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Implementation of a new birth record in three hospitals in Jordan: a study of health system improvement.

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system improvement

Abstract

This study tested the introduction of a new integrated clinical record in Jordan where currently no clinical report links antenatal, birth and postnatal care for women. As a result no continuity of information is provided to clinicians nor are there national statistics on trends, or performance of hospitals around birth. Our study was conducted in the Jordanian Ministry of Health, the maternity wards and registration departments of three hospitals in Jordan and in the Maternal Child Health Centres located near these hospitals. We used an exploratory, descriptive design and practice-research engagement to investigate and report on the process of change to improve and implement the new birth record. Engaging practitioners in research achieved system reform as clinicians improved their quality of reporting, managers developed more effective hospital performance and policy makers were provided with the basis to establish a national maternity data monitoring system. Quantitative and qualitative audit data demonstrated improved clinical reporting, organisational development and sustained commitment to the new record from clinicians, managers and policy leaders.

Keywords **maternal health services, practice-research engagement, quality assurance, health care quality.**

Introduction

Efforts to develop a Perinatal National Minimum Data Set have been undertaken in many countries, led by the World Health Organisation (World Health Organization 2004). The aim of such data collections is to improve the health of mothers and babies by monitoring perinatal health, as well as providing ongoing information to service providers and policy makers about trends and patterns in the health status of mothers and babies. Although perinatal surveillance systems are feasible in developed countries they have still not been implemented widely (Beck et al 2003; Laws and Sullivan 2004). Often where elements of such record systems exist they are described as fragmented, incompatible, uncoordinated and not comprehensive and a concerted effort is needed to enable regular monitoring of maternal morbidity and mortality (AbouZahr and Wardlaw 2001). Researchers have stressed that practice could be adversely affected by inaccurate clinical information and that there is an urgent need for the development of standard data-collection tools for collection of high-quality data (M'kumbuzi et al 2004; Wyatt and Wright 1998).

Jordan is geographically small and classified as a developing country with a population of 5.5 million people (World Health Organization 2001). The birth rate is 29/1000 and the fertility rate is high at 3.7 (Department of Statistics 2004). In Jordan 27 Ministry of Health hospitals provide birth services with nearby Maternal Child Health Centres providing antenatal and postnatal care. The record keeping system in these hospitals and Maternal Child Health Centres is controlled nationally resulting in two separately located information systems. Pregnant women's antenatal and postnatal records are held in the community at the Maternal Child Health Centres while labour and birth records are in the hospital. There is no system linking the antenatal, birth and postnatal record to provide

continuity of information to clinicians, national statistics on trends, or performance of hospitals around birth.

Under-reporting of maternal and infant mortality and morbidity is likely, due to difficulties in collection and aggregation of data. Available data are usually based on 'snap shot' research or surveys which are costly to conduct (Nsheiwat and Al-Khalidi 1997; Shihadeh and Al-Najdawi 2001), while large-scale demographic and reproductive health surveys, are carried out intermittently (Jordan Population and Family Health Survey 1997, 2002). Our baseline study, confirmed that recording of birth data collected in hospital records was of poor quality, recorded in 18 different places in the hospital record and that insufficient hospital data were returned to the community to inform postnatal care. There were other concerns including duplication of data that was time consuming for the recorder with frequent gaps in information, retrospective completion of records and clinicians often not reporting on their own care. In addition, pregnant women had no access to their own records and there was no peer review of performance in the health team. Since data were not used for analysis or planning there were no opportunities to 'benchmark' performance individually by clinicians or by the hospital against other hospitals or with international evidence or standards (Khresheh 2006). No published studies or reports are available in Jordan describing professional practice during labour that could be linked to morbidity outcomes and efforts have been made through research, rather than routine data collections, to explore the causes of mortality (Khoury and Masaad 2002; Nsheiwat and Al-Khalidi 1997). However, a National Information System now being introduced provides an opportunity to combine an 'on line' clinical data entry system with one that can report trends in the safety and quality of birthing services through aggregation of clinical data (National Information Centre 2001).

The study reported here aimed to investigate the feasibility and outcomes of introducing a new birth record shared between hospital and community. The new record, the Jordanian Consolidated Birth Record (JCBR), is based on the NSW Perinatal Data Collection Form (NSW Department of Health 2004) which is part of the Australian perinatal data collection system of national reporting and benchmarking (Laws and Sullivan 2004). It was modified by Jordanian experts to meet Jordanian needs.

Our research objectives were to improve the quality of the clinical reporting system, to enhance organisational development through teamwork around data collection and to improve the quality of care by linking community and hospital antenatal, birth and postnatal records. Ultimately we aimed to establish if the JCBR could be the basis of a national maternity data system that would monitor and benchmark maternity care services in Jordan. The results are reported against these objectives.

Methods:

Design

The study, begun in January 2004 and completed in October 2005, used an exploratory, descriptive design and an action research approach; Practice-Research Engagement. The practice-research engagement process allows investigation of a quality improvement process based on supporting change management (Brown 2001). The study drew on a combination of quantitative and qualitative data to compare baseline data with implementation data produced from the new record.

Setting

The study was conducted in three Ministry of Health hospitals (A, B, and C) purposively selected by the Ministry in different regions of Jordan. Two hospitals are peripheral hospitals and one is a tertiary centre. These hospitals provide birthing services for approximately 14,530 women annually (Department of Statistics 2001). The Ministry of Health in Jordan and the Ethics Committee of the University of Technology, Sydney, approved the study. De-identified hospital data were used for the record audit and all participants in the action research study formally consented to participate.

Data collection and analysis

The study consisted of three standardised record audits, pre-implementation baseline data, immediate post-implementation and seven months post-implementation data. Qualitative data that describes and explains the change process were collected in each setting from managers, clinicians and medical records staff using focus groups and interviews and standardised questions. Field notes were also kept.

A training program was conducted in each hospital to prepare health professionals to use the JCBR. This was also an important part of the action research methodology as sharing information from the outset, especially the baseline data which confirmed the nature of the problem, was helpful in motivating participants to work together to improve their record keeping. Clinicians were also encouraged to complete the JCBR contemporaneously, rather than retrospectively. The items collected in the new record have been identified in Table1. The first record audit included 180 records, 60 from each hospital, randomly selected from women who gave birth in 2003. This was compared with results of a second audit post-implementation (n= 1,254) that aimed to sample all women who gave birth during two-months use of the new record. A third audit of 42

records, randomly selected from women who gave birth seven months after implementation, assessed the sustainability of the effect of the new record on the quality of reporting and recording of data about mothers and babies. Quantitative data were collected for record audits and analysed using excel spreadsheets and frequency tabulation.

Nine interviews and three focus groups were undertaken before the implementation of the JCBR with 36 people who played key roles at different levels of the health system. This established their opinions of the record. A second round of interviews and focus groups was undertaken immediately after the implementation of the JCBR with clinicians and medical record staff (n= 40), with mothers (n=15) who received their own copy of the JCBR and with Maternal Child Health Centre staff who provided antenatal and postnatal care (n=21). A third round of interviews with hospital staff (n= 23) occurred concurrently with the seven months post-implementation audit. Questions explored how the JCBR affected the reporting and recording of data and how staff used the data subsequently. Audio-recorded data from interviews and focus groups were transcribed in Arabic and content analysis was used to identify repetitive themes. Field notes recorded general observations made during visits to hospitals, clinics or during appointments and were updated daily. Field notes were also analysed for themes, quotes and observations and have been extracted to exemplify findings reported here.

The field researcher, Khresheh, who is Jordanian and a clinician, worked alongside staff during the implementation in each hospital. During random weekly checks at each hospital the accuracy of data being recorded in the JCBR was assessed enabling us to see if records had been fully completed and if not the type and number of incomplete items,

the accuracy of these records compared with the notes in the medical records and the differential participation rates of groups of staff. These visits also maintained, or built, the commitment of the participating health professionals as part of the practice-research engagement process as the researcher and participants worked together to analyse and improve results.

Results

Quality of clinical records

In pre-implementation audit data up to 50% of the records were inadequately completed with important clinical information unrecorded. It was also difficult to find this information since records were duplicated and recorded in 18 different places and by up to four different care-providers. In contrast, post-implementation data showed that, although completion rates of the JCBR continued to improve over time, even at the beginning of implementation, quality and completeness were better. By the end of the implementation period more than 75% of records were fully completed. Hospital A had the best results with more than 78% of the record items completed at the end of implementation, followed by Hospital B then Hospital C. Overall percentages of improvement on a sample of data are shown in Figure 1.

The quality and completeness of the recording of important clinical information such as Apgar scores, gestational age, admission to NICU and discharge status improved. Additional data which had not been sufficiently well recorded previously, or were absent from the mother's medical records were now being collected. This included socio-economic status of the mother; type of last delivery; information on the current pregnancy, for example the date of the first visit to the antenatal clinic and smoking

status; complications after delivery; information about breast-feeding initiation and advice for the mother about postnatal care. Now all this data could be found in one place in the record. Results from the third record audit showed sustained improvement in the completeness rate and the quality of data recorded in the women's medical record (Figure 2).

Qualitative post-implementation data also showed that the JCBR was considered to be useful and valuable for hospital staff, mothers and Maternal Child Health Centre staff. Hospital staff wanted the JCBR to continue because documentation was easy to complete, saved time and effort, and provided valuable, accessible data assisting their clinical decision-making. For example one obstetrician said, 'the information on the baby after delivery is very important. I don't know why we didn't record these data before.'

Discussion

Organisational performance

The action research and practice-research engagement process was designed to engage staff in a quality improvement process. Initially we found there was a relatively low commitment by staff to the new system in all departments in each hospital, although commitment by midwives was generally higher than doctors. Registration workers were less committed in two of the three hospitals. However, commitment and enthusiasm for change gradually improved over time for all groups of health professionals (Figure 3).

The use of JCBR increased the health professionals' sense of responsibility toward the care they provided, respect for others in the team and the accuracy of data they recorded in the mother's records. As a midwife said, 'everyone had to write and record and sign

off the exact care provided to woman so the next care-provider could continue with the suitable care.’

The managers of the hospitals and clinical directors supported both staff and the field researcher and contributed to the positive affect the JCBR had on promoting teamwork and enhancing relationships among health team members. For example, a midwife commented, ‘it was team work; we all participated in completing the JCBR.’ While a doctor said, ‘when I was not sure of something recorded in the JCBR usually I went back to the responsible care-provider for more clarification.’ The JCBR also improved the health professionals’ record-keeping habits including the timely and accurate completion of the important clinical data record and recording of new clinical data unrecorded previously. The accessibility of data from the JCBR also encouraged some of the health professionals to review their practices for the first time motivating them to question the current situation. One resident doctor demonstrated the enhanced clinical leadership and accountability when he stated, ‘at first I found this new record unnecessary, but with time I valued its importance, we noticed that the majority of mothers have low haemoglobin.’

The implementation phase of the research was completed in two months. During this time staff undertook a double load as they completed their routine documentation as well as the JCBR. Staff from all three hospitals have continued using the JCBR and are still collecting the statistical summary copies of the new record and sending them to the researcher for analysis.

Creating links between services

Health professionals in the Maternal Child Health Centres were highly motivated to link community and hospital records. They were aware that information about the course of labour, details of birth and health of the baby influences the quality of postnatal care. For example, one obstetrician said, ‘these information systems are of no benefit if they stay like this, without connection. We need complete information if we want to make real improvement.’ In interviews and focus groups staff suggested that client-held records would facilitate integration and that a simple computerised system based on three hard copies of the antenatal record, birth and postnatal record would be feasible. The immediate post-implementation and longer term evaluations, record audits and interviews confirmed the potential of developing a sustainable national hospital-based perinatal information system using the new record and connecting all hospitals and nearby Maternal Child Health Centres. There is national commitment in Jordan to achieve these links.

National system improvement

The study confirms that clinical information and health information systems can be used for purposes that extend beyond individual patient care to include quality review and improvement processes. Results also indicate that this information can assist with allocation of resources, budgetary and long-term planning and productivity measurement (Slagle 1999; World Health Organization 2004).

The process of quality improvement in clinical practice and health system development is complex and challenging. Quality improvement should focus on areas of real importance, the organisation should have capable leadership and be prepared to change, and the external environment should encourage change (Shortell, Bennett et al 1998). In this

study, action research, which emphasises practice-research engagement and is based on theories of change management (Brown 2001), was successful in introducing and managing the change identified by the researcher-practitioner team, as well as investigating this process and its outcomes.

Effective leadership is necessary to manage improvement in clinical practice settings. This leadership involves influencing others to contribute to positive outcomes (Redelmeier and Cialdini 2002). Leadership qualities such as honesty, trust, fairness, integrity and respect are necessary for effective researcher interaction with practitioners (Buonocore 2004). In this study, the field researcher aspired to these leadership characteristics as she helped to stimulate an increased sense of pride in the practitioners work, facilitated their contribution to the research and quality improvement process and worked hard at communicating with and motivating staff. Health workers demonstrated increased professionalism while managers and clinical directors were supportive in creating a simple change that enhanced the working environment in a way that appears to be sustained.

As well as solving the immediate practical clinical record problems a significant outcome was that the research process helped initiate, develop and maintain new opportunities for professional dialogue as doctors, nurses and midwives worked towards the common goal of improving health care for mothers and babies. This process helped in building a team in a hierarchal environment where professionals were not used to this mode of operating. Practitioners were given the opportunity to work in new ways with medical record workers, nurses and midwives who are usually low status within the system. Obstetricians, at first somewhat sceptical, ultimately responded positively also finding

teamwork produced better results for their work. Providing women with their own copy of their clinical record facilitated their communication with health professionals. As one resident doctor in a Maternal Child Health Centre reported, ‘mothers who have the JCBR with them were more informed than those who don’t have a record, which makes it easy to communicate with them.’

Proper staff preparation was important and is necessary in any major quality improvement process (USAID 1999). During training health professionals were educated about the purpose of the study and became committed to the new record. This enabled them to maintain a sense of control, built further support during implementation, and also minimized resistance to change (Henry 1997; Moody et al 2001). Commitment of staff to the process of implementation varied across hospitals and among the health professionals themselves. From the beginning Hospital A showed the highest commitment of staff while Hospitals B and C began with less commitment but improved over time. It was likely that the relationship between the researcher and the hospital staff contributed, as the researcher was already known to colleagues in Hospital A at the beginning of the study, and she was able to spend more time in the field there because of its close location to her home. Despite this hospitals B and C also showed significant and sustained improvement.

Midwives and registration workers were more committed to recording quality information and improving processes than doctors. They may have accepted the nurse researcher leadership more readily than the doctors, but this may also be explained by cultural issues that include the reluctance to accept female leadership by males in some Arab countries. Overall, because of the strategy and effort of building strong researcher-

practitioner relationships, the commitment of all staff improved over this time, including that of male doctors.

The JCBR helped improve the accuracy of data recorded by health professionals with data now recorded once only by the person providing care who signed this off with less risk of transcription errors. The increased accuracy of data in the JCBR may also be explained by the increased accountability of health professionals toward their data. Important data that were previously not collected such as Apgar scores at birth were now available, were able to be aggregated and could be used for a national reporting system.

Follow-up visits by Khresheh to the field were a necessary part of the improvement. Similar to other improvement studies, interaction with practitioners in the field helped identify problems and plan and initiate solutions during the implementation period (Brydon-Miller and Greenwood 2003; Nolan and Grant 1993; Webb 1990). The reciprocal process, in which the researcher and practitioners informed each other, established new knowledge and effective problem solving actions. In turn this appeared to result from the efforts made by the field researcher to develop collaborative relationships with practitioners in the field, build motivation and provide practical support. Also it was dependent on local and national leaders who helped manage and lead this project. The frequent meetings and informal discussions with clinicians, especially doctors, were strategies the researcher used to manage change during field visits that built good researcher-practitioners' relationships.

Conclusion

Our study showed that identifying a shared goal and engaging practitioners and researchers in practical activity to achieve this goal can bring about sustained clinical improvement. Clinicians were recording better quality more useful data collected with increased professionalism following the study. The health professionals were using aggregated information to evaluate their performance and the hospitals could use the data in planning for improvements. The policy makers who created the environment for the research are committed to apply the results nationally and are working towards consolidating data into electronic records which can be automatically analysed which provides the capacity to monitor the national maternity system.

References

- AbouZahr C, Wardlaw T. 2001, 'Maternal mortality at the end of the decade: signs of progress?' *Bulletin of the World Health Organization*, vol. **79**, no. 6, pp. 561-73.
- Beck LF Johnson CH, Morrow, B. 2003, *PRAMS 1999 Surveillance Report: Pregnancy Risk Assessment Monitoring System*, Atlanta,GA.
- Brown LD. 2001, *Practice- Research Engagement and Civil Society In a Globalizing World*, The Houser Center for Non-profit Organizations, Washington, DC.
- Brydon-Miller M, Greenwood D. 2003, 'Why action research?' *Action Research*, vol. **1**, no. 1, pp. 9-27.
- Buonocore D. 2004, 'Leadership in action: creating a change in practice', *AACN Clinical issues*, vol. **15**, no. 2, pp. 170-81.
- Department of Statistics. 2001, *Statistical Yearbook: Number of Births by Hospitals*, Ministry of Health, Amman.
- 2004, *Jordan in Figures 2003*, 6th edn. Department of Statistics, Amman.
- Henry P. 1997, 'Overcoming resistance to organisational change', *American Dietetic Association*, pp. S1 45- S17.
- Jordan Population and Family Health Survey. 1997, *Demographic and Health Surveys, 1997*, Jordan Department of Statistics, Macro International.
- 2002, *Demographic and Health Surveys, 2002*, Department of Statistics, Jordan.
- Khouri S, Masaad D. 2002, 'Causes of Infant Mortality in Jordan', *Saudi Medical Journal*, vol. **23**, no. 4, pp. 432-5.

- Khresheh, R. 2006, 'Investigating the feasibility of introducing a consolidated birth record: the first step in an information system that identifies outcomes and enables improvement', PhD thesis, University of Technology, Sydney.
- Laws PJ, Sullivan EA. 2004, *Australia's mothers and babies 2001*, PER 25., AIHW Cat:Sydney.
- M'kumbuzi VRP, Amosun SL, Stewart AV. 2004, 'Retrieving physiotherapy patient records in selected health care facilities in South Africa- is record keeping compromised?' *Disability and Rehabilitation*, vol. **26**, no. 18, pp. 1110-6.
- Moody G, Choong Y, Greenwood D. 2001, 'An action research approach to the development of a clinical pathway for women requiring Caesarean sections', *Contemporary Nurse*, vol. **11**, no. 2-3, pp. 195-205.
- National Information Centre. 2001, *Information Age Policies and Strategies*, Amman, Jordan.
- Nolan M, Grant G. 1993, 'Action Research and quality of care: a mechanism for agreeing basic values as a precursor to change', *Journal of Advanced Nursing*, vol. **18**, pp. 305- 11.
- Nsheiwat M, Al-Khalidi Z. 1997, *Maternal Mortality Study in Jordan's Health Status: Findings from the Epidemiological Studies and Strategies for Future Surveillance System*, Ministry of Health and Health Care, Amman, Jordan.
- NSW Department of Health. 2004, *New South Wales Mothers and Babies 2003*.
Centre for Epidemiology and Research. NSW Public Health Bulletin.
- Redelmeier DA, Cialdini RB. 2002, 'Problems for clinical judgment: 5. Principles of influence in medical practice', *Canadian Medical Association Journal*, vol. **166**, no. 13, pp. 1680-4.

- Shihadeh A, Al-Najdawi W. 2001, 'Forceps or Vacuum extraction: a comparison of maternal and neonatal morbidity.' *Eastern Mediterranean Health Journal*, vol. **7**, no. 1-2, pp. 106-14.
- Shortell SM, Bennett CL, Byck GR. 1998, 'Assessing the impact of continuous quality improvement on clinical practice: what it will take to accelerate progress.' *Milbank Quarterly*, vol. **76**, pp. 593-624.
- Slagle TA. 1999, 'Perinatal Information Systems for Quality Improvement: Vision for Today', *PEDIATRICS*, vol. **103**, no. 1, pp. 266-76.
- USAID. 1999, *The Comprehensive Postpartum Project, Jordan*, Amman.
- Webb, C. 1990, 'Partners in Research', *Nursing Times*, vol. 82, no. 32, pp. 40-4.
- World Health Organization. 2001, *Country Profiles, Jordan*, viewed 2 March 2006 2003, <<http://www.who.int/countries/jor/en/>>.
- 2004, *Developing Health Management Information Systems.*, World Health Organization, Manila, Philippines.
- Wyatt JC, Wright P. 1998, 'Design should help use of patient's data', *Lancet*, vol. **352**, pp. 1375-8.

Table 1: Items collected in the new record (JCBR)

Demographic: Record number, national number, hospital name, woman's full name, age, address, date of admission, nationality, occupation for woman and husband, and health insurance.
Maternal health: Number of previous pregnancies, live births and abortions. Type of last delivery and number of previous caesarean sections.
Pregnancy: Date of last menstrual period, antenatal care, medical conditions, smoking status
Labour and delivery: Onset of labour, pain relief or anaesthetics, presentation at birth, type of delivery, perineal status, surgical repair of vagina or perineum, immediate post natal complications.
Baby: Place of birth, date of birth, sex, plurality, birthweight, estimated gestational age, Apgar scores, resuscitation of baby, breast feeding initiation, birth defect, admission to NICU.
Discharge notes: final diagnosis, mother discharge status, baby discharge status, date of discharge for mother and baby, laboratory results for mother, physician treatment and advice.

Figure 1: Improvement of a sample of data (%) on baby after delivery, before (Audit 1 n=180) and after the implementation of the JCBR (Audit 2 n=1254) in the three hospitals.

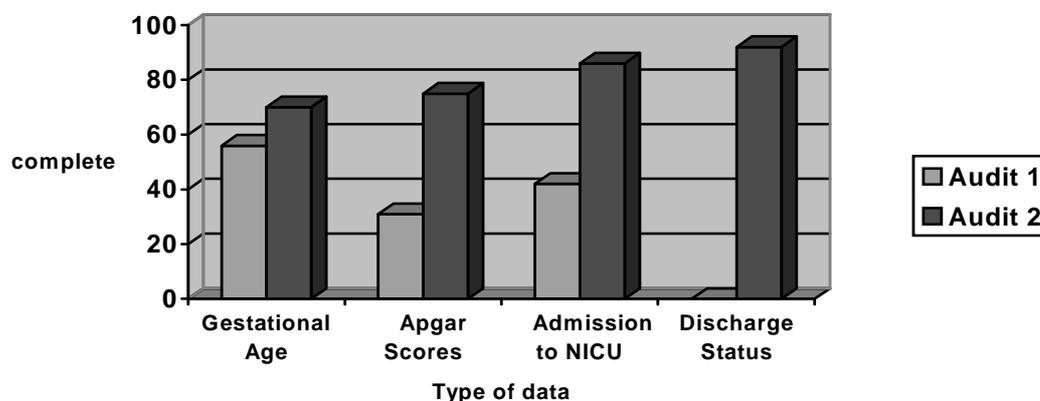


Figure 2: Improvements in a sample of clinical data (%) before (Audit 1 n=180) and seven- month after the implementation of the JCBR (Audit 3 n=42) in the three hospitals.

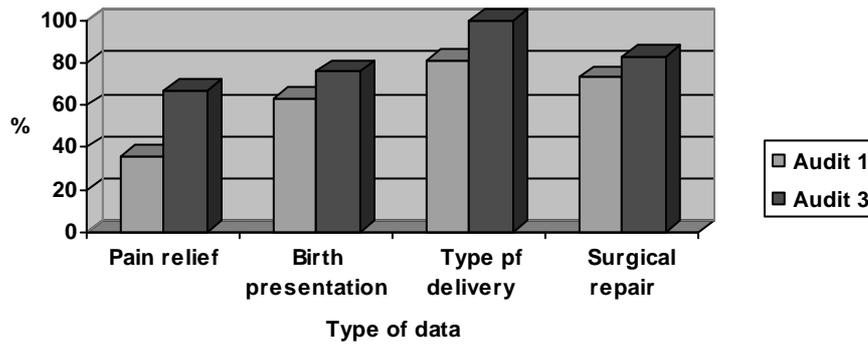


Figure 3: Improvement of staff commitment toward the implementation of the JCBR over two months

