7. Action research

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Action research is one form of emancipatory research. It has a long tradition in community and organizational development work, for example, including work that adopts a systems thinking approach (for example, Luckett & Grossenbacher, 2003). It is also increasingly being used in quality improvement work in low- and middle-income countries (see for example, work supported by the Institute for Health Improvement http://www.ihi.org/IHI/Programs/StrategicInitiatives/DevelopingCountries.htm) and in health policy and systems-related work with communities – such as the work on governance issues supported by the Regional Network on Equity in Health in Southern and Eastern Africa (Loewenson et al., 2010). However, there are still relatively few published action research studies.

Action research is an overarching approach to research. “Essentially action research is concerned with generating knowledge about a social system, while, at the same time, attempting to change it” (Meyer, 2001:173). Sometimes the researchers are those whose practices and actions are the subject of inquiry; sometimes external researchers can support participants to examine their practices and experiences, and also act as facilitators to support the introduction of new practices or interventions. Such research is always flexible in character and responsive to participants’ changing needs as findings are repeatedly fed back to them, reflected on and, perhaps, acted on. Action research studies always involve multiple methods, but are mainly qualitative in nature and are often written up as case studies.

Rigour in action research

Given the features of action research and the active role of the researcher in the process, the three key approaches to ensuring rigour, particularly addressing the possibility of researcher bias (Meyer, 2001), are:

- triangulation across data sources and rich contextualization of experience
- researcher reflexivity
- member checking, that is the feedback of findings to participants for their review and reflection.

References


Overview of selected papers

Two papers were chosen for this section as they together illuminate the approach of action research, based on the same study.

Khresheh & Barclay (2008) report on the findings of their action research study supporting the implementation of a new birth record system in three Jordanian hospitals. Subsequently, they report their reflections on their experience in conducting this study (Khresheh & Barclay, 2007).

References for selected papers


This article describes the practice–research engagement (PRE) that occurred during an action research project conducted in three hospitals in Jordan. The project aimed to develop and test the feasibility of an improved clinical record-keeping system. This article focuses on how relationships were built and evolved over time with national and local leaders and practitioners to facilitate the study, and how this led to a process of health system improvement. The article draws on outcomes and analyses from data collected in field notes, recorded interviews and focus groups. Results showed that the PRE approach assisted people to change as they undertook a process of clinical improvement and health systems development.
Background

This article describes the details of the practitioner–researcher engagement process, undertaken by the first author and field researcher (Khresheh), to implement a shared, consolidated clinical record (the Jordanian Consolidated Birth Record [JCBR]) within three hospitals in Jordan. We took a pragmatic quality-improvement approach to the research. In the article we describe how practice–research engagement was employed within a number of action research cycles to contribute to health service improvement. The JCBR was tested in three different hospitals in Jordan with the new record being completed by staff in addition to the normal records for the duration of the study. In particular, we analyse the importance and complexity of engaging project participants and building relationships, which deepened as staff and researcher worked together towards the ultimate success of the project. Himmelman's (2001) framework is used to analyse the researcher-managed process of engagement. Change processes within action research cycles (Brown, 2001) were undertaken jointly by the field researcher and practitioners to achieve mutual goals around practical system improvement (Batliwala, 2003; Brown, Bammer, Batliwala & Kunreuther, 2003; Reason & McArdle, 2006).

Problem identification and need for change

Jordan is a small developing country, located in the Middle East. The Jordanian population is approximately 5.5 million with a birth rate of 29/1000, a death rate of 5/1000 and a fertility rate of 3.7 (Department of Statistics, 2004). The Maternal Mortality Rate (MMR) in Jordan is 41/100,000 live births with 82 percent of these identified as being preventable (Nsheiwat & Al-Khalidi, 1997). Preliminary research suggested improvements could be made in maternal and child health data systems. Initial field visits to Jordan by both authors and their meetings with key stakeholders in the Ministry of Health in October 2003 confirmed the need to improve maternity care records and to develop ways of monitoring performance.

The research reported in this article was part of a larger study aimed at testing the introduction of a new clinical record in Jordan. This was designed to inform planning, and demonstrate accountability from the local level to a national system of monitoring perinatal mortality and morbidity, as well as improve clinical outcomes and organizational efficiency. The study was conceived and planned by both authors in conjunction with Jordanian health leaders, with the field research carried out by the first author who is a Jordanian national. Other publications are in preparation including an article describing the process of implementation of the new record as a first step toward system improvement and a second article reporting on the testing of the new standardized record to
provide regular and reliable data around birth services and allow comparison with evidence-based practice.

There are two information systems for birthing women in Jordan held in two parallel national records. The antenatal and postnatal records are held in the Maternal Child Health clinics in the community where care is provided by obstetricians, midwives and nurses. Labour and birth records are held in the hospital where other obstetricians, midwives and nurses provide care. Currently in Jordan there is no opportunity for women to retain copies of these records in the form of hand-held records. As a result clinicians work without vital information and there are no opportunities to ‘benchmark’ performance of clinicians, or by one hospital against another hospital, or to compare Jordanian outcomes of maternity care with international standards.

The study

The study used an action research process underpinned by Practice–Research Engagement (PRE) (Brown, 2001). Brown describes PRE processes as: working on a problem that requires the resources of both practitioners and researchers; recruiting participants appropriate to the problem and the PRE process; establishing shared values, goals and expectations for joint work and diagnosing institutional arrangements that support or retard PRE, organizing the engagement process to use participants’ resources effectively and learning from the process about the issues and PRE. These principles were integrated into each action research cycle and influenced the relationships built with participants. The action research was also guided by literature that acknowledges that research aimed at practical systems change cannot generate knowledge or improvement without engaging with practitioners (Batliwala, 2003; Brown et al., 2003; Lindsey, Shields & Stajduhar, 1999; Reason & McArdle, 2006).

The Ministry of Health gave approval to conduct the study in three selected hospitals in three different areas of the country. The Ethics Committee of the University of Technology, Sydney (UTS), also provided ethical clearance for the research to be undertaken.

Prior to commencement of the project we conducted a baseline audit that investigated the quality of the data kept in the regular clinical record. We then engaged policy-makers and clinicians in the design and then the implementation of the JCBR (Brown et al., 2003). In this process, which is described below, we applied change theories within action research cycles during the planning, implementation and evaluation of the new clinical record (Brown, 2001).

The audit of 180 medical records of mothers from the three participating hospitals confirmed the poor quality of the data collected in hospitals. Only 50 percent of these records were adequately completed with documentation
occurring in 18 different places throughout the record. It took an average of 90 minutes to complete the full record for each woman. Further, the records were often completed retrospectively by a person who had not provided the care that was described, as clinicians would complete the information when they had time or leave this task to their senior colleagues to complete (Khresheh, 2006).

In keeping with the first principle of PRE (Brown, 2001) the record audit data were presented at preliminary meetings with practitioners in the field. Health leaders in the Ministry of Health, managers of the three hospitals, and health professionals working in the maternity departments in participating hospitals all agreed that high quality clinical data for the care of mothers should be a priority and that the current poor records needed to be improved. The new consolidated and linked birth record, the JCBR, was considered to be a solution that could improve the quality of record-keeping systems around birth, inform planning, and demonstrate accountability from the local level to a national level through monitoring perinatal mortality and morbidity. It was believed the record would improve clinical outcomes and organizational efficiency. This new record was based on a similar record used in the Australian health system (NSW Department of Health, 2004).

This high level of agreement around the new record as a solution to the problem of poor clinical records supported the rationale for the study. Participants were enthusiastic about the potential for an integrated, better designed, shared record to assist clinicians, managers and policy-makers to improve a range of outcomes for which they were responsible: the clinicians for improved care of individual women, the managers for more accountable performance in their hospital and the policy-makers for a system that reviewed services and worked to improve health care. In exchange for the assistance of the researchers in designing, implementing and evaluating the new record, participants agreed to facilitate and contribute to finding solutions and to generate the data needed to investigate and understand the quality improvement process.

Initial interviews and focus groups were undertaken with 36 people. These included staff in medical records departments (n = 3), nurses and midwives (n = 15), medical directors and senior staff in hospitals (n = 12) and Ministry of Health officials (n = 6). These initial interactions with participants in the interviews and focus groups at national and hospital level helped identify the practitioners in the various departments who were able to work with researchers to improve the quality of records and manage the change process. The formation of ‘communicative spaces’ through focus groups (Reason, 2004) encouraged interaction that led to active participation. New forms of communication also developed among participants from different disciplines, for example nursing, medical and midwifery professionals came together for the first time, with the research providing them with the opportunity for mutual understanding and a means to reach a shared agreement about actions (Reason, 2004). These discussions raised the practi-
tioners’ awareness of the problem by presenting them with an analysis of their own baseline data. This helped to build motivation for change as they realized their own data was of poor quality.

Once the strategy for improvement was identified and agreed with health leaders and hospital staff, practice–research engagement groups were established at different levels of the health system and in the three different hospital settings. These were entitled the ‘National Steering Group’, with separate groups: the ‘Local Leadership Group’ and ‘Local Action Group’. The National Steering Group comprised experts from the Ministry of Health and included those responsible for maternal and child health, quality assurance and nursing leadership. The National Steering Group provided the field researcher with the authority to conduct her work, assistance in planning, guidance and recommendations that were helpful to the study. The Local Leadership Groups consisted of the managers of the three selected hospitals, directors of nursing, medicine and medical records departments. The Local Leadership Groups provided the researcher with the authority to work with their staff, guided and assisted in her work and were linked at a policy and professional level with the national steering group. The Local Action Groups consisted of the health professionals who were working in the maternity departments of the selected hospitals, including obstetricians, resident doctors, midwives and nurses, and included medical records department workers. The Local Action Groups were supported and guided by their directors in their work with the researcher in the implementation of the JCBR. The process of practitioners–researcher engagement in this study and the role of the researcher in relation to the National Steering Group, Local Leadership Groups and Local Action Groups is described in Figure 1.

The action research cycles

Planning

Overlapping cycles of action research, diagnosing, planning, implementing and evaluating activities were used in each setting and guided the researcher’s interactions with participants (Davison, Martinsons & Kock, 2004; Meyer, 1993). Interviews and focus groups conducted with staff from three Maternal Child Health clinics, linked to the participating hospitals, allowed additional data to be collected to investigate the changed record system and its impact outside hospitals and were also fed back into research cycles and conclusions.

Health policy leaders, hospital managers, clinical and medical directors and clinicians were all included in planning to ensure their co-operation and commitment in achieving the aims of the study (Brown, 2001; Brown et al., 2003; Evans, 2003; Larrabee, 2004). Open communication and co-operative interactions between researcher and practitioners on each level produced valuable feedback
on the final draft of the JCBR and the process of its implementation in the field. This included modifications of the items in the record, adding new items, specifying who should complete the JCBR, the training of the health professionals in the use of the JCBR and the process of its implementation. The items, the design of the record, and identifying who should complete the form were decided and agreed. The draft JCBR was reviewed, discussed and revised many times during group meetings. All groups from the national to local levels were then invited to provide feedback on the final draft of the JCBR before this was implemented.

‘Training’ sessions that were conducted to enable practitioners to use the new JCBR were also motivating, engaging and consultative in the PRE sense (Brown et al., 2003). They were planned jointly by the first researcher and the action research groups and conducted based on their recommendations. This included the number of training sessions to be conducted in each hospital, the
knowledge and practice that needed to be provided to health professionals and the best time for conducting training sessions.

Implementation

The National Steering Group led the study, with members identifying participating hospitals, providing formal approval for the study and encouraging hospitals to participate. Local Leadership Groups supported the implementation of the JCBR in the three hospitals, facilitating the involvement of their staff in the process of the implementation. The Local Action Groups working in the maternity departments at the three hospitals were involved in the implementation of the JCBR. The staff of the registration office, admission unit, labour room and postnatal department in the three hospitals shared this responsibility with the researcher. The local director encouraged staff to become actively involved in the implementation process. This helped increase the staff’s commitment to the implementation process and enabled continuous feedback to be included in the evolving, shared process of the study.

The flexibility of the PRE approach and the overlapping action research cycles assisted the researcher and practitioners in dealing with problems that arose during the implementation of the JCBR. The frequent interaction between the researcher and staff during the fieldwork and the co-operative relationship that shaped this interaction created opportunities for the researchers and whole team to reflect, analyse and make change during the implementation process. This resulted in rapid problem solving and was used to keep staff informed and provide supportive feedback to them. For example, the researcher found during earlier field visits that some health professionals did not complete their sections in the record as had been agreed. The researcher, with the co-operation of the director of each department, conducted additional meetings with staff providing more explanation and clarification of the process, resulting in improved compliance in record-keeping.

The engagement between the support groups, practitioners and researcher was organized, managed and sustained by the field researcher, balancing the different values, goals, perspectives and capacities of the researcher and practitioners. This helped limit any negative impact of unequal levels of participation, and maintained the co-operative relationship between researcher and practitioners (Brown, 2001; Brown et al., 2003). The organization of the practice research engagement process into national and local action groups helped solve the problems of power differences that would have arisen if these groups had been integrated (Brown, 2001; Brown et al., 2003). This enabled open and frank exchanges within each group unhampered by issues of status and power as groupings included similar levels of authority, experience and participation. Action research groups at each level were provided with different types of support to
manage the change processes of the project ranging from the use of authority and
guidance to the personal involvement by clinicians as staff used the new record on
a daily basis.

**Evaluation**

The evaluation of the implementation of the JCBR in the three participating
hospitals began at a local level in September 2004 and finished nationally with a
meeting of leaders in May 2005. Immediate outcomes as well as longer-term
evaluations were assessed using record audits, interviews and focus groups. The
data obtained were analysed into themes on the basis of frequency and strength
of responses. Findings from the evaluation of the JCBR were fed back to groups
at each level and discussed in meetings. Initially findings were also shared with
the Local Action Groups in the three hospitals at meetings held during field visits
to each hospital. These findings and the staff reflections were then shared with
Local Leadership Groups in each hospital. Finally the findings and the reflections
of both these groups were reported to the National Steering Group in the
Ministry of Health. The ultimate results of the project were presented, by invita-
tion, at a national public forum hosted by the National Steering Group. This
inclusive process allowed the project to become the jointly owned work of the
Ministry of Health and the researcher, and indicated the ultimate success of the
practice–research engagement process (Brown, 2001).

The engagement between the researcher and the practitioners challenged
current practices, identified effective improvements and developed a tool, the
JCBR, which was based on both research and practice (Brown, 2001). The
members of all the action research groups and the researchers found the results of
the study important and promising. Relationships had been built between the
research team and the action research groups that have evolved into long-term
collaborations on national and local levels. These have been sustained subsequent
to the research being completed. One of us, the first author, has been invited to
help in a new project for the Ministry of Health that aims to improve the quality
of records in maternity care in all the hospitals in Jordan. Additionally practi-
tioners originally involved in the research are still collecting data on the JCBR and
sending this to the first author for analysis.

**Outcomes and analysis**

The outcomes of this study are on multiple levels and exist in the real world as the
Jordanian maternal child health system continues to evolve informed by our work.
The learning that we experienced as researchers during the study is explicated
below, as we believe it is valuable to share.
Formation of the practice–research engagement groups

The PRE group formation phase started in January 2004 and continued until June 2004 during the diagnosing, or planning, phase of the early action research cycles. It was important to have a co-operative inquiry group that consisted of people who shared a common concern for developing understanding and practice in a specific field. It was the field researcher’s role to create the conditions for democratic dialogue among participants within each group (Reason & McArdle, 2006). Data generated during interviews and focus groups was also fed back into the system and informed and stimulated representatives of the whole system in thinking through and planning change.

Key people were identified and engaged in the process during the initial interviews and discussions and continued to participate throughout the project. The researcher targeted her efforts to establish, build and strengthen relationships with the partners in the study and used networking to maximum effect in the early stages (Himmelman, 2001). One health leader in the Ministry of Health, for example, directed the researcher to other key people who could help; this ‘snowballing’ technique of recruitment became the starting point for building action research teams. Frequent, informal meetings and discussions with key people identified their interests and capacity to engage in the research process. Focus groups helped to identify other appropriate people for the practice–research engagement at the local level who were then invited to participate in the project subject to completion of normal formal consent processes (Brown, 2001).

The nature and level of the working relationship that developed between the field researcher and her colleagues in each setting became clearer over the duration of the project and differed according to the nature of tasks undertaken together. Different strategies for engagement were also used with different groups and with individuals. These were influenced by the Jordanian culture, gender and professional role and type of involvement. This was of particular importance when applied to the relationship between the field-based researcher and participants who were doctors, nurses and midwives. This became played out very overtly because the field researcher was a woman and a nurse, making it challenging in the early stages for her to achieve a collegial or leadership role with male medical directors who were of higher gender and professional status within this culture. For example, in one of the participating hospitals, the director of the medical department, a doctor, initially completely refused to co-operate. While there were other complicating factors also operating, relating to hierarchical disputes within the hospital, additional efforts were required to gain his co-operation in the research. The researcher took advice from other health professionals working in the hospital on the best way to get the co-operation of the hospital directors, and was ultimately successful in developing a personal and friendly relationship with each separately, and over time earning their respect as a researcher.
Establishing shared goals and objectives

The researchers and action research groups all shared a common goal of improving the quality of care provided to birthing women and increasing the accountability for services by the health professionals. However, another unpredicted level of goal sharing and teamwork developed through this study. Training sessions, focus groups, and meetings helped doctors, nurses, and midwives in the three hospitals to interact positively, find common interests, and begin to work in teams focused on this project’s goal rather than as different status individuals (Reason, 2004). Shared objectives and frameworks developed as the content of the JCBR was renegotiated, tested, and modified based on group suggestions during discussions in meetings (Brown, 2001). These negotiations resulted in the strategies and methods suitable for the implementation of the JCBR within the Jordanian health system and its hospitals. Further discussions and negotiations resulted in agreement on the level and degree of commitment of participants and how their own interests would be served by their participation in the research (Batliwala, 2003; Brown, 2001; Brown et al., 2003; Lindsey et al., 1999).

The field researcher actively applied the principle of reciprocation confirming the notion that in PRE, research does not just ‘take’ but also contributes (Redelmeier & Cialdini, 2002). She found that she could meet the needs of some participants in ways that enhanced their working relationship. For example, one hospital director was interested in becoming more up-to-date with normal birth and evidence-based practice, and needed a source for this information. The researcher provided her with copies of articles about evidence-based practice and normal delivery and also recommended a contact person within the WHO office in Jordan.

The changing nature of the partnership in PRE

While the commitment to developing partnerships between the researcher and practitioners in this study was based on PRE principles (Brown, 2001), it can also be explained using the definitions of networking, co-ordination, co-operation, and collaboration strategies identified by Himmelman (2001). These definitions describe the transformation of power relations necessary to achieve coalitions between organizations to solve problems. They can be usefully applied in relation to the different levels of PRE achieved over the duration of the study and the ever-developing relationships in this project.

Networking involves the exchange of information for mutual benefit. It initiated the relationship and began to build trust between researcher and practitioners (Himmelman, 2001). Coordinating involves the exchange of information for mutual benefit and altering activities for a common purpose. This requires time to develop. In this study the establishment of trust between researcher and
practitioners was demonstrated, for example, in the relationship built between
the researcher and the hospitals’ managers, leading to joint planning of the study
and implementation of the training program. Co-operating involves the exchange
of information, altering activities, and sharing resources for mutual benefit and a
common purpose (Himmelman, 2001). This also requires significant amounts of
time, high levels of trust, and a significant sharing of ‘turf’. This took at least 10
months to develop and considerable targeted effort by the field researcher and
shaped, for example, the relationship between the researcher and the National
Steering Group. This co-operation resulted in letters authorizing the research
being sent to hospitals and generated the co-operation, guidance and support of
Local Leadership Groups and department directors in facilitating their staff’s
involvement in the study. The co-operation of the directors of departments was
not only logistically desirable, but also increased the motivation of their staff to
attend the two hour training sessions. Directors informed the participants about
the activities of the training sessions and some promised the nurses and midwives
on their staff a day ‘off’ if they attended the training sessions. The field researcher
also provided small incentives during the training sessions, such as food, drinks
and small gifts in keeping with local Jordanian customs.

A collaborative strategy operates at the peak level of Himmelman’s hier-
archy. It involves exchange of information, altering activities, sharing resources
and enhancing the capacity of practitioners for mutual benefits and a common
goal (Himmelman, 2001). Again this requires the highest level of trust, consider-
able amounts of time, and extensive sharing undertaken for the good of the
research and its potential outcomes. The shared goals of improving the health
care for mothers and babies and the maternal and child health system in Jordan
guided the researcher and practitioners in their joint work and created commit-
ment for the considerable effort needed for the research to succeed. For example,
involvment of health care professionals (Local Action Groups) in the imple-
mentation of the birth record over a period of time, and their willingness to con-
tribute to the improvement of the quality of care in their health systems, required
them to complete two sets of records for the duration of the study. Figure 2
describes the nature and the level of partnership development with the three
action research groups.

Institutional arrangements

Institutional arrangements may affect the practice–research engagement work
and, as Brown (2001) describes, researchers need to learn how to interact within
institutional requirements. The first step was obtaining permission from leaders
in the Jordanian health systems for the study. The Ministry of Health’s interest
and subsequent permission for the study helped provide managers of the hospi-
tals with the flexibility to engage in the research and to use their own authority to
facilitate the implementation process. This high level approval enabled the engagement of practitioners throughout the health system and reduced institutional constraints regarding their participation. It also helped the researcher to interact with practitioners in the field in a flexible and authoritative manner.

The second level of institutional participation was required at the hospital level. The manager’s permission for the research allowed directors of each department (medical, nursing, registration) to engage in the process and use their authority similarly with their staff to facilitate the research process. This provided doctors, nurses, midwives and other workers, who implemented and used the JCBR, with the flexibility to participate and reflect on the process of the implementation with the researcher.

Frequent discussions between the researcher and practitioners helped identify the challenges and/or constraints that an institution might impose on the practice-research engagement within the field. These challenges and constraints were documented during fieldwork and discussed in PRE meetings. We found, as have others, that organizational development and action research can be strongly emancipatory, creating processes and structures for collaborative inquiry (Reason & McArdle, 2006). These processes encourage values of inquiry and learning and mutual respect for other people (Reason & Bradbury, 2001; Reason & McArdle, 2006).
Conclusion

Practice–research engagement was effective in merging the insights of practice with the analytic tools of research to generate new knowledge and improvement in practice. It also helped us learn about managing a process of change that ultimately could improve a health system (Brown, 2001).

Good communication skills, skilful listening, flexibility and respect are some of the strategies the change agent should use to build trust and close relationships with key persons (Buonocore, 2004). The field researcher attempted to model these characteristics and apply them with leaders in the system and appeared to be highly successful in doing so.

Baseline data from interviews and focus groups showed that the time for training, shortage of staff and workload, and resistance to change, were potential barriers to the implementation of the JCBR and constituted risks to the study. Strategies to overcome these were identified early and key people at national and local levels assisted us in implementing these strategies. We found the work of Reason and McArdle (2006), stating how action research can contribute to organizational development through more effective work practices and better understanding of processes of organizational change, to hold strongly in this study. Information collection and feedback to staff led to joint problem solving so that organizational development became not only a process of organizational improvement but also a process of mutual and liberating inquiry. In this study, for example, practitioners learned together that each discipline needed to improve their record-keeping behaviours and work together as a team to improve care for women.

The researchers identified resistance to change by health professionals as one of the barriers to the implementation of the JCBR. Most resistance to change occurs due to lack of knowledge about the change and fear of the unknown. Understanding the key areas of change management and how to avoid obstacles are critical to project success. Professionals may feel threatened, especially if there is no clear positive benefit of change apparent to them immediately. They will assume negative consequences and act accordingly to stop or delay the change process (Handly, Grubb & Keefe, 2003; Howardell, 2006; Linton, 2002). In this study, health professionals working in the maternity departments in the three hospitals were involved in the implementation process of the JCBR. In addition, key persons at national and local levels actively assisted and were actively engaged. Effective communication, clear and shared goals and establishment of joint involvement and shared ownership proved effective strategies that were adopted to enhance change and were successful in preventing resistance.

Co-operation from health professionals was essential for the implementation of the JCBR. One of the participating hospitals was an institution where the field researcher had previously worked. She was well known in this hospital with
most of the staff having previously been colleagues and they readily accepted and co-operated with her. While creating some bias, this confirmed the importance of close relationships between researcher and practitioners in the process of implementing the required change. She worked hard to build this type of relationship in the other two hospitals, where she was not known initially, and while not achieving the same depth or duration of relationship, she was ultimately successful.

Our research verified findings reported in the literature that careful structured planning of the change process helps overcome barriers to change (Buonocore, 2004). Also that preventing resistance to change is better than overcoming it, with involvement and communication being the best strategies to prevent resistance to change (Szocska, Rethelyi & Normand, 2005). Achieving change in a public-sector organization requires more than minimizing resistance however and is difficult because the complexity is overwhelming. Success depends on the quality of the implementation, on the sensitivity to different points of view, the degree of support from key persons in the organization and the reliability of principles of the change approach adopted (Byram, 2000; Iles & Sutherland, 2001; Winkelman, 2003).

We found that developing effective practice–research engagement and using action research at different levels of the system concurrently enabled us to achieve substantial health system change. Our work has confirmed that a PRE approach can facilitate complex health system change associated with quality improvement.

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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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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 and 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. Through engaging practitioners in research, care improved, the quality of reporting changed, managers developed more effective measures of hospital performance and policy makers were provided with information that could form the basis of a national maternity data monitoring system. Quantitative and qualitative audit data demonstrated improved clinical reporting, organizational 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

KEY MESSAGES

- Clinical information can extend beyond individual patient care to include quality review and improvement processes within health information systems.
- Identifying a shared goal and engaging practitioners and researchers in practical activity to achieve this goal can bring about sustained clinical improvement.
- A Practice Research Engagement process led by a skilled researcher can play a key role in quality improvement beyond the immediate aims of the research project.

Introduction

Efforts to develop a Perinatal National Minimum Data Set have been undertaken in many countries, led by the World Health Organization (World Health Organization 2004). The aim of such data collection 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 (Wyatt and Wright 1998; M’kumbuzi et al. 2004).

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 and Child Health Centres providing antenatal and postnatal care. The record-keeping system in these hospitals and Maternal and 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 and 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. Incorrect reporting of maternal and infant mortality and morbidity is likely as there are difficulties in collection and aggregation of poor quality data, with no validation of this or quality controls in place.

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 (Department of Statistics and Macro International Inc. 1998; Department of Statistics and ORC Macro 2003). 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 (Nsheiwat and Al-Khalidi 1997; Khouri and Masaad 2002). 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. This Australian tool was chosen for pragmatic reasons because of its accessibility to the researchers. The JCBR consists of eight basic areas, many modified from the Australian tool to suit the Jordanian context. Items include demographic data and information on maternal health, the pregnancy, labour, delivery and perinatal outcomes (see Box 1). Modifications suggested by the Ministry of Health officials included removal of data not applicable to the Jordanian community such as ‘aboriginality’ and addition of data such as the woman’s nationality, occupation, husband’s occupation and income, type of health insurance, final diagnosis upon discharge, haemoglobin level, blood grouping and Rh of mother and infant etc.

Our research objectives were to improve the quality of the clinical reporting system, to enhance organizational development through teamwork around data collection and to improve the quality of care by linking community and hospital antenatal, birth and postnatal records. We explored whether the JCBR could be the basis of a national maternity data system.

**Box 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, perinatal status, surgical repair of vagina or perineum, immediate post-natal complications.

**Baby:** Place of birth, date of birth, sex, plurality, birth weight, estimated gestational age, Apgar scores, resuscitation of baby, breastfeeding 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.
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. This approach was chosen because the design allows investigation of a quality improvement process that simultaneously supports 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 standardized record audits, pre-implementation baseline data, immediate post-implementation data and a smaller opportunistic evaluation conducted 7 months post-implementation. Qualitative data that describe and explain the change process were collected in each setting from managers, clinicians and medical records staff using focus groups, interviews and standardized questions. Field notes were also kept.

A training programme 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.

A detailed coding sheet was developed for manually coding audit data from records. This sheet collected completeness of record, errors, persons/role of person completing the record as well as clinical data. This coding sheet was tested pre-baseline, modified slightly and then used for baseline assessments, post-implementation and for the longer term follow-up.

The first record audit was with a random sample of 180 records, 60 from each hospital, of women who gave birth in 2003. This sample was considered of sufficient size to convincingly describe the size and nature of the problem. This was compared with results of a second audit post-implementation (n = 1,254) that sampled records of all women who gave birth during 2 months use of the new record. The size of the third opportunistic audit of 42 records, randomly selected from women who gave birth 7 months after implementation, was estimated to be sufficient to assess 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 (spread equally across each of three participating hospitals) were undertaken before the implementation of the JCBR with a total of 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 and 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 7 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 which are reported qualitatively using text and quotes. Field notes recorded observations made during visits to hospitals, to clinics or during appointments, and were updated daily. Field notes were also analysed for themes, quotes and observations, which 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. Consistent with a methodology that promotes change, these visits maintained, or built, the commitment of the participating health professionals as the researcher and participants worked together to analyse and improve results. At each visit, the researcher randomly drew 10 records of participating women. The participation rates of different groups of staff were identified through their signatures, enabling the researcher to identify whether a doctor or midwife or registration worker had completed his or her section. The percentages of completed sections for each different group's signatures were calculated by the researcher (see Figure 3 below).

**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 and Table 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 and Table 2).

Qualitative post-implementation data also showed that the JCBR was considered to be useful and valuable for hospital staff, mothers and Maternal and Child Health Centre staff. Hospital staff wanted the JCBR to continue because documentation was easy to complete, took less time and effort, and provided valuable data that assisted 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.’

Organizational and individual 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 for 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, their 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 a 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 effect 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 2 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 and 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 computerized 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 linking all hospitals and nearby Maternal and Child Health Centres. There is national commitment in Jordan to achieve these links.

Discussion
The study had a number of limitations. This included the positive bias that was introduced by purposive selection of the hospitals and the researcher’s attention to the quality of interaction with people. This was intentional and an element of the design. The evaluation conducted after 7 months was opportunistic rather than ideally situated in scope or time from completion to convincingly measure long-term sustainability.

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. The data produced and their improved quality confirms the claim by others 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 organization should have capable leadership and be prepared to change, and the external environment should encourage change (Shortell et al. 1998). In this study, action research, which emphasizes 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). As a result of the researcher working with them, 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 hierarchical 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 that teamwork produced better results for their work. Providing women with their own copy of their clinical record facilitated their communication with health professionals.

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 initially more committed than doctors to improvement processes. They may have accepted the leadership of the researcher, a female nurse, more readily than the doctors, but this may also be explained by gender issues common 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, reducing risks 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.

Similar to other improvement studies, interaction with practitioners in the field helped to identify problems and plan and initiate solutions during the implementation period (Webb 1990; Nolan and Grant 1993; Brydon-Miller and Greenwood 2003). 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 develop collaborative relationships with practitioners in the field, to build motivation and to provide practical support. Local and national leaders helped manage and lead this project.

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 supported and guided the study as partners now have a basis to apply the results nationally. They are closer to their goals of consolidating data into electronic records that can be analysed automatically, which provides the capacity to monitor the national maternity system.

Endnote

1 While all items mentioned in Table 1 were analysed, there were too many items to be presented here or in Tables 2 and 3. Therefore, a sample of items that represent particularly important clinical data that were not collected or inadequately collected previously have been presented.

References


