

## FEEDING PATTERN OF MALNOURISHED CHILDREN ADMITTED TO NUTRITIONAL REHABILITATION CENTRE (NRC) IN BASRAH GENERAL HOSPITAL

Firas Fadhil Abbas<sup>1</sup>, Sawsan Issa Habeeb<sup>2</sup>

### ABSTRACT

Across sectional study was carried out to evaluate the feeding pattern of malnourished children and to study the association between their demographic and nutritional variables. The study was conducted on 157 infants and children aged 2-36 months (65 males and 92 females) attending Nutritional Rehabilitation Center In Basrah General Hospital during the period from November 2007 till the end of May 2008. Selected demographic variables, feeding pattern, age of administration and type of different complementary foods and frequency of these food items were recorded. Measurement of weight and height or length by standard procedures was done for all infants and children recruited in the study. Anthropometric data were applied to appropriate charts: weight for length Z score, weight for age Z-score and height for age Z-score which were estimated according to CDC/WHO charts. all studied children were underweight; (93.6%) wasted and (87.3%) were stunted, (9.5% and 90.5%) were with severe and moderate wasting respectively, (38% and 62%) with severe and moderate stunting respectively, (45.9%, 54%) with severe and moderate underweight respectively. Study of feeding pattern of malnourished children has revealed that (28.7%) were on breastfeeding; (36.9%) formula feeding & (34.4%) with mixed feeding. Regarding the duration of breastfeeding; (75.8%) were breastfed less than 12 months. The age onset of complementary feeding; 71(65.1%) of children had their complementary feeding at age of 4-6 months. Malnourished children consume mainly cereals & rice in high proportion (38.9%, 56.1%) and least for fish and meat (3.8%, 4.5%) respectively. Children were given complementary food on daily bases in order of frequency of administration; (7%) were given rice, (5.7%) vegetables, (3.2%) cereals, (2.5%) eggs and (1.9%) fruits. Other foods were never on daily bases or even occasionally (> 1/wk) including meat, fish, legumes; they were never given in (95.5%, 96% & 88.5%) respectively.

*In conclusion:* there was a significant positive correlation between age of onset of complementary feeding and underweight.

### INTRODUCTION

Inappropriate feeding practices is still believed to account for at least one-third of causes of malnutrition, and contributes significantly to morbidity and mortality, among children under five. <sup>[1]</sup> The link has been well established. Malnutrition has been responsible, directly or indirectly, for 60% of all deaths among children under five years annually. Over 2/3 of these deaths are often associated with inappropriate feeding practices and occur during the first year of life. Only 35% of infants worldwide are exclusively breastfed during the first four months of life. Exclusive breastfeeding in the early months of life is correlated strongly with increased infant survival and lowered risk of illness, particularly from diarrheal disease. To achieve optimal growth, development and health, WHO recommends that infants should be exclusively breastfed for the first six months of life and that breastfed should continue for up

to two years of age or beyond.<sup>[2]</sup> Complementary feeding begins either too early or too late with foods which are often nutritionally inadequate and unsafe. Poor feeding practices in infancy and early childhood, resulting in malnutrition, contribute to impaired cognitive and social development, poor school performance and reduced productivity in later life. Poor feeding practices are, therefore, a major threat to social and economic development as they are among the most serious obstacles to attaining and maintaining health of this important age group.<sup>[2,3]</sup> The present study was carried out to identify pattern of feeding practices in malnourished children admitted to nutritional rehabilitation centre and study related demographic characteristic of these children and their mothers.

<sup>1</sup> MBChB, Department of Paediatrics, College of Medicine, University of Basrah, Iraq

<sup>2</sup> Thi-Qar, Aljibaeash

## PATIENTS AND METHODS

A prospective study was carried out to assess the nutritional status of children (aged 2-36 months) admitted to Nutritional Rehabilitation Center (NRC) in Basrah General Hospital during the period from first of November 2007 till the end of May 2008.

Children with chronic diseases e.g. (congenital heart disease, cerebral palsy, chronic renal disease, etc) were excluded from the study.

Information was obtained from mothers through a direct interview using simple and clear language. A questionnaire was filled for each child regarding; type of feeding (breastfeeding, formula or mixed), duration of breastfeeding in months age of introduction of complementary foods (<4, 4-6, >6 months), number of meals per day (1, 2,  $\geq 3$ ), age of administration of specific food items in months (cereals, rice, vegetables, fruits, fish, meat, egg and legumes) and frequency of these food items (never given,  $\leq 1$ /week, >1/week or daily). All children were weighed and their length was measured. The child anthropometric data (weight, length or height) are applied to appropriate charts: weight

for length Z-score, weight for age Z score, height for age Z-score which were estimated according to CDC/WHO normalized references, and accordingly each child's measures were classified as follows: <sup>[4,5]</sup>

### \*Regarding weight/height chart:

>-1 SD normal, -1 SD mild wasting  
>-2 SD moderate wasting, <-3 SD severe wasting

### \*Regarding weight /age chart:

>-1 SD normal, -1 SD mild underweight  
>-2 SD moderate underweight, <-3 SD severe underweight

### \*Regarding height/age:

>-1 SD normal, -1SD mild stunting  
>-2 SD moderate stunting, < -3 SD severe stunting

## RESULTS

A total of 157 children were included in the study, 65 were males (41.4%) and 92 were females (58.6%). Their ages ranged from 2-36 months (mean age was  $10.6 \pm 2.3$ ), 73.9% of them were  $\leq 12$  months.

The anthropometric measurement of studied children is presented in (Table-1)

**Table 1. Classification of nutritional status of hospitalized children.**

Z - score	Wasting No. (%)	Stunting No. (%)	Underweight No. (%)
>-2 to -3 SD (Moderate)	133 (90.5)	85 (62.0)	85 (54.1)
> -3 SD (Severe)	14 (9.5)	52 (38.0)	72 (45.9)
<b>Total</b>	<b>147 (100)</b>	<b>137 (100)</b>	<b>157 (100)</b>

All admitted children to NRC, were underweight. Out of 157 of patients, 147(93.6%) were wasted and 137(87.3%) were stunted. About (54.1%, 45.9%) of children were with moderate & severe malnutrition respectively. Moderate wasting & stunting were more frequent among admitted children (90.5% & 62%) respectively, while severe wasting was recorded only in 14(9.5%) of children. Distribution of cases in relation to type of feeding. Breast feeding was recorded in 45(29%) of cases, artificial & mixed feeding

were (37%, 34%) respectively. Regarding the duration of breast feeding; 75(75.8%) were breastfed less than 12 months. The age onset of complementary feeding was recorded; 71(65.1%) of children had their complementary feeding at age of 4-6 months, only 6(5.5%) before 4 months. Only 12(11.8%) of children receive  $\geq 3$  meals; 90 (88.2%) of children receive 1-2 meals per day. Underweight and stunting were observed among (73.9% and 71.5%) of patients less than 12 months old respectively. There was a decline in the

frequency of underweight, stunting and wasting after age 18 months. Wasting was found to be most frequent in infants 2-6 months age 45.6% as shown in (Table-2). Malnutrition seems to be more in females compared to males, (58.6%)

were underweight; (61.3%) stunted and (57.8%) wasted. There was no significant difference in nutritional status in relation to age of child, P-value >0.05 (Table-2).

**Table 2. Nutritional status in relation to child age and gender.**

Variables	Wasting No. (%)	Stunting No. (%)	Under weight No. (%)
<b>Age of child (months)</b>			
2-6	67 (45.6)	61 (44.5)	71 (45.2)
7-12	41 (27.9)	37 (27.0)	45 (28.7)
13-18	24 (16.3)	22 (16.1)	24 (15.3)
>18 -36	15 (10.2)	17 (12.4)	17 (10.8)
<b>Gender</b>			
Male	62 (42.2)	53 (38.7)	65 (41.4)
Female	85 (57.8)	84 (61.3)	92 (58.6)
<b>Total</b>	<b>147 (100)</b>	<b>137 (100)</b>	<b>157 (100)</b>

**P-value >0.05**

Infant feeding practices were analyzed for their risk on under nutrition as shown in (Table-3). Proportion of underweight among children on breastfeeding (28.7%), with duration of

breastfeeding less than 12 months (75.8%); who got complementary feeding after 6 months age (29.4%) and among children who receive 1 meal per day was 49%.

**Table 3. Infants feeding practices and nutritional status.**

Variable	Wasting No. (%)	Stunting No. (%)	Under weight No. (%)
<b>Type of feeding</b>			
Breast feeding	44 (30.0)	41 (30.0)	45 (28.7)
Formula feeding	53 (36.0)	50 (36.5)	58 (36.9)
Mixed	50 (34.0)	46 (33.5)	54 (34.4)
<b>Total</b>	<b>147 (100)</b>	<b>137 (100)</b>	<b>157 (100)</b>
<b>Duration of breast feeding</b>			
<6 months	39 (41.5)	35 (40.2)	40 (40.4)
6-11 months	33(35.1)	32 (36.8)	35 (35.4)
12-18 months	13 (13.8)	12 (13.8)	15(15.2)
> 18 months	9 (9.6)	8 (9.2)	9 (9.0)
<b>Total</b>	<b>94 (100)</b>	<b>87 (100)</b>	<b>99 (100)</b>
<b>Age onset of complementary feeding</b>			
<4 months	6 (5.8)	4 (4.2)	6 (5.5)
4-6 months	66 (64.1)	62 (65.3)	71 (65.1)
>6 months	31 (30.1)	29 (30.5)	32 (29.4)
<b>Total</b>	<b>103 (100)</b>	<b>95 (100)</b>	<b>109 (100)</b>
<b>NO. of meals /day</b>			
1 meal	48 (50.0)	40 (44.9)	50 (49.0)
2 meals	38 (39.6)	37 (41.6)	40 (39.2)
≥3 meals	10 (10.4)	12 (13.5)	12 (11.8)
<b>Total</b>	<b>96 (100)</b>	<b>89 (100)</b>	<b>102 (100)</b>

Although frequency of stunting is 30% among breastfed infants, the percent less than those who were formula or mixed fed. Malnourished children who were given 1 meal/day are more prone for stunting 44.9%. Proportion of wasting in children who receive breastfeeding was 30% and duration more than 18 months was 9.6%.

As well as those who receive 1 meal/day show high prevalence of wasting 50%. There was no significant difference in nutritional status in relation to infant feeding practices, P-value > 0.05. The study didn't reveal significant difference in outcome in relation to type of feeding, P-value >0.05, (Table-4).

**Table 4. Outcome of patients in relation to feeding history.**

Feeding	Total	Improved	Not improved	Died	Discharged on family responsibility
Breast feeding	45 (100)	32 (71.1)	4 (8.9)	2 (4.4)	7 (15.6)
Formula	58 (100)	39 (67.2)	6 (10.3)	8 (13.8)	5 (8.7)
Mixed	54 (100)	40 (74.1)	7 (12.9)	1 (1.9)	6 (11.1)
Total	157(100)	111 (70.7)	17 (10.8)	11 (7.0)	18 (11.5)

*P-value >0.05*

Concerning food consumed by malnourished children; cereals and rice consumed in high proportion 38.9%, 56.1%; followed by vegetables 29.3% and least for fish and meat 3.8%, 4.5% respectively. Children were given complementary food on daily bases in order of frequency of administration; 7% were given rice, 5.7% vegetables, 3.2% cereals, 2.5% eggs and 1.9% fruits. Other foods were never given on daily bases or even occasionally (more than once time per week) including meat, fish, legumes; they were never given in 95.5%, 96% and 88.5% respectively. 48.9% of patients less than 12 months and 37.5% of children aged 12-18 months receive cereals more than once per week compared to 33%, 54% of same age groups who didn't receive cereals, P-value <0.001. Children who receive rice (>1/WK) were 15.5%, 52.9% in children aged 2-6 months and older than 18 months while children of the same age group who were never given rice were

75% and 5.9% respectively, P-value <0.05. Fruits and vegetables never given in 72%, 70.7% respectively with decreasing frequency of administration with increasing age. Eggs never given in 68% of studied children, less frequently given in 5.7% and given occasionally in 23.6%. 64.4% of infants aged 6-12months were never given eggs more than once per week compare to 5.9% and 88.2% of older children aged 18-36 months, P-value <0.001. In order to determine the relative effect of each studied variable, a stepwise multiple regression analysis was done. There was significant negative correlation with duration of breastfeeding (P-value <0.01); with increase in duration of breastfeeding there was decrease in proportion of wasting (Table-5). While logistic regression of selected variables with underweight; it shows significant positive correlation with age onset of complementary feeding (P-value <0.001).

**Table 5. Logistic regression of selected variables with nutritional status of studied children.**

Variables	Wasting			
	B*	SE*	R <sup>2</sup> *	P-value
Duration of breastfeeding	-8.83	0.034	0.970	<0.01
Underweight				
Age onset of complementary foods	0.279	0.088	0.961	<0.001

\*B: regression coefficient

\*SE: standard error

\*R<sup>2</sup>: R square

**DISCUSSION**

Severe malnutrition is one of the most common causes of morbidity and mortality among children under the age of five years worldwide, many severely malnourished children die at home without care but even when hospital care is provided, case fatality rate may be high.<sup>[6]</sup> Previous WHO survey in Iraq in 2003 showed that malnutrition affects a significant proportion of children; 9.2% of children aged less than two years were <-2SD of weight for length and 13.8% of them were <-2SD of length for age).<sup>[7]</sup> In Basrah; it was found that 20.6% of children were moderately and severely wasted while 24.5% were moderately & severely stunted.<sup>[8]</sup> All studied children were malnourished and managed in NRC as a strategy for combating childhood malnutrition. Their nutritional status was ranging from moderate to severe malnutrition. Approximately half of children admitted to NRC were moderately malnourished because the admission criteria were adjusted according to ward capacity. More than 2/3 of admitted children were below 12 months age, & female affected more than male, this is in agreement with other survey because of much care given for male more than female.<sup>[9,10]</sup> It had been recorded that breastfeeding is less in proportion than other types of feeding. This difference explains according to education level of mother and economic state of family. Mothers regard artificial feeding is easier than breast feeding; or their thought that it is related to modern life in urban areas. Nyovani, et al

noticed that, most of children living in rural areas were breastfed.<sup>[11]</sup> In United Arab of Emirates, the frequency of breast fed infant decreases because of these infants are living in a society where family income is high, baby food is abundant, and it is quite likely that a mother may easily change her baby’s food under the influence of a friend or neighbor.<sup>[12]</sup> Exclusive breastfeeding was not recorded in this study because most of the mothers give water in the first days of life; this is in agreement with Dinesh, et al, in India reported exclusive breastfeeding in 23.5% of studied women.<sup>[13]</sup> In present study there is a negative significant correlation between the duration of breastfeeding and wasted children which means that whenever the duration of breastfeed is prolonged, it will be protective for children from malnutrition. This is in agreement with other study reported by Wamani, et al that shows that mother who continue breast feeding for a period of up to 12 months of age may be aware of the protective effects of breast milk that is regarded as a cultural norm among the low social class peoples.<sup>[14]</sup> Prolonged exclusive breastfeeding is not recommended because it can produce anemia if continues for more than 6 months, & in this case it should be supplemented with iron starting from the fourth month.<sup>[15]</sup> However, poverty necessitated mothers to prolong breast feeding in Iraq<sup>[16]</sup> and to extend the lactation period to delay the next pregnancy.<sup>[17]</sup> The vast majority of children in

study were receiving complementary food between 4-6 months. This is also reported by Marchioni, et al, where mother tend to administer food even before 6 months of age.<sup>[18]</sup> Delayed complementary food administration is not a major problem, but certain dietary items with caloric & protein values are given late and infrequently. This was also observed by Hassan et al, who showed that a diet of children aged 6-36 months was consisted mainly of low value diet,<sup>[19]</sup> & also seen by WHO global survey.<sup>[20]</sup> Complementary foods most frequently administered; were rice & cereals. This is in agreement with other studies.<sup>[19-21]</sup> While in Benghazi and UAE the main complementary foods were milk formulas, powdered milk, pasteurized fresh milk, raw goat's and cow's milk, dairy products, cereals, of which rice was the most common, and several kinds of nuts.<sup>[12,22]</sup> The complementary foods were given much less frequently on daily basis & this would certainly have an adverse effect on the total caloric & protein value of diet of these children. There was a significant positive correlation between age of administration of complementary foods & underweight children. It seems that younger age children were offered eggs, meat, legumes less frequently, these finding obviously explain the association with malnutrition. Our recommendations is to encouraging breastfeeding; exclusive breastfeeding for initial 6 months and then continue on breastfeeding as long as possible together with complementary food. Careful nutritional evaluation of children on admission to NRC is essential.

In addition to promoting nutritional awareness and defining standards and protocols for nutrition in hospitals and community.

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