

# Primary health care facility infrastructure and services and the nutritional status of children 0 to 71 months old and their caregivers attending these facilities in four rural districts in the Eastern Cape and KwaZulu-Natal provinces, South Africa

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## Abstract

**Objective:** To assess primary health care (PHC) facility infrastructure and services, and the nutritional status of 0 to 71-month-old children and their caregivers attending PHC facilities in the Eastern Cape (EC) and KwaZulu-Natal (KZN) provinces in South Africa.

**Design:** Cross-sectional survey.

**Setting:** Rural districts in the EC (OR Tambo and Alfred Nzo) and KZN (Umkhanyakude and Zululand).

**Subjects:** PHC facilities and nurses (EC: n = 20; KZN: n = 20), and 0 to 71-month-old children and their caregivers (EC: n = 994; KZN: n = 992).

**Methods:** Structured interviewer-administered questionnaires and anthropometric survey.

**Results:** Of the 40 PHC facilities, 14 had been built or renovated after 1994. The PHC facilities had access to the following: safe drinking water (EC: 20%; KZN: 25%); electricity (EC: 45%; KZN: 85%); flush toilets (EC: 40%; KZN: 75%); and operational telephones (EC: 20%; KZN: 5%). According to more than 80% of the nurses, problems with basic resources and existing cultural practices influenced the quality of services. Home births were common (EC: 41%; KZN: 25%). Social grants were reported as a main source of income (EC: 33%; KZN: 28%). Few households reported that they had enough food at all times (EC: 15%; KZN: 7%). The reported prevalence of diarrhoea was high (EC: 34%; KZN: 38%). Undernutrition in 0 to younger than 6 month-olds was low; thereafter, however, stunting in children aged 6 to 59 months (EC: 22%; KZN: 24%) and 60 to 71 months (EC: 26%; KZN: 31%) was medium to high. Overweight and obese adults (EC: 49%; KZN: 42%) coexisted.

**Conclusion:** Problems regarding infrastructure, basic resources and services adversely affected PHC service delivery and the well-being of rural people, and therefore need urgent attention.

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## Background

Inadequate health services and an unhealthy environment are underlying causes of malnutrition in children, while poor food quality, insufficient food intake and severe or repeated infections also contribute to malnutrition.<sup>1-3</sup> People in rural communities are most likely to experience such conditions. In 1994, with the inauguration of a government of national unity in South Africa, new health policies were put in place to ensure that public health services were sufficient for and were accessible and affordable to all consumers at all times and that facilities were adequately equipped for the delivery of safe and optimal health care.<sup>4</sup> In 2001, it was reported that most people in rural areas live far from and are unable to pay for transport to their nearest health-care facility.<sup>5</sup> This complicates peoples' access to health care and other essential services. Infrastructural problems and transport costs deprive many rural people of access to educational systems and opportunities to equip them to achieve an acceptable level of socio-economic independence to determine their own future. Rural communities are therefore trapped in poverty, which deprives them of basic goods and services and inhibits the capacity of families to care for their children.<sup>2</sup> It has been shown that children

of families in the bottom wealth quintile of the population are more than twice as likely to die before the age of five and that the infant and child mortality rate is significantly higher where environmental conditions are below standard.<sup>2</sup> A national nutrition survey reported a strong link between maternal education and the anthropometric status of children,<sup>6</sup> illustrating the importance of education, which many mothers in rural communities are deprived of. These factors remain as obstacles in the transformation of the South African rural population from one of a vicious cycle of poverty, malnutrition and disease into one of wealth, growth and health.<sup>1,2</sup>

The national Department of Health (DoH) has implemented the Integrated Nutrition Programme (INP) to address the nutritional imbalances experienced by vulnerable groups and communities in South Africa.<sup>7</sup> The INP is a cornerstone of primary health care (PHC) and has the potential to address many of the underlying causes of undernutrition. The Health Systems Trust (HST), a non-governmental organisation, has developed a model based on principles of the INP to support the DoH in its aim to improve the nutritional status of vulnerable groups.

The objective of this study was to assess PHC facility infrastructure and services, and the nutritional status of 0 to 71-month-old children and their caregivers attending PHC facilities in four rural districts in the Eastern Cape (EC) and KwaZulu-Natal (KZN) provinces. The results of this study are to be used by the HST as a guide for the implementation of a new project based on principles of the DoH's INP in these catchment areas.

## Methodology

### Study design

The study was conducted in two districts each in the EC and KZN provinces during 2003. These districts were OR Tambo (Ntabankulu and Nyandeni sub-districts) and Alfred Nzo (Umzimkulu sub-district) in the EC, and Umkhanyakude (Jozini sub-district) and Zululand (Nongoma and Pongola sub-districts) in KZN. In each of the four districts, the HST, assisted by the provincial DoH sub-directorates, identified 10 PHC facilities in disadvantaged and nutritionally vulnerable communities for the HST project. The study had a cross-sectional design and the study population comprised professional nurses employed at the 40 PHC facilities, and 0 to 71-month-old children and their caregivers attending these PHC facilities.

### PHC facility infrastructure and services

One nurse from each of the selected PHC facilities (EC:  $n = 20$ ; KZN:  $n = 20$ ) was selected to participate in the study. Either the nurse in charge or, if not available, the nurse second in charge was selected.

Information on PHC facility infrastructure and services was obtained by means of observation and structured and semi-structured interviewer-administered questionnaires. The nurses' questionnaire was based on previous questionnaires developed by the Nutritional Intervention Research Unit (NIRU) of the Medical Research Council (MRC) and also contained questions specifically developed for this study. Researchers from the MRC's NIRU completed the nurses' questionnaires. The questionnaires were pre-tested among nurses and researchers to ensure content validity and were adjusted accordingly. The researchers checked the weighing scales and malnutrition registers at the respective PHC facilities for accuracy and completeness. The positions of the scales' needles were checked to see whether they were on zero and a standard known weight was used to check the accuracy of the reading on the scales. The infant and children's scales were checked at the children's weighing point and the adults' at the family planning or TB treatment points at the PHC facilities.

### Nought to 71-month-old children and their caregivers

Trained fieldworkers systematically selected caregivers and children attending the PHC facilities. The selection criteria were that not more than one child of the same household be included in the study, that children presenting with fever, breathing difficulties, vomiting or diarrhoea, or visiting the facilities for the first time be excluded and that households where the selected caregivers did not understand and therefore responded inappropriately to the questions after explanation be excluded.

Ten consecutive numbers (1 to 10) were placed in a container, from which a number was drawn to start the selection process. Every 10th child was systematically selected until a total of 50 questionnaires

per PHC facility was completed. The number of children selected per day depended on the number of children attending the PHC facility on that specific day. If attendance was less than 10 per day, a convenience sampling method was used in consultation with the nursing staff. In areas where attendance was low, the recruitment process was discontinued after a maximum of three months.

For each of the 20 PHC facilities, NIRU researchers trained and standardised two fieldworkers from the local community in fieldwork methodology. The training was undertaken during one week at a central venue in each of the two provinces.

A separate structured interviewer-administered household questionnaire based on previous questionnaires developed and standardised by NIRU researchers was used to collect information on socio-demographics and on maternal and child health. The household questionnaire was translated into isiXhosa and isiZulu for the EC and KZN provinces, respectively. The translations were verified through back translations and the questionnaires were pre-tested on a sample of 20 mothers in each of the two provinces during the week of training. Changes were made accordingly. The caregivers of the selected children were interviewed in their local language, isiXhosa for the EC and isiZulu for KZN.

### Anthropometry

Three measurements were taken and the average of the three was recorded for weight, length and height. 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 children two years and older and of their caregivers was measured to the nearest 0.1 cm using a vertical wooden board (or stadiometer) with a fitted measuring tape and a sliding headboard.

The weight and length of the children at birth and their gestational age were obtained from their road-to-health cards (RTHCs).

Fifty 0 to 71-month-old children ( $n = 1\ 000$ ) and their caregivers ( $n = 1\ 000$ ) were selected from each of the 20 PHC facilities in the EC and KZN. Out of the samples of 1 000 each, 994 (99.4%) children and their caregivers participated in the EC and 992 (99.2%) in KZN. The average number of respondents per facility varied between 45 and 54, except for one facility where this number was 22 due to the loss of questionnaires during transportation. There was a slight variation in the sample size for certain variables due to unanswered questions or missing birth information.

### Ethics

The survey was planned in collaboration with the HST, the DoH and community leaders. Permission was obtained from the provincial DoH sub-directorates to enter the health facilities and the community to interview the caregivers. Written consent was obtained from the nurses and from the caregivers of the 0 to 71-month-old children after the purpose and nature of the study had been explained to them. The study was approved by the Ethics Committee of the MRC.

## Data analysis

The SAS software package was used for data analysis. Categorical data were presented as frequencies. The mean and standard deviation (SD) were given for continuous data. The data were presented per province, as this was almost similar for the districts.

The children's anthropometric data were analysed using the Epi Info 2000 software package and expressed as z-scores (SDs of the median of the reference population)<sup>8</sup> 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 SDs below the reference median were classified as stunted, underweight and wasted, respectively. Anthropometric indicators for 153 children were excluded from data analysis, mostly because of missing or erratic height or length measurements. The strategic objective of the INP is to contribute to the reduction of malnutrition in South African

children, with the performance indicators being the prevalence of underweight, stunted and wasted children under five years of age.<sup>9</sup> Anthropometric indicators were therefore presented for children up to the age of 59 months in two sub-categories (below 6 months and between 6 to 59 months), while measurements for 60 to 71-month-old children were presented as a third sub-category.

For the caregivers, body mass index (BMI) was calculated as weight in kilograms divided by the square of height in metres and classified as underweight (BMI < 18.5), normal weight (BMI 18.5 – < 25), overweight (BMI 25 – < 30) or obese (BMI ≥ 30).<sup>10</sup>

## Results

### PHC facility infrastructure and services

Table I reflects the nurses' information on PHC facility infrastructure and services. Of the 40 PHC facilities in the two provinces, eight

**Table I: PHC facility infrastructure**

	Eastern Cape		KwaZulu-Natal	
	(n = 20)		(n = 20)	
	n	%	n	%
<b>PHC facilities built/renovated after 1994</b>	8	40	6	30
<b>Facilities in bad condition</b> (poor maintenance, vandalism, theft)	9	45	11	55
<b>Water supplies</b>				
Tap water from a central piped municipal system (safe)	4	20	5	25
Surface water (rain water caught in tanks; rivers; dams)	16	80	15	75
<b>Problems:</b> Drought; broken tank/pump	15	75	10	50
<b>Energy supplies</b>				
Electricity	9	45	17	85
Gas/paraffin; combination (solar, gas, paraffin)	11	55	3	15
<b>Problems:</b> Insufficient supplies; no money; not activated	13	65	5	25
<b>Toilet facilities</b>				
Flush toilets	8	40	15	75
Combination (pit/bucket, flush/pit)	12	60	5	25
<b>Problems:</b> Tank broken/stolen; vandalism; system not functioning	9	45	8	40
<b>Telephones</b>				
Fully operational	4	20	1	5
<b>Problems:</b> Calls restricted: only incoming calls or calls to hospital allowed; not activated;	8	40	4	20
no money; lines cut off	8	40	9	45
	–	–	6	30
<b>Nurses' views on factors influencing health service quality</b>				
<b>Infrastructure, basic resources, supplies</b>				
Insufficient telephone services, water supplies and electricity	19	95	15	75
Staff shortages (nursing and domestic)	17	85	16	80
Bad roads, transport	15	75	10	50
Lack/shortage of diagnostic equipment	10	50	7	35
Lack/shortage of medical supplies	8	40	6	30
Shortage of cleaning material and clean linen	2	10	5	25
Poor hygiene	7	35	4	20
Mean (SD) number of nurses per facility	3.1 (1.1)		3.6 (1.2)	
Mean (SD) number of clients per nurse per day	30 (15)		25 (10)	
<b>Potentially harmful cultural practices</b>				
Nurses aware of cultural practices in community	18	90	16	80
<b>Potentially harmful cultural beliefs/practices listed</b>				
Enema for diarrhoea, vomiting (gut-related symptoms)	11	55	8	40
Consultation of traditional health practitioners and use of traditional medicine	14	70	10	50
Opposition to contraceptives	2	10	3	15
Opposition to childhood immunisation	1	5	1	5
Rejection of HIV-positive members	1	5	2	10
<b>Nurses' views on how harmful practices could be addressed</b>				
Education of mothers	18	90	18	90
Discussion with traditional healers	5	25	1	5
Other	2	10	2	10

in the EC and six in KZN had been built or renovated after 1994 and approximately half were rated as being in a bad condition. PHC facility access to basic resources was as follows: safe drinking water (EC: 20%; KZN: 25%); electricity (EC: 45%; KZN: 85%); flush toilets (EC: 40%; KZN: 75%); and operational telephones (EC: 20%; KZN: 5%). More than 80% of the nurses reported infrastructural problems, insufficient resources (telephones, water and electricity supplies, and staff shortages), and the existence of potentially harmful cultural practices as problems influencing the quality of services.

#### INP activities conducted by nurses at PHC facilities

Table II reflects information obtained through observation and interviews regarding INP activities conducted by nurses at PHC facilities. Many nurses were not aware which INP guidelines were used at the facility (EC: 30%; KZN: 50%). Of the nurses who had received training in the administering of INP or related protocols, protein-energy malnutrition (PEM) received the lowest coverage (45%) and vitamin A supplementation the highest coverage (75%) in the EC compared to KZN, where none of the nurses had received training in PEM and 75% had received training in the integrated management of childhood illnesses (IMCI), the prevention of mother-to-child transmission (PMTCT), HIV and the expanded programme on immunisation (EPI). The delegation of the responsibility of managing INP activities at PHC facilities to a specific nurse was poor (EC: 15%; KZN: 35%). Many PHC facilities did not have malnutrition registers (EC: 35%; KZN: 20%) and, for those that did, up to 80% were incomplete. Observation regarding TB registers at PHC facilities was similar. The advantages of breastfeeding were indicated as the key

breastfeeding promotion message by 90% of the nurses, while other breastfeeding messages were given a lower priority.

#### Characteristics of children and their caregivers

Table III reflects the characteristics of children and their caregivers. The number of girls (EC: 50%; KZN: 48%) participating in this study was almost similar to that of boys. The relationships of caregivers to the children were as follows: biological mother (EC: 88%; KZN: 85%); caretaker (EC: 7%; KZN: 9%); guardian (EC: 5%; KZN: 5%); and father (EC: 0%; KZN: 1%). Two-thirds of the children were younger than 24 months. The mean age of the caregivers was 30.5 for the EC and 30.2 for KZN. Most of the caregivers were unemployed (EC: 96%; KZN: 86%), almost half were single (EC: 46%; KZN: 56%) and some had no formal education (EC: 6%; KZN: 17%). Social security was indicated as a main source of household income (EC: 33%; KZN: 28%) and more than one-third of the households had no income (EC: 46%; KZN: 33%). More than 20% of the caregivers had large families in both provinces. The number of households reporting that they always had enough food was low (EC: 15%; KZN: 7%). A number of caregivers indicated that they smoked (EC: 4%; KZN: 6%).

#### Maternal and child health

Table IV reflects information on maternal and child health. In addition to visiting local PHC facilities, two-thirds of the caregivers also visited health facilities in other areas or traditional health practitioners for health care. The prevalence of home births was high (EC: 41%; KZN: 25%). Of the home births (EC: n = 411; KZN: n = 250), 95% were conducted by non-nursing staff. Primary reasons for visiting PHC facilities were indicated as weighing, treatment or immunisation

Table II: Integration of INP activities at PHC facilities by nurses

	Eastern Cape		KwaZulu-Natal	
	(n = 20)		(n = 20)	
	n	%	n	%
INP guidelines on which nurses' practices are based				
Local/national	14	70	10	50
Not sure	6	30	10	50
Nurses' training in administering nutrition protocols since 1994				
Growth monitoring and promotion	12	60	1	5
PEM supplementation	9	45	-	-
Breastfeeding and promotion	11	55	7	35
Vitamin A supplementation	15	75	7	35
Other (IMCI, PMTCT, HIV, EPI)	13	65	15	75
Delegation of INP responsibility to specific nurse	3	15	7	35
GM equipment – observation of scales				
Specific nurse responsible for checking condition of scales	-	-	2	10
Infant-scale needle not registering at zero	9	45	10	50
Child/adult-scale needle not registering at zero/not balancing	15	75	12	60
Scales calibrated with known 1 kg weight	1	5	1	5
Facilities using one standard scale for weighing infants and adults	-	-	-	-
Nutritional-status monitoring				
No malnutrition registers at PHC facilities	7	35	4	20
Malnutrition registers not up to date (Oct–Dec 2003)	10	50	16	80
No TB registers	1	5	1	5
TB registers not up to date (Oct–Dec 2003)	6	30	6	30
Nutritional promotion – key messages presented by nurses				
GMP: GM intervals, weight plot, weight interpretation, action	20	100	20	100
Breastfeeding: Advantages of breastfeeding	18	90	18	90
Breastfeeding exclusively for 4–6 months	5	25	14	70
Breastfeeding for 2 years or longer	5	25	11	55
Transmission of HIV infection through breast milk if HIV positive	5	25	4	20

Table III: Characteristics of children and their caregivers

	Eastern Cape	KwaZulu-Natal
<b>Caregiver/child pairs</b>	(n = 994)	(n = 992)
	%	%
Single	46	56
Unemployed	96	86
<b>Caregivers' age distribution</b>	%	%
15 – < 18 years	4	4
18 – < 35 years	70	68
>= 35	26	28
Mean age (SD)	30.5 (10.3)	30.2 (10.0)
<b>Children's age distribution</b>	%	%
< 6 months	23	20
6 – < 12 months	18	20
12 – < 24 months	24	24
24 – < 60 months	31	31
60+ months	4	5
<b>Gender</b>	%	%
Female caregivers	99	99
Female children (girls)	50	48
Male children (boys)	50	52
<b>Caregivers' source of income</b>	%	%
Own, spouse, combined income	17	24
Social security	33	28
Occasional income (begging, donations)	4	15
No income	46	33
<b>Educational status</b>	%	%
No formal education	6	17
Grades 1–5	24	21
Grades 6–9	45	29
Grades 10–11	18	19
Grade 12+	7	14
<b>Number of live born children</b>	(n = 460)	(n = 980)
	%	%
4 or fewer children	78	74
5–9 children	20	24
10–14 children	2	2
Average number of children per family	3.1	3.2
<b>Food available for consumption</b>	(n = 994)	(n = 992)
	%	%
Always enough food	15	7
Sometimes not enough food	52	39
Most times not enough food	33	52
Not sure	–	2
<b>Cigarette smoking</b>	(n = 752)	(n = 988)
	%	%
Caregivers who smoke	4	6

(80%) and food aid (EC: 25%; KZN: 28%). The prevalence of diarrhoea as reported by caregivers was high (EC: 34%; KZN: 38%) and was also the leading cause of caregiver-reported under-five child deaths (EC: 34%; KZN: 20%). These data were unfortunately not verified by means of PHC facility data.

#### Nutritional status of children and their caregivers

Table V shows the nutritional status of children and their caregivers. The mean birth weight of infants was 3 158 g for the EC and 3 089 g for KZN and the prevalence of low birth weight (less than 2 500 g at birth) was 5% for the EC and 8% for KZN. The prevalence

Table IV: Maternal and child health

	Eastern Cape	KwaZulu-Natal
	(n = 994)	(n = 992)
<b>Caregivers utilising other facilities in addition to PHC facility</b>	%	%
	60	62
Percentage home births	41	25
<b>Reasons for attending facility (more than one option could be chosen)</b>	%	%
Weigh child	47	48
Child sick/child needs treatment	47	43
Childhood immunisation	44	38
Assessment/screening	24	18
Food aid/nutritional support	28	25
<b>Child health problems reported by caregivers during previous month</b>	%	%
Diarrhoea	34	38
Acute respiratory infections	23	26
Skin lesions, rash	22	23
<b>Caregivers' perceptions of consequences of diarrhoea</b>	%	%
Child loses fluid	71	74
It is dangerous, child could die	15	9
Other	1	5
Don't know, not told anything	13	12
<b>Caregivers' practices in terms of diarrhoea</b>	%	%
Give oral rehydration solution (ORS)	91	91
Give remedies to stop it	6	6
Not sure	3	3
<b>Caregivers' perceptions of causes of diarrhoea</b>	%	%
Dirty bottles/dirty water/germs	84	87
Not sure	14	10
Other	2	3
<b>Under-five-year-old-child deaths reported by caregivers*</b>	%	%
Caregivers who lost a child	20	22
<b>Causes of under-five-year-old-child deaths reported by caregivers**</b>	(n = 202)	(n = 218)
	%	%
Diarrhoea	35	20
Acute respiratory infections	10	5
Witchcraft	4	13
Other causes	29	22
Don't know/not specified	22	39

\* Under-five-year-old-child deaths: Reported by caregivers, not verified with PHC facility data

\*\* Causes of under-five-year-old-child deaths: Proportion of sample of deaths reported by caregivers

of stunting, underweight and wasting was low for children younger than six months. Among 6 to 59-month-old children, underweight was 11% for both the EC and KZN, stunting was 22% for the EC and 24% for KZN, which is classified as medium according to the World Health Organization (WHO),<sup>1</sup> wasting was 5% for the EC and also classified as medium, while the prevalence of 4% for KZN is classified as low.<sup>1</sup> In KZN, 31% of 60 to 71-month-old children were stunted, which is classified as high according to WHO.<sup>1</sup> The small sample size for 60 to 71-month-old children should, however, be noted. The number of overweight (EC: 32%; KZN: 27%) and obese (EC: 17%; KZN: 15%) caregivers was high.

Table V: Nutritional status of children and caregivers

Anthropometric measurements	Eastern Cape	KwaZulu-Natal
Children aged 0–< 6 months (%)	(n = 190)	(n = 185)
Stunted (height-for-age z-score < -2 SD)	8	8
Underweight (weight-for-age z-score < -2 SD)	1	1
Wasted (weight-for-height z-score < -2 SD)	3	2
Children aged 6–59 months (%)	(n = 674)	(n = 704)
Stunted (height-for-age z-score < -2 SD)	22	24
Underweight (weight-for-age z-score < -2 SD)	11	12
Wasted (weight-for-height z-score < -2 SD)	5	4
Children aged 60–71 months (%)	(n = 35)	(n = 45)
Stunted (height-for-age z-score < -2 SD)	26	31
Underweight (weight-for-age z-score < -2 SD)	14	7
Wasted (weight-for-height z-score < -2 SD)	3	2
Caregivers' BMI status (%)	(n = 954)	(n = 985)
Underweight (< 18.5)	2	7
Normal weight (18.5–< 25)	49	51
Overweight (25–< 30)	32	27
Obese (> 30)	17	15
Birth profiles obtained from RTHCs		
Birth weight (g)	(n = 624)	(n = 779)
Mean (SD)	3 158 (487)	3 089 (489)
Percentage < 2 500 g	5	8
Birth length (cm)	(n = 348)	(n = 623)
Mean (SD)	48.8 (3.3)	48.3 (3.6)
Birth head circumference (cm)	(n = 342)	(n = 624)
Mean (SD)	34.2 (2.2)	34.6 (2.4)
Gestational age (weeks)	(n = 361)	(n = 698)
Mean (SD)	39.2 (1.9)	38.8 (1.9)
Percentage < 37 weeks	4	5

## Discussion

This paper describes PHC facility infrastructure and services, and the nutritional status of 0 to 71-month-old children and their caregivers.

A number of PHC facilities in the study area had been built or renovated after 1994 but half of the facilities were nevertheless in a bad condition because of poor maintenance, vandalism and theft. Infrastructural problems, insufficient resources and the existence of cultural practices were indicated among the key aspects influencing the quality of services delivered. Among the cultural practices listed, the use of enemas to treat diarrhoea is particularly threatening for child survival in communities where the prevalence of diarrhoea is already high. Although harmful cultural practices warrant direct discussions with traditional practitioners, very few of the nurses indicated this as an option. This may indicate a conflict of interest, as it has been reported that health professionals also consult traditional health practitioners, even after consultation with a medical practitioner.<sup>11</sup> Since the role of traditional practitioners and their potential to serve as a critical component of comprehensive health care in the lives of African people have been acknowledged,<sup>11</sup> formal health sectors should be sensitised about this. This may stimulate a gradual integration of traditional with mainstream medicine and reduce or eliminate harmful cultural practices.

PHC facility nurses are the key implementers of the INP, yet their training in administering INP protocols has been neglected. This can be attributed to gaps in pre-service and in-service training and to basic, ongoing and specialised training in nursing.<sup>12,13</sup> It was also found that nurses do not interpret nutritional status in the same way as dietitians due to a difference in training,<sup>14</sup> which contributes to the missed opportunities of identifying and targeting nutritionally at-risk children at PHC facilities for intervention.<sup>15</sup> Nurses included all the essential growth monitoring aspects as the key messages that are part of nutritional promotion. Regarding breastfeeding promotion, more than 90% of nurses indicated the advantages of breastfeeding as a key message, while far fewer nurses, especially in the EC, indicated exclusive breastfeeding or other essential breastfeeding messages as the key message. Breastfeeding education and promotion are key child health and survival strategies, and the key messages should therefore be equally promoted. It has been reported that knowing the advantages of breastfeeding is completely insufficient as a form of encouraging, motivating or making a mother decide to breastfeed. To make a difference in breastfeeding practices and, in particular, in exclusive breastfeeding, nursing capacity should be strengthened and constraints in human resources should be addressed. This is the ultimate way of ensuring continuity in the promotion of essential health and nutritional messages to mothers at both facility and community level. In rural communities with insufficient safe water and electricity supplies and where the prevalence of HIV infections may be high, it is essential that mothers be fully informed about the safest infant-feeding options. This will allow them to share in making an informed decision about their infants' feeding options. The inadequate promotion of exclusive breastfeeding, taking into consideration the HIV/AIDS pandemic, is detrimental, as non-breastfed and non-exclusively breastfed infants have an increased risk of dying of diarrhoea and pneumonia in comparison with infants who are exclusively breastfed.<sup>16</sup>

The implementation of numerous programmes in health-care facilities, including the INP, is a huge burden for nurses.<sup>15</sup> With nurses expected to continue their leading role in the INP, training gaps and human-resource constraints should be addressed to overcome the existing imbalance between policy and practice. The failure of policies appears to be directly linked to constraints in human resources.<sup>17</sup> Health-care workers, with the necessary support, have been successful in assisting with various community-based programmes and are therefore a crucial link between policy and practice.<sup>17,18</sup> This need has been identified and flagged for urgent attention to the Minister of Health in more than one report and the insufficient progress in this regard is regrettable.<sup>17,18</sup>

Socio-demographic information reflects a number of households with large families and with insufficient income and food for consumption, which must be extremely taxing on the mothers' child-caring capacities. The implementation of a combination of INP strategies aimed at social development, improved access to social grants and household food security<sup>7</sup> may be beneficial in addressing the underlying nutritional and social needs in these communities. This may be difficult to achieve without a strong community-based component. Developing the skills of caregivers with higher-level education should be included in such projects.

The services of the formal health sector should be utilised more consistently to prevent the disruption of growth and the monitoring of nutrition or essential treatment schedules. Home births, which were higher than the 1998 demographic health survey (DHS) findings for the same provinces<sup>19</sup> and were mainly conducted by non-qualified women, should be minimised or regulated through appropriate control bodies. Since the safety of home births cannot be guaranteed, such births contradict the millennium development goals of promoting safe maternal and child health practices.<sup>20</sup> Caregivers indicating food support as a reason for visiting PHC facilities can be viewed as a public declaration of their need for food and of the prevailing socio-economic situation. Although caregivers were seemingly knowledgeable about the causes and management of diarrhoea according to their reported information, diarrhoea was nevertheless the leading health problem and leading cause of under-five-year-old-child deaths in the area. This could demonstrate the effect of an unfavourable living environment lacking basic resources, making it difficult to put knowledge into practice. A revolutionary approach could strengthen communication on the prevention, management and consequences of diarrhoea in these communities. This should be supported by the provision of safe water and pre-packed ORS at central points in the community for easy access and by demonstration on the safe preparation of ORS during the acute stage of diarrhoea. Trained IMCI workers should be considered to support health staff with diarrhoea-management campaigns.

The mean gestational-age and birth-weight outcomes were indicative of a pregnancy of full-term duration and birth weight within the normal range. The prevalence of low birth weight was slightly lower than the 1998 DHS findings for the African non-urban population and is not a typical reflection of the inequalities and adverse conditions associated with poor rural communities.<sup>19</sup> Based on WHO criteria,<sup>21</sup> all the indices for undernutrition were low for 0 to under-6-month-old infants and medium for 6 to 59-month-old children in both provinces. In KZN, 31% of 60 to 71-month-old children were stunted, which is high.<sup>1</sup> It should, however, be noted that the sample size for this category was considerably smaller than that for the other two age categories.

The underweight and stunting prevalence rates compare well with the findings of the two national studies for South African children of 0 to 71 months and 1 to 9 years but the prevalence of wasting exceeded national findings,<sup>6,22</sup> which is a concern. Although the underweight prevalence rate was classified as low, in 1995 an estimated 54% of under-five-year-old child deaths in developing countries was associated with low weight-for-age, due largely to the potentiating effect of mild to moderate undernutrition.<sup>3</sup> It is thus important not to exclude communities with intermediate or low underweight prevalence rates from interventions. Regular surveys in local pockets are also suggested, as national surveys may obscure malnutrition prevalence rates in impoverished geographical areas within provinces.<sup>23</sup> The number of overweight and obese adults is increasing and coexists with underweight children. This has been reported both in South Africa and globally,<sup>17,24,25</sup> indicating gaps in existing nutritional policies.

In conclusion, shortcomings in infrastructure and services, in human resources and in nursing training are part of the inequalities that keep rural communities in a disadvantaged position. This affects the quality of services and should be addressed before a difference in the health and nutritional status of vulnerable groups in South Africa can be expected.

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