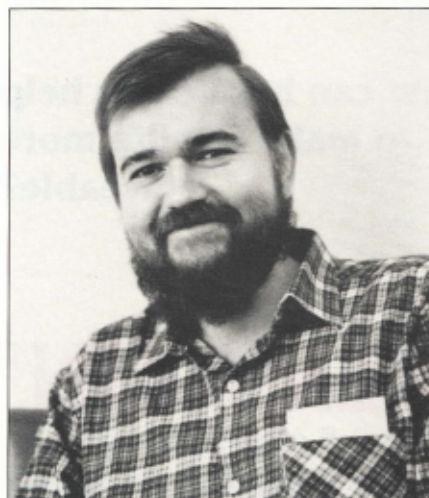


Follow-up Kwashiorkor Patients Discharged from the Nutritional Rehabilitation Ward of the Gelukspan Community Hospital — P Ferrinho, M Bac, D Blaaw, W Fraser, A Kometz



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Curriculum vitae

Paulo Ferrinho had his school education in Mocambique and then went on to the University of Cape Town to obtain the MBChB in 1980. He did his internship at the Groote Schuur hospital in Cape Town and then worked at the Gelukspan Community Hospital from 1982 to 1986. After that he became a registrar in Community Health at the University of the Witwatersrand. He then became the Clinic Manager and Director for Research of the Alexandra Health Centre and University Clinic/Institute for Urban Primary Health Care until 1991. Currently he is at the Institute of Tropical Medicine and Hygiene in Lisbon. Although specialising in Community Health, his professional interest remains in support to primary health care.

Summary

This study assessed the nutritional status of a group of children admitted with kwashiorkor to the Nutrition Rehabilitation Ward of the Gelukspan Community Hospital in 1985. Weight, height and arm circumference were measured during July 1987 to assess their nutritional status and more specifically the effectiveness of nutrition rehabilitation of children with kwashiorkor in the Nutrition Rehabilitation Ward. The sample consisted of 80 children of which 71 (89%) were traced and 64 (80%) were measured. The mortality rate of the sample was less than 1%. Forty four percent of the children had a low weight for age, 75% were stunted, 2% were acutely malnourished and none were severely malnourished. The implications for further research and programme development are discussed.

S Afr Fam Pract 1992; 13: 141-6

KEYWORDS:

Kwashiorkor; Child; Follow-up Studies; Nutritional Status; Anthropometry.

Introduction

In many developing regions, including South Africa, protein-energy malnutrition (PEM) is an important problem¹⁶ and a number of intervention programmes have been developed to control, prevent or minimize its impact on the well-being of small children.

In South Africa one of the best known and documented intervention programmes has been reported from the Gelukspan Health Ward (GHW), a rural area bordering Botswana.^{7,17} The GHW has a population of about 90 000. The constituted health authority is the Gelukspan Community Hospital (GCH) and its satellite clinics.¹⁷

As a result of a nutrition survey in 1980 an extensive intervention program was initiated with three components: an Under Fives Clinic (UFC) with food supplements, a Nutrition Rehabilitation Ward (NRW) and a gardening and poultry project. The nutrition programme and its community impact have been previously reported.^{7,17} But there were no scientific data on the nutritional performance and survival of small children with severe malnutrition after discharge from the NRW.

Population and Methods

This study involves a follow up of children 0-5 years of age admitted with kwashiorkor to the GCH NRW in 1985. Children with kwashiorkor were selected on the basis of the provisional diagnosis from the ward register.

The hospital's records were used to

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extract relevant information on the child's hospital admissions and personal history (sex, date of birth, evidence of oedema, low protein levels, residence, weight on discharge, information on readmissions and previous admissions for nutritional reasons and infections noted at admission).

The children were visited at the satellite clinics or at their homes in the different villages over a period of two weeks in July 1987.

The children's shoes were removed and height was measured (with an accuracy of 0,5cm) using standard methods with a metallic rod. Weight was checked (with an accuracy of 0,1 Kg) with a suspended Salter scale (calibrated daily) after undressing the children. The arm circumference was measured (with an accuracy of 0,1cm) with a plastic tape at the mid-point of the left upper arm.¹⁸

Further information was obtained from the child's road to health card (RTHC) including the number of

Kwashiorkor is not a disease of infancy but of 2 to 4 year olds

times that the child attended the UFC and whether supplements were given since discharge from NRW. From the growth curve an indication of growth velocity each time the children were weighed after discharge was determined.^{19,20} The growth of a child was said to be type A if a child was growing at a rate greater than expected for a healthy child of the same weight; type B if growing at a velocity greater than expected for a

healthy child of the same age; type C if growing at a rate slower than expected for a child of the same age.

The weight for age, height for age, weight for height were compared with NCHS standards. Student t tests and chi-square tests were used to test levels of probability of statistical significance of the data.

Results

All 80 children (40 boys and 40 girls) with kwashiorkor from the

GHW, were included for follow-up. Only 71 (89%) could be traced. Of these 1% (n=1) had died, 4% (n=3) had moved, 6% (n=4) were away; and 79% (n=63) were located and measured. The hospital files of 4 children could not be found or were incomplete.

Demographic data

Fifty two percent (n=33) were females and 48% (n=30) were males. Ages on admission to the NRW and at the time of study are summarized in Table I.

Table I. Age and Anthropometric measurements at discharge from the nutrition rehabilitation ward and at follow up.

At Discharge Age Group			At Follow-up Mean \pm Std Deviation			
Months	N	Weight	N	Weight kg	Height cm	Arm Circ cm
0-11	0	-	-	-	-	-
12-23	35	8,8 \pm 1,2	0	-	-	-
24-35	23	9,7 \pm 0,9	3	11,6 \pm 1	82,2 \pm 2,4	14,5 \pm 0,6
36-47	13	11,2 \pm 1,0	24	13,7 \pm 1,7	89,9 \pm 3,4	15,7 \pm 1,1
48-59	4	11,8 \pm 1,7	19	14,0 \pm 1,4	91,4 \pm 5,1	15,4 \pm 0,9
60-71	1	11,5 \pm 0,0	13	14,8 \pm 1,9	96,2 \pm 4,2	15,5 \pm 0,8
72-83	0	-	3	16,6 \pm 2,1	98,9 \pm 6,1	16,4 \pm 0,8
84+	0	-	1	-	-	-

Table II. Other admissions for nutritional disorders

Number	Previous Admissions		Readmissions	
	Frequency	Percent	Frequency	Percent
0	53	84,1	53	84,1
1	3	4,8	9	14,3
2	3	4,8	1	1,6
No Data	4	6,3	-	-
Total	63	100,0	63	100,0

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Admission data

Thirty seven percent (n=22) were admitted alone, 49% (n=29) with the mother, 10% (n=6) with the grandmother and 3% (n=2) with an aunt (no data in 4).

During admission 76% (n=45) of the children had no record of infection, 3% (n=2) had tuberculosis and 20% (n=12) had other infections (mostly gastrointestinal or respiratory tract).

The number of readmissions and previous admissions for nutritional disorders are given in Table II. Forty percent of the children with subsequent readmissions had infections diagnosed during the readmissions.

The nutritional status on discharge is summarized in Table I. The mean period from admission to discharge was $1,03 \pm 0,88$ months.

Highest percentage of underweight children were 5+ years

Follow-up study

The time from discharge to the study averaged $23,1 \pm 3,6$ months; 5 children (8%) had been discharged less than 18 months before. At follow-up 11% (n=7) had no RTHC, although most claimed that it was kept elsewhere.

Of the 56 with RTHCs 7% (n=4) never attended UFCs; 36% (n=20) attended less than once every 4 months; 22% (n=12) attended

Table III. Food Supplements Handed Out

Number of Supplements Issued Since Discharge	Frequency	Percent
0	6	9,5
1	11	17,5
2	13	20,6
3	3	4,8
4	6	9,5
5	2	3,2
6	5	7,9
7	1	1,6
8	1	1,6
9	2	3,2
10+	6	9,5
No data	7	11,1
Total	63	100,0

between once every 4 months and less than once every 2 months; 33% (n=18) attended between once every 2 months and once a month; and 2% (n=1) attended more than once a month.

The frequency of handing out supplements is presented in Table III. Only 3 children were still receiving supplements at the time of study.

During the follow-up 44% had a low weight for age; 74% had a low height for age; and 2% had a low weight for height. This is compared with NRW data and community data in Tables I and IV.

Sixteen percent (n=9) showed some growth velocity of type A; 59% (n=33) type B and 25% (n=7) type C; 32% did not show any C growth velocity in the period since discharge but 20% had poor growth velocity (C) for more than 40% of the period since discharge.

Table IV. Comparison of Malnutrition Rates at discharge with rates at follow-up, with rates found in community surveys.

	Percent
Low Weight for Age	
Sample	44,4
At Discharge	82,0*
District	31,0*
Low Height for Age	
Sample	74,4
District	25,0*
Low Weight for Height	
Sample	1,6
District	1,0

*Value significantly different from sample (P<0,05)

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Low weight for age was more likely in females ($p < 0,05$) and low height for age was more likely for children reporting readmissions.

Discussion

Despite the good response rates the power of statistical analysis is limited by the small numbers in each sex category.

Mortality

One child from the group of children traced had died giving the mortality rate of the study as 1%. The fate of the children who were untraced is unknown. In case all nine of them had died, the maximum mortality rate of our study group is 12% in the period since discharge (which is approximately 6% per year). The mortality rate of 2% of the under six population of the whole district⁹ is comparable to the minimum mortality rate of our study. The results from other studies vary but generally report a higher mortality.^{21,26}

Anthropometric measurements

Eighty two percent of the children had a weight for age less the 80% of the NCHS mean on discharge. One

More females were underweight than males

might assume that this would predispose to a poor prognosis, however the children continued to improve after discharge and the proportion of children underweight

at the time of study is significantly reduced when compared to discharge. It seems that the policy of releasing children before they have attained at least 80% of the expected weight for age is appropriate. This has been reported also from elsewhere.²¹

But this group remains more stunted than the equivalent population in the community. The importance of this observation in terms of public health intervention is not clear. The fact that

The problem with supplementary feeding: it tends to substitute rather than supplement the normal diet

stunting is more likely in children with readmissions and the observation that 40% of these children have infections suggests the need to study carefully the households of these children to look at factors, in the domestic micro-environment, that are amenable to intervention.

Growth velocity has been used as an indicator of recovery from malnutrition.^{8,24} At the time of study 75% had had catch-up growth (growth velocity A or B) and 32% had not experienced growth faltering (C growth velocity) at any time since discharge. In 1982 a follow-up study of children in the region who had received supplements, half of the children showed C growth velocity at the time of the survey.⁸ The difference in C growth velocity between the two studies may reflect either different study methodologies, better support for the children after discharge, or a marked improvement

in the nutritional status of the general population since 1982.

Factors to consider in programme development

Age - It is obvious that kwashiorkor is not a disease of infancy but essentially of the 2nd to the 4th year of life.

The proportion of underweight children is also correlated with age. Most researchers claim that the critical period for the development of malnutrition is the age group 1-3 years.^{7,9,13} In 1985 our sample consisted of children from 0-5 years. At the time of our study (July 1987) this group was older: there were no children below 24 months of age and a large proportion were above 5 years of age. The highest percentage of

Nutrition supervision should continue till after 5 years

underweight children in our study was found in children over 5 years. This may indicate a need for continued growth monitoring and screening of children over the age of 5 years.

Sex - More females have been shown to be underweight than males. This association has not been reported in any of the other studies in the region^{7,9} although it has been reported from other countries.

Education of the child-minder - Mac William²¹ found that children of mothers receiving nutritional

education showed improved recovery and development. In our study there were no anthropometric differences between children whose mother or guardian stayed with them in the ward and those with whom none stayed. Glatthaar also found that nutrition education of the mother or minder did not make a significant

Children with Kwashiorkor remain more stunted

impact on the nutrition of children.²⁷ From Bangladesh it has been reported that below a critical level of income nutrition education is not beneficial.²⁸ It is therefore possible that poverty is associated with most cases of kwashiorkor. Unfortunately no data on economic status were collected.

Attendance of well-baby clinics and food supplementation - No correlation was found between UFC attendance, the number of supplements given and the nutritional status of the child, which has also been reported in a number of other studies.^{21,29} An increased number of UFC attendances does not imply a better nutritional status because many children are brought to the UFC only when a deterioration in the child's health is noticed by the mother. A possible explanation for the ineffectiveness of supplementary feeding is that supplementary food may substitute rather than supplement the normal diet.²⁹

Conclusions

After appropriate hospital treatment children with kwashiorkor survive

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stunted. None of the interventions studied seems to have an impact on the anthropometric prognosis of the children.

The disadvantages associated with stunting have been well reviewed. It is important therefore that the problem of nutritional stunting should be thoroughly investigated and addressed. Particular attention should be paid to the role of infections and poverty.

Still it is essential that nutrition supervision should continue at least through the first 5 years of life as part of a comprehensive PHC programme.

It is also important to investigate the apparent failure of maternal education in the NRW and food supplementation after discharge to impact on anthropometric outcome.

Acknowledgements

Dr de Jonge and the staff of Gelukspan Community Hospital for their assistance in this study and Dr Cameron for the loan of anthropometric measuring equipment.

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