

# Failure Mode Effect Analysis of Malnutrition Factors on Body Proportion of Under-Five Children in Muzaffarpur District

**Dr. Renu Kumari**

M.A., Ph.D.

Department of Home Science,

B.R.A.Bihar University, Muzaffarpur.

**Abstract :** Malnutrition among children is one of the most hurtful disasters for any country. Child is called the future of a nation. A nation whose child face the crisis of malnutrition can never develop in future. Child malnutrition is a serious concern for the national health authorities in India as it affects the brain development too. This article performs a qualitative method known as Failure mode effect analysis to study the impact of factors of child malnutrition on their body proportion and growth in Muzaffarpur district. There has been no similarity in the sampling area of study and scoring of parameters to the best of my knowledge.

**Keywords :-** Child malnutrition, FMEA, Muzaffarpur, Overweight, Obesity.

## I. INTRODUCTION

In India, 20% of children under five years of age suffer from wasting due to acute under nutrition, more than one third of the world's children who are wasted live in India. 43% of Indian children under five years are underweight and 48% are stunted due to chronic under nutrition, India accounts for more than 3 out of every 10 stunted children in the world[1]. Since nutrition plays a pivotal role in human resource development of any nation, the importance of nutrition must be given prime importance. Bihar is among the worst performers when it comes to malnutrition deaths in children under five years of age and tops the list of states with stunted children and low birth weight of infants. Considering this environment, assessment of factor contributing to under nutrition is pivotal and has been done in this study using FMEA.

Obesity was found to be less prevalent in the sampling area and hence been taken out of the assessment procedure.

## II. SAMPLING METHODOLOGY

The present study was carried out in Muzaffarpur District in the regions mentioned in Table 1. The wife, managing the house affairs, acted as the respondents. Variables studied in the suvey are listed in Table-2.

**Table 1 :** Selection of sampling Region

Name of Region	No. of selected Respondent
Dhobighat Area (Mushahari block)	50
Yogimath Area (Mushahari block)	50
KarnpurTole (Bochahan block)	50
Karnpur South Area (Bochahan block)	50
Total	200

**Table 2** : Parameters studied within the sample size

Parameters	Variable in consideration	Remarks
Independent	Weight	Nutritional anthropometry measurement
	Involvement in Child Labor	Y/N
	Orphan	Y/N
	Height	Nutritional anthropometry measurement
	Sex	Male/Female
	Caste	A. Schedule cast B. Backward class –I C. Scheduled Tribes D. General E. Economically Backward Category (EBC)
	Family size	A. Small family: up to 5 members. B. Medium family: Between 5 to 7 members C. Big family: 7 and above members
	Family income	A. Up to Rs. 500 B. Rs. 1500 – 3000 C. Rs. 4000 – 8000 D. Rs. 8000 and above
	Family education level & Mother's education status	1. Illiterate 2. Can read only 3. Can read & write 4. Up to primary 5. Up to middle 6. Up to metric 7. Metric & above
	*Nutritional Knowledge of mothers *Knowledge about childhood infections	A. Unsatisfactory B. Intermediate C. Satisfactory
	Birth weigh of the child	(a) 1.5 Kg (b) 2 Kg. m (c) 2.5 Kg (d) 3 Kg (e) 3.5 Kg
	Expenditure on food	A. Up to Rs. 800 B. Rs. 800 – 1600 C. Rs. 1600- 1900 D. Rs. 1900- 3000
Percent of income spent on the food stuff	A. Up to 30% B. Between 30% - 50 % C. Between 50% - 75 % D. 75% and above	

Intervening variables	Dietary survey	one 24 hour recall method was carried out to determine the food and nutrient intake of respondents in the research area on the basis of information obtained from representative sample.
Dependent variables	Immunization status	A. Complete immunization B. Partial immunization C. Nil
	Body Mass Index (BMI)	A. Underweight B. Normal Weight C. Overweight
	Receive oral doss of Vitamin A , Knowledge about the National Prophylaxis Programme for prevention of Nutritional Blindness, Knowledge about supplementary feeding programmers provided by ICDS(Integrated Child Development Services)	Y/N

The failures that can happen due to parameters studied (Table 2) were sorted and formulated, and a questionnaire was developed in which respondents were asked to score: occurrence (probability of the factor occurring), detectability (probabilities of the event not being detected), and severity (effect of the factor on the child). This rating scale was on 0-10 for each of the aspects: occurrence, detectability and severity. The numeric score that quantified these three items was used to calculate the risk priority index (RPI) (occurrence  $\times$  detectability  $\times$  severity). The highest scoring failures were considered high risk and identified as main factors.

### III. Results

The evaluation process detected a total of 14 possible critical factors distributed as captured in Table-3. The RPI values obtained ranged from 48 to 448. Lack of awareness of the fact that children are suffering from malnutrition has the highest RPI followed by low nutritional quality of available foods. Government role in proper delivery of programs and corruption involved were the second major contributor. Nevertheless the impact of floods in worsening the situation can not be ignored either.

**Table 3:** High risk factors for malnourishment among under-five children and their corresponding RPI

Factor	Severity(S)	Occurrence(O)	Detectability(D)	RPI=S*O*D
Natural calamities e.g., floods etc.	8	3	2	48
Big family size	7	7	1	49
Immunization status	6	8	2	96
Lack of functioning of health centers	9	7	2	126
Poverty	7	8	3	138
Knowledge about childhood infections	6	8	3	144
Knowledge about government programs	7	6	4	168
Birth weigh of the child	9	7	3	189
Body Mass Index	8	6	5	240
Family Occupation (Agriculture vs private jobs)	8	8	4	256
Orphan	7	7	7	343
Child Labor	7	7	7	343
Low quality of food intake	9	8	6	432
Unawareness about malnourishment prevalence	8	8	7	448

#### IV. Discussion & Concluding Remarks

The score matrix has been developed with utmost care and precision to the extent possible neglecting any emotional bias or political agenda. The author makes the following recommendation which needs attention:

1. Child Labor must be abolished
2. Government should open food distribution centers for children
3. Proper Hygiene and sanitation
4. Breastfeeding to infants must be made mandatory
5. Introduction of supplementary foods for infants
6. Food basket widening for better immunity
7. Nutrition education via online and offline platforms
8. Monitoring of Government supplementary feeding programme

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