

PROTEIN ENERGY MALNUTRITION: ANALYSIS OF ADMISSION AND OUTCOME

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ABSTRACT

Background: Protein energy malnutrition (PEM) is a common condition in our environment. The morbidity and mortality is still high.

Method: A retrospective study of 136 children with PEM, aimed at evaluating the outcome of management of children with severe protein energy malnutrition in Ahmadu Bello University Teaching Hospital over a five-year period.

Results: There were 75 males and 63 females (M: F=1.2:1). Marasmus was the most common type of PEM, present in 55(40.4%). Poverty, poor weaning practices and communicable diseases such as measles and recurrent diarrhoeal disease were the major predisposing factor identified. There were 38 deaths (mortality rate of 27.9%) while 29 (21.3%) absconded from treatment. The case fatality rates for the different type of PEM were 42.9% for marasmic-kwashiorkor, 28.6 % for kwashiorkor, 21.8% for marasmus and 16.7% for underweight. The result further showed that only 7/38 (18.4%) died within the first 72 hours of admission and 16/38 (42.1%) within the first seven days while 15/38 (39.5%) survived into the third week of admission and beyond before dying. Also, of the 38 fatal cases, 22 (57.9%) died between the hours of 9.01pm and 7.00am with only 3/38 (7.9%) dying between the hours of 7.01am and 2.00pm.

Conclusion: This report has shown that, while the mortality of severe PEM still remains high, more of our patients died after the first week of admission and during the night. There is the need therefore for close monitoring of all cases of severe PEM throughout the period of admission particularly during the night.

Key words: Protein energy malnutrition, management, mortality

INTRODUCTION

Protein energy malnutrition (PEM) is a significant cause of childhood morbidity and mortality. It is a preventable and

curable condition. Available data in Africa indicates a prevalence of up to 65%.¹ Previous Hospital studies in Nigeria have reported the prevalence of protein energy malnutrition as being

between 4.4% and 11.6%.^{2,3}

In spite of apparently enormous global progress in the understanding of the pathogenesis and management of PEM, the morbidity and mortality have remained high.^{4, 5} The present retrospective study was undertaken to evaluate the outcome of management of these patients in our hospital over a five-year period.

MATERIALS AND METHODS

The records of all malnourished children admitted to the Paediatric wards of our hospital, (Ahmadu Bello University Teaching Hospital Zaria), over a five-year period (January 1996- December 2000) were retrieved from the medical records department and reviewed. Relevant data were extracted and analyzed. These include date and time of admission, age, sex, clinical types of PEM, serum electrolytes, outcome of management and date and time of discharge or death. For the purpose of this study, classification of protein energy malnutrition was based on the Welcome working group.⁶ Statistical analysis was carried out using the SPSS 7.5 statistical package and student 't' test was used to compare mean for significant difference. A $p < 0.05$ was taken as statistically significant.

RESULTS

There were 4309 patients admitted into the two Paediatric wards of Ahmadu Bello University Teaching Hospital, Zaria during the study period, out of which, 174 (prevalence of 4.04%) were cases of PEM. Of the 174 admitted with PEM, individual case records were only retrieved for 136 patients and are the subjects of the present study. There were 73 males and 63 females (M: F

=1.2: 1). The age and sex distribution of the study population is displayed in table 1. Majority of the children were within the age range of 13-24 months (62.5%).

Marasmus was the most common type of PEM, present in 55 (40.4%) of the cases. This is presented in table II. Apart from poverty and poor weaning practices, which were present in all the cases, the major predisposing factors identified were communicable diseases. Measles precipitated PEM in 30(22.1%) cases while recurrent diarrhoeal disease was the precipitator in 26(19.1%) cases. Electrolyte values were fully documented in 117 (86%) cases. Independent comparison of the mean electrolyte levels of survivors and fatal cases showed significant differences in K^+ levels among kwashiorkor patients ($t=3.25$, $df=24$, $p < 0.001$) and Na^+ levels among underweight children ($t=8.25$, $df=13$, $p < 0.001$).

The outcome of management of these patients revealed that only 53 out of the 136 cases of PEM (38.9%) were discharged after full recovery. Seventeen cases (12.5%) were discharged without full recovery because of pressure from the parents or guardians while 29 (21.3%) of them absconded. There were 38 deaths (case fatality rate of 27.9%). The pattern of mortality is displayed in table 2. The highest mortality rate occurred among the Marasmus-kwashiorkor patients while the least was observed among the underweight children. The result further showed that out of the 26 cases of PEM in whom recurrent diarrhoeal disease was identified as a predisposing factor, 11 (42.3%) died while 7/30 (23.3%) of those with measles as the predisposing factor, died. With regards to the duration of hospital stay, the result showed that only 7 (18.4%) of the fatal cases died during the first 72 hours of admission and 16/38 (42.1%) within the first 7 days, while 15 (39.5%) survived into the third

week of admission and beyond. Table 3 shows the time of the day these patients died. Of the 38, 22 (57.9%) died between the hours of 9.01pm and

7.00am, with only 3 (7.9%) dying between the hours of 7.01am and 2.00pm.

Table 1. Age and sex distribution of the cases of PEM

Age (mnths)	Marasmus		Marasmus-Kwashiorkor		Kwashiorkor		Underweight		Total
	M	F	M	F	M	F	M	F	
0 - 6	-	1	-	-	-	-	-	1	2
7 - 12	7	6	2	1	6	2	6	1	31
13 - 24	17	17	15	12	8	7	4	5	85
25 - 36	5	2	1	4	-	4	1	-	17
37 - 48	-	-	-	-	1	-	-	-	1
Total	29	26	18	17	15	13	11	7	136

Table 2: The prevalence and case fatality rates for the different types of PEM in Zaria

Type of PEM	Number of cases		Total	% of total
	Survived	Died (%)		
Marasmus	43	12(21.8)	55	40.5
Marasmus-Kwashiorkor	20	15(42.9)	35	25.7
Kwashiorkor	20	8(28.6)	28	20.6
Underweight	15	3(16.7)	18	13.2
Total	98	38(27.9)	136	100.0

Table 3: Time of the day patients died

Time of day	No. (%)
7.01am - 2.00pm	3 (7.9)
2.01pm - 9.00pm	13 (34.2)
9.01pm - 7.00am	22 (57.9)
Total (%)	38 (100.0)

DISCUSSION

The admission incidence of 4.04% observed in the present study is similar to the 4.4% reported by Laditan and Tindimewa.⁷ This is however lower than

the 6.8% reported earlier by Alegbejo and Yakubu¹ from Zaria and higher than the 2.5% reported by Obi⁸ from Benin in the southern part of Nigeria. These Hospital incidences may not reflect the true prevalence of PEM in the community, as many cases of PEM, especially the less severe ones, are not likely to be admitted to a Hospital.

The overall mortality of 27.9% in this study is similar to earlier reports in Nigeria (28.1%)⁷ and other parts of Africa, Lesotho (25.2%)⁹, Zambia (25.8%)¹⁰ and Malawi (25%).¹¹ These high case fatality rates for severe protein-energy malnutrition is not

limited to general or district hospitals but even at university teaching hospitals such as ours.¹² Poor case management and lack of intensive nursing care for these ill children have been suggested as the explanation for these high case fatality rates.¹¹ Intensive nursing care will facilitate better compliance of prescribed dietary protocol and prompt detection of complications. The case fatality was highest among patients with marasmic-kwashiorkor than for marasmus and kwashiorkor. This is a frequent finding^{9,10} although not invariable.^{7,13}

Laditan and Tindimebwa⁷ reported that most deaths in kwashiorkor and marasmic-kwashiorkor occurred within the first 48-72 hours. Manary and Brewster¹² reported that 37% of their subjects died within the first 48 hours and 68% by the first 5 days after admission. In this report, only 7/38 (18.4%) of our subjects died within the first 72 hours of admission and 42.1% within the first 7 days of admission. The reason why over 50% of patients with protein-energy malnutrition died after the first one week of admission in the present series was not clear. In our hospital, all cases of PEM are admitted on the same general paediatric wards along with other clinical conditions. It is possible that the close observations needed by these patients with PEM are not extended into the second week of admission and beyond, particularly in a busy Paediatric ward in Africa like ours.

Only 3/38 (7.9%) of our patients died during the active working hours of the hospital (7.00 am – 2.00 pm), when all cadres of hospital workers were available. Most of the deaths (57.9%) occurred during the hours of 9.01pm and 7.00am, a period that corresponds with the least number of hospital workers on duty. Although earlier workers had stressed sudden death of children with PEM, especially at night,¹⁴ inadequate

attention and management during this period could be the most likely factor responsible for the high death rate at night. Wilkinson et al,¹⁵ in their report, have identified increased attention given by nurses to children with malnutrition as an important factor responsible for a significant fall in mortality among their patients.

Absconding from Hospital remains an important problem of management of children with PEM in our Hospital. Of the 136 cases of PEM, 29 (21.3%) absconded from treatment. This is similar to the 22.4% reported by Gernaat et al¹⁰ from Zambia. Although the outcome of these children are not known, they are more likely to die at home than to survive. The reasons why these patients abscond from treatment are not clear. However, this could be explained by the fact that recovery from PEM is regrettably distressingly slow, and with most of the parents poor, the cost of such a long Hospital stay may be too much for them to bear.

In conclusion, this report has highlighted the fact that, while the mortality rates of severe cases of PEM still remains high, it is very difficult to know the true mortality rate of severe PEM because of the high rate of abscondment from Hospital admission. There is also the need for close monitoring of all cases of severe PEM through out the period of admission particularly during the night..

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