FACTORS RESPONSIBLE FOR DETERIORATING HEALTH DUE TO SUPPLY CHAIN MANAGEMENT GAPS IN NATURALLY GROWN FOOD

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ABSTRACT

The WHO and UNICEF proposed diagnostic criteria for severe acute lack of nutrition in kids, showed that both the prevalence of anti-malarial immune respondents and specific levels were significantly lower in malnourished kids than in kids who were not malnourished. In the same study, wasted kids and stunted kids presented a lower specific IgG Ab response than their respective controls. Researchers studied association between malaria and lack of nutrition and showed Kids who were severely wasted had higher odds of malarial attack. All kids in the age group between 6 months to 59 months admitted in Pediatric ward of Delhi Hospitals with severe acute lack of nutrition was included in the study in accordance with the inclusion / exclusion criteria. This Observational descriptive cross sectional study was conducted in Pediatric ward of Delhi Hospitals. Age of the child was recorded and in case of discrepancies using Birth/ Delivery / Anganwadi / School records in this order. Informed written consent in Hindi language was taken from mothers of these kids who were willing to participate in the study and they were explained about purpose of study. Lack of nutrition among kids below five years of age remains a major embarrassment, and impediment to optimal human capital development in India. India is home to greatest population of severely malnourished kids in the world.

KEYWORDS: Organic Food, Supply Chain, Logistics, Health Issues & Strategic Gaps

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INTRODUCTION

Evidences suggest that long term physical, developmental and cognitive skill negatively affects school enrolment and increases chances of developing chronic disease. This Observational descriptive cross sectional study was conducted in Pediatric ward of Delhi Hospitals. Age of the child was recorded and in case of discrepancies using Birth/ Delivery / Anganwadi / School records in this order. Informed written consent in Hindi language was taken from mothers of these kids, who were willing to participate in the study and they were explained about purpose of study. Complete detailed history was recorded, Contact History was recorded. Body weight was recorded with the help of an electronic/ Digital weighing machine with minimal clothing to the nearest of 0.01kg. Height was measured against a non-stretchable tape fixed to a vertical wall with the participant standing on a firm/ level surface to the precision of 0.1cm. Recumbent length (for kids<24 months of age) was measured by using infantometer. Kids were dressed in light under clothing and without any shoes during the measurement. Each measurement was done twice and mean of the two readings was recorded. The same measuring equipment was used throughout the study. Mid upper arm circumference (MUAC) was measured on the upper left arm to the nearest millimeter at the exact midpoint between the end of shoulder (acromion) and the tip of the

elbow(olecranon) using a non-stretchable MUAC measuring tape issued by UNICEF. The arm was then allowed to hang freely, palm towards the thigh and the measuring tape was placed snugly around the arm at the midpoint mark, and the tape was not to be pulled too tight. Weight for Length /Weight for Height was calculated using WHO child growth standards. [4]MALARIA: blood was drawn with due consent and subjected to microscopic examination and rapid diagnostic kit test.

MATERIAL AND METHODS

Age and Gender

Table 1: Age and Gender Distribution

AGE (In Months)		Gender		Total	P value
		Female	Male		
AGE (in months)	1)<=12 months	34 (45.95%)	40 (54.05%)	74 (100.00%)	0.597
	2)13-24 months	25 (54.35%)	21 (45.65%)	46 (100.00%)	
	3)25-36 months	10 (55.56%)	8 (44.44%)	18 (100.00%)	
	4)37-48 months	7 (63.64%)	4 (36.36%)	11 (100.00%)	
	5)49-59 months	1 (100.00%)	0 (0.00%)	1 (100.00%)	
Total		77 (51.33%)	73 (48.67%)	150 (100.00%)	

X²=2.7 df=4

Sex preponderance varies with age group. Less than 1 year there is male dominance and more than 1 year there is female dominance. With increasing with age, there was increasing female to male ratio. P value is 0.597, which is statistically insignificant

Weight for Height /Length

Table 2: Weight for Height /Length

	Frequency	Percentage
LESS THAN -3SD	148	98.67%
NORMAL	2	1.33%
Total	150	100.00%

Total subjects having weight for length less than 3SD were 148 (98.67%) in the study group.

Figure 1: Weight for Height /Length

Mid Upper Arm Circumference

Table 3: Mid Upper Arm Circumference

MUAC	Frequency	Percentage
>11.5cm	17	11.33%
<11.5cm	133	88.67%
Total	150	100.00%

Total subjects having MUAC more than 11.5 cm were 17 (11.33%) while the frequency of MUAC (less than 11.5cm) were 133 (88.67%) in the study group.

Figure 2: Mid Upper Arm Circumference

Pedal Edema

Table 4: Pedal Edema

Pedal Edema	Frequency	Percentage
Absent	149	99.33%
Present	1	0.67%
Total	150	100.00%

Out of 150 kids pedal edema was seen in 1 (0.67%) kids.

Figure 3: Pedal Edema

Complaints

Table 5: Complaints

	Frequency	Percentage
Edema	1	0.67%
Persistent vomiting	76	50.67%
Very weak, apathetic	30	20.00%
Fever (Axillary temperature > 38.5 degree Celsius)	101	67.33%
Kids with fast breathing / chest in drawing/ cyanosis	62	41.33%
Extensive skin lesions, eye lesions, post-measles states	6	4.00%
Diarrhea with dehydration based on history and clinical signs	79	52.67%
Severe pallor	12	8.00%
Purpura or bleeding tendency	1	0.67%
Hypothermia (Axillary temperature <35 degree centigrade), shock	9	6.00%
Dysentery	2	1.33%
Seizure	7	4.67%
Failure to gain weight	1	0.67%

Among 150 respondents, common clinical presentations in descending order are Fever (67.33%), Diarrhea (52.67%), Vomiting (50.67%), Cough/Fast breathing (41.33%), Weakness (20%), Severe pallor (8%), Hypothermia (6%), Skin lesions (4%), Dysentery (1.33%), Failure to gain weight = bleeding tendency = edema (0.67%).

Figure 4: Complaints

Random Blood Sugar

Table 6: Random Blood Sugar

Random Blood Sugar	Frequency	Percentage
Euglycemia	142	94.67%
Hypoglycemia	8	5.33%
Total	150	100.00%

Figure 5: Random Blood Sugar

Hemoglobin

Table 7: Hemoglobin

	Frequency	Percentage
Normal	23	15.33%
Anemic	127	84.67%
Total	150	100.00%

Out of 150 kids, 127(84.67%) kids had anaemia

Figure 6: Hemoglobin

Tuberculosis Contact History

Table 8

	Frequency	Percentage
Negative	137	91.33%
Positive	13	8.67%
Total	150	100.00%

Out of 150 respondents, 13 kids (8.67%) had contact with TB

Figure 7

X Ray Chest**Table 9**

	Frequency	Percentage
Normal	91	60.67%
Abnormal	59	39.33%
Total	150	100.00%

Figure 8**Diagnosis****Table 10**

	Frequency	Percentage
Bronchiolitis	28	18.67%
Pneumonia	33	22.00%
Acute gastroenteritis	68	45.33%
Acute gastroenteritis with shock	6	4.00%
Urinary tract infection	6	4.00%
Sepsis	45	30.00%
Meningitis	5	3.33%
Febrile seizure	3	2.00%
Vivax malaria	2	1.33%
Falciparum	1	0.67%
TB	2	1.33%
Enteric fever	7	4.67%
Measles	13	8.67%

Diagnosis of 150 respondents in descending order based on frequency described below: 74(49.33%) had Acute gastroenteritis [68(45.33%) had Acute gastroenteritis+ 6(4%) had AGE with shock], 61(40.67%) had Respiratory tract infections [in which 33(22%) had Pneumonia and 28(18.67%) had Bronchiolitis], 45 (30%) had Sepsis, 13 (8.67%) had measles, 7(4.67%) had Enteric fever 6 (4%) had Urinary tract infections 5(3.33%) had Meningitis 3(2%) had Malaria [2(1.33%) had Vivax and 1(0.67%) had Falciparum] 2(1.33%) had Tuberculosis

Figure 9

Out of 150 kids, 45 had positive blood cultures, antibiotics sensitivity in general without organism consideration showed that all 33 which were exposed to vancomycin and linezolid are sensitive. All 28 exposed to chloramphenicol were sensitive. Out of 43 exposed to Cefiximeclavulnic acid, 41.86% sensitive. Out of 37 exposed to amikacin, 75.68% were sensitive. out of 33 exposed to clindamycin, 90.91% were sensitive. Out of 32 exposed to amoxyclav, 71.88% were sensitive. Out of 29 exposed to erythromycin, 44.83% were sensitive. Out of 28 exposed to chloramphenicol, 100% were sensitive. Out of 11 exposed to ceftriaxone, 72.73% were sensitive. Out of 8 exposed to meropenem, all were sensitive. Out of 7 exposed to piptaz, 71.43% were sensitive. Cefuroxime was sensitive in both slides tested. Ampicillin was resistance in 1 out of 2 checked. Cotrimoxazole and norfloxacin was resistant to 1 out of 1 checked. Nitrofurantoin was sensitive in 1 out of 1 checked.

Table 11

	Frequency	Percentage
Normal	144	96.00%
Abnormal	6	4.00%
Total	150	100.00%

CONCLUSIONS AND RECOMMENDATIONS

Globally, more than one third of the child deaths are attributed to under nutrition and it continues to be a major public health problem in developing countries. Our present study was conducted to determine the clinical profile of severe acute malnourished kids in tertiary hospital of Delhi and to study the positive culture isolates associated with severe acute lack of nutrition. For present study, 51.33% were females and remaining 48.67% were males. Male to female ratio in this study was 1:1.05 and most of the kids presented with SAM are in age group of less than 1 year. 49.33% were in the group of less than 1 year, 30.67% between 1.1 to 2 years, 12% between 2.1 to 3 years, 7.33% between 3.1 to 4 years, 0.67% between 4.1 and 5 years. Commonest age group was below 24 months, which is consistent with other previous studies. Yaikhomba T et al (36) and Arya A K et al (39). In the first 2 years of life, rapid growth occurs and requirement of substrates for energy and building of tissues also increases, thus deficiency of energy, protein and micronutrients often result. Age distribution were consistent with other previous studies Chaudhary et al [37] and Goyal S et al [40]. It was postulated that due to ritual and social norms, parents give more importance and seek medical advice more often for male child. However, our study, despite showed Female Sex preponderance which were consistent with other previous studies

Chaudhary et al [37] and Sandeep B et al [42].

Table 12

Authors	Common Age Group & Prevalence	Age Distribution	Sex & Prevalence
Yaikhomba T et al 2015 [36]	6-24months (76%)		Male (58%)
Chaudhary, et al 2015[37]		14.92 ± 7.48 months	Female (84.2%)
Tariq A et al 2015[38]	1 to 2 years (39.7%)		Male (54.8%)
Arya AK et al 2017 [39]	6-24 months (78.5%)		Male (59%)
Suhas PK et al 2017[41]	4-5 years (42.86%)		Male (67.35%)
Goyal S et al 2017 [40]		17.25+-12.60 months	Male (57.5%)
Sandeep B et al 2017 [42]	2-3 years (43.1%)		Female (54.6%)
Present study	6-12 months (49.33%)	1.52 ± 1.03 years	Female (51.33%)

These findings are consistent with Choudary et al (2015) [37] that most common presenting symptom was fever followed by vomiting, loose motion, cough and loss of appetite or weight loss. Other common presenting symptoms were oedema, abdominal distension and ear discharge. Bernal et al (2008) and Bagga et al (2003) [65] in their study also reported diarrhea and fever as common presenting symptom. Shazia et al (2001) [44] also reported that diarrhea (25.8%) and fever/vomiting (30.9%) were the common presenting symptom in malnourished kids.

For study, Anaemia is found in 84.67%, which was consistent with Choudary et al 2015 [37], Kumar et al 2013 [48].

Table 13

	Our Study	Choudary et al 2015[37]	Kumar et al 2013[48]	Devi et al 2015[49]	Das et al 2017[52]
ANAEMIA	84.67	85.3	88.3	69.2	74.2

For study 5.33% had hypoglycemia, which was found to be consistent with Tariq et al 2015[38] and Das et al 2017[52].

Table 14

	Our Study	Choudary et al 2015[37]	Tariq 2015[38]	Das et al 2017[52]
Hypoglycemia	5.33	21.3	6.8	3.02

Study had 1.33% pulmonary TB which is consistent with Das (2017). Higher prevalence were noticed in Kumar et al (2015), Choudary et al(2015), Tariq et al(2015), Manohar et al(2015).

Table 15

Characteristics	Our Study (%)	Payghan et al 2013 [67] (%)	Kumar et al 2014[48] (%)	Chaudhary et al 2015 [37] (%)	Tariq A et al 2015[38] (%)	Manohar B et al 2016 [50] (%)	Das et al 2017[52] (%)
TB	1.33	5.6	22.1	9.3	4	3.01	0.63

For study 6kids (4%) had Urinary tract infection which was consistent with Choudary et al (2015). For study, all had Escherichia coli grown in urine which is sensitive to Amikacin, Gentamicin and Meropenem. Half of them are resistant to Ceftriaxone and Ciprofloxacin which was consistent with Adamu and Dennis (2002). Lower prevalence seen in Kumar et al (2014) [48], Devi et al (2015) [49], Ganesh et al (2016) [51], Tariq et al 2015[38], Das et al (2017) [52]. Higher prevalence were noticed in Manohar et al (2016)[50], Adamu et al (2002) [64], Bagga et al (2003) [65].

Table 16

	Our Study (%)	Adamu et al (2002) [64]	Bagga et al (2003) [65]	Kumar et al 2014 [48] (%)	Chaudhary et al 2015 [37] (%)	Tariq A et al 2015 [38] (%)	Devi et al 2015 [49] (%)	Manohar B et al 2016 [50] (%)	Ganesh et al 2016 [51] (%)	Das et al 2017[52] (%)
UTI	4	11.3	15.2	1	4	2.7	1.3	7.8	0.9	2.38

Our study had 1 child (0.66%) had HIV which is consistent with Das et al 2017[52] Higher prevalence were noticed in Kumar et al 2014[48], Chaudhary et al 2015 [37], Devi et al 2015 [49], Ganesh et al 2016[51].

Table 17

Characteristics	Our Study (%)	Kumar et al 2014 [48] (%)	Chaudhary et al 2015 [37] (%)	Devi et al 2015 [49] (%)	Ganesh et al 2016 [51] (%)	Das et al 2017[52] (%)
HIV	0.66	2.9	4	2.6	0.9	0.31

Our study had 3Kids (2%) with Malaria, out of which 2 had had Vivax and 1 had Falciparum Malaria. This is consistent with Choudary (2015). Higher prevalence were noticed in Kumar et al 2014[48], Manohar et al (2016)[50]. Low prevalence was seen in Das et al 2017[52]. Malaria cases were found to be zero percent in Devi et al 2015 [49].

Table 18

Characteristics	Our Study (%)	Kumar et al 2014 [48] (%)	Chaudhary et al 2015 [37] (%)	Devi et al 2015 [49] (%)	Manohar et al (2016) [50] (%)	Das et al 2017[52] (%)
Malaria	2	3.8	1.3	0	5.4	0.31

DISCUSSIONS

Among 150 respondents, common clinical presentations in descending order are fever(67.33%), diarrhea (52.67%), vomiting (50.67%), cough/fast breathing (41.33%), weakness (20%), severe pallor (8%), hypothermia (6%), skin lesions (4%), dysentery (1.33%), failure to gain weight = bleeding tendency = edema (0.67%). Among 150 kids, 84.67% (127 kids) had anemia. Among 150 respondents, 5.33% (8 kids) had Hypoglycemia. Among 150 subjects, Diagnosis of 150 respondents in descending order based on frequency described below: However, further multicenter studies with large sample size should be conducted in different parts of the country, to assess the clinical profile and bacterial isolate in severe acute lack of nutrition kids in different regions, and to validate the data of this study.

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