Risk Factors which Contribute to Malnutrition in Children in Babylon Hospital for Maternity and Children

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Abstract
The aim: To find out the main problems affecting the nutrition of children.

Methods: An observational study was done on 134 children 6 months -2 years of age who admitted to nutrition rehabilitation center of Babylon teaching hospital for maternity and children from 1/6/2007-1/6/2008. The growth of these children is -2SD and below.

Results: We found there is no significant differences between the number of children who where on breast feeding 63 (47%) and the number of children who where on bottle feeding 71 (53%). We also found the largest group of malnourished children are those who are started complementary food too late (from 10 months-1 year of age) 90 (67.3%), followed by 30 (22.3%), 12 (9%) and 2 (1.4%) for those who started complementary food at age > 12 m, 7m-9m and 4m-6m respectively. About maternal education we found the largest group of malnourished children is those who's their mothers finished primary school (56%). We found the number of malnourished children below 1 year of age 84 (62.75%) is more than those above 1 year of age 50 (37.3%). The number of malnourished children from crowded family (with 4-6 sibling) are 69 (51.5%) more than less crowded families. There are no significant differences between number of malnourished children from urban 69 (51.5%) and those from rural area 65 (48.5%). We found those children on breast feeding (65%) responding to treatment with F 100 milk significantly more than those on artificial feeding (35%).

Conclusions: These findings revealed that the important risk factor for developing malnutrition is delayed complementary feeding with the superiority of breast feeding on artificial feeding in decreasing the risk for malnutrition and in the acceptance of complementary food beyond 6 months of age.
Introduction

Most consider the diagnosis of malnutrition if a child’s weight is below the fifth percentile in the growth chart or if drops down more than two major percentile lines.[1] Weight-for height below the fifth percentile remain the single best growth chart indicator of acute malnutrition, children who have been chronically malnourished may be short as well as thin so that their weight-for height curves may appear relatively normal.[2] Malnutrition can be graded from mild to severe according to percentage of median of weight for age, example: mild; when the weight is 75-90% from the median of weight for age, moderate is 60-70% and severe is < 60% of median.[3] Nutritional insufficiency must be differentiated from congenital, constitutional, familial and endocrine causes of decreased growth. In the later cases the length decline first or at the same time as the weight; Weight-for height is normal or elevated. In nutritional insufficiency the weight decline before length and the weight-for height is low (unless there has been chronic stunting). [4] In children 6-59 months, an arm circumference less than 110 mm. is also indicative of severe acute malnutrition. [5] Severe acute malnutrition remains a major killer of children under five years of age. Globally, it’s estimated that there are nearly 20 million children with acute sever malnutrition. Current estimates suggest that about 1 million children die every year from severe acute malnutrition. Complementary feeding should be started at age of 4-6 months.[1] In developing countries the age at which breastfed infants are first given complementary food is of public health importance because of the risk of diarrheal diseases from contaminated food, and the potential risk of growth faltering if foods are inappropriately delayed.[6] 

Aim of the Study

To know the main important causes of malnutrition in our society and to put the possible solution for them.

Materials and Methods

An observational study was done on 134 children from 6 months-2 years old who were admitted to nutrition rehabilitation center in Babylon teaching hospital for maternity and children from the 1st July 2007 to 1st July 2008. History and clinical examination were done and information included:

1. Type of feeding whether breast or bottle feeding or mixed.
2. The time of introducing complementary food.
4. Number of children in the family.
5. The sex and the age of child.
6. The residence whether rural or urban.

We depend on weight-for age growth chart which is the easiest and an accurate chart, and according to normal distribution curve (bell shaped curve) we select children who are only two standard deviation below the mean (-2 SD) to be involved in this study. Any organic diseases that cause failure to thrive were excluded from the study by history, physical examination and some investigation if necessary. Any history of low birth weight and prematurity were excluded. All studied
Infants were treated by F. 100 high calorie milk and followed-up for weight gain, those who were gaining weight in about 10 gm/day considered successful.

WHO is currently estimating the global number of children suffering from severe acute malnutrition and the number of death associated with the condition.

Health workers instruct mothers how to reconstitute F.100 milk and how to give it to the baby.

Results
From the total 134 infants, we found the number of malnourished children who are on breastfeeding is 63 (47%) which is less than malnourished infant who are on bottle feeding 71 (53%), but this is not significant (p > 0.05) (figure 1).

We found the total number of infants who successfully responded to treatment with F 100 milk is 95 during follow up. The response to F 100 milk by breastfed infants are 62 (65%) which is significantly more than (p < 0.05) the response of artificial fed infants which were 33 (35%) (figure 2).

From the total 134 malnourished infants, the number of infants who were started on complementary food was as follow:
- Infants who were started complementary food at age of 4-6 months were 2 (1.4%).
- Infants who were started complementary food at age of 7-9 months were 12 (9%).
- Infants who were started complementary food at age of 10-12 months were 90 (67.3%).
- Infants who were started complementary food beyond 1 year of age were 30 (22.3%) (Figure 3).

About the sex distribution, we found the number of male malnourished infants were 58 (48.3%), while female were 76 (61.7%), and this is not significant (p > 0.05) (Figure 4).

According to residence, the number of malnourished infants who live in urban area were 69 (51.5%), while those who live in rural area were 65 (48.5%) with no significant difference (p > 0.05) (figure 5).

About age distribution, we found the number of malnourished infants who were below 1 year of age were 84 (62.7%), more than those who were 1 year of age and above which were 50 (37.3%) which is significant (p < 0.05) (figure 6).

According to maternal education, we found the number of illiterate mothers were 23 (17%), the primary school educated mothers were 75 (56%), while the secondary school educated mothers and beyond were 36 (27%) (Figure 7).

About the number of children in the family, the number of malnourished without siblings were 16 (12%), those children with 1-3 sibling were 49 (36%), and those with 4-6 siblings were 69 (51%) (Figure 8).
**Figure 1** Malnutrition in relation to type of feeding.

**Figure 2** The response of malnourished infants to complementary feeding.

**Figure 3** Number of malnourished infants in relation to the onset of starting complementary food.
Figure 4  Sex distribution of malnutrition.

Figure 5  Residence distribution of malnutrition.

Figure 6  Age distribution of malnutrition.
Figure 7 Education level of the mothers

Figure 8 Malnutrition in relation to the number of sibling in the family.

Discussion
We found the number of malnourished infants who are breastfed =63 (47%) is slightly but not significantly less than the number of malnourished infants who are artificially fed =71 (53%), this slight difference is explained by that in our community the nursing mothers are outnumber the non nursing mothers, and the cause of malnutrition in breastfed infants is poor breastfeeding practice.

Castillo C et al; found during study in Chilean children up to eighteen months age malnutrition in bottle feed infants is higher than breastfed infants.[7] But Kavanagh K F et al; in California found formula fed infants gain weight faster than breastfed infants.[8] The response to complementary foods (F.100 milk) in breastfed infants (65%) is significantly (p < 0.05) more than that in artificially fed infants (35%), this is explained by that the breastfed infants accustomed to complementary food more easily than artificially fed infants. Cohen R G et al; found that delaying the introduction of complementary foods until 6 months does not affect appetite or mothers report of food acceptance of breastfed infants 6-12 months age in a low income Honduran population.[9]
We found the number of malnourished children who are late in starting complementary feeding (10-12 months of age) are 90 (71.7%) which is significantly higher \((p < 0.05)\) than those who started complementary feeding at the standard time (4-6 months of age) who were 2 (1.4%), and the number of those who started complementary feeding at 7-9 months also outnumber those who started complementation at the standard time, this result is similar to the result found by Castillo C, Atalah E and Castro R; they said among children 6 months old and above, those who were exclusively breastfed and had never received solid foods were more likely to be malnourished than those who received both breast milk and solid foods \((p < 0.05)\).[7]

Simondon K B and Simondon F; found through a longitudinal observational study in three health clinic in rural area of Senegal; when complementary foods starts late (7-9 months old) and very late (10-12 months old) associated with low nutritional status.[10]

Also we found in our study the number of malnourished infants who received complementary foods before 6 months old were very low, they are 2 (1.4%) mean they are exclusively (or predominant) breast or cow's milk fed in the 1st 4-6 months of life which is protective against malnutrition. Simondon K B and Simondon F; found in other study done in Fatick region, a rural area of Senegal; infants 2-3.9 months old who received millet gruel were both shorter and thinner than their counterpart \((p < 0.05)\).[11]

Cohen R G et al; said there is no advantage in introducing complementary foods before 6 months of age.[9]

About age distribution, the number of malnourished children below 1 year of age = 84 (62.7%) is significantly higher \((p < 0.05)\) than those 1 year old and above =50 (37.3%) and this is due to late introduction of complementary foods.

About mother education, the higher percentage is found in children whose mothers are just finished or not finished primary school =75 (56%), this is explained by low level of education is more common in our community because most female do not complete their education.

Cattaneo A et al; found higher rate of malnutrition is found in children of less educated mothers. [13]

About gender distribution, the number of malnourished female children =76 (61.7%) outnumber malnourished male =58 (48.3%) which is not significant \((p > 0.05)\); this is explained by that the result of reproduction in our country is mainly female.

Ekpo U F et al; said boys were found more malnourished than the girls, but this is not significant. [14]

There is no difference between number of malnourished children in rural and urban area because the nursing mothers in rural area more than those in urban area, while in urban area the education is more, so one factor counterpart the other.

While Cattaneo A et al; found higher rate of malnutrition in rural area.[13]

The number of malnourished children with 4-6 sibling =69 (51.5%) is more than those with 2-4 sibling and significantly more than children with no sibling \((p < 0.05)\), this is due to competition in care, love and financial state.

**Conclusions**

These findings revealed that the important risk factor for developing malnutrition is delayed complementary feeding with the superiority of breast feeding on artificial feeding in decreasing the risk for malnutrition and in the acceptance of
complementary food beyond 6 months of age.

The other traditional risk factors are: low level of education of the mother and increase in the number of sibling in the family. There is no difference between the rate of malnutrition in rural and urban area.

Recommendation

According to the results of this study we recommend the following:

1. Encourage complementary feeding for all infants from 6 months of age and over.
2. During the program of breastfeeding promotion we should focus on the importance of solid foods and its role in infants' growth.
3. Parents and other caregivers should have access to objective, consistent and complete information about appropriate feeding practices free from commercial influences. In particular, they need to know about the recommended period of exclusive breastfeeding, the time of the introduction of complementary foods, what types of food to give, how much and how often to feed these food safely.
4. A national attention to improve the social and economic state to remove the difficulties that family face in proper feeding and caring for their children.

References

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