Socio-demographic profiles and anthropometric status of 0- to 71-month-old children and their caregivers in rural districts of the Eastern Cape and KwaZulu-Natal provinces of South Africa

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Abstract

Objectives: To determine the nutritional status of 0- to 71-month-old children and their caregivers, as well as their socio-demographics, in two provinces in South Africa.

Design: Cross-sectional baseline survey.

Setting: OR Tambo and Alfred Nzo districts in the Eastern Cape (EC), and Umkhanyakude and Zululand (Nongoma and Pongola subdistricts) in KwaZulu-Natal (KZN), South Africa.

Subjects: 0- to 71-month-old children and their caregivers (EC 1 794; KZN 1 988).

Methods: Questionnaire and anthropometric survey.

Results: The prevalence of childhood malnutrition doubled from the first to second year of life and reached high levels in the EC and Nongoma (KZN). Many caregivers were either overweight or obese (EC 55%; KZN 45%). Initiation of breast-feeding was universal. For infants younger than six months, more than 80% were breast-feeding, and 50% received bottle feeds in addition to breast milk in the EC. Breast-feeding was similar in the two provinces up to the age of 18 months, but differed for 18- to 24-month-old children (EC 50%; KZN 33%). Animal products and yellow/orange-fleshed vegetables were not consumed regularly by children aged two to five years. Immunisation coverage up until 10 weeks was approximately 90%; measles immunisation coverage at 18 months was 40 to 43%. Toilet facilities (31 to 96%), tap water (9 to 38%), electricity (8 to 51%), single mothers (29 to 68%) and unemployed husbands (19 to 55%) varied among provinces. Many households relied on grants for income. In Umkhanyakude, 37% of the caregivers had no formal education.

Conclusions: Childhood malnutrition and maternal overweight/obesity co-existed. A large proportion of the study population did not have access to basic services. Differences were observed within and between provinces. Nutrition programmes should be flexible, taking into consideration local conditions.

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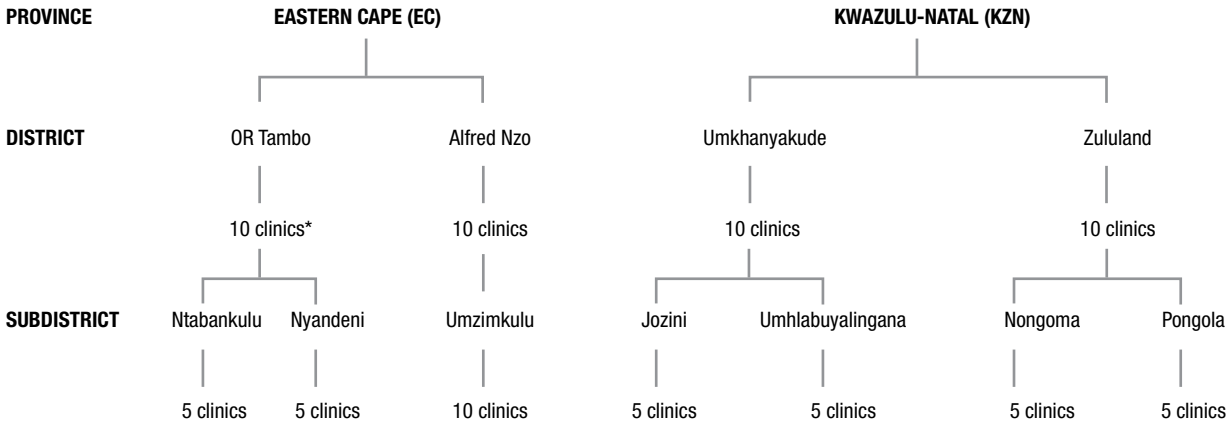
Background

In 1995, the South African Department of Health initiated the Integrated Nutrition Programme (INP) to address and prevent malnutrition with the vision of optimal nutrition for all. The INP targets nutritionally vulnerable communities, groups and individuals, with children under five years of age and at-risk pregnant and lactating women the priority target groups.[1] The INP adopts the conceptual framework of the United Nations Children's Fund (UNICEF) for childhood malnutrition, which shows that child malnutrition is a result of immediate (individual level), underlying (household level) and basic (societal level) causes. The two immediate causes of malnutrition (insufficient dietary intake and disease) are affected by three underlying factors, namely (i) household food security, (ii) child and maternal care, and (iii) access to healthcare services and a healthy environment.[2] The comprehensive approach of the INP addresses the underlying causes of malnutrition through direct (e.g. nutrition education and promotion; micronutrient supplementation; food fortification; and disease-specific nutrition counselling and support) and indirect (e.g. provision of healthcare services; improved access to food; parasite control; and provision of clean and safe water) nutrition interventions, and includes service delivery as well as aspects of behaviour change. Within the INP it is suggested that an interactive and participatory process of problem assessment and analysis is followed, followed by action, and that the intervention decided upon depends on the findings of the situation assessment and analysis, as well as the availability of resources.[1,3]

Health Systems Trust (HST), a large nongovernmental organisation, initiated a project based on the INP principles to be implemented in two provinces, namely the Eastern Cape (EC) and KwaZulu-Natal (KZN), in two districts per province. Their strategy was to promote behavioural change within communities using a grassroots development approach, with community-based organisations (CBOs) as implementing agents. A community-based and health-facility-based baseline situation assessment was done in these



* 100 0- to 71-month-old children per clinic
The results of the study are given per district, except for Zululand, where Nongoma and Pongola are reported separately because of the vast socio-economic differences between the two areas.

Figure 1: Schematic overview of the study population

districts by the Nutritional Intervention Research Unit (NIRU) of the Medical Research Council (MRC) at the request of HST and as a forerunner of the intervention programme. This paper describes the community-based assessment and the implications thereof for the implementation of the intervention.

Methods

Study design and ethics

The study was done in two districts each in the EC and KZN during 2003. These districts were OR Tambo (Ntabankulu and Nyandeni subdistricts) and Alfred Nzo (Umzimkulu subdistrict) in the EC, and Umkhanyakude and Zululand (Nongoma and Pongola subdistricts) in KZN (Figure 1). In each of these districts, HST had previously identified 10 health facilities where the INP strategy was to be implemented.

The study had a cross-sectional design and the target population was 0- to 71-month-old children and their caregivers residing in the four districts. A stratified random sample was drawn in each district, using the 10 health facilities in each district as the strata. All primary schools within the catchment area of each health facility were identified; thereafter five schools per strata were randomly selected. At each of the selected schools, learners with siblings aged 0 to 71 months were identified. One hundred siblings per stratum were randomly selected from the five schools, proportional to the number of learners per school. This amounted to 1 000 children aged 0 to 71 months per district, and translated to 4 000 children aged 0 to 71 months in the two provinces. The sampling procedure was based on the assumptions that (i) a good coverage of the study population would be obtained by using primary school learners to identify households with 0- to 71-month-old siblings, and (ii) that recruitment through schools would give a high rate of consent for participating. The 1998 Demographic and Health Survey showed that 90% of non-urban 6- to 15-year-old children attended school.[4] Recruiting households through schools, however, excluded families who had recently had their first child. No adjustment was made for this bias. The selected 0- to 71-month-old children and their mothers/caregivers were asked to attend pre-scheduled sessions at the health facility for anthropometric measurements and completion of questionnaires.

Two fieldworkers per strata were trained and standardised by NIRU staff in fieldwork methodology. The Ethics Committee of the MRC approved the study. Written consent was obtained from the mothers/guardians of the 0- to 71-month-old children after the purpose and nature of the study were explained to them.

Questionnaire and dietary assessment

A structured questionnaire was developed to collect information on socio-demographics, household food security, food consumption, maternal knowledge of nutrition and breast-feeding practices, using the guidelines of Gross *et al*.[5] The questionnaire included a set of pre-tested unquantified food frequency questions for the qualitative assessment of the dietary intake of the two- to five-year-old children, focusing on foods of animal sources, yellow/orange-fleshed fruit and vegetables and dark-green leafy vegetables. The frequency of consumption of the pre-specified food items was recorded using the preceding month as guideline, with the caregiver having five options, namely (i) every day, (ii) most days (not every day, but at least four days per week), (iii) approximately once a week (less than four days per week, but at least once per week), (iv) seldom (less often than once a week), and (v) never. The fieldworkers used this questionnaire to interview the mother or caregiver (a member of the family, usually the grandmother of the child, in whose care the child was during the day), hereafter collectively referred to as caregivers, in the local language (Zulu in KZN and Xhosa in the EC).

Anthropometry

The anthropometric measurements of the 0- to 71-month-old children and their caregivers were taken in light clothing and without shoes. Weight was measured on a calibrated electronic load cell digital scale (UC-300 Precision Health Scale, Mascot) accurate to 50 g. The recumbent length of children younger than two years was measured to the nearest 0.1 cm using a length measuring board with an upright headboard and sliding foot-piece. The height of the children aged two years and older and that of the caregivers were

measured to the nearest 0.1 cm using a wooden board with a fitted measuring tape and a sliding headboard. Anthropometric data were analysed using the Epi Info 2000 software package and expressed as z-scores (standard deviations of the median of the reference population[6]) for each of the anthropometric indices of malnutrition. Children with height-for-age, weight-for-age and weight-for-height z-scores more than two standard deviations below the reference median were classified as stunted, underweight and wasted respectively. The strategic objective of the INP is to contribute to the reduction of malnutrition in South African children, with the performance indicators being the proportion of underweight, stunted and wasted children under five years of age.[7] Therefore, although anthropometric measurements were taken for children up to the age of 71 months, anthropometric indicators are presented for children up to the age of 59 months only (under fives).

For the caregivers, body mass index (BMI) was calculated as the weight in kilograms divided by the square of the height in metres and categorised as underweight (BMI < 18.5), normal weight (18.5 < BMI < 25), overweight (25 ≤ BMI < 30) or obese (BMI ≥ 30).[8]

Of the two thousand households per province that were recruited, questionnaire data were available for 1 794 households in the EC and 1 988 households in KZN. For one of the clinics in the EC, only 50 of the required 100 questionnaires were available, as some of the completed questionnaires were lost while being transported from the clinic to the offices of the Medical Research Council in Durban, KZN. The loss of these questionnaires partly explains the lower number of available questionnaires in the EC.

Data analysis

Data analysis was done using the SAS software package. Categorical data are presented as frequencies. The mean and standard deviation (SD) are given for continuous data. The data are given per district, except for Zululand, where the Nongoma and Pongola subdistricts are reported separately because of the vast socio-economic differences between the two areas. Data are also presented per province.

Results

Anthropometry of children and caregivers

The age distribution of the children included in the study per province is indicated in Figure 2. Table I presents the anthropometric indicators for the 0- to 59-month-old children. From Table 1 it is clear that the prevalence of childhood malnutrition during the first year of life was low according to WHO criteria,[9] while 16 to 18% of the infants in the two provinces were overweight. The prevalence of childhood malnutrition more or less doubled from the first to the second year of life, and the prevalence of stunting reached high levels in both districts in the EC, as well as in Nongoma in KZN. Overweight was prevalent mostly during infancy and, to a lesser extent, during the second year of life.

The anthropometric status of the caregivers is given in Table II. Except for the Umkhanyakude district (KZN), the mean BMI was above 25 and therefore falls within the overweight category. The prevalence of female obesity was high, with 55% of caregivers in the EC and 45% of caregivers in KZN being either overweight or obese. Nine per cent of the caregivers in the Umkhanyakude district of KZN were underweight.

Figure 2: Age distribution of 0- to 71-month-old children included in the study per province

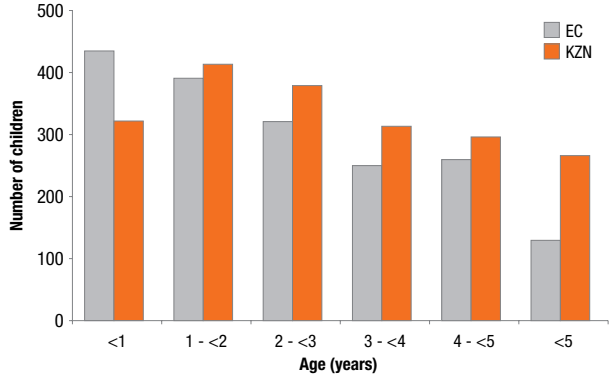


Table I: Prevalence of stunting, underweight and wasting for children younger than five years, categorised by age, district code and province

Age category	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
< 12 months							
N	*236*	*168*	*404*	*144*	*89*	*57*	*290*
Stunted	11	14	12	12	13	14	13
Underweight	2	5	3	12	8	5	6
Wasted	2	4	3	6	1	2	1
Overweight	16	21	18	16	17	16	16
12 to < 24 months							
N	*174*	*189*	*363*	*170*	*109*	*106*	*385*
Stunted	37	22	29	24	35	18	25
Underweight	13	11	12	13	7	6	9
Wasted	5	4	4	6	1	3	4
Overweight	13	11	12	9	19	8	11
24 to < 60 months							
N	*361*	*404*	*765*	*437*	*228*	*270*	*935*
Stunted	26	33	30	18	33	18	22
Underweight	12	12	12	9	10	8	9
Wasted	7	2	4	6	3	2	4
Overweight	3	6	5	3	10	4	5

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Stunted: height-for-age z-score < -2 SD of the median of the reference population
Underweight: weight-for-age z-score < -2 SD of the median of the reference population
Wasted: weight-for-height z-score < -2 SD of the median of the reference population
Overweight: weight-for-height z-score > 2 SD of the reference population
Values are given as percentages
Criteria for assessing the severity of malnutrition in a population[9]:
Stunting: low (< 20%), medium (20 to 29.9%), high (30 to 39.9%), very high (>= 40%)
Underweight: low (< 10%), medium (10 to 19.9%), high (20 to 29.9%), very high (>= 30%)
Wasting: low (< 5%), medium (5 to 9.9%), high (10 to 14.9%), very high (>= 15%)

Table II: Anthropometric status of the mother/caregiver per district and province

	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	*879*	*872*	*1751*	*963*	*489*	*484*	*1936*
Age (yrs)	33.2 (11.6)	33.8 (11.2)	33.5 (11.4)	34.3 (10.8)	31.7 (11.2)	31.5 (10.6)	32.9 (10.9)
BMI	26.0 (5.1)	27.2 (5.7)	26.6 (5.4)	24.3 (5.3)	26.9 (5.5)	26.3 (5.1)	25.5 (5.3)
Underweight	3	1	2	9	< 1	2	5
Normal weight	46	39	43	57	44	44	50
Overweight	30	32	31	20	30	33	26
Obese	21	27	24	14	26	21	19

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Values are given as percentages, except for age and BMI, which are given as the mean (SD)

Infant characteristics, feeding practices, and immunisation status

Information on breast-feeding was collected for children younger than two years (EC n = 797; KZN n = 698). Breast-feeding was initiated for most of the infants (Table III) – within four hours after birth for 82% of the infants in the EC and 58% of infants in KZN. The prevalence of infants currently being breast-fed was very similar in the two provinces up to the age of 18 months. Although more than 80% of infants younger than six months received breast milk in both provinces, 50% received bottle feeds in addition to breast milk in the EC. The prevalence of breast-feeding for children in the 18- to < 24-month-old age category was higher in the EC than in KZN (50% versus 33%). The prevalence of bottle-feeding in this age group was higher in the EC than in KZN.

Table III: Breast-feeding and complementary feeding practices (0- to 24-month-old children)

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	430	367	797	312	215	171	698
Breast-feeding initiated (%)	99	98	99	100	100	100	100
Time for initiating breast-feeding							
0–4 hours after birth	83	80	82	53	65	59	58
5–24 hours after birth	5	8	6	12	13	6	11
One day after birth	10	7	9	17	19	29	21
Don't know	1	5	3	17	3	5	10
Breast-feeding per age-category							
< 6 months	90	84	87	90	-	-	85
6– < 12 months	85	76	81	82	82	86	83
12– < 18 months	71	66	67	76	57	54	64
18– < 24 months	51	50	50	42	16	35	33
Bottle feeding per age-category							
< 6 months	73	53	66	41	-	-	44
6– < 12 months	70	45	59	49	44	39	45
12– < 18 months	50	35	42	47	45	24	39
18– < 24 months	44	31	38	14	14	26	18
Mixed feeding [a]							
< 6 months	59	36	50	26	-	-	29
6– < 12 months	58	30	45	23	37	27	29
12– < 18 months	33	15	24	20	30	10	20
18– < 24 months	26	11	18	8	3	11	7

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Insufficient data was available for infants younger than six months for districts 4 and 5 (fewer than 25 infants per age category)
Values are given as percentages
[a] Breast-feeding plus bottle-feeding

The immunisation status of the 0- to 71-month-old children was obtained from the Road-to-Health Card and is given in Table IV. The sample size (N) given in the table for each immunisation indicates the number of children who were old enough to have received the immunisation, with a two-week allowance to attain the required age. For example, to determine the immunisation coverage at 18 months, the sample includes all children 17.5 months and older. Immunisation coverage for BCG at birth and DPT and polio up until 10 weeks was approximately 90%. The coverage for DPT and polio at 14 weeks decreased. As the children became older, the immunisation status deteriorated, especially the measles coverage at 18 months (EC 43%; KZN 40%).

Table IV: Immunisation coverage for children from birth to five years of age per district and province

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	*871*	*852*	*1723*	*976*	*493*	*489*	*1958*
Polio at birth	96	93	94	99	100	98	99
BCG at birth	97	96	96	99	99	98	99
N	*857*	*844*	*1701*	*970*	*493*	*488*	*1951*
Polio, DTP, Hib, Hep at 6 wks	93	94	93	97	95	96	96
N	*832*	*837*	*1669*	*952*	*489*	*486*	*1927*
Polio, DTP, Hib, Hep at 10 wks	87	90	89	90	89	87	89
N	*817*	*828*	*1645*	*946*	*487*	*482*	*1915*
Polio, DTP, Hib, Hep at 14 wks	70	78	74	78	74	71	75
N	*688*	*733*	*1421*	*871*	*441*	*451*	*1763*
Measles at 9 months	81	83	82	84	75	64	77
N	*529*	*583*	*1112*	*747*	*345*	*372*	*1464*
Polio, DTP at 18 months	59	41	50	59	29	48	49
N	*529*	*583*	*1112*	*747*	*345*	*372*	*1464*
Measles at 18 months	51	36	43	52	19	34	40
N	*63*	*67*	*130*	*194*	*30*	*47*	*271*
DT & OP at 5 years	21	4	12	22	7	11	18

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Values are given as percentages

Household food security

Approximately one-third of the households in all the districts, except for Nongoma, reported often not having enough food available for consumption (Table V). The 0- to 71-month-old children, and then school children, were given priority over adults when food was scarce. Two per cent or less of the households had consumed food from a communal garden during the preceding month, while 26% and 12% of the households consumed food from home gardens in the EC and KZN respectively.

Usual dietary intake of foods of animal origin, yellow/orange-fleshed fruit and vegetables and dark-green leafy vegetables of two- to five-year-old children is given in Table VI. In this table, the categories 'every day' and 'most days' were grouped together as 'at least four days per week', and the categories 'seldom' and 'never' were grouped together as 'seldom or never'. The frequency of consumption of animal products was in general higher in KZN than in the EC. Nonetheless, more than half of the children in both provinces consumed animal products seldom or never. Yellow/orange-fleshed vegetables were not consumed regularly. Tropical fruits such as mango and paw-paw were consumed more regularly in KZN than in the EC, most probably because of the difference in climate between the two provinces. In the Umkhanyakude district in KZN, 22 to 25% of the 0- to 71-month-old children consumed paw-paw and mango at least once a week; 44% of the children obtained these fruits from either a communal or home garden (Table VII). At the other four study sites, fruit was not produced at community level. When consumed, 44% of the households in the EC and 36% in KZN obtained pumpkin and/or butternuts from home gardens (Table VII). For the two- to five-year-old children, locally-produced maize (either from a home garden or a community garden) was consumed by 47% in the EC and 24% in KZN, and locally-produced sweet potatoes were consumed by 12% in the EC and 26% in KZN.

Table V: Household food security per district and province

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	905	889	1794	996	495	497	1988
Source of food for the past month							
Own home garden	32	19	26	17	2	13	12
Communal garden	2	2	2	1	1	2	1
Own livestock	2	< 1	1	1	< 1	5	2
Bought/shops	76	79	78	75	74	80	76
Payment in kind	< 1	1	< 1	4	8	5	6
Gifts	4	8	6	6	8	7	7
Food aid/welfare/NGO	< 1	0	< 1	2	2	2	2
Borrowed	10	10	8	1	1	1	1
Begged	9	10	9	5	7	4	5
Food availability for consumption							
Always enough	15	12	14	6	6	12	8
Sometimes not enough	54	46	50	61	74	57	63
Often not enough	31	42	36	33	20	31	29
Priority to be fed available food							
Adults/elderly	2	3	2	3	4	5	4
Schoolchildren	34	10	22	35	46	30	36
0- to 71-month-old children	64	86	75	62	50	65	60
Owns livestock [1]	66	53	60	67	72	69	64
Owns home-garden [2]	81	73	77	56	43	37	49
Main function of home garden							
Daily food needs	88	90	89	82	86	75	83
Income	3	1	2	9	8	17	10
Daily food needs and income	7	8	8	6	5	6	5
Other	1	1	1	2	1	2	2

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
[1] Chickens mostly, followed by cattle and goats
Eastern Cape: mostly mealies, followed by imifino; KwaZulu-Natal: mostly spinach, cabbage and imifino
Values are given as percentages

Table VI: Usual dietary intake of foods of animal origin, yellow/orange-fleshed fruit and vegetables and dark-green leafy vegetables for two- to five-year-old-children as determined by a set of unquantified food frequency questions

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	371	493	864	631	274	317	1222
Animal products							
Eggs							
At least four days per week	18	33	27	19	33	42	28
Approximately once per week	20	20	20	8	16	20	13
Seldom or never	62	46	53	73	51	38	59
Meat							
At least four days per week	4	12	8	14	43	35	26
Approximately once per week	16	23	20	20	17	30	22
Seldom or never	80	65	71	66	40	35	52
Chicken							
At least four days per week	4	16	10	19	32	38	27
Approximately once per week	17	26	22	21	29	32	25
Seldom or never	79	58	67	60	39	30	48
Fish							
At least four days per week	6	5	5	22	17	21	21
Approximately once per week	9	11	10	17	15	18	17
Seldom or never	85	84	84	61	68	61	62
Milk							
At least four days per week	16	28	23	19	55	55	37
Approximately once per week	9	17	13	6	12	22	12
Seldom or never	75	55	64	74	32	23	51

Table VI: cont

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	371	493	864	631	274	317	1222
Vegetables							
Carrots							
At least four days per week	4	7	6	9	8	13	9
Approximately once per week	9	7	8	5	6	13	7
Seldom or never	87	86	86	86	86	74	83
Pumpkin/butternut							
At least four days per week	23	17	20	26	14	36	26
Approximately once per week	21	19	20	13	20	22	17
Seldom or never	56	63	60	61	66	41	57
Spinach							
At least four days per week	21	18	19	36	20	43	34
Approximately once per week	19	18	19	16	14	24	18
Seldom or never	60	64	62	47	66	33	48
Imifino							
At least four days per week	34	32	33	50	15	31	37
Approximately once per week	17	20	19	12	13	22	15
Seldom or never	48	48	48	38	72	47	48
Fruit							
Mango							
At least four days per week	2	0	1	14	16	8	13
Approximately once per week	3	1	1	6	6	14	8
Seldom or never	95	99	98	80	78	78	79
Paw-paw							
At least four days per week	2	1	1	16	11	5	12
Approximately once per week	3	1	2	9	4	10	8
Seldom or never	95	98	97	75	84	85	80

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Values are given as percentages

Socio-demographic information

Socio-demographic indicators are shown in Table VIII. The average household size was approximately 10 members in the EC and 12 in KZN. More than half of the households did not have access to toilet facilities in two districts, namely OR Tambo (69%) in the EC, and Umkhanyakude (56%) in KZN. Water from the river was the main source of drinking water in both provinces. More than 70% of the households did not have an electricity supply, except for Pongola, where half of the households had electricity. Most households used wood as energy source for cooking, mostly as an open fire inside the dwelling. In general, households in KZN had more assets such as fridges, gas stoves, television sets, radios, cars and cell phones than households in the EC. Within KZN, differences were observed among the three study sites, with households in Pongola having the most assets. This was closely linked to the availability of electricity (half of the households in Pongola had electricity versus less than 10% in Umkhanyakude). Child support grants (in the EC) and pension/disability grants (in the EC and KZN) were major sources of income. The caregivers reported that the health facility was the main source of information on nutrition and health, followed by the radio.

Table VII: Sources of yellow/orange-fleshed fruit and vegetables and dark-green leafy vegetables for those two- to five-year-old children who consumed the specific vegetable

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
Total number of households (N)	371	493	864	631	274	317	1222
Carrots							
N	*131*	*131*	*262*	*248*	*100*	*127*	*475*
Shops	68	58	63	66	67	83	71
Home garden	23	40	31	33	29	10	26
Community garden	9	2	1	1	4	7	3
Pumpkin/butternut							
N	*294*	*287*	*581*	*444*	*200*	*244*	*888*
Shops	47	46	46	53	72	68	62
Home garden	39	48	44	46	26	24	36
Community garden	14	6	10	1	1	7	2
Spinach							
N	*275*	*279*	*554*	*468*	*193*	*271*	*932*
Shops	55	60	57	47	71	79	61
Home garden	33	37	35	52	26	15	36
Community garden	12	3	8	1	3	6	3
Imifino							
N	*274*	*364*	*638*	*276*	*430*	*425*	*1131*
Bought	45	46	46	46	56	75	60
Home garden	42	50	46	51	41	17	34
Community garden	13	4	8	3	3	9	5
Mango							
N	*79*	*103*	*182*	*376*	*118*	*145*	*639*
Shops	100	98	99	56	99	91	72
Home garden	0	2	1	32	1	6	20
Community garden	0	0	0	12	0	3	8
Paw-paw							
N	*80*	*98*	*178*	*351*	*83*	*118*	*552*
Shops	91	98	95	56	96	89	69
Home garden	9	2	5	37	4	7	25
Community garden	0	0	0	7	0	4	6

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Values are given as percentages

Caregiver characteristics

Being a common-law wife was most prevalent in the EC (Table IX), whereas single mothers were common in KZN. For married caregivers, 53% of the husbands in the EC were unemployed, versus 23% in KZN. More than 90% of the caregivers had either primary school (42%) or high school (50%) education in the EC, versus 35% and 40% respectively in KZN. Umkhanyakude in KZN had the highest prevalence of caregivers with no formal education (37%).

Discussion

This study was done nine years after South Africa became a democracy in 1994. Although many positive socio-political changes have taken place, under-nutrition seems to prevail in several communities throughout the country. When comparing the anthropometric status of children aged 12 months and older to the findings of the national survey of the South African Vitamin A Consultative Group (SAVACG) done in 1994,[10] the nutritional status of children in KZN was worse than the findings of the SAVACG study, while the nutritional status of children in the EC was similar to the findings of the study. Seemingly little progress has been made with

Table VIII: Socio-economic indicators of households in the Eastern Cape and KwaZulu-Natal

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
Recruited	1 000	1 000	2 000	1 000	500	500	2 000
N	905	889	1794	996	495	497	1988
Household size							
Elderly	2 (1)	2 (1)	2 (1)	2 (1)	2 (1)	2 (1)	2 (1)
Adults	3 (1)	3 (1)	3 (1)	3 (1)	4 (1)	4 (1)	4 (1)
School children	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)	3 (1)
0- to 71-month-old children	2 (1)	2 (1)	2 (1)	3 (1)	3 (1)	3 (1)	3 (1)
Access to toilet facilities[a]	31	96	64	44	60	86	59
Source of drinking water							
River	85	67	76	39	78	46	50
Borehole	1	3	2	18	6	2	11
Own tap	2	5	4	12	2	35	16
Public tap	7	16	11	19	3	3	11
Well	2	4	3	12	7	6	9
Electricity inside home	24	29	27	8	25	51	24
Energy source for cooking [b]							
Electricity	6	3	5	1	6	11	5
Gas	1	2	1	4	4	6	4
Paraffin	39	22	31	2	13	13	7
Coals	< 1	3	2	< 1	8	2	3
Wood, open fire inside dwelling	81	91	86	68	77	69	71
Wood, open fire outside	42	10	26	35	11	20	25
Assets of the household							
Fridge	5	9	7	16	22	36	22
Coal stove	2	14	8	1	8	41	13
Electric stove	1	2	2	2	13	13	7
Electric hotplate	8	8	8	4	15	18	10
Gas stove	3	5	4	27	20	18	23
Paraffin stove	83	74	79	31	65	59	46
TV	9	20	14	17	22	27	21
Radio	55	63	59	67	71	85	73
Kettle	21	7	14	3	10	17	8
Motor car	3	4	4	8	6	15	9
Mobile phone	24	18	21	29	28	46	33
Sources of income							
Own income/salary	6	4	5	12	6	10	10
Husband income/salary	14	15	15	12	7	17	12
Child support grant	46	28	37	14	10	18	14
Living-in family/friends	8	5	6	7	28	12	13
Boarders	2	1	1	0	1	< 1	< 1
Pension/disability	23	27	25	34	23	41	33
Sale of products	8	8	8	15	9	13	13
No cash income	1	< 1	1	1	1	1	2
Sources of nutrition information							
Radio	10	15	13	9	30	17	16
Television	1	1	1	< 1	2	3	1
Health facility staff	81	67	74	66	38	50	55
Newspaper	1	1	1	< 1	< 1	< 1	< 1
Magazines	< 1	< 1	< 1	< 1	0	< 1	< 1
Family	1	2	2	4	3	4	4
Friends	2	3	3	4	9	3	5
None	23	9	16	16	17	23	18

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
[a] Pit toilet
[b] More than one answer could be given
Values are given as percentages, except for the household members, which are given as a mean (SD)

Table IX: Caregiver characteristics per district and province

Parameter	Eastern Cape			KwaZulu-Natal			
	District		All	District			All
	1	2		3	4	5	
N	905	889	1794	996	495	497	1988
Marital status							
Married, only one wife	27	20	24	25	30	17	24
Married, more than one wife	1	1	1	7	3	7	6
Common-law wife	36	30	33	5	6	5	5
Unmarried	29[a]	40[b]	35	56[c]	55[d]	68[e]	59
Separated/divorced	1	1	1	< 1	< 1	< 1	< 1
Widowed	6	8	7	6	5	2	5
Husband's employment							
Employed, home every night	4	3	4	30	28	24	28
Employed, migrant labourer	27	29	28	27	29	31	27
Unemployed	51	55	53	24	23	19	23
Works locally	8	3	6	14	17	22	17
Casual work	5	5	5	1	1	1	1
Other	4	4	4	4	2	2	3
Maternal education							
Did not attend school	12	3	7	37	10	13	24
Primary school (1–7 yrs)	42	42	42	35	37	32	35
Secondary school (8–12 yrs)	45	55	50	27	52	52	40
Higher qualification	< 1	< 1	< 1	< 1	< 1	2	< 1

District codes: 1 = OR Tambo; 2 = Alfred Nzo; 3 = Umkhanyakude; 4 = Nongoma; 5 = Pongola
Values are given as percentages
For mothers only: [a] 31%; [b] 42%; [c] 57%; [d] 60%; [e] 72%

regard to improving the nutritional status of children. One should be cautious, though, when comparing provincial data with prevalence figures of specific geographical areas in the province. It could be argued that the task at hand is enormous, and that the legacy of insufficient health services to the poor – one of the major underlying causes of malnutrition, and the removal of poverty will take time to address. In addition, the high prevalence of HIV infection could have contributed directly or indirectly to the decline in the nutritional status of children in KZN. In 2002, the estimated prevalence rate of HIV infection in KZN was 18.4% of the total population and 34.5% for women of child-bearing age.[11]

The prevalence of stunting doubled from the first to the second year of life, and reached high levels in some of the districts. Stunting is often associated with poor overall economic conditions, and the poorest bear the heaviest burden of stunting and underweight in South Africa.[12] In Hlabisa, a rural area of KZN, risk factors for stunting and underweight were shown to reflect maternal factors and the socio-economic status of the household.[13]

The study showed low levels of acute malnutrition (i.e. wasting), but high levels of chronic malnutrition as manifested by the high levels of stunting. This pattern of childhood nutritional status is similar to that observed in two national surveys that were done during the 1990s.[10,14] Cognisance should be taken of differences between provinces (EC was worse than KZN) and amongst districts within provinces (e.g. Nongoma was worse than Pongola in KZN) when developing national strategies to address childhood malnutrition.

Co-existence of childhood undernutrition and maternal overweight and obesity has been reported previously.[15] High levels of maternal overweight and obesity suggest that there are sufficient energy-providing foods in the homes. When implementing nutrition interventions to address childhood undernutrition, care should be taken not to increase the problem of maternal obesity. In the Umkhanyakude district of KZN, where 9% of the caregivers were underweight, the availability of an adequate amount of food seemed to be a problem in several of the households.

Despite the high prevalence of maternal overweight, approximately one-third of the households in both provinces indicated that they often did not have enough food available for consumption. Local food production can potentially increase the availability of food at household level.

For the study population, 77% of the households in the EC and 49% in KZN reportedly had home gardens. The discrepancy between the number of households that reportedly owned a home garden and those that consumed food from a home garden the preceding month could be an indication that there was not a continuous supply of food from the gardens. Existing gardening practices should be strengthened and selective crop production should be encouraged, focusing on crops that can significantly contribute to the nutritional requirements of the households. For example, home gardens that focus on the production of vegetables rich in provitamin A have been shown to improve vitamin A intake and status.[16,17] Against the backdrop that 38% of 6- to 71-month-old children in KZN and 31% in the EC were previously shown to be vitamin A deficient,[10] and because of the infrequent consumption of yellow/orange-fleshed non-citrus fruit and vegetables and dark-green leafy vegetables (which are good sources of provitamin A carotenoids) reported in this study, local production of provitamin A-rich vegetables should be encouraged. However, vegetable gardens are by no means the sole solution and should be viewed within the bigger picture of INP strategies. Foods of animal origin, such as liver, egg yolk and dairy products, are good sources of vitamin A. Foods of animal origin are expensive and probably not within the financial reach of most of the participants in the study, explaining the infrequent consumption of foods of animal origin in both provinces.

The extent of poverty was demonstrated by the large proportion of the study population in both provinces that did not have access to basic services. Many households still used river water for consumption and an open fire to cook food. This lack of basic services will limit the impact of nutrition interventions that address childhood malnutrition, e.g. poor sanitation and a lack of safe drinking water increase the risk of diarrhoea and childhood malnutrition. It is estimated that up to two-thirds of all the episodes of diarrhoea in children could be avoided through readily available and inexpensive interventions to improve hygiene.[18–20] Hygiene improvement should follow a comprehensive approach that includes the installation of the necessary hardware or technologies, the promotion of healthy behaviours, and support for an enabling environment to ensure wide-scale application and sustainability.[21] Providing and maintaining basic services should be a top priority of the appropriate government and municipal departments. Until these services are provided, one of the aims of community-based interventions within the INP approach should be to ensure hygienic practices within the existing environment.

Fifty per cent of infants younger than six months in the EC and 29% in KZN received mixed feeding, which has been reported to have a higher risk of HIV transmission than breast-feeding.[22] Considering that the prevalence of HIV infection in pregnant women in both

provinces is high,[11] mixed feeding of infants should be discouraged.[23] Bacterial contamination and incorrect dilution of bottle feeds have been reported for South African infants.[24,25] Strategies should be put in place to ensure safe and adequate bottle-feeding for those mothers who bottle feed.

Poor utilisation of health services is indicated by the number of home deliveries (EC 41%; KZN 25%), as well as the deterioration of immunisation coverage as the children grew older. People's access to health facilities is hampered by the poor conditions of the roads and an inadequate public transport system. It could be argued that many people cannot afford public transport because of unemployment and a lack of income. Furthermore, health facilities are often overcrowded and the long waiting times are a deterrent for people to attend health facilities.

Child support and pension/disability grants were major sources of income in both provinces. However, a large percentage of households did not receive a child support grant (EC 63%; KZN 86%). Considering the socio-economic profiles of the study population, it is assumed that most (if not all) of the households were eligible to receive a child grant. Strategies should be put in place to ensure that all eligible households have access to these grants and that the money is spent responsibly. There is a general belief by some that child support grants can potentially motivate young girls to become pregnant. Analyses of existing national data, however, show that there is no association between teenage fertility in South Africa and the child support grant, but the authors did state that specifically designed studies are needed to address this issue conclusively.[26] Income-generating activities, skills development and job creation will increase the availability of cash in households. This is essential within INP strategies, as a lack of cash limits a household's access to sufficient nutritious food.

The magnitude of poverty was further emphasised by the high prevalence of unemployed husbands in the EC (50%), which was double that of KZN. Close on 20% of the husbands in both provinces were migrant labourers. Migrancy is a social phenomenon common to South Africa that affects family structures and facilitates the spread of sexually transmitted diseases from urban to rural areas. Further, more caregivers had either primary or high school education in the EC than in the KZN. Illiteracy was high in Umkhanyakude in KZN in particular, where 37% of the caregivers did not have any formal education. Differences in environmental health indicators were observed between provinces, as well as within provinces, indicating the complexity of addressing malnutrition in a uniform way.

In conclusion, differences within and between provinces, as well as the co-existence of childhood malnutrition and maternal overweight/obesity, should be taken into consideration when planning nutrition activities within the INP. The results of the study suggest poor utilisation of health services and show that a large proportion of the study population did not have access to basic services. Nutrition programmes should therefore be flexible, taking into consideration local conditions.

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