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Child survival in a rural area in Zimbabwe: are we winning?

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SUMMARY

Health teams in a rural district in Zimbabwe have been implementing child survival programmes since 1984. A prospective study of the causes of morbidity and mortality in under-five children was done. Community based surveys assessing nutrition status, immunisation coverage and knowledge and use of sugar and salt solution for diarrhoea were carried out.

Malnutrition, acute respiratory infections and diarrhoea accounted for 69,7 pc of the 902 under-fives admissions while 33 (67,4 pc) of the hospital deaths were under-fives. The mortality pattern parallelled that of morbidity. Malnutrition was more common in the dry communal areas and on the commercial estates. Full immunisation coverage rates in the 12–23-month-olds increased from 44,3 pc in 1984 to 70 pc in 1989; and up to 69 pc of the mothers correctly prepared and used sugar and salt solution for diarrhoea management.

Although there appears to have been little impact on malnutrition, respiratory infections and diarrhoea, the study shows that a lot can be achieved even in a remote rural district given political will, community involvement, and dedicated staff.

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The maintenance of the current momentum and the introduction of further socio-economic reforms is a big challenge facing the health teams, community members and politicians.

INTRODUCTION

As part of the national health care strategy, the health teams in the rural district of Chimanimani in Zimbabwe have been implementing a comprehensive primary health care programme including measures to improve child survival since January 1984.

From 1984, we kept morbidity and mortality records in the under-five children and regularly reviewed some aspects of the programme using community based surveys.

Although current national trends in child survival in Zimbabwe have been described,[1, 2] there has been no long term prospective study of child survival in the rural areas. The specific objective of the hospital based study was to document the disease pattern, establish the causes of death and assess changes in the disease pattern. The community based study, on the other hand, sought to determine the nutrition status and immunisation coverage of under-fives as well as assessing mothers' knowledge of oral rehydration therapy.

The study was carried out in Chimanimani district which lies in the eastern part of Zimbabwe, about 410 km south east of the Zimbabwean capital, Harare. The district covers an arc of 3 353 square km and shares its eastern border with Mozambique.

The western part has poor agricultural land which is over-cultivated and over-grazed while the eastern part enjoys an annual rainfall of 900 mm, is fertile and supports perennial crops, forestry and livestock. The western part is mainly communal and the eastern part commercially owned.

The population is fast approaching 94 000 with 119 villages. Only two percent of the population live in the administrative centre at Chimanimani.

The population has a typical developing country pyramid structure with 54 pc of the people comprising the under 15-year-olds while women in the child bearing age (15–44) group account for 20 pc of the total population. The majority of the villages have no road or dust track making access difficult. Most families live in houses made of mud and thatch and few have access to clean water.

Forty-six percent of the households have access to sanitation facilities of their own, while 58,4 pc have none.[3]

Since January 1984, the district health team has aimed at providing an integrated health care service with emphasis on community development.

At the ward level, the health teams are encouraged to use the so-called supermarket approach in an attempt to meet the health needs of the people. For example, a pregnant mother coming for antenatal care, may have two children below the age of five years who are due for immunisation. The mother will get her antenatal care including tetanus toxoid vaccines while her children get treatment for cough or cut wounds and receive any vaccines due and appropriate health education given. This not only maximises the mother's time but it also provides an integrated approach to her family's heath.

By 1987, 187 village workers and 645 traditional midwives had been trained, forming the bulk of the health workers at village level.

There were fifteen health centres including one mission hospital at Mutambara, and a poorly equipped rural hospital at Chimanimani. Chimanimani Hospital, which is run by the district council, had 40 beds, a simple laboratory service and an X-ray machine, but no theatre facilities for major operations. Children needing further investigations or treatment were referred to the Provincial Hospital in Mutare, 150 km away. As there was no ambulance service, these referred patients travelled to Mutare by truck borrowed from either the District Medical Office or from different sectors in the district, including the District Administrator, the District Council and the forest estates.

MATERIALS AND METHODS

Hospital based study: The in-patient register of Chimanimani Hospital was used for the data collection. All the 902 under-five children admitted to Chimanimani Hospital from 1st May 1985 to 30th April 1988 were studied. Personal details, date of admission, discharge/referral or death as well as diagnosis were extracted from the register.

The following disease entries were made:

Acute respiratory infections (ARI): all lower and upper respiratory tract infections needing hospital care; Diarrhoea and vomiting: all forms of

gastroenteritis and associated with dehydration; Accidents and injuries: accidental poisoning, trauma, snake bites and all other accidental injuries; Measles: any child with measles as the primary diagnosis, for example, a child with post measles pneumonia would be classified as measles and not in the acute respiratory infection section; Malaria; Meningitis; Low birth weight and neonatal complications; Typhoid; Pertussis (recorded separate from ARI); Others (any other disease of children no falling in the above categories, for example, metabolic disorders, hepatisis).

Community based study: In order to control for biases inherent in health facility based data, we conducted community based surveys to assess nutrition status of the under-five children and evaluate other specific aspects of the primary health care programme, that is, immunisation coverage and mothers' knowledge of oral rehydration therapy.

In the assessment of immunisation and mothers' knowledge of oral rehydration solution, the standard WHO technique, as described by Henderson and Sundaresan[4] was used. In this method, the sample used is chosen by random two stage sampling. A total of 30 clusters are selected each of which contains seven children aged 12–23 months, yielding a total sample of 210 children. Children are considered vaccinated if they have a vaccination card with a date of vaccination recorded.

In assessing the nutrition status, a similar sampling method[4] was used except that the sample included children under the age of five years, and each cluster contained four to seven children yielding a sample of between 129 and 215 children in each of the wards studies. (See Table III in results).

Children were weighed using Salter scales. The pointer (needle) on the scale was adjusted to zero with the weighing sling attached before each child was weighed. Scales were checked with a standard weight at the beginning of each day's session and adjusted accordingly. Children weighed nude to the nearest 0,1 kg. Each weight measurement was dictated to a recorder who repeated it aloud after writing it down.

Further standardisation and quality control were carried out using methods suggested by WHO[5] and Zerfas.[6] Children were considered malnourished if their weights for age fell below the third centile (80 pc of the median weight for age) on the Zimbabwean Road to Health Chart, which is based on NCHS/WHO reference data.[7] No heights or arm circumferences were measured.

RESULTS

Hospital based study

There were 902 children under the age of five years and this was 38 pc of all hospital admissions. Four hundred and thirty-two (47,9 pc) were male and 470 (52,1 pc) female. Protein energy malnutrition, acute respiratory infections and diarrhoea were the main causes of morbidity in the under-fives (Table I)

Table I: Under-five children in-patient, Chimanimani Hospital, Zimbabwe, May 1985–April 1988

Disease Condition	1985/86		1986/87		1987/88	
	No	pc	No	pc	No	pc
P.E.M.*	91	22,2	90	33,0	55	25,1
ARI*	99	24,1	74	27,1	65	29,7
D + V*	81	91,8	50	18,3	24	11,9
Measles	65	15,9	5	1,8	13	5,9
Accident and Injury	27	6,6	17	6,2	5	2,3
LBW and Neonatal	21	5,1	14	5,1	13	5,9
Malaria	11	2,7	1	0,4	7	3,2
Pertussis	7	1,7	1	0,4	0	0,0
Meningitis	4	1,0	6	2,2	0	0,0
Typhoid	3	0,7	5	1,8	6	2,7
Others	1	0,2	10	3,7	31	14,2
TOTAL	410	100,0	273	100,0	219	100,0

**P.E.M. = Protein energy malnutrition*
**ARI = Acute respiratory infection*
**D + V = Diarrhoea and vomiting*

From 1st March 1985 to 30th April 1986, acute respiratory infection, protein energy malnutrition and diarrhoea and vomiting (ARI, PEM and D&V) accounted for 271 (66,1 pc) of the under-fives admissions. The respective figures for 1986/7 and 1987/8 periods are 214 (78,4 pc) and 144 (65,8 pc). Over the three-year period, these three diseases

singly or in combination accounted for 69,7 pc of the 902 under-five children admissions.

With an annual population growth for Chimanimani of 2,6 pc, according to the Central Statistical Office (CSO),[3] the number of under-fives in 1985 would be about 16 829, that is 17,45 pc of the population and 17 267 in 1988. The hospital in-patient admission rate for the under-fives fell from 25,0 per 1 000 in 1985/6 to 12,7 per 1 000 in 1987/88 (Table II).

Table II: Admission rates for under-five children, Chimanimani Hospital, Zimbabwe 1985-1988

Year	0–4 year population	0–4 year hospital admissions	Admission rates per 1 000 childrenaged 0–4 year
1985/86	16 403	410	25,0
1986/87	16 829	273	16,2
1987/88	17 267	219	12,7

When measles cases are excluded, the respective hospital in-patient admission rates for the under-fives fell from 21,0 per 1 000 in 1985/6 to 11,9 per 1 000 in 1987/88.

Mortality: During the study period, 49 persons in all the age groups died at the hospital. Of these, 33 (67,4 pc) were children under the age of five years. The causes of death in the children were mainly a combination of protein energy malnutrition, diarrhoea, acute respiratory infection or some other infections as shown in Table III.

Table III: Causes of death of children 0–4 years old, Chamanimani Hospital, Zimbabwe, May 1985-April 1988

Cause of death	Number	Percentage
PEM	10	30,3
Diarrhoea and vomiting	9	27,3
Acute Respiratory Infection	4	12,1
Low Birth Weight	4	12,1
Measles	2	6,1
Cong. Heart Disease	1	3,0
Meningitis	2	6,1
Anaemia	1	3.0
TOTAL	33	100,0

Table IV: Nutrition status of under-five children in some administrative wards, Chimanimani District, Zimbabwe 1986-1988)

Area	Date	Total number weighed No		Below 3rd centile pc
Nyanyadzi	August 86	215	57	26,5
	August 87	174	43	24,7
	September 88	181	42	23,2
Chayamiti	August 86	129	30	23,3
	August 87	186	38	20,4
	September 88	202	44	21,8
Charter (Pvt)	August 86	177	57	32,2
	August 87	168	47	28,0
	September 88	159	42	26,4
Ngorima	August 86	147	12	8,2
	August 87	154	15	9,7
	September 88	201	19	9,5

Table V: Immunisation status of children aged 12–23 months, Chimanimani District, Zimbabwe 1984–1989

Year	Number of children examined	Fully immunised for age No.	pc
1984	210	93	44,3
1986	216	146	67,6
1987	213	158	74,2
1988	212	154	72,6
1989	210	147	70,0

Community based study: The nutrition surveys revealed a striking difference between Ngorima area which is in the high rainfall belt with the rest of the district which has low rainfall (Fig. I). They show no consistent trend in the nutritional status of the under-fives over the three-year period (Table IV). The district has achieved reasonable immunisation coverage rates Table V).

We kept record of the percentage of mothers who were able to prepare a correct solution for oral rehydration therapy using sugar, salt and water. There has been a steady increase in the percentage of mothers who can correctly prepare and use the standard sugar, salt solution of the management of diarrhoea (Table VI).

Fig. I:Map of Chimanimani District, Zimbabwe, showing nutrition status of under-five children and annual rainfall.

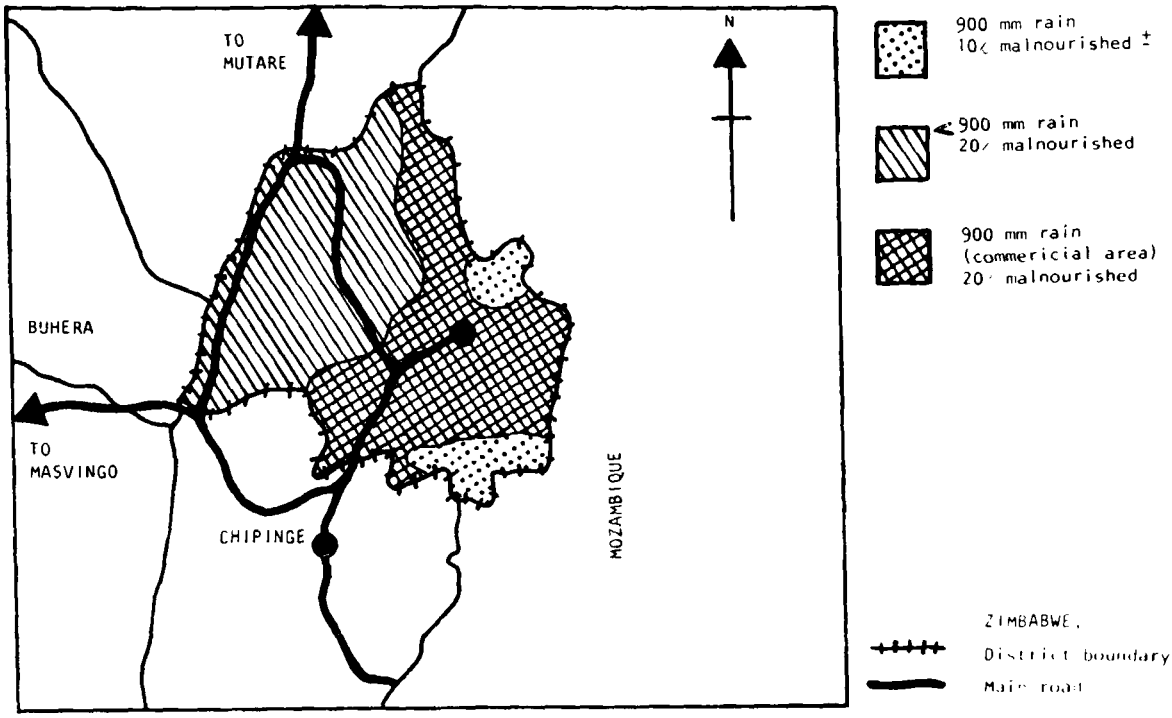

Table VI: Mother's knowledge and use of oral sugar-salt solution, Chimanimani District, 1984-1989

Year	Number of mothers questioned	SSS recipe correct and used	
		No.	pc
1984	210	95	45,2
1986	215	113	52,6
1987	213	150	70,4
1988	212	148	69,8
1989	210	145	69,0

SSS = Sugar-salt solution

DISCUSSION

Lack of appreciation of the well know interaction between malnutrition and infection, and the single diagnosis approach, may lead to mistaken attribution of cause of morbidity and mortality.[8]

Although hospital based figures are sometimes inaccurate, we tried to keep accurate records over the years and believe that these results provide a good picture of causes of morbidity and mortality in the hospital based population. However, those who become ill or those who avail themselves of services are likely to be different from the general population. Despite this shortcoming, the study has shown that protein energy malnutrition, acute respiratory infection and diarrhoea are the major causes of morbidity and mortality in the under-five children in the district.

Diarrhoea and vomiting accounted for 11 pc of the 219 under-five admissions in 1987/88 as compared

to 19,8 pc of the 420 admissions in 1985.86. It is possible that home treatment of diarrhoea with salt and sugar solution contributed to the lower percentage of admissions for this illness in 1988. Some reduction in deaths from diarrhoea would be expected from the increased use of sugar and salt solution in the villages. Community based morbidity and mortality studies will be needed to elucidate this.

Only children with a road to health card indicating full immunisation by dates were considered fully immunised. This underestimates the true immunisation coverage as some of the mothers might lose their children's vaccination card. Moreover, some of the vaccinations might be recorded by a tick mark rather than date.

The immunisation coverage results show that high rates have been achieved and this may have reduced morbidity and mortality associated with the six target diseases, namely, tetanus, pertussis, diphtheria, measles, polio and tuberculosis. Although no cases of neonatal tetanus or polio have been seen since 1985, it is possible that children with these conditions may have been treated at other hospitals outside the district or at their homes.

Deaths in the under-fives accounted for 67,4 pc of all the hospital deaths, yet the under-fives make up only 17,45 pc of the total population.[1] Protein energy malnutrition, respiratory infections and diarrhoea causing most morbidity and mortality in children is seen as a problem of the developing countries. It is interesting to note these were also the biggest killers in London[9] in 1903.

Eighty-six percent of the total reduction in death rate in England and Wales from the beginning of the 18th century to the present was caused by the decline in deaths from infections diseases.[9] This was not due to medical intervention but to improved living standards and improved hygiene. The incidence of diarrhoea and other water-related infections were decreased by the provision of purified water and effective sewage disposal. Improved nutrition played a vital role as it enabled people to respond to infection.

Planners of child survival programmes recognise that improved living conditions and efficient provision of safe water and sanitation and nutrition would greatly improve child survival.[10, 11] However, a few international agencies give meaningful support to these programmes. Instead, priority is only given to the more easily implemented programmes of growth monitoring, oral rehydration therapy, breast feeding, immunisation and family planning.[12]

The fundamental developmental programmes like land acquisition are dubbed as costly and needing political will to resolve. There has been very strong political will and commitment in Zimbabwe and there is need for these agencies to come to the assistance of the government and communities in consolidating programmes already started.

Although the hospital admissions for protein energy-malnutrition, respiratory infections and diarrhoea have decreased, it would seem that the primary health care programmes have had little impact on the relative importance of these diseases as the leading cases of child morbidity and mortality. These are still the leading causes of child morbidity and mortality nationwide[13] although HIV and AIDS related diseases are likely to become the leading causes as the HIV epidemic takes hold.

The western part of the district has suffered four successive droughts. In these areas the nutrition status of the under-fives has remained unsatisfactory despite intervention with the child supplementary feeding programme and assistance with supplementary food production inputs like seed and fertiliser.

Despite adequate rainfall and fertile land there are unacceptable levels of malnutrition on the commercial farms and forest estates (Figure I).

This is not surprising as many of the working families on these estates and farms have no access to land for growing food. They, therefore, depend on expensive food from the farm or estate shops where prices are much higher than in the urban areas.[14]

As the majority of the farm workers receive wages far below the recommended minimum wages,[14] they find it difficult to buy even the basic foods like maize meal. The situation has been confounded further by the removal of food subsidies and the erosion of the purchasing power of the Zimbabwean dollar.[1]

It is quite clear that acute respiratory infection is an important cause of child morbidity and mortality. The ARI programme may reduce the number of deaths due to ARI but the problem needs a multidisciplinary approach. The primary health care programme should encourage community involvement in education about ARI, its causes and treatment.

The living conditions on the commercial farms and estates are poor although management have started building latrines. If the incidence of malnutrition, diarrhoea and acute respiratory infections is to be reduced, more needs to be done. There is need for better housing, clean water supply and improving the working conditions (wage package) of the farm workers.

In conclusion, one can say that the health teams in Chimanimani have attempted to improve child health care programmes with some success.

Although the programmes seem to have had little impact on the relative importance of protein energy malnutrition, acute respiratory infections and diarrhoea, the Chimanimani health teams must be complimented on a job well done. They have succeeded in their attempt to improve the provision of a comprehensive health care service to a large number of children.

This shows that a lot can be achieved even in a rural district given political will, community involvement and dedicated staff. The maintenance of the current momentum and further socio-economic reforms is a big challenge to the health teams, the communities and politicians.

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