OPEMS: Health System Method for Collecting and Displaying Information for Obstetric Patients.

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Abstract

Objectives: The main objective of the study was to develop and introduce an electronic data collection system for the monitoring and evaluation of obstetric patients. It was also to eliminate the use of too many different registers and solve the problems of omission and overcounting of data in our present data collection systems (medical records)

Materials and Methods: A pre-development survey of patients' information sources and records was undertaken in order to capture all the indicators of activities in the obstetric unit for the electronic worksheet. A total of 120 case-notes were evaluated for stationery content as to the types, availability and quantity, and 120 QCA with 120 obstetric data sheets for their completeness of extracted information. An adequacy score (AS) was developed to assess the case-notes.

Results: The unit case-note stationery were 71% ± 22.4% adequate for type, quantity and availability during the month of September and October 2001. However, only 22/120 (18.3%) of the case-notes had complete stationery items (AS: 100), 39/120 (32.5%) had 6 items (AS: 75), while 15/120 (12.6%) were less than 45% adequate (3 items or less). An illustration report generated with the obstetric patients' electronic monitoring system (OPEMS) from three tables and query in the database using the patients' hospital number as primary key is also presented.

Conclusion: The existing data collection systems using case-notes have poorly met our present day information need. Developing an electronic data collection system for monitoring patients in obstetric units is feasible in the developing world.

Key Words: Maternity Care Monitoring, Health Records, Stationery [Trop J Obstet Gynaecol, 2003, 20: 40-43]

Introduction

In contemporary obstetric practice, each health institution should set targets for strategic achievement in preventing maternal mortality and morbidity, monitor quality of care and present progress reports as visual displays or graphs. Gathering information and monitoring service is not a novel idea. Introducing an electronic obstetric patients worksheet however needs careful planning, consultation, clarification of definitions and criteria for clinical evaluation from the onset [1, 2, 3, 4].

There is a critical deficiency of health information management in most developing countries, and also deficient use of the information management systems donated by various international agencies such as the World Health Organisation (WHO) [5, 6]. Their calls for improved use and offer of technical assistance have met with limited success. Poor utilisation of available systems is due mainly to poor definition or clarification of goals [5, 6, 7]. Some of the difficulty may be attributed to poor input from local experts, poor consultation at the design stage and the weaknesses in the health systems, resulting in poor consumption. For example, the previous data collection system in our department was handled by one individual, was complicated by access denial, did not rely on computers and was used only as a research tool with doubtful impact on patient care.

The problem of duplicate counting and omission of data is real in the manual system [2], therefore the authors genuinely seek to develop an electronic system-OPEMS (obstetric patients' electronic monitoring system) that delivers a lot more than just patients records, a system providing easy-to-use desktop tools made readily available for the use of residents, consultants, academic staff and teaching hospital administrators for the purpose of generating reports for patient management, the unit's business and for research. The patients' data needed could be obtained instantly, eliminating the need to search through stacks of case-notes (a paper free world?).

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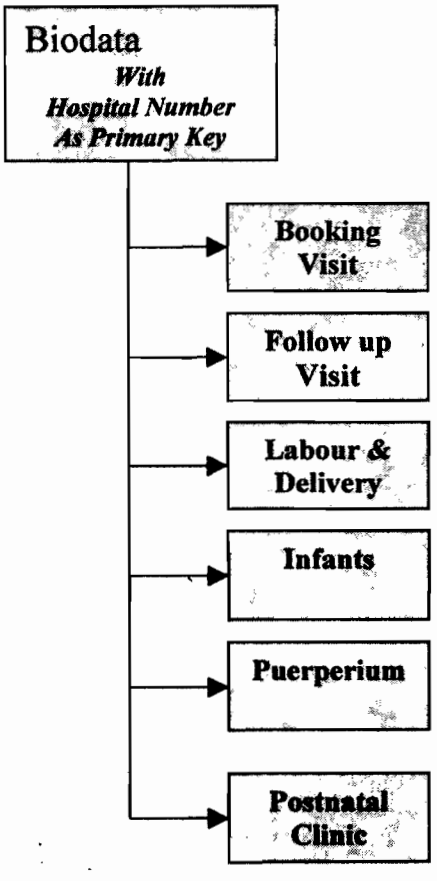
Materials and Methods

Predevelopment Study for the Database

In order to capture all the indicators of the obstetrics unit activities for the electronic worksheet a pilot survey of all the sources of patients' information and records was conducted. 120 case notes were evaluated for stationary content as to the types, availability and the quantity, 120 QCA sheets and 120 obstetric data sheets for the completeness of extracted information. An adequacy score was developed to assess the case notes. The indicators selected were 7 items of record keeping for gynaecology and 8 for obstetrics case notes. The selected record items were In-patients sheets, Operation sheet, Recovery chart, Temperature chart, Treatment chart, Fluid chart, Observation chart and Partograph only for the obstetric patients' case notes. A score of 1 or 0 is given when these sheets are available in the case note. Each case note scores a maximum of 7 or 8 depending on the type of patients' records (gynaecology or obstetrics) that is being evaluated.

Figure 1

Representative Database Tables Created and Linked with Hospital Number as the Primary Key



Creating the Database

The current obstetric data sheet and QCA, admission record were used as templates for the development of the information management system. The database is written in Visual basic 6 for Epi Info 2000 or Microsoft Access and covers all aspect of patients care (Figure 1) from the first booking visit to postnatal clinic visit, using the hospital numbers of patients as the primary key to link all the tables. All section of the database is modular in design and follow similar graphical interface, which makes the users task easy and quick.

The first 1000 consecutive deliveries of the year 2000 were coded and the system tried out and debugged. The system was used to generate various reports and reconstruct virtually all aspect of missing records from the case notes or reconstruct an entire case file instantly and concisely

System Requirements:

A desktop PC or a Laptop with 32 Mb memory, hard disk space 50 Mb or more and a Pentium processor with 150 Mhz speed or higher is require for use. A secondary storage device is desirable for possible system crash and data backup /recovery facility.

Results

The study revealed that the stationery in case-notes used in the unit were 71.0 % ± 22.4 (SD) adequate as for the right items, quantity and availability during the period of study. Table 1 shows the availability of the stationary item selected during the month of September and October 2001.

Table 1

Availability of the Appropriate Stationery Item in the Case Notes

Stationery Item	Number (%)
Inpatient Notes	116(96.7)
Temperature Chart	111 (92.5)
Drug Chart	106(88.3)
Observation Chart	102(85.0)
Fluid Chart	75 (62.5)
Partograph (n = 60)	33(55.0)
Operation Notes	51 (42.5)
Recovery Sheet	45 (37.5)

The stationery item most available during this period was *Inpatients Notes* (96.67%), followed by *Temperature Chart* and *Drug Chart* with frequency distributions of 92.5% and 88.3% respectively. The stationery item *Partograph* was available in 3 3/60 (55%) of the case-notes. *Postoperative Recovery Sheet* and *Operation Notes* were the least available during this study period. These were available only in 37.5% and 42.5% of the case-notes respectively.

Table 2

Adequacy Score of the Completeness of Stationery Items in the Case Notes

Adequacy Score (Number of Stationery Items)	Number (%)
15 (1)	5 (4.2)
30 (2)	5 (4.2)
45 (3)	5 (4.2)
60 (4)	17 (14.2)
75 (5)	27 (22.5)
90 (6)	39 (32.5)
100 (7 or more)	22 (18.3)
Total	**120 (100)**

Table 2 shows the evaluation of each case note for completeness of the stationary items. Only 22/120 (18.3%) case notes had all the stationary items with an adequacy score of 100, while 39/120 (32.5%) of the case notes had 6 items (Adequacy score of 75) and 15/120 (12.6%) case notes were less than 45 % adequate (3 items or less).

Table 3 is an illustration report generated with OPEMS from the tables and query in the database using patients' hospital number as the primary key. The information in table 3 was extracted from three tables, the biosocial data, delivery and infants' tables by writing a simple query to the database.

Discussion

During the pre-development study, the information on the case notes studied showed that stationery items were purchased but were inappropriately used. For example, nearly all the stationery items were available during the study period but not all the case notes were adequately stocked. This is reflected by the study finding that only 18.3% of the case notes had an adequacy score of 100. Some case notes had only one or two stationery items in them. Severe shortage of essential stationary for recording information at ward level, affects data collection immensely.

Table 3

OPEMS-Generated Report from Three Tables Using the Hospital Number as Primary Key

Hospital Number	*Delivery ID*	*Maternal Age*	*Booking Status*	*Delivery Mode*	*Sex*	*Birth Weight (Kg)*	*APGAR Score at 1 Minute*
318082	1	25	Yes	SVD	F	3.30	8
313990	2	31	Yes	SVD	F	3.00	7
320960	3	30	Yes	SVD	M	3.50	8
320949	4	26	No	Forceps	F	2.00	5
317793	5	24	Yes	ABD	M	3.10	8
318625	6	30	Yes	CS	M	2.90	7
320041	7	32	Yes	CS	M	3.70	6
315563	8	29	Yes	SVD	M	3.00	7
321361	9	25	No	CS	F	1.55	5
313470	10	32	Yes	CS	M	4.70	6
299036	11	25	Yes	CS	M	2.65	5

Some of the available stationery items were also inappropriately used. Operation notes were available in 37.5% of case notes, yet some case notes had more than five copies being used as inpatients notes. Also, the observation charts were used improperly for recording patients' progress and drugs served. Only the temperature chart was readily available and not extensively abused. It takes a very dedicated audit assistant to get 100% data extraction into data collection forms under such circumstances. The net result of not using the right stationery item was that information extraction was both difficult, confusing and incomplete; hence duplications and omission were frequently encountered in the QCA and obstetric data sheets used as template for the development of OPEMS.

A major observation during the study period was the issue of temporary case notes, which most of the time had poor stationery content and very little information required for patient management or clinical research. These case notes are issued from the medical records department to patients when there is difficulty in retrieving the original records. The OPEMS information management system will remove this difficulty.

Amongst present day service providers, there is the widespread belief that the health information needs of an institution can be predetermined by a professional systems developer or by a computer programmer. In reality it should be a collaborative venture. Developing the electronic data sheet raised a number of technical issues, for example the recording system should be able to distinguish between the number of women delivered and the number of babies actually delivered in the unit. This problem arises when mothers are admitted as emergency or referred with the babies either not referred at the same time or having been stillborn. The electronic information is strategic to improve the management of health unit resources and to build the capacity of the head of department, the hospital management advisory committee and members of the academic staff. OPEMS as an organized method for collecting, recording, processing and disseminating relevant information will help management to make informed decisions.

Any system is as good as its users make it to be. To gain support and motivation for the project, all consultants were actively involved at the initial stages of planning, with the resident doctors being most involved in the data collection and analysis. The programme was developed to serve varying level of information needs of the health service practitioners at various levels of responsibility [5]. OPEMS is written with the existing software, which makes it easy to use and teach. The software Epi Info 2000 is available and downloadable free from the Internet and it comes with strong technical support [3]. Table 3 is a sample of the numerous reports that can be generated effortlessly by writing a simple query into the programme. This information could then be filtered and subjected to any statistical analysis.

The existing data collection systems based on poorly stocked case notes have poorly met our clinical service and research information needs. Developing an electronic data collection system for monitoring patients in obstetric units is feasible but needs diligent planning and commitment from the supervisor and service provider from the onset.

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