

# A Diet Survey in Kalene Hill Area

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This survey of local diet was undertaken in two chiefdoms near Kalene Hill hospital during September, 1968. The inquiry was undertaken as a corollary to, and at the same time as, clinical studies of nutritional state in the same areas. Special emphasis was given to blood sugar testing in view of an earlier geographical suggestion<sup>1</sup> that a high incidence of diabetes mellitus

The area lies in the protrusion of Mwinilunga district into a bulge north-westwards between Angola and the Congo (Kinshasa) Republic. The soils are ferrallitic sandy textured sediments which have been strongly leached and have very low inherent fertility. Drainage, although locally north and west, forms the headwaters of the south and east flowing Zambezi. Water temperatures near this continental water parting are cold, which accounts for the absence of bilharziasis locally.

The rainy season is longer here in the extreme north-west than in the rest of Zambia, extending usually from mid-October to late April. In this period 60 inches (150cms.) of rain is received, mostly in heavy deluges.

The natural vegetation of the area is brachystegia woodlands but much of it has been cleared at some time for cassava gardens. Game animals formerly numerous are now reduced to a few small buck such as duiker and reedbuck and some bush pig. The streams and rivers have some fish which are caught in an ingenious variety of traps, scoops and baskets. In minor streams poison is also used to stun fish.

Commercial communication with the world—which seems very remote when one is at Kalene 580 miles from Lusaka—is by dirt road by Mwinilunga and Solwezi to the main tarmac at Chingola. The three chiefdoms are served by a Post Office at Chief Ikelenge's village and a three times a week bus service to the Copper-belt towns. All trade goods carry a heavy surcharge on account of the long distances and poor roads.

#### Method of Survey

Two villages for survey were selected arbitrarily by agreement with the chiefs. One was Chief Ikelenge's village which is the commercial hub of the area with three shops, a post office, a school and a permanent dispensary. This was expected to prove typical of better living conditions, whilst still being truly rural. Secondly, Kabuya's group of villages, three miles west of Chief Mwininyilamba's court, was selected as typical of the more remote rural parts.

In each village seventy consecutive houses were given numbers and ten were then chosen by random number table from those already numbered. In Kabuya's, one house proved to be uninhabited and another was substituted. Also in Kabuya's one household (Number Eight) consisted of two wives of one man feeding their families separately so that, effectively, eleven families were surveyed.

Short questionnaires on socio-economic factors and on physique and education were used<sup>2</sup> but the main effort was upon the weighing of all items of diet within each family for a period of five consecutive days. In each village an expatriate recorder was assisted by a local lady-interpreter.

#### Housing and Possessions

In both villages standards of housing proved to be similar. The typical dwelling was a well-constructed mud-brick house with wooden door and window frames. The house might, on occasion, be partly or completely sub-divided internally by walls or reed matting screens. Windows, when they existed, were shuttered not glassed. The normal floor was beaten earth and the walls were neatly plastered inside and out. Roofs were well thatched with fine grass. Re-roofing in preparation for the rains was much in evidence in late September. Separate kitchens were normal (six out of ten in each sample) and were, in general, more ramshackle and smaller versions of the main houses. In particular headroom in these kitchens was limited by overhead racks carrying spare utensils and stores of food. Those families without kitchens cook in the open air in dry weather. Under half the households (3 out of 10 in Ikelenge's and 4 out of 10 in Kabuya's have pit latrines. The rest use 'the bush'.

All of Kabuya's people obtain water for all purposes from a clear stream about half a mile from the village.

In Ikelenge's group one household uses a well 200 yards from the house, one uses his brother's tap water supply and the rest go about a mile to the Luinga stream.

In Ikelenge's village sample three household heads had at least part-time employment; in Kabuya's sample not one had. Cash income is therefore extremely limited although some families very occasionally receive irregular remittances from relatives employed elsewhere.

The sale of cassava, which fetches 2n per lb. weight of unsieved flour in the villages, is the main source of income. Expenditure is upon clothing, school fees and indigenous-type medical care. In both villages, but especially Kabuya's, long-standing debts to the store and to the Headman were admitted.

Ikelenge's sample possessed three bicycles and a radio and Kabuya's two bicycles amongst, in each case ten households. No household surveyed had a sewing machine, plough or gun. In each group only a minority of children attended school and many only attended for two to four years; in each sample seven years schooling was the maximum. Kabuya's villages' children seem to average more school-years than Ikelenge's possibly because competition for places is less fierce.

#### Agriculture

Cassava mound gardens are predominant and surround all the villages in this area. Indeed little else is grown (as appears from the diet) other than some sweet potatoes, green vegetables, and (in Ikelenge's only) tomatoes. Cassava, whilst easy and labour-saving to grow is extremely tedious to prepare for eating.<sup>3</sup>

There are no cattle in either village although dairy and beef cattle have been successfully reared by Europeans at Hillwood Farm a few miles to the east. In the villages a very few sheep, goats and pigs wander at will and a few chickens are kept. All these are alleged to be for meat, but there seems to be antipathy to anything so final as slaughter.

#### Age and Sex Distribution

The groups from Kabuya's and Ikelenge villages were comparable. Thus in the former there were 19 males and 26 females and in the latter 20 males and 20 females. Below the age of 14 there were 7 Kabuya males, 12 Ikelenge males, 11 Kabuya females and 7 Ikelenge females. In Kabuya's village there were 3 females pregnant, lactating or both, and 2 such in Ikelenge's village.

No record was made of deaths in each household nor of family members temporarily or permanently absent.

#### Diet

In each village the interviewers went around at irregular times once in the morning and once in the late afternoon to weigh and record all foodstuffs consumed in each household. This task was perhaps easier in Kabuya's where diversions were fewer and these interviews assumed some amusement value. In fact the present writer acquired the nicknames, "Kukabakana kwawantu", "Tuwanenu nkwashe" or "Kukwasha mukwenu" which all mean, more or less, "he who helps us in our troubles". In Ikelenge's people were busier and also more often absent from home.

The method used was to weigh dry all food before preparation. In a few cases prepared food was weighed

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### Presentation

**Betnovate** (0.1% betamethasone as 17-valerate)

Cream: 5 and 15 gram tubes

Ointment: 5 and 15 gram tubes

Lotion: 20 ml squeeze bottle

Scalp Application: 30 gram plastic squeeze bottle

**Betnovate-C** (Betnovate + 3% clioquinol)

Cream: 5 and 15 gram tubes

Ointment: 5 and 15 gram tubes

**Betnovate-N** (Betnovate + 0.5% neomycin sulphate)

Cream: 5 and 15 gram tubes

Ointment: 5 and 15 gram tubes

Lotion: 20 ml squeeze bottle

Tulle: tin of 10 pieces (4 in x 4 in)

### Indications

All steroid-responsive dermatoses including psoriasis. Betnovate-N preparations should be used if bacterial infection is present or suspected. As an alternative or when there is fungal infection, Betnovate-C preparations may be used.

### Dosage

#### Ointment, Cream, Lotion and Scalp Application

Apply a small quantity once or twice daily.

#### Tulle

Apply direct to the lesion and cover with an absorbent dressing if necessary.

### Adverse reactions

Betnovate preparations are usually tolerated well but if signs of hypersensitivity appear, application should be stopped immediately. When used with occlusive dressings on extensive areas, or for prolonged periods, as with all topical steroids, there is a possibility of systemic absorption. When using Betnovate-C preparations, cover lesions with a dressing to protect clothing.

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and converted back to dry equivalent. Two meals were general although one was often missed. Hours of visits were adjusted to be present early in preparation. Snacks

are thought to be negligible.

Tables I and II show the average weight of each foodstuff eaten per diem over the five-day period recorded.

TABLE I.  
Kabuya's Village

Foodstuffs in Grams per day	Household Consumption Groups										Total	
	1	2	3	4	5	6	7	8a	8b	9		10
Cassava, fresh				91	2315	182	1362	454	545		136	1408
Cassava, flour	2270	1952	1544	2828		2385	2338	2061	2497	908	22460	
Potato, sweet		25	50	58			425	962	1680	113	255	3568
Kidney, bean								182				182
Leaves, high carotene	85	25				102	142	119	21	102		596
Leaves, medium carotene	59	51	102	59	113	170	181	340	325	198	136	1734
Leaves, low carotene					34			34				88
Lettuce					85							85
Onions, spring								11				11
Vegetable oil		42	266	170	8	3		566				1044
Fish, dried				215	68	28	85					396
Beef, lean												57
Chicken	57											17
Eggs								17				57
Honey						57						3172
Beer, cassava	454	454						2264				
Total	2942	2552	1962	3421	2623	2927	2195	7287	4632	2910	1435	34886
No. of Persons	3	5	2	7	3	2	3	9	4	6	1	45
Gm. per capita	981	510	981	489	874	1464	732	810	1158	485	1435	775

TABLE II.  
IKELENGE'S VILLAGE

Foodstuffs in Grams per day	Household Consumption Groups										Total	
	1	2	3	4	5	6	7	8	9	10		
Maize meal		136				68						204
Wheat, flour								12				12
Cassava, fresh								51	34	11		96
Cassava, flour	1476	1476	1191	1387	1816	1135	985	481	1698	2323		13968
Groundnut, fresh					45							45
Beans, green								34				34
Leaves, high carotene					28		17		11	28		84
Leaves, medium carotene			102	37	93	147	23	108	23			533
Onions, spring						11		6				17
Squash								34				34
Tomato	238	192		37	119	62				85	28	761
Wild fruit					23							23
Pineapple										37		37
Beef, fat								6				6
Fish, freshwater						57	17		11			142
Fish, dried	23							11		57		91
Fish, canned											57	57
Kapenta									23			23
Caterpillars		34										34
Beef, lean		28	74	28				8				138
Pork	34		37								113	184
Honey	181											181
Sugar, white		11										11
Beer, cassava			48									48
Total		1952	1979	1387	1573	2286	1192	1317	560	1939	2578	16763
No. of Persons		7	6	3	2	7	2	2	1	7	3	40
Gm. per Capita		279	330	462	787	326	596	659	560	277	859	419

between meals were very rare although children especially sometimes found and ate some wild fruits. Although some beer is recorded it is possible that some was missed by the survey.

Bias upwards might arise from people vying with each other: more often probably food was concealed. In Kabuya's at least recording errors from this source

The tables show the enormous variation in amounts eaten between households. As marked is the variation in cassava meal eaten each day. For instance one elderly couple ate 280gm. of dry sifted cassava flour on one day and only 42 gm. a few days later. Nor is there any pattern of a heavily fed day alternating with a lightly fed day. The dearth of protein and of the fat-containing foods in

TABLE III.  
KABUYA'S VILLAGE

Household Consumption Group		Food Consumed				Food Needed		% of Need	
No.	Persons	Calories	Protein	Fat	Carbo-Hydrate	Calories	Protein	Calories	Protein
1	3	8175	52	29	1928	5711	169	143	31
2	5	7134	60	17	1664	8716	234	82	24
3	2	6188	194*	17	1313	3261	100	190	194*
4	7	10856	194	42	2427	12941	387	84	50
5	3	8182	52	18	1965	5205	154	157	34
6	2	8779	51	9	2125	3309	102	255	50
7	3	5433	54	24	1269	4709	143	115	38
8a	9	11988	228	25	2576	16862	490	71	47
8b	4	9899	68	7	2384	7189	208	138	33
9	6	8722	48	2	2139	10307	314	85	15
10	1	3642	21	2	884	1517	44	240	48
Total	45	89048	1022	184	20674	79727	2365	112	43

\* Fisherman's family

TABLE IV.  
IKELENGE'S VILLAGE

Household Consumption Group		Food Consumed				Food Needed		% of Need	
No.	Persons	Calories	Protein	Fat	Carbo-Hydrate	Calories	Protein	Calories	Protein
1	7	5698	44	13	1388	14401	433	40	10
2	6	5718	61	12	1370	13295	360	43	12
3	3	4253	38	24	1002	5305	173	80	46
4	2	4847	30	4	1171	2896	106	167	28
5	7	6735	54	14	1597	11275	340	60	16
6	5	3912	22	1	955	3414	113	115	19
7	2	3642	27	4	511	2926	104	124	26
8	1	1712	9	2	248	1025	40	167	23
9	7	6076	68	4	1439	14504	388	42	18
10	3	8781	68	78	2009	6552	179	134	38
Total	40	51374	421	156	11672	75593	2236	68	19

the lower part of the tables, is very noticeable.

In Tables III and IV the amounts of each foodstuff have been calculated<sup>4</sup> to give four columns of **actual** consumption under headings; calories, grams of protein, fats and carbohydrates. The nutrients **required** by each household group have been calculated from the F.A.O. tables<sup>5</sup> of recommended dietary allowances in East and Central Africa. The calculation allows for the age and weight of every individual in each household consumption group and then makes allowance pro rata for weight above or below 60 kg. for men and 55 kg. for women. The average daily temperature maxima and minima during the survey were 35½°C (96°F) and 17°C (63°F) so that a deduction of 2½% of the calory requirements was made to allow for an average temperature in excess of 21½°C.

The remaining two columns of the table show the actual consumption of calories and proteins expressed as a percentage of what is recommended for that particular household group.

Considering, firstly, Kabuya's villages Table III shows an average caloric consumption as a percentage of need of 112%. The range is extremely wide; 71% to 265% with seven of the eleven families receiving more calories than are needed. The protein requirements are less adequately met. The average figure of 43% of protein need is made up of a range from 15% to 50%. One household is clearly anomalous. It is that of a fisherman and

his wife who together eat much of his catch.

Table IV gives similar calculations for Ikelenge's sample. At once it is apparent that these people are considerably worse off nutritionally. The average intake of calories is only 69% of need with a range from 40% to 195%. The protein figures also compare unfavourably with Kabuya's. The average is a mere 19% of need with individual families ranging from 10% to 38%.

The original impression that Ikelenge's people would be better fed than Kabuya's is thus shown to be badly in error. In fact the totals (Tables I and II) show that Kabuya's people eat almost twice as much in quantity as Ikelenge's; 775 gm. per head per day as against 417 gm. Kabuya's sample eats a smaller variety of food; this reflects less available cash and greater distance from food shops.

Taking the two samples together as typical of the area, protein and fat are shown to be seriously deficient. Carbohydrate intake is high and caloric requirements are usually adequately, often more than adequately, met. Possibly there is an unconscious urge to make up the deficiency of protein by eating great weights of, in particular, cassava. With the protein intake so extremely low, a general deficiency of vitamin B is probable.

Since poultry and both beef and dairy cattle are kept nearby and a few groundnuts are already grown it would appear that an increase of production of each of these lines could without innovation radically improve

at least 3%. After analysing the results of 51 of 64 such cases he concluded that section rather than trial of labour was the ideal management. This approach would have reduced fetal mortality in this series; unfortunately many patients arrived in advanced labour with no antenatal care whatsoever.

In a recent paper Merkel (1968) discussed the mode of delivery in 319 breech presentations; 76.5% were delivered by Bracht's manoeuvre, 10.7% by partial extraction, 6.9% by complete extraction, 0.3% with a vacuum extractor, and 5.6% by Caesarean section. The gross perinatal mortality was 7.2%.

### SUMMARY AND CONCLUSIONS.

The perinatal mortality of 13.2% is high. It is considered that this may be reduced by the following factors:

#### 1. During Pregnancy.

- (a) Improved ante-natal services throughout the country with special attention to the general state of health, nutrition and the prevention and treatment of anaemia.
- (b) Routine external cephalic version after the 32nd week, under general anaesthesia if necessary provided there are no contraindications.
- (c) Clinical and, where indicated radiological pelvimetry. Careful selection of patients for vaginal delivery.

#### 2. In Labour.

- (a) All breech presentations must be delivered in hospital.
- (b) The use of the most skilled operators available.
- (c) Recognition of the fact that more perinatal deaths occur in multiparous patients, consequently closer observation and care during delivery of these patients.

- (d) More extensive use of episiotomy.
- (e) Elimination of breech extraction in complicated cases.
- (f) Presence of anaesthetist during second stage.
- (g) Routine use of forceps to the after coming head.
- (h) Caesarean section in cases of pelvic contraction, elderly primigravida, poor obstetric history, toxæmia, previous section.

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