were maternal illiteracy (OR=3.83, 95% CI 1.93-7.67), paternal illiteracy (OR=2.04, 95% CI 1.13- 3.71), monthly family income of less than 50 USD (OR =3.44, 95% CI 1.66-7.20) and large family size with the number of children greater than 3 (OR=1.96, 95% CI 1.04-3.73).[9] In a study done at NKP Salve institute of medical sciences at Nagpur, low socioeconomic status was associated with malnutrition in 74.44%. [10]

Our results also highlight the need to consider maternal factors when evaluating potentially at- risk infants. For instance, our observed association between SAM infants and maternal anthropometric deficit on univariate analysis is consistent with other evidence that maternal nutritional status has both short- and long- term associations with infant health.[13] That supplementing undernourished mothers might have also benefits for their infants is biologically plausible but needs more evidence.[14]

In this study 80% of controls were given exclusive breast feeding for 6 months whereas only 40% Cases were given exclusive breast feeding till 6months of age with p value of <0.05. Similar results were seen in other studies. Solomon amsalu found that lack of exclusive breastfeeding in the first six months of age was associated with severe malnutrition (OR=3.00, 95% CI 1.58-5.73).[9]

CONCLUSION

The study findings will help to increase the knowledge about the factors associated with severe acute malnutrition. Not many community-based case-control studies done in India to identify the risk factors. There is a statistical correlation of Severe Acute Malnutrition with rural area, maternal Illiteracy and low socioeconomic status, and failure of exclusive breast feeding for 6 months.

REFERENCES

1. What is acute malnutrition - Action Against Hunger [Internet]. [cited 2014 Sep 10]. Available from: http://www.actionagainsthunger.org.uk/what-we-do/about-acutemalnutrition/what-is-acute-malnutrition/.
2. Bahariah Baharin. malnutrition: Introduction [Internet]. [cited 2014 Sep 10]. Available from: http://questgarden.com/78/83/4/090330190842/.
3. Black RE, Allen LH, Bhutta ZA, et al; Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: global and regional exposures and health consequences. Lancet. 2008;371:243–60.
4. Black RE, Victora CG, Walker SP, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet. 2013;382:427– 51.
5. Victora CG, Adair L, Fall C, et al; Maternal and Child Undernutrition Study Group. Maternal and child undernutrition: consequences for adult health and human capital. Lancet. 2008;371:340–57.
6. Kerac M, Blencowe H, Grijalva-Eternod C, et al. Prevalence of wasting among under 6-month-old infants in developing countries and implications of new case definitions using WHO growth standards: a secondary data analysis. Arch Dis Childhood. 2011;96:1008–13.
7. Hossain IM, Yasmin R, Kabir I. Nutritional and immunization status, weaning practices and socioeconomic conditions of under five children in three villages of Bangladesh. Ind J Pub Health. 1999;43(1):37-41.

8. Abate G, Makau KW, Muroki NM. Hygiene and health-seeking behaviors of households as predictors of nutritional insecurity among preschool children in urban slums in Ethiopia the case of Addis Ababa. South African J Clinic Nutrit. 2001; 14(2):56-60.
9. Amsalu S, Tigabu Z. Risk factors for severe acute malnutrition in children under the age of five-A case-control study. Ethiop. J. Health Dev. 2008;22(1).
10. Dhatrak PP, Pitale S, Kasturwar NB, Nayse J, Relwani N. Prevalence and Epidemiological Determinants of Malnutrition among Under-Fives in an Urban Slum, Nagpur. Natl J Community Med. 2013;4(1):91-5.
11. Sengupta P, Philip N, Benjamin AI. Epidemiological correlates of under-nutrition in under-5 years children in an urban slum of Ludhiana. HPPI. 2010;33(1):1-9.
12. Goyal S, Agrawal N. Risk factors for severe acute malnutrition in central India. Inter J Medical Sci Res Prac. 2015;2(2):70-2.
13. Liu, P., Xu, L., Wang, Y., Zhang, Y., Du, Y., Sun, Y., & Wang, Z. Association between perinatal outcomes and maternal pre- pregnancy body mass index. Obesity Reviews. 2016;17:1091–102.
14. Stevens, B., Buettner, P., Watt, K., Clough, A., Brimblecombe, J., & Judd, J. The effect of balanced protein energy supplementation in undernourished pregnant women and child physical growth in low- and middle- income countries: A systematic review and meta- analysis. Maternal & Child Nutrition.2015; 11(4): 415–32.