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Primary Care Informatics: Bhorugram, India: Revisited

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Abstract

A Primary Health Care Informatics project was initiated in 1990 at Bhorugram, Rajasthan, India. It was reported in MIE91 with initial, encouraging results. The evaluation of the information system has been successful in all operational terms, and the Fully Immunised Child (FIC) could be used as a local cardinal index to monitor and evaluate the quality of care, cost-effectiveness and community participation. Health Systems and Health Economy Research alike have long searched for apt quality and performance markers that in themselves could embrace and express a number of aspects and factors. The FIC index is shown to well meet the criteria of such a cardinal measure in the MCHC services. We, also, demonstrate an implementation strategy for establishing Information Systems in Primary Health Care Centres in Developing countries.

Keywords: Developing Countries, Health Care Indicator, Information Systems, Maternal Health Services, Primary Health Care.

Introduction

The world is undergoing a transition from an industry based to a cyber based society as a result of the phenomenal growth of the computer and telecommunications industries. The Internet or the Web has literally converted the world into a global village. Health care web sites are gradually finding their way into the cyber world[1]. Telemedicine is emerging as one of the most promising technology solutions of our times, and is described as "delivery of health care without regard to geographic locations"[2] . The modern age is heading towards technical excellence. Realisation of the bold goal set up by the WHO of Health For All (HFA) by the Year 2000[3], may not be far away.

Research to strengthen the information infrastructure in primary health care delivery with computer technology has been recommended, specially in the developing countries[4-5]. The manual process of data management at the level of first contact takes the care providers away from their primary activity of care delivery into doing mundane tasks of collation and reporting, this makes the foundation of information systems weak. A report estimates that between 40 - 60 % of the care providers work time in developing countries is spent on data collation, compilation and reporting duties[6] .

WHO in its global review emphasised that "A major constraint reported by practically all countries is inadequate information support for the managerial process"[7]. Many researchers express similar views and advocate the use of information technology in developing countries specially in the area of primary health care[4,8-9]. A Primary Care Informatics project was started at the PHC centre in the Bhorugram in Rajasthan, India[10-11].

Research objectives

The research objectives were to design and develop an application software in the MCHC domain, based on an applicable Essential Data Set (EDS) and to implement an Information System with this software, at a number of primary health care centres in a developing country. The further aim was to draw wider conclusions and generalisation from the gained experience.

Materials and methods

Site

This research was initiated in 1990 at Linkoping, Sweden, in the departments of Medical Informatics and Primary Health Care in tune with the WHO motto: "**Think globally, act locally**".

Bhorugram is a small village situated in the state of Rajasthan in the Indian sub-continent. The health statistics indicate a high Infant Mortality Rate ranging from 80 to 120 per 1000 live births and a high crude birth rate ranging from 24 to 34 per 1000 population. It is located in the Thar desert where the terrain is sandy, with high sand dunes. The temperatures range from 50^0C in summer to -2^0C in winters. There are a few roads with most of the villages connected to the State roads by untarred paths. Electricity supply is irregular.

The village had a small dispensary in 1990, which was converted into a rural hospital in 1992. The rural hospital is run by the Bhoruka Charitable Trust (BCT), an organisation working at the "grass roots" level (villages) to improve the quality in life of the people in the area. The activities of the BCT are inter-sectoral. They are involved in Forestry, digging of wells, low cost sanitation blocks building, constructing houses for the poor, non-formal education of girls and other similar activities.

Clientele/Community

The rural hospital is catering to the needs of forty villages with a population of 49,137 (1991 census) which is scattered in radius of 20 Km. 42.5% of the villages have less than 1000 population while 30% villages have a population of over 1500. There are 5 villages (12.5%) within 5 km distance from the hospital and 28 villages (70%) more than 10 km distance. Most of the villages now have electricity supply and "kucha" roads.

The population is illiterate with literacy rates being 28% and 19% approximately for males and females respectively. The distribution of the population shows a large dependency ratio: about 39% of the population are in the age group below 15 years and only 38% constitute the work force. Most of the population in this area is involved in agricultural work.

Manpower and Other Resources

In 1990 the Bhorugram dispensary had 2 physicians, one pharmacist, one Auxiliary Nurse Midwife and a Community Health worker. Presently the manpower in the hospital has been increased by the management. The hospital is run by the senior physician with administrative support from the manager of the BCT.

At the start of the project the dispensary had a PC/XT with two 360 kb floppy drives which have been upgraded to a Intel-486 PC and three Intel-386 PCs. A couple of Dot Matrix printers are also available. Besides health care monitoring the computers are used for day-to-day office work of the BCT.

Baseline survey

A baseline survey was carried out by the non-formal education teachers to assess the needs of the community and the resources available[12]. The survey results indicated that the ante natal cover was nil and all deliveries were done at home by Traditional Birth Attendant (TBA). This fact, that the TBAs constitute an available resource and that they are culturally acceptable[13], was taken into consideration and a retraining program started for them.

The base line survey, also, indicated that the drop-out rate in the Immunisation program was about 72%, hence, the "grass root" workers were directed to pay special attention to this program. Inference drawn from the baseline survey data was that communication of Health information in the society was the main problem[14]. Target groups in the population were identified for immunisation, family planning and ante natal care. The aim was "*not to deliver basic health but to encourage it*" through communication.

Method: Project Plan: Small Achievable Steps

The project plan was to use the outreach services of the immunisation programme and build up other primary care activities. Data from the immunisation camps were entered in the computer and lists for the next dose given to health workers. These lists were followed by a list of "drop-outs". The CHWs and ANMs were repeatedly informed that it will be the "drop-outs" who will add to the mortality and morbidity status of the population.

The Fully Immunised Child (FIC) status was monitored in the subsequent camps. Simultaneously the other primary care activities such as ante natal care, nutritional status monitoring, blindness prevention in that particular family were started. Community involvement was achieved by concentrating on individual families, whose children were involved in the immunisation subprogram.

Results

The use of information as a catalyst for effecting change in the society is demonstrated in the results. The figures in Table 1 show the FIC status for DPT vaccine from the Bhorugram site between the period 1992-96. The FIC status for DPT vaccine was 45.4% , which in 1996 increased to 81.9%. A similar FIC status is seen in the Oral Polio Vaccine. The FIC status in Rajasthan in 1992-93 was 29.7% for DPT vaccine and 32.8% for Polio[15].

Table 1. Fully Immunised Child (FIC) DPT Vaccination

Year	DPT - I Dose	DPT - II Dose	DPT - III Dose	FIC (%)
92-93	700	494	318	45.4%
93-94	811	760	630	77.6%
94-95	794	671	603	75.9%
95-96	874	712	716	81.9%

Sinha, involved in the work of Independent Commission on Health in India, has in the review of "Maternal and Child in India: A Critical Review" given the real grass root picture[15]. The overall health status of India and the health status of Rajasthan (Bhorugram site) are discussed here and are taken as the control community figures (Source: Introductory Report of National Family Health Survey (NFHS) of India 1992-93, Bombay: IIPS). Table 2 depicts the ante natal care received by the

women in 1992-93. In Rajasthan 67% of the women did not get ante natal care in 1992-93. Kerala, a prosperous State in India, however, depicts a different picture of nearly 100 % ante natal care. The reason attributed to this disparity is the literacy rate among women in these two States. Kerala has 100% female literacy whereas Rajasthan has 20% female literacy.

Table 2. The percentage of mothers who received various types of ante natal services in 1992-93.

State	Recd TT Dose	Received Iron/ Folic Acid Tablets	Home visit by CHW	Ante natal check-up by Doctor	Ante natal check up by others	Did not get ante natal check up
India	61.1	50.5	21.0	39.8	9.6	--
Rajasthan	34.7	29.3	11.5	15.6	7.9	67
Kerala	94.1	91.0	26.5	95.9	0.7	3

The data (Table 3) at the Bhorugram site show an increase in the ante natal coverage from 1992 to 1996. The Tetanus toxoid coverage is gradually increasing.

Table 3. Ante natal Registration & Tetanus Toxoid Vaccinations at Bhorugram

Year	Total Registration	Tetanus Toxoid I Dose	Tetanus Toxoid II Dose	Drop-outs (%) from I Dose
92-93	384	374	200	46.5%
93-94	590	590	343	48.6%
94-95	586	527	388	26.1%
95-96	705	586	296	49.4%

Discussion

In developing countries, 60 to 70% population lives in the villages, where the health care facilities are minimal. The health status of these masses living in the periphery is further compromised as nearly 40 to 45% of them live below the poverty line. They are not in a position to avail the secondary or tertiary care services because of their poverty status. The inequitable distribution of health resources is one of the greatest of problems in many developing countries where Maternal mortality continues to be an ongoing but neglected "epidemic"[16].

Health For All demands a broad-based approach to prevention with emphasis on the community rather than the hospital, on prevention for the majority rather than a cure for the few, on community involvement and participation rather than the creation of dependence on professional health personnel. It requires education of the people.

Community based interventions at global scale like Immunisation, Vitamin A therapy and Oral rehydration therapy have been extremely successful[17]. By the end of 1990 the global target of vaccination of 80 % was claimed to have been reached for all antigens, however, WHO acknowledges that these immunisation coverage rates can be deceptive[18]. Primary Care Informatics appears to be the only solution to resolve such differences.

Microcomputer Utopia may not be far away in developing countries, particularly in the Primary Health Centres. There is a tendency to believe that once the installation decision is taken the worst is over[19]. For most people generally the equation for implementation means hardware + software = success. However, in real life, the situation is totally different and the expanded equation is (Hardware + Software + Project management + Training) = Success. This research demonstrates a working model for implementation of Information systems at Primary Health centres.

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