

## REPORT FROM THE FIELD

**A study of Community Based Nutritional Intervention and prevention of malnutrition**

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**Abstract**

**Background:** PEM is one of the major health and nutritional problem in India. It is not only an important cause of childhood mortality and morbidity but also leads to permanent impairment of both physical and mental growth of those who survive. Malnutrition is implicated in >50% of deaths of <5 children (5 million/yr). Improving nutrition for children is crucial in meeting two of the Millennium Development Goals. According to national family health survey-3 there is considerable variation across states with Madhya Pradesh recording the highest rate for underweight children (60.3%) and Kerala among the lowest (28.8%). The great majority of cases of PEM nearly 80% are intermediate that is mild and moderate cases which frequently go unrecognized. These are the fact that made us to pick this issue in order to benefit the children of locality to some extent. **Objectives:** To identify under 5 year children with malnutrition, To demonstrate the method of preparing high protein mix diet and to educate mothers about adequate recommended diet as per age of children, To find out whether high protein mix improves nutritional status of identified malnourished children. **Methodology:** It was cross sectional and interventional study carried out in two villages of Jabalpur districts during the period of three months among 100 under five children. We had screened them and calculated weight for age (%) and categorized them according to Gomez Classification that is normal, mild, moderate and severe malnutrition. Intervention was done on malnourished children then 4 follow ups at the interval of 15 days. **Intervention strategies:** Nutrition education and provision of High Protein Mix Diet. **Result:** 12% children were identified as malnourished where 7% were having mild grade malnutrition and 5% with moderate grade of malnutrition. Among male there were 14.04% children were malnourished while among female 9.3% were malnourished. After intervention 50% children were showing change in the grade where one shifted to normal grade and 4 to mild grade. Weight of malnourished children steadily increasing during follow-up. **Conclusion:** Regular and proper age wise dietary intake and High protein mix diet can significantly contribute to correct malnutrition at community level.

**Key Words**

PEM; High Protein Mix; Community Based Nutritional Intervention

**Introduction**

Protein Energy Malnutrition (PEM) is one of the major health and nutritional problem in India. It is not only an important cause of childhood mortality and morbidity but also leads to permanent impairment of both physical and mental growth of those who survive (1). Inadequate intake of food

both in quality and quantity infection, poor environmental condition, poor maternal health and large family size are the major contributory factors. In India, around 46% of all children below the age of 3 are too small for their age, 47% are underweight and at least 6% are wasted. According to National Family Health Survey - III there is considerable

variation across states with Madhya Pradesh recording the highest rate for underweight children (60.3%) and Kerala among the lowest (28.8%). Malnutrition in early childhood has serious, long-term consequences because it impedes motor, sensory, cognitive, social and emotional development. Malnutrition is implicated in >50% of deaths of <5 children (5 million/yr). Improving nutrition for children is crucial in meeting two of the Millennium Development Goals. Highly prevalent in developing countries among <5 children; severe forms 1-10% & underweight 20-40%. In 2000 WHO estimated that 32% of <5 children in developing countries are underweight (182 million). 78% of these children live in South-east Asia & 15% in Sub-Saharan Africa.

According to NFHS-3, carried out 2005-06 among India's children under the age of three- 40% are underweight, 45% are stunted, 23% are wasted. The great majority of cases of PEM nearly 80% are intermediate that is mild and moderate cases which frequently go unrecognized. These are the fact that made us to pick this issue in order to benefit the children of locality to some extent.

### Aims & Objectives

1. To identify under 5 year children with malnutrition.
2. To demonstrate the method of preparing high protein mix diet and to educate mothers about adequate recommended diet as per age of children.
3. To find out whether high protein mix improves nutritional status of identified malnourished children.

### Material and Methods

A Cross sectional interventional study. **Study place:** Jodhpur tola and Jodhpur padav. **Study period:** 3 months. **Study subjects:** 12 malnourished children who were screened out among 100 under five children in 2 villages. **Inclusion criteria:** malnourished children under 5 year of age. **Exclusion criteria:** Children above 5 yrs, well nourished, those who are not willing to participate, severely ill children.

We had screened 100 under 5 year children and calculated weight for age (%) and categorized them according to Gomez Classification that is normal, mild, moderate and severe malnutrition. We had got 12 malnourished children out of 100. We had started our intervention on them then 4 follow ups at the interval of 15 days.

### Intervention strategies: NUTRITION EDUCATION:

We counselled the mother of malnourished children especially the need and the importance of proper diet. We educated the mothers of identified malnourished children to feed their children accordingly-

- 6-12 month- breast feeding+3 times a day meal , if not breast fed- 5 times a day meal (1 small bowl at a time)
- 12 months-2 yrs- 5 times a day. (1 and a ½ small bowl)
- 2 yrs and above – 3 time's main family meal in between two nutritional fruits, or milk, eggs etc.

We had prepared HPMD with previous ingredients by taking reference from NRC

On the day of demonstration in anganwadi we demonstrated the method of preparing HPMD among the mothers of malnourished children. On every 15th day we provided them HPMD and weight them upto 2 months.

**Educational Tools:** charts and audio video aids, Demonstration for preparation of HPMD

### Results

With the age risk of malnutrition is decreasing as per above table. Children below the age of two year were more at risk for malnutrition compared to children above the age of two year. And it was statistically significant Chi square = 0.520, P =0.471, OR= 1.592 (95%CI= 0.446 -5.678)33% of Female were suffering with malnutrition as compared to male children which was higher i.e. 67%. Sex specific distribution is also similar as male 14.04% were malnourished compared to female i.e. 9.3% and is also not significant statistically. Chi square = 0.028, P =0.868, OR= 1.125 (95%CI= 0.281 -4.509).

This table reflecting that who having more siblings were more malnourished compared to having no sibling or less. Statistically it was not significant. Chi square = 1.160, P =0.281, OR= 0.330 (95%CI= 0.040 - 2.721)

Table shows all malnourished children belonged to lower middle class.

#### PREVALENCE OF MALNUTRITION

$$\frac{12}{100} \times 100 = 12\%$$

▶ % OF CHILDREN SHOWING CHANGE IN THE GRADE  
= 58.33% were showing change in grade

▶ % OF MOTHER ADOPTED RECOMMENDED DIET FOR THEIR CHILDREN  
=80%

### Discussion

This study successfully demonstrated the rehabilitation of malnourished children in their home environment. Only one of the children had any acute complications and did not require referral to a tertiary care facility. These children were closely monitored fortnightly and counseling to mothers helped in successful weight gain as almost all the children showed improvement in their weight. Only one had infection during the phase of rehabilitation. This is contrary to hospital based care where the child is exposed to cross infections. Cost of care was minimal as the family was at home and they did not incur traveling cost nor did they have to interrupt their routine work. In addition the child was also safe from infections which would have added to the cost of care. Community based therapeutic programmes in Malawi, Ethiopia, and Sudan have shown the cost effectiveness of community based rehabilitation varying from US \$12 to US \$132/year of life gained. That could be studied further in our area.

Compliance was not a problem as the mother did not have to visit a health facility and she got advice at her door step as may be the case in hospital based care. WHO formulated F100 diet - a liquid based diet has been used in the rehabilitation of severely malnourished children in the hospital. This is not recommended by WHO to be used at home as under unhygienic conditions it can serve as an excellent growth medium for pathogenic bacteria. Non milk diets too have been used but have been found to be less effective. Alternatives to F100 diet suggested are ready to use food (RTUF) from locally available ingredients. These have resulted in higher weight gain than F100. And it was also found in our study too.

## Conclusion

In this study we used a High Proein Mixed Diet made from local foods which is easy to prepare, has an adequate shelf life and provides high calories. The diet was accepted and tolerated as evidenced by absence of vomiting or diarrhea as well as satisfactory weight gain. A longer full scale project can be planned to further consolidate this approach and use of our locally prepared high protein supplement.

We conclude that regular adequate age wise dietary intake and high protein powder can significantly contribute to correct malnutrition problem in community. A larger study at multiple sites should be undertaken to prove the effectiveness of this approach in India.

## Recommendation

Malnutrition among under five children is a big challenge before Madhya Pradesh. Though we have Nutritional Rehabilitation Centres in almost all districts, which deal with SAM children only we need Community based Nutritional Rehabilitation to combat the big challenge of Malnutrition.

## Limitation of the study

It is small field based experience but required a large study at multiple sites of Madhya Pradesh to prove this community based model.

## Relevance of the study

There is no intensive Community based Nutritional rehabilitation programme except ICDS at community level.

## Authors Contribution

NAT: Conceptualization, Data Analysis and Script writing, PK: Guiding though out project implementation, SN, AC, AS, AS, NM, MB: Data collection, implementation of intervention and Follow up.

## References

1. Park's Text book of Preventive and social Medicine, 22nd edition
2. United Nations 5th report on the World nutrition status. In SCN News, United Nation System, 2004: pp 20-24.
3. National Family Health survey(NFHS 2005-2006) India National Report
4. UNICEF percentage of under-five suffering from underweight (moderate and severe) (1995 - 2003). Demographic and health survey (DHS), Multiple Indicator Cluster Surveys (MICS), World Health Organization (WHO) and UNICEF.
5. WHO. Management of severe malnutrition: a manual for physicians and other senior health workers. Geneva: World Health Organization. 2002.
6. Ashworth A, Chopra M, McCoy D, Sanders D, Jackson D, Karaolis N, *et al*. Who guidelines for management of severe malnutrition in rural South African hospitals: effect on case fatality and the influence of operational factors. *Lancet* 2004; 363: 110-5.
7. Ashworth A, Khanum S. Cost effective treatment for severely malnourished children: What is the best approach? *Health Policy Plan* 1997; 12: 115-21.
8. Cuming Puoane T K, Sanders D, Ashworth A. Why do some hospitals achieve better care of severely malnourished children than others? Five year follow up of rural hospitals in Eastern Cape, South Africa. *Health Policy Plan* 2008; 23: 428-37. Collins S. Changing the way we address severe malnutrition during famine. *Lancet* 2001; 358:498-501.
9. Ashworth A, Khanum S. Fighting malnutrition from hospital to home *Child Health Dialogue* 1996; 6-7.
10. Khanum S, Ashworth. Controlled trials of three approaches to the treatment of severe. *Lancet* 1994; 344: 24-31.
11. Gaboulaud V, Dan Bouzoua, Brasher C, Fedida G, Gergonne B, Brown V. Could nutritional rehabilitation complement or

replace centre based therapeutic feeding programmes for severe malnutrition. *J Trop Paediatric* 2007; 53: 49-51.

12. Cilberto MA, Manary MJ, Ndekha MJ, Briend A, Ashorn P. Home based therapy for oedematous malnutrition with ready -to-use-therapeutic food. *Acta Paediatr* 2006; 95: 1012-5.
13. Cilberto MA, Sandiqe H, Ndekha MJ, Briend A, Cilberto HM, Manary MJ. Comparison of home based therapy with ready to use therapeutic food with standard therapy in the treatment of malnourished Malawian children: a controlled, clinical effectiveness trial. *Am J Clin Nutr* 2005; 81: 864-70.
14. Collins S, Sadler K, Dent N, Khara T, Guerrero S, Myatt M, *et al*. Key issues in the success of community-based management of severe malnutrition. *Food Nutr Bull* 2006; 27 (3 Suppl): S 49-82.
15. Savadogo L, Zoetaba I, Donnen P, Hennart P, Sondo BK, Dramaix M. Management of severe malnutrition in an urban nutrition rehabilitation centre in Burkina Fazo. *Rev Epidemiol Sante Publique* 2007; 55: 265-74.
16. Brewster DR, Manary MJ, Menzies IS, Henry RL, Loughlin EV. Comparison of milk and maize based diets in Kwashiorker. *Arch Dis Child* 1997; 76: 242-6.
17. Diopel HI, Dossou NI, Ndour MM, Briend A, Wade S. Comparison of the efficacy of the solid ready-to-use food and a liquid, milk based diet for the rehabilitation of the severely malnourished children: a random trial. *Am J Clin Nutr* Aug 2003; 78: 302-7.

## Tables

**TABLE 1 LOW COST HIGH PROTEIN MIX**

CONTENT	AMOUNT	ENERGY	PROTEIN
GROUNDNUT	250gm	1425kcal	65.5gm
SESAME SEED	100gm	563kcal	18.3gm
JAGGERY	250gm	383kcal	1gm
GRAM	250gm	900kcal	42.75gm
PUFFED RICE	200gm	650kcal	15gm
TOTAL	1050gm	4495.5kcal	142.55gm

**TABLE 2 AGE SPECIFIC DISTRIBUTION OF MALNOURISHED CHILDREN**

AGE	TOTAL NUMBER OF CHILDREN	MALNOURISHED	% OF MALNOURISHED CHILDREN
<1yr	4	1	25%
1-2yrs	8	3	16.67%
2-5yrs	78	8	10.26%
TOTAL	100	12	12%

**TABLE 3 SEX SPECIFIC DISTRIBUTION OF MALNOURISHED CHILDREN**

SEX	TOTAL NUMBER	MALNOURISHED	% OF MALNOURISHED CHILDREN
FEMALE	43	4	9.30%
MALE	57	8	14.04%
TOTAL	100	12	12%

**TABLE 4 DISTRIBUTION OF CHILDREN AS PER THEIR SIBLINGS**

NO.OF SIBLINS	TOTAL CHILDREN	MALNOURISHED CHILDREN	% OF MALNOURISHED
NO SIBLING	18	3	1.67%
1	55	6	10.91%
2	16	1	6.25%
3	9	2	22.22%
4	2	0	0
TOTAL	100	12	12%

**TABLE 5 DISTRIBUTION ON THE BASIS OF SOCIOECONOMIC STATUS**

SOCIOECONOMIC STATUS	TOTAL CHILDREN	MALNOURISHED CHILDREN	% OF MALNOURISHED CHILDREN
I	0	0	0
II	5	0	0
III	15	1	8.33%
IV	80	11	91.67%

V	0	0	0
TOTAL	100	12	12%

TABLE 6 DISTRIBUTION OF MALNOURISHED CHILDREN BEFORE AND AFTER INTERVENTION

GRADE	AT THE TIME OF SCREENING	LAST FOLLOW UP
NORMAL	0	1
MILD (I)	5	10
MODERATE (II)	7	1
SEVERE (III)	0	0

Figures

FIGURE 1 DISTRIBUTION OF CHILDREN AS PER WEIGHT FOR AGE (%)

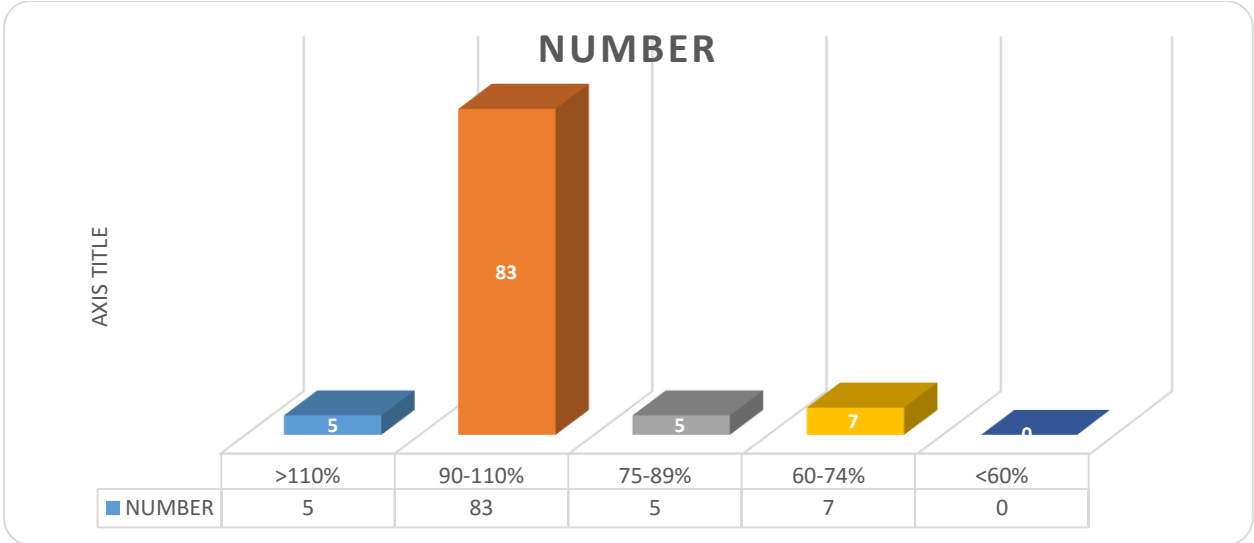


FIGURE 2 DISTRIBUTION OF CHILDREN AS PER GRADE, (GOMEZ CLASSIFICATION)

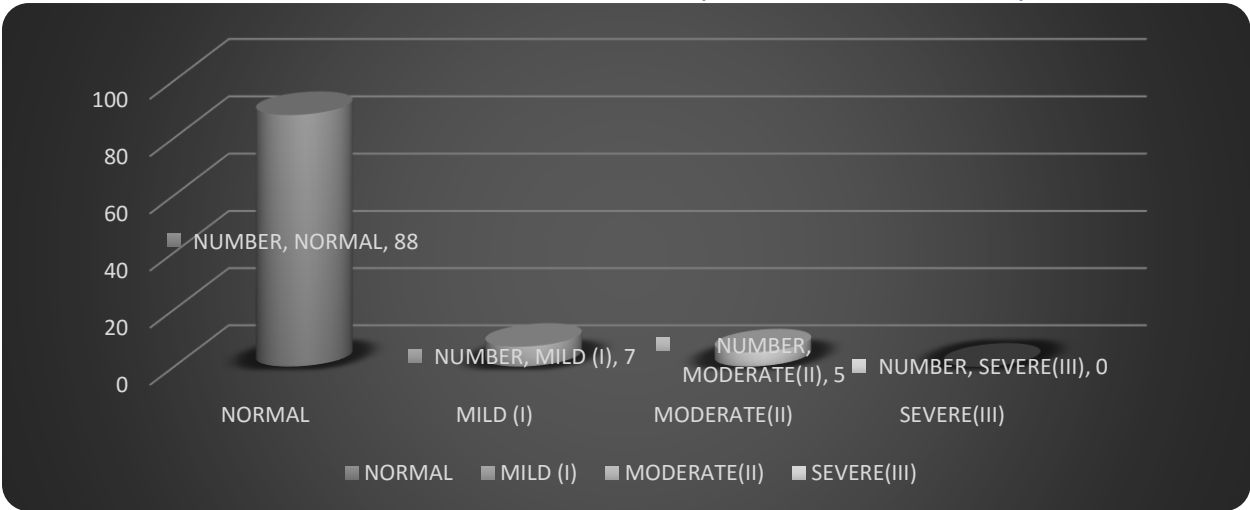


FIGURE 3 DISTRIBUTION OF CHILDREN AS THEIR NUTRITIONAL STATUS

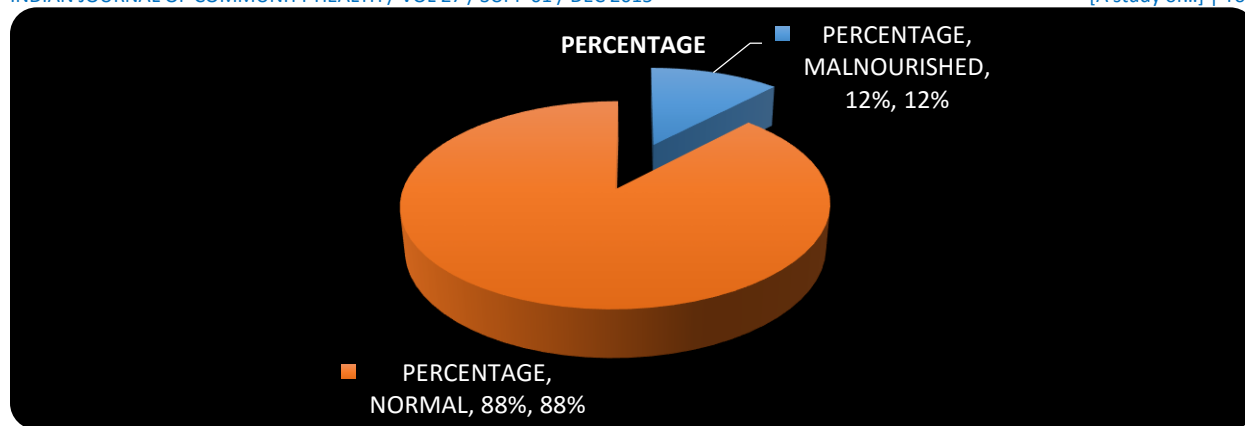


FIGURE 4 AGE WISE DISTRIBUTION OF MALNOURISHED CHILDREN

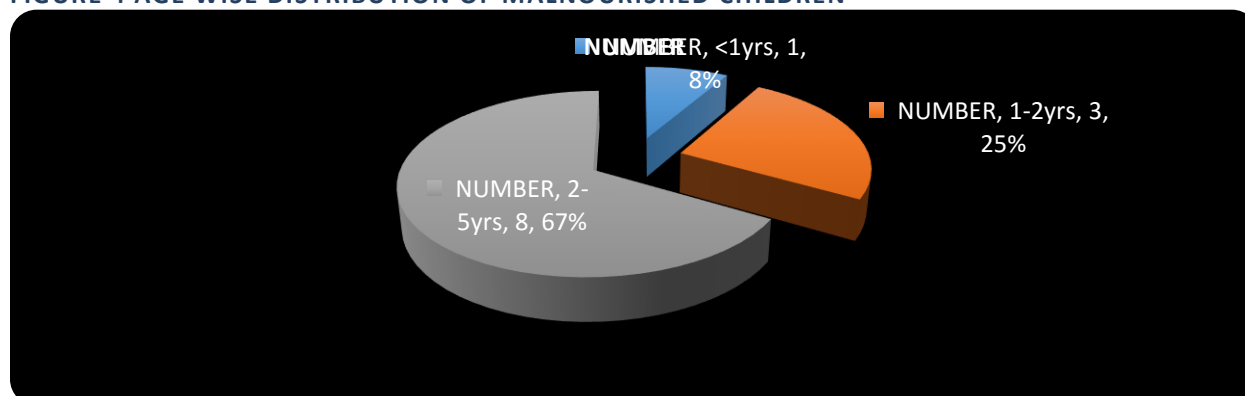


FIGURE 5 DISTRIBUTION OF MALNOURISHED CHILDREN AS PER THEIR GRADING DURING FOLLOW UPS

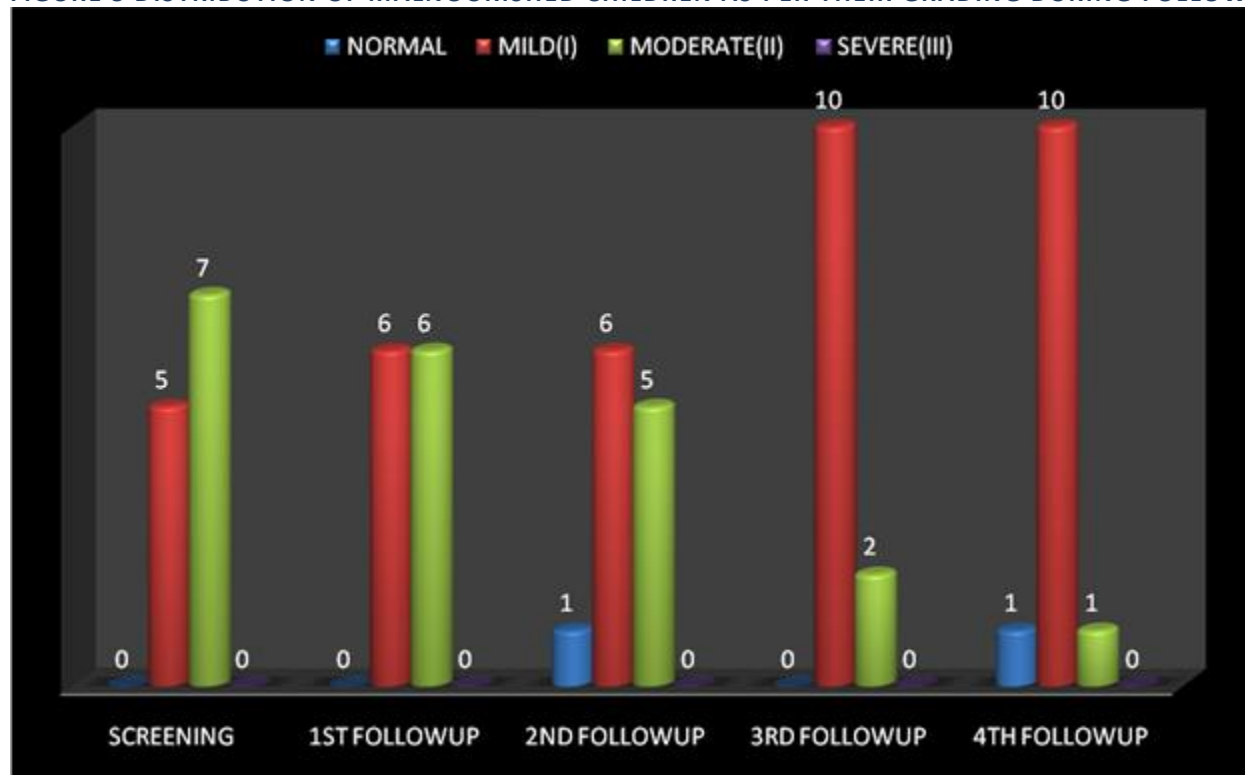


FIGURE 6



