SECOND CARNEGIE INQUIRY INTO POVERTY

AND DEVELOPMENT IN SOUTHERN AFRICA

The nutritional status of inhabitants of northern Gazankulu and the response of the Health services

by

Karel Ijsselmuiden

Carnegie Conference Paper No. 208

Cape Town

13 - 19 April 1984

ISBN 0 7992 0635 0

THE NUTRITIONAL STATUS OF INHABITANTS OF NORTHERN GAZANKULU AND THE RESPONSE OF THE HEALTH SERVICES.

KAREL IJSSELMUIDEN.

Elim Hospital is a 550 bed general hospital situated in the north western corner of Gazankulu , see Figure 1. Due to its geographical position, only about half of all patients seen at the hospital are Gazankulu residents. The others come from Venda, Lebowa and surrounding "white" areas. Patients for specialist ophtalmologic treatment for which Elim offers the only permanent facilities north of Pietersburg, come from an even wider area. Thus, although the area from which patients will come to Elim Hospital for consultation is quite large and has an estimated population of approximately 200.000 people, the population for which the hospital has to provide community health services consists of only 65.000 people, making it the smallest of the 5 Gazankulu health districts.

Gazankulu is divided into a "mainland" and 3 smaller islands as is shown in Figure 1. The mainland area is covered by 3 hospitals : Elim, Malamulele and Nkhensani (Giyani) and has an estimated permanent population of 280.000 and at present 22 doctors (ration 1:12.000). These three areas are still largely traditional. There has been relatively little influx of "foreign" people; the only major upheaval during the last 30 years has been caused by the relocation of scattered homesteads into defined villages to make more land available for agricultural use. The islands consist of Ritavi (Letaba) 1 and 2 near Tzaneen and Mhala near Acornhoek which together have a population of around 300.000. These areas are closer to agricultural and industrial areas and have suffered more from "foreign" influx due to resettlement policies. Traditional lifestyle is therefore much less maintained than in the mainland.

This paper describes the nutritional status of the inhabitants of the Elim area mainly and is based on studies done in this area over the years, some of which have been published previously.
Due to discontinuity of staff and research interests, the data are sometimes haphazardly arranged leaving gaps in the picture of malnutrition and the health services' response to it.
Because the Malamulele and Giyani areas are similar to the Elim area in respect of traditional lifestyle, communal land tenure, lack of water and level of development and because the health services have been less well represented in those areas over the years, the findings of this paper can be applied to these areas without making great errors. However, they are less or not applicable to the Letaba and Mhala districts.

1. MALNUTRITION PRESENTING AT THE HOSPITAL.

1.1. Data.

Hospital statistics on malnutrition are available only for children. Although malnutrition is also seen in adults, it is mostly secondary to wasting diseases like tuberculosis and oesophagus carcinoma or to old age and neglect. These therefore escape notification.

The situation in the children's ward is different since for many children the primary diagnosis is malnutrition. The children's ward admits children from 0 - ± 7 years, has 56 beds and is chronically overcrowded : for 1982 the average bed occupancy was 129% with a range of 103 - 150%. The importance of malnutrition as a cause of admission and death is illustrated in TABLE I A+B. The figures were extracted from children's ward admission records from 1976 - 1982, except figures concerning malnutrition which cover 1976 -1983 and do not show an increase in spite of the present drought.

(TABLE I A+B)

Since the coding system used in Elim Hospital does not include additional diagnoses, it is impossible to estimate the percentage malnutrition caused by deficient nutrition or secondary to organic diseases , but the impression is that the latter is of minor importance. This is supported by the findings of community surveys which will be discussed later.

The peak of admissions for malnutrition is amongst children of 12 - 18 months, while 90% of admitted children are less than 4 years of age. For 1982, the Case Fatality Rate (CFR) of all cases of malnutrition was 20.3%. The CFR of marasmus, 32.2%, is double that of kwashiorkor, 16.1%. Of all children admitted for malnutrition, 14% had a weight above the 3rd percentile of

Weight-for-Age (W/A), while all deaths occured in the group with a weight below the 3rd percentile of W/A. Height measurements are not routinely taken yet. Of all deaths, 40% occured within 72 hours after admission, indicating that there is a long patient delay in the treatment of malnutrition. The average duration of stay in hospital for cases of malnutrition was 18 days. This period is long enough to give adquate nutrition education to mothers [1], but not as long as is the case in Nutrition Rehabilitation Units [2].

1.2. Steps taken by the hospital to improve treatment and prognosis of malnutrition :

1. Treatment : the only way to achieve optimal treatment in a situation of overcrowding, understaffing, rapid turn-over of medical staff and relatively low training level of ward assistants, is to develop routines. These include fixed treatment schemes for malnutrition, mealses, tetanus and rehydration and provide orders for food, vitamins, minerals, antibiotics and drips.
2. Education : nutrition lectures are routinely given to all mothers of children admitted in the children's ward. At present there is a weekly cooking demonstration of a mixture of maize, beans and peanuts which is attended by all mothers of malnourished children. Unfortunately, this mixture is not (yet) a routine diet of the children's ward itself. Children are not discharged if their mother shows a lack of knowledge concerning weaning food, rehydration and the importance of the Road-to-Health chart.
3. Socio-economic circumstances : mothers who are thought to be destitute, are assessed by a social worker. There is however little that can be done, since funds are lacking and financial assistance, even when approved, is not timely given.

4. Clinics : these were created amongst others to help fight malnutrition, especially to improve accessibility, early detection and follow-up. On discharge, most children are refered to their nearest clinic for weekly weighing until their weight gain is satisfactory. Recently, Care Groups[3] are also becoming involved in the follow-up.

1.3. Effectiveness of hospital treatment.

No formal investigation into the effectiveness of hospital treatment has been done, so that judgement can only be based on circumstantial evidence.

1. Follow-up : of all children admitted for malnutrition in 1982, 11 came from the Elim village itself and were consequently urged to come back for weekly weighing at the hospital's Under Five Clinic (UFC). Only 3 did so, while the others were not traced.[4]

2. Prognosis after discharge : children residing in Gazankulu and admitted for malnutrition during 1982, were traced early in 1983. Because it was a retrospective study and the addresses on the bedletters were often unclear, only 23 out of 58 (40%) could be found. The figures are therefore not representative, but they are the only available. See TABLE II.

(TABLE II)

If "failure of therapy" is defined as the number of children who died after discharge plus the number of children still below the 3rd percentile of W/A, then there is a failure rate of 16/23 or 70% in the post-hospitalisation period.

3. Accessibility of the hospital : Fig. 2 shows that almost equal numbers of children are admitted from areas that are at a distance of 0 - 10, 10 - 20 km etc. from the hospital. There is a peak at 30 - 40 km which coincides with some large settlements.

This could give the impression that the access to the hospital is independent of distance from the hospital. This is however a false picture. Assuming an evenly dispersed population in the areas surrounding Elim district, which borders on the 2 other"homelands" Venda and Lebowa and on "white" farms where also many black people live, then the surface area and population double with each 10 km increase in distance from the hospital. If the number of children coming from a certain distance is related to the assumed doubling of population with every 10 km increase in distance, and if the number of children coming from 0 - 10 km distance is arbitrarily called 100%, then Fig. 2 takes a quite different shape : see Fig. 3.
This indicates that the accessibility of the hospital for the area as a whole halves with every 10 km increase in distance from the hospital. This is not an original finding [5] , but serves to show,together with the long patient delay, that this still is a developing area with lack of transport and opportunity for early consultation, like in many other "third" world areas.
However, for children residing in the Gazankulu area served by Elim Hospital, the percentage of Under Fives admitted for malnutrition in 1982 was fairly constant at 0.5-1% of the total number of Under Fives (UF) of each village. This is probably due to regular transport between hospital and clinics which is free of charge for patients. As will be seen later, the percentage of Under Fives admitted for malnutrition is only a very small portion of all UF that are underweight, and is in fact only a third of all children under five who have a weight of less than 60% of expected weight-for-age and need immediate help.
Mobile clinics visiting all places without fixed clinics were introduced early in 1983. Although their first purpose is to ensure adequate vaccination coverage, they will doubtlessly

increase accessibility of the hospital for malnourished children as well, but this can only be seen after some more time.

2. MALNUTRITION PRESENTING AT THE CLINICS.

2.1. Data.

Seeing the need for a greater accessibility, outlying clinics were established long ago. Presently, there are 7 clinics and 1 Health Center for the 22 villages in the district. A clinic is staffed with 1 sister-midwife, 1 staff nurse, 1 nursing assistant and 1 cleaner. A health Center will eventually be staffed with 6 sisters, but functions largely as a clinic at present. The functions of a clinic in the management of malnutrition has been defined as follows :

1. Early detection : this is done by organising weekly Under Five Clinic days, where children are weighed and vaccinated and where health education is given to mothers.
2. Health education : 1. At the Under Five Clinic days. This takes the form of a lecture preceeding the day's activities.
   2. For mothers who deliver their baby at the clinic, concerning child care in general.
   3. For the community in general, by having a demonstration garden from which vegetables can be sold.
3. Follow-up : ideally, all malnourished children should be weighed weekly and other steps taken when indicated. In practice however, only those children who come to the clinic will be seen weekly. Since no records for children with malnutrition are kept at the clinics, since no transport is available for

clinic staff and because there is a genuine lack of time, tracing of patients is not done.

2.2. Effectiveness of clinic management of malnutrition.

As in the case of hospital management of malnutrition, no formal evaluation has been done, so that judgement can also only be based on circumstantial evidence.

1. More children will have had contact with the health services in villages with a clinic than in villages without a clinic : 59.8% versus 48.2% , as was found in a recent survey [6] . Although this difference is statistically significant, it is not impressive in absolute terms.
2. In another survey [7] it was found that the percentage of children below the 3rd percentile of W/A in villages with a clinic was not significantly different from the percentage in villages without a clinic : 27.2 % versus 29.3%.
3. Signs of community activity in health, which should be initiated and supported by clinic staff, are virtually completely lacking. Few vegetable gardens are kept, Care Groups are rarely asked to participate in the clinic's activities, few housevisits are made and almost no school health education is given by clinic staff. Most villages appreciate "having" a clinic, but few show responsibility for the clinic : it is for example extremely difficult to obtain their cooperation when material help for a clinic is needed as in the case of a rondavel to be used as a "waiting maternity" or of a nightwatchman for the clinic premesis.

The causes for this are multiple and not easily singled out, but the most important seem to be :

1. Staff availability : a genuine shortage of staff; quick rotation of clinic staff so that they do not have sufficient time to get acquainted with their community; lack of transport facilities.
2. Staff training and evaluation : there is insufficient emphasis on the preventive and promotive functions of a clinic, with as consequence that a clinic is more like a small hospital than a community health center.
   This lack of emphasis shows itself mainly in 2 forms :
   Firstly, the training of nurses. This is based on standards set by the S.A. Nursing Council which caters mainly for "first world" medicine. The total training of 3½ years allows only 3 weeks to be spent on "public health".*
   Secondly, the evaluation of clinic performance . This is done mainly on the number of deliveries, the number of patients seen and of vaccinations given. In the evaluation forms there is no space for housevisits, patients traced lectures given at schools and other more suitable criteria.

* The new, "integrated" 4-years training course for nurses which will be started in 1986 will spend more time on "public health", but it is doubtful if it will devote more time on rural medicine.

3. MALNUTRITION IN THE COMMUNITY.

3.1. Data.

3.1.1. The nutritional status of children under the age of 5 years.

TABLE III shows the percentage of underweight children in the various age groups. The data are derived from a survey done in August 1982, in which, due to lack of staff, only weight-for-age was measured.[7] It can be seen that roughly 1/3 of all Under Fives (UF) are below the 3rd percentile of W/A, and that there is a peak around 12-24 months of age which coincides with the age at which children are weaned from the breast in this area.

In a study of UF in 4 big settlements in 1979 the following similar results were obtained. See TABLE IV. (P.W. KOK,1979, unpublished report).

3.1.2. The nutritional status of schoolage children.

In August 1983, an anthropometrical survey was done amongst Standard I school children. (A.D. PENMAN, 1983, unpublished report). A random sample of 11 schools was taken and a systematic sample of pupils present on that particular day, which was at times less than 50%, was used for measuring. Ages were recorded as given by the child. A standing beam balance scale accurate to within 200 g was used for weighing, and a standing measuring board with movable head piece accurate to within 0.5 cm was used for heights. Weight and heights were compared with the standards of the U.S. National Center for Health Statistics of 1976 with the help of the Institute for Biostatistics of the Medical Research Council, Tygerberg. In total 462 pupils were measured.

The results are shown in TABLE V.

(TABLE V)

This study has several flaws. Firstly, the low attendance of Standard I pupils on some days of the survey and the school attendance of these age groups in general, which may be as low as 60%, make that the figures presented in Table V are not necessarily representative of children of this age in the whole population. Secondly, establishing ages is very difficult in this population. Results were calculated with 6 months difference in age to see how much difference there would be. It appeared that for various age groups the difference could be as much as 10 - 15%. Besides this inaccuracy of the absolute percentages however, the study shows that both the number of underweight and the number of "underheight" children increase with age, which was also described by Richardson[8] and which is in agreement with the results of the adult nutritional status discussed below. It also shows that there are few "wasted" children, i.e. low weight-for-height, which is an indicator of acute malnutrition. The significance of low weight and height in children with normal weight-for-height and over 2 years of age is uncertain in terms of morbidity and mortality.[9]

The increase of the percentage stunted or underheight children with age indicates a persistently deficient diet throughout the prepubescent period, if it is assumed that the Tsonga people can attain standard weights and heights in optimal circumstances which was shown for various other african people.[10]

3.1.3. The nutritional status of adults.

Migrant labour causes many adults to be absent from their homes for large parts of the year. Before outlining the nutritional status it is therefore useful to define the extent of the absenteism amongst adults; this was one of the reasons to make a case study of one village, considered to be average in many

aspects. (C.B. IJSSELMUIDEN, Mahatlani survey, jan.1982, unpublished). In this study every house in the village was visited and information was obtained by means of a questionnaire. Information concerning births and deaths was asked only about the year immediately preceeding the survey.

From this study the following data were obtained : There were 269 households consisting of 1486 permanent inhabitants. Permanent inhabitants is here defined as people sleeping more than once a week in the village. A population pyramid was constructed and is shown in Fig. 4.

(Fig. 4)

The vital statistics obtained were : birthrate 39.9/1000 inhabitants/ /year ; death rate : 12.8/1000 inhabitants/year ; the rate of natural increase is therefore 27.1/1000 inhabitants/year, which is in agreement with the rate of natural increase for Africa as a whole of approximately 29/1000/year.[11] . The Infant Mortality rate was 92.3/1000 live births/year.

The population pyramid shows a sharp decrease in the number of persons, especially males, older than 20 years, at which age people leave home to look for work. In total, 235 people were less than once a week at home, of whom 211 were males and 24 females. Of the males, 147 or 57% were head of a household. In terms of absenteism it means that 62% of all males over 20 years of age or 68% of all males between 20 - 60 years are away from home for most of the year.

An anthropometric survey of adults of 20 - 60 years of age, who live permanently in this area was done in August 1983. Permanent inhabitants was in this case defined as all people sleeping in the village every night, which excludes also persons working on nearby farms who can return home on weekends.

This was done to reduce the number of persons absent on the day of the survey for whom the survey team had to return on a later day. The sampling method has been described elsewhere. [12]

The instruments used to measure heights and weights are the same as those used for the survey of schoolage children (see 3.1.2.), and in addition, triceps skinfold thickness was measured using a Lange skinfold caliper.

The results are presented in TABLE VI.

(TABLE VI)

Of the 442 adults in the sample, 42 or 9.5% were males, which is much less than expected from the Mahatlani survey discussed above. This can probably be explained by the use of a different definition of "permanent inhabitants".

This study shows that the nutritional status,as measured by height, weight and skinfold thickness,of adults in this area is good, the women even being slightly obese. However, mild malnutrition in the form of vitamin deficiencies like pellagra were not studied. Another interesting phenomenon is that the average height of the various 10-year age groups does not show a tendency to increase in the younger age groups. Assuming again that the Tsonga people can attain standard height and weight in optimal circumstances, this means that no significant change occured in socio-economic circumstances in the period 10- 50 years ago. Such an increase in stature following on improvement of socio-economic conditions has been demonstrated in several industrialized countries. [13]

3.2. The response of the health services on malnutrition.

Although the first formal survey to determine the extent of malnutrition in the community at large was only conducted in 1979, the health services were well aware of the problem prior to this date. Action taken to combat malnutrition at hospital and clinic level was described earlier.

Measures to control malnutrition at community level have been taken on various occasions in the past, although only 1 was evaluated to some extent. Little documentation of these past efforts is still available, so that the various programmes will only be mentioned briefly. Attempts that were made include :

1. Food distribution schemes : These were started in isolation or in the framework of greater, nationwide programmes. During the 1950's a governement school feeding scheme was launched, later followed by a feeding scheme for private schools. In the 1960's, distribution of a balanced cereal was started under the name of Kupugani, later replaced by a similar product under the name of ProNutro. During the early 1970's, high protein powders were distributed via schools and clinics, amongst others milk powder and PVM, both of which were never used to any great extent. Since then no feeding schemes have been undertaken anymore. (Dr. P.H. Jaques, superintendent Elim Hospital, personal communication).
2. Nutrition education : 1978 was made "Nutrition Year" in Gazankulu. Quite extensive nutrition education was given to hospital and clinic staff. Efforts to include schools and radio in the nutrition education were less succesful.
3. Structural attempts to reduce malnutrition include :
   1. The introduction of a Morley-type Road-to-Health chart and stimulation of mothers to have their children weighed monthly.

This was introduced in 1978 and is still used extensively.

2. The introduction of Community Health Workers (CHW).
   CHW in Gazankulu are government paid women of Nursing Assistant level, chosen by their village (in practice usually by the chief or another important person), who have had half a years extra training in various health matters including special attention for nutrition. No formal evaluation has been done since their introduction in 1980, but at this time it is not immediately obvious that they have a positive influence on malnutrition, while in some areas their impact in this respect is doubtful. (see paper by Dr. E. Buch).
3. The formation of Care Groups (CG).
   CG will be discussed in the next paper by Dr. E. Sutter. Suffice it to say that they consist of volunteers, mostly women, and that they were originally started in 1976 to reduce the incidence of trachoma. Since their inception however, there has been a considerable input of education concerning nutrition and gardening techniques. Two studies were done by students from the University of the Witwatersrand to evaluate some aspects of the CG.
   The first study, by S. Tollman e.a.,[14] in which CG-members of 2 different CG were compared with villagers of their communities, found that general hygienic measures, pit latrines, vegetable gardens and the use of chlorinated water were more commonly encountered with Care Group members than with villagers, and also more frequently with villagers who had had contact with CG than with those who did not have previous contact with CG. The study also found that CG-members in those 2 villages tended to belong to a higher social group than the villagers with whom they were compared.

In the second study , by M. Barry, children of CG-members were compared with children of non-CG-members for weight and height.[15] He found a slightly lower percentage of children with low weight-for-age and weight-for-height among CG children, but the difference was not significant. Taking into consideration that CG-members possibly belong to a higher social stratum, the conclusion must be that as yet no positive influence on malnutrition is exerted by the CG. But it is only fair to say that CG were never specifically directed at reducing malnutrition and that both studies were of limited scope , so that CG must not be discarded as a tool in the management of malnutrition.

Closely associated with malnutrition is the problem of nutritional blindness. Prevalence surveys done in this area done between 1976 and 1979 show that the prevalence of blindness of all causes in all age groups is 15 - 20/1000 inhabitants, while the W.H.O. norm is 1 - 3/1000 inhabitants. In children of 0 - 6 years of age, the prevalence of corneal scarring, mostly due to vitamin A deficiency with or without concomitant measles infection, is 5/1000 while the W.H.O. norm to consider Vitamin A deficiency as a public health priority is > 1/1000. Blindness presenting in children seen at Elim Hospital over the period 1967 - 1972 was in 41% of cases associated with measles and malnutrition and in 15% with malnutrition alone. (Dr.E. Sutter, ophtalmologist Elim Hospital, personal communication). Prevention of these cases of blindness can be achieved to a large extent by 2 measures : effective measles vaccination (since March 1983 no more cases of measles were seen in Under Fives from this district) and by distribution of Vitamin A (200.000 IU twice yearly) via Under Five Clinics, both of which need a well organized distribution system that will reach at least 70 - 80% of Under Fives.

An unexpected evaluation : the present drought.

In spite of many reports in the press about the severe drought conditions in the homelands and in spite of a massive cattle death there has not been an increase in the number of children admitted for malnutrition in the 3 northern hospitals. See Fig. 5.

(Fig. 5)

A second survey of the nutritional status of Under Fives was done in August 1983, 1 year after the baseline survey, to establish the effect of the present drought on children. Unfortunately, the sampling technique was messed up by a rapidly spreading rumour that "a white van with white doctors was driving around to kill children" - a story which has also in the past interfered with community health activities - , so that the results are probably not accurate. The sampling technique is described elsewhere,[12] while techniques for weighing were similar to those used in the 1982 survey. In total 589 children were weighed. It was found that 24% was below the 3rd percentile of W/A, compared to 30% in 1982. The difference is not significant, but the result made us believe that there has been at least no deterioration. The difference can not be ascribed to the nutrition supplementation programme which started only in September 1983.

Support for the theory that the drought did not (yet) influence the nutritional status of UF came from a study done by the Department of Health and Welfare to establish the influence of the drought in several areas in the RSA, amongst which one area is bordering on the Elim area.[16] Although the Department critisized its own study on various points, the overall finding was that the amount of acute malnutrition was very low, and that it was similar in very dry areas compared with areas with a higher rainfall.

These findings contrast strongly with number of deaths amongst cattle which clearly indicate that there was a serious lack of vegetation including plants for human consumption. In fact, nothing edible has come off the land for almost 3 years. That in spite of that the nutritional status of Under Fives did not deteriorate further can not be explained by an improved vaccination programme for the Elim area, since the same phenomenon is also seen in Malamulele, Nkhensani and various other parts of the RSA where vaccination programmes remained as before.

Possible explanations for this occurence are :

1. Subsistence farming as a source of food or income for families has become insignificant in present day Gazankulu, in which case a drought will not affect the food supply to a great extent. This seems the most likely explanation.
2. Sufficient money is available to replace pre-drought subsistence production with purchases of food. There is no indication that this is so and the income of an average family is still estimated at around R 40 per month (this estimation was made by Care Group Motivators and is based on discussions with villagers, not on a survey) which hardly allows for any food purchases other than maize. This needs however further study, since it could have important consequences for future nutrition intervention programmes.

4. MALNUTRITION AND THE GAZANKULU DEPARTMENT OF HEALTH.

This Department came into being in 1976 when it took over 5, now 6, mission hospitals. From its inception it has been plagued by lack and discontinuity of staff in general and of public health trained staff in special. There is no sub-section for nutrition. As far as malnutrition is concerned, the Department did not really involve

itself, but did allow, and mostly supported, individual hospitals and private organisations to initiate nutrition programmes. Although not stated as such, malnutrition is not considered as a top priority. Cooperation with other departments like Agriculture and Works (for water affairs) is often very difficult, making a comprehensive approach to malnutrition almost impossible at present.

Conclusions and recommendations.

1. Concerning nutritional status.

Probably no major change occured in nutrition in this area over the last 50 - 60 years, as was shown by the assumed stunting of adults and the present high percentage of underweight children. The importance of this lies not so much in the failure to reach maximal genetic heights and weights per se. There is in fact little evidence that height and weight for age are good indicators for risk of mortality except in very young children.[9] It is even argued that an average short stature because of a consequent lower energy requirement might be beneficial in the face of a world food shortage.[17] What matters more is that the present day adults are in fact the survivors of a group of people exposed to childhood malnutrition. A negative influence of childhood malnutrition on intellectual and social development of individuals is almost certainly present, although it is difficult in this respect to isolate nutritional from social factors.[18,19,20,21]

It is even more difficult, if not impossible, to assess the effect of childhood malnutrition on the progress of developing nations. Reluctance to define the malnutrition problem is based on these doubts about risk indicators and on the difficulties in assessing the influence of malnutrition on individual and group development. There can be little doubt, however, about absolute numbers of children admitted in hospitals with frank malnutrition, be it kwashiorkor, marasmus, a mixed picture or corneal scarring due to vitamin A deficiency. Compulsory notification of these conditions for all population groups, even if these are only the tip of the iceberg, would put the problem of malnutrition into perspective. It will also allow the monitoring of progress made in the control of malnutrition in the worst affected group or groups.

In addition, monitoring of heights of Substandard A pupils, in which grade there is an almost 100% attendance, on a yearly basis of one, known age group, e.g. 6-7 or 7-8 years, also provides a continuous information on progress made in nutrition.

2. Concerning the health services' response.

Various attempts to eradicate or control malnutrition were made in the past. Up to now, it appears as if the incidence of malnutrition has not been reduced to a significant extent. Except for the most recent programmes, all previous efforts were based on the philosophy that malnutrition can be cured by supplying food. True as this may be in individual patients, it does not apply to malnutrition in the community. Evidence from elswhere in the world leaves no doubt that programmes aiming at eradication of malnutrition by food suplementation alone will not be succesful [22,23,24] since these disregard the equally important causes for malnutrition in the community, namely : ignorance and wrong feeding habits, availability of health care and incidence of infectious diseases, socio-economic and political conditions. It is most likely that only a programme which takes steps to counter all these factors, can be succesful.

At present, the basic elements to provide a comprehensive approach to malnutrition seem to be available in the Elim area :
the health services are outreaching with the help of fixed and mobile clinics; clinic staff, Community Health Workers and Care Groups can provide information; and Care Groups can, if well guided, become the nucleus of organisation of villagers, opening the way to small scale agriculture and small scale industries.
Malnutrition and its management has to become a top priority of the central or local government, whereby stimulation and coördination

of activities of its main departments involved with malnutrition, Health , Agriculture, Education and Works (wateraffairs).

Measures to be taken by the health services themselves include :

At national level : compulsory notifications, the formulation of a national policy concerning nutrition and vaccinations and the coördination of efforts of individual hospitals and private organisations.

At hospital level : There is an immediate need for more training and allocation of staff for community health purposes in general. More emphasis on the preventive and promotive roles of the hospital and clinics must be given. Needless to say that provision of adequate vaccination and Under Five Clinic facilities within easy reach of all, i.e. within less than 1 hour walking distance, is a conditio sine qua non.

Changes in the socio-economic and political conditions do not fall under the direct responsibility or power of the health services. The health services can play an important role, however, in bringing about the appropriate changes by :

1. creating awareness of the malnutrition problem by supplying data on a regular basis. This may influence socio-economic and political conditions on macro scale.
2. promoting "community development" in its widest sense, i.e. not only relating to health issues, by means of Care Groups or Community Health Workers or similar staff. This may improve socio-economic and political conditions on a micro scale.

ACKNOWLEDGEMENTS.

I would like to thank Prof. JDL Hansen , Drs. P.H. Jaques and EE Sutter for their stimulation in preparing this paper. I am also grateful to Drs. PW Kok and AD Penman for permission to use data obtained by them in this paper.

REFERENCES :

1. Frankish JG. Nutrition Rehabilitation Units in the Transkei. Economics of health in South Africa, Vol. II , SALDRU , University of Cape Town, 1980, p.6.

2. Koppert J. Nutrition Rehabilitation. 1977, p.20. Tri-Med Books, London.

3. Sutter EE, Ballard RC. A community approach to trachoma control in the northern Transvaal. S.Afr.med.J.,1978,53,622.

4. Waleffe E. Malnourished children in a rural South African hospital. 1983. Unpublished report by an elective medical student.

5. King M. Medical Care in Developing Countries. Oxford University Press. Nairobi,1966; p. 2:6

6. IJsselmuiden C.B. Beliefs and practices concerning measles in Gazankulu. S.Afr.med.J.,1983,63,360.

7. IJsselmuiden C.B. The nutritional status of children under the age of 5 years in northern Gazankulu. S.Afr.med.J. In press.

8. Richardson BD. Growth patterns of South African children : an overview. S.Afr.J.med.Sci.,1978,74,246.

9. Walker ARP. Some thoughts on malnutrition, dietary intervention and amelioration of high death rates in young South African blacks. S.Afr.med.J.,1980, 57,696.

10. Coovadia HM, Adhikari M, Mthethwa D. Physical growth of negro children in the Durban area. Trop.geogr.Med.,1978,30,373.

11. Time International Magazine, January 16 1984, No. 3 , p.6. "Africa's woes".

12. Kok PW, Kwamanga D. A simple random survey method for the Expanded Programme on Immunization. Current Medical Research in Eastern Africa. Proceedings of the Third Annual Medical Scientific Conference. Nairobi, Kenya, 1982. Africascience International Publishing Ltd. Nairobi.

14. Tollman S et.al. Evaluation of a community approach to preventable disease in Gazankulu. Economics of health in South Africa, Vol.1, SALDRU , University of Cape Town, 1979, p.303.

15. Barry M. Evaluation of effect of Care Groups on nutritional status of under 3 - year olds. Paper of the Department of Community Medicine, University of the Witwatersrand, 1981.

16. Department of Health and Welfare, section Epidemiology. Studies to determine the risk of malnutrition attributable to the present drought. Epidemiological Comments (magazine of the Dept. of Health), Vol.10, issues number 7,8 and 11; 1983.

17. Richardson BD. Malnutrition and nutritional anthropometry. J.trop. Pediatr.,1980,26,80-84.

18. Evans D, Bowie MD, Hansen JDL, Moodie AD, Van der Spuy HIJ. Intellectual development and nutrition. J.of Pediatrics, 1980, 97, 358 - 363.

19. Moodie AD, Bowie MD, Mann MD, Hansen JDL. A prospective 15-year follow-up study of kwashiorkor patients. S.Afr.med.J.,1980, 671-681, Parts I and II.

20. Van Rensburg et.al., The relationship between scholastic progress and nutritional status. Part I. S.Afr.med.J.,1977,52,644-649.

21. Morley D, Woodland M. See how they grow, p.148. London: the Macmillan Press, 1979.

22. Jackson T, Eade D. Against the grain; the dilemma of project food aid. Oxford: OXFAM, 1982.

23. Gwatkin DR, Wilcox JR, Wray JD. Can health and nutrition interventions make a difference ? Washington DC: Overseas Development Council, monograph No. 13, 1980.

24. Fehrsen GS. Malnutrition in South Africa. S.Afr.med.J.,1975,49,2221-2224.

TABLE I. Malnutrition in Elim Hospital Children's ward.

A. Main causes of mortality in the children's ward.

1.	Gastro enteritis	19.5 %
2.	Kwashiorkor	16.6
3.	Pneumonia	12.9
4.	Measles*	12.8
5.	Marasmus	11.0
6.	Neonatal Tetanus**	5.0
7.	Meningitis	3.5
8.	Burns	2.8
9.	Typhoid Fever	1.5
10.	Cardiac dysfunction	1.4

B. Rates related to malnutrition.

Average admissions (all cases) per year	2030	
Average overall mortality	6 %	
Average number of admissions for malnutrition	234	= 11.5%
Average mortality caused by malnutrition	34	
	= 27.6 % of all mortality	
	= 14.5 % Case Fatality Rate	

Figures are obtained from Elim Hospital Children's Ward admission records from 1976 - 1982 (Table IA) and from 1976-1983 (Table IB).

* = A very effective measles vaccination campaign in August 1982, followed by continuous mobile vaccinations has rem-oved measles from the 1983 mortality list and also virtually from the morbidity list.

** = Vaccination of pregnant women against Tetanus has been intensified and it is hoped that Neonatal Tetanus will disappear from the mortality list within 1 - 2 years.

Note that 68% of mortality (including some disease not occuring in the above list like whooping cough, childhood TB, congenital syphilis) is due to diseases that can in principle be prevented.

TABLE II.

Children who were admitted for malnutrition, 5 - 15 months after discharge. (Gazankulu residents only).

Number of children traced	23	
still alive	17	
died	6	(26%)

Of the 17 children still alive :

- were above the 3rd percentile of Weight-for-Age 7
- were below the 3rd percentile of Weight-for-age 10

TABLE III.

Percentage underweight children per age group.

AGE (years)	% below P_3 (W/A)
0 -	21.1
1 -	38.2
2 -	28.0
3 -	26.3
4 -	32.3
Total UF	29.8 %

In total 1.8% was below 60% of expected Weight-for-Age.

Figures were obtained from a systematic sample taken from the whole Under Five population and consisting of 658 children.

TABLE IV.

Malnutrition in 4 major villages in Elim Hospital District.

Overall figures.

WEIGHT-FOR-AGE	:	26.3%	<	80%	;	1.7%	<	60%
WEIGHT-FOR-HEIGHT:		18.2%	<	90%	;	4.8%	<	80%
HEIGHT-FOR-AGE	:	58.6%	<	95%	;	27.0%	<	90%

TABLE V.

Nutritional status of Substandard A schoolchildren.

AGE (years)		7+8	9	10	11	12	13+
W/A % <80%	F	8.0	28.8	72.1	81.6	73.7	82.6
	M	-	33.3	41.5	73.3	75.8	95.7
H/A % <90%	F	-	3.8	18.0	28.6	15.8	43.5
	M	10.0	13.9	15.1	17.8	18.2	53.2
W/H number < 80%	F	-	1	2	-	-	-
	M	-	-	3	1	-	2
Number in sample	F	33	52	61	49	19	23
	M	10	36	53	45	33	47

W/A = expected weight for age. H/A = expected height for age.
W/H = expected weight for height.

Note that the NCHS graphs for W/H only supply information for girls up to 137 cm of height, and for boys up to 145 cm. In total 75 pupils could therefore not be analysed for W/H. (57 F and 18 M).

TABLE VI.

Nutritional status of Adults in Elim district.

A. Mean weights and heights of various age groups.

FEMALE(N)	AGE	MALE(N)	WEIGHTS (kg)
58.6 (174)	21 - 30	59.5 (11)	
61.4 (120)	31 - 40	69.4 (11)	
63.7 (45)	41 - 50	60.2 (7)	
58.4 (53)	51 -60	72.8 (11)	
			HEIGHTS (cm)
159.8	21 - 30	169.9	
160.7	31 - 40	174.2	
160.4	41 - 50	170.2	
157.3	51 - 60	171.0	
			TRICEPS SKINFOLD THICKNESS (mm)
21.6	21 - 30	13.3	
22.6	31 - 40	18.5	
23.8	41 - 50	14.6	
20.1	51 - 60	20.5	

B. Mean weights,heights and triceps skinfold thickness of males and females between the ages of 20 - 60 years.

FEMALES		MALES
60.0	WEIGHT	66.2
107.4	% IDEAL BODY WEIGHT	97.5
160.2	HEIGHT	171.8
21.9	TST	16.7

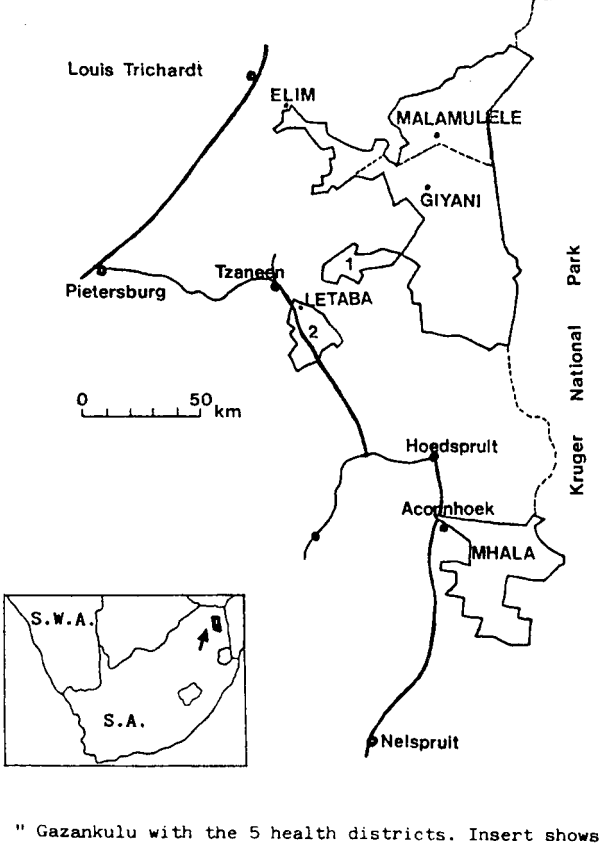

Fig. 1. " Gazankulu with the 5 health districts. Insert shows position of Gazankulu in South Africa."

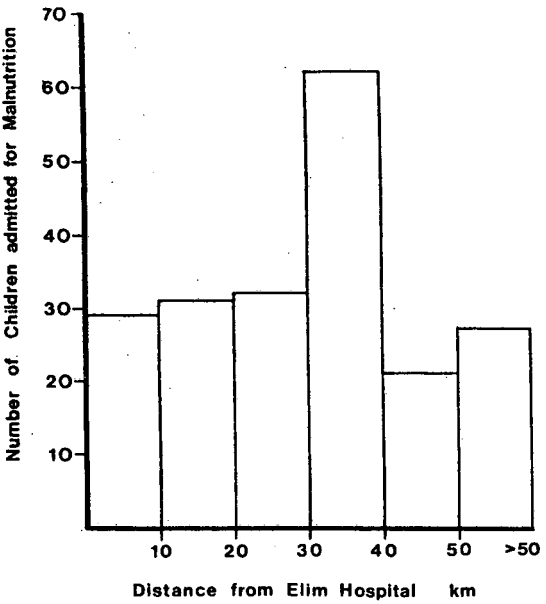

Fig. 2. " Number of children admitted for malnutrition in Elim Hospital as a function of the distance between their homes and the hospital. "

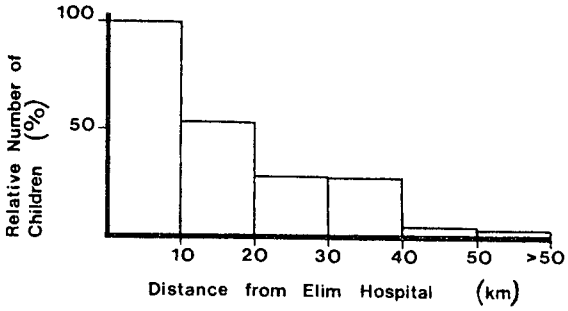

Fig. 3. " The relative number of children admitted for malnutrition in Elim Hospital as a function the total population presumed to be living at the indicated distances from the hospital. See text for further explanation. "

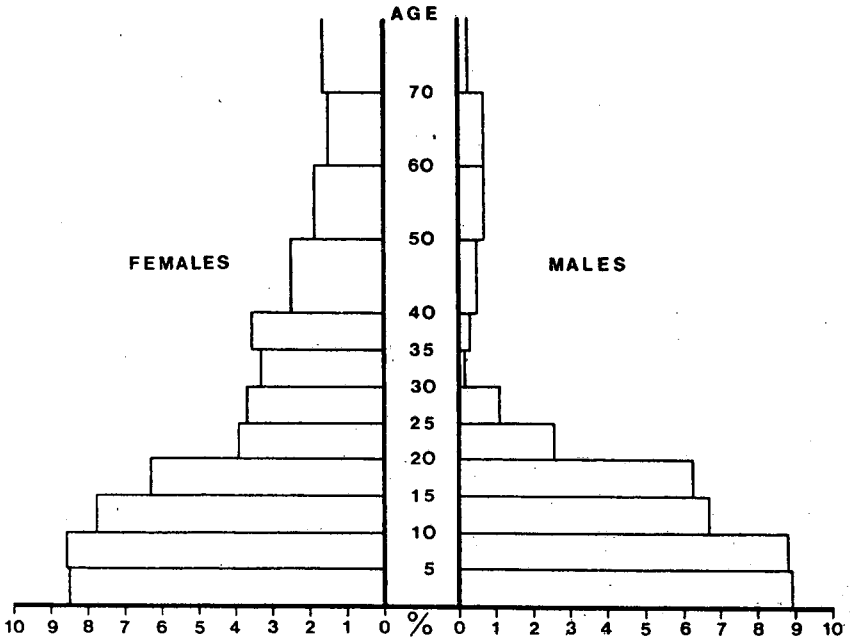

Fig. 4. " Age distribution of the population of the Mahatlani village. "

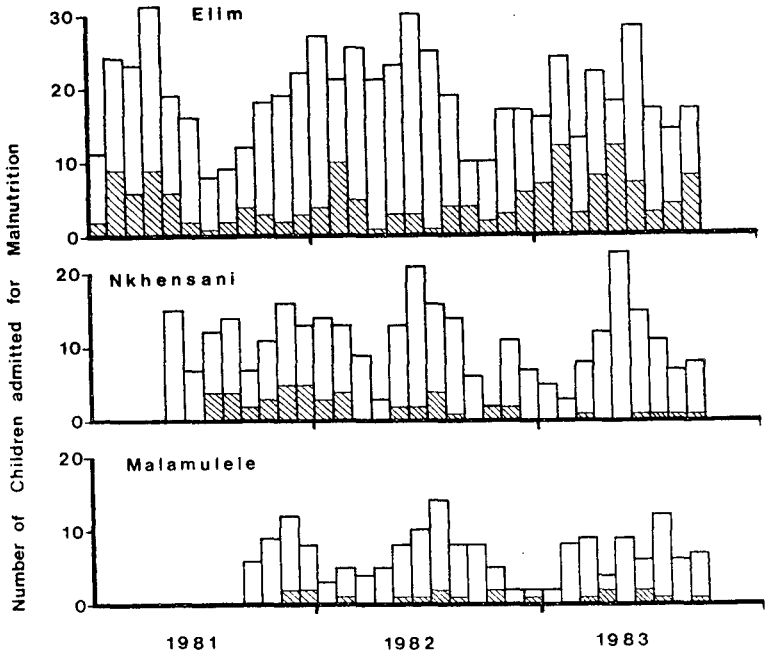

Fig. 5. " Monthly distribution of children admitted for malnutrition in the 3 northern Gazankulu hospitals. The height of the open column indicates the total number of admissions, while the shaded area represents the number of children with marasmus.
Data were derived from admission records, which could only be traced back to May 1981 for Nkhensani, and back to September 1981 for Malamulele at which date the hospital was opened. "

These papers constitute the preliminary findings of the Second Carnegie Inquiry into Poverty and Development in Southern Africa, and were prepared for presentation at a Conference at the University of Cape Town from 13-19 April, 1984.

The Second Carnegie Inquiry into Poverty and Development in Southern Africa was launched in April 1982, and is scheduled to run until June 1985.

SALDRU
School of Economics
Robert Leslie Building
University of Cape Town
Rondebosch 7700

Edina-Griffiths