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Management information system for leprosy eradication programme—an alternative information system*

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Summary For efficient monitoring of multidrug therapy programmes for leprosy both at microlevel (individual patient monitoring) as well as macrolevel (programme monitoring), DANIDA decided to develop an alternative, simple and quick information system using a computer. A patient data base system was designed using dBase III Plus package. The field workers of the National Leprosy Eradication Programme were trained in transcribing data on to coded data sheets. The data of 1750 patients of six leprosy control units from the 4 MDT districts were processed and feedback reports were sent to paramedical workers and programme managers. The initial experience in the field over the past year has shown that a computerized management information system is feasible and well accepted by the field staff for the purpose of improving monitoring.

Introduction

A population-based multidrug therapy programme for leprosy, the new technology available for containing the disease, needs to be closely monitored and assessed both operationally and epidemiologically if the programme is to be successful. Realizing this need, the National Leprosy Eradication Programme (NLEP) in India has recommended a highly sensitive monitoring system to ensure smooth and coordinated progress of planned MDT activities.[1] If a monitoring system is to be functionally effective, the data flow must be timely and relevant to each action level of the programme. In the MDT programme, a quick performance analysis of key activity areas is important, especially as a feedback to field workers (paramedical workers).

The current monitoring, through voluminous manually compiled data that pass upwards from the peripheral field workers through several levels of the NLEP hierarchy in the form of monthly progress reports (MPR) has definite limitations especially for individual patient monitoring. Recognizing this, the Independent Evaluation Committee of NLEP, Governing of India, 1987 recommended that the tendency to compile data only for onward transmission should be discouraged and assessment should be backed-up by complete and relevant feedback.[2]

The usefullness of computers at the field level in a limited way and in other health programmes has been reported.[3,4] However the application of this technology has not yet been tried in a routine leprosy programme though some experience has been reported from Malawi.[5] The OMSLEP group has designed a simple recording and reporting system for routine leprosy programmes which can be

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adapted to computerization.[6] However, reports of its effectiveness both at microlevel (individual patient monitoring) and at macrolevel (programme monitoring) are awaited. Hence, DANIDA (Danish International Development Agency) in its assistance to the NLEP–MDT Programme in India decided to develop a simple Computerized Management Information System (COMIS) and evaluate its potential in improving the efficiency of the MDT programme especially at field level. A pilot study was designed to examine: (a) the possibility of developing a field-based model for microlevel as well as macrolevel monitoring; (b) the feasibility of using a computerized system by field staff; and (c) the usefulness of a bottom-up monitoring system at peripheral level.

Methodology

The following steps were taken while designing this computerized information system as an action research programme using field staff of the leprosy programme:

Problem Oriented Medical Record System (POMRS): A basic file (patient card) as described by Lloyd was designed to obtain all the relevant information about the individual patient.[7] These cards were introduced in all the 4 MDT districts assisted by DANIDA.

2 Patient identification number (Figure 1). A patient is identified by a 14-digit identification number consisting of a 6-digit Indian Postal Pin Code (Leprosy Control Unit code), a 2-digit paramedical worker code, a 3-digit village code and a 3-digit patient code.

3 Coded data sheets I (basic information) and II (clinical information) were designed for transcribing patient data into numerical language for feeding into the computer. A coding structure was designed to assist field workers in filling up data sheet.

4 A DCM-Tandy 3000 PC/AT was installed at the Delhi office and dBase III Plus software was used to design a patient database system. A patient file structure was designed to enter all the basic and clinical data. Another file structure was designed to enter the code of the state, the district and the leprosy control unit, in order to generate computerized reports at different levels. A foxbase compiler was used to improve the efficiency of the programme.

5 Computerized reports. Six different kinds of computerized reports were designed for use as monthly progress reports to monitor achievements in relation to specific objectives of the MDT programme:

Report I (Figure 2) and Report II (Figure 3) were designed for subcentre paramedical worker (PMW) to monitor individual patients from a specific subcentre registered for MDT in each village. Report I gives details of all the patients registered during the month. Report II gives details of previously registered as well as newly registered patients during the month including their treatment status and compliance.

Report III (Figure 4) provides village with aggregated data from a subcentre indicating total size of problems like needs for footwear and surgical correction and reasons for treatment discontinuity.

Reports IV/V/VI (Figure 5) provides aggregated data at control unit level for a medical officer, at district level for a district leprosy officer and a state level for a state leprosy officer, respectively for programme monitoring.

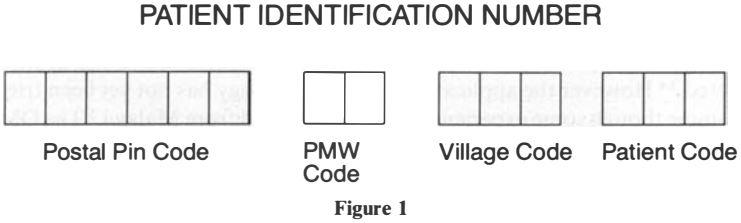

Figure 1

REPORT 1
MONTHLY PROGRESS REPORT FOR SUBSCENTRE PARAMEDICAL WORKER
(Leprosy Patients Registered during the month)

LCU NO:
PMW NO: MONTH: YEAR:

VILLAGE NAME	PATIENT NAME	M F	MB +ve -ve	PB	AGE >14 <14	DISABILITY I II III NO
Total						

Figure 2

REPORT II
MONTHLY PROGRESS REPORT FOR SUBCENTRE PARAMEDICAL WORKER
(Patients Registered Upto End of Reporting Month Since Beginning)

LCU NO:
PMW NO: MONTH: YEAR:

VILLAGE	PATIENT	M F	MB +ve -ve	PB	AGE >14 <14	URINE CHECK +ve -ve	TABLET COUNT C W	PULSE DATE	NO. OF DOSES COMPLE-TED
TOTAL									

Figure 3

REPORT III
MONTHLY PROGRESS REPORT FOR SUBCENTRE PARAMEDICAL WORKER

LCU NO.
PMW NO. UPTO:

VILLAGE NAME	MODE OF DETECTION* 0 1 2 3 4 5 6 7 8 9	FOOTWEAR NEED NOT KNOWN YES NO	SURGICAL NEED NOT KNOWN YES NO	ULCER NOT KNOWN YES NO	REHAB. NEED NOT KNOWN YES NO.	REASON FOR** DISCONTINUITY 0 1 2 3 4 9
Total						

* *00-Not known: 01-General Survey; 02-Contact Survey; 03-Target Survey; 04-Rapid Survey; 05-Voluntary Reporting; 06-Referal by PHC; 07-Referal by GP; 08-Referal by Target people; 09-Others.*

** *0-Not known; 2-Left Control area; 3-Died; 4-Complications due to therapy; 9-Others.*

Figure 4

*REPORT IV/V/VI
MONTHLY PROGRESS REPORT FOR
Medical Officer/District Leprosy Officer/State Leprosy Officer

LCU No./District No./State No.
PMW No: UPTO MONTH: YEAR:

Total No. of Patients (Old + New) MB: PB: Total:
Total No. Released from Treatment (RFT) MB: PB: Total:
Reasons for Discontinuity:
Unknown: By Default: Left Area: Died: Complications due to Therapy: Others
Total No. Completed Surveillance:
Physiotherapy Treatment Given: Yes: No: Not Available:
Footwear Needed: Yes: No: Not Available:
Footwear Provided: Yes: No: Not Available:
New Cases since Start of MDT till today
MB (Positive): MB (Negative): PB:
Age: >14: <14 Sex: Male: Female:
Disability: Grade I Grade II Grade III No Disability
No. of MB patients whose BI not given
No. of patients whose disability status not given:
Total No. of Disabled Cases (Old + New): No disability: Grade I: Grade II: Grade III Not available:
Mode of Detection:
General Survey: Contact Survey: Target Survey: Rapid Survey:
Voluntary Reporting:
Referral by PHC: Referral by General Practitioners: Referral by Target People:
Not Known: Others:

**IV-Medical Officer, V-District Leprosy Officer, VI-State Leprosy Officer*

Figure 5

IMPLEMENTATION IN THE FIELD

To test the feasibility and utility of this computerized system, 6 leprosy control units out of 31 from these 4 MDT districts were chosen and a selected number of staff were given training in the field for 3 days. The contents of the training were: transcribing data from patient cards on to data sheets, internal consistency checking, computer demonstration and use of computer reports for monitoring their work Table 1.

Observations and discussions

With this training, 20 paramedical workers transcribed the data of 1750 patients on to data sheets; the data were processed at Delhi and reports were sent back to the field workers as well as to the programme managers. Review meetings were held to determine the effectiveness of these computerized reports in identifying field problems, improving standards of patient care, generating reliable statistics and producing better programme monitoring at both unit and district level.

Table 1. Staff trained in the computerized monitoring system

District	Leprosy control unit	Paramedical worker	Nonmedical supervisor	Medical officer
Cuttack	Athagarh	6	4	1
Durg	Bhilai	6	2	1
	Durg	3	1	1
	Bemetara	2	1	—
Rajnandgaon	Rajnandgaon	1	1	1
Salem	Tiruchengode	2	2	1
	Total	20	11	5

Over the past year it was observed that: (1) a basic training of three days was sufficient for transcribing data with negligible errors; (2) a maximum of 5 minutes per patient was required to fill in data sheets I and II for the first time after the registration for treatment and subsequently a maximum of half a minute per patient was required to fill in data sheet II with monthly information such as attendance for pulse dose, reactions and complications if any; (3) computerized reports were found to be more useful for monitoring both at microlevel as well as macrolevel; (4) the field workers realized the need for reliable data collection; (5) the staff found that they saved the time previously spent preparing monthly progress reports manually; (6) Reports I, II and III could be used as registers, eg. known case register, treatment register and disability register; (7) the staff were more enthusiastic to adopt this alternative system as they were learning a new technology.

WORKLOAD ON PARAMEDICAL WORKERS (PMWS)

While implementing this system, it was considered as an additional workload on the field staff. Hence the estimated time required for one paramedical worker for his population of 20,000 with an estimated prevalence rate (P R) 10/1000 and incidence rate (I R) 1/1000 was worked out (Table 2). It was presumed that all the 200 patients were brought under MDT at one time. A worker will have to spend a maximum of 16 hours (3 working days) for the first time. Subsequently for both old and new patients, a maximum of 2 hours per month will be spent. With this, all the six reports are generated. No additional time is required to generate Reports IV, V and VI. The field workers and the programme managers at different levels will receive their respective monthly reports directly, quickly and with accurate, reliable and meaningful statistics. On the other hand, in the existing monitoring system, a full day is spent by a field worker preparing an MPR for his subcentre and 2 days are spent at control unit and district level preparing MPRs for a medical officer and a district leprosy officer respectively. In this system delays and inaccuracies are inevitable. These aggregated reports are not useful for individual patient monitoring.

Table 2. Workload on a Paramedical Worker

Transcribing data for the first time for 200 patients put on MDT (5 minutes/patient both Data sheets I and II)	16 hours — 3 working days
Updating 200 patient files (data sheet II) every month (1/2 minute/patient)	1·6 hours/month
New cases every month approximately 2 (Data Sheets I and II)	10 minutes/month

Table 3. Cost of district computerized monitoring system

Hardware/Software	Approximate expenditure (US$)
1 Computer (PC-XT), accessories and floppy discs	6296·0
2 Data sheets and stationaries etc. (5 years)	29700·0
3 Programme package	833·0
Total	36829·0

Thus our initial experience shows that a computerized monitoring system is feasible in a routine leprosy control programme and the field staff can use it for the purpose of improving monitoring. The system can, also, be used for developing a bottom-up monitoring system.

DISTRICT LEVEL COMPUTERIZATION

On a pilot basis, district data were processed at the DANIDA Office in Delhi. Approximately one week was required to receive the data by post and an equal time was required for the staff to receive the computerized reports. To overcome this time lag for despatching and possible loss of records or reports, it was decided to process data at the district level. Hence an approximate expenditure for establishing a district computerized monitoring system was worked out (Table 3).

The cost is worked out for a district with a population of 2 million and an estimated PR 10/1000 assuming that all 20,000 (MB 4000 and PB 16,000) patients are brought under MDT. The initial cost of establishing a computerized monitoring system is high but this expense is offset by the many advantages resulting from the installation of such a system.

Acknowledgments

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