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Impact of primary health care on childhood and mortality in rural Ghana: the Gomoa experience

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SUMMARY

The impact of a combination of PHC intervention activities on child survival, growth, morbidity and mortality was assessed in three selected rural communities (Gomoa Fetteh, Gomoa Onyadze/Otsew Jukwa and Gomoa Mprumem) in the Central Region of Ghana from 1987 to 1990.

EPI, provision of basic essential drugs and supplies for the treatment of common childhood diseases, treatment of the sick child, growth monitoring, health education, provision of antenatal services, family planning, training and supervision of Community Health Workers, disease surveillance and special studies were the major PHC strategies used to improve the health of the child and the pregnant woman in the three communities.

These activities in their totality have had significant impact on morbidity and mortality in children under five and on maternal mortality over the study period 1987 to 1990. Although malaria, acute respiratory infections and diarrhoea diseases continue to be major causes of childhood morbidity, deaths due to these diseases have dramatically declined. Measles and other

vaccine preventable diseases no longer contribute significantly to childhood morbidity and mortality.

Infant and under five mortality have been reduced from 114,6/1 000 and 155,6/1 000 live births to 40,8/1 000 and 61,2/1 000 live births respectively. The crude birth rates however, remain almost the same over the five year period (43 to 48/1 000 pop.) but crude death rates have declined (11 to 12,4/1 000 pop.).

Indications are that where there are weak district and sub district administrative and political structures for the promotion of intersectoral approach to comprehensive PHC, selective or Basic Primary Health Care will continue to be adopted to reduce mortality especially among vulnerable groups like pre-school children and pregnant women.

INTRODUCTION

Infant mortality rate in Ghana is currently estimated at 91/1 000 live births and the under five mortality rate (U5MR) at 155/1 000 live births.¹ The main causes of childhood mortality like malaria, malnutrition, measles and diarrhoeal diseases are by and large preventable and can be controlled with available technologies. Maternal mortality of five to 15 per 1 000 live births² is also high, especially in the rural areas. These maternal deaths could be reduced considerably through good midwifery services accessible to pregnant women.

The Noguchi Memorial Institute for Medical Research (NMIMR) initiated in 1987 to 1990 a number of child survival activities within the context of PHC in three rural communities in the Central Region of Ghana aimed at:

- (i) Improving the health of pre-school children and pregnant women in the selected rural communities through research and provision of basic services within the context of primary health care (PHC) strategy in Ghana.
- (ii) Assessing the impact of a combination of PHC intervention activities on child survival, including morbidity and mortality trends on children under five years of age, in the selected communities.

MATERIALS AND METHODS

Three rural villages - Gomoa Fetteh, Gomoa Onyadze/Otsew Jukwa and Mprumem in the Gomoa Ewutu Efutu District in the Central Region of Ghana were selected for the project which began in 1987. Gomoa

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Fetteh is a coastal village about 70 km from Accra the capital city. Fishing and petty trading are the major occupations in the village. Gomoa Onyadze/Otsew Jukwa, a twin village is a few kilometres inland and about 80 km from Accra. The people in the villages are mainly subsistence farmers, pottery makers and petty traders. Gomoa Mprumem is about 85 km from Accra and also a few kilometres inland. The people are also subsistence farmers, pottery makers and petty traders.

The selection of the villages for this PHC initiative was based on a low vaccination coverage of <10 pc, a relatively high under five mortality rate of 155/1 000 live births, easy accessibility to the communities and the communities initial willingness to participate in the subject.

Mapping and enumeration of houses in the project areas were done initially and repeated every two years. Initial censuses were conducted in each of the three villages and repeated every two years. All births and deaths, and possible causes of deaths were recorded continuously in the communities by trained Community Clinic Attendants (CCAs). Verbal autopsies were also done for all under five deaths recorded.

All children under five years of age were registered and followed up at weekly clinic sessions which were conducted in each community for the first three years and then reduced to one clinic session fortnightly. The services provided were within the context of PHC in Ghana. Health education of mothers on infant feeding, nutrition, disease prevention and control (EPI diseases, malaria, DD and ARI) and family planning was provided through discussions, role play, film shows, talks and demonstrations on each visit.

The height and weight of children were also measured at least once a month on clinic days and recorded. Children were seen either by a physician or by a nursing sister. Each child received his/her immunisation against the EPI diseases when due. Children also received a yellow fever vaccine at the age of one year. If a child was well, the mother was encouraged to keep him/her healthy. The health status of each child was recorded on a Nutrition and Disease Surveillance Form. Children were given treatment by the physician or nurse who was also the dispensing officer. The seriously sick were referred to the local district hospital/or central hospital in Accra. Children who did not attend the scheduled clinic were followed up at home, and mothers were

encouraged to send the children to the clinic on the next scheduled clinic session.

Essential drugs like chloroquine, paracetamol, penicillin, combantrine, and supplies for the treatment of other common childhood diseases (e.g. skin and eye problems) were provided by the Institute. Six monthly deworming of pre-school children was carried out with combantrine tablets/powder. Adults who reported at the clinic with health problems were also treated.

Pregnant women were also registered and seen by the clinic staff in antenatal clinics where they were routinely given tetanus toxoid, iron tablets and antimalarial for malaria prophylaxis. Complicated pregnancy cases were referred to the district hospital. Family planning activities in the form of talks, discussions and demonstrations were initiated and family planning tablets, foams and injectables also made available for women of child bearing age.

Training of Community Health Workers: Two local community clinic attendants (CCAs) and one traditional birth attendant (TBA) were trained and placed in each of the three villages. They were supervised by the Institute's outreach clinic team. During the training of the CCAs emphasis was placed on the diagnosis and management of the most common causes of under five morbidity i.e. acute respiratory infections, malaria, diarrhoeal diseases, intestinal parasites and skin conditions (scabies, impetigo and eczema) which accounted for about 80 pc of all clinic attendances. The CCAs were also trained to record all births, deaths, and possible causes of deaths. The TBAs were given refresher courses, provided with materials and supervised to ensure safe and hygienic methods of child delivery and prevent maternal deaths.

The Noguchi team collected demographic data, conducted weekly clinic sessions, and supervised CCAs and TBAs. The CCAs conducted clinic sessions in between outreach sessions, followed up children at home and encouraged mothers to send their children to the clinic. Pregnant women who attended our antenatal clinic were delivered by the TBAs.

Data collected during clinic sessions and surveys (vaccination coverage, diarrhoeal diseases, utilisation of community health workers and services during clinic sessions) were sent to the Noguchi Memorial Institute for Medical Research and EPINFO software used for processing and analysis. Tables and graphs were pre-

Table 1: Under five disease incidence in three rural communities in Gomoa District 1987 to 1990.

Diseases	1987		1988		1989		1990	
	No.	pc	No.	pc	No.	pc	No.	pc
Malaria	1 558	22,61	1 260	21,85	1 710	33,37	1 632	31,24
ARI	1 952	28,30	1 576	27,33	1 396	27,24	1 462	27,99
Diarrhoea	507	7,36	323	5,60	348	6,79	432	8,31
Skin diseases	417	6,05	347	6,02	266	5,19	234	4,84
Worm infection	73	1,06	92	1,60	86	1,68	70	1,34
Eye disease	136	1,97	92	1,60	40	0,78	110	2,11
Measles	17	0,20	0,00	0,00	0,00	0,00	0,00	0,00
Others	323	4,69	344	5,96	238	4,64	260	4,98
Healthy	1 924	27,92	1 733	30,05	1 040	20,30	1 022	19,56
Total	6 890	100,00	5 767	100,00	5 124	100,00	5 224	100,00

pared to show major causes and trends of morbidity and mortality in children under five years of age.

RESULTS

Democracy: The total population of the three rural communities was 4 225 in 1987 and 4 411 in 1990. Males form 44 pc of the population and females 56 pc. The under five population was 19,9 pc (839) of the population in 1987 and 19,0 pc (851) in 1990. Crude birth rates ranged from 42 to 46/1 000 population and crude death rates 10,7 to 5,4/1 000 population over the period 1987 to 1990.

Morbidity and mortality: The four most common causes of under five morbidity in the three communities were identified as malaria, acute respiratory infections, diarrhoeal diseases and skin infections. These diseases accounted for between 50 to 70 pc of all under five visits to the clinics (Table I). Malaria accounted for 20 to 30 pc of all clinic attendances and it was estimated that a child under five years would have two to three episodes of malaria in a year. Acute respiratory infections (ARI) accounted for 27 pc of all clinic attendances and a child on average would have 5,3 to seven episodes of ARI annually. Incidence of ARI generally peaked in September/October. Diarrhoeal diseases, the third major cause of morbidity constituted about 7 pc of all under five clinic attendances. The annual incidence rate of diarrhoeal diseases which was 4,5 episodes per child per year at the beginning of the project in 1987 declined to one to two episodes by 1990 mainly through

health education on infant feeding and personal hygiene practices.

There has been a progressive decline in childhood deaths in the three communities since the initiation of the PHC. IMR has been reduced from 114,6/1 000 live births in 1987 to 40,8/1 000 live births by 1990. The under five mortality has also declined from 155,6/1 000 live births to 61,2/1 000 live births in 1990 (Figure I). Malaria, ARI and diarrhoea were the major causes of death (Figure II). Malaria accounted for six of 15 deaths (40 pc) in 1987. The malaria specific death rate in children under five was 8,6/1 000 in 1987; however no malaria related deaths were recorded in 1990. Five deaths due to ARI were recorded in 1987 but no deaths due to ARI have been recorded since 1988 in the three communities. The under five mortality due to ARI was 7,2/1 000, representing 33,3 pc of all under five deaths at the beginning of the project but has been reduced to nil since 1988. Deaths due to diarrhoeal diseases contributed 6,7 pc (1/15) to 42,9 (3/7) of all deaths in 1987 and 1990 respectively. Diarrhoeal death rates have increased from 1,4/1 000 in 1987 to 4,3/1 000 in 1990 in the under five population in all the three communities (Figure II).

In 1987, 18,9 pc (97/512) of the children under five were found to be generally malnourished (acute and chronic) as assessed by pc of Reference Median (Weight/Age); 23,8 pc were chronically malnourished (Height/Age) and 4,2 pc were wasted (Weight/Height). In 1990,

Figure I: Childhood mortality in three rural communities in Gomoa District 1987 to 1990.

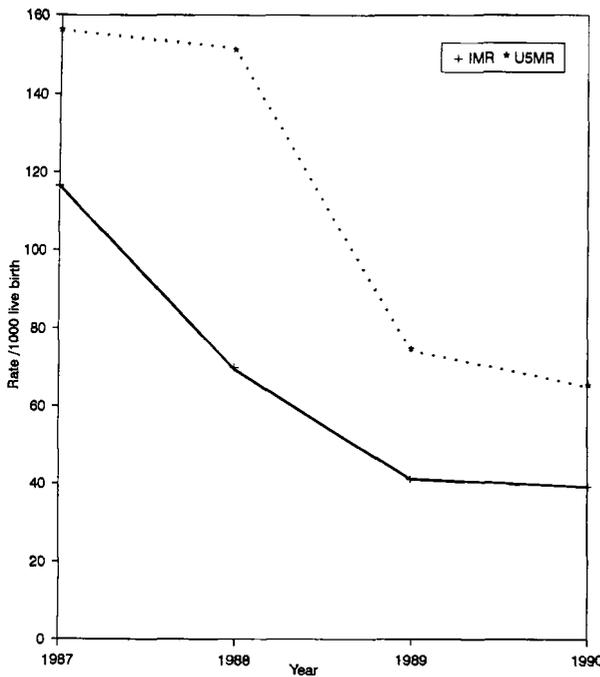
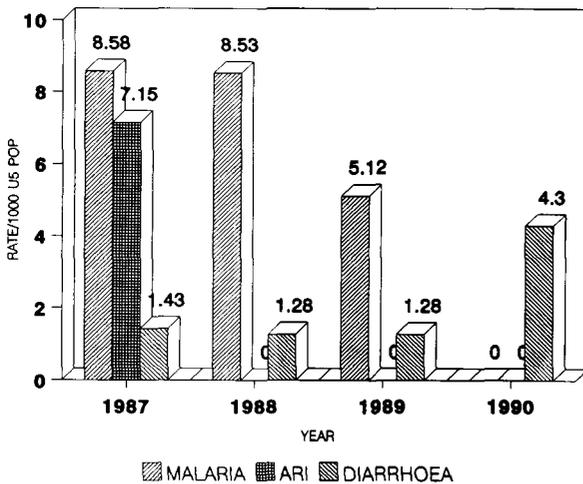


Figure II: Causes of under five deaths in three rural communities in Gomoa District 1987 to 1990.



13,7 pc (85/620) of the children under five were found to be generally malnourished, 21 pc stunted and 2,7 pc wasted. The nutritional status of children under five has generally not improved significantly in height for age ($Z = 1,23$; $P = 0,1299$) and weight for height ($Z = 1,39$; $P = 0,0822$) since the beginning of the project.

Out of 467 births recorded in 1987 to 1988, 444 (95 pc) were delivered by TBAs. There were no maternal deaths and there were no cases of neonatal tetanus over the period. Mothers have embraced EPI, and immunization coverage in children aged one to two years which was about 10 pc in 1987 has been increased to 80 to 85 pc by 1990. Measles and other vaccine preventable diseases are no longer causing childhood morbidity and mortality in the three communities.

The weekly clinics in the communities were conducted on non-farming days as approved by the communities themselves. Children who attended (brought by their mothers) regularly constituted about 50 pc of the under five childhood population. Some of the reasons given by mothers for non regular attendance to the clinics were that they used the non-farming days for social visits (28,9 pc), went to the market or the child was well and they did not see a need for attending the clinic (26,3 pc). Some had moved out temporary to farmland elsewhere (5,9 pc). These situations resulted in more man hour time spent for follow up of children by CCAs at home. Regular attendance of the under fives has now increased to about 70 pc since the weekly visits were reduced to fortnightly in one community and monthly in the two other communities.

Project cost: The total annual recurrent expenditure was $\text{¢}4\,757\,451,42$ (US\$11 893,60). This expenditure was made up of drugs ($\text{¢}3\,044\,651,42 = \text{US}\$7\,611,6$), consumables like gauze, syringes etc. ($\text{¢}800\,000 = \text{US}\$2\,000$), fuel and maintenance of vehicle used for field visits ($\text{¢}748\,800 = \text{US}\$1\,872$), allowances for six CCAs ($\text{¢}144\,000 = \text{US}\360) and stationery ($\text{¢}20\,000 = \text{US}\50). Weighing scales and measuring rods were also bought at a cost of $\text{¢}650\,400$ (US\$1 626). One Nissan Patrol was also purchased at a cost of US\$15 000 to convey Institute staff to and from the outreach stations. On average an amount of $\text{¢}55\,597$ (US\$14,00) was spent on a child/year or $\text{¢}466,4$ (US\$1,2)/child/month or $\text{¢}233,2$ (US\$0,6)/child/fortnightly visit.

DISCUSSION

The Gomoa Rural child Health Project in Ghana has

demonstrated that properly planned and applied PHC activities like health education on disease prevention and control, immunisation against childhood vaccine preventable diseases, provision of essential drugs and early recognition and treatment of common childhood disease could progressively and significantly reduce infant/childhood mortality and improve the health of the child in a rural community. This reduction of infant/childhood mortality was achieved through the activities which drastically reduced childhood deaths due to malaria, ARI and diarrhoeal diseases. Similar studies in West Africa,^{3,4} Hait⁵ and in Zaire⁶ have shown that PHC activities targeted against diseases including diarrhoea, EPI related diseases, clinical malaria and malnutrition progressively reduced childhood mortality.

Crude Death Rates have also been generally low due mainly to the low infant and under five mortality whilst Crude Birth Rates have been relatively high as a result, natural rates of population increase have also been relatively high. The high rate of population growth will need to be addressed through a well planned family programme.

The nutritional status of children under five has not improved significantly since the beginning of the project. Although mothers and child caretakers were educated on child nutrition, the project was not able to influence the easy availability of high protein energy foods nor was it able to increase earning capacity of the people in the three communities. Ethnic differences and leadership styles, personality conflicts and weak local political/administrative structures contributed to continued poverty in the communities.

The project has also shown that the TBAs, who are traditional private practitioners and have always been part of the community, are fully accepted and effectively utilised by the communities. Indications are that TBAs will continue to provide services for pregnant women and their newborn babies especially in rural communities in Ghana. Integration of their activities into PHC (including their further training, supervision and support) will greatly enhance their role in the national efforts to reduce maternal deaths and prevent deaths due to neonatal tetanus through hygienic deliveries.

The CCAs (two in each community) had middle school education. They were trained to treat common childhood diseases, do home visiting and record births and deaths in the communities. They also participated

in the registration and weighing of children during the weekly clinic sessions. CCAs were not readily accepted as health care providers by these communities since they tend to be regarded as members of the community who have not had much training in the diagnosis and management of diseases. This level of acceptance affected optimal utilisation of their services and community support for their remuneration. However, CCAs were found to be very useful, dedicated and hard working and could provide needed primary health care to communities with no access to any health care.

PHC envisages intersectoral approaches for achieving success and a desired sustainable health effect. Our Gomoa rural project has shown that although other health related sectors (education, community development, water and sewerage, agriculture) were willing to participate in PHC activities, their sectoral priorities and resource constraints such as manpower, transport and budget allocations greatly limited their effective participation in health activities within the context of PHC in the selected communities.

Our experiences have demonstrated that in spite of weak administrative structures at the community/sub-district levels, organised PHC activities like health education, immunisation, early detection and treatment of childhood common diseases, regular antenatal clinics, training, utilisation and supervision of community health workers (TBAs and CCAs) and regular supply of essential drugs can be effectively initiated and applied to reduce morbidity and mortality in the childhood population and also prevent maternal deaths.

The cost of ¢233 per child every two weeks was affordable. The current process of decentralisation in the country should empower the district to support community health workers financially and supervise regular availability of drugs. This process is being initialised to sustain PHC at the community level.

Our PHC was targeted at childhood population and pregnant women. The availability of food, provision of sanitation and some aspects of water supply were not addressed due to the problems of intersectoral approach discussed above. Such PHC strategy may be considered Basic Primary Health Care (BPHC) or even selective Primary Health Care (SPHC) although we tried to make the services provided as comprehensive and integrated as possible. Advocates of SPHC^{7,8,9} may cite the reduction of morbidity and mortality using our strategy in support of SPHC whilst the proponents of

Comprehensive Primary Health Care (CPHC)^{10,11,12} might find our approach not comprehensive enough. We do not intend to enter into the debate between SPHC and CPHC. However, in areas where district and subdistrict administrative and political structures are weak and cannot provide leadership for CPHC, Health Services will continue to adopt strategies within the context of PHC to prevent suffering and deaths in vulnerable groups like preschool children and pregnant women.

It is also our view that in the provision of basic health (promotion as well as restorative care) for rural communities in developing countries, the practical approaches to reduce disease burden and prevent unnecessary deaths are more relevant to communities than theoretical concepts and debates. Although CPHC may represent the ideal strategy to achieve Health for All, its full implementation may require a phased approach, depending on the environment in which the strategy will be applied. Our PHC experiences in Gomoa would support such an approach. Moreover, the spirit and letter of the Alma Ata declaration provides for such a phased PHC strategy.¹⁰

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