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PROTEIN-CALORIE MALNUTRITION IN UGANDA

II—Busoga District

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BUSOGA DISTRICT has an area of approximately 6,876 square miles, of which 3,167 are water and 3,709 land and swamp. Its boundaries are formed by Lake Victoria to the south, the Victoria Nile to the west, Lake Kyoga to the north and the Mpologoma Swamp to the east.

Population

The total population of Busoga, according to the 1959 African census, was 660,507. The numbers of children were:

Age (years)	Number (thousands)	Per cent of population	Ratio: $\frac{\text{males}}{\text{females}}$
0 to 1	23	3.5	1.00
1 to 4	77	11.6	0.97
0 to 4*	100	15.1	0.98

Seventy-one per cent of the population are Basoga, a tribe of the Bantu group. The remainder are a mixture of Bantu and other tribes, the most numerous being Iteso, who form about five per cent of the total population.

Soil

The soil of Busoga is classed as of medium productivity. Principally it is a reddish-brown sandy loam or deep red clay on laterite. The most fertile and most heavily cultivated area is the south-west part of the district.

In 1960 an estimated 1,167 square miles (747,000 acres), roughly 31 per cent of the total land and swamp in the district, were under African cultivation. The population for each square mile of the cultivated land was nearly 570.

Climate

The rains fall from mid-March to May and in August, September and November. In the south, that part of Busoga south of the railway line, the annual rainfall is 47 to 50 in., fairly evenly distributed throughout the year. In the north, although the annual rainfall is usually over 50 in., most of it falls in the first rains of the year and the dry season, from October to February, is more marked than it is in the south.

Crops

The main cash crops are cotton and, to a much lesser extent, groundnuts. Coffee growing has started only in recent years. The principal food crops

* For the explanation of the inclusion of this group see Burgess and Dean (1962)

are cooking bananas, finger millet, sweet potatoes, cassava, groundnuts, maize, beans and sesame (simsim). All the crops are grown throughout Busoga, except coffee and bananas which do not do well in the north. There, finger millet takes the place of bananas as the commonest staple. Details of the crops are given in Table 1.

Table 1
Crops Grown in Busoga District

<i>Crop</i>	<i>Acreage in 1960</i>	<i>Planting time</i>	<i>Harvesting time</i>
Cotton	392,100	Late April to early August	November to early March
Coffee	7,800	April to May	June and July, November and December
Cooking bananas	197,200	Perennial	Perennial, peak in January
Finger millet	133,900	December to March	Late April to June
Sweet potatoes	74,400	April to July and September, November	Piecemeal harvesting from July to September and February, March
Cassava	47,700	April, May and September	Piecemeal harvesting November to April
Groundnuts	54,300	April and May	June and July
Maize	45,700	February and March	June to September
Beans, mixed (mostly <i>Phaseolus vulgaris</i> and <i>lunatus</i>)	35,100	February to April and September, October	May to July and late November to December
Sesame	2,700	April and September	July, August and December

The district agricultural staff, who were asked to comment on the period covered by the survey, said that in 1959 weather conditions were better than normal, food crop production was above average and there was a record cotton crop. In 1960 there were good rains for the food crops which are planted early, such as millet, beans and maize. Although the acreages were less than in 1959, the yields were above average. Cotton yields in 1960, however, were reduced because the weather was dry in the planting and boll-setting times.

This confirmed the opinion expressed by the staffs of the Dispensaries that there was no unusual food shortage during the period of the survey.

Livestock

The livestock population of Busoga in 1960, and the numbers slaughtered, were:

	<i>Total number</i>	<i>Number slaughtered</i>	<i>Lean meat yield (tons)</i>
Cattle	197,652	18,881	1,627
Sheep	30,490	1,266	7
Goats	297,312	10,108	.88

Cattle are more common in the north. Traditionally, they were kept more for social prestige than for food, but gradually some of the more progressive owners are starting to crop their herds and to regard them as an economic asset. The milk produced was formerly drunk only by the herdsmen, but an increasing number of owners are now using it themselves. The daily production of milk in 1960 was approximately 10,000 gallons. The milk of goats and sheep is not used.

Fish

Fishing is carried out in Lake Kyoga, Lake Victoria, the Victoria Nile and in various dams and fish ponds. At present sleeping-sickness restrictions, covering most of the Lake Victoria coast of Busoga, confine fish landings to certain parts, especially Lugala in the east and some places in the Jinja area in the west. The landings from Lake Victoria and Lake Kyoga could probably be greatly increased. The estimated landings for 1960 were:

	<i>Tons</i>
Lake Victoria	3,800
Lake Kyoga and the Victoria Nile	2,700
Dams and fish ponds	50
Total	6,550

The exports from Busoga were estimated to be about one-third of the total.

Animal protein

The amount of animal protein available per head of population in Busoga for 1960, from meat, milk and fish, was as follows:

	<i>Protein (g.)</i>
Meat	263
Milk	730
Fish	444
Total	1,437

For one day, therefore, the amount was 3.9 g.

Food taboos

The taboos were described by the District Medical Officer, himself a Musoga. They are similar to those held elsewhere in Uganda and are said to apply only to females over six years old. Eggs, poultry, mutton, pork and certain kinds of fish are forbidden. No specific taboos relate to pregnancy or lactation. It is thought that the taboos are not very strictly observed and that they are ignored by the more educated.

In addition, many Basoga are Moslems who keep the usual restrictions enjoined by their religion.

Medical Units

Busoga is served by two Government Hospitals, one Health Centre and seven Dispensaries. In addition, there were three Mission Maternity Units and one small Mission Hospital. Together the Government and the Missions provided a total of 247 Dispensary beds and 346 general hospital beds. All the Government units had daily out-patient clinics and each had a Child Welfare Clinic once a week. The Dispensaries were in the charge of Medical Assistants: each was visited once a fortnight by the District Nursing Sister and every two to three weeks by a doctor.

RESULTS

The results given were obtained in the period from November, 1959 to October, 1960. They include data from seven Government Dispensaries and from Jinja and Namasagali Hospitals, but none from the Mission Units.

Owing to previous difficulties with the local population the scheme could not be started at Namungalwe Health Centre until February 1960. As the data from the Centre were incomplete they have been excluded from the analyses. Fortunately, relatively few cases (40) were seen there.

Malnutrition seen at Government Dispensaries in Busoga

During the year of the survey period 864 cases of malnutrition were seen of which 437 (51 per cent) were diagnosed as kwashiorkor and 427 (49 per cent) as marasmus.

Many cases that would otherwise have been classified as marasmus had slight œdema, usually of the legs alone, and were therefore placed in the category of kwashiorkor. It was remarkable that the cases of marasmus were, nevertheless, almost as numerous as those of kwashiorkor. By contrast, at the Medical Research Council's Rural Child Welfare Clinic in Buganda (Burgess, 1960) cases of kwashiorkor outnumbered those of marasmus by seven to one.

The 864 children were 1.8 per cent of the total number of children under six years old attending the Dispensaries.

Table 2 shows the total number of children seen at each Dispensary and the incidence of malnutrition. For comparison, the returns for malnutrition on the official Medical Form 77 are included.

The number of malnourished children recorded in the survey on the whole confirmed the impressions gained during visits. The large numbers at Kiyunga, Namwendwa and Kamuli Dispensaries reflected the large totals of attendances there.

The uncertainty of the returns made on the official Medical Form 77 was demonstrated by both Bugiri and Nsinze Dispensaries, where more malnutrition was recorded in the survey than in the returns. Usually the Medical Form showed larger numbers because it included "undernourished" children with insufficient clinical signs to justify filling in a survey form. Namwendwa's large Medical Form return was found to be due to the enthusiasm of the Medical Assistant, who noted as malnourished any child

Table 2

Number of Children seen at Dispensaries in Busoga from November, 1959 to October, 1960

	Dispensary							Total
	Bugiri	Nsinze	Kaliro	Kiyunga	Namwendwa	Buyende	Kamuli	
Total number of children under six years old attending Dispensary	3,689	6,638	5,458	10,714	7,795	5,212	7,829	47,335
<i>Malnourished children</i>								
Kwashiorkor	57	135	34	93	58	19	45	441
Marasmus	64	96	33	83	67	17	63	423
Total	121	231	67	176	125	36	108	864
Number of malnourished children/1,000 children under six years old	31	34	12	16	16	7	14	
Number of cases of malnutrition shown on Medical Form 77	76	169	234	230	1,145	42	133	2,029

Table 3

Cases of Malnutrition seen each Month at Dispensaries in Busoga
November and December, 1959 and January to October, 1960

	1960										1959		Total
	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Total number of children under six years old attending Dispensaries	3,039	2,938	3,129	3,916	5,368	4,971	4,243	4,076	4,046	4,783	3,592	3,234	47,335
<i>Malnourished children</i>													
Kwashiorkor	24	38	39	40	56	33	28	25	24	18	51	61	437
Marasmus	40	45	50	40	34	34	23	21	24	23	47	46	427
Total	64	83	89	80	90	67	51	46	48	41	98	107	864
Number of malnourished children/1,000 children under six years old	23	28	28	23	14	13	12	11	12	9	27	33	
Number of cases of malnutrition shown on Medical Form 77	117	146	204	183	234	188	169	124	129	136	227	172	2,029

who was slightly thin. Other Medical Assistants included only the more obvious cases.

Seasonal incidence

Table 3 gives, for each month of the survey, the total number of children seen, the number of cases of kwashiorkor and marasmus recorded, the incidence of malnutrition and the returns for malnutrition on the Medical Form 77. The incidence was consistently lower in the period from May to October 1960 than in the other six months of the survey year.

Possible reasons for the fluctuations in number of cases recorded in the survey

1. Most Dispensaries ran out of dried skimmed milk in April, 1960, although at one or two, where the attendances were small, stocks lasted until May. No more milk was issued until the end of October. Over the "milkless" period there was a steady reduction in the number of cases of malnutrition seen, although there was an increase in the total number of children attending. If the shortage of dried skimmed milk contributed to the decrease in the numbers of malnourished children the Basoga must recognize malnutrition as an entity, or at least recognize a connection between the state of ill-health and treatment with milk.
2. The Medical Assistants, being unable to treat malnutrition, may have recorded cases of malnutrition under other headings, such as hookworm, malaria and diarrhoea, conditions that they could treat. On questioning, however, they all denied having done so.
3. There may have been a falling off of enthusiasm on the part of the Medical Assistants, with consequent avoidance of the use of the survey forms. No evidence of such a falling off was seen during visits and it seems unlikely that all the Assistants suddenly became unenthusiastic in the eighth month of the survey.
4. Medical and agricultural staff in Busoga said that food was often in poor supply in January, February and March. As Table 1 shows, the chief foods available in those months are the cooking banana, sweet potato and cassava. The very important millet crop is mostly taken in May and June and groundnuts and beans are harvested then. Groundnuts are also harvested in July and maize in July, August and September. By November and December the stored foods are becoming exhausted: there is another bean crop in December, but it is small.

The incidence of malnutrition found in the survey (notably decreasing from June to October) undoubtedly reflected to some degree the availability of food.

5. The main season for the picking of cotton in Busoga extends from December to March and the smaller total number of children seen during this period might have been due to the reluctance of parents to leave their gardens.

The main time for cultivation and planting of the food crops is from February to May, before and during the first rains. One of the more cynical Medical Assistants commented that at the times when the

mothers are very busy a child has to be acutely ill before he is taken to a Dispensary.

Age incidence

For 612 out of the 864 children the exact date of birth was given by the parents: the dates were probably correct, but there was no way of checking them. The ages of the 612 children when they first attended, and the diagnoses, are summarized in Table 4.

Table 4
*Age of Malnourished Children Attending Dispensaries in Busoga
Whose Dates of Birth were Known*

Age (months)	Kwashiorkor		Marasmus	
	Number of children	Percentage	Number of children	Percentage
0 to 6	16	5	37	12
7 to 12	85	28	105	35
13 to 18	98	32	104	34
19 to 24	69	22	40	13
25 to 36	33	11	16	5
Over 36	7	2	2	1
Total	308	100	304	100

The Table shows that 70 per cent of the cases of marasmus and 60 per cent of those of kwashiorkor were between seven and 18 months old when they were first seen. In children over 18 months old kwashiorkor was much more common than marasmus, as is usual.

The unexpected findings were that there should be so many young cases of kwashiorkor and so many cases of marasmus, especially in children over a year old. The findings could not have been greatly influenced by mistakes in the dates of birth: further analysis showed that in the 252 children whose birthdays were unknown (and whose ages could therefore only be assessed roughly) there were 129 cases of kwashiorkor and 123 of marasmus.

Sex ratio

In the survey period 24,663 boys and 24,211 girls under six years old were seen. The ratio between these figures, 1.02, was close to that of the whole population under five years old in the district, which was 0.98.

Of the malnourished children 464 were boys and 389 girls: the sex of 11 children was not recorded. The ratio, 1.20, was similar to that found in malnourished groups in other countries.

Examination of the ratio for children at individual Dispensaries did not show any significant differences.

Reattendances

The reattendance rates in the first and second halves of the survey period were very different, as Table 5 shows. The numbers of children

Table 5

Number of Malnourished Children Attending Dispensaries in Busoga twice or more in the two Half-years of the Survey

Dispensary	November, 1959 to April, 1960			May to October, 1960			Clinic attendances*	
	Total number of children	Number attending twice	Number attending more than twice	Total number of children	Number attending twice	Number attending more than twice	Total number of children	Number re-attending
Bugiri	83	12	10	38	1	0	2,528	1,080 (43)
Buyende	24	3	1	12	1	0	819	180 (21)
Kaliro	36	7	2	31	0	0	1,411	226
Kamuli	57	2	6	51	0	0	2,028	386
Kiyunga	104	25 (24)†	6	72	0	0	1,774	140
Namwendwa	106	15	3	19	2	0	2,435	950 (39)
Nsinze	111	26 (23)	5	120	0	0	2,115	655 (31)

* Attendances at Child Welfare Clinics November, 1959 to October, 1960: see text.

† Percentages over 20 are shown in brackets.

attending twice, and attending more often, are shown separately. The reattendance rates at the Child Welfare Clinics, which were held weekly at each Dispensary by the Medical Assistant and visited monthly by the District Nursing Sister, are also shown. The records of the Clinics did not indicate the frequency with which the children reattended.

The total reattendance rate at the seven Dispensaries during the first half-year of the survey was about 24 per cent and was much the same as the rate at the Child Welfare Clinics (28 per cent). It was surprising that the Clinic rate was not much greater: a large proportion of the children brought to the Clinic are breast-fed and most mothers seem to be more concerned with the health of the newest baby than with the welfare of the older siblings.

The reattendance rate, even for the first half-year, was so low that very few children can have received much benefit from the dried skimmed milk that was issued. Each child in whom malnutrition was diagnosed was given 10 oz. of the milk powder and the mother was told to return in one week. In the half-year approximately 450 lb. must have been issued for children who never reattended and that amount must have been almost entirely wasted; no established case of malnutrition could be expected to benefit to an appreciable extent from 10 oz. of the milk powder. Benefit could only accrue from regular attendance, but only 30 per cent returned within two weeks of their first Dispensary visit and 40 per cent did not return until more than four weeks had elapsed.

The records of 117 children contained sufficient details of the findings on reattendance for an assessment of improvement, or lack of it. There was no change in 88 children. Of the 27 who apparently improved, 15 returned more than four weeks after their first attendance: their improvement must therefore have been spontaneous, or at least independent of the dried milk. Two children were known to have died.

Malnourished children admitted to the Dispensaries for treatment

Only at Bugiri and Kamuli Dispensaries were significant numbers of cases of malnutrition admitted. At Bugiri 70 out of 121 cases seen were admitted and at Kamuli 53 out of 108. Nsinze Dispensary, which saw the largest number of malnourished children, only recorded six admissions. Almost certainly this number was too low: the Medical Assistant usually failed to indicate admission on the survey form.

Buyende recorded one admission, Kaliro two, Kiyunga none and Namwendwa three. These small numbers were probably correct: no in-patient admitted for the treatment of malnutrition was seen at any of the Nutrition Officer's visits. The Medical Assistants said that parents usually refused admission, but there seemed to be no good reason why they should refuse at these four Dispensaries and accept at others.

Results of in-patient treatment

The in-patient records were not complete, but 59, of which 58 were obtained either at Bugiri or Kamuli, could be used. A higher proportion of these children (12 out of 22) stayed more than eight days in the first half-year

than in the second (four out of 37). In the first half-year, also, three of the children admitted were known to have run away, and in the second, 21.

Forty-three of the 59 children stayed eight days or less. Improvement was noted in 17 of the 59, but 11 of the 17 had stayed more than eight days. Four children died.

The fate of malnourished out-patients

Attempts were made to find 148 of the children who had made only one out-patient attendance and had not reappeared. One-third had received 10 oz. dried skimmed milk and two-thirds none. Eighty-eight of the children were eventually traced, 70 of them four to nine months after they were seen at the Dispensaries. The tracing was done by Health Inspectors who recorded their findings on a special form (Burgess and Dean, 1962).

Table 6
Result of the Follow-up Examination of 88 Children who had Attended a Dispensary in Busoga

Diagnosis	Number traced	Condition on discharge		Died
		Improved	Not improved	
Kwashiorkor Slight	15	11	0	4
Moderate or severe	50	21	5	24
Marasmus	23	12	6	5
Total	88	44	11	33

The results appear in Table 6. They show chiefly the appalling death rate (48 per cent) of moderate or severe cases of kwashiorkor that are not properly treated. The number of cases of slight kwashiorkor and marasmus were too small for safe conclusions, but nine deaths in 38 cases (24 per cent) cannot be ignored.

Most of the deaths might have been prevented. From the somewhat scanty details that could be obtained it seemed that at least 23 of the 33 children who died showed signs of malnutrition at the time of death. Of the rest, it is probable that whatever the immediate or presumed cause of death, such as malaria, anaemia, gastro-enteritis or an upper respiratory tract infection, malnutrition was a contributory factor.

Malnourished children seen at Busoga Government Hospitals

The two hospitals in Busoga are at Jinja, the principal town and one of the chief ports of Lake Victoria, and Namasagali, the port on the Victoria Nile.

Jinja Hospital has about 247 general beds, a staff of several doctors and nursing sisters and is a Training School for nurses. Namasagali Hospital has only 36 beds, about the same number as any of the Dispensaries, but it has a resident doctor.

Because of the large turnover of patients the staff at Jinja Hospital felt that they could not complete the survey forms. It was therefore necessary to use the normal hospital records, consisting of the in-patient sheets for admissions to the Children's Ward and the case cards of children attending the weekly Child Welfare Clinic to which all out-patient cases of malnutrition were referred. As the details recorded for these cases differed from those recorded in the Dispensaries, the hospital results have had to be dealt with separately.

The number of patients seen at Namasagali Hospital was sufficiently small to allow the survey forms to be used, but as the other records were those of a hospital, the results could not be included with those of the Dispensaries.

During the year of the survey 131 children (6.4 per cent of the total admissions of children under six years old) were admitted to Jinja Hospital for the treatment of malnutrition and 128 malnourished children (4.1 per cent of the total attendance) were seen at the hospital's Child Welfare Clinic. Of the admissions about 90 per cent were classed as kwashiorkor and only ten per cent as marasmus; it is possible that the marasmus cases were usually considered to be suitable for out-patient treatment, which was given at the Welfare Clinic. The Clinic records did not, for the most part, permit of a clear distinction between marasmus and kwashiorkor.

The number of children treated in each month is given in Table 7. The significance of the monthly fluctuations was uncertain. The pædiatric ward at Jinja Hospital is very busy and the availability of beds may have limited admissions more in some months than in others. No malnourished children were admitted to Namasagali Hospital.

Table 7

Malnourished Children seen at Jinja and Namasagali in each Month from November, 1959 to October, 1960

	Jinja Hospital		Namasagali Hospital out-patients
	In-patients	Out-patients	
<i>1960</i>			
January	9	10	0
February	7	9	1
March	14	8	1
April	6	12	1
May	3	13	2
June	12	20	4
July	17	15	1
August	8	6	1
September	12	5	1
October	24	8	2
<i>1959</i>			
November	11	11	5
December	8	11	1
Total	131	128	20

Comment on incidence in Busoga

The incidence of malnutrition, in relation to the whole population, was calculated for each of the Gombololas in Busoga, but the results were not very illuminating. Malnutrition was found chiefly in the central areas, which are well populated. Proximity to a medical unit was probably an important factor in attendance, but the density of the local population did not seem to be related to the numbers of cases.

The northern and southern areas had lower incidences of malnutrition than the central ones. In the north, much of the fish from Lake Kyoga is used locally, as its distribution is dependent on bicycle transport that has a limited range. Cattle are more numerous in the north and millet rather than cooking bananas is the staple food there. In the south most of the coastline to within a few miles of Jinja is a restricted area because of sleeping-sickness; the landing of fish is therefore forbidden and the population for several miles inland is sparse. The northern parts of these coastal Gombololas and those around the Jinja-Tororo road are, however, quite well populated and it is interesting that they should have a low incidence of malnutrition. A new Dispensary has recently been opened at Busesa in Gombolola Sabaddu, Bugweri. If many cases of malnutrition from the nearby Gombololas attend there, the idea that distance from a medical unit is a vital factor in attendance will be confirmed.

The relatively high incidence of marasmus in Busoga could be due to a low economic status, to ignorance causing a reduced intake of calories as well as protein, to unsatisfactory practices of weaning and infant feeding, or to concomitant debilitating illness. We have no evidence to show which of these factors was the most important. It seemed that early failure of breast milk, followed by poor feeding mostly due to ignorance, commonly preceded malnutrition. Conditions such as malaria, respiratory infections, measles or anaemia were frequently noted by the Medical Assistants and may have acted as precipitating factors.

There was very little doubt that the low reattendance rate of out-patients at the Dispensaries, the reluctance to stay at the Dispensaries and the tendency to run away all reflected a lack of faith in the efficacy of the treatment offered: and there was no doubt that the difference between the numbers for the first and second halves of the year was largely due to the absence, in the second half, of supplies of dried skimmed milk. The supplies failed in April and May, 1960 and were not replenished before the end of the year of the survey.

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